Finance Leases and Capital Allocation Efficiency in China

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Abstract

We examine how stronger creditor protection in finance lease helps mitigate financial frictions. Utilizing transaction-level data from Chinese listed firms, we uncover several unique findings: (1) lessees (borrowers) tend to be more efficient but face greater financial constraints, while lessors (lenders) are less efficient but experience fewer financial constraints; (2) state-owned enterprises (SOEs) are more likely to act as lessors, whereas private-owned enterprises (POEs) are more likely to be lessees; (3) finance leases enable lessors to generate profits and help lessees alleviate financial frictions. A general equilibrium model with heterogeneous firms captures these empirical findings. Calibrating the model to the Chinese economy, we show that the finance lease market increases total factor productivity (TFP) by 12.71%. This improvement results from reducing both general financial frictions faced by individual firms and distortions associated with state ownership. We find that the latter effect dominates, accounting for 80% of the total TFP gain.

JEL Codes: E22, E44, O16, G23

Keywords: Finance Leases, Capital allocation efficiency, Repossession advantage, Agency cost, Shadow Banking

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I Introduction

Since the pioneering work of Restuccia and Rogerson (2008) and Hsieh and Klenow (2009), numerous studies have documented the positive effects of reducing resource misallocation among firms on aggregate total factor productivity (TFP) and overall economic output (Buera and Shin, 2013; Midrigan and Xu, 2014; Whited and Zhao, 2021). However, a crucial gap in the literature remains: the approach to addressing resource misallocation. Without a viable solution, existing conclusions remain theoretical and offer little practical guidance.

Among the key drivers of resource misallocation, financial frictions play a crucial role, particularly in developing countries with weak legal frameworks. Numerous institutions and policies contribute to financial friction within the banking system, such as legal infrastructure and state ownership. Calomiris et al. (2017) finds that due to weaker collateral laws, loans secured with movable assets have lower loan-to-value (LTV) ratios, leading to distortions in resource allocation. It is well-documented that state-owned enterprises (SOEs), due to their close government connections, enjoy preferential access to financial resources, often leading to significant efficiency losses. (Bai et al., 2018; Liu et al., 2021; Belo et al., 2023). Given the multiple factors contributing to financial frictions in the banking system, internal reforms are complex and often politically constrained.

Building on the influential works of La Porta et al. (1997), Djankov et al. (2008), Levine (1998), Levine (1999) and Shleifer and Vishny (1997), which underscore the role of strong creditor protections in alleviating financial frictions and fostering economic growth, an important question arises: Given the challenges of reforming traditional banking systems, can alternative and more innovative credit markets—characterized by stronger creditor rights and robust legal infrastructure—serve as a viable solution to mitigate financial frictions and, in turn, enhancing economic growth? Furthermore, what are the underlying mechanisms driving these effects, and to what extent do they influence economic outcomes?

To address these questions, we focus on the finance lease market in China, which provides an ideal setting for our analysis. Although finance leases resemble firm-to-firm secured loans, lessors benefit from significantly stronger repossession rights under the legal framework, providing greater protection in the event of borrower default. Using transaction-level data from 2007 to 2023, we demonstrate both empirically and theoretically that such creditor protection in finance leases yields substantial productivity improvements. These improvements arise from the reallocation of resources from less efficient firms to more efficient ones. The total increase in TFP due to the finance lease market is 12.71%, comparable to the findings

of Bian (2020).

Our results also provide implications for mitigating resource misallocations introduced by state ownership of corporations, a phenomenon common worldwide. The advantages of SOEs to access financial resources can lead to inefficiencies in resource allocation. We demonstrate that the presence of the finance lease market helps alleviate some of this inefficiency by facilitating capital flow from the state-owned sector to the private-owned sector. This market-driven credit channel enables financial transfers outside traditional banking and between non-financial firms. In our quantitative estimation, this cross-sector reallocation contributes to 10.03% of TFP growth, accounting for 80% of the total growth brought about by the finance lease market.

We start by analyzing the micro-level characteristics of borrowers and lenders in the finance lease market. Leveraging mandatory disclosure requirements for listed firms' finance leases, we manually compiled 4,789 finance lease transactions from the annual reports and public announcements of 52,206 publicly traded firms, covering the period from 2007 to 2023. This transaction-level dataset allows us to document three novel facts. First, lessors tend to be less productive firms, while lessees are more productive, both within the SOE and POE sectors. Lessors also exhibit lower investment and sales growth than their peers, while lessees demonstrate the opposite. Second, SOEs disproportionately act as lessors, accounting for 64% of lessors and over 80% of funding, whereas POEs are more likely to be lessees, involved in over 60% of lease contracts. This points to a meaningful capital flow from the state to the private sector. Third, we show that both lessors and lessees benefit economically from the arrangement. Lessors earn a positive spread over their own borrowing costs, while POE lessees access finance at rates lower than the bond market. These findings suggest that the finance lease market acts as a market-based reallocation mechanism, shifting capital from less to more productive firms.

To understand the mechanisms behind these patterns and to quantify their aggregate effects, we start with a static model to build intuition and then extend to a dynamic general equilibrium model for quantitative analysis.

In the model, there are two sources of firm heterogeneity. First, firms in the private-owned sector and the state-owned sector differ in terms of sectoral productivity and financial frictions. Specifically, firms in the private-owned sector exhibit higher sectoral productivity but face more financial frictions compared to firms in the state-owned sector (Hsieh and Klenow, 2009; Song et al., 2011; Liu et al., 2021). Second, within each sector, firms differ in their

idiosyncratic productivity (Belo et al., 2022). In addition to the traditional banking system, we introduce the finance lease market. To capture the creditor protection and repossession advantages of the lessor, we assume that the loan-to-value (LTV) ratio in the finance lease market is higher than that in the banking sector.

The presence of the finance lease market generates two allocation effects: within-sector and cross-sector. Within each sector, the finance lease market allows firms with low productivity to lend out and earn a higher lease return. Due to the high LTV ratio, the finance lease market attracts firms with high productivity to borrow more, and their higher borrowing costs can be compensated by producing more with additional inputs. Thus, the existence of the finance lease market concentrates capital on high-productivity firms within each sector, further increasing sectoral productivity. As for the cross-sector effects, the finance lease market also facilitates capital reallocation cross sectors. However, the direction of this flow depends on the parameters. If capital flows from the SOE sector to the POE sector, then aggregate total TFP would increase; otherwise, the effect on aggregate TFP is indeterminate and also depends on the parameters.

To analyze the long-run and transitional effects of the finance lease market, we embed the static structure into a dynamic model, which incorporates three features critical to capturing the evolution of China's economy: (1) government subsidies; (2) endogenous firm net value decisions; and (3) firm entry and exit dynamics. Then we calibrate it to align with the Chinese economy and examine the transition dynamics from an economy without a finance lease market to one with an established finance lease market. This analysis effectively captures the evolution of the finance lease market in China since 2007.

Our calibrated dynamic model matches the empirical evidence well in the following aspects: first, Our calibrated dynamic model closely matches the observed within-sector patterns of lessees and lessors. In the model, high-productivity firms become lessees, while low-productivity firms become lessors. This reflects their differing incentives: less productive firms earn higher returns by leasing out capital rather than using it in production, whereas more productive firms, despite higher lease costs, benefit from accessing larger financing amounts through leasing; second, the model captures the cross-sector dynamics between SOEs and POEs. Capital flows from the state-owned sector to the private-owned sector, as more SOEs act as lessors and fewer as lessees. This pattern reflects the combination of lower sectoral productivity and better bank access among SOEs, which makes leasing out capital more attractive. Moreover, the relatively small advantage of leasing over bank loans for SOEs further reduces their incentive to borrow through leases; third, the model captures the

benefits of leasing for both lessors and lessees. Lessors earn a positive spread, as lease rates exceed their bank borrowing costs. On the borrower side, POE lessees benefit more than SOE lessees. Since SOEs already have favorable bank access, leasing offers limited additional value. In contrast, POEs face tighter credit constraints, so the higher LTV ratios in leasing provide a more valuable financing alternative.

At the aggregate level, the introduction of finance leases increases TFP by 12.71%. Decomposing this gain, we find that 80% is driven by cross-sector capital reallocation—primarily from less productive but better-financed SOEs to more productive, credit-constrained POEs, while the remaining 20% results from improved allocation within sectors. The within-sector effect reflects more efficient capital use, as high-productivity firms expand through leasing despite limited bank access. The cross-sector effect underscores the finance lease market's crucial role in mitigating asymmetric financial frictions arising from state ownership.

To deepen our understanding of the finance lease market's allocative power, we conduct a set of counterfactual analyses using our calibrated dynamic model. These exercises underscore the dual importance of the leasing mechanism as a tool for reallocation and the detrimental impact of distortionary government policies.

First, we examine an economy where POEs face even more severe credit constraints in the traditional banking sector. Under this scenario, the productivity gains from the lease market become more pronounced, as POEs—more productive but financially constrained—rely even more heavily on leasing to bypass the frictions that restrict their access to traditional financing. This highlights the leasing market's essential role in mitigating asymmetric financial frictions, reallocating capital from the state sector, where it is over-allocated, to high-productivity POEs that are underfunded.

Second, we evaluate the consequences of increasing government subsidies to SOEs by 10%. These subsidies lower SOEs' incentives to participate in leasing as lessors, since they can continue inefficient production backed by artificially cheap funding. As a result, fewer SOEs choose to lend their excess capital through the lease market, weakening the cross-sector capital reallocation mechanism that is central to the productivity gains we identify. The aggregate outcome is striking: the total increase in TFP attributable to the finance lease market falls by half—from 12.71% in the baseline to just 6.36%. This illustrates that distortionary government intervention not only reduces leasing participation by SOEs but also impairs the broader economic benefits of market-based reallocation.

Related Literature Our analysis contributes to multiple strands of literature, particu-

larly the growing body of research on leasing. Most existing studies focus on operating leases, the dominant form of leasing in the U.S. Miller and Upton (1976), Smith Jr and Wakeman (1985), and Graham et al. (1998) document how tax incentives drive firms to lease. Eisfeldt and Rampini (2008) highlight that while leasing has higher debt capacity than secured lending, it also involves agency costs due to the separation of ownership and control. From an asset pricing perspective, Li and Tsou (2019) and Li and Song (2023) argue that operating leases provide a risk-sharing mechanism. From a macroeconomic perspective, Li and Yu (2023) finds that operating leases mitigate the financial accelerator effect. Hu et al. (2022) suggests that operating leases enhance capital reallocation efficiency through the intensive margin, while Hu et al. (2023a) examines their role in facilitating entry from the extensive margin. Our paper also adopts a macroeconomic perspective but focuses on finance leases rather than operating leases. Unlike operating leases, which offer firms a "rental" option, finance leases resemble secured lending while providing stronger creditor protection. Firms face different costs and benefits when choosing between the two, leading to distinct mechanisms through which they influence aggregate economic outcomes.

There are papers study finance lease in China. Chang et al. (2022) documents that banks use their affiliated leasing firms to provide credit to clients in order to circumvent the government's targeted credit tightening policy and do regulation arbitrage. However, in this paper, we mainly focus on the nonbank-affiliated leasing firms, which accounts for larger share in the sample. To our best knowledge, this paper is the first paper to model finance lease in China and to analyze the relationship between finance lease and capital allocation.

This paper also contributes to the large and developing literature that examines how creditor protection affect lending and real economic outcomes. Benmelech and Bergman (2011) finds that strengthening creditor rights enhances plant-level productivity by relaxing borrowing constraints and enabling firms to adopt more efficient production technologies. Campello and Larrain (2016) study how enlarging collateral manus affects total TFP. Bian (2020) focus on the airline industry and find creditor rights affect real outcome through across-firm realloction. This paper deviates from these papers in two ways. First, We focus on how stronger creditor protection in another credit market outside bank can affect lendings between non-financial firms and thus real economic; Second, instead of focusing on one specific industry, we focus on the whole economy and the using of the general equlibrium model enable us to quantify the real outcome and relative importance of each channel.

This paper also related to the literature on financial frictions and aggregate productivity (Hsieh and Klenow, 2009; Buera and Shin, 2013; Midrigan and Xu, 2014; Whited and Zhao,

2021). Bai et al. (2018) reveals the financial frictions and loss of TFP caused by state-ownership. Whited and Zhao (2021) estimates that the real value-added would increase ranging from 51% to 69% by eliminating the misallocation of finance in China to mimic the efficiency of U.S. These literature, however, have not give answer on how to eliminating resources misalloctaion. There are literature study how institutional reforms attribute to higher allocative efficiency through mitigating financial frictions (Larrain and Stumpner, 2017; Bai et al., 2018). Larrain and Stumpner (2017) links capital account liberlization to higher TFP through higher allocation efficiency. Bai et al. (2018) reveals how bank deregulation leads to labor and capital reallocation. Our paper focus on domestic capital allocation effect and the role of other credit market-finance lease market on capital allocation efficiency. Also, we study how finance lease market in mitigating finanical frictions caused by both state-ownership and weak legal infrastruction.

The paper is organized as follows: Section II outlines the institutional background of China's leasing industry. Section III describes the sample and data collection process, followed by micro-level evidence on lessees and lessors in Section IV. In Section V, we develop a static model with heterogeneous firms facing financial constraints in both traditional banking and finance lease markets, and use a simple example to illustrate the key mechanism. In Section VI, we extend the static model into a dynamic framework and conduct some quantitative analysis. Based on the dynamic model, we perform some counterfactual analyses in Section VII. In Section VIII, we draw conclusions. A separate appendix with additional results, proofs, and robustness checks is posted online Appendix.

II Finance Lease Industry In China

In this section, we describe the unique characteristics of the finance lease industry in China. We first illustrate how finance leases dominate the leasing market in China and how they resemble secured lending with ownership transferred to lessors during the lease term. Next, we demonstrate how China's legal infrastructure provides creditors with repossession advantages and stronger protections in finance leases, as well as the associated tax benefits of finance lease. Finally, we present evidence of the important role that finance leases play in China's financial system.

II.1 Finance Lease Dominates Chinese Leasing Market

According to Eisfeldt and Rampini (2008), leases can be divided into operating leases and finance leases (capital leases), based on whether ownership would be transferred to the borrowers (lessees) after the lease term[1]. In the operating lease, the lessor lends capital to the lessee and obtains periodic rents from the lessee. Throughout this whole process and after the lease term, the ownership of the leased capital belongs to the lessor, and the lessee only has the right to use it. In the finance lease, ownership is transferred to the lessee after the lease term, while ownership belongs to the lessor during the lease period. Additionally, the finance leased capital appears on the lessee's balance sheet along with the corresponding debt obligation[2]. The illustrations of operating leases and finance leases are shown in Figure A.3. We also provide some detailed information in Appendix A.1. Thus, the essence of an operating lease is merely renting capital, where the lessor lends the capital to the lessee and obtains periodic rents from the lessee. On the contrary, finance lease is similar to secured lending, where lessor in a finance lease earn interest rate and temporarily has the ownership during the lease term. Lessee pays installments and obtain ownership of the leased capital after full payment.

In the U.S., operating leases dominate the leasing market (Cornaggia et al., 2013; Li and Tsou, 2019; Hu et al., 2023b), while in China, finance leases dominate and account for over 90% of the total leasing market in China[3].

The divergence between China and the U.S. can be attributed to many factors. In this paper, we will not focus on the underlying reasons for this difference. We propose several potential factors: (1) China's legal framework provides repossession and tax advantages for finance leases, enhancing their appeal to lessors (discussed later); (2) the underdeveloped secondary market for used assets in China makes it costly for lessors to bear asset-related risks; and (3) state-owned assets in China often have lower redeployability.

[1] Also, besides the transfer of ownership, meeting one of the following criteria is sufficient to be considered a capital lease: an option to buy at a price sufficiently below the value at the exercise date when the lease expires; a lease term that exceeds 75% of economic life; or lease payments that exceed 90% of the asset's value in present value.

[2] After 2019, firms are required to recognize lease assets and lease liabilities from off-balance-sheet activities on their balance sheets. This change increases transparency and comparability among organizations.

[3] In particular, the "sales-and-leaseback" (SLB) type is the main form of finance lease, accounting for 84% (according to calculations by the Ministry of Commerce). We provide some detailed information in Appendix A.1.

II.2 The Creditor Protection of Finance Lease

In this subsection, we illustrate the strong creditor protection of finance lease in China. In the US, only lessors involved in operating leases have repossession advantages. In China, both lessors involved in operating leases and finance leases benefit from repossession advantages and protections, which is due to the different legal frameworks.

In the U.S., finance leases are often classified as conditional sales contracts during the bankruptcy proceedings, which undermines the lessor's repossession advantages. Under U.S. bankruptcy and business law, leases are generally categorized as either true leases or conditional sales contracts (Eisfeldt and Rampini, 2008). If a lease is intended as a security arrangement—or is recharacterized as such by a bankruptcy judge—the lessor is treated like any other secured lenders. In this case, the automatic stay provision under U.S. bankruptcy law applies, preventing the lessor from recovering or foreclosing on the collateral during bankruptcy proceedings. While this legal framework safeguards the operational continuity of lessees during financial distress, it reduces the attractiveness of finance leases for lessors due to diminished repossession rights.

In contrast to the U.S., the repossession advantages of lessors in China are well protected by the legal framework. Leasing in China are primarily governed by the *Civil Code* and *Contract Law*. These laws provide clear protection for the lessor's repossession rights by explicitly stating the lessor's ownership and the exclusion of the leased property from the bankruptcy estate. In practice, most contracts explicitly state that ownership of the leased property remains with the lessor throughout the lease term. In addition to legal provisions, regulators also recognize finance leases as true leases in actual regulatory practice. We provide the legal clauses in Appendix A.2 and the agreements between lessors and lessees in Table B.3.

Although Chinese law does not include an automatic stay provision (in Chapter 11 of the U.S. Bankruptcy Code), claims on collateral in secured loans are still subject to bankruptcy proceedings. This process can be both time-consuming and costly for creditors. Thus, compared to secured loans in China, finance leases provide lessors with stronger repossession rights and protections.

II.3 The Tax Benefits of Finance Lease

Besides the repossession advantages, lessors of finance leases also enjoy more tax benefits than those of operating leases in China due to its unique tax framework.

In the U.S., intermediate goods used in manufacturing or for resale are generally exempt from sales tax. Sales tax is typically imposed only on end consumers, with businesses acting as tax collectors. Thus, the only difference between operating leases and finance leases is related to corporate tax. For operating leases, the asset and its corresponding depreciation are recorded on the lessor's financial statements, which can be used for tax deductions. The lessee records rental payments as an expense, while the lessor treats the asset as a capital expenditure (including associated depreciation) and rental payments as income. For finance leases, the asset and its corresponding depreciation appear on the lessee's financial statements, with interest expenses recorded as a financial cost.

China's tax framework is unique due to its value-added tax (VAT) system, which applies different rates across various goods and services, creating a tax advantage for finance leases. Under this system, input tax credits allow deductions at each stage until final consumption. If all goods and services were subject to a uniform VAT rate, the choice of leasing type would not affect a firm's effective tax burden. However, in China, VAT rates vary across sectors, giving sale-and-leaseback arrangements a tax advantage, which explains their dominance in the leasing market.

According to Cai Shui [2016] No.36[4], tangible asset direct leasing and real estate direct leasing are classified under modern service industry leasing services, with VAT rates of 13

This tax advantage is a key factor behind the prevalence of finance leases in China, as it significantly reduces costs for the whole activity.

II.4 Different Types of Leasing Firms

In China, both financial institutions, such as banks, and non-financial institutions, including non-financial firms, are permitted to establish leasing companies. The former are financial leasing firms, while the latter are financed leasing firms. These two types of leasing firms are regulated by different authorities. Financial leasing firms are regulated by the China Banking and Insurance Regulatory Commission (CBIRC), while financed leasing firms were

[4]"Notice of the Ministry of Finance and the State Administration of Taxation on Comprehensively Promoting the Pilot Program for Replacing Business Tax with Value-Added Tax."

regulated by the Ministry of Commerce until April 20, 2018. Since then, the regulation of financed leasing firms has been transferred to both the CBIRC and local government financial regulatory bureaus.

The motivations behind different types of leasing firms can differ significantly. A key distinction lies between bank-affiliated and nonbank-affiliated leasing firms. As studied in Chang et al. (2022), bank-affiliated leasing firms can be considered an additional channel through which banks may engage in regulatory arbitrage. Due to certain industry and credit regulations, firms with specific characteristics or in specific industries may have difficulty obtaining bank loans. As a result, banks use their subsidiaries, the bank-affiliated leasing firms, to provide financing to these firms. Typically, these firms are more likely to be SOEs and also carry higher risk.

In this paper, we mainly focus on the transactions initiated by nonbank-affiliated firms. These transactions account for a larger share of our sample. The list of bank-affiliated leasing firms is in Table B.1 in the Appendix, all other leasing firms who are not in this list are considered as nonbank-affiliated.

II.5 The Development of Leasing in China

The leasing market in China has grown to become the second largest globally, following the U.S. Similar to the development of other markets in China, the Chinese leasing market has experienced tumultuous development during the 1980s and 1990s. The rapid growth began in 2007 when the China Banking Regulatory Commission (CBRC) permitted commercial banks to establish subsidiary leasing firms under its supervision. The number of leasing firms grew from nearly zero to 12,000 by 2018, while the outstanding lease amounts increased significantly from 0.024 trillion RMB in 2007 to a peak of 6.65 trillion RMB in 2018 (shown in panel (a) and (b) in Figure A.1).

The leasing market has rapidly evolved into a crucial financing component of the Chinese financial system. As noted in He and Wei (2023), Aggregate Financing to the Real Economy (AFRE)[5] measures the total funds the real economy receives from the financial system, highlighting unique aspects of China's financial landscape. A significant part of AFRE includes shadow banking, which accounts for up to 30% of the total. Financial leasing falls under

[5]Including bank credits, equity and bond issuances, and various shadow banking items like trust loans, AFRE is perhaps the most closely monitored and analyzed statistic released by China's central bank for macroeconomic management today.

shadow banking, representing approximately 60% of entrusted loans, the largest component of finance lease. Additionally, the highest share of newly added lease loans to newly added bank loans achieves 18.5%, while that of AFRE achieves 10%, indicating the importance of finance leases[6] (Panels (c) and (d) in Figure A.1). The rapid growth and important roles of the finance lease industry contribute to the impressive growth of the Chinese economy.

III Data and Sample

In this section, we first outline the data collection process for finance lease contracts, followed by a description of the sample used in this study. We use data from listed firms in China ranging from 2007 to 2023.

III.1 Data

We manually collected transaction-level leasing data from the annual reports and lease announcements of listed firms in China. Our main source of lease contracts is the financial statements. According to Article 39 of China's Accounting Standards for Enterprises - No. 21 Leasing, implemented in 2006, listed lessees are required to disclose key contract terms of sale-and-leaseback (SLB) agreements in their financial statements, which account for over 90% of the leasing-related disclosures. In addition to the contracts recorded in financial statements, firms sometimes issue announcements related to leasing contracts. The contracts in the announcements often provide more detailed information. However, the regulatory requirements for such announcements remain ambiguous. As a result, we use these announcements as a supplementary data source to cross-check and enrich the information derived from the annual reports.

Following the methodology of Chang et al. (2022), we compile our sample by searching for the terms "finance lease," "sale-and-leaseback," and "lease" in the annual reports and leasing announcements of all non-financial A-share listed firms in China. After extracting the context around these keywords, we leverage the large language model (ChatGPT) to analyze this context and extract relevant variables related to finance lease contracts. For each contract, we identify information such as lessees, lessors, leased assets, lease rates, amounts, maturities, and whether the lessors are affiliated with banks. We determine whether the

[6]The highest fraction of stock accounts for 5% of bank loans and 3% of AFRE, which is due to the late development of the finance lease market.

lessor belongs to bank-affiliated or nonbank-affiliated firms based on their names. We focus only on transactions initiated by nonbank-affiliated firms. A detailed description of the data collection process is in Appendix B.

We supplement our data with accounting information from the China Stock Market & Accounting Research (CSMAR) database, a comprehensive financial and economic data platform managed by Shenzhen GTA Information Technology Co., Ltd., which provides accounting and return data for listed firms. Financial firms are excluded from our sample. We also exclude stocks from the Sci-Tech Innovation Board, Beijing Stock Exchange, and other B-share markets, identified by stock ID prefixes '68', '90', '8', '43', and '2', due to their recent establishment and differing institutional frameworks compared to main board firms[7].

Using the CSMAR database, we gather additional details on lessees and lessors. Since the finance lease contracts are collected from the financial statements of lessees, we are able to match all lessees with financial data from CSMAR. In terms of lessors, we are able to match 36.00% in the database. The remaining 64% are funded by private companies or individually controlled firms, for which we do not have detailed accounting information.

To estimate the financing cost from the traditional market of listed firms, we use newly issued bond data from the WIND dataset. Following Geng and Pan (2024), we include three types of corporate bonds: medium-term notes, which represent the largest portion and are traded in the interbank market; corporate bonds, the second largest, traded on exchanges; and enterprise bonds, a minor component, traded in both markets. While Chinese firms also issue short-term notes (with maturities typically under one year), we exclude them from our sample because few leasing contracts have maturities shorter than one year[8]. A detailed description is in Appendix B.4.

The definitions and constructions of the variables are described in Appendix B.5.

III.2 Sample Description

Our sample focuses on the listed firms in China, ranging from 2007 to 2023. Although the total number of contracts we collect is 4,789, the sample used for the main analysis comprises 3,458 lease contracts after cleaning. There are 1,763 lessee-year observations from 747 unique lessees. Besides the contracts, the dataset includes 52,206 firm-year observations

[7] In the following context, we refer to the sample as the cleaned sample without specification.

[8] Only 289 out of 4,789 leasing contracts (214 out of 3,458 cleaned leasing contracts) have maturities under one year, compared to 69,091 out of 114,567 short-term notes in the bond data.

corresponding to 5,365 unique non-financial firms.

Although our sample is limited to the leasing activities of listed firms due to data constraints, it exhibits a similar inverse U-shaped trend observed in the broader sample, which indicates the representativeness of our sample (shown in Figure B.1). Both the lease amount and the number of lessees in our sample peaked in 2018 and then declined due to the new asset management regulations. The richer data available for listed firms enable a more detailed analysis.

Table 1 provides a detailed breakdown of the number of listed firms initiating new finance leases each year from 2007 to 2023, along with the corresponding number of new leases and their total value in RMB (prior to excluding firms from certain industries) in the raw sample[9]. The data reveal a distinct inverse U-shaped trend in the volume of finance leases over the sample period, aligning with patterns reported in industry studies. From 2007 to 2018, the magnitude of finance leases increased significantly, and then decreased after 2018 (with the implementation of China's New Asset Management Regulations). The number of listed firms engaged in finance leases increased from 12 in 2007 to a peak of 582 in 2018, before declining to 100 by 2023. A similar pattern is observed in the number of new contracts, which rose from 15 in 2007 to a high of 582 in 2018, followed by a decline in subsequent years. The total value of these leases mirrored this trend, growing from RMB 1.81 billion in 2007 to a peak of RMB 93.16 billion in 2018.

Although banks are richer in funding and use leasing firms for regulatory arbitrage, surprisingly, nonbank-affiliated firms dominate the market, are involved in more contracts, and provide more leasing funding. The proportion of contracts initiated by nonbank-affiliated leasing firms is 76.55%, which is much larger than the proportion of contracts initiated by bank-affiliated leasing firms, which is 23.45%. In terms of funds, 68.19% of funds were initiated by nonbank-affiliated lessors and 31.81% are initiated by bank-affiliated lessors.

Following Belo et al. (2022), we classify lessees as SOEs or POEs based on their ultimate controlling shareholders according to the identifier provided by CSMAR. A detailed description is in Appendix B.3.

In our sample, the majority of contracts involve POE lessees. Specifically, 61.16% of contracts are drawn by POEs, while 38.84% are drawn by SOEs. However, in terms of funding amounts, SOEs borrow more. They account for 57.48% of total funding, whereas POEs account for 42.52%. This discrepancy is largely due to the larger size of SOEs, which

[9]The cleaned sample also exhibits a similar trend as shown in Table B.4 in the Appendix

allows them to secure higher loan amounts per contract.

IV Micro Evidences

In this section, we present micro-level evidence on the characteristics of lessors and lessees. We start by analyzing the characteristics of the lessors in our sample. Then, we characterize the lessees in our sample by providing summary statistics and rigorous evidence on the decision to become a lessee.

IV.1 Who tend to be lessor?

We investigate the characteristics of nonbank-affiliated lease firms in this section. According to Chang et al. (2022), banks use their subsidiary leasing companies as tools for regulatory arbitrage. Banks provide funding to firms in regulated overcapacity industries. These firms have no chance of obtaining credit from the traditional banking system due to credit regulation policies. Then a related question raises: what motivates nonbank-affiliated firms to lend their funds to other firms instead of investing in their own businesses?

We summarize the characteristics of lessors in Table 2; all means are market capitalization weighted. To mitigate the impact of outliers, all continuous accounting variables are winsorized at the 1st and 99th percentiles. Column (1) reports the characteristics of all SOEs excluding SOE lessors. Column (2) summarizes the characteristics of SOE lessors. Column (3) reports the characteristics of all POEs excluding POE lessors. Column (4) summarizes the characteristics of POE lessors.

