Non-Financial Enterprises’ Shadow Banking Business and Total Factor Productivity of Enterprises

Chen Yang * and Weitao Shen

Department of Business Management, School of Management, Xiamen University, Xiamen 361005, China; wtshen@xmu.edu.cn
* Correspondence: tryyangchen@stu.xmu.edu.cn

Abstract: This study empirically analyzes the impact of the shadow banking business (SBB) of non-financial enterprises (non-FEs) on the total factor productivity (TFP) of enterprises using data concerning non-FEs listed in China’s A-share market from 2008 to 2019. The results show that non-FEs’ SBB has a significantly negative impact on their TFP, and for every 10% increase in the involvement of non-FEs in SBB, their TFP decreases by 4.22% on average. The negative effect is more significant in the period of loose monetary policy, lower industry competition, and non-state-owned enterprises. Alleviating financing constraints, reducing information asymmetry, and optimizing financial resource allocation may mitigate the negative effect. Our study reveals the mechanism by which non-FEs’ SBB inhibits their TFP. These findings enrich the theoretical research on the two, and provide empirical evidence to alleviate the “off real to virtual” of the economy and promote long-term, high-quality and sustainable economic development.

Keywords: shadow banking; total factor productivity; financing constraints; information asymmetry; financial mismatch

1. Introduction

How can sustainable total factor productivity (TFP) growth be achieved? China’s economic development has shifted from high-speed to high-quality growth, which has resulted in changes to its demographic structure, labor costs and supply–demand relationships, and an increase in the costs of production factors. It is becoming increasingly apparent that there are a number of challenges resulting from the sloppy growth model such as environmental pollution and inefficient resource allocation. Currently, China’s economic development is focused on achieving high-quality development by pursuing innovation, coordination, green, openness, and sharing rather than a growth rate. Sustainable economic development emphasizes technological iteration and innovation, industrial transformation and upgrading, and economic structure optimization, of which the most critical is whether enterprises can continuously improve TFP. TFP can be regarded as the driving source of the modern economy with high quality. China must promote continuous improvement of TFP in order to achieve long-term, high-quality, and sustainable economic development. Furthermore, preventing enterprises from “off real to virtual” and strengthening the real economy are essential for promoting long-term, high-quality and sustainable economic development. Therefore, from the perspective of enterprise TFP, a thorough understanding of the impact of the “off real to virtual” trend on the development of real enterprises may guide enterprises to rationally allocate factors and prevent the economy from “de-realization to deficiency”.

China’s shadow banking business (SBB) has experienced explosive growth since the global financial crisis of 2008. Shadow banking refers to various financial intermediary businesses that exist outside of the conventional banking system [1]. They rely on non-bank financial institutions as carriers to convert risk factors such as credit, liquidity, and maturity of financial assets [2]. Shadow banking plays the role of “bank-like”, which...
can partially compensate for the inefficiency of bank credit rationing. As a result of the explosive development of shadow banking in China, the real economy has turned from real to virtual, which poses a grave threat to China’s attempts to achieve high-quality economic and financial transformation. Shadow banks have hidden debt and guarantee networks, and the continuous convergence of systemic risks in the financial markets may accelerate the spread of financial risks. By the end of 2019, the size of broad shadow banking in China was estimated to be 84.80 trillion RMB, while that in the narrow sense was 39.14 trillion RMB, according to the Report on China’s Shadow Banking released by the China Banking and Insurance Regulatory Commission.

Recently, China’s non-FEs have also experienced a serious “shifting from real to virtual” in asset allocation and profit accumulation. It appears that non-FEs are increasing their investment in the shadow credit market in an effort to maximize their returns and shorten the duration of the debt, which does not support the sustained development of enterprises. Non-FEs have joined the shadow banking market after traditional financial institutions, small loan companies, financing guarantee companies, and other financial intermediaries. Presently, China’s non-FEs primarily participate in SBB through entrusted loans, entrusted finance, bridge loans, and the purchase of shadow credit products, etc. [3,4]. Non-FEs engaged in the SBB may be considered disguised participation of enterprises in financial investment activities. Specifically, there is an upward trend in the proportion of shadow credit assets to total assets and in the proportion of profits generated from the shadow banking system. On the one hand, corporate sector re-lending is typically seen in emerging markets and economies in transition [5,6]. Considering China’s development reality, imbalanced credit allocation and low efficiency of financial resource allocation have imposed severe budget constraints on small and medium-sized enterprises (SMEs) and private enterprises [7]. These provide the environment and conditions for enterprises to act as intermediaries and participate in the SBB. On the other hand, an increasing gap exists between the financial and entity yields. Non-FEs seek high-interest rate returns by purchasing shadow credit products such as bank financial products, trust loans, brokerage financial products, asset management plans, structured deposits, and private equity funds [4]. Non-FEs have become credit entities in the shadow banking system by indirectly participating in credit chains such as banks, securities and fund companies. However, non-FEs engage in SBB with high risk, poor liquidity, and excessive nesting of products, and they will encounter serious financial dilemmas once financial assets become substantially impaired or the bubble bursts. There will be more non-performing loans and corporate defaults at this point, which will undermine the traditional financial system and the real economy [8,9].