Compared with non-lessors, both SOE lessors and POE lessors are much larger in size, which is captured by total asset. The average size of SOE lessors is almost 3 times larger than that of non-lessor SOEs. The average size of POE lessors is 1.5 times larger than that of non-lessor POEs. As shown in the table, the size of non-lessor SOEs is 31.09 billion RMB, and 5.05 billion RMB for non-lessor POEs. In contrast, the average size of SOE lessors is 115.57 billion and 14.32 billion of POE lessors.

Lessor firms differ from non-lessors in other several key aspects. First, they are firms with low growth who exhibit lower investment rates, fixed asset growth, sales growth and revenue growth. The investment rate is 7% lower for SOE lessors and 4% lower for POE lessors compared to their non-lessor counterparts. Similarly, fixed asset growth is 6% lower

for SOE lessors and 4% lower for POE lessors. Sales growth for both SOE and POE lessors is 12% lower than for non-lessors. Revenue growth is 7% lower for SOE lessors and 9% lower for POE lessors. Second, lessors have higher leverage. SOE lessors have a leverage ratio of 0.62, 12% higher than non-lessor SOEs (0.50), while POE lessors have a leverage ratio of 0.48, 7% higher than non-lessor POEs (0.41). Third, lessors have low cash holding. The cash-to-assets ratio is 0.13 for SOE lessors and 0.15 for POE lessors, compared to 0.19 and 0.22 for their respective non-lessor counterparts.

In terms of the financing costs in the bond market, lessors have a higher bond spread than non-lessors. We use the bond spread to estimate the relative costs for firms. The bond spread represents the average difference between the bond issuance rate and the bank loan interest rate[10] of the same maturity, capturing the maturity-adjusted cost of bond issuance. The average bond spread is -72 bps for average SOEs and 67 bps for POEs. For SOE lessors, the bond spread is -66 bps, while it is 70 bps for POE lessors. This slightly higher bond spread indicates that lessors are those "bad" firms with higher risk.

Our summary statistics of bond spreads also indicate the asymmetric financial frictions of SOEs and POEs in the bond market, which aligns with existing literature (Geng and Pan, 2024). In our sample, the bond spread of POEs is 139 bps larger than that of SOEs.

Our summary statistics also shows that lessors benefit from lending in the leasing market. Lessor firms are able to earn positive benefits by lending through the leasing market. In order to capture the revenue lessors get through leasing, we estimate the lease spread, which equals the difference between the lease rate and the issuance rate of bonds with similar maturity. By lending in the leasing market, SOE lessors are able to obtain an average of 73 bps in revenue and 127 bps when lending to POEs. POE lessors are able to obtain 16 bps in revenue.

This estimated revenue is the lower bound of the actual revenue lessors can generate from lending in the leasing market. There are two main reasons: (1) Our lease rate primarily accounts for the interest component and does not include lease fees and other charges, which significantly contribute to the revenue of lessors. Typically, lessors charge a lease fee for each transaction, which is not negligible and should be considered in financial assessments (we show some examples in the Appendix B.1); (2) using the bond issuance rate as a proxy for firms' financing costs in the traditional credit market tends to overestimate their financing costs and further underestimate the revenue they can generate from lending as lessors in the leasing market. Besides issuing bonds to obtain funds, firms often borrow from banks. There are two

[10]The bank loan interest rate is set by central bank and same for all firms

possibilities for banks to obtain lower funds: first, most bond financing is collateral-free, while part of bank loans is collateral-based, which normally has lower financing costs; second, SOEs benefit from preferential treatment in the financial sector, particularly in the form of lower interest rates on bank loans (Brandt et al., 2013; Hsieh and Klenow, 2009). This preferential access is primarily due to the implicit government guarantee associated with SOEs, which reduces their perceived credit risk and incentivizes banks—especially state-owned commercial banks—to lend at more favorable terms.

Another characteristic is that most of the lessors are SOEs. The number of SOE lessors is twice as much as that of POE lessors. In our sample, there are 83 SOE lessors and 46 POE lessors. The proportion of unique SOE lessors is 64.34%, while the proportion for POE lessors is 35.66%. The total funds provided by SOEs is 82.14%.

In summary, our sample shows that most leasing contracts are funded by SOE lessors. Compared to other firms in the same sector (state-owned and private-owned), lessors tend to be larger in size, yet exhibit lower investment rates, slower growth (in sales, revenue, and fixed assets), lower cash holdings, and higher leverage. Their business model relies on generating revenue through lending in the leasing market.

[**Place Table 2 about here**]

IV.2 Who tend to be lessee?

In this subsection, we investigate what types of firms tend to become lessees. Table 3 presents the summary statistics of lessees. All means are market capitalization weighted. To mitigate the impact of outliers, all continuous accounting variables are winsorized at the 1st and 99twywyh percentiles. Column (1) presents the summary statistics of SOEs excluding SOE lessees, while column (2) shows those of SOE lessees. Column (3) presents the summary statistics of POEs excluding POE lessees, and column (4) shows those of POE lessees.

[**Place Table 3 about here**]

The average size of SOE lessees is slightly smalller than the average firms, while the average size of the POE lessees is slightly larger than the average non-lessee POEs. Besides from the size, lessee firms are different from non-lessee firms in the investment rate (fixed asset growth), as well as in sales and revenue growth.

Compared to non-lessees, lessees exhibit higher investment rates and fixed asset growth.

The investment rate is 3% higher for SOE lessees and 5% higher for POE lessees, while fixed asset growth is 6% higher for SOE lessees and 10% higher for POE lessees. Lessee firms also outperform in sales and revenue growth. Sales growth is 10% higher for SOE lessees and 9% higher for POE lessees, while revenue growth is 11% higher for SOE lessees and 9% higher for POE lessees.Besides from the growth rate and investment, lessee firms have higher leverage and lower cash holdings than non-lessees. SOE lessees have 18% higher leverage than other SOEs, while POE lessees have 15% higher leverage than other POEs (0.41 on average). Cash holdings are 6% lower for SOE lessees and 8% lower for POE lessees compared to their non-lessee counterparts.

In terms of the financial frictions, lessee firms face tighter financial frictions and higher funding costs in the traditional credit market. Within each sector, their bond financing costs exceed those of their peers, with bond spreads 44 bps higher for SOE lessees and 20 bps higher for POE lessees.

All these results indicate that lessees are those firms that have higher productivity, more investment opportunities, and grow faster but are more financially constrained in the traditional credit market.

Now, let's analyze the relative cost for lessees to borrow from the bond market and the lease market. The relative cheapness is captured by the lease spread, which reveals notable differences between SOE and POE lessees. For SOE lessees (in nonbank-affiliated contracts), the leasing rate is comparable to bond issuance costs, with a lease spread of 5 bps. However, for POE lessees, the leasing rate (47 bps lower) is significantly lower than bond issuance costs, underscoring the importance of the leasing market for POEs. Given their disadvantages in the bond market, leasing provides POEs with a more affordable funding source[11].

To obtain more rigorous results, we then run multivariate logit regressions to identify the determinants of firms becoming lessees. The regression model is specified as follows:

$$\text{Lessee Dummy}_{ijt} = \alpha + \beta IK_{ijt} + \gamma Controls + \eta_j + \xi_t + \varepsilon_{ijt} \tag{1}$$

where η_j are the industry fixed effects, ξ_t are the time fixed effects. IK_{ijt} represents investment rate of firm i in industry j and year t, which reflects firms' investment opportunities (productivity). $Lessee\ dummy_{ijt}$ is the lessee dummy, which equals 1 if firm i in industry j

[11]Though the lease interest has no significant difference from the traditional financing costs for SOE lessees, they still have incentives to borrow from lessors. From a risk management perspective, SOEs have incentives to diversify their debts. Additionally, firms might face times when they cannot borrow from banks for various reasons, necessitating alternative funding resources.

is a lessee in year t and 0 otherwise. The investment equals the summation of the net value of fixed assets and depreciation expense (which is equal to the change in gross fixed assets). Table 4 presents the results of logit regressions with $Lessee\ dummy_{ijt}$ as the dependent variable, using the investment rate as a proxy for investment opportunities. The sample covers 2007–2023, with all financial variables winsorized at the 1st and 99th percentiles. P-values are based on standard errors clustered by firm and year, with both year and industry fixed effects included. To mitigate potential reverse causality, all control variables and independent variable in the regression are lagged by one period.

To compare the analyzed groups with relevant benchmarks, we divide the sample into subgroups. In columns (1) and (2), we compare all lessees with non-lessees. The former only adds the IK variable to the model, while the latter adds all control variables to the model. In columns (3) and (4), we compare POE lessees with POE non-lessees. In columns (5) and (6), we compare SOE lessees with SOE non-lessees.

The key coefficient is on the investment rate IK. All coefficients in columns (1) to (6) are significantly positive, indicating that lessees are those with high investment rates (high productivity). For the overall group of firms, a one standard deviation[12] increase in the investment rate would increase the odds of borrowing from lessors by 13% after controlling for other characteristics. For the POE and SOE groups, a one standard deviation[13] increase in the investment rate would increase the odds of borrowing from lessors by 14% and 12% after controlling for other characteristics.

Additionally, it is noteworthy that the coefficient on the $KZ\ index$ for all lessees is significantly positive. This suggests that the leasing market plays a crucial role in alleviating financial frictions by helping highly financially constrained firms to obtain funds.

[Place Table 4 about here]

In summary, these findings indicate that lessees are those firms that have more investment opportunities and grow faster but are more financially constrained in the traditional credit market. Borrowing from the leasing market helps them relax collateral constraints.

As discussed in Chang et al. (2022), SOEs in overcapacity industries are not high-investment firms, whereas those in non-overcapacity industries behave similarly to other

[12]The standard deviation is 0.356, the odd ratio increase by $(e^{0.35*0.356} - 1) * 100\% = 13\%$

[13]The standard deviation is 0.37 for POE lessee sample and 0.30 for SOE lessee sample. The odd ratio of POEs to become lessees increase by $(e^{0.37*0.36} - 1) * 100\% = 14\%$ and that of POEs to become lessees increase by $(e^{0.30*0.37} - 1) * 100\% = 12\%$

lessees, with a marginally significant positive IK coefficient. We discuss this part in the Appendix C.1. Our findings align with them, those lessees are not necessarily firms with high productivity and growth.

V Two-Period Model

This section presents a simple static two-period model to highlight the effects of the finance lease market on firms' decisions and within-sector and cross-sector capital allocation efficiency. The basic setting of the model follows Liu et al. (2021). The additional element in our model is the finance lease market, where firms can endogenously choose to become lessors and lessees.

In the two-period model economy, there is a representative household and homogeneous goods produced by firms in two sectors: a SOE sector (sector s) and a POE sector (sector p). There is a continuum of firms within each sector, with a measure of μ of firms in the SOE sector and $1-\mu$ in the POE sector. Firms in each sector have constant-returns technology that transforms capital into a homogeneous final good. Firms in sector j are endowed with h^j units of net worth. The total productivity of a firm is determined by a sector-specific productivity (z^j) and an idiosyncratic productivity (ε), where the idiosyncratic productivity is distributed independently and identically across firms. Firms finance production through both internal funds (net worth) and external borrowing.

In order to capture the effects of finance lease market, we compare two cases: in Case I, firms could only borrow or save in the traditional market, while in Case II, firms can borrow or save both in the traditional loan market (with loan-to-value ratio θ^j) and in the finance lease market (with loan-to-value ratio η^j), which is a firm-to-firm credit market. Both markets are competitive.

We assume POE sector has higher productivity than SOE sector, however, firms in SOE sector have easier access to the traditional loans than POEs (Song et al., 2011; Liu et al., 2021). In the model, these characteristics are captured by the higher collateralizability of SOEs and the higher sectoral productivity of POEs: $\theta^s > \theta^p$ and $z^p > z^s$.

An additional assumption regarding the finance lease market is that firms have higher collateralizability in the finance lease market ($\eta^j > \theta^j$) due to the repossession advantages of lessors. Here, we assume that SOE and POE firms have the same collateralizability in the finance lease market. In general, the magnitudes of collateralizability are: $\eta^s = \eta^p > \theta^s > \theta^p$.

These assumptions match with our empirical results.

V.1 Household

There is a representative household in the economy, who is the owner of all firms. At the beginning of the first period, the representative household is endowed with W units of wealth, which can be used to consume or save in the bank in the first period. In the second period, the household consumes all of his/her wealth, including the interest payments and profits from firms. The representative household aims to maximize the utility function:

$$\max_{C_1,C_2,S} C_1 + \beta C_2 \tag{2}$$

where the β is the discounted factor and C_i denotes the consumption in period i, $i \in \{1, 2\}$, subjects to:

$$C_1 + S = W \tag{3}$$

$$C_2 = (1 + r)S + \Pi \tag{4}$$

where S denotes the lending to firms, Π is the overall dividend from firms and r denotes the interest rate on lending to firms.

The first order condition of the household implies:

$$r = \frac{1}{\beta} - 1 \tag{5}$$

V.2 Credit Market

In this paper, we have two credit markets where firms can borrow capital: the traditional loan market and the finance lease market. In the traditional credit market, banks are the lender while firms and household can borrow from banks, while in the finance lease market, both lenders and borrowers are firms.

In the traditional loan market, banks are free to enter, obtain funds from households and firms, and lend out. This market is competitive. When borrowing from banks, firms face a collateral-based constraint. Due to the government's implicit guarantee, we assume that SOEs are able to borrow more and have high collateralizability, while POEs have lower collateralizability ($\theta^s > \theta^p$). The interest rate in this market is denoted as r.

In the finance lease market, firms also face a collateral-based constraint with collateralizability η^j. Due to the repossession advantages and higher protection for lenders (as mentioned in the previous sections), we assume that firms have higher collateralizability in this market, such that $\eta^j > \theta^j$ and $\eta^s = \eta^p$. We assume the finance lease market is also competitive, and we denote the interest rate in this market as r_l.

V.3 Firms

Firms are divided into two sectors $j \in \{s, p\}$, where s denotes the state-owned sector and p denotes the private-owned sector. There are infinitely many firms in each sector, with measures μ for the SOE sector and $1-\mu$ for the POE sector. In period 1, firms in sector j are endowed with the same amount of net value (h^j) and observe their idiosyncratic productivity ε, which is drawn from a distribution with cumulative distribution function (CDF) $F^j(\varepsilon)$[14]. without loss of generality, we assume $h^p = h^s$. Since the only heterogeneity for firms in the same sector is the idiosyncratic productivity, we can index firms by sector j and their idiosyncratic productivity ε.

After observing their idiosyncratic productivity, firms make production and financial decisions simultaneously. The financial decisions include: (i) traditional loans ($b^j(\varepsilon)$); and (ii) finance leases ($l^j(\varepsilon)$)[15]. In period 2, firms use capital to produce and pay back both the principal and interest on traditional loans and finance lease loans.

In order to distinguish capital being used as collateral in banks from that being used as collateral in the finance lease market, we label the first type as owned capital ($ko^j(\varepsilon)$) and the second type as leased capital ($kl^j(\varepsilon)$). We assume that owned capital and leased capital are perfect substitutes in production, which is consistent with previous studies Eisfeldt and Rampini (2008) and Rampini and Viswanathan (2013). The capital used in final production is denoted by $k^j(\varepsilon)$[16].

A firm in sector j with idiosyncratic productivity ε maximizes the profit:

$$\pi^j(\varepsilon) = z^j \varepsilon k^j(\varepsilon) + (1-\delta)k^j(\varepsilon) - (1+r)b^j(\varepsilon) - (1+r_l)l^j(\varepsilon) \tag{6}$$

[14]For simplicity, we assume the distribution is a Pareto distribution, with the CDF given by: $F(\varepsilon) = 1 - \left(\frac{\varepsilon_{\min}}{\varepsilon}\right)^{\alpha}$.

[15]A positive $b^j(\varepsilon)$ means a firm with idiosyncratic productivity ε borrows from the bank, while a negative $b^j(\varepsilon)$ means the firm saves its funds in the bank. A positive $l^j(\varepsilon)$ indicates that the firm is a lessee in the finance lease market, whereas a negative $l^j(\varepsilon)$ means the firm is a lessor in the finance lease market.

[16]The capital used in production is not necessarily equal to the sum of owned capital and leased capital, because firms could lend their capital to other firms through the finance lease market.

where $\pi^j(\varepsilon)$ denotes the profit, δ denotes the depreciation, r denotes the interest rate of bank loans, and r_l denotes the interest rate of lease loans.

To account for the existence of heterogeneous firms, we make the following assumption.

Assumption 1. $\frac{1}{\beta} + \delta > z^p \varepsilon_{min}$

When $\varepsilon_{\min}$ is small enough, this assumption is easily satisfied. This assumption guarantees that there exist firms with low productivity whose production return is not sufficient to compensate for the discount and depreciation. Consequently, these firms have an incentive to lend out their resources, leading to the existence of firms that would save in the bank when there is no finance lease market[17].

V.3.1 Constraints

In the traditional loan market, the firm face the borrowing constraint:

$$b^j(\varepsilon) \leq \theta^j k o^j(\varepsilon) \tag{7}$$

where θ^j denotes the collateralizability or LTV for firms in sector j. This constraint implies that firms only need to pay $ko^j(\varepsilon) - b^j(\varepsilon)$ as a down payment to possess $ko^j(\varepsilon)$ capital.

The firm can also choose to deposit (save)[18], which should not exceed the total endowment. Thus, the firm also faces a saving constraint:

$$-h^j(\varepsilon) \leq b^j(\varepsilon) \tag{8}$$

The firm also make decisions on leased capital ($kl^j(\varepsilon)$) and finance lease ($l^j(\varepsilon)$). As finance lease resembles secured-loan, we assume firms also face a borrowing constraint in this market:

$$l^j(\varepsilon) \leq \eta^j k l^j(\varepsilon) \tag{9}$$

where η^j is the collateralizability of leased capital in the finance lease market. This constraint implies that to achieve $kl^j(\varepsilon)$ amount of capital, the firm only need to pay $kl^j(\varepsilon) - l^j(\varepsilon)$ as a down payment, which is smaller than the down payment required for bank loans.

The down payments should be paid using firms net worth, thus not exceed the net value the firm has:

[17] This matches the reality where there are firms inactive in production.

[18] Negative borrowing means saving in banks.

$$ko^j(\varepsilon) - b^j(\varepsilon) + kl^j(\varepsilon) - l^j(\varepsilon) \leq h^j \tag{10}$$

If the firm choose to be a lessor, there is also a constraint:

$$-(h^j + b^j(\varepsilon)) \leq l^j(\varepsilon) \tag{11}$$

the left-hand side of this inequality is the total resources firm ε in the sector j has, which is the sum of he internal finance and external finance from bank[19].

The flow-of-fund constraint is:

$$k^j(\varepsilon) = h^j + b^j(\varepsilon) + l^j(\varepsilon) \tag{12}$$

where $k^j(\varepsilon)$ is the capital used by firm ε in sector j to produce.

Next, we will analyze firms' decisions in the case when there is no finance lease market and in the case when a finance lease market exists.

V.3.2 Case I: Without finance lease Market

When there is no finance lease market, firms in each sector only need to decide: (i) whether to produce or not; (ii) if produce, whether to borrow from the traditional loan market or not. In this case, firms' decisions are summarized in the following proposition.

Proposition 1. *In the economy without a finance lease market, there exists one threshold level of idiosyncratic productivity denoted by $\tilde{\varepsilon}^j$ for each sector $j \in \{s, p\}$, such that the optimal decisions for firm ε in sector j can be summarized as:*

$$b^j(\varepsilon) = \begin{cases} -h^j, & if \quad \varepsilon \leq \tilde{\varepsilon}^j \\ \frac{\theta^j}{1-\theta^j} h^j, & if \quad \tilde{\varepsilon}^j \leq \varepsilon \end{cases} \tag{13}$$

$$k^j(\varepsilon) = ko^j(\varepsilon) = \begin{cases} 0, & if \quad \varepsilon \leq \tilde{\varepsilon}^j \\ \frac{1}{1-\theta^j} h^j, & if \quad \tilde{\varepsilon}^j \leq \varepsilon \end{cases} \tag{14}$$

The threshold $\tilde{\varepsilon}^j$ is defined as:

$$\tilde{\varepsilon}^j = \frac{r + \delta}{z^j} \tag{15}$$

[19]Lessor firms lending capital in the finance market captures the direct lease, lessor firms lending liquidity captures sales-and-leaseback

We provide a proof in the Appendix; see Proof E.1.

Proposition 1 shows that in the absence of a finance lease market, firms in each sector fall into two distinct types. Their decisions are driven by the relative magnitude of revenue generated from production versus saving in a bank. The distribution of firms in each sector are captured by the "production cutoff" $\tilde{\varepsilon}^j$. For firms with idiosyncratic productivity $\tilde{\varepsilon}^j$, the revenues from production and saving are the same. For firms with higher idiosyncratic productivity than the cutoff ($\varepsilon^j > \tilde{\varepsilon}^j$), producing is more profitable, so they choose to produce. Due to the linear production technology, those firms would borrow to the limit from bank. For firms with productivity lower than the cutoff ($\varepsilon^j < \tilde{\varepsilon}^j$), they choose not to produce but save in the traditional loan market. Because their return on production is lower than saving.

V.3.3 Case II: With finance lease Market

When a finance lease market exists, firms can borrow from both banks and lessors. Additionally, firms can lend money in this market. In the following section, we will characterize firms' decisions in the presence of a finance lease market.

Before analyze the choice of firms in the presence of finance lease market, we have the following proposition regarding interest rates in the two markets:

Proposition 2. *The finance lease market exists if and only if* $r_l \geq r$.

Proof. We prove the Proposition by contradiction. If $r_l < r$, then no firms would act as lessors in the finance lease market. If some firms have low productivity (such that production is not profitable), they would choose to save in the bank rather than become lessors in the finance lease market. Consequently, under such conditions, a finance lease market would not exist. Therefore, we have $r_l \geq r$. □

The following proposition characterizes firms' decisions in the presence of a finance lease market:

Proposition 3. *In an economy with a finance lease market, there exist two threshold levels of idiosyncratic productivity, denoted by* $\underline{\varepsilon}^j$ *and* $\bar{\varepsilon}^j$ *for each sector* j*, such that the optimal decision for a firm with productivity* ε *in sector* j *can be summarized as follows:*

$$ko^j(\varepsilon) = \begin{cases} \frac{1}{1-\theta^j}h^j, & if \quad \varepsilon \leq \bar{\varepsilon}^j \\ 0, & if \quad \bar{\varepsilon}^j \leq \varepsilon \end{cases} \tag{16}$$

$$kl^j(\varepsilon) = \begin{cases} 0, & if \quad \varepsilon \leq \bar{\varepsilon}^j \\ \frac{1}{1-\eta^j}h^j, & if \quad \bar{\varepsilon}^j \leq \varepsilon \end{cases} \tag{17}$$

$$k^j(\varepsilon) = \begin{cases} 0, & if \quad \varepsilon < \underline{\varepsilon}^j \\ \frac{1}{1-\theta^j}h^j, & if \quad \underline{\varepsilon}^j \leq \varepsilon \leq \bar{\varepsilon}^j \\ \frac{1}{1-\eta^j}h^j, & if \quad \bar{\varepsilon}^j \leq \varepsilon \end{cases} \tag{18}$$

$$l^j(\varepsilon) = \begin{cases} -\frac{1}{1-\theta^j}h^j, & if \quad \varepsilon < \underline{\varepsilon}^j \\ 0, & if \quad \underline{\varepsilon}^j \leq \varepsilon \leq \bar{\varepsilon}^j \\ \frac{\eta^j}{1-\eta^j}h^j, & if \quad \bar{\varepsilon}^j \leq \varepsilon \end{cases} \tag{19}$$

$$b^j(\varepsilon) = \begin{cases} \frac{\theta^j}{1-\theta^j}h^j, & if \quad \varepsilon \leq \bar{\varepsilon}^j \\ 0, & if \quad \bar{\varepsilon}^j \leq \varepsilon \end{cases} \tag{20}$$

The threshold $\underline{\varepsilon}^j$ (production cutoff) and $\bar{\varepsilon}^j$ (capital cutoff) is defined as

$$\underline{\varepsilon}^j = \frac{r_l + \delta}{z^j} \tag{21}$$

$$\bar{\varepsilon}^j = \frac{\delta}{z^j} + \frac{\eta^j(1-\theta^j)r_l - \theta^j(1-\eta^j)r}{z^j(\eta^j - \theta^j)} \tag{22}$$

We provide a proof in the Appendix; see Proof E.2.

Since $r_l \geq r$, firms will only save in the finance lease market if they choose not to produce. Their decisions are based on the relative revenue from: (1) saving in the finance lease market; (2) producing and borrowing from a bank; (3) producing and borrowing from the finance lease market. The distribution of firms is characterized by two thresholds: the "production cutoff" ($\underline{\varepsilon}^j$) and the "capital cutoff" ($\bar{\varepsilon}^j$).

Within each sector j, firms with idiosyncratic productivity ε lower than the "production cutoff" ($\underline{\varepsilon}^j$) choose not to produce but instead become lessors in the finance lease market[20], allowing them to earn higher profits than they would by saving in a bank. For this type

[20]To rationalize the model results for this type of firm, we can imagine the following process for a lessor: initially, the lessor uses their initial endowment h^j to purchase capital from a lessee. They then use this h^j amount of capital as collateral to borrow from the bank, obtaining $\theta^j h^j$ in liquidity. Simultaneously, the

of firms, they would use all their initial endowment as collateral and borrow from the bank ($b^j(\varepsilon) = \frac{\theta^j}{1-\theta^j}$), the owned-capital used as collateral to borrow from bank is $ko^j(\varepsilon) = \frac{1}{1-\theta^j}h^j$. After borrowing from bank, firms would lend out all their resources in the finance lease market, so $l^j = -\frac{1}{1-\theta^j}h^j$ and the capital used in production is $k^j(\varepsilon) = 0$.

The tradeoff between borrowing from banks and lessors lies in leverage and costs. Lessors can provide firms with higher leverage ($\eta^j > \theta^j$) but charge a higher interest rate, while banks provide lower leverage but charge a lower interest rate. For firms with medium productivity ($\underline{\varepsilon}^j \leq \varepsilon^j \leq \bar{\varepsilon}^j$), although they seek to obtain as much capital as possible, they are not profitable enough to cover the higher interest rates. As a result, these firms choose to produce and only borrow capital from banks, with borrowing given by $b^j = \frac{\theta^j}{1-\theta^j}h^j$ and leasing $l^j = 0$. Their owned capital is $ko^j = \frac{1}{1-\theta^j}h^j$, while leased capital is $kl^j = 0$, and the total capital being used in production is $k^j = \frac{1}{1-\theta^j}h^j$.

For firms with high productivity ($\bar{\varepsilon}^j \leq \varepsilon^j$), the profit gained from utilizing more capital in production is large enough to compensate for the high cost of finance lease. Therefore, these firms choose to borrow from lessors instead of banks, leading to $b^j = 0$, $l^j = \frac{\eta^j}{1-\eta^j}h^j$, $kl^j = \frac{1}{1-\eta^j}h^j$, and $ko^j = 0$. Due to the high returns from production, they allocate all their funds to production the total capital being used in production is $k^j = \frac{1}{1-\theta^j}h^j$. The intuition behind the cutoff $\bar{\varepsilon}^j$ is that the benefit of using leased capital should exceed its cost:

$$z^j\varepsilon\left(\frac{\eta^j}{1-\eta^j} - \frac{\theta^j}{1-\theta^j}\right)h^j \geq \left(\frac{\eta^j}{1-\eta^j}(r_l+\delta) - \frac{\theta^j}{1-\theta^j}(r+\delta)\right)h^j.$$

V.4 Equilibrium

An equilibrium consists of the traditional loan interest rate r, the leasing interest rate r_l, and the allocations $\{ko^j(\varepsilon), k^j(\varepsilon), l^j(\varepsilon), b^j(\varepsilon), kl^j(\varepsilon)\}$ for each firm in sector j with $\varepsilon \in F^j(\varepsilon)$, such that: (i) allocations for each firm in each sector solve the firm's optimization problem. (ii) finance lease market clears such that:

$$\mu\int l^s(\varepsilon)dF^s(\varepsilon) + (1-\mu)\int l^p(\varepsilon)dF^p(\varepsilon) = 0 \tag{23}$$

lessor can lend the capital (previously bought from the lessee) back to the same lessee. The lessor then uses the liquidity $\theta^j h^j$ to buy more capital from the lessee and repeats the process. At the end of this process, the total capital owned by the lessor is given by $\frac{1}{1-\theta^j}h^j$.

(iii) traditional loan market clears:

$$S = \mu \int b^s(\varepsilon) dF^s(\varepsilon) + (1-\mu) \int b^p(\varepsilon) dF^p(\varepsilon) \tag{24}$$

(iv) capital market clears:

$$\mu \int k^s(\varepsilon) dF^s(\varepsilon) + (1-\mu) \int k^p(\varepsilon) dF^p(\varepsilon) = \mu h^s + (1-\mu) h^p + S \tag{25}$$

(v) goods market clears automatically.

In the following part, we focus on the finance lease equilibrium (where finance lease market exists) without special statement.

V.5 Effects of Finance Lease

In this section, we analyze the effects of the existing finance lease market.

Proposition 4. *With the introduction of the finance lease market, the production cutoff shifts rightward, concentrating more capital in high-productivity firms. The proportion of SOE lessors among SOEs is higher than that of POE lessors among POEs.*

We provide a proof in the Appendix; see Proof E.3.

Figure D.1 summarizes the distributions and cutoffs of both sectors. In the presence of a finance lease market, the "production cutoff" shifts rightward, concentrating more capital in high-productivity firms. The "production cutoff" in the SOE sector is higher than that in the POE sector, meaning that more POEs choose to produce. However, the relative magnitude of the capital cutoffs between the two sectors depends on the parameters.

We use capital letters and superscripts to represent aggregate variables in each sector. The total capital in each sector is:

$$K^j = \int k^j(\varepsilon) dF^j(\varepsilon) \tag{26}$$

The total output in each sector is [21]:

$$Y^j = \int y^j dF^j(\varepsilon) \tag{27}$$

[21] The output for each firm is in the Appendix.

And it is easy to show that the TFP in sector j is:

$$A^j = \frac{Y^j}{K^j} \tag{28}$$

We use subscript to represent case I and case II. For example, the capital of sector j in case I is K_1^j and capital of sector j in case II is K_2^j.

The following proposition shows the effects of the existence of finance lease market on the capital flow and TFP.

Proposition 5. *The existence of finance lease market increase the TFP of both SOE sector and POE sector:*

$$\frac{A_2^s}{A_1^s} > 1 \tag{29}$$

$$\frac{A_2^p}{A_1^p} > 1 \tag{30}$$

We provide a proof in the appendix; see Proof E.4.

This proposition captures the within-sector allocation effects of the finance lease market. When a finance lease market exists, within each sector, more low-productivity firms choose not to produce but instead act as lessors, lending out their resources. In addition, high-productivity firms in each sector can leverage up by borrowing from the finance lease market. Overall, capital becomes more concentrated in high-productivity firms, increasing the TFP of each sector in the presence of a finance lease market.

Proposition 6. *A sufficient condition for introducing finance lease market to increase aggregate TFP is:*

$$\frac{K_2^p}{K_1^p} - 1 \geq \frac{K_2^s}{K_1^s} - 1 \tag{31}$$

that is the percentage change in capital of private-owned sector is larger than state-owned sector, i.e. the capital flows from state-owned sector to private-owned sector.

We provide a proof in the appendix; see Proof E.5.

Aggregate TFP depends not only on within-sector effect but also on cross-sector effect. Since the private-owned sector has higher sectoral productivity than the state-owned sector, an increase in capital flow to the state-owned sector does not necessarily lead to an increase in total TFP, even if the TFP of each sector rises. We can consider total TFP as the weighted

average of the TFP of both the POE and SOE sectors. However, whether this condition holds depends on the parameters.

V.6 A Simple Example

To illustrate the effects of the existence of a finance lease market and how changes in the LTV ratio in the finance lease market (η) influence the overall economy, we provide a numerical example.

We set $z^p/z^s = 2$, $\theta^s/\theta^p = 2$, $\mu = 0.5$, $\theta^p = 0.2$, and $\delta = 0$. We assume that idiosyncratic shocks are drawn from a log-normal distribution with a mean value of 1 and a standard deviation of 0.3.

Figure 1 presents the results. Since $\theta^s = 0.4$, the region where $\eta < 0.4$ (referred to as region 1) corresponds to Case I, where no finance lease market exists. The region where $\eta > 0.4$ (referred to as region 2) corresponds to Case II, where a finance lease market exists. In region 2, an increase in η implies that firms can obtain higher collateralizability in the finance lease market.

The second row of Figure 1 shows the change in capital as η increases. In region 2, as η rises, the utilized capital in the SOE sector decreases, whereas the utilized capital in the POE sector increases. However, the decrease in capital in the SOE sector outweighs the increase in the POE sector, leading to a slight decline in total utilized capital.

The first row of Figure 1 illustrates the change in output as η increases. Since utilized capital decreases in the SOE sector, output in this sector also declines, while output in the POE sector increases due to rising capital utilization. In terms of total output, the increase in POE sector output outweighs the decline in SOE sector output, resulting in an overall increase in total output.

The last row of Figure 1 displays the change in TFP as η increases. As demonstrated in Proposition 4, TFP rises in both sectors. In this specific example, the total TFP of the economy also increases as the capital flows from state-owned sector to private-owned sector as implied by Proposition 6.

This simple example illustrates the key implication of our model: the presence of a finance lease market facilitates capital allocation from low-productivity firms to high-productivity firms, thereby improving overall productivity. However, to obtain results that more accurately reflect real-world dynamics, a richer dynamic model is needed to calibrate the real

economy.

[**Place Figure 1 about here**]

VI Finance Lease Market and Transition Dynamics

In this section, we extend the static model to a dynamic model. We then calibrate the dynamic model to match reality and conduct quantitative analysis.

VI.1 The dynamic model

The main features of the dynamic model are similar to those of the static model, with the following differences:

First, we introduce government subsidies. Since SOEs are owned by the government, we incorporate government subsidies to SOEs in the dynamic model. Second, we introduce the endogenous firm net value decision. In the dynamic model, firms must decide h_{t+1}^j for period $t+1$ at the end of period t, after observing their idiosyncratic productivity ε_{t+1}^j for the next period. This decision is equivalent to determining capital holdings, borrowing, and savings for period $t+1$. Third, we incorporate firms' entry and exit dynamics. After producing and before making decisions for the next period, firms in each sector have a probability δ_e of exiting, and δ_e new firms enter each sector with an initial endowment h_0^j.

VI.1.1 Household

There is a continuum of identical, infinitely-lived households with a measure of one. Each household supplies one unit of labor inelastically to firms, owns all firms, and chooses consumption C_t and savings S_{t+1} to maximize discounted utility:

$$\max_{C_t, B_t} E_0 \sum_{t=0}^{\infty} \beta^t \left[\log\left(C_t\right)\right] \tag{32}$$

Subject to the budget constraint:

$$C_t + S_{t+1} \leq W_t N_t + (1 + r_{d,t}) S_t + D_t - T_t \tag{33}$$

where D_t is the dividend received from firms, net of the start-up funds for new firms, and T_t is the lump-sum tax collected by the government to subsidize firms.

The first order conditions of household is:

$$1 = \beta E_t \frac{\Lambda_{t+1}}{\Lambda_t}(1 + r_{d,t+1}) \tag{34}$$

where $\Lambda_t = \frac{1}{C_t}$ denotes the marginal utility of household.

VI.1.2 The firm

At the beginning of period t, firm i in sector $j \in \{s, p\}$ has capital stock $k^j_{i,t}$, bank loans $b^j_{i,t}$, and lease loans $l^j_{i,t}$. The predetermined bank loan rate is $r_{d,t}$, and the predetermined lease rate is $r_{l,t}$. After observing the sector-specific productivity z^j and idiosyncratic productivity $\varepsilon^j_{i,t}$, the firm produces a final good using labor $n^j_{i,t}$ and effective capital $z^{jx}\varepsilon^j_{i,t}k^j_{i,t}$ as inputs, where $\varepsilon^j_{i,t}$ is an idiosyncratic productivity shock observed at the end of period $t-1$ before firms make decisions for period t.

The production function for the firm is given by

$$y^j_{i,t} = (z^j \varepsilon^j_{i,t} k^j_{i,t})^\alpha (n^j_{i,t})^{1-\alpha} \tag{35}$$

The firm takes the real wage W_t as given and optimizes production profit according to:

$$\pi^j_{i,t} = \max_{n^j_{i,t}, k^j_{i,t}} \tilde{\tau}^j (z^j \varepsilon^j_{i,t} k^j_{i,t})^\alpha (n^j_{i,t})^{1-\alpha} - W_t n_{i,t} \tag{36}$$

where $\tilde{\tau}^j$ captures the government subsidies. We assume SOEs get more government subsidies than that of POE ($\tilde{\tau}^s > \tilde{\tau}^p$). By solving the optimization problem of production, the optimal labor is:

$$n^j_{i,t} = z^j \varepsilon^j_{i,t} k^j_{i,t} \left(\frac{(1-\alpha)\tilde{\tau}^j}{W_t} \right)^{\frac{1}{\alpha}} \tag{37}$$

And the production profit is:

$$\pi^j_{i,t} = \alpha (\tilde{\tau}^j)^{\frac{1}{\alpha}} z^j \varepsilon^j_{i,t} k^j_{i,t} \left(\frac{1-\alpha}{W_t} \right)^{\frac{1-\alpha}{\alpha}} = \tau^j z^j \varepsilon^j_{i,t} k^j_{i,t} R_t \tag{38}$$

where $R_t = \alpha \left(\frac{1-\alpha}{W_t} \right)^{\frac{1-\alpha}{\alpha}}$ is the general return on capital, and $\tau^j = (\tilde{\tau}^j)^{\frac{1}{\alpha}}$.

After production, the net value h_{it}^j of the firm is defined by:

$$h_{i,t}^j = \left(\tau^j z^j \varepsilon_{i,t}^j R_t + 1 - \delta\right) k_{i,t}^j - (1 + r_{d,t})\, b_{i,t}^j - (1 + r_{l,t})\, l_t^j \tag{39}$$

We assume there is an exogenous probability δ_e that a firm exits the market after finishing production but before making investment, saving, or borrowing decisions for the next period. Upon exiting, the firm transfers all net worth $h_{i,t}^j$ to the households that own the firm. An equal measure of new firms enters the market, receiving $h_{0,t}^j$ units of start-up funds from the households. Thus, the net value received by households is:

$$\delta_e \sum_{j \in \{s,p\}} \left(\int h_{i,t}^j(\varepsilon_{i,t}^j) dF^j(\varepsilon_{i,t}^j) - h_{0,t}^j \right).$$

At the end of period t, each firm i in sector j observes an idiosyncratic productivity shock $\varepsilon_{i,t+1}^j$ and makes decisions regarding borrowing, saving, and capital holdings for period $t+1$. Firms can choose to borrow from either the traditional credit market (banks) or the leasing market. As in the static model, due to creditor protection, the LTV ratio in the leasing market is higher than that in the banking sector, i.e., $\eta^j > \theta^j$.

Given net worth $h_{i,t}^j$ after production and the idiosyncratic productivity $\varepsilon_{i,t+1}^j$ for the next period, the firm's objective at the end of period t is to maximize the expected present value of future terminal dividends[22]:

$$V_{i,t}^j(h_{i,t}^j, \varepsilon_{i,t+1}^j) = \max_{k_{i,t+1}^j, b_{i,t+1}^j, l_{i,t+1}^j, ko_{i,t+1}^j, kl_{i,t+1}^j} \mathbf{E}_t \left[\sum_{s=1}^{\infty} \delta_e^s \beta^s \frac{\Lambda_{t+s}}{\Lambda_t} h_{i,t+s}^j \right] \tag{40}$$

where $k_{i,t+1}^j$ is the capital used in production, $b_{i,t+1}^j$ denotes the bank loan, and $l_{i,t+1}^j$ represents the lease loan[23]. $ko_{i,t+1}^j$ denotes owned capital (used as collateral to borrow from banks), while $kl_{i,t+1}^j$ represents leased capital used as collateral to borrow from lessors.

In the banking system, firms face collateral-based constraints with a LTV ratio of θ^j:

$$b_{i,t+1}^j \leq \theta^j ko_{i,t+1}^j \tag{41}$$

In the leasing market, firms face collateral-based constraints with loan-to-value ratio of η^j:

[22] Each period, a fraction δ_e of firms exits the market, and all their value is transferred to households.

[23] A negative $b_{i,t+1}^j$ indicates savings in the bank, while a negative $l_{i,t}^j$ indicates acting as a lessor in the leasing market.

$$l^j_{i,t+1} \leq \eta^j k l^j_{i,t+1} \tag{42}$$

Also, if the firm chooses to save in the bank, the maximum amount of saving is its net worth:

$$-h^j_{i,t} \leq b^j_{i,t+1} \tag{43}$$

The total down payments of own-capital and leased-capital should not exceed the total net worth:

$$kl^j_{i,t+1} - l^j_{i,t+1} + ko^j_{i,t+1} - b^j_{i,t+1} \leq h^j_{i,t} \tag{44}$$

The constraint lessor has in leasing market is:

$$-(h^j_{i,t} + b^j_{i,t+1}) \leq l^j_{i,t+1} \tag{45}$$

where the left-hand side is the total resources the firm have after the bank loan decision.

The flow-of-fund constraint is:

$$h^j_{i,t} + b^j_{i,t+1} + l^j_{i,t+1} = k^j_{i,t+1} \tag{46}$$

In the following section, we discuss firms' decisions in the absence of a finance lease market (Case I) and in the presence of a finance lease market (Case II).

VI.1.3 Case I: Without finance lease Market

In this case, the decisions of the firm can be summarized in the following proposition.

Proposition 7. *Given the net worth $h^j_{i,t}$ and idiosyncratic productivity ε^j_{t+1} (which is drawn from the distribution with CDF of $F^j(\cdot)$, the optimal decision of $\{b^j_{i,t+1}, ko^j_{i,t+1}, k^j_{i,t+1}\}$ can be summarized as:*

$$k^j_{i,t+1}(\varepsilon^j_{t+1}) = ko^j_{i,t+1}(\varepsilon^j_{t+1}) = \begin{cases} 0, & \varepsilon_{min} \leq \varepsilon^j_{t+1} < \underline{\varepsilon}^j_{t+1} \\ \frac{1}{1-\theta^j} h^j_{i,t}, & if \quad \underline{\varepsilon}^j_{t+1} \leq \varepsilon^j_{t+1} < \varepsilon_{max}. \end{cases} \tag{47}$$

$$b^j_{i,t+1}(\varepsilon^j_{t+1}) = \begin{cases} -h^j_{i,t}, & \varepsilon_{min} \leq \varepsilon^j_{t+1} < \underline{\varepsilon}^j_{t+1} \\ \frac{\theta^j}{1-\theta^j} h^j_{i,t}, & if \quad \underline{\varepsilon}^j_{t+1} \leq \varepsilon^j_{t+1} < \varepsilon_{max}. \end{cases} \tag{48}$$

The cutoff:

$$\tilde{\varepsilon}^j_{t+1} = \frac{r_{d,t+1} + \delta}{\tau^j z^j R_{t+1}} \tag{49}$$

The proof is provided in Appendix E.6.

The interpretation of these decisions is analogous to those in the static model. Firms' decisions in each sector can be characterized by a cutoff value, denoted as $\tilde{\varepsilon}^j_{t+1}$. Firms with sufficiently high idiosyncratic productivity ($\varepsilon^j_{i,t+1} > \tilde{\varepsilon}^j_{t+1}$) find it beneficial to produce and borrow up to the limit from banks. Conversely, firms with low idiosyncratic productivity ($\varepsilon^j_{t+1} < \tilde{\varepsilon}^j_{t+1}$) find it more advantageous to save their resources in banks rather than engage in production.

In the dynamic model, the key difference lies in the denominator of the cutoff. Two additional terms appear in the denominator: the government subsidy τ^j and the general production return R_{t+1}. When government subsidies increase (τ^j rises), the cutoff $\tilde{\varepsilon}^j_{t+1}$ decreases, leading more low-productivity firms to choose production. This occurs because the subsidies lower the effective cost of production, making it more attractive for unproductive firms. The government subsidies would further distort the capital allocation efficiency. Additionally, when the general return on production is high, more firms would choose to produce because low-productivity firms find it easier to achieve net benefits from production.

VI.1.4 Case II: With finance lease Market

When a finance lease market exists, firms must make two decisions: first, if produce whether to produce or not, and second, whether to borrow from banks or lessors. Their decisions are summarized in the following proposition.

Assumption 2. *Due to the repossession advantage of lessors, we assume: $\eta^j > \theta^j$ for each sector j.*

Proposition 8. *Assume that the idiosyncratic productivity of firms in each sector follows a distribution with the CDF $F^j(\cdot)$. The LTV ratio for banks is θ^j, while the LTV ratio for lessors is η^j. Assumption 2 holds and after observing the idiosyncratic productivity for the next period, $\varepsilon^j_{i,t+1}$, and taking the aggregate variables as given, the optimal decisions for $\{ko^j_{i,t+1}, k^j_{i,t+1}, kl^j_{i,t+1}, b^j_{i,t+1}, l^j_{i,t+1}\}$ are summarized as follows:*

$$k^j_{io,t+1}(\varepsilon^j_{t+1}) = \begin{cases} \frac{1}{1-\theta^j} h^j_{i,t}, & if \quad \varepsilon_{min} \leq \varepsilon^j_{t+1} \leq \bar{\varepsilon}^j_{t+1} \\ 0, & if \quad or \ \bar{\varepsilon}^j_{t+1} \leq \varepsilon^j_{t+1} \leq \varepsilon_{max} \end{cases} \tag{50}$$

$$k_{il,t+1}^{j}(\varepsilon_{t+1}^{j}) = \begin{cases} 0, & if \quad \varepsilon_{min} \leq \varepsilon_{t+1}^{j} \leq \bar{\varepsilon}_{t+1}^{j} \\ \frac{1}{1-\eta^{j}} h_{i,t}^{j}, & if \quad \bar{\varepsilon}_{t+1}^{j} \leq \varepsilon_{t+1}^{j} \leq \varepsilon_{max}. \end{cases} \tag{51}$$

$$k_{i,t+1}^{j}(\varepsilon_{t+1}^{j}) = \begin{cases} 0, & if \quad \varepsilon_{min} \leq \varepsilon_{t+1}^{j} \leq \underline{\varepsilon}_{t+1}^{j} \\ \frac{1}{1-\theta^{j}} h_{i,t}^{j}, & if \quad \underline{\varepsilon}_{t+1}^{j} \leq \varepsilon_{t+1}^{j} \leq \bar{\varepsilon}_{t+1}^{j} \\ \frac{1}{1-\eta^{j}} h_{i,t}^{j}, & if \quad \bar{\varepsilon}_{t+1}^{j} \leq \varepsilon_{t+1}^{j} \leq \varepsilon_{max}. \end{cases} \tag{52}$$

$$l_{i,t+1}^{j}(\varepsilon_{t+1}^{j}) = \begin{cases} -\frac{1}{1-\theta^{j}} h_{i,t}^{j}, & if \quad \varepsilon_{min} \leq \varepsilon_{t+1}^{j} \leq \bar{\varepsilon}_{t+1}^{j} \\ \frac{\eta^{j}}{1-\eta^{j}} h_{i,t}^{j}, & if \quad \bar{\varepsilon}_{t+1}^{j} \leq \varepsilon_{t+1}^{j} \leq \varepsilon_{max}. \end{cases} \tag{53}$$

$$b_{i,t+1}^{j}(\varepsilon_{t+1}^{j}) = \begin{cases} \frac{\theta^{j}}{1-\theta^{j}} h_{i,t}^{j}, & if \quad \varepsilon_{min} \leq \varepsilon_{t+1}^{j} \leq \bar{\varepsilon}_{t+1}^{j} \\ 0, & if \quad \bar{\varepsilon}_{t+1}^{j} \leq \varepsilon_{t+1}^{j} \leq \varepsilon_{max}. \end{cases} \tag{54}$$

where

$$\underline{\varepsilon}_{t+1}^{j} = \frac{r_{l,t+1} + \delta}{\tau^{j} z_{t}^{j} R_{t+1}} \tag{55}$$

$$\bar{\varepsilon}_{t+1}^{j} = \frac{\eta^{j}(1-\theta^{j})(r_{l,t} + \delta) - \theta^{j}(1-\eta^{j})(r_{d,t} + \delta)}{\tau^{j} z^{j} R_{t+1}(\eta^{j} - \theta^{j})} \tag{56}$$

The net value of firm is:

$$h_{i,t}^{j} = (\tau^{j} z^{j} \varepsilon_{t}^{j} R_{t} + 1 - \delta) k_{i,t}^{j} - (1 + r_{d,t})\, b_{i,t}^{j} - (1 + r_{l,t}) l_{i,t}^{j} \tag{57}$$

The proof is provided in the Appendix; see Proof E.7.

The interpretations of firms' decisions are analogous to those in the static model. Specifically, firms with low idiosyncratic productivity ($\varepsilon_{t+1}^{j} < \underline{\varepsilon}_{t+1}^{j}$) choose to save. In particular, they prefer to save in the leasing market (acting as lessors) because the lease rate is higher than the bank loan rate. Firms with high productivity ($\varepsilon_{t+1}^{j} > \underline{\varepsilon}_{t+1}^{j}$) choose to produce, and their financing decisions between bank loans and lease loans depend on the trade-off between leverage and financing costs. High-productivity firms that place greater value on leverage (i.e., they earn more from additional funding) choose to borrow from lessors, whereas moderately high-productivity firms, which place less value on leverage, choose to borrow from banks.

VI.2 Aggregate and Competitive Equilibrium

In this section, we describe the aggregate variables and the competitive equilibrium.

We define the net worth of sector j at period t, after production but before exiting, as:

$$H_{t-1}^{j} = \int \int h_{it-1}^{j} \; dF^{j}(\varepsilon_{t-1}^{j}) di \tag{58}$$

The net value of sector j after old firms exit and new firms entry is represented by:

$$\tilde{H}_{t-1}^{j} = (1-\delta_e) H_{t-1}^{j} + \delta_e h_{0t-1}^{j} \tag{59}$$

We denote the distribution of net value (after exiting) in sector j at period t as $G_t^j(\cdot)$. The aggregate capital of sector j at period t is defined as:

$$K_t^j = \int \int k_{it}^j(\varepsilon_t^j, h_{t-1}^j) \; dF^j(\varepsilon_t^j) dG_t = \tilde{H}_{t-1}^j \int \frac{k_{it}^j}{\tilde{h}_{t-1}^j} dF^j(\varepsilon_t^j) \tag{60}$$

where $\frac{k_{it}^j}{h_{t-1}^j}$ is independent of h_{t-1}^j due to the linear relationship between k_{it}^j and h_{t-1}^j. $\tilde{h}_{t-1}^j = h_{t-1}^j$ for incumbent and $\tilde{h}_{t-1}^j = h_{0t-1}^j$ for new entrants.

The effective capital of sector j at period t is defined as:

$$\tilde{K}_t^j = \tilde{H}_{t-1}^j \int z^j \varepsilon_t^j \frac{k_{it}^j}{\tilde{h}_{t-1}^j} \; dF^j(\varepsilon_t^j) \tag{61}$$

The traditional bank loan of sector j at period t is defined as:

$$B_t^j = \tilde{H}_{t-1}^j \int z^j \varepsilon_t^j \frac{b_{it}^j}{\tilde{h}_{t-1}^j} \; dF^j(\varepsilon_t^j) \tag{62}$$

The leased loan of sector j at period t is defined as:

$$L_t^j = \int l_{it}^j \; dF^j(\varepsilon_t^j) = \tilde{H}_{t-1}^j \int \frac{l_{it}^j}{\tilde{h}_{t-1}^j} \; dF^j(\varepsilon_t^j) \tag{63}$$

The labor of sector j at period t is defined as:

$$N_t^j = \tau^j \left(\frac{1-\alpha}{W_t} \right)^{\frac{1}{\alpha}} \tilde{K}_t^j = \tau^j \left(\frac{R_t}{\alpha} \right)^{\frac{1}{1-\alpha}} \tilde{K}_t^j \tag{64}$$

The output of sector j at time period t is:

$$Y_t^j = \left(\tilde{K}_t^j\right)^{\alpha} \left(N_t^j\right)^{1-\alpha} \tag{65}$$

The TFP of sector j at time period t is:

$$A_t^j = \frac{Y_t^j}{(K_t^j)^{\alpha}(N_t^j)^{1-\alpha}} \tag{66}$$

The total output is:

$$Y_t = \sum_{j\in\{s,p\}} Y_t^j \tag{67}$$

The total capital is:

$$K_t = \sum_{j\in\{s,p\}} K_t^j \tag{68}$$

The total labor is:

$$N_t = \sum_{j\in\{s,p\}} N_t^j \tag{69}$$

We assume that total TFP is the weighted average TFP of the two sectors:

$$A_t = \sum_{j\in\{s,p\}} \frac{K_t^j}{K_t} A_t^j \tag{70}$$

A competitive equilibrium consists of allocations and prices such that: (i) Taking prices as given, the allocations solve the optimization problems of households and firms; (ii) Prices clear the goods market, labor market, capital market, traditional credit market, and leasing market.

The market-clearing conditions are:

- Goods market:

$$C_t + K_{t+1} = Y_t + (1-\delta)K_t \tag{71}$$

- Leasing market:

$$L_t^s + L_t^p = 0 \tag{72}$$

- Traditional loan market clears:

$$B_t^s + B_t^p = S_t \tag{73}$$

- Capital market:

$$\sum_{j\in\{s,p\}} K_t^j = \sum_{j\in\{s,p\}} \tilde{H}_{t-1}^j + S_t \tag{74}$$

- Labor market:

$$1 = \sum_{j\in\{s,p\}} N_t^j \tag{75}$$

The specific definitions of aggregate variables for each case are provided in Appendix F.1, and Appendix F.2 describes how we solve this dynamic model.

VI.3 Calibration

In the calibration, we use annual data to calibrate our dynamic model.

The parameters to be calibrated include the discount factor β, the income share of capital α, the capital depreciation ratio δ, and the exit probability δ_e. Additionally, since there are two sectors, we need to calibrate parameters specific to each sector $j \in \{s, p\}$: sector-specific productivity z^j, sector-specific subsidy $\tilde{\tau}^j$, the LTV ratio θ^j for traditional bank loans, the LTV ratio η^j in the finance lease market, idiosyncratic productivity dispersion σ^j, and the endowment of newly entering firms h_0^j. For simplicity, we assume $\eta^s = \eta^p$[24].

We calibrate our model at an annual frequency and group the parameters mentioned above into four blocks.

In the first block, we set parameters based on the literature. In particular, we set the capital income share $\alpha = 0.5$ following Song et al. (2011) and Bai et al. (2006).

For the parameters in the second block, we determine them by uniquely matching them with their empirical counterparts at the aggregate level. The depreciation rate of capital stock, δ, is set to 0.1 to match the annual depreciation rate of 10% (Song et al., 2011; Bai et al., 2006; Liu et al., 2021). We set the exit probability $\delta_e = 0.128$, in line with the empirical evidence in Brandt et al. (2012)[25]. For the discount factor β, we calibrate it to 0.978 to match

[24] In the finance lease market, SOEs are assumed not to have a privileged position due to implicit government guarantees, as creditors' rights are largely secured through repossession advantages.

[25] They construct a firm-level database of the Chinese manufacturing sector. According to Table A.3 in their online Appendix, the average exit rate from 1998-2006 is 12.8%.

the average real deposit rate of the Chinese economy of 2.25% from 1998-2021, as in Belo et al. (2022).

For the parameters in the third block, we calibrate each of them to uniquely match one moment implied by our model. We calibrate the LTV ratios $\theta^s = 0.504$ and $\theta^p = 0.279$ to match the average firm-level Long-Term Liability/Fixed Asset ratio for each sector using firm-level panel data from China's Annual Survey of Industrial Firms from 1998-2007, as in Liu et al. (2021)[26].

As for the wedge, we normalize the POE wedge $\tilde{\tau}^p = 1$, which implies $\tau^p = 1$. According to equations (64) and (65), we have:

$$Y^j = \tau^j \left(\frac{R}{\alpha}\right) \tilde{K}^j \tag{76}$$

and the ratio of outputs of each sector is:

$$\frac{Y^p}{Y^s} = (\tau^s)^{1-\alpha} \frac{\tilde{K}^s}{\tilde{K}^p} \tag{77}$$

Also, according to the definition of sector productivity (66) we have:

$$\frac{A^p}{A^s} = \left(\frac{\tilde{K}^p}{\tilde{K}^s}\right)^{\alpha} \left(\frac{K^p}{K^s}\right)^{\alpha} \tag{78}$$

Combine these two equations we have:

$$\tau^s = \left(\frac{Y^s}{Y^p}\right)^{\frac{1}{1-\alpha}} \left(\frac{K^p}{K^s}\right)^{\frac{1}{1-\alpha}} \left(\frac{A^p}{A^s}\right)^{\frac{1}{\alpha(1-\alpha)}} \tag{79}$$

Thus, we use the ratio of output, capital, and the TFP gap between the two sectors in the data to calibrate τ^s. We use data from CEIC to estimate the output and capital ratios of the two sectors. In terms of the TFP gap, we follow Brandt et al. (2012); Hsieh and Klenow (2009). Brandt et al. (2012) estimates an average gap of 1.8 during 1998-2004, while Hsieh and Klenow (2009) estimate an average gap of 1.42. In our calibration, we set $A^p/A^s = 1.58$, which is the midpoint of these estimates. Based on CEIC data from 1998-2007, we set $Y^s/Y^p = 0.48/0.52$ and $K^p/K^s = 0.38/0.62$. Thus, we calibrate $\tau^s = 2$.

For the parameters in the fourth block, $\{z^s, z^p, \sigma^s, \sigma^p\}$, we calibrate them simultaneously to match four moments. These targeted moments include the consumption-to-output ratio,

[26] They use data from 1998-2007; here, we use the extended dataset from 1998-2013.

the SOE output ratio, the POE borrower ratio, and the leasing loan rate spread. Specifically, we target $C/Y = 0.6$, $Y^s/Y = 0.48$, $1 - F^p(\underline{\varepsilon}^p) = 0.7$, and $r_l - r = 1.06\%$. We calibrate the endowment for new firms, h_0^j, to be 25% of the net worth of existing firms in sector j. Finally, all parameters are summarized in Table 5.