Figure 1 shows the trend of non-FEs’ SBB and TFP for the sample from 2008 to 2019. Clearly, they show opposing trends. Then, does non-FEs’ SBB inhibit their TFP, and what factors will affect their relationship? Existing studies have mainly investigated the impact of non-FEs’ SBB on social welfare losses [10], bank profitability [11], financing constraints [12], business performance [5] and business and operating risk [3], etc. Non-FEs’ SBB and TFP of enterprises have received very little attention. There is a critical period of structural adjustment, transformation, and upgrading in China. Thinking about the above problems will help regulate non-FEs’ SBB, promote the real economy to “get rid of the virtual and return to the real”, and achieve long-term, high-quality and sustainable economic development. To explore the impact of non-FEs’ SBB on their TFP, we selected Chinese A-share listed companies from 2008 to 2019 as our samples. According to our findings, non-FEs’ SBB significantly inhibits their TFP. The negative effect may be influenced by financing constraints, information asymmetry, financial mismatch, etc. Non-FEs’ SBB has a more significant negative effect on their TFP in the period of loose monetary policy, lower industrial competition, and non-state-owned enterprises (non-SOEs).
Our study makes the following potential contribution. First, we explored the relationship between “non-FEs’ SBB and TFP of enterprises”. These results provide further insight into the factors affecting the TFP of enterprises and contribute to the study of the impact of non-FEs’ SBB on the real economy. Our findings better clarify the economic consequences of non-FEs’ SBB in emerging market countries and provide a reference for better regulating non-FEs’ SBB and promoting long-term, high-quality, and sustainable economic development. Second, we also identified possible ways to guide enterprises to “return to the real” and enhance the strategic goal of their TFP. Our findings reveal that reducing financing constraints, lowering information asymmetry, and promoting efficient allocation of financial resources may alleviate the negative effect of non-FEs’ SBB on their TFP. Third, we examined whether there are differences in the effects of the external macro-environment (monetary policy), the meso market (industry competition), and their internal micro characteristics (equity nature) on non-FEs’ SBB and TFP of enterprises. Our analysis deepens and expands our research conclusions and provides some policy implications for corporate governance and regulatory issues.

The main structure is organized as follows. Section 2 reviews the literature on non-FEs’ SBB and TFP of enterprises; Section 3 presents our hypothesis development; Section 4 describes our research design, including sample and data, main variables, regression models, etc.; Section 5 presents our empirical testing results; Section 6 performs further analysis; Section 7 conducts heterogeneity analysis; and Section 8 summarizes our findings, and considers the implications of the negative effects of both.

2. Literature Review

2.1. Shadow Banking Business of Non-Financial Enterprises

Shadow banking has grown rapidly in emerging economies since 2008, largely due to the huge impact of the global financial crisis. Shadow banking activities in transition economies, however, differ from those in developed economies. Especially in China, where the corporate sector relending is a typical “Chinese style shadow banking”: non-FEs’ SBB.

Research on non-FEs’ SBB has been focused primarily on motivations, influencing factors, and economic consequences. First, the motivations of non-FEs’ SBB: (i) Precautionary savings motive. Shadow banking satisfies the high demand for funds [13]. In the absence of sufficient funds for productive investment, companies tend to exhibit “precautionary savings behavior” by actively participating in SBB; (ii) Arbitrage motive. Non-FEs can earn much more profit from SBB than investing in the real economy [14]. Managers have a financial incentive to utilize funds for SBB to gain more benefits in the short term [15].

Second, the factors influencing non-FEs’ SBB: (i) Macro-environment. Shadow banking in China is greatly influenced by China’s unique political and economic dynamics, such as monetary policy [16], a rigid financial licensing system, and credit policy controls [2];
(ii) Meso-market. Financial exclusion [17], financing constraints [12], and the degree of financial mismatch [18] are factors influencing non-FE investments in SBB. (iii) Micro-firm characteristics. Only a few studies have focused on factors such as supply chain relationships [19], CEOs’ financial backgrounds [20], and directors’ and officers’ liability insurance [21] on non-FEs’ engagement in SBB.

Finally, the economic consequences of non-FEs’ SBB: through their SBB, non-FEs contribute to bank profitability [11], alleviate financing constraints [22], and improve their business performance [5]. However, non-FEs may also suffer negative effects from their SBB. According to the majority of existing literature, non-FEs’ SBB may lead to social welfare losses [10], higher operational risk [3], systemic risk [23], stock price collapse risk [24], etc.

Non-FEs’ SBB has been explored from different perspectives. However, few studies have explored the relationship between non-FEs’ SBB and TFP of enterprises. It remains to be further investigated whether and how non-FEs’ SBB inhibits their TFP.

2.2. Enterprises Total Factor Productivity

Enterprises TFP has received much attention both from theorists and practitioners as a key indicator of the long-term sustainability of enterprises. TFP is caused by technological and structural changes, and generally consists of technological progress, allocation efficiency, etc. Factors that influence the TFP of enterprises can be classified as positive or negative. (i) Positive factors. Financial development has horizontal and growth effects on TFP through the channels of efficiency and technology [25]. Allocating resources and factors scientifically and efficiently can result in higher TFPs [26]. Several factors are capable of contributing to an increase in TFP of enterprises, including R&D spillover, investment in R&D, R&D activities, and technology development and transformation investments [27]; (ii) Negative influences. Financial frictions lead to factor mismatch by distorting firm entry and exit mechanisms, which hinders the increase of TFP of enterprises [28,29]. Resource mismatch, in turn, reduces TFP [30]. Due to information asymmetry, there will be a problem of moral hazard and adverse selection that will hinder the increase of TFP [31]; financing constraints hinder the further increase of TFP [32]. Excessive leverage will lead to systemic risks and financial crises [33], and corporate debt leverage will negatively affect the increase of TFP of enterprises.

There is a lot of discussion in the existing literature concerning the factors influencing the TFP of enterprises. However, there is no direct investigation of the impact of non-FEs engaging in SBB on their TFP, which provides an opportunity for our study.

3. Hypotheses Development

According to our analysis, we believe that the impact of non-FEs’ SBB on their TFP can be divided into two categories.

(1) Non-FEs’ SBB may have a negative impact on the TFP of enterprises, and non-FEs engaging in SBB may inhibit the improvement of TFP. Currently, non-FEs can engage in SBB by issuing entrusted loans, entrusted finance and other compliant methods. Additionally, they can facilitate liquidity support to SMEs, real estate enterprises, home buyers, and other capital demanders through non-compliant channels, such as underground financing. On the one hand, the increase in TFP of enterprises requires high investment and high-risk investment in R&D and innovation. However, the resources that enterprises have are often scarce, and the funds they have are limited. Cupertino et al. [34] found that a non-FE’s investment in finance would crowd out investments in the real economy. If an enterprise invests in SBB with funds originally used for its main business or others, it could lead to a “crowding out” effect on industrial investment. For example, enterprises may invest less in fixed assets [35]; enterprises cannot have enough capital to upgrade equipment and engage in technological R&D activities, etc., thereby hindering the improvement of their TFP.

On the other hand, non-FEs engage in high risk, less liquid, and overly nested SBB, which will increase the possibility that they will not be able to recover their future funds on
time. At this point, enterprises will face a greater risk of default, increasing the cost and difficulty of refinancing. The uncertainty of shadow credit funding will have a negative impact on the enterprise’s main business investment, which will have a negative impact on their long-term sustainable development. In addition, non-FEs engaging in SBB will magnify the cross-contagion effect of risks between the real sector and the financial market. And it will also increase the uncertainty of enterprise cash flows as a result of the continued convergence of systemic risks in the financial market [24]. If financial assets are significantly impaired or the bubble bursts, enterprises may fall into serious financial distress, increasing non-performing loans and corporate defaults. Consequently, non-FEs engaging in SBB may have a negative impact on their TFP.

(2) Non-FEs’ SBB may also have a positive impact on the TFP of enterprises. First, financing constraint is the main factor that restricts R&D investment [36] and hinders the increase of TFP of enterprises [37]. China’s capital market is still at an early stage of development, and most companies obtain their financing from bank credit. The financing constraint is exacerbated by the fact that banks are afraid of lending, which severely constrains the financing demand of enterprises [38,39]. The existence of financing constraints is one of the most obvious reasons for the involvement of non-FEs in SBB and its expansion [12]. Non-FEs’ SBB is manifested by acting as intermediaries for real enterprises and providing liquidity to fund integrators such as SMEs and non-SOEs. Non-FEs’ SBB is conducive to facilitating new capital flow channels for enterprises, relying on the rich cash flow of the subject to supply funds for those enterprises at a financing disadvantage [23]. As a result, non-FEs’ SBB alleviates financing constraints in the capital market. Second, information asymmetry will lead to moral hazard and adverse selection problems, which will hinder the improvement of TFP. As a financial intermediary, shadow banking can build a bridge between the demand side (borrowers) and the supply side (savers) in areas not covered by traditional banks. Participation in SBB is equivalent to drawing market oversight within firms, which mitigates information asymmetry and moral hazard between them. Thirdly, distortions in resource allocation are the main cause of lower TFP in China [30]. For example, the traditional financial system favors large SOEs in the allocation of financial resources, while the most promising small and medium-sized non-SOEs in the real economy have difficulty in obtaining effective financial support. These distortions in resource allocation have restricted growth opportunities for higher-quality enterprises. As a result, a number of shadow banks have emerged outside the formal banking system [2] to remedy the imbalance in the initial allocation of credit resources [6]. Therefore, it may be expected that Non-FEs’ SBB may contribute to their TFP by alleviating financing constraints, reducing the degree of information asymmetry, and optimizing resource allocation.

Accordingly, we propose Hypothesis 1a and Hypothesis 1b.