[Place Table 5 about here]

Table 6 presents key moments from both the data and our model, indicating that our model aligns well with the Chinese economy.

VI.4 Transition Dynamics

After calibrating the parameters in our dynamic model, we now discuss the dynamic effects of the existence of a finance lease market. The economy starts from the steady state without a finance lease market (period -5 to 0). Suppose that in period 1, the finance lease market emerges with a collateralizability of $\eta = 0.6$. The economy then converges to the steady state with a finance lease market. Figures 2 - 5 present the transition dynamics of the existing of finance lease market.

VI.4.1 The TFP gap of lessor and lessee

Figure 2 shows the TFP gap between lessees and lessors within each sector. In the presence of a leasing market, the productivity of lessee firms is higher than that of lessor firms within both the state-owned and private-owned sectors. This model implication aligns with empirical evidences.

The left panel displays the TFP gap in the state-owned sector, while the right panel shows the TFP gap in the private-owned sector. The red line represents the average idiosyncratic productivity of lessee firms, the blue line represents the average idiosyncratic productivity of lessor firms, and the black dashed line represents all other firms (excluding lessees and lessors).

Before the introduction of the finance lease market, there is no difference in average idiosyncratic productivity among these three types of firms. However, after the leasing market emerges, the average productivities of lessee firms in both the state-owned and private-owned sectors surge and become significantly higher than that of other firms. Meanwhile, the average productivity of lessor firms declines and becomes significantly lower than that of other firms.

In our model, investment is monotonic in productivity, meaning that high productivity implies that lessee firms have high investment rates, while low productivity implies that lessor firms have low investment rates—consistent with our main empirical findings.

[**Place Figure 2 about here**]

VI.4.2 Dynamics of finance lease market

Figure 3 illustrates the transition dynamics of key financial market variables. Panel (a) shows the dynamics of the LTV of lease loans, while Panel (b) presents the dynamics of the lease rate. As the economy transitions from a state without a finance lease market to one with it, the lease rate initially rises from the risk-free rate[27] to nearly 5% before gradually converging to its new steady state. This overshooting pattern results from the assumption of a permanent and substantial increase in the LTV ratio.

Additionally, as shown in Panel (c), the magnitude of the finance lease market[28] also increases, aligning with real-world trends. Since 2007, the finance lease market has experienced significant growth, reflecting its ongoing development and expansion.

At the same time, our model effectively captures the proportions of SOEs and POEs among both lessees and lessors. Panels (d) and (e) illustrate the proportion of SOEs and POEs among lessees and lessors, respectively.

Following the introduction of the finance lease market, SOEs account for nearly 60% of lessors, while POEs make up the remaining 40%. In our dataset, we observe that SOEs represent 64% of lessors, whereas POEs account for 36%. Regarding contract initiation, 81% of contracts in the data are initiated by SOE lessors[29].

In terms of lessees, SOEs comprise 40% of lessees, while POEs make up 60%. In the data, 61% of lease contracts are initiated by POEs, whereas 39% are initiated by SOEs[30].

Panel (f) presents the net position of the state-owned and private-owned sectors in the

[27] In the model, a lease rate equal to the risk-free rate signifies the absence of a finance lease market.

[28] The magnitude of the finance lease market refers to the total volume of borrowing (or lending) within the finance lease market.

[29] The discrepancy between these figures may be due to missing data on lessors. We can only match lessors when their parent firms are publicly listed, leading to missing data on many non-listed lessors, among which POEs constitute a larger share.

[30] In the data, each firm can enter multiple contracts per period, whereas in the model, we assume each firm can enter only one contract per period. As a result, the number of firms equals the number of contracts in the model.

finance lease market. As the figure indicates, the private-owned sector is a net credit borrower, while the state-owned sector is a net credit lender in the finance lease market. This finding suggests that credit flows from the state-owned sector to the private-owned sector through this market.

[**Place Figure 3 about here**]

VI.4.3 Dynamics of each sector

Figure 4 presents our model's implications for the dynamics within each sector. Panel (a) captures the dynamics of the LTV of lease loans, where the red dashed line represents the private-owned sector, and the black solid line represents the state-owned sector.

As illustrated in Panel (d), the TFP of both the state-owned and privately-owned sectors increases with the presence of a finance lease market. Specifically, sectoral TFP rises by 5.14% for the state-owned sector and 3.65% for the private-owned sector. This boost in sectoral TFP can be attributed to the increased concentration of capital among high-productivity firms, as indicated by both the reduced mass and the enhanced average productivity of active firms.

Panel (b) shows that the number of active firms within both sectors decreases by 19%, while Panel (c) reveals that the average idiosyncratic productivity of active firms rises by 15.46% in the private-owned sector and by 11.08% in the state-owned sector. These findings suggest that more less productive firms choose to lend their capital to high productive firms through the leasing market rather than engage in production themselves. This redistribution of capital from low- to high-productivity firms within each sector significantly enhances overall sectoral productivity.

In addition to intra-sectoral capital flows, Panel (e) reveals that capital also moves between sectors with the introduction of a finance lease market. Specifically, the capital share of the private-owned sector increases from 23.3% to 44.10%, while that of the state-owned sector decreases from 76.68% to 55.90%. Consequently, capital is reallocated from the lower-productivity state-owned sector to the higher-productivity private-owned sector.

As the private-owned sector now commands a larger share of capital, its output increases. Conversely, the output of the state-owned sector declines due to its reduced capital share in the presence of the finance lease market. This dynamic shift not only reflects the strategic movement of capital across sectors but also underscores the impact of finance lease on sectoral productivity and output.

[**Place Figure 4 about here**]

VI.4.4 Dynamics of Aggregate Economy

In this section, we explore the aggregate economic implications of our model. Panel (a) captures the dynamics of the LTV of lease loans. In all panels, the red dashed line represents the private-owned sector, while the black solid line represents the state-owned sector.

Panel (b) details the dynamics of aggregate capital within the economy, which initially decreases before rising and ultimately stabilizing at a new steady state. At this new steady state, total capital in the economy increases by 7.28%. The initial decrease is primarily due to a significant reduction in capital in the state-owned sector, which outweighs the initial increase in the privately-owned sector. This pattern reflects the early adjustments and redistributions of capital between sectors before reaching a new equilibrium.

Panel (c) shows the dynamics of aggregate TFP in the economy. At the new steady state, aggregate TFP rises by 12.71%. This increase, which is significantly larger than the rise in sectoral TFP, is primarily driven by the redistribution of capital across sectors, underscoring the critical cross-sector reallocation effects of the leasing market.

Panels (d) and (e) illustrate the dynamics of aggregate consumption and output, respectively. Consumption and output increase by 21.21% and 16.24%, respectively, highlighting the significant economic growth and improved well-being resulting from the influence of the finance lease market.

[**Place Figure 5 about here**]

VI.4.5 Decomposition of TFP

From the previous analysis, we understand that the increases in TFP can be attributed to reallocation effects both within and across sectors. In this section, we decompose the increase in TFP to examine the relative contributions of these two channels. This detailed analysis aims to illuminate the specific mechanisms through which TFP improvements are achieved, providing insights into the dynamics of sectoral productivity growth.

We denote the aggregate TFP at the new steady state and the old steady state as A_1 and A_0, respectively, and the share of capital as ω_1^j and ω_0^j, respectively. We decompose the

change in aggregate TFP based on equation (70). This decomposition yields the following three terms:

$$\begin{aligned} A_1 - A_0 &= \omega_1^s A_1^s + \omega_1^p A_1^p - \omega_0^s A_0^s - \omega_0^p A_0^p \\ &= \omega_0^s (A_1^s - A_0^s) + (\omega_1^s - \omega_0^s) A_s^0 + (\omega_1^s - \omega_0^s)(A_s^1 - A_s^0) \\ &+ \omega_0^p (A_1^p - A_0^p) + (\omega_1^p - \omega_0^p) A_p^0 + (\omega_1^s - \omega_0^p)(A_p^1 - A_p^0) \\ &= \underbrace{\sum_{j \in \{s,p\}} \omega_j^0 \Delta A^j}_{Within} + \underbrace{\sum_{j \in \{s,p\}} \Delta\omega_j A_j^0 + \sum_{j \in \{s,p\}} \Delta\omega_j \Delta A^j}_{\text{Across Sector}} \end{aligned} \tag{80}$$

where $\Delta A^j = A_1^j - A_0^j$ and $\Delta\omega^j = \omega_1^j - \omega_0^j$ Our decomposition of TFP at the aggregate level has a similar form to that of Bian (2020), which performs the decomposition at the firm level.

The first term in equation (80) captures the TFP gain from sectoral TFP growth. Sectoral TFP growth primarily results from the within-sector reallocation of capital from low-productivity firms to high-productivity firms. The second and third terms are often referred to as cross-sector reallocation effects because they are related to changes in the capital share of each sector.

The second and third term represents the across effect, capture the contribution of capital share changes between the two sectors, holding their productivity constant and the covariance between changes in capital share and changes in productivity. In the calibrated economy, the total growth in aggregate TFP is 12.71%, of which the across effect contributes 10.03% (approximately 80%), while the within effect contributes 2.68% (approximately 20%). Thus, most TFP gains result from the more efficient allocation of capital between the private-owned and state-owned sectors.

VII Counterfactual Analysis

In this section, we do some counterfactural analysis basing on the model in the previous section.

VII.1 Increase the dispersion of idiosyncratic productivity

In this subsection, we analyze the effects of increasing the dispersion of idiosyncractic productivity in both sectors.

First, while keeping all other parameters constant, we increase the dispersion of idiosyncratic volatility in the POE sector, σ^p, by 10%. The transition path of both the level and the percentage change of aggregate TFP is illustrated in Figure (**??**). As the dispersion in POE sector increases, the positive impact of the finance lease market on aggregate TFP becomes more pronounced, resulting in an additional TFP increase of 0.99% compared to the baseline model.

Then, we increase the dispersion of idiosyncratic volatility in the SOE sector (keep all other parameters including the dispersion in POE sector the same) by 10%. When uncertainty is large, finance lease market is more important. The transition path of both the level and the percentage change of aggregate TFP is illustrated in Figure (**??**). As the dispersion in POE sector increases, the positive impact of the finance lease market on aggregate TFP becomes more pronounced, resulting in an additional TFP increase of 0.17% compared to the baseline model.

Increasing dispersion in both the POE and SOE sectors have no big influence on the level of aggregate TFP in the case when there is no finance lease market. As shown in both figures, there is not big difference between the red line and black line at time 0. That is because the we only change the second moment of the distribution of the productivity and leave the first moment of distribution to be the same. However, increasing the dispersion of productivity distributions positively impacts the effects generated by the finance lease market. This is because the increase in dispersion enhances within-sector reallocation. As dispersion rises, more firms on the right tail with high idiosyncratic productivity become lessees and obtain more credit, while more firms on the left tail with low idiosyncratic productivity become lessors, thereby enhancing within-sector reallocation.

The effect of increasing dispersion in the POE sector has a greater impact on aggregate TFP than that in the SOE sector. This is partly because the original magnitude of dispersion in the POE sector is larger than that in the SOE sector ($\sigma^p > \sigma^s$), so a 10% increase results in a more significant rise in the POE sector. In addition to this technical difference, the sectoral productivity of the POE sector is higher, and the effects on aggregate TFP are equal to the within-effect multiplied by sectoral productivity. Therefore, the effects of increasing σ^p are more pronounced.

This counterfactual analysis highlights the importance of the finance lease market during bad times, particularly when accompanied by a positive shock to the second moment (Bloom et al., 2018). Although there are negative effects associated with the first moment, the

presence of the finance lease market, along with the positive shock to the second moments, contributes to improvements in aggregate TFP and output to some extent.

VII.2 Decrease LTV of POE sector in bank.

In this subsection, we analyze the impact of a decrease in the parameter θ^p on the effects of the finance leasing market on capital allocation efficiency. The difference between θ^p and θ^s reflects the magnitude of financial frictions caused by state ownership of corporations. Thus, a decrease in θ^p represents an economy with greater financial frictions stemming from state ownership.

We decrease θ^p by 10%, from 0.279 to 0.2511, while keeping all other parameters unchanged. As shown in Panel (a) of Figure 6, this decrease in θ^p leads to a lower level of aggregate TFP in the economy (red line). This result is intuitive: the private sector has higher sectoral productivity, and by lowering the LTV ratio for POEs, fewer resources are reallocated to this sector, thereby harming aggregate TFP.

As mentioned in the previous section, the finance leasing market helps mitigate financial frictions caused by state ownership of corporations. Therefore, the impact of improvements in the finance leasing market is expected to be larger when financial frictions are more pronounced. This conjecture is illustrated in Panel (b) of Figure 6. The red line is above the black line, indicating that the effects of the finance leasing market on improving aggregate TFP increase. Comparing the baseline case with the case of a lower θ^p, the effect of finance leasing on aggregate TFP improves by 0.59%.

VII.3 Increasing the SOEs Subsidies

In our baseline model, SOEs receive subsidies from the government, which can distort resource allocation efficiency. To assess the significance of these subsidies on the effects of the finance leasing market, we increase the subsidies, denoted as τ^s, by 10% in this subsection. The results are presented in Figure 7.

Compared to changes in other parameters, the increase in τ^s has a substantial impact on both the level of aggregate TFP and the effectiveness of the finance leasing market. Specifically, when τ^s increases, total TFP decreases in both scenarios—with and without the finance leasing market—as shown in Panel (a) of Figure 7. In the absence of a finance leasing market, the increase in τ^s reduces aggregate TFP from 0.61 to 0.59, whereas when

the finance leasing market is present, the increase in τ^s reduces aggregate TFP from 0.69 to 0.63. This decline is attributed to government subsidies incentivizing less efficient SOEs to produce, leading to a greater allocation of capital to the SOE sector, particularly to firms with low productivity.

Furthermore, the increase in government subsidies weakens the positive effects of the finance leasing market on aggregate TFP. As shown in Panel (b), the improvement effect of the finance leasing market decreases by half, from 12.71% in the baseline model to 6.36% after the subsidy increase. This reduction occurs because higher government subsidies reduce the magnitude of the finance leasing market. In the baseline model, less productive SOEs act as lessors. However, with the rise in production subsidies, fewer SOEs become lessors, reducing capital reallocation through the finance leasing market and, consequently, diminishing the improvement effects on aggregate TFP.

VIII Conclusion

We examine how stronger creditor protection, brought by legal infrastructure in the finance leasing market, leads to more efficient capital allocation in China.

We conduct a large-sample, transaction-level study of the leasing market in China, focusing on the characteristics of lessors and lessees. Our findings indicate three key pieces of evidence: (1) Lessees are more efficient but more financially constrained, while lessors are less efficient but less financially constrained. (2) SOEs account for a larger share of lessors, whereas POEs account for a larger share of lessees. (3) Finance leasing helps lessors earn profits and mitigates the financial frictions faced by lessees.

We develop a general equilibrium model with heterogeneous firms facing collateral constraints in both traditional banking and finance leasing markets. The presence of a finance leasing market generates two allocation effects: within-sector and cross-sector. Within each sector, the finance leasing market allows low-productivity firms to lend out capital and earn a higher return (lease rate). Due to the high LTV ratio, the finance leasing market attracts high-productivity firms to borrow more, and their higher borrowing costs can be offset by increased production using more inputs. Thus, the existence of the finance leasing market concentrates capital among high-productivity firms within each sector, further increasing sectoral productivity. Regarding within-sector effects, the finance leasing market also causes capital to be reallocated cross sectors.

To quantify the impact of the finance leasing market, we calibrate the model to the Chinese economy and analyze the transition dynamics from an economy without a finance leasing market to one with an established finance leasing market. Our model aligns well with the empirical evidence. Our results show that the finance leasing market improves TFP by 12.71%. We further decompose this TFP growth into within-sector and cross-sector effects. Among these two effects, the cross-sector effect contributes the larger share. The within-sector effect accounts for 20% of the total TFP increase, while the cross-sector effect contributes the remaining 80%.

The within-sector effect highlights how finance leasing enhances resource allocation efficiency within each sector. The cross-sector effect emphasizes how finance leasing facilitates resource allocation efficiency cross sectors, underscoring its critical role in mitigating asymmetric financial frictions caused by state ownership, beyond general financial frictions.

Our paper has strong practical implications. It provides a method to mitigate financial frictions by strengthening creditor protection in other credit markets.

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Figure 1: The Effects of Increasing LTV (η) of Financial Leasing Market

This figure reports the effects of increasing LTV of financial leasing market in the static model. The x-axis denotes the LTV η of the finance lease market.

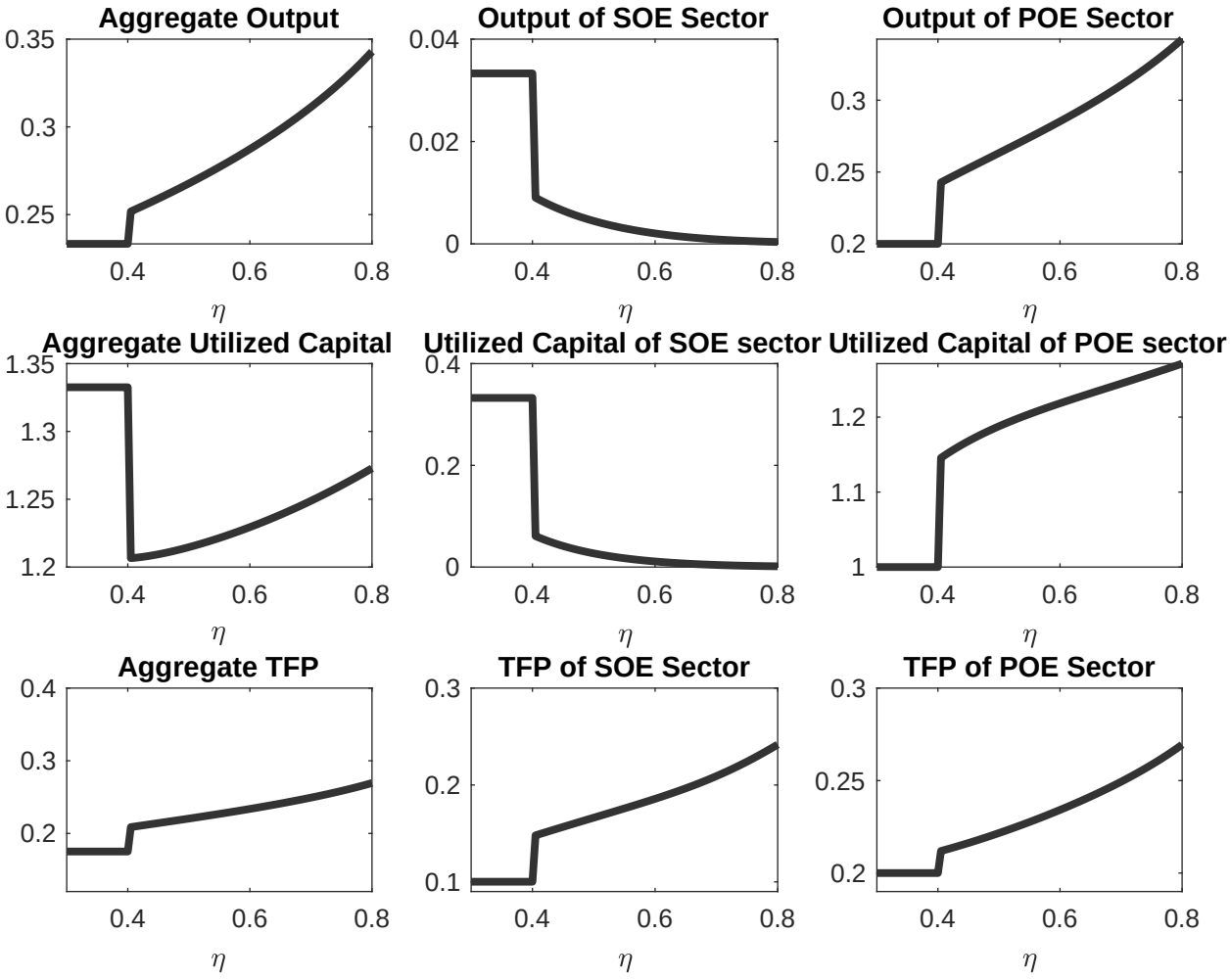


Figure 2: TFP Gap Between Lessee and Lessor

This figure reports the productivity of different types of firms—lessees, lessors, and others—within each sector along the transition dynamics. Before time 0, there is no finance lease market, after time 0, finance lease market exists with LTV $\eta = 0.6$. Panel (a) illustrates the SOE sector, while Panel (b) illustrates the POE sector. The red line represents the average productivity of lessee firms, the blue line represents the average productivity of lessor firms, and the black line represents the average productivity of all other firms. Compared to other firms, lessee firms exhibit higher productivity, while lessor firms have lower productivity in both the SOE and POE sectors.

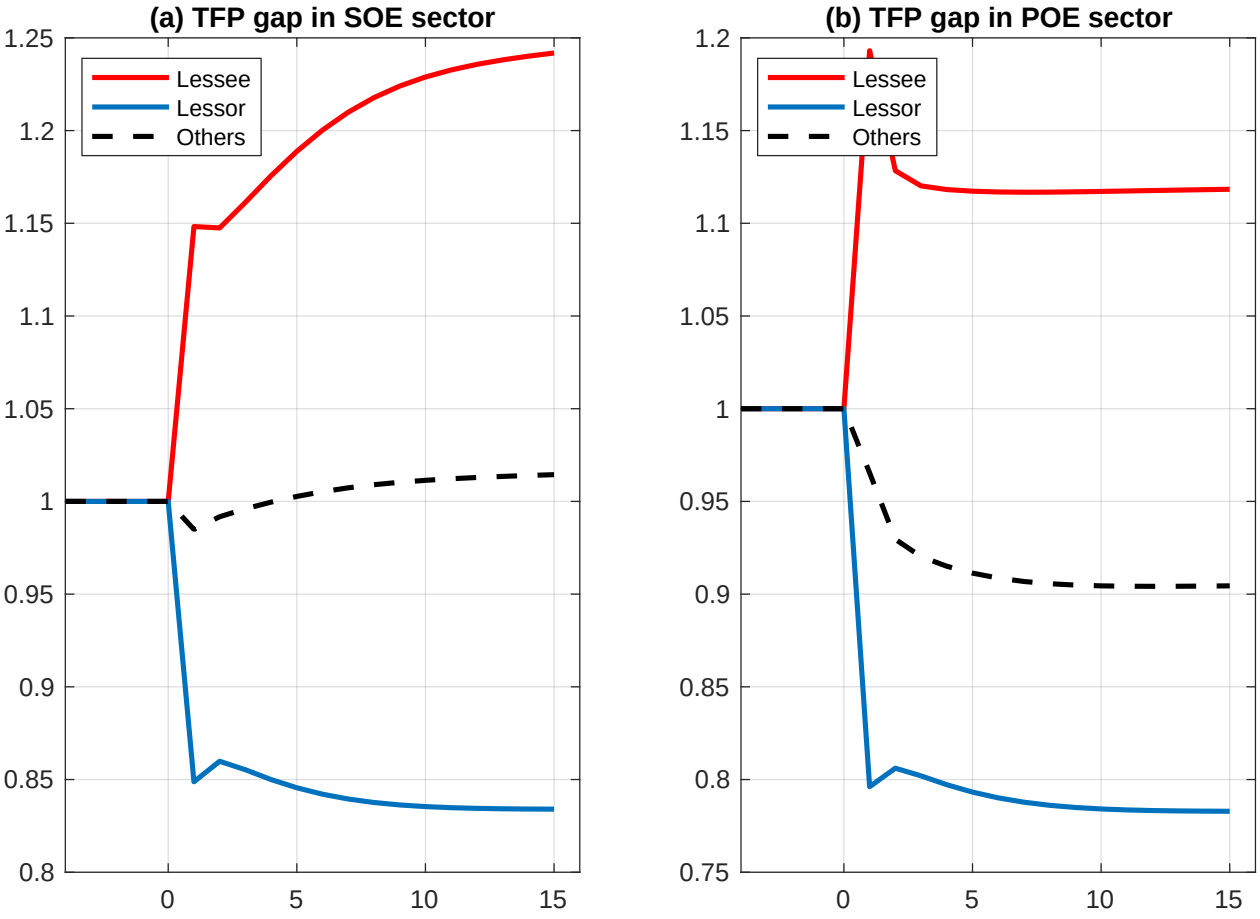


Figure 3: Transition Dynamic: Lease Market

This figure reports the transition dynamics of lease market from the economy without finance lease market to that with finance lease market. Before time 0, there is no finance lease market, after time 0, finance lease market exists with LTV $\eta = 0.6$, which is captured by Panel (a); Panel (b) shows the dynamics of lease rate and risk-free rate; Panel (c) shows the magnitude of the finance lease market; Panel (d) illustrates the share of SOE lessors and POE lessors, the red line represents the POE sector and black line represents the SOE sector; Panel (e) illustrates the share of SOE lessees and POE lessees, the red line represents the POE sector and black line represents the SOE sector; Panel (f) illustrates the net lease loans of SOE sector and POE sector, the red line represents the POE sector and black line represents the SOE sector.

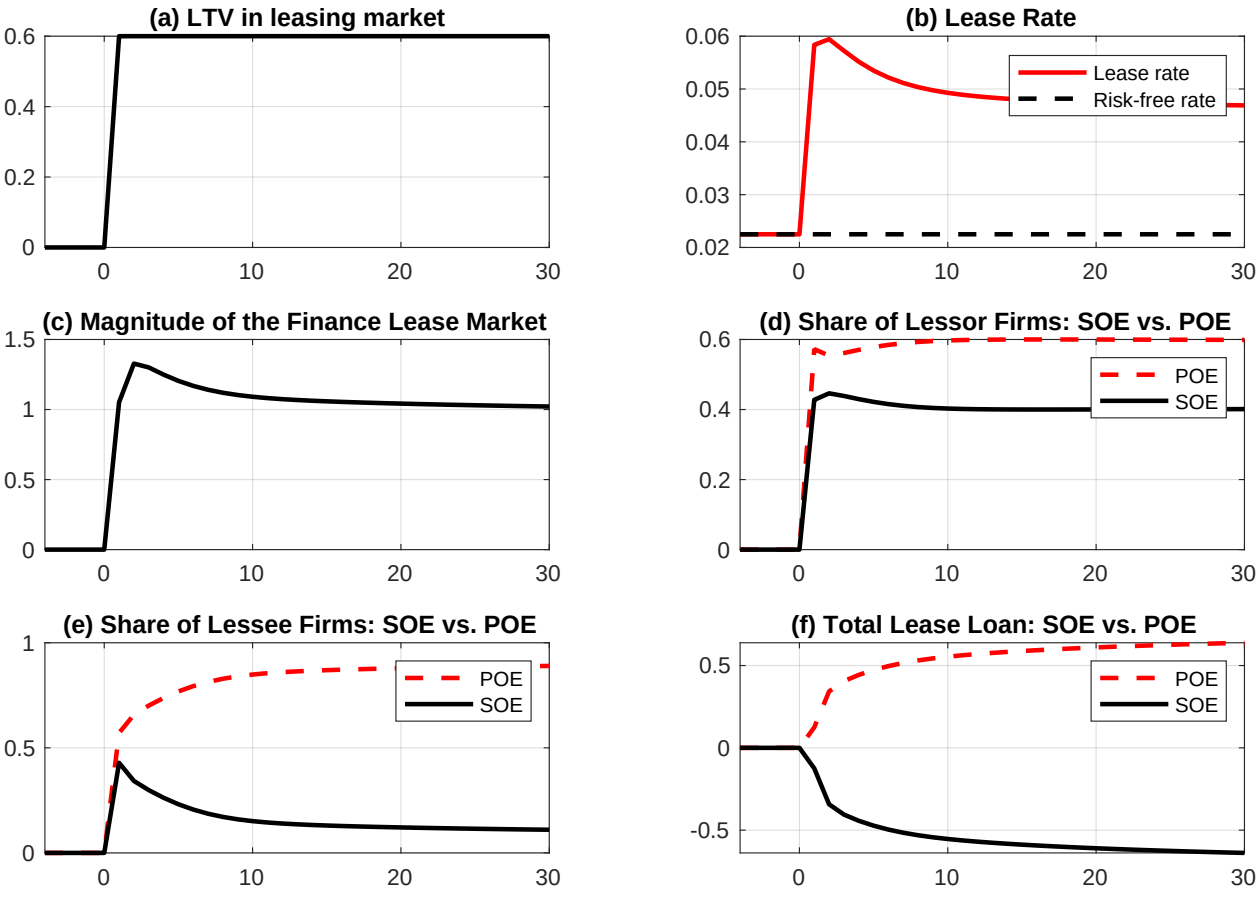


Figure 4: Transition Dynamic: Two Sectors

This figure presents the transition dynamics of the SOE and POE sectors as the economy shifts from a state without a finance lease market to one with it. Before time 0, there is no finance lease market, after time 0, finance lease market exists with LTV $\eta = 0.6$, which is captured by Panel (a). In other panels, the red line represents the POE sector, while the black line represents the SOE sector. The left y-axis corresponds to the POE sector, while the right y-axis corresponds to the SOE sector. Panel (b) shows the mass (or number) of active firms that produce independently within each sector, while Panel (c) presents the average productivity of these active firms. Panel (d) illustrates the sectoral TFP, and Panel (e) displays the capital shares of each sector, where the sum equals 1. Finally, Panel (f) depicts the sectoral outputs, capturing the impact of the finance lease market on both sectors.

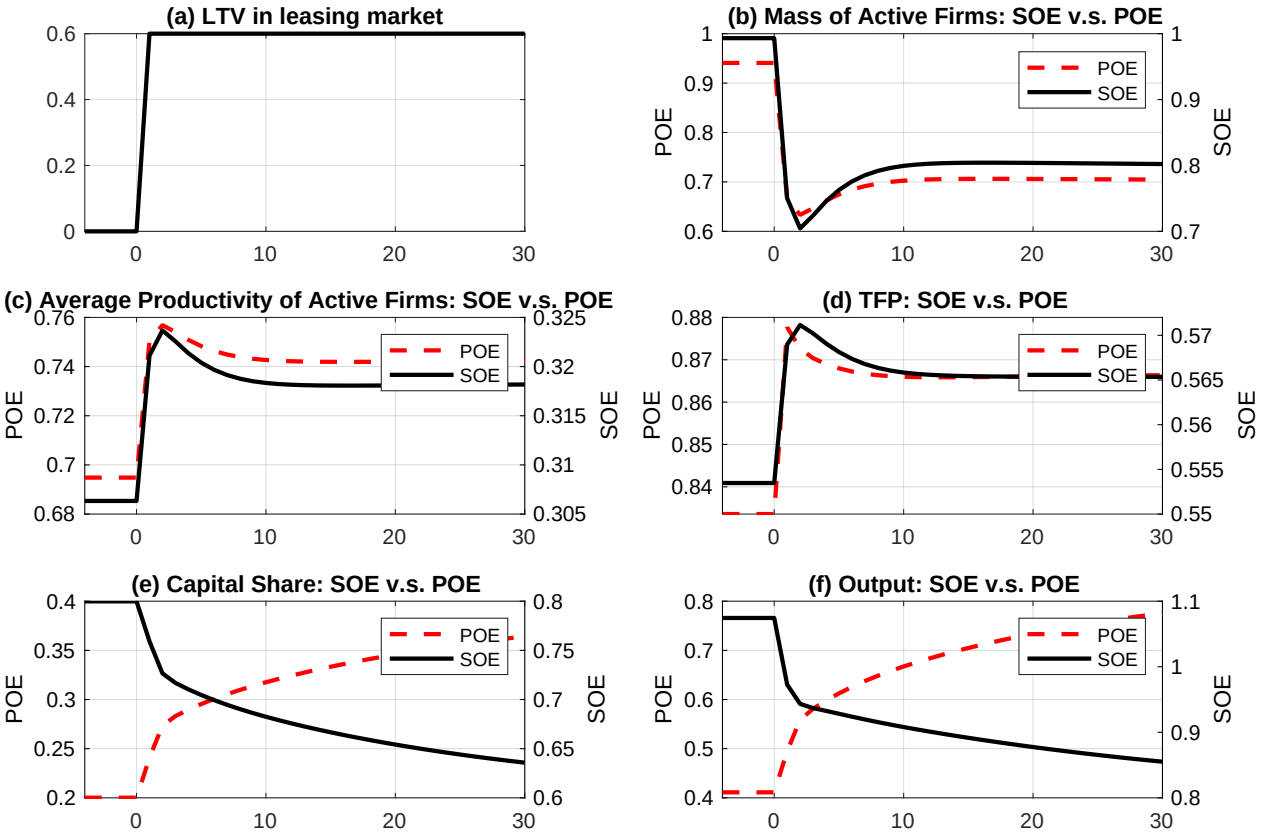


Figure 5: Transition Dynamic: Aggregate

This figure presents the transition dynamics of the aggregate economy as it shifts from a state without a finance lease market to one with it. Panel (a) captures the change in η from 0 (no finance lease market) to 0.6 (finance lease market introduced). Panel (b) depicts the dynamics of aggregate capital, while Panel (c) presents the dynamics of aggregate TFP. Panel (d) illustrates the dynamics of total consumption, and Panel (e) shows the dynamics of aggregate output.

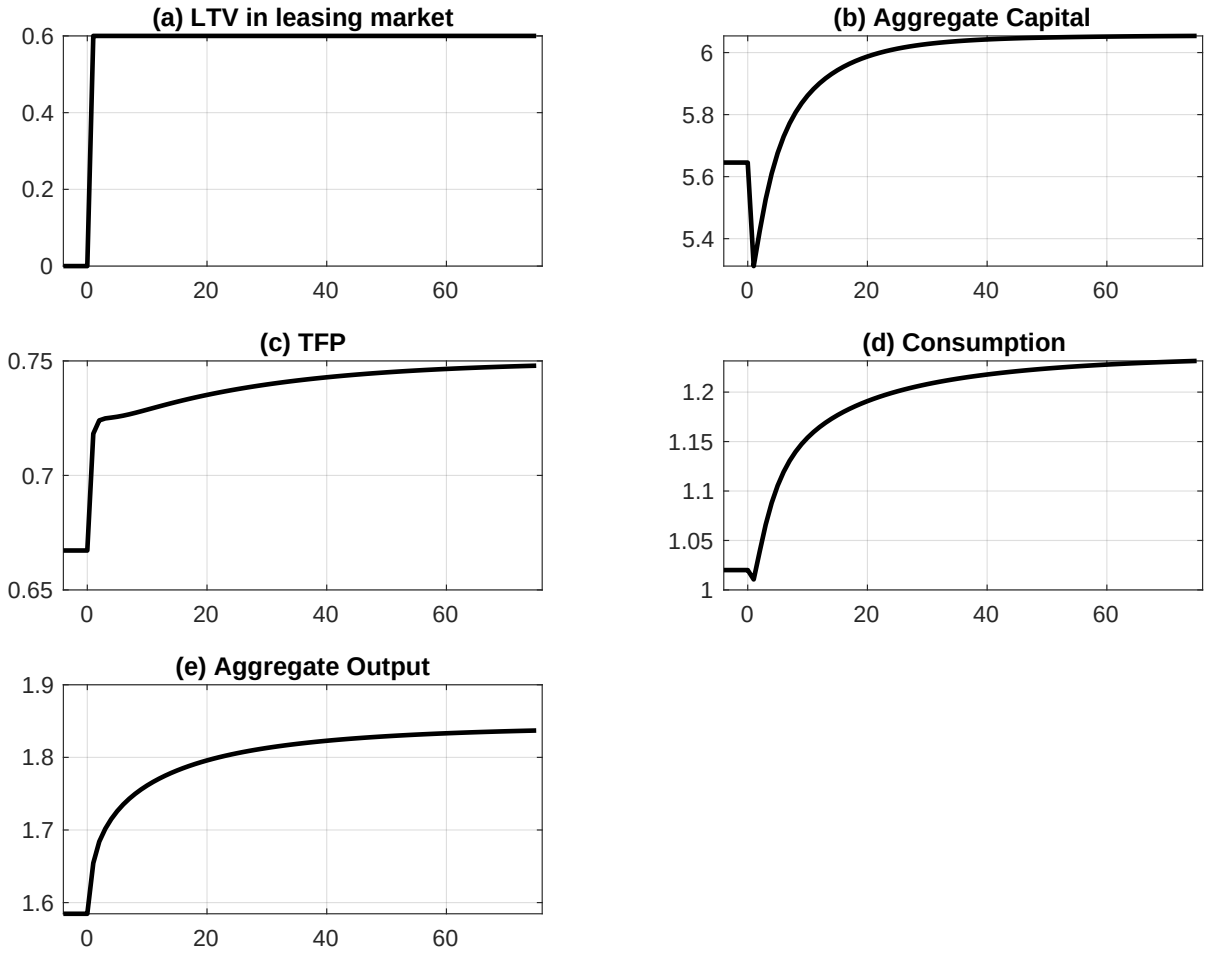


Figure 6: Counterfactural Analysis: decrease θ^p

This figure shows the transition dynamics of both the level and percentage change in aggregate TFP in the counterfactual scenario where θ^p is reduced. The black line represents the baseline, while the red line depicts the case in which θ^p is decreased by 10%.

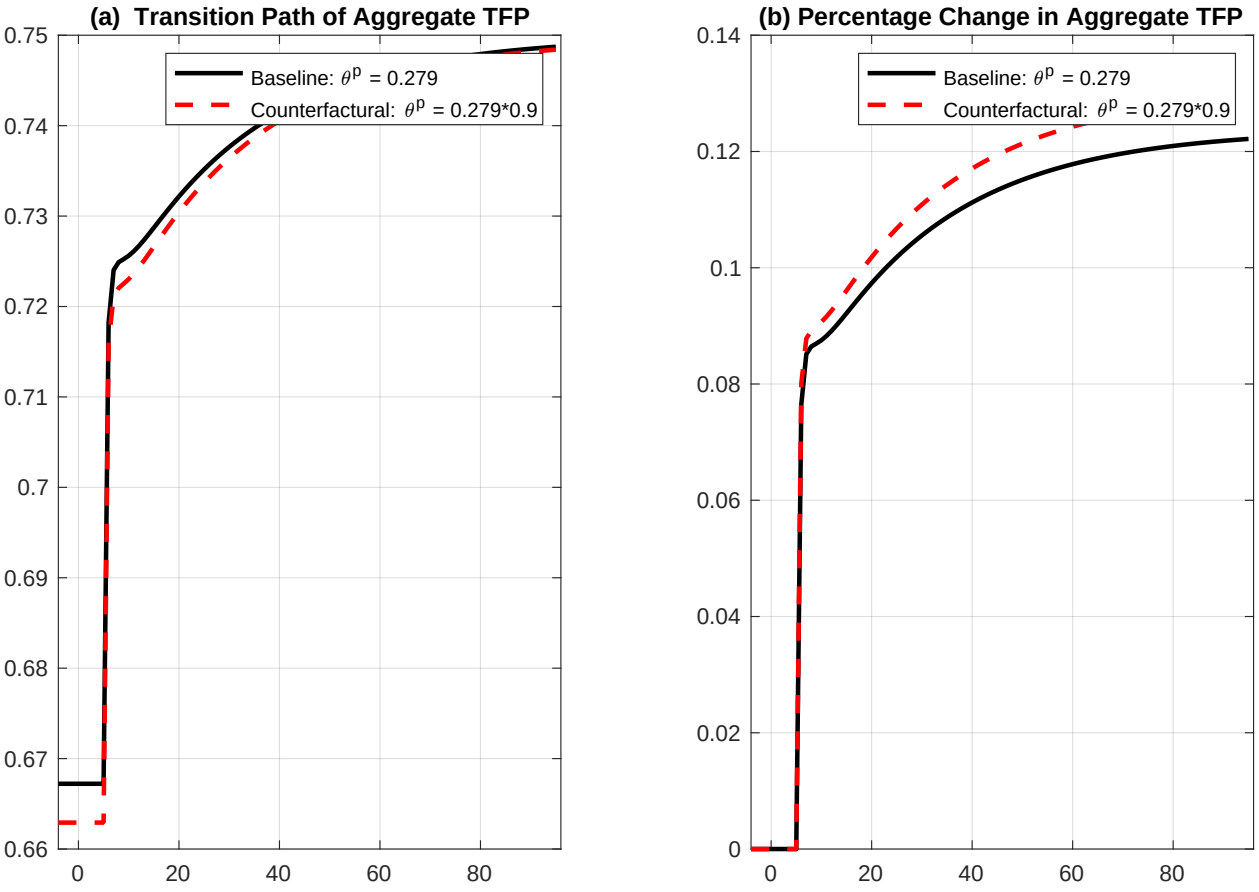


Figure 7: Counterfactural Analysis: increase τ^s

This figure illustrates the transition dynamics of the level and percentage change of aggregate TFP in the counterfactual analysis of increasing τ^s by 10%. The black line represents the baseline case, while the red line represents the scenario in which τ^s is increased by 10%.

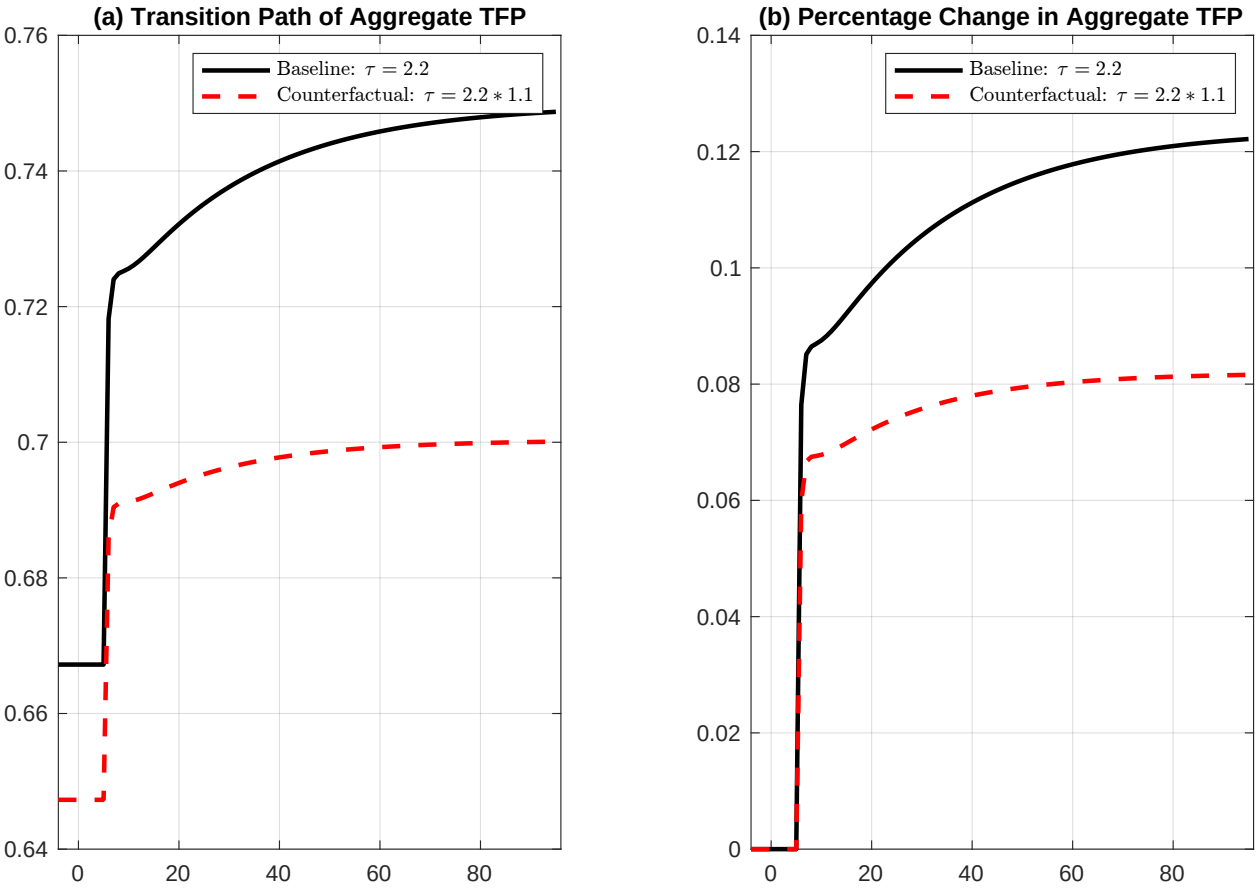


Table 1: Finance Lease Amounts in Uncleaned Contract Data

This table reports the time series of unique firms, observations, and finance lease amounts in our contract sample from 2007 to 2023. There are 4,789 lease transactions during our sample period. The number of non-missing observations for the leasing rate, leasing amount, and maturity (in years) are 1640, 4786, and 618, respectively.

Year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Total
Unique Firms	12	32	51	47	62	79	94	165	216	249	213	262	215	184	169	176	100	2326
Unique Observations	15	44	62	67	82	103	140	293	431	534	496	582	413	405	398	417	213	4695
Finance Lease Amount (in billion RMB)	1.81	4.54	12.49	11.87	20.07	25.08	33.06	59.50	89.50	94.06	81.45	93.16	68.66	65.71	57.12	59.41	30.95	808.44

Table 2: Summary Statistics of Lessor

This table reports the summary statistics of lessors. All Renminbi (RMB) values are adjusted to constant 2015 RMB. We use market capitalization weights to compute the mean for each group. Continuous variables are winsorized at the 1% and 99% levels. Column (1) reports the statistics of all SOE firms excluding lessor firms, while Column (2) reports the statistics of all POE firms excluding lessor firms. Column (3) presents the statistics of lessor firms that lend to SOE lessee firms, and Column (4) reports the statistics of lessor firms that lend to POE lessee firms. Finally, Column (5) provides the statistics of SOE lessor firms that lend to POE lessee firms. ln(Asset) represents the natural logarithm of total assets. *Firm age* denotes a firm's age, measured from the year it was listed to the year when the loan was made. *Sales growth* refers to the growth rate of sales, while *Revenue growth* represents the growth rate of operating revenue. *Fixed asset growth* denotes the growth rate of the net value of fixed assets. I/K (investment rate) is defined as: $IK_t = \frac{I_t}{0.5(K_t+K_{t+1})}$, where physical capital stock K_t is represented by net fixed assets, and physical capital investment I_t is defined as the change in gross fixed assets. *Leverage* is calculated as total liabilities divided by total assets. *Bond spread*(%) represents the percentage difference between a firm's bond issuing rate and the bank loan rate (for the same maturity). *Lease spread*(%) is the percentage difference between a firm's lease spread and the bond spread. B denotes the number of observations in each column.

	SOE	SOE Lessor	POE	POE Lessor
Assets	31.09	115.57	5.05	14.32
Sales growth	0.21	0.09	0.26	0.14
Revenue growth	0.25	0.18	0.24	0.15
Fixed asset growth	0.18	0.04	0.30	0.20
I/K	0.10	0.03	0.19	0.15
Cash/assets	0.19	0.13	0.22	0.15
Leverage	0.50	0.62	0.41	0.48
Bond issue rate(%)	4.83	4.47	6.23	5.70
Bond spread(%)	-0.72	-0.66	0.67	0.70
Lease rate		5.45		6.05
Lease spread(%)		1.40		0.44
N	10,482	254	17,763	75

Table 3: Summary Statistics of Lessee

This table reports the market capitalization-weighted averages for firm-year observations of each group. Column (1) presents the statistics for SOEs (excluding SOE lessees), while Column (2) summarizes the statistics for SOE lessees. Column (3) focuses on the characteristics of bank-affiliated SOE lessees. Column (4) reports the statistics for all POE firms (excluding POE lessee firms), and Column (5) provides the statistics for all POE lessee firms. All Renminbi (RMB) values are adjusted to constant 2015 RMB. We use market capitalization weights to compute the mean for each group. Continuous variables are winsorized at the 1% and 99% levels. The definitions of variables are the same as those in 2.

	SOE	SOE Lessee	POE	POE Lessee
Assets	32.36	20.85	4.98	6.55
Sales growth	0.16	0.26	0.18	0.27
Revenue growth	0.18	0.29	0.15	0.24
Fixed asset growth	0.13	0.19	0.20	0.30
I/K	0.10	0.13	0.18	0.23
Cash/assets	0.20	0.14	0.22	0.14
Leverage	0.50	0.59	0.41	0.56
Bond issue rate(%)	4.81	5.27	6.21	6.23
Bond spread(%)	-0.75	-0.31	0.66	0.86
Lease rate		5.83		5.94
Lease spread(%)		0.05		-0.47
N	10,055	704	17,071	1,059

Table 4: Desicion of Lessee: IK

This table reports the regression results of the lessee decision. We run logit regressions using the Loan dummy as the dependent variable. Financial variables are winsorized at the 1% and 99% levels. p-values are based on standard errors that are double-clustered by firm and year. The dependent variable is $Lessee\ Dummy_{it}$, where if firm i is a lessee in year t, then $Lessee\ Dummy_{it} = 1$; otherwise, $Lessee\ Dummy_{it} = 0$. In column (1) and column (2), we include all firms; In column (3) and (4), we include only POEs; In column (5) and (6), we include only SOEs.The sample period spans from 2007 to 2023.

	Lessee vs Others		POE Lessee vs Other POE		SOE Lessee vs Other SOE	
	(1)	(2)	(3)	(4)	(5)	(6)
lessee_dummy						
IK	0.27***	0.35***	0.26**	0.36**	0.34*	0.37*
	(0.004)	(0.001)	(0.020)	(0.021)	(0.090)	(0.070)
ln(Asset)		-0.04		0.04		-0.12
		(0.557)		(0.666)		(0.110)
Firm Age		-0.01		0.00		-0.02
		(0.646)		(0.865)		(0.176)
Sales Growth		0.05		0.16*		-0.04
		(0.261)		(0.068)		(0.529)
Tobin's Q		-0.38***		-0.46***		-0.20
		(0.000)		(0.000)		(0.112)
Leverage		0.96		0.88*		2.39***
		(0.439)		(0.070)		(0.000)
Cash/asset		-1.20**		-1.11		-1.14
		(0.026)		(0.142)		(0.133)
KZ index		0.35***		0.41***		0.18**
		(0.000)		(0.000)		(0.034)
Year_FE	Yes	Yes	Yes	Yes	Yes	Yes
Ind_FE	Yes	Yes	Yes	Yes	Yes	Yes
N	21418	21063	13299	13053	7551	7450
r2_p	0.056	0.122	0.069	0.160	0.059	0.104

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 5: Parameter Values in Dynamic Model

This table reports the calibrated parameters in the dynamic model.

Parameter	Description	Value	Target
β	Subjective discount factor	0.978	Average risk-free rate of 2.25%
α	Capital share	0.5	Standard in literature
δ	Capital depreciation rate	0.1	Capital depreciation rate of 10% per year
δ_e	firm exit rate	0.128	Evidence in (Brandt et al., 2012)
z^s	TFP of SOE sector	0.35	Estimated
z^p	TFP of POE sector	0.72	Estimated
τ^p	wedge of POE sector	1	Standardized
τ^s	wedge of SOE sector	2.2	Match TFP gap
θ^s	LTV ratio of POE sector	0.279	Long term liability/fixed assets ratio
θ^p	LTV ratio of SOE sector	0.504	Long term liability/fixed assets ratio
η	Leasing loan-to-value ratio	0.6	Mean LTV ratio in contracts
σ^s	SOE productivity dispersion	0.12	Estimated
σ^p	POE productivity dispersion	0.20	Estimated
h_0^s	value of new entrant in SOE sector	0.65	25% of existing firm in SOE sector
h_0^p	value of new entrant in POE sector	0.41	25% of existing firm in POE sector

Table 6: Moments: Model v.s. Data

This table shows the moments comparison between data and our model.

Variables	Data	Model
Consumption to Output ratio	0.60	0.67
Output share of SOE	0.48	0.48
Capital share of SOE	0.62	0.56
Lease loan spread $(r_l - r)$	1.06%	1.26%
Labor share of SOE	0.5	0.57
Lease Loan to Capital Ratio		0.15
Borrower share of POE	0.7	0.7
Share of Number of SOE Lessor	0.60	0.64
Share of SOE Lessee	0.39	0.40

Internet Appendix for

"Finance Lease and the Capital Allocation Efficiency in China"

July 4, 2025

A Additional Institutional Background

This section provides additional background on the institutional framework governing finance leases in China. We begin by comparing different types of leases, followed by a discussion of the specific legal provisions related to finance leasing. Finally, we examine the broader context of shadow banking in China, of which finance leases constitute an important component.

A.1 Comparison of Different Types of Lease

Leasing can be classified into two types: operating leases and finance leases. Figure A.3a illustrates the structure of an operating lease, in which the lessor (lender) retains ownership of the asset while granting the lessee (borrower) the right to use it. In this arrangement, the lessor provides leased capital to the lessee, who, in return, makes periodic rent payments for the use of the asset. Throughout the lease term, ownership remains with the lessor, as indicated by the curved arrow in the diagram. A finance lease also involves a lessor and a lessee (as shown in Figure A.3b), but it is structured more like a financing arrangement. The lessee assumes the risks and rewards of ownership during the lease term, with both the leased capital and periodic payments recorded on the lessee's balance sheet. At the end of the lease term, the lessee often has the option to purchase the asset at a reduced price. In this arrangement, the lessor provides leased capital to the lessee, who gains the right to use the asset for most of its economic life. In return, the lessee makes installment payments to the lessor over the lease term. While the lessor legally retains ownership during the lease term, ownership or control of the asset may transfer to the lessee afterward. Thus, the key difference between an operating lease and a finance lease is that in a finance lease, ownership of the leased capital is effectively transferred to the lessee, whereas in an operating lease, ownership remains with the lessor.

A finance lease can be further classified into a direct lease and a sale-and-leaseback (SLB) arrangement, as shown in Figures A.3c and A.3d. The distinction between these two types of finance leases lies in whether the seller and the lessee are the same party. In a direct lease, the lessor directly purchases an asset from a supplier and leases it to the lessee. The lessor makes payments to the supplier, while the lessee pays installments to the lessor for the use of the asset. Ownership remains with the lessor throughout the lease period, and it may be transferred to the lessee after the lease term. In contrast, in a sale-and-leaseback (SLB) arrangement, the lessor first purchases an asset from the lessee and then leases it back

to them. This type of lease involves two steps: first, in the buy-and-sell phase, the seller (who later becomes the lessee) sells the asset to the buyer (who later becomes the lessor) and receives the full payment. Second, in the lease phase, after selling the asset to the lessor, the lessee leases the same asset back and makes periodic payments.

An SLB arrangement provides greater financial flexibility for the lessee, allowing them to use previously owned assets as collateral to secure financing for future investments. In this case, the lessor functions more like a financial intermediary or a bank, helping the lessee unlock liquidity from existing assets.

A.2 Laws related to finance lease

In China, the *Contract Law* and *Civil Law* provide the legal framework for finance lease.

According to *Article 242* of the *Contract Law*: *"The lessor holds ownership of the leased property. If the lessee goes bankrupt, the leased property shall not be included as part of the bankruptcy estate."* From this article, we can see that the *Contract Law* recognizes the legal ownership of the leased property as belonging to the lessor, and the property can be reclaimed by the lessor if the lessee goes bankrupt.

Furthermore, the law defaults the ownership of the leased property to the lessor if no related agreement is made. *Article 250* allows the lessor and lessee to agree on the ownership of the leased property upon the expiration of the lease term. If no agreement is made, or if the agreement is unclear and ownership cannot be determined according to *Article 61*, the leased property will default to the lessor. Once bankruptcy proceedings begin, the lessor can reclaim the property through the administrator in accordance with *Article 38* of the *Bankruptcy Law*: *"After the people's court accepts a bankruptcy application, the owner of property held by the debtor but not belonging to the debtor may reclaim the property through the administrator."*

Beyond the legal framework, regulatory practices in China also support the legal position of lessors in finance lease. According to regulatory documents issued by the Ministry of Commerce: *"Finance leasing firms and leasing firms established by foreign companies may engage in finance lease business in forms such as direct leasing, subleasing, sale-and-leaseback, leveraged leasing, entrusted leasing, and joint leasing, provided they comply with relevant laws, regulations, and rules."* The sale-and-leaseback arrangement is also considered a type of finance lease, and its legality is protected by the regulator.

All this evidence supports the repossession advantages and legal protections granted to lessors in finance lease in China.

A.3 Shadow Banking in China

Finance leasing is one of the key components of shadow banking in China. In this section, we discuss shadow banking in China, with a particular focus on the differences between finance leases and entrusted loans within the shadow banking system.

Shadow banking encompasses credit activities conducted outside the traditional banking system. Since the 2008 Subprime Mortgage Crisis, China has experienced a drastic boom in shadow banking activities, attracting significant attention. According to Moody's calculations, the scale of shadow banking was equivalent to 87% of GDP in 2016[31]. As shown in Figure A.2, shadow banking in China has grown rapidly since 2002, reaching almost 30% of total AFRE.

Unlike shadow banking in the U.S., where non-bank financial institutions outside the banking system dominate, shadow banking in China is primarily driven by commercial banks. It has developed as a response to restrictions on the formal banking sector and serves as an alternative credit channel, particularly for sectors and borrowers with limited access to traditional bank loans. The Chinese government views shadow banking with concern due to its potential to undermine financial stability by increasing debt levels and introducing less-regulated risks into the financial system. In 2018, the government issued the New Asset Management Regulations to tighten control over the shadow banking system, enhancing transparency and stability in the financial sector. Since then, the share of shadow banking in AFRE has declined sharply.

Among various shadow banking activities, components such as entrusted loans and wealth management products have been extensively studied in the literature (Chen et al., 2018; Allen et al., 2019; Hachem and Song, 2021). However, another important component—leasing remains relatively understudied.