**Hypothesis 1a.** Non-FEs’ SBB has a negative effect on the TFP of enterprises.

**Hypothesis 1b.** Non-FEs’ SBB has a positive effect on the TFP of enterprises.

### 4. Research Design

#### 4.1. Sample and Data

We selected Chinese A-share listed companies from 2008–2019 as the sample. All data are obtained from the China Stock Market and Accounting Research (CSMAR) database, except for non-FEs’ SBB size, which are manually sorted. With reference to the existing literature, we screened the samples: (i) excluding the samples of the financial and insurance industry; (ii) excluding the samples with insolvency; and (iii) excluding the samples with missing main variables. In addition, to avoid the potential influence of outliers, we apply
a 1% tail shrinkage to the continuous variables before and after. Finally, we obtained 25,671 “firm-year” observations, and the data are unbalanced panel data.

4.2. Main Variables
4.2.1. Explained Variable

TFP of enterprises (TFP.OP). Referring to Lu and Lian [40], the OP method (non-parametric method) can effectively address the endogeneity problem caused by the mutual determination bias of variables, as well as the problem caused by the sample selection bias. We mainly adopted the OP method to calculate the TFP [41]. In addition, referring to Liu et al. [42], we used the LP method in the subsequent robustness discussion for the regression after re-measuring the TFP of enterprises.

\[
\ln Y_{i,t} = \beta_0 + \beta_1 \ln K_{i,t} + \beta_2 \ln L_{i,t} + \beta_3 \ln \text{I}_{i,t} + \beta_4 \text{Age}_{i,t} + \beta_5 \text{Soe}_{i,t} + \beta_6 \text{EX}_{i,t} + \text{Industry} + \text{Year} + \text{Region} + \epsilon_{i,t}, \tag{1}
\]

where \(i\) represents each firm and \(t\) represents year; \(Y_{i,t}\) represents sales revenue; \(K_{i,t}\) represents capital input, which is measured by the “book value of fixed assets”; \(L_{i,t}\) represents labor input, which is measured by “cash paid to and for employees”; \(\text{I}_{i,t}\) represents the enterprise’s investment, which is measured by “cash paid for the acquisition of fixed assets, intangible assets and other long-term assets”; \(\text{Age}\) represents the firm’s age; \(\text{Soe}\) represents nature of equity; \(\text{EX}\) represents a dummy variable for whether the firm is involved in export activities; Industry, Year and Region represent industry, year and region fixed effects, respectively, and \(\epsilon\) represents the residual term.

4.2.2. Explanatory Variables

Non-FEs’ SBB size (lnShadow). Referring to Si et al. [24], Li and Han [3] and Jiang et al. [43], we measure the ratio of the sum of entrusted loans, entrusted finance, and private lending to total assets. Among them, (i) entrusted loans are mainly obtained by checking the entrusted loan announcements issued by listed companies in Shanghai and Shenzhen and manually collating the entrusted loan amounts of each listed company; (ii) entrusted finance is taken from the “Listed Companies Entrusted Finance Table” in the CSMAR database’s corporate research series—foreign investment section; and (iii) private lending is taken from the “Balance Sheet” in the CSMAR database’s corporate research series—financial statements section, and we choose the other receivables as its proxy variable.

4.2.3. Control Variables

We include a series of control variables based on existing studies. Among them, the firm-level variables include: firm size (Size), age of company listing (Age), financial leverage (Lev), gross operating profit (GOP), growth rate of main business revenue (Growth), and cash flow (Cash). Corporate governance dimensions include board size (Board), largest ownership (Lshare), and nature of equity (Soe). In addition, we control for firm and time effects to overcome potential endogeneity problems. The specific variables are defined and constructed as shown in Table 1.

4.3. Regression Models

Our study aims to investigate the impact of non-FEs’ SBB on the TFP of enterprises. Therefore, we choose TFP.OP as the explained variable, and lnShadow as the explanatory variable to construct the model (2).

\[
\text{TFP.OP}_{i,t} = \alpha_0 + \alpha_1 \ln \text{Shadow}_{i,t} + \alpha \times \text{Control}_{i,t} + u_i + \gamma_t + \epsilon_{i,t}, \tag{2}
\]

where \(i\) means each firm, \(t\) means year, and Control is the control variable. We also incorporate firm and time fixed effects to control for factors that vary with individuals and time.
Table 1. Variable definition and description.

| Variable | Description of the Variable |
|----------|----------------------------|
| TFP_OP  | Calculated using the OP method. |
| lnShadow | Non-FEs' SBB size, (entrusted loans + entrusted finance + private lending)/total assets. |
| Size    | Firm size, ln (total assets). |
| Age     | Age of company listing. |
| Lev     | Financial leverage, total liabilities/total assets. |
| GOP     | Gross operating profit, (operating revenue – operating cost)/operating revenue. |
| Growth  | Growth rate of revenue from main business, (current period revenue – previous period revenue)/previous period revenue. |
| Cash    | Corporate cash flow, net cash flow from operating activities/total assets. |
| Board   | Board size, ln (number of board members). |
| Indep   | Percentage of independent directors, number of independent directors/total number of directors. |
| lshare  | Largest ownership, the percentage of ownership of the largest shareholder. |
| Soe     | Nature of equity, if it is a SOE, the value is 1; otherwise, it is 0. |