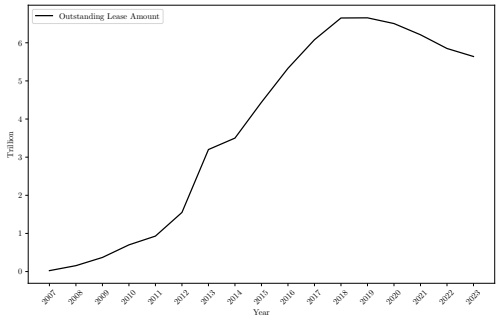
By definition, finance leasing qualifies as a shadow banking activity, as it represents a firm-to-firm secured loan. However, as observed in our sample, most contracts are initiated by non-bank-affiliated lessors. A "one-size-fits-all" approach to regulating shadow banking activities may inadvertently harm the positive role of finance leasing in the real economy.

[31]The data is from the Quarterly China Shadow Banking Monitor released by Moody's (May 2017).

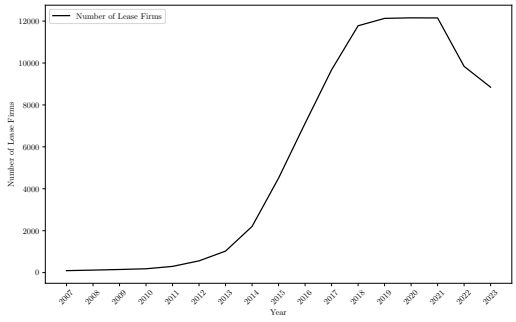
A.4 Figures and Tables for Appendix A

Figure A.1: **Leasing Industry Trends from 2007 to 2023**

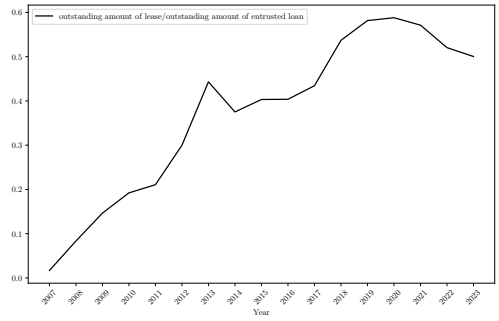
This figure presents key trends in the Chinese leasing industry from 2007 to 2023, including outstanding lease amounts, the number of leasing firms, the share of leasing loans relative to entrusted loans, and the share of leasing loans relative to bank loans and AFRE.



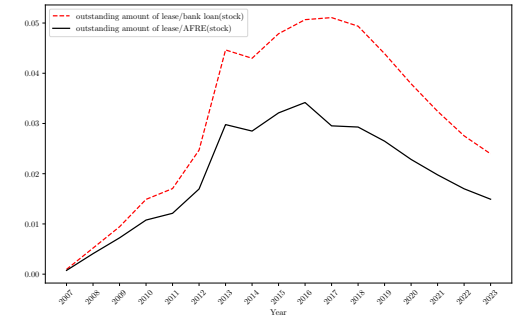
(a) Outstanding Lease Amount



(b) Number of Lease Firms



(c) Share of Lease Loan to Entrusted Loan



(d) Share of Lease Loan to Bank Loan and AFRE

Figure A.2: **Fraction of Shadow Banking and Bank Loans in AFRE**

This figure shows the fraction of newly added shadow banking and bank loans in the newly added total financing to the real economy (AFRE). The red line represents the fraction of shadow banking, while the blue line represents the fraction of bank loans.

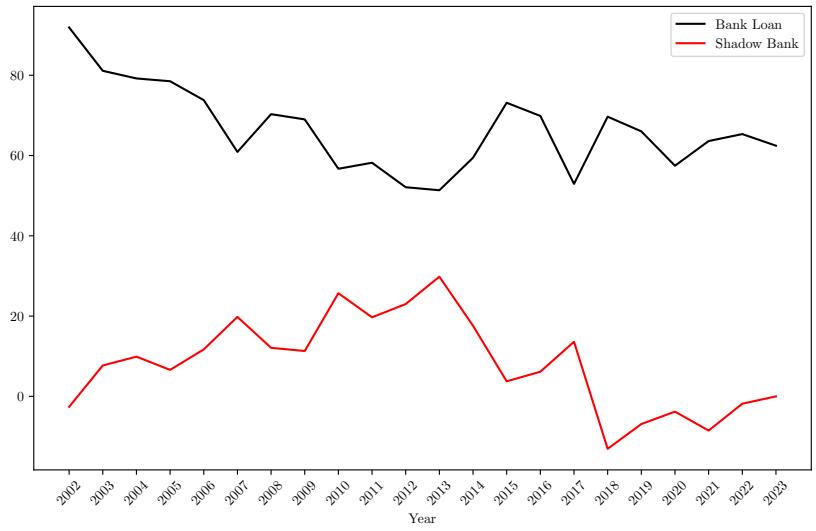
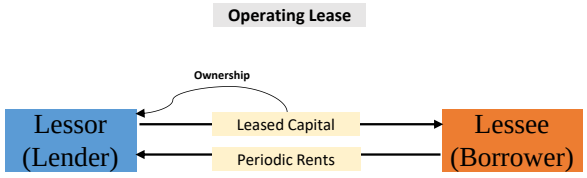
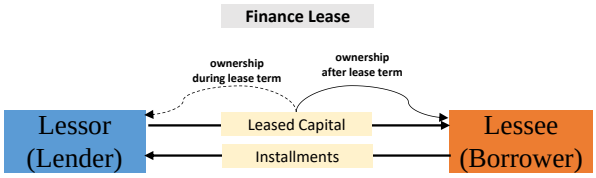


Figure A.3: **Comparison of Different Types of Lease**

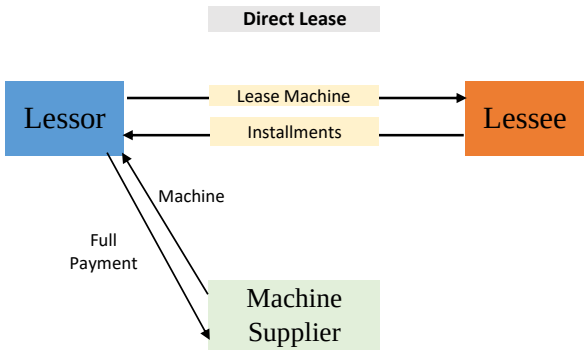
This figure compares the characteristics of operating leases, finance leases, direct leases, and sales-and-leaseback arrangements. Panel (a) illustrates the operating lease, Panel (b) depicts the finance lease, Panel (c) presents the direct lease, and Panel (d) shows the sales-and-leaseback arrangement.



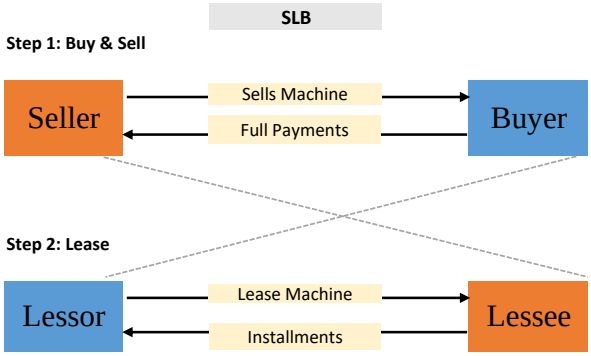
(a) Operating Lease



(b) Finance Lease



(c) Direct Lease



(d) Sales-and-leaseback

B Collection of Finance Lease Data and Variable Construction

In this section, we provide a detailed description of the data collection process for finance lease contracts and the construction of variables including SOEs and POEs, bond issuance cost, and other variables.

B.1 Finance Lease Contract Sample

In this section, we provide examples of finance lease contracts to illustrate that explicit ownership remains with the lessor during the lease term and to highlight the significance of service fees when estimating the revenue a lessor can generate.

Table B.3 presents two detailed finance lease contracts, both of which are structured as sales-and-leaseback agreements. These contracts include specific clauses explicitly stating that ownership of the leased capital belongs to the lessor throughout the lease term. Additionally, upon lease expiration, ownership of the leased property is transferred to the lessees.

[**Place Table B.3 about here**]

In the following section, I provide two examples of contracts that include records of service fees. Both examples illustrate the significance of service fees when estimating the revenue a lessor can generate.

Contract 1: In 2013, Chuanhua Co., Ltd. entered into a sale-and-leaseback financing agreement with Shanghai Kangxin Leasing Co., Ltd. The total lease financing amount was RMB 150 million. The lease term was three years, with an annual interest rate of 6.95%. A notable cost in this agreement was the leasing fee of RMB 6.1125 million, which accounted for 4% of the total financing amount.

Contract 2: Jiangxi Wannianqing Cement Co., Ltd. signed a sale-and-leaseback financing agreement with China Foreign Trade Financial Leasing Co., Ltd. The total financing amount was RMB 200 million, and a leasing fee of RMB 6 million was charged, accounting for 3% of the total financing amount. The lease term was 36 months, with an interest rate of 5.2275%.

B.2 ChatGPT Prompt

After scraping content containing financial leasing contract information from financial reports and announcements, we utilize ChatGPT to analyze the text and extract relevant variables for each leasing contract. Specifically, we send the following prompt to ChatGPT:

> "The provided text contains information about financial leasing contracts. Please extract the following variables for each financial leasing contract mentioned in the text: Listed Company, Stock Code, Lessee, Lessor, Announcement Date, Lease Rate, Leasing Principal, Rent Repayment Method, etc.
>
> The content may include multiple contracts. Please provide the corresponding information for each contract in sequence using the following format:
>
> **Contract One:** Variable 1: Corresponding Information Variable 2: Corresponding Information ...
>
> **Contract Two:** Variable 1: Corresponding Information Variable 2: Corresponding Information ...
>
> **Contract Three:** Variable 1: Corresponding Information Variable 2: Corresponding Information
>
> If any variable is not mentioned or cannot be identified in the text, please return 'None' for that variable."

B.3 Classification of SOE and POE

In this paper, we classify lessees as SOEs or POEs based on their ultimate controlling shareholders, according to the identifier provided by CSMAR. CSMAR reports a state ownership identifier, which has been available on an annual frequency since 2003. CSMAR determines the actual controlling shareholder using information disclosed in a firm's financial annual report. If this information is not disclosed, CSMAR identifies the actual controlling shareholder based on the shareholding chain.

If the identifier is "state-owned," we classify the firm as an SOE. If the identifier is "private-owned," we classify the firm as a POE. Some firms have multiple identifiers; in such cases, in the main analysis, we classify a firm as an SOE if its CSMAR identifiers include "state-owned." If there is no "state-owned" identifier but at least one of the identifiers is "private-owned," we classify the firm as a POE.

Since the classification of SOEs and POEs plays an important role, in the robustness check, we apply stricter criteria, and the results remain unchanged.

B.4 Bond Issuance Cost

We estimate the financial cost of firms in the traditional credit market using the bond issuance rate. To incorporate bonds issued with different maturities, we use the following procedure to estimate firms' financial costs.

First, we calculate the bond spread for each bond issued by a firm. The bond spread is defined as the difference between the bond issuance rate and the bank loan rate with the same maturity.

Next, the financial cost of a firm is calculated as the weighted average of the bond spreads of all bonds issued by the firm in a given year, with the bond issuance amount serving as the weight.

Not all listed firms issue bonds annually. When bond issuance data is unavailable, we use the average bond cost of comparable firms as a proxy. Comparable firms are selected based on matching state ownership status and credit ratings. For example, if a POE with an AAA rating did not issue any bonds in 2007, we use the average bond cost of all AAA-rated POE issuers from that year as a proxy.

B.5 Variables

The variables used in the main analysis are defined in Table B.2. All variables are deflated using the 2015 GDP deflator.

For investment I_t, we use changes in gross fixed assets as a proxy. In Belo et al. (2022), the authors use the change in gross fixed assets plus the decrease in accumulated depreciation to estimate investment. In the robustness check, we also use this proxy to estimate investment, and the results remain robust.

B.6 Figures and Tables for Appendix B

Table B.1: Bank-affiliated Lease Firms

This table shows the lease firms that are identified as bank-affiliated in our sample. The first column presents the name of bank-affiliated leasing firms and the second column shows the parent bank related to the bank-affiliated lease firms.

Bank-affiliated Leasing Firm	**Parent Bank**
Jiangsu Financial Leasing	Bank of Nanjing
Bank of Communications Financial Leasing	Bank of Communications
CMB Financial Leasing	China Merchants Bank
Minsheng Financial Leasing	China Minsheng Bank
Industrial Bank Financial Leasing	Industrial Bank
Agricultural Bank of China Financial Leasing	Agricultural Bank of China
ICBC Leasing	Industrial and Commercial Bank of China
Everbright Financial Leasing	China Everbright Bank
Huaxia Financial Leasing	Huaxia Bank
Suzhou Financial Leasing	Suzhou Bank
Yangtze United Financial Leasing	Shanghai Rural Commercial Bank
China Development Bank Leasing	China Development Bank
Jiangnan Financial Leasing	Jiangnan Rural Commercial Bank
CCB Financial Leasing	China Construction Bank
Bangyin Financial Leasing	Zhongyuan Bank
SPDB Financial Leasing	Shanghai Pudong Development Bank
Zheyin Financial Leasing	Zheshang Bank
Zhejiang Chouzhou Financial Leasing	Zhejiang Chouzhou Commercial Bank
Suyin Financial Leasing	Bank of Jiangsu
Sichuan Tianfu Financial Leasing	Sichuan Tianfu Bank
Guiyang Gyb Financial Leasing	Bank of Guiyang
BOL Financial Leasing	Luoyang Bank
Fujian Haixi Financial Leasing	Xiamen Bank
Jiangxi Financial Leasing	Jiangxi Bank
Foshan Haisheng Financial Leasing	Guangdong Nanhai Rural Commercial Bank
Shandong Tongda Financial Leasing	Weihai City Commercial Bank
Jinyin Financial Leasing	Bank of Jinzhou
Citic Leasing	China CITIC Bank
Bank of Beijing Financial Leasing	Bank of Beijing
Qianhaixingbang Financial Leasing	Shenzhen Rural Commercial Bank
Xiamen Financial Leasing	Xiamen Rural Commercial Bank
Maxwealth Financial Leasing	Bank of Ningbo
Cqrc Financial Leasing	Chongqing Rural Commercial Bank
Zhujiang Financial Leasing	Guangzhou Rural Commercial Bank
Henan Jiuding Financial Leasing	Zhengzhou Bank
Qingdao Bank Leasing	Bank of Qingdao
Tianyin Financial Leasing	Tianjin Bank
Jiyin Financial Leasing	Hebei Bank
Huayin Financial Leasing	Huishang Bank
Chongqin Xinyu Financial Leasing	Bank of Chongqing
Hubei Financial Leasing	Wuhan Rural Commercial Bank
Bank of China Financial Leasing	Bank of China
Gansu Lanyin Financial Leasing	Lanzhou Bank
Jilin Jiuyin Financial Leasing	Jilin Jiutai Rural Commercial Bank

Table B.2: Variable Definition

This table shows the definition of variables used in empirical analysis. The first column shows the name of teh variable and the second column shows the definition.

Variable	Definition
ROA	Return on assets at the beginning of the year
Firm age	Firm's age from the listed year to the year when the loan is made.
ln(Asset)	Total assets at the beginning of the year when the loan is made, adjusted to constant year 2015 RMBs.
Leverage	Ratio of total debt to assets at the beginning of the year when the loan is made, in percent.
Sales growth	Sales growth rate in the year $t-1$
Cash/asset	Ratio of cash to assets at the beginning of the year
IK	Investment ratio, $\frac{I_t}{0.5(K_t+K_{t-1})}$
I	Sum of increase in net value of fixed assets and depreciation expense, adjusted to constant year 2015 RMBs.
lease rate	The interest rate in the leasing contract, in percent
Bond issue rate	Bond issue rate, in percent.
Bond Spread	Difference between firm's bond issuing rate and bank loan rate (same maturity), in percent
Lease Spread	Difference between firm's lease spread of bank loan and bond spread, in percent
Fixed asset growth	Fixed asset growth rate in the year $t-1$
Revenue growth	Operating revenue growth rate in the year $t-1$

Table B.3: Finance Lease Contract Sample

This table shows two detailed contracts of finance lease, both of them are sales-and-leaseback contracts.

Panel A. SDYS Financ Lease Announcement

Lessee	Shandong YiSheng Breading Ltd. Co.
Lessor	YanTai Guoyu Financial Leasing Co.
Asset Type	Breeding equipment and facilities
Lease Type	Sales-and-Lease Back
Financing Amount	50 million yuan
Lease Term	36 months
Details	During the lease term, the ownership of the leased property belongs to YanTai Guoyu Financial Leasing Company (i.e., repossession advantage). After the lease expires, the ownership of the leased property is transferred to Yisheng.

Panel B. YYLZ Finance Lease Announcement

Lessee	Yueyang Linzhi Ltd. Co.
Lessor	Zhonghang International Leasing Co.
Asset Type	machines for making paper; equipment of production line
Lease Type	Sales-and-Lease Back
Financing Amount	500 million yuan
Lease Term	4 years
Book Value	625 million yuan
Interest Rate	4.75%
Details	During the lease term, the ownership of the leased property belongs to leasing company. After the lease expires, Yueyang Linzhi would pay 100 yuan to buy the ownership of the leased properties back.

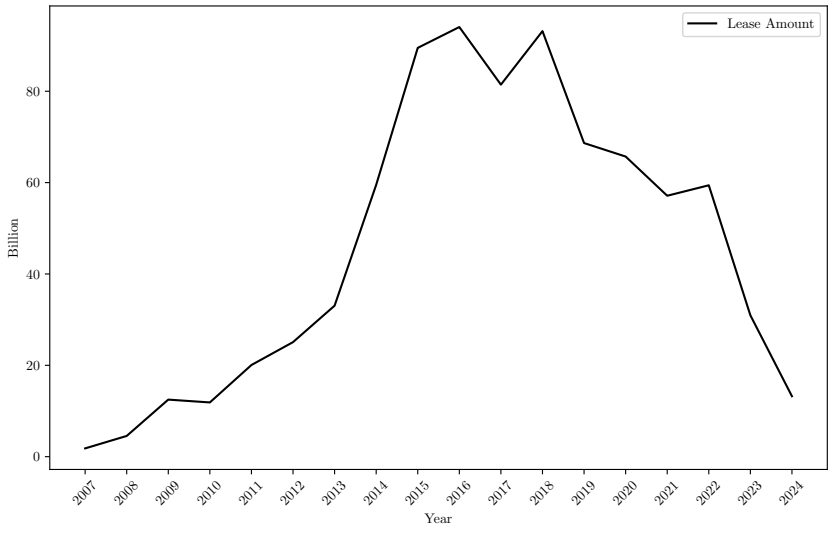
Table B.4: Finance Lease Amounts in Cleaned Contract Data

This table reports the time series of unique firms and observations and finance amount of our cleaned contract sample from 2007 to 2023. There are 3,458 lease transactions in our sample period. The number of non-missing observations for leasing rate, leasing amount, and maturity (years) are 1062 , 3457 , and 462 , respectively.

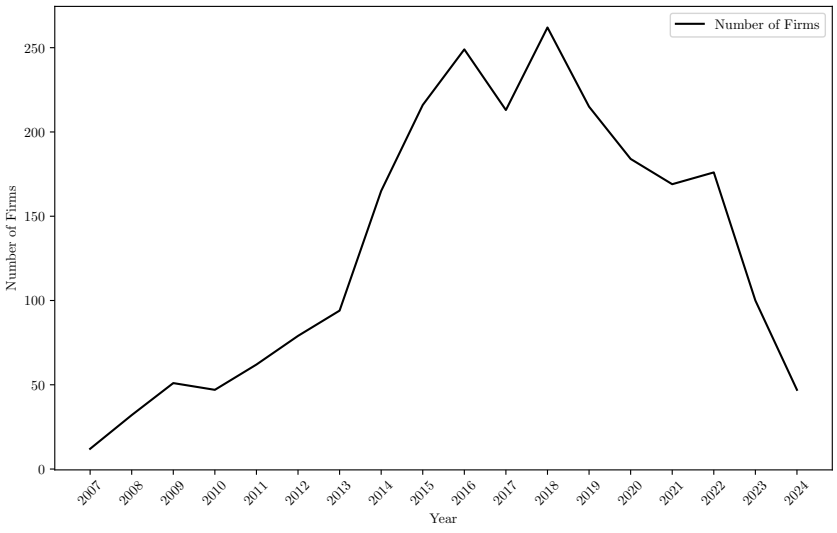
Year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Total
Unique Firms	10.00	27.00	42.00	35.00	47.00	56.00	73.00	129.00	155.00	197.00	165.00	196.00	154.00	137.00	129.00	134.00	77.00	1763.00
Unique Observations	12.00	38.00	52.00	51.00	65.00	78.00	110.00	224.00	291.00	395.00	374.00	412.00	288.00	293.00	304.00	298.00	173.00	3458.00
Finance Lease Amount (in billion RMB)	0.70	3.82	9.20	7.81	15.24	16.75	24.01	44.33	57.17	69.89	61.11	63.22	41.86	39.25	36.52	42.10	23.90	556.89

Figure B.1: **Lease Amount and Number of Lessee Firms in Contract Data**

This figure presents the time series of lease amounts and the number of lessee firms in the contract data. Panel (a) illustrates the lease amount, while Panel (b) depicts the number of lessee firms.



(a) Lease Amount in Contract Data



(b) Time Series of Number of Lessee Firms in Contract Data

C Supplementry Empirical Analysis

In this section, we provide additional empirical evidences to support the argument presented in the main content.

C.1 Lessees in Overcapacity industry

In the main context, we focus on finance leases between non-financial firms. According to Chang et al. (2022), firms operate in overcapacity industries subject to credit regulation, prompting banks to use affiliated leasing firms for regulatory arbitrage. Here we illustrate the different characteristics of productivity (or investment rate) between lessees who borrow from bank-affiliated lease firms (analyzed in Chang et al. (2022)) and nonbank-affiliated lease firms.

Following the 2008 global financial crisis, China's proactive fiscal and monetary stimulus successfully averted a sharp economic downturn but inadvertently contributed to widespread industrial overcapacity. According to IMF estimates, the country's average capacity utilization declined significantly from 80% in 2007 to around 60% by the end of 2011. This excess capacity not only triggered resource misallocation and inefficiencies domestically but also drew criticism from international trade partners, intensifying trade tensions. In response, the State Council issued Policy Note No. 38 [2009], identifying a range of sectors—such as steel, cement, electrolytic aluminum, and wind power equipment—as overcapacity industries requiring strict control. To operationalize this directive, the People's Bank of China (PBOC) and the China Banking Regulatory Commission (CBRC) implemented targeted credit tightening measures, mandating banks to adopt a differentiated approach to lending, restricting credit to sectors marked by excess production. In 2013, the range of the regulated industries have been refined in State Concil of China Note No.41 [2013]. This is an follow-up policy, focusing on deepening structural adjustment in a narrower set of overcapacity industries. It retained steel, cement, electrolytic aluminum, flat glass, and shipbuilding on the overcapacity list but removed other sectors such as polysilicon and wind power equipment, indicating a shift toward more targeted and sector-specific interventions. The regulated industries in two files are summarized in Table *C*.10.

[Place Table C.10 about here]

According to Chang et al. (2022), banks use their affiliated leasing firms to perform

regulatory arbitrage, here we run the same regression for lessees who are in overcapacity industries and borrow from bank-affiliated lease firms, the results are shown in Table C.5. In column (1) and (2), we use the definition of overcapacity industries in 2009 regulatory file; in columns (3) and (4), we use the definition of overcapacity industries in 2013 regulatory file. In all regression, the coefficients before Ik are insignificant, which indicates that those firms are not necessarily firms with high growth and productivity, which aligns with Chang et al. (2022).

[Place Table C.5 about here]

C.2 Effects of Monetary Policy Shock

As documented in Belo et al. (2022), monetary tightening amplifies capital misallocation by constraining private firms more than SOEs, resulting in lower aggregate productivity and output. Consequently, the greater asymmetry in bank loan access between lessors (typically less financially constrained) and lessees (more financially constrained) is likely to drive lessee firms to increasingly rely on the finance lease market, as they face limited access to credit from the traditional banking sector. In order to test this implication, we run the following regression:

$$\text{Lease Ratio}_{it} = \alpha + \beta MP_t + \gamma \text{Controls}_{it} + \varepsilon_i + \varepsilon_{it} \tag{81}$$

We use three measures to proxy for a firm's reliance on finance leases (Lease Ratio_{it}): the ratio of finance lease to total liabilities, the ratio of finance lease to long-term debt, and the ratio of finance lease to total assets. This ratio measures the extent of entrusted loans borrowed by borrower i, normalized by its total liablity or long-term debt or total assets for the given year t. To capture monetary policy shocks, we follow Chen et al. (2018) who develops and estimates an endogenously switching monetary policy rule in the spirit of Taylor (1993). We use the exogenous component of $M2$ growth in their paper[32]. The control variables are the same as previous analysis and individual fixed effects are include, the standard errors are double-clustered by firm and year. All independent variables are lag one period. The results are shown in Table (C.5). The coefficients before MP_2 are all negative, which indicates

[32]Here I use data before 2016 as in their paper, which needed to be extended to 2018 as pre-2018, the People's Bank of China (PBoC) followed a quantity-based framework, with M2 growth and bank credit serving as key intermediate targets for monetary policy implementation. After 2018, the PBoC began a transition toward a price-based monetary policy framework, placing greater emphasis on interest rates, especially the Loan Prime Rate (LPR) and open market operations (OMOs).

that firms are more rely on finance lease after tight monetary policy. 1% decrease in the M2 growth would cause firms' $\frac{\text{Finance Lease}}{\text{Long-Term Debt}}$ increase 0.17%, $\frac{\text{Finance Lease}}{\text{Total Liablity}}$ increase 0.03% and $\frac{\text{Finance Lease}}{\text{Assets}}$ increase 0.01%. The results align with our model implications.

[**Place Table C.6 about here**]

Also, if firms are more productivity, their finance lease should react more to the tight monetary policy. We run the following regression to test:

$$\text{Lease Ratio}_{it} = \alpha + \beta_1 MP_{t-1} + \beta_2 MP_{t-1} \times IK_{it-1} + \gamma \text{Controls}_{it-1} + \varepsilon_i + \varepsilon_{it} \tag{82}$$

The results are shown in Table C.7. As for $\frac{\text{Finance Lease}}{\text{Long-term Debt}}$, the coefficient β_2 are significant negative whether add controls or not, which indicates high productive firms rely more on finance lease after tight monetary policy shock.

C.3 Robustness check of decision on becoming lessees

We discuss other common empirical proxies for investment opportunities in this section.

In the main analysis, we use the investment rate (I/K) as a proxy for investment. Our investment construction differs slightly from that in Belo et al. (2022). In the main analysis, we estimate investment using the change in gross fixed assets. Here, we follow Belo et al. (2022) and estimate investment using the change in gross fixed assets plus the decrease in accumulated depreciation, and we find consistent results.

The results are shown in Table C.8. Overall, we find consistent findings regarding the decision to become lessees: firms with more investment opportunities and greater financial constraints are more likely to become lessees. As shown in column (2), a one-standard-deviation increase in the investment ratio increases the odds of becoming a lessee by 15%.

[**Place Table C.8 about here**]

C.4 Tight Classification of POE and SOE Firms

In the main analysis, we classify a firm as an SOE if its CSMAR identifiers include "state-owned" and as a POE if there is no "state-owned" identifier but at least one identifier is "private-owned." Here, we apply a stricter standard to classify SOEs and POEs. A firm is

identified as an SOE only if "state-owned" is the sole identifier in CSMAR, and a firm is identified as a POE only if "private-owned" is the sole identifier in CSMAR. We then redo the multivariate regression.

The results are shown in Table C.9. Overall, we find consistent results regarding the decision to become lessees: firms with more investment opportunities and greater financial constraints are more likely to become lessees. As shown in column (2), a one-standard-deviation increase in the investment ratio increases the odds of becoming a lessee by 17%.

[**Place Table C.9 about here**]

C.5 Relation between investment ratio, sales growth and productivity

Due to the lack of reliable productivity measures and the presence of noise in productivity data in China, we employ the investment ratio as a proxy for investment opportunities and productivity, following the approach of Belo et al. (2022). Here, we provide evidence supporting a monotonic relationship between the investment ratio, sales growth rate, and the average product of capital, as demonstrated by Cong and Gao (2019).

Table C.11 displays the average sales growth and investment rates for three portfolios sorted by the average product of capital (APK). These portfolios are divided into quintiles—from q1, representing the lowest total factor productivity (TFP), to q5, representing the highest. Panel A presents data for the state-owned enterprise (SOE) sector, while Panel B presents data for the privately-owned enterprise (POE) sector. The "q5-q1" column denotes the high-minus-low portfolio, highlighting the differences between firms in the highest and lowest TFP quintiles.

Both sectors exhibit a significantly positive difference in investment rates and sales growth between q5 and q1, suggesting that firms with higher productivity tend to invest more and experience higher sales growth. Among SOE firms, those in q1 have an average investment ratio of 8.3% and a sales growth rate of 9.5%, while those in q5 have an average investment ratio of 18.9% and a sales growth rate of 25.2%. Among POE firms, those in q1 have an average investment ratio of 12.2% and a sales growth rate of 9%, while those in q5 have an average investment ratio of 30.3% and a sales growth rate of 39.4%.

[**Place Table C.11 about here**]

C.6 Industry distribution

[**Place Table C.12 about here**]

Unlike entrusted loans, where most of the funding flows into risky industries such as real estate and construction, the majority of finance lease amounts flow into less risky industries such as electrical machinery, CCEM, equipment, and others. These industries are capital-intensive.

Additionally, there is heterogeneity between the SOE and POE sectors. The top five industries for the SOE sector are ferrous metals, chemicals, transportation, coal & mining, and equipment. The ferrous metals industry receives 26.41% of leasing funds, chemicals 12.87%, transportation 10.85%, coal & mining 10.68%, and equipment 6.77%. Due to China's industrial policies, these industries are dominated by SOEs, with few privately-owned firms.

The top five industries for the POE sector are electronic machinery, electrical machinery, computers, communication (CCEM), chemicals, equipment, and paper & printing. Electrical machinery accounts for 22.75% of funds, CCEM 17.92%, chemicals 10.78%, equipment 5.48%, and paper & printing 4.6%. POE lessee funds are primarily directed toward high-tech industries.

Table C.5: Decision of Lessee: Over-capacity Firms

This table reports the regression results of lessee decisions of firms in overcapacity industry. We run logit regressions using the loan dummy as the dependent variable. Financial variables are winsorized at the 1% and 99% levels. p-values are based on standard errors double-clustered by firm and year. The dependent variable is $Lessee\ Dummy_{it}$. If firm i is a lessee in year t, then $Lessee\ Dummy_{it} = 1$; otherwise, $Lessee\ Dummy_{it} = 0$. In column (1), we include both the non-lessee POE sample and the POE lessee sample. In column (2), we include only the non-lessee SOE sample and the SOE lessee firms that borrow from nonbank-affiliated leasing firms. In column (3), we include the non-lessee SOE sample and the SOE lessee firms that operate outside over-capacity industries and borrow from bank-affiliated leasing firms. In column (4), we include the non-lessee SOE sample and the SOE lessee firms in over-capacity industries that borrow from bank-affiliated leasing firms. The sample period spans from 2007 to 2023.

	(1)	(2)	(3)	(4)
	BA-OC SOE vs Other SOE:2009	BA-OC SOE vs Other SOE:2009	BA-OC SOE vs Other SOE:2013	BA-OC SOE vs Other SOE:2013
lessee_dummy				
IK	0.82	0.80	0.76	0.21
	(0.104)	(0.215)	(0.409)	(0.817)
ln(Asset)		0.83**		1.28
		(0.020)		(0.101)
Firm Age		-0.01		-0.23
		(0.907)		(0.142)
Sales Growth		-0.12		-0.04
		(0.711)		(0.946)
Tobin's Q		-0.15		-3.81
		(0.840)		(0.273)
Leverage		3.08		12.18**
		(0.216)		(0.025)
Cash/asset		5.21		10.99*
		(0.110)		(0.082)
KZ index		0.19		0.16
		(0.422)		(0.714)
Year_FE	Yes	Yes	Yes	Yes
Ind_FE	Yes	Yes	Yes	Yes
N	881	869	312	307
r2_p	0.135	0.280	0.062	0.328

p-values in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table C.6: Effect of Monetary Policy on Finance Lease

This table reports the regression results of how monetary policy shock influence firms' reliance on finance lease.Financial variables are winsorized at the 1% and 99% levels. p-values are based on standard errors double-clustered by firm and year. In column (1) and (2), we use $\frac{\text{Finance Lease}}{TotalLiability}$ as dependent variable; In column (3) and (4), we use $\frac{\text{Finance Lease}}{Long-TermDebt}$ as dependent variable; In column (5) and (6), we use $\frac{\text{Finance Lease}}{Assets}$ as dependent variable. The sample period spans from 2007 to 2015.

	(1)	(2)	(3)	(4)	(5)	(6)
	Finance Loan/Total Liability	Finance Loan/Total Liability	Finance Loan/Long-term Debt	Finance Loan/Long-term Debt	Finance Loan/Asset	Finance Loan/Asset
MP	-0.04***	-0.03***	-0.27***	-0.17***	-0.02***	-0.01**
	(0.005)	(0.004)	(0.000)	(0.002)	(0.008)	(0.013)
ln(Asset)		0.06		0.52**		0.04
		(0.171)		(0.036)		(0.129)
Cash/asset		-0.19**		-1.25*		-0.07
		(0.027)		(0.065)		(0.122)
Leverage		0.02		0.11*		0.01
		(0.113)		(0.075)		(0.126)
Sales Growth		-0.03		-0.03		-0.01
		(0.146)		(0.557)		(0.146)
ROA		0.22		-0.13		0.09
		(0.177)		(0.846)		(0.228)
Tobin's Q		-0.00		-0.01		-0.00
		(0.617)		(0.667)		(0.618)
KZ index		-0.00		0.02		0.00
		(0.642)		(0.604)		(0.720)
Year_FE	Yes	Yes	Yes	Yes	Yes	Yes
Id_FE	Yes	Yes	Yes	Yes	Yes	Yes
N	11055	10744	11055	10744	11055	10744
r2	0.462	0.467	0.448	0.458	0.538	0.549

p-values in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table C.7: Effect of Monetary Policy on Finance Lease: Heterogeneity

This table reports the regression results of how monetary policy shock influence firms' reliance on finance lease.Financial variables are winsorized at the 1% and 99% levels. p-values are based on standard errors double-clustered by firm and year. In column (1) and (2), we use $\frac{\text{Finance Lease}}{TotalLiability}$ as dependent variable; In column (3) and (4), we use $\frac{\text{Finance Lease}}{Long-TermDebt}$ as dependent variable; In column (5) and (6), we use $\frac{\text{Finance Lease}}{Assets}$ as dependent variable. The sample period spans from 2007 to 2015.

	(1)	(2)	(3)	(4)	(5)	(6)
	Finance Loan/Long-term Debt	Finance Loan/Long-term Debt	Finance Loan/Total Liability	Finance Loan/Total Liability	Finance Loan/Asset	Finance Loan/Asset
MP	-0.22***	-0.13***	-0.03***	-0.02**	-0.02**	-0.01*
	(0.001)	(0.008)	(0.008)	(0.015)	(0.023)	(0.056)
MP*IK	-0.28**	-0.25*	-0.04*	-0.03	-0.02*	-0.02
	(0.034)	(0.059)	(0.077)	(0.144)	(0.095)	(0.219)
IK	0.33*	0.31*	0.03	0.03	0.01	0.01
	(0.078)	(0.085)	(0.234)	(0.250)	(0.344)	(0.469)
ln(Asset)		0.45*		0.05		0.04
		(0.069)		(0.229)		(0.166)
Cash/asset		-1.11*		-0.17**		-0.06
		(0.085)		(0.043)		(0.172)
Leverage		0.10*		0.01		0.01
		(0.095)		(0.135)		(0.161)
Sales Growth		-0.04		-0.03		-0.01
		(0.432)		(0.147)		(0.145)
ROA		-0.22		0.22		0.08
		(0.754)		(0.193)		(0.242)
Tobin's Q		-0.01		-0.00		-0.00
		(0.558)		(0.552)		(0.529)
KZ index		0.02		-0.00		0.00
		(0.690)		(0.612)		(0.778)
Year_FE	Yes	Yes	Yes	Yes	Yes	Yes
Id_FE	Yes	Yes	Yes	Yes	Yes	Yes
N	11055	10744	11055	10744	11055	10744
r2	0.449	0.458	0.462	0.468	0.539	0.549

p-values in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table C.8: Decision of Lessee: IK in Belo et al. (2022)

This table reports the regression results of lessee decisions. We run logit regressions using the loan dummy as the dependent variable. Financial variables are winsorized at the 1% and 99% levels. p-values are based on standard errors double-clustered by firm and year. The dependent variable is $Lessee\ Dummy_{it}$. If firm i is a lessee in year t, then $Lessee\ Dummy_{it} = 1$; otherwise, $Lessee\ Dummy_{it} = 0$. In column (1) and column (2), we include all firms; In column (3) and (4), we include only POEs; In column (5) and (6), we include only SOEs. The sample period spans from 2007 to 2023.

	Lessee vs Others		POE Lessee vs Other POE		SOE Lessee vs Other SOE	
	(1)	(2)	(3)	(4)	(5)	(6)
lessee_dummy						
IK	0.40***	0.45***	0.36**	0.43**	0.54**	0.51*
	(0.001)	(0.000)	(0.013)	(0.013)	(0.038)	(0.051)
ln(Asset)		-0.04		0.04		-0.12
		(0.561)		(0.666)		(0.114)
Firm Age		-0.01		0.00		-0.02
		(0.658)		(0.875)		(0.184)
Sales Growth		0.05		0.17**		-0.05
		(0.265)		(0.041)		(0.487)
Tobin's Q		-0.38***		-0.46***		-0.20
		(0.000)		(0.000)		(0.111)
Leverage		0.96		0.88*		2.38***
		(0.430)		(0.064)		(0.000)
Cash/asset		-1.22**		-1.12		-1.15
		(0.025)		(0.142)		(0.130)
KZ index		0.35***		0.41***		0.17**
		(0.000)		(0.000)		(0.035)
Year_FE	Yes	Yes	Yes	Yes	Yes	Yes
Ind_FE	Yes	Yes	Yes	Yes	Yes	Yes
N	21418	21063	13299	13053	7551	7450
r2_p	0.056	0.123	0.069	0.160	0.060	0.105

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table C.9: Decision of Lessee: Change SOE Classification

This table reports the regression results of lessee decisions. We run logit regressions using the loan dummy as the dependent variable. Financial variables are winsorized at the 1% and 99% levels. p-values are based on standard errors double-clustered by firm and year. The dependent variable is $Lessee\ Dummy_{it}$. If firm i is a lessee in year t, then $Lessee\ Dummy_{it} = 1$; otherwise, $Lessee\ Dummy_{it} = 0$. In column (1) and column (2), we include all firms; In column (3) and (4), we include only POEs; In column (5) and (6), we include only SOEs. The sample period spans from 2007 to 2023.

	Lessee vs Others		POE Lessee vs Other POE		SOE Lessee vs Other SOE	
	(1)	(2)	(3)	(4)	(5)	(6)
lessee_dummy						
IK	0.27***	0.35***	0.24**	0.33**	0.39*	0.43**
	(0.095)	(0.106)	(0.109)	(0.161)	(0.207)	(0.202)
ln(Asset)		-0.04		0.04		-0.13
		(0.064)		(0.083)		(0.078)
Firm Age		-0.01		0.00		-0.02
		(0.014)		(0.017)		(0.018)
Sales Growth		0.05		0.15*		-0.05
		(0.042)		(0.085)		(0.070)
Tobin's Q		-0.38***		-0.46***		-0.21*
		(0.097)		(0.096)		(0.127)
Leverage		0.97		0.87*		2.46***
		(1.248)		(0.457)		(0.637)
Cash/asset		-1.20**		-1.07		-1.14
		(0.542)		(0.759)		(0.770)
KZ index		0.35***		0.41***		0.17**
		(0.094)		(0.055)		(0.078)
Year_FE	Yes	Yes	Yes	Yes	Yes	Yes
Ind_FE	Yes	Yes	Yes	Yes	Yes	Yes
N	21418	21063	13248	13004	7596	7493
r2_p	0.056	0.122	0.070	0.160	0.059	0.105

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table C.10: Regulated Over-capacity Industries

This table presents the definition of regulated over-capacity industries. The regulated industries are different in the 2009 and 2013.

Policy Name	**Industries Restricted for Overcapacity**
State Council Policy Note No.38 [2009]	Steel, Electrolytic Aluminum, Coal, Shipbuilding, Cement, Flat Glass, Fertilizer, Polysilicon, Wind Power Equipment, Soybean Crushing, Large Forgings
State Council of China Note No.41, [2013]	Steel, Cement, Electrolytic Aluminum, Flat Glass, Shipbuilding

Table C.11: Sorting Portfolio

This table presents the average sales growth and investment rate of three one-way portfolios sorted by the average product of capital (APK), following the methodology of Cong et al. (2019). "IK" refers to the investment rate, while "Sales Growth" represents the growth rate of sales. The portfolios are sorted into quintiles (q1 to q5) based on Total Factor Productivity (TFP), where firms in q1 have the lowest TFP and those in q5 have the highest. "q5-q1" represents the high-minus-low portfolio, capturing the difference in characteristics between firms in the highest and lowest TFP quintiles. "Avg" refers to the average value of a particular characteristic across the q1 to q5 portfolios. The average characteristics for each portfolio are constructed by first calculating the mean of each characteristic across all firms within a portfolio for a given year and then reporting the time series averages of these values.

Panel A. SOE

	q1	q2	q3	q4	q5	Avg	q5-q1
IK	0.083	0.140	0.150	0.155	0.189	0.143	0.106
Sales growth	0.095	0.117	0.164	0.172	0.252	0.159	0.157

Panel B. POE

	q1	q2	q3	q4	q5	Avg	q5-q1
IK	0.122	0.222	0.260	0.281	0.303	0.237	0.181
Sales growth	0.090	0.171	0.199	0.222	0.394	0.216	0.304

Table C.12: Industry Distribution of Lessee Firms

This table presents the industry distribution of lessee firms. Panel A shows the distribution for SOE lessee firms, while Panel B shows the distribution for POE lessee firms. The column "Amount" summarizes the total leasing funds allocated to each industry, while the column "Percentage (%)" represents the percentage of the total leasing amount that each industry receives. CCEM refers to the Computer, Communication, and other Electronic Machinery industry.

Panel A. SOE

Industry	Amount	Percentage(%)
Ferrous metal	84.53	26.41
Chemicals	41.18	12.87
Transportation	34.72	10.85
Coal and Mining	34.19	10.68
Equipment	21.67	6.77

Panel B. POE

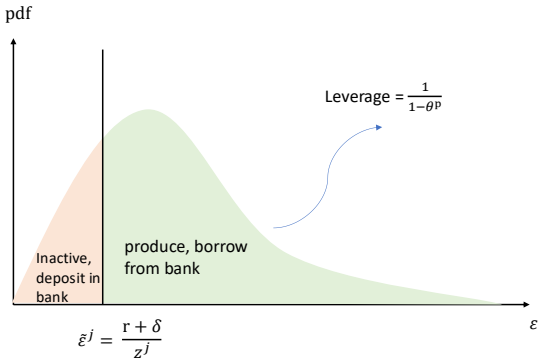
Industry	Amount	Percentage(%)
Electrical machinery	53.87	22.75
CCEM	42.43	17.92
Chemicals	25.52	10.78
Equipment	12.97	5.48
Paper and Printing	10.9	4.6

D Supplementary Materials for Model

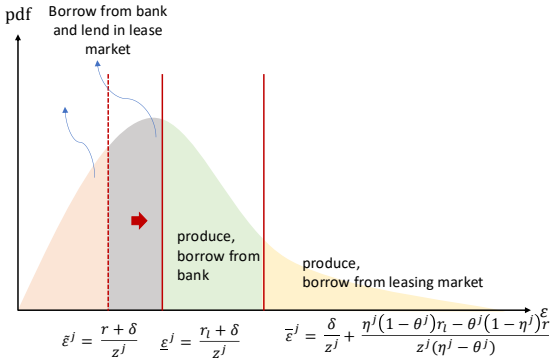
D.1 Figures and Tables for Appendix D

Figure D.1: **Distribution and Cutoffs in Two Cases**

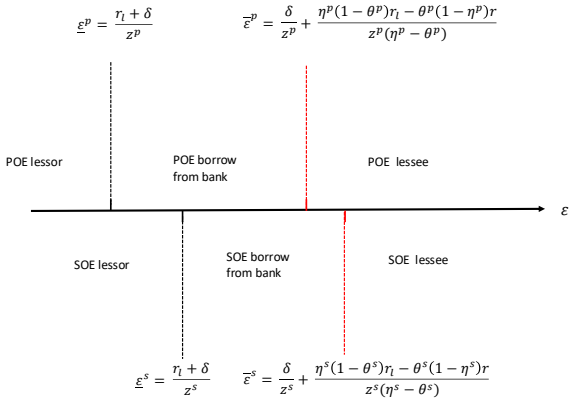
This figure shows the distributions of firms in two scenarios and the cutoffs for both cases. Panel (a) presents the distribution without a finance lease market, while Panel (b) illustrates the distribution with a finance lease market. Panel (c) compares the cutoffs between the two cases.



(a) Cutoff Comparison



(b) Finance Lease



(c) Cutoff Comparison

E Appendix A: Proof

E.1 Proof of Proposition (1)

Proof. When there is no finance lease market, firms would only choose traditional loan ($b^j(\varepsilon)$), owned capital ($ko^j(\varepsilon)$) and the capital used in the production $k^j(\varepsilon)$.

The profit function Equation (6) and flow-of-fund contraint Equation (12) become:

$$\pi^j(\varepsilon) = [z^j\varepsilon + (1-\delta)]k_o^j(\varepsilon) - (1+r)b^j(\varepsilon) \tag{83}$$

$$k^j(\varepsilon) = h^j(\varepsilon) + b^j(\varepsilon) \tag{84}$$

Plug the flow-of-funds contraint into the profit function we have:

$$\begin{aligned} \pi^j(\varepsilon) &= [z^j\varepsilon + (1-\delta)][h^j(\varepsilon) + b^j(\varepsilon)] - (1+r)b^j(\varepsilon) \\ &= [z^j\varepsilon + (1-\delta)]h^j(\varepsilon) + [z^j\varepsilon - (r+\delta)]b^j(\varepsilon) \end{aligned} \tag{85}$$

To maximize the profit, firms would choose to borrow from traditional loan market if and only if the coefficient before $b^j(\varepsilon)$ is greater than zero, which is equivalent to $\varepsilon > \frac{r+\delta}{z^j}$.

So when $\varepsilon > \frac{r+\delta}{z^j}$, firm would borrow to the limit due to the constant return technology, $b^j(\varepsilon) = \theta^j ko^j$. Combine this equation with Equation (84) we get $b^j(\varepsilon) = \frac{\theta^j}{1-\theta^j}h^j$ and $ko^j = \frac{1}{1-\theta^j}h^j$. The final capital being used in the production is: $k^j = \frac{1}{1-\theta^j}h^j$.

When $\varepsilon < \frac{r+\delta}{z^j}$, firm would be lender in the traditional loan market, so the $b^j(\varepsilon) = -h^j$ and owned capital $ko^j(\varepsilon) = 0$ and $k^j(\varepsilon) = 0$. □

E.2 Proof of Proposition (3)

Proof. Substitute the flow-of-funds constraint (Equation (12)) into the profit function Equation (6) we have:

$$\pi^j(\varepsilon) = (z^j\varepsilon + 1 - \delta)h^j + \left[z^j\varepsilon - (\delta + r)\right]b^j(\varepsilon) + \left[z^j\varepsilon - (\delta + r_l)\right]l^j(\varepsilon) \tag{86}$$

We are going to prove that there are two cutoffs, which divided all firms in each sector j into three types.

First we noticed that when a firm has $\varepsilon > \underline{\varepsilon}^j = \frac{r_l+\delta}{z^j}$, it would like to make b^j and

l^j as largest as possible (since the coefficients before b^j and l^j are positive). According to the borrowing constraint (Equation (7)) and lessee constraint (Equation (9)), we have: $b^j(\varepsilon) = \theta^j ko^j(\varepsilon)$ and $l^j(\varepsilon) = \eta^j kl^j(\varepsilon)$. Accoriding to the down payment constraint, we assume the firm uses mh^j original resources as collateral to borrow from bank and $(1-m)h^j$ original resources as collateral to borrow from lessor, we are going to prove that there exists a cutoff $\bar{\varepsilon}^j$: firms with $\varepsilon \geq \bar{\varepsilon}^j$ would choose $m = 0$, while firms with $\underline{\varepsilon}^j \leq \varepsilon \leq \bar{\varepsilon}^j$ would choose $m = 1$. The profit function is:

$$\pi^j(\varepsilon) = (z^j\varepsilon + 1 - \delta)h^j + \left[z^j\varepsilon - (\delta + r)\right]\frac{\theta^j}{1-\theta^j}mh^j + \left[z^j\varepsilon - (\delta + r_l)\right]\frac{\eta^j}{1-\eta^j}(1-m)h^j \quad (87)$$

Take derivatives of m, it is straight forward to obtain a cutoff $\bar{\varepsilon}^j = \frac{\delta}{z^j} + \frac{\eta^j(1-\theta^j)r_l - \theta^j(1-\eta^j)r}{z^j(\eta^j - \theta^j)}$ that when $\varepsilon > \bar{\varepsilon}^j$, firms would choose to use all their original endowments as collateral to borrow from lessor, thus, we have $b^j = 0$, $l^j(\varepsilon) = \frac{\eta^j}{1-\eta^j}h^j$, $ko^j(\varepsilon) = 0$, $kl^j(\varepsilon) = \frac{1}{1-\eta^j}h^j$, $k^j(\varepsilon) = \frac{1}{1-\eta^j}h^j$; when $\underline{\varepsilon}^j \leq \varepsilon \leq \bar{\varepsilon}^j$, firms would choose to use all their original endowments as collateral to borrow from bank, we have $b^j = \frac{\theta^j}{1-\theta^j}h^j$, $l^j(\varepsilon) = 0$, $k_o^j(\varepsilon) = \frac{1}{1-\theta^j}h^j$, $k_l^j(\varepsilon) = 0$,$k^j(\varepsilon) = \frac{1}{1-\theta^j}h^j$

As for a firm with $\varepsilon \leq \underline{\varepsilon}^j$, according to Equation (86), the firm would not borrow from lessor ($l^j = 0$) since the revenue of producing is smaller than the cost of lease funding. To see this implication, we should compare the profit of borrowing from bank and then lending out through leasing market with the profit of borrowing from bank and produce. The profit of the first choice is:

$$\pi_1^j = \left((1 + r_l)\frac{1}{1-\theta^j} - (1 + r)\frac{\theta^j}{1-\theta^j}\right)h^j \quad (88)$$

The profit of the second choice is:

$$\pi_2^j = (z^j\varepsilon + 1 - \delta)\frac{1}{1-\theta^j}h^j - (1 + r)\frac{\theta^j}{1-\theta^j}h^j \quad (89)$$

We have $\pi_1^j \geq \pi_2^j$ when $\varepsilon \leq \underline{\varepsilon}^j$, which indicates that firms would act as a bridge to borrow from bank and then lend out. In this scenario, we have $b^j = \frac{\theta^j}{1-\theta^j}h^j$, $l^j(\varepsilon) = \frac{1}{1-\theta^j}h^j$, $ko^j(\varepsilon) = 0$, $kl^j(\varepsilon) = 0$, $k^j(\varepsilon) = 0$.

□

E.3 Proof of Proposition (??)

Proof. Proposition 4 is a direct implication of Proposition 3. The production cutoff in Case I is given by $\tilde{\varepsilon}^j = \frac{r+\delta}{z^j}$, while in Case II, the cutoff is $\bar{\varepsilon}^j = \frac{r_l+\delta}{z^j}$. By Proposition 2, we know that $\bar{\varepsilon}^j > \tilde{\varepsilon}^j$, which indicates that more low-productivity firms will choose not to produce but instead lend out their resources to high-productivity firms. Additionally, for the most productive firms ($\varepsilon > \bar{\varepsilon}^j$), they can utilize more capital in production, as $\frac{1}{1-\eta^j} > \frac{1}{1-\theta^j}$. Overall, capital is more concentrated in firms with higher productivity in the presence of a finance lease market. Under the assumption that $z^p > z^s$, we have

$$\underline{\varepsilon}^s = \frac{r_l+\delta}{z^s} > \underline{\varepsilon}^p = \frac{r_l+\delta}{z^p},$$

which confirms the second half of the statement.

□

E.4 Proof of Proposition (5)

Proof. Due to the constant return technology, the TFP of each sector is:

$$A^j = \frac{Y^j}{K^j} \tag{90}$$

In case I where there is no leasing market, the total capital of j sector is:

$$K_1^j = \int k_o^j(\varepsilon) dF^j(\varepsilon) = \frac{1}{1-\theta^j} H^j (1 - F(\tilde{\varepsilon}^j)) \tag{91}$$

The output of j sector is:

$$Y_1^j = \int k_o^j(\varepsilon) dF^j(\varepsilon) = z^j H^j \frac{1}{1-\theta^j} \int_{\tilde{\varepsilon}^j} \varepsilon dF^j(\varepsilon) \tag{92}$$

The TFP of each sector is:

$$A_1^j = \frac{z^j H^j \frac{1}{1-\theta^j} \int_{\tilde{\varepsilon}^j} \varepsilon dF^j(\varepsilon)}{\frac{1}{1-\theta^j} H^j (1 - F(\tilde{\varepsilon}^j))} = z^j \frac{\int_{\tilde{\varepsilon}^j} \varepsilon dF^j(\varepsilon)}{(1 - F(\tilde{\varepsilon}^j))} \tag{93}$$

In the case II where there exists leasing market, the total capital of j sector is:

$$K_2^j = \int k_o^j(\varepsilon) dF^j(\varepsilon) = \frac{1}{1-\theta^j} H^j(F(\bar{\varepsilon}^j) - F(\underline{\varepsilon}^j)) + \frac{1}{1-\eta^j} H^j(1 - F(\bar{\varepsilon}^j)) \tag{94}$$

The output of j sector in Case II is:

$$Y_2^j = \int k_o^j(\varepsilon) dF^j(\varepsilon) = z^j H^j \left[\frac{1}{1-\theta^j} \int_{\underline{\varepsilon}^j}^{\bar{\varepsilon}^j} \varepsilon^j dF^j(\varepsilon) + \frac{1}{1-\eta^j} \int_{\bar{\varepsilon}^j} \varepsilon^j dF^j(\varepsilon) \right] \tag{95}$$

The TFP of j sector is:

$$\begin{aligned} A_2^j = \frac{Y_2^j}{K_2^j} &= z^j \frac{\frac{1}{1-\theta^j} \int_{\underline{\varepsilon}^j}^{\bar{\varepsilon}^j} \varepsilon dF^j(\varepsilon) + \frac{1}{1-\eta^j} \int_{\bar{\varepsilon}^j} \varepsilon dF^j(\varepsilon)}{\frac{1}{1-\theta^j}[F^j(\bar{\varepsilon}^j) - F^j(\underline{\varepsilon}^j)] + \frac{1}{1-\eta^j}[1 - F^j(\bar{\varepsilon}^j)]} \\ &= z^j \frac{\frac{1}{1-\theta^j} \int_{\underline{\varepsilon}^j} \varepsilon dF^j(\varepsilon) + \left(\frac{1}{1-\eta^j} - \frac{1}{1-\theta^j}\right) \int_{\bar{\varepsilon}^j} \varepsilon dF^j(\varepsilon)}{\frac{1}{1-\theta^j}[1 - F^j(\underline{\varepsilon}^j)] + \left(\frac{1}{1-\eta^j} - \frac{1}{1-\theta^j}\right)[1 - F^j(\bar{\varepsilon}^j)]} \end{aligned} \tag{96}$$

The sector productivity is determined by a exogenous component (z^s) and a endogenous component, which reflect the efficiency of capital allocation. Now, we are going to prove that $\frac{A_2^j}{A_1^j} > 1$:

$$\begin{aligned} \frac{A_2^j}{A_1^j} &= \left(z^j \frac{\frac{1}{1-\theta^j} \int_{\underline{\varepsilon}^j} \varepsilon dF^j(\varepsilon) + \left(\frac{1}{1-\eta^j} - \frac{1}{1-\theta^j}\right) \int_{\bar{\varepsilon}^j} \varepsilon dF^j(\varepsilon)}{\frac{1}{1-\theta^j}[1 - F^j(\underline{\varepsilon}^j)] + \left(\frac{1}{1-\eta^j} - \frac{1}{1-\theta^j}\right)[1 - F^j(\bar{\varepsilon}^j)]} \right) / \left(z^j \frac{\int_{\tilde{\varepsilon}^j} \varepsilon dF^j(\varepsilon)}{(1 - F(\tilde{\varepsilon}^j))} \right) \\ &= \frac{\frac{1}{1-\theta^j} \frac{\int_{\underline{\varepsilon}^j} \varepsilon dF^j(\varepsilon)}{\int_{\tilde{\varepsilon}^j} \varepsilon dF^j(\varepsilon)} + \left(\frac{1}{1-\eta^j} - \frac{1}{1-\theta^j}\right) \frac{\int_{\bar{\varepsilon}^j} \varepsilon dF^j(\varepsilon)}{\int_{\tilde{\varepsilon}^j} \varepsilon dF^j(\varepsilon)}}{\frac{1}{1-\theta^j} \frac{1-F^j(\underline{\varepsilon}^j)}{1-F^j(\tilde{\varepsilon}^j)} + \left(\frac{1}{1-\eta^j} - \frac{1}{1-\theta^j}\right) \frac{1-F^j(\bar{\varepsilon}^j)}{1-F^j(\tilde{\varepsilon}^j)}} \\ &> \frac{\frac{1}{1-\theta^j} \frac{\int_{\tilde{\varepsilon}^j} \varepsilon dF^j(\varepsilon)}{\int_{\tilde{\varepsilon}^j} \varepsilon dF^j(\varepsilon)} + \left(\frac{1}{1-\eta^j} - \frac{1}{1-\theta^j}\right) \frac{\int_{\bar{\varepsilon}^j} \varepsilon dF^j(\varepsilon)}{\int_{\tilde{\varepsilon}^j} \varepsilon dF^j(\varepsilon)}}{\frac{1}{1-\theta^j} \frac{1-F^j(\bar{\varepsilon}^j)}{1-F^j(\tilde{\varepsilon}^j)} + \left(\frac{1}{1-\eta^j} - \frac{1}{1-\theta^j}\right) \frac{1-F^j(\bar{\varepsilon}^j)}{1-F^j(\tilde{\varepsilon}^j)}} \\ &= \frac{\frac{1}{1-\theta^j} + \left(\frac{1}{1-\eta^j} - \frac{1}{1-\theta^j}\right) \frac{\int_{\bar{\varepsilon}^j} \varepsilon dF^j(\varepsilon)}{\int_{\tilde{\varepsilon}^j} \varepsilon dF^j(\varepsilon)}}{\frac{1}{1-\theta^j} + \left(\frac{1}{1-\eta^j} - \frac{1}{1-\theta^j}\right) \frac{1-F^j(\bar{\varepsilon}^j)}{1-F^j(\tilde{\varepsilon}^j)}} \end{aligned} \tag{97}$$

The inequality is due to the relationship that: $\tilde{\varepsilon}^j < \underline{\varepsilon}^j < \bar{\varepsilon}^j$. To prove the previous equation

is larger than 1 is equivalent to prove that:

$$\Rightarrow \frac{\int_{\bar{\varepsilon}^p} \varepsilon dF^p(\varepsilon)}{1-F^p(\bar{\varepsilon}^p)} > \frac{\int_{\tilde{\varepsilon}^p} \varepsilon dF^p(\varepsilon)}{1-F^p(\tilde{\varepsilon}^p)} \tag{98}$$

We define $G^j(\varepsilon^*) = E^j(\varepsilon|\varepsilon > \varepsilon^*) = \frac{\int_{\varepsilon*} \varepsilon dF^j(\varepsilon)}{1-F^j(\varepsilon^*)}$ is the conditional expectation of ε, which is obvious an increasing function in ε^*. Thus, we have $\frac{A^{p'}}{A^p} > 1$, the existence of finance lease market increases the TFP in both SOE and POE sectors. □

E.5 Proof of Proposition (6)

Proof. The aggregate TFP is:

$$A = \frac{Y}{K} = \frac{\mu Y^s + (1-\mu)Y^p}{\mu K^s + (1-\mu)K^p} = A^s\omega^s + A^p\omega^p \tag{99}$$

where $\omega^s = \frac{\mu K_s}{\mu K_s + (1-\mu)K_p}$ and $\omega^p = \frac{(1-\mu)K_p}{\mu K_s + (1-\mu)K_p}$, representing the capital fraction of SOE sector and POE sector.

$$\begin{aligned} \Delta A &= A_2^s\omega_2^s + A_2^p\omega_2^p - A_1^s\omega_1^s - A_1^p\omega_1^p \\ &= \omega_1^s\Delta A^s + A_2^s(\omega_2^s - \omega_1^s) + \Delta A^p\omega_1^p + A_1^p(\omega_2^p - \omega_1^p) \\ &= \omega_1^s\Delta A^s + \Delta A^p\omega_1^p + (A_1^p - A_1^s)(\omega_2^p - \omega_1^p) \end{aligned} \tag{100}$$

We use the subscript number to denote for case I and case II.From Proposition 5 we know, $\Delta A^s > 0$, $\Delta A^p > 0$. So the sufficient condition for $\Delta A > 0$ is that $\omega_2^p \geq \omega_1^p$, the POE's fraction of capital is no smaller than that in the case where there is no leasing market.