5. Empirical Testing Results

5.1. Descriptive Statistics

Table 2 shows descriptive statistics of the main variables. The mean of TFP_OP in China is 3.6197, while the median is 3.5411, indicating that the data structure is not significantly skewed, and it is close to the results of existing studies. The mean of lnShadow in the sample is as high as 7.44%, with a standard deviation (SD) of 0.2031. There has been a gradual increase in the SBB from the 5–95% quantile, and SBB has become an important investment activity for non-FEs in Chinese capital market. The mean and SD of the control variables are similar to those of existing studies.

Table 2. Descriptive statistics results of the main variables.

| Variable | Obs  | Mean    | SD    | P5    | Median | P95   |
|----------|------|---------|-------|-------|--------|-------|
| TFP_OP  | 25,671 | 3.6197  | 0.7126| 2.5668| 3.5411 | 4.9229|
| lnShadow| 25,671 | 0.0744  | 0.2031| 0.0025| 0.0344 | 0.0896|
| Size    | 25,671 | 22.1003 | 1.2722| 20.3347| 21.9202| 24.5233|
| Age     | 25,671 | 2.1403  | 0.7436| 0.6931| 2.3026 | 3.1355|
| Lev     | 25,671 | 0.4355  | 0.2061| 0.1106| 0.4305 | 0.7828|
| GOP     | 25,671 | 0.2823  | 0.1713| 0.0588| 0.2505 | 0.6324|
| Growth  | 25,671 | 0.1878  | 0.4669| –0.2720| 0.1124 | 0.8178|
| Cash    | 25,671 | 0.0453  | 0.0714| –0.0735| 0.0445 | 0.1654|
| Board   | 25,671 | 2.1410  | 0.986 | 1.7918| 2.1972 | 2.3979|
| Indep   | 25,671 | 0.3737  | 0.0534| 0.3333| 0.3333 | 0.5000|
| lshare  | 25,671 | 0.3475  | 0.1484| 0.1358| 0.3277 | 0.6182|
| Soe     | 25,671 | 0.3801  | 0.4854| 0.0000| 0.0000 | 1.0000|

5.2. Correlation Analysis

Table 3 presents the correlation analysis of the main variables in our study. As shown in Table 3, lnShadow is significantly and negatively correlated with TFP_OP at the 1% level. The result suggests that non-FEs engaging in SBB reduce their TFP. However, there has been no consideration of the effects of individual, time, and other heterogeneous factors, which should be investigated further. In addition, we calculated the variance inflation factor (VIF) to make the multicollinearity test results more robust. According to our analysis, the maximum VIF among all variables is 1.65, and the mean is 1.33. These values are below the empirical threshold value of 10, indicating that there is no multicollinearity among the variables.
### Table 3. Correlation analysis.

| Variable | TFP_OP | lnShadow | Size | Age   | Lev   | GOP   | Growth | Cash | Board | Indep   | Lshare | Soe    |
|----------|--------|----------|------|-------|-------|-------|--------|------|-------|---------|--------|--------|
| TFP_OP   | 1      |          |      |       |       |       |        |      |       |         |        |        |
| lnShadow | −0.068 *** | 1        |      |       |       |       |        |      |       |         |        |        |
| Size     | 0.484 *** | −0.048 *** | 1    |       |       |       |        |      |       |         |        |        |
| Age      | 0.194 *** | −0.069 *** | 0.361 *** | 1    |       |       |        |      |       |         |        |        |
| Lev      | 0.410 *** | −0.165 *** | 0.484 *** | 0.363 *** | 1    |       |        |      |       |         |        |        |
| GOP      | −0.390 *** | 0.111 *** | −0.143 *** | −0.172 *** | −0.393 *** | 1    |        |      |       |         |        |        |
| Growth   | 0.165 *** | −0.004   | 0.049 *** | −0.039 *** | 0.034 *** | 0.061 *** | 1        |      |       |         |        |        |
| Cash     | −0.017 *** | 0.033 *** | 0.038 *** | −0.021 *** | −0.160 *** | 0.206 *** | 0.007   | 1    |       |         |        |        |
| Board    | 0.099 *** | −0.083 *** | 0.245 *** | 0.120 *** | 0.166 *** | −0.076 *** | −0.013 *** | 0.047 *** | 1    |         |        |        |
| Indep    | −0.015 ** | 0.029 *** | 0.020 *** | −0.029 *** | −0.020 *** | 0.034 *** | 0.004   | −0.022 *** | −0.510 *** | 1    |         |        |
| Lshare   | 0.138 *** | −0.006   | 0.216 *** | −0.084 *** | 0.068 *** | −0.038 *** | 0.013 ** | 0.089 *** | 0.030 *** | 0.043 *** | 1    |        |
| Soe      | 0.141 *** | −0.107 *** | 0.321 *** | 0.402 *** | 0.289 *** | −0.208 *** | −0.063 *** | 0.021 *** | 0.267 *** | −0.058 *** | 0.237 *** | 1    |

Notes: t statistics in parentheses; ** $p < 0.05$, *** $p < 0.01$. 
5.3. Baseline Regression

Table 4 displays the regression results of the impact of non-FEs’ SBB on their TFP. As shown in column (1), we controlled only the firm and year fixed effects without considering control variables to test the direct impact of non-FEs’ SBB. It can be seen that the coefficient of lnShadow is significantly negative at the 1% level. The estimate results of columns (2)–(3) indicate that the coefficient of lnShadow remains significantly negative at the 1% level even after including different levels of control variables. Accordingly, these results indicate that non-FEs’ SBB negatively impacts their TFP. In statistical terms, if non-FEs increase SBB by 10%, their TFP decreases by 4.22% on average. Economically, when non-FEs’ SBB increases by one-unit SD (0.2031), the average decrease in their TFP is equivalent to 1.20% of the sample SD ($\approx 0.0422 \times 0.2031/0.7126$).

Table 4. Non-FEs’ SBB and TFP of enterprises: Baseline regression.

| Variable | (1) TFP_OP | (2) TFP_OP | (3) TFP_OP |
|----------|------------|------------|------------|
| lnShadow | $-0.0655$ *** | $-0.0423$ *** | $-0.0422$ *** |
|          | (−4.7352) | (−3.4489) | (−3.4468) |
| Size     | $0.2294$ *** | $0.2312$ *** | $0.2312$ *** |
|          | (46.0619) | (45.9877) | (45.9877) |
| Age      | $-0.0534$ *** | $-0.0514$ *** | $-0.0514$ *** |
|          | (−5.3529) | (−5.0164) | (−5.0164) |
| Lev      | $-0.0206$ | $-0.0186$ | $-0.0186$ |
|          | (−0.9940) | (−0.8989) | (−0.8989) |
| GOP      | $-0.6192$ *** | $-0.6265$ *** | $-0.6265$ *** |
|          | (−23.9495) | (−24.2187) | (−24.2187) |
| Growth   | $0.2073$ *** | $0.2064$ *** | $0.2064$ *** |
|          | (48.6863) | (48.4436) | (48.4436) |
| Cash     | $0.5634$ *** | $0.5635$ *** | $0.5635$ *** |
|          | (16.9886) | (17.0049) | (17.0049) |
| Board    | 0.0061 | 0.2797 | 0.2797 |
| Indep    | 0.1266 * | 1.9297 | 1.9297 |
| Lshare   | $-0.0165$ | $-0.04995$ | $-0.04995$ |
| Soe      | $-0.0841$ *** | $-5.7046$ *** | $-5.7046$ *** |
| _cons    | $3.6540$ *** | $-1.0271$ *** | $-1.0845$ *** |
|          | (372.3923) | (−9.9669) | (−9.3034) |
| Firm/Year| Yes | Yes | Yes |
| N        | 25,671 | 25,671 | 25,671 |
| R^2      | 0.0209 | 0.2342 | 0.2355 |

Notes: t statistics in parentheses; * p < 0.1, *** p < 0.01.

5.4. Robustness Checks

We performed robustness tests by considering endogeneity concerns, alternating measurements, changing sample ranges, controlling for other shocks, and changing parameter estimation methods.

5.4.1. Endogeneity Concerns

On the one hand, enterprises with relatively lower TFP may be inclined to actively engage in SBB for precautionary savings or arbitrage motives. From this perspective, non-FEs’ TFP may in turn affect their SBB; On the other hand, there are inevitably unobservable factors that affect both non-FEs’ SBB and TFP, and the resulting omitted variable problem will also trigger the endogeneity of our study. We attempt to alleviate these problems between non-FEs’ SBB and their TFP using an instrumental variables approach.
Referring to Faccio et al. [44] and Si et al. [24], we employed the mean of investments made by other enterprises of the same industry in SBBs as our instrumental variable (lnShadow_IV). Table 5 displays the findings of the two-stage regression of lnShadow_IV. In column (1), the coefficient of lnShadow_IV is significantly positive at the 1% level, verifying the correlation assumption for lnShadow_IV. As shown in column (2), the coefficients of lnShadow are significantly negative at the 1% level, which supports the original model estimation, as well as mitigates the potential endogeneity in our study.