Substitute 91 and 94 into the definition of ω^j and use the assumption that $H^p = H^s$, we have the following equations:

$$\omega_1^p = \frac{(1-\mu)\frac{1}{1-\theta^p}(1-F(\tilde{\varepsilon}^p))}{(1-\mu)\frac{1}{1-\theta^p}(1-F(\tilde{\varepsilon}^p)) + \mu\frac{1}{1-\theta^s}(1-F(\tilde{\varepsilon}^s))} \tag{101}$$

$$\omega_2^p = \frac{(1-\mu)\left[\frac{1}{1-\theta^p}(F(\bar{\varepsilon}^p) - F(\underline{\varepsilon}^p)) + \frac{1}{1-\eta}(1-F(\bar{\varepsilon}^p))\right]}{(1-\mu)\left[\frac{1}{1-\theta^p}(F(\bar{\varepsilon}^p) - F(\underline{\varepsilon}^p)) + \frac{1}{1-\eta}(1-F(\bar{\varepsilon}^p))\right] + \mu\left[\frac{1}{1-\theta^s}(F(\bar{\varepsilon}^s) - F(\underline{\varepsilon}^s)) + \frac{1}{1-\eta}(1-F(\bar{\varepsilon}^s))\right]} \tag{102}$$

Divide ω_2^p by ω_1^p, we have:

$$\frac{\omega_2^p}{\omega_1^p} = \frac{N}{D} \tag{103}$$

where:

$$N = \frac{F(\bar{\varepsilon}^p) - F(\underline{\varepsilon}^p)}{1 - F(\tilde{\varepsilon}^p)} + \frac{\frac{1}{1-\eta}(1 - F(\bar{\varepsilon}^p))}{\frac{1}{1-\theta^p}(1 - F(\tilde{\varepsilon}^p))} \tag{104}$$

The second equation is obtained by using the CDF of Pareto distribution.

$$\begin{aligned}
D &= \frac{(1-\mu)\left[\frac{1}{1-\theta^p}(F(\bar{\varepsilon}^p) - F(\underline{\varepsilon}^p)) + \frac{1}{1-\eta}(1 - F(\bar{\varepsilon}^p))\right] + \mu\left[\frac{1}{1-\theta^s}(F(\bar{\varepsilon}^s) - F(\underline{\varepsilon}^s)) + \frac{1}{1-\eta}(1 - F(\bar{\varepsilon}^s))\right]}{(1-\mu)\frac{1}{1-\theta^p}(1 - F(\tilde{\varepsilon}^p)) + \mu\frac{1}{1-\theta^s}(1 - F(\tilde{\varepsilon}^s))} \\
&= \frac{\left[\frac{1}{1-\theta^p}(F(\bar{\varepsilon}^p) - F(\underline{\varepsilon}^p)) + \frac{1}{1-\eta}(1 - F(\bar{\varepsilon}^p))\right]}{\frac{1}{1-\theta^p}(1 - F(\tilde{\varepsilon}^p))} \frac{(1-\mu)\frac{1}{1-\theta^p}(1 - F(\tilde{\varepsilon}^p))}{(1-\mu)\frac{1}{1-\theta^p}(1 - F(\tilde{\varepsilon}^p)) + \mu\frac{1}{1-\theta^s}(1 - F(\tilde{\varepsilon}^s))} \\
&+ \frac{\left[\frac{1}{1-\theta^s}(F(\bar{\varepsilon}^s) - F(\underline{\varepsilon}^s)) + \frac{1}{1-\eta}(1 - F(\bar{\varepsilon}^s))\right]}{\frac{1}{1-\theta^s}(1 - F(\tilde{\varepsilon}^s))} \frac{\mu\frac{1}{1-\theta^s}(1 - F(\tilde{\varepsilon}^s))}{(1-\mu)\frac{1}{1-\theta^p}(1 - F(\tilde{\varepsilon}^p)) + \mu\frac{1}{1-\theta^s}(1 - F(\tilde{\varepsilon}^s))} \\
&= \frac{\left[\frac{1}{1-\theta^p}(F(\bar{\varepsilon}^p) - F(\underline{\varepsilon}^p)) + \frac{1}{1-\eta}(1 - F(\bar{\varepsilon}^p))\right]}{\frac{1}{1-\theta^p}(1 - F(\tilde{\varepsilon}^p))} \frac{1}{1+m} \\
&+ \frac{\left[\frac{1}{1-\theta^s}(F(\bar{\varepsilon}^s) - F(\underline{\varepsilon}^s)) + \frac{1}{1-\eta}(1 - F(\bar{\varepsilon}^s))\right]}{\frac{1}{1-\theta^s}(1 - F(\tilde{\varepsilon}^s))} \frac{m}{1+m}
\end{aligned} \tag{105}$$

where $m = \frac{\mu\frac{1}{1-\theta^s}(1-F(\tilde{\varepsilon}^s))}{(1-\mu)\frac{1}{1-\theta^p}(1-F(\tilde{\varepsilon}^p))}$

$$\frac{\omega_2^p}{\omega_1^p} = \frac{1}{\frac{1}{1+m} + \frac{m}{1+m}\frac{\frac{\left[\frac{1}{1-\theta^s}(F(\bar{\varepsilon}^s)-F(\underline{\varepsilon}^s))+\frac{1}{1-\eta}(1-F(\bar{\varepsilon}^s))\right]}{\frac{1}{1-\theta^s}(1-F(\tilde{\varepsilon}^s))}}{\frac{\left[\frac{1}{1-\theta^p}(F(\bar{\varepsilon}^p)-F(\underline{\varepsilon}^p))+\frac{1}{1-\eta}(1-F(\bar{\varepsilon}^p))\right]}{\frac{1}{1-\theta^p}(1-F(\tilde{\varepsilon}^p))}}} \tag{106}$$

To prove $\frac{\omega_2^p}{\omega_1^p} > 1$ is to prove that $1 > \frac{1}{1+m} + \frac{m}{1+m}\frac{\frac{\left[\frac{1}{1-\theta^s}(F(\bar{\varepsilon}^s)-F(\underline{\varepsilon}^s))+\frac{1}{1-\eta}(1-F(\bar{\varepsilon}^s))\right]}{\frac{1}{1-\theta^s}(1-F(\tilde{\varepsilon}^s))}}{\frac{\left[\frac{1}{1-\theta^p}(F(\bar{\varepsilon}^p)-F(\underline{\varepsilon}^p))+\frac{1}{1-\eta}(1-F(\bar{\varepsilon}^p))\right]}{\frac{1}{1-\theta^p}(1-F(\tilde{\varepsilon}^p))}}$, which is equivalent to:

$$1 \geq \frac{\frac{\left[\frac{1}{1-\theta^s}(F(\bar{\varepsilon}^s)-F(\underline{\varepsilon}^s))+\frac{1}{1-\eta}(1-F(\bar{\varepsilon}^s))\right]}{\frac{1}{1-\theta^s}(1-F(\tilde{\varepsilon}^s))}}{\frac{\left[\frac{1}{1-\theta^p}(F(\bar{\varepsilon}^p)-F(\underline{\varepsilon}^p))+\frac{1}{1-\eta}(1-F(\bar{\varepsilon}^p))\right]}{\frac{1}{1-\theta^p}(1-F(\tilde{\varepsilon}^p))}} \tag{107}$$

which is equivalent to:

$$
\begin{aligned}
&\Rightarrow \frac{\left[\frac{1}{1-\theta^p}(F(\bar{\varepsilon}^p)-F(\underline{\varepsilon}^p))+\frac{1}{1-\eta}(1-F(\bar{\varepsilon}^p))\right]}{\frac{1}{1-\theta^p}(1-F(\tilde{\varepsilon}^p))} \geq \frac{\left[\frac{1}{1-\theta^s}(F(\bar{\varepsilon}^s)-F(\underline{\varepsilon}^s))+\frac{1}{1-\eta}(1-F(\bar{\varepsilon}^s))\right]}{\frac{1}{1-\theta^s}(1-F(\tilde{\varepsilon}^s))} \\
&\Rightarrow \frac{K_2^p}{K_1^p} \geq \frac{K_2^s}{K_1^s} \\
&\Rightarrow \frac{K_2^p}{K_1^p} - 1 \geq \frac{K_2^s}{K_1^s} - 1
\end{aligned}
\tag{108}
$$

that is the percentage change of capital use by POE sector should be larger than that of SOE sector. □

E.6 Proof of Proposition (7)

Proof. Given net worth of period t and the idiosyncratic productivity for period $t+1$, firms in j sector choose owned capital $k^j_{o,t+1}$, savings s^j_{t+1} , bank loans bl^j_{t+1} for the next period to maximize:

$$V^j_{i,t} = \mathbf{E}_t \left[\sum_{s=1}^{\infty} \delta_e^s \beta^s \frac{\Lambda_{t+s}}{\Lambda_t} h^j_{i,t+s} \right] \tag{109}$$

which is equivalent to solve the following maximizing problem (given the idiosyncratic shock is $i.i.d$ across time):

$$\max_{b^j_{i,t+1}, k^j_{i,t+1}, ko^j_{i,t+1}} h^j_{i,t+1}(b^j_{i,t+1}, k^j_{i,t+1}, ko^j_{i,t+1}) \tag{110}$$

where

$$h^j_{i,t+1} = (\tau^j z^j \varepsilon^j_{t+1} R_{t+1} + 1 - \delta) k^j_{i,t+1} - (1 + r_t) b^j_{i,t+1} \tag{111}$$

In this case, the flow-of-fund condition becomes:

$$k^j_{i,t+1} = h^j_{i,t} + b^j_{i,t+1} \tag{112}$$

Plug the the flow-of-fund condition into Equation (111), we have:

$$h^j_{i,t+1} = (\tau^j z^j \varepsilon^j_{t+1} R_{t+1} + 1 - \delta) h^j_{i,t} + \left[\tau^j z^j \varepsilon^j_{t+1} R_{t+1} - (\delta + r_t) \right] b^j_{i,t+1} \tag{113}$$

The choice of the bank loan depends on the sign of the coefficient before $b^j_{i,t+1}$.

For firms with high idiosyncratic productivity $\varepsilon^j_{t+1} \geq \tilde{\varepsilon}^j_{t+1}$, the coefficient is positive, so firms would choose to borrow as much as they can. We have $b^j_{i,t+1} = \theta^j ko^j_{i,t+1} = \frac{\theta^j}{1-\theta^j} h^j_{i,t}$ and $ko^j_{i,t+1} = \frac{1}{1-\theta^j} h^j_{i,t}$. The capital used in production $k^j_{i,t+1} = \frac{1}{1-\theta^j} h^j_{i,t}$.

For firms with low idiosyncratic productivity $\varepsilon^j_{t+1} \leq \tilde{\varepsilon}^j_{t+1}$, the coefficient is negative, so firms would choose to save as much as they can. Thus we have $b^j_{i,t+1} = -h^j_{i,t}$ and $ko^j_{i,t+1} = 0$. The capital used in production $k^j_{i,t+1} = 0$. □

E.7 Proof of Proposition (8)

Proof. Given the net worth h^j_t and idiosyncratic productivity ε^j_t, the firm in j sector would maximize:

$$V^j_{i,t} = \mathbf{E}_t \left[\sum_{s=1}^{\infty} \delta_e^s \beta^s \frac{\Lambda_{t+s}}{\Lambda_t} h^j_{i,t+s} \right] \tag{114}$$

which is equivalent to solve the following maximizing problem (given the idiosyncratic shock is $i.i.d$ across time):

$$\max_{b^j_{i,t+1},l^j_{i,t+1},k^j_{i,t+1},k^j_{il,t+1}} h^j_{i,t+1}(b^j_{i,t+1}, l^j_{i,t+1}, k^j_{i,t+1}, ko^j_{i,t+1}, kl^j_{i,t+1}) \tag{115}$$

where

$$h^j_{i,t+1} = (\tau^j z^j \varepsilon^j_{t+1} R_{t+1} + 1 - \delta)k^j_{i,t+1} - (1 + r_t)b^j_{i,t+1} - (1 + r_{lt})l^j_{i,t+1} \tag{116}$$

Plugging Equation (46) into Equation (116) we have:

$$\begin{aligned} h^j_{i,t+1} = {} & (\tau^j z^j \varepsilon^j_{t+1} R_{t+1} + 1 - \delta)h^j_{i,t} + \left[\tau^j z^j \varepsilon^j_{t+1} R_{t+1} - (\delta + r_{d,t+1)})\right] b^j_{i,t+1} \\ & + \left[\tau^j z^j \varepsilon^j_{t+1} R_{t+1} - (\delta + r_{l,t+1})\right] l^j_{i,t+1} \end{aligned} \tag{117}$$

When $\varepsilon^j_{t+1} \leq \frac{r_{l,t+1}+\delta}{\tau^j z^j R_{t+1}} = \underline{\varepsilon}^j_{t+1}$, the coefficient before $l^j_{i,t+1}$ is negative, thus firms would choose $l_{i,t+1} = -(h^j_{i,t} + b^j_{t+1})$. Equation (117) becomes:

$$h^j_{i,t+1} = (1 + r_{l,t+1})h^j_{i,t} + (r_{l,t+1} - r_{d,t+1})b^j_{i,t+1} \tag{118}$$

Under the condition $r_{l,t+1} > r_{d,t+1}$, we have $b^j_{i,t+1} = \theta^j ko^j_{i,t+1}$, $ko^j_{i,t+1} = \frac{1}{1-\theta^j} h^j_{i,t}$ and $k^j_{i,t+1} = 0$.

When $\varepsilon^j_{t+1} \geq \frac{r_{l,t+1}+\delta}{\tau^j z^j R_{t+1}} = \underline{\varepsilon}^j_{t+1}$, coefficients before $b^j_{i,t+1}$ and $l^j_{i,t+1}$ are positive, thus we have $b^j_{i,t+1} = \theta^j ko^j_{i,t+1}$ and $l^p_{i,t+1} = \eta^j kl^j_{i,t+1}$ and Equation (44) becomes:

$$(1 - \theta^j)ko^j_{i,t+1} + (1 - \eta^j)kl^j_{i,t+1} = h^j_{i,t} \tag{119}$$

We represent $ko^j_{i,t+1}$ in $kl^j_{i,t+1}$ and plug it with $b^j_{i,t+1} = \theta^j ko^j_{i,t+1}$ and $l^j_{i,t+1} = \eta^j kl^j_{i,t+1}$ into Equation (117) and get:

$$\begin{aligned} h^j_{i,t+1} = {} & \left[\frac{1}{1-\theta^j}\tau^j z^j \varepsilon^j_{t+1} R_{t+1} + 1 - \delta - (\delta + r_{d,t+1})\frac{\theta^j}{1-\theta^j}\right] h^j_{i,t} \\ & + \frac{(\eta^j - \theta^j)\tau^j z^j \varepsilon^j_{t+1} R_{t+1} - [\eta^j(1-\theta^j)(r_{l,t+1} + \delta) - \theta^j(1-\eta^j)(r_{d,t+1} + \delta)]}{1 - \theta^j} kl^j_{i,t+1} \end{aligned} \tag{120}$$

The choice of $kl^j_{i,t+1}$ depends on the sign of the coefficient before $kl^j_{i,t+1}$, which implies the second cutoff in Equation (56).

For firms with $\varepsilon^j_{t+1} \geq \bar{\varepsilon}^j_{t+1}$, the coefficient before $kl^j_{i,t+1}$ is positive, firms would choose

$kl^j_{i,t+1}$ to be as large as possible. Thus, we have $kl^j_{i,t+1} = \frac{1}{1-\eta^j} h^j_{i,t}$ and $ko^j_{i,t+1} = 0$, $l^j_{i,t+1} = \frac{\eta^j}{1-\eta^j} h^j_{i,t}$, $b^j_{i,t+1} = 0$. The capital in production is: $k^j_{t+1} = \frac{1}{1-\eta^j} h^j_{i,t}$.

For firms with $\underline{\varepsilon}^j_{t+1} \leq \varepsilon^j_{t+1} \leq \bar{\varepsilon}^j_{t+1}$, the coefficient before $kl^j_{i,t+1}$ is negative, firms would choose $kl^j_{i,t+1}$ to be as small as possible. Thus, we have $kl^j_{i,t+1} = 0$ and $ko^j_{i,t+1} = \frac{1}{1-\theta^j} h^j_{i,t}$, $l^j_{i,t+1} = 0$, $b^j_{i,t+1} = \frac{\theta^j}{1-\theta^j} h^j_{i,t}$. The capital in production is: $k^j_{t+1} = \frac{1}{1-\theta^j} h^j_{i,t}$.

The results in the proposition 8 have been proved. □

F Solve Dynamic Model

In this section, we first specify the sectoral variables in each case, and then we illustrate the algorithm to solve the steady stated of the model.

F.1 Aggregate Variables

F.1.1 Case I: Without Financial Leasing Market

In case I when there is no financial leasing market, the aggregate variables are defined as follow.

The capital used as collateral to borrow from bank is:

$$KO_t^j = \tilde{H}_{t-1}^j \frac{1}{1-\theta^j} \int_{\bar{\varepsilon}_t^j} d\mathbf{F}^j\left(\varepsilon^j\right) \tag{121}$$

The aggregate capital of sector j at period t is:

$$K_t^j = \tilde{H}_{t-1}^j \frac{1}{1-\theta^j} \int_{\bar{\varepsilon}_t^j}^{\infty} d\mathbf{F}^j\left(\varepsilon_t^j\right) \tag{122}$$

The aggregate effective capital of sector j at period t is:

$$\tilde{K}_t^j = \tilde{H}_{t-1}^j z^j \frac{1}{1-\theta^j} \int_{\bar{\varepsilon}_t^j}^{\infty} \varepsilon_t^j d\mathbf{F}^j\left(\varepsilon_t^p\right) \tag{123}$$

The aggregate bank loan of sector j at period t is:

$$B_t^j = \tilde{H}_{t-1}^j \left(-\int^{\bar{\varepsilon}_t^j} d\mathbf{F}^j\left(\varepsilon_t^j\right) + \frac{\theta^j}{1-\theta^j} \int_{\bar{\varepsilon}_t^j} d\mathbf{F}^j\left(\varepsilon_t^j\right) \right) \tag{124}$$

The aggregate value of sector j at period t is:

$$\tilde{H}_t^j = (1-\delta_e)\left[\tau^j R_t \tilde{K}_t^j + (1-\delta) K_t^j - (1+r_{d,t}) B_t^j\right] + \delta_e h_{0t}^j \tag{125}$$

F.1.2 Case II: With Financial Leasing Market

The owned-capital of sector j at period t is:

$$KO_t^j = \tilde{H}_{t-1}^j \frac{1}{1-\theta^j} \int_{\underline{\varepsilon}_t^j}^{\bar{\varepsilon}_t^j} d\mathbf{F}^j\left(\varepsilon^j\right) \tag{126}$$

The leased-capital of sector j in period t:

$$KL_t^j = \tilde{H}_{t-1}^j \frac{1}{1-\eta^j} \int_{\bar{\varepsilon}_t^j} d\mathbf{F}^j\left(\varepsilon_t^j\right) \tag{127}$$

The total capital of sector j is:

$$K_t^j = \tilde{H}_{t-1}^j \left(\frac{1}{1-\theta^j} \int_{\underline{\varepsilon}_t^j}^{\bar{\varepsilon}_t^j} d\mathbf{F}^j\left(\varepsilon^j\right) + \frac{1}{1-\eta^j} \int_{\bar{\varepsilon}_t^j}^{\infty} d\mathbf{F}^j(\varepsilon_t^j) \right) \tag{128}$$

The effective capital of j sector is:

$$\tilde{K}_t^j = z^j \tilde{H}_{t-1}^j \left\{ \frac{1}{1-\theta^j} \int_{\underline{\varepsilon}_t^j}^{\bar{\varepsilon}_t^j} \varepsilon^j d\mathbf{F}^j\left(\varepsilon^j\right) + \frac{1}{1-\eta^j} \int_{\bar{\varepsilon}_t^j}^{\infty} \varepsilon^j d\mathbf{F}^j\left(\varepsilon_t^j\right) \right\} \tag{129}$$

The financial leasing loan of SOE sector is:

$$L_t^j = \tilde{H}_{t-1}^j \left(-\frac{1}{1-\theta^j} \int^{\bar{\varepsilon}_t^j} d\mathbf{F}^j\left(\varepsilon_t^j\right) + \frac{\eta^j}{1-\eta^j} \int_{\bar{\varepsilon}_t^j} d\mathbf{F}^j\left(\varepsilon_t^j\right) \right) \tag{130}$$

The bank loan of SOE sector is:

$$B_t^j = \tilde{H}_{t-1}^j \frac{\theta^j}{1-\theta^j} \int^{\bar{\varepsilon}_t^j} d\mathbf{F}^j\left(\varepsilon_t^j\right) \tag{131}$$

We define the net value of sector j at period t as:

$$\tilde{H}_t^j = (1-\delta_e)\left[\tau^j R_t \tilde{K}_t^j + (1-\delta) K_t^j - (1+r_{d,t-1}) B_t^j - (1+r_{l,t-1}) L_t^j\right] + \delta_e h_{0t}^j \tag{132}$$

F.2 Solving Steady State of Dynamic Model

F.2.1 Initial Steady State without Financial Leasing Market

Step 1: Solving $R, \tilde{H}^j$. Recall equation (34), we get $r_d = 1/\beta - 1$ at the steady state. From the definition of the cutoffs $\tilde{\varepsilon}^j$, the cutoff could be represented as the function of $\{R, r_d\}$. According to the definition of sectoral variables, at the steady state we have:

$$\frac{K^j}{\tilde{H}^j} = \frac{1}{1-\theta^s} \int_{\tilde{\varepsilon}^j} d\mathbf{F}^j\left(\varepsilon^j\right) \tag{133}$$

$$\frac{B^j}{\tilde{H}^j} = -\int^{\tilde{\varepsilon}^j} d\mathbf{F}^j\left(\varepsilon_t^j\right) + \frac{\theta^j}{1-\theta^j} \int_{\tilde{\varepsilon}^j} d\mathbf{F}^j\left(\varepsilon^j\right) \tag{134}$$

$$\frac{\tilde{K}^j}{\tilde{H}^j} = z^j \frac{1}{1-\theta^j} \int_{\tilde{\varepsilon}^j} \varepsilon^j d\mathbf{F}^j\left(\varepsilon^j\right) \tag{135}$$

$$N^j = \tau^j \left(\frac{R}{\alpha}\right)^{\frac{1}{1-\alpha}} \tilde{K}^j \tag{136}$$

According to the Equation (59),we have:

$$1 = (1-\delta_e)\left[\tau^j R \frac{\tilde{K}^j}{\tilde{H}^j} + (1-\delta)\frac{K^j}{\tilde{H}^j} - (1+rd)\frac{L^j}{\tilde{H}^j}\right] + \delta_e \frac{h_0^j}{\tilde{H}^j} \tag{137}$$

Combine two equations indicated by Equation (59) and the labor market clearing condition we can pin down $R, \tilde{H}^j$.

Step 2: Solving Other Variables.

After we solve $\{R, \tilde{H}^j\}$, we can get $\{K^j, B^j, \tilde{K}^j, N^j\}$ from equation (133)- (136). The sectoral variables $\{Y^j, A^j\}$ are directly obtained from equations (65) and (66). The aggregate $\{Y, K, N, A\}$ are generated from equation (67) - (70). According to the clearing condition of traditional credit market equation (62), we obtain S. The definition of R indicates that $W = (1-\alpha)\left(\frac{\alpha}{R}\right)^{\frac{\alpha}{1-\alpha}}$, the goods market clearing condition equation (71) indicates the consumption C of household.

F.2.2 End Steady State with Financial Leasing Market

Step 1: Solving $R, r_l, \tilde{H}^j$ The cutoffs can be represented as functions of R, r_l. Also, we have:

$$\frac{K^j}{\tilde{H}^j} = \frac{1}{1-\theta^j}\int_{\underline{\varepsilon}^j}^{\bar{\varepsilon}^j} d\mathbf{F}^j\left(\varepsilon^j\right) + \frac{1}{1-\eta^j}\int_{\bar{\varepsilon}^j} d\mathbf{F}^j\left(\varepsilon^j\right) \tag{138}$$

$$\frac{\tilde{K}^j}{\tilde{H}^j} = z^j\left[\frac{1}{1-\theta^j}\int_{\underline{\varepsilon}^j}^{\bar{\varepsilon}^j} \varepsilon^j d\mathbf{F}^j\left(\varepsilon^j\right) + \frac{1}{1-\eta^j}\int_{\bar{\varepsilon}^j}^{\varepsilon_{\max}} \varepsilon^j d\mathbf{F}^j\left(\varepsilon^j\right)\right] \tag{139}$$

$$\frac{B^j}{\tilde{H}^j} = \frac{\theta^j}{1-\theta^j}\int_{\underline{\varepsilon}^j}^{\bar{\varepsilon}^j} d\mathbf{F}^j\left(\varepsilon^j\right) \tag{140}$$

$$\frac{L^j}{\tilde{H}^j} = -\frac{1}{1-\theta^j}\int_{\varepsilon_{\min}}^{\underline{\varepsilon}^j} d\mathbf{F}^j\left(\varepsilon^j\right) + \frac{\eta^j}{1-\eta^j}\int_{\bar{\varepsilon}^j}^{\varepsilon_{\max}} d\mathbf{F}^j\left(\varepsilon^j\right) \tag{141}$$

$$N^j = \tau^j\left(\frac{R}{\alpha}\right)^{\frac{1}{1-\alpha}}\tilde{K}_t^j \tag{142}$$

We can express $\{K^j, \tilde{K}^j, L^j, B^j, N^j\}$ as functions of R, r_l and $\tilde{H}^j$. Then we can pin down the steady state values of R, r_l and $\tilde{H}^j$ using the net value definition indicated by (59), labor market clearing condition (75) and leasing market clearing condition (72).

Step 2: Solving Other Variables.

The step 2 to solve the steady state with finance lease market is the same with the case when there is no steady state.