Table 5. Non-FEs’ SBB and TFP of enterprises: Instrumental variables method.

| Variable      | (1) lnShadow       | (2) TFP_OP      |
|---------------|--------------------|----------------|
| lnShadow_IV   | 0.2577 ***         |                |
|               | (4.1389)           |                |
| lnShadow      |                     | −0.8626 *      |
|               | (−1.7794)          |                |
| Size          | −0.0013            | 0.2297 ***     |
|               | (−0.4868)          | (41.1777)      |
| Age           | 0.0286 ***         | −0.0258        |
|               | (5.0899)           | (−1.3715)      |
| Lev           | −0.1047 ***        | −0.1045 *      |
|               | (−9.2576)          | (−1.8804)      |
| GOP           | 0.0171             | −0.6101 ***    |
|               | (1.2114)           | (−20.3511)     |
| Growth        | −0.0006            | 0.2060 ***     |
|               | (−0.2714)          | (44.0157)      |
| Cash          | −0.0561 ***        | 0.5169 ***     |
|               | (−3.0979)          | (11.3412)      |
| Board         | 0.0020             | 0.0076         |
|               | (0.1646)           | (0.3192)       |
| Indep         | 0.0221             | 0.1443 **      |
|               | (0.6157)           | (1.9864)       |
| Lshare        | 0.0188             | −0.0022        |
|               | (1.0387)           | (−0.0601)      |
| Soe           | 0.0030             | −0.0821 ***    |
|               | (0.3751)           | (−5.0722)      |
| _cons         | 0.0400             | −1.0408 ***    |
|               | (0.6273)           | (−7.9864)      |
| Firm/Year     | Yes                | Yes            |
| N             | 25,670             | 25,670         |
| R²            | 0.0469             | 0.0819         |

Notes: t statistics in parentheses; * p < 0.1, ** p < 0.05, *** p < 0.01.

5.4.2. Alternative Measurements

Referring to Liu et al. [40], we calculated TFP using the LP method (TFP_LP) for the explained variable. Referring to Si et al. [24] Li and Han [3] and Han et al. [5] et al., we adopted three measures to estimate the explanatory variable, including: (i) using entrusted loans, entrusted finance, and private lending to sum and take logarithms to measure it (lnShadow1); (ii) using the ratio of the sum of other current assets, non-current assets maturing within one-year, other non-current assets, entrusted finance amount, and other receivables to total assets to measure it (lnShadow2); and (iii) since some enterprises may not disclose the specific information of entrusted loans in their entrusted loan announcements on time, we exclude the entrusted loan and use the sum of entrusted finance and private lending and take the logarithm to measure it (lnShadow3). Table 6 shows that the coefficients of lnShadow are all significantly negative at the 10% level. The conclusions remain valid after replacing the variable measures.
Table 6. Non-FEs’ SBB and TFP of enterprises: Alternative Measurements.

| Variable       | (1) TFP_LP | (2) TFP_OP | (3) TFP_OP | (4) TFP_OP |
|----------------|-----------|-----------|-----------|-----------|
| InShadow       | -0.0202 * | -0.0027 * | -0.0431 *** | -0.0026 * |
|                | (-1.6593) | (-1.8522) | (-3.9969) | (-1.8130) |
| InShadow1      |           |           |           |           |
|                |           |           |           |           |
| InShadow2      |           |           |           |           |
|                |           |           |           |           |
| InShadow3      |           |           |           |           |
|                |           |           |           |           |
| Size           | 0.5437 *** | 0.2340 *** | 0.2313 *** | 0.2340 *** |
|                | (108.7548) | (44.5721) | (46.0259) | (44.5523) |
| Age            | -0.0051   | -0.0515 *** | -0.0514 *** | -0.0514 *** |
|                | (-0.4991) | (-5.0215) | (-5.0154) | (-5.0073) |
| Lev            | 0.0187    | -0.0143   | -0.0201   | -0.0143 |
|                | (0.9056)  | (-0.6881) | (-0.9688) | (-0.6926) |
| GOP            | -0.6785 *** | -0.6278 *** | -0.6260 *** | -0.6278 *** |
|                | (-26.3705) | (-24.2634) | (-24.1974) | (-24.2629) |
| Growth         | 0.2015 *** | 0.2064 *** | 0.2064 *** | 0.2064 *** |
|                | (47.5267) | (48.4308) | (48.4258) | (48.4336) |
| Cash           | 0.7246 *** | 0.5643 *** | 0.5629 *** | 0.5642 *** |
|                | (21.9839) | (17.0215) | (16.9853) | (17.0171) |
| Board          | 0.0783 *** | 0.0065    | 0.0059    | 0.0064 |
|                | (3.6037)  | (0.2980)  | (0.2725)  | (0.2938) |
| Indep          | 0.1457 ** | 0.1273 *  | 0.1275 *  | 0.1270 * |
|                | (2.2320)  | (1.9391)  | (1.9436)  | (1.9347) |
| Lshare         | 0.0129    | -0.0178   | -0.0167   | -0.0178 |
|                | (0.3925)  | (-0.5361) | (-0.5048) | (-0.5371) |
| Soe            | -0.0368 ** | -0.0842 *** | -0.0838 *** | -0.0842 *** |
|                | (-2.5097) | (-5.7109) | (-5.6867) | (-5.7115) |
| _cons          | -3.9619 *** | -1.1050 *** | -1.0871 *** | -1.1040 *** |
|                | (-34.1725) | (-9.4442) | (-9.3270) | (-9.4381) |
| Firm/Year      | Yes       | Yes       | Yes       | Yes |
| N              | 25,671    | 25,671    | 25,671    | 25,671 |
| R²             | 0.5825    | 0.2352    | 0.2356    | 0.2352 |

Notes: t statistics in parentheses; * p < 0.1, ** p < 0.05, *** p < 0.01.

5.4.3. Lag of Explained Variables

Given the possible endogeneity problem of reverse causality in the underlying regression of non-FEs’ SBB on their TFP, we analyzed TFP with a one-period lag. Our result is shown in column (1) of Table 7. The coefficients of InShadow are significantly negative at the 1% level, with the effect marginally decreasing over time. The conclusion remains robust after lagging the explained variable.

5.4.4. Subsample Regression

To exclude the impact of the 2008 financial crisis on our analysis, and consider the possible lag of policy effects, we removed the samples of 2008 and 2009 and re-estimated the results, as shown in column (2) of Table 6. Meanwhile, in order to exclude the impact of the 2015 “stock market crash”, we deleted the samples of 2015 for analysis, and the results are shown in Column (3) of Table 6. Subsample regressions reveal that the coefficients of InShadow are significantly negative at the 1% level. These results still hold after excluding the effect of the financial crisis and the stock market crash.
Table 7. Lagged explanatory variables, subsample regressions, and changing parameter estimation methods.

| Variable | (1) Lagged Explanatory Variables | (2) Consider the 2008 Financial Crisis | (3) Consider the 2015 Stock Market Crash | (4) Bootstrap Estimation |
|----------|----------------------------------|--------------------------------------|----------------------------------------|-------------------------|
| LnShadow | $-0.0378^{***}$ | $-0.0402^{***}$ | $-0.0490^{***}$ | $-0.0422^{**}$ |
|          | ($-2.8498$) | ($-3.3531$) | ($-3.6789$) | ($-2.5459$) |
| Size     | $0.2846^{***}$ | $0.2345^{***}$ | $0.2371^{***}$ | $0.2312^{***}$ |
|          | (51.2638) | (42.8514) | (44.9930) | (16.2409) |
| Age      | $-0.0845^{***}$ | $-0.0498^{***}$ | $-0.0526^{***}$ | $-0.0514^{***}$ |
|          | ($-5.6391$) | ($-4.4886$) | ($-4.9291$) | ($-2.8490$) |
| Lev      | $-0.0078$ | $-0.0110$ | $-0.0322$ | $-0.0186$ |
|          | ($-0.3449$) | ($-0.4986$) | ($-1.4578$) | ($-0.3622$) |
| GOP      | $-0.3837^{***}$ | $-0.5786^{***}$ | $-0.6740^{***}$ | $-0.6265^{***}$ |
|          | ($-13.6616$) | ($-21.1946$) | ($-24.5277$) | ($-7.7635$) |
| Growth   | $-0.2413^{***}$ | $0.2017^{***}$ | $0.2161^{***}$ | $0.2064^{***}$ |
|          | ($-53.4443$) | (46.1604) | (45.0260) | (27.0707) |
| Cash     | $0.4452^{***}$ | $0.5272^{***}$ | $0.5521^{***}$ | $0.5635^{***}$ |
|          | (12.4084) | (15.0539) | (15.6975) | (10.4442) |
| Board    | $0.0173$ | $0.0221$ | $0.0055$ | $0.0061$ |
|          | (0.7313) | (0.9446) | (0.2372) | (0.1455) |
| Indep    | $0.1678^{**}$ | $0.1895^{***}$ | $0.1274^{*}$ | $0.1266$ |
|          | (2.3730) | (2.7061) | (1.8280) | (1.1062) |
| Lshare   | $-0.0032$ | $-0.0621^{*}$ | $-0.0259$ | $-0.0165$ |
|          | ($-0.0876$) | ($-1.7502$) | ($-0.7412$) | ($-0.2102$) |
| Soe      | $-0.0612^{***}$ | $-0.0841^{***}$ | $-0.0900^{***}$ | $-0.0841^{**}$ |
|          | ($-3.8085$) | ($-5.0855$) | ($-5.8404$) | ($-2.4234$) |
| _cons    | $-2.2456^{***}$ | $-1.2520^{***}$ | $-1.1854^{***}$ | $-1.0845^{***}$ |
|          | ($-17.2665$) | ($-9.7828$) | ($-9.6787$) | ($-3.3813$) |
| Firm/Year| Yes | Yes | Yes | Yes |
| N        | 22,031 | 23,243 | 23,342 | 25,671 |
| R²       | 0.2302 | 0.2384 | 0.2311 | 0.2355 |

Notes: t statistics in parentheses; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

5.4.5. Changing the Parameter Estimation Method

We applied the bootstrap method of self-sampling with multiple replicates of the original sample to further eliminate the bias that may have been introduced by sample self-selection. As can be seen from column (4) of Table 7, the coefficients of lnShadow are all significantly negative at the 5% level. The result remains robust after changing the method.

6. Further Analysis

6.1. From the Perspective of Financing Constraints

Financial constraints are a crucial factor for non-FEs to engage in, and expand, SBB [12]. Comparatively, enterprises facing higher financing constraints to engage in SBB have a more significant negative effect on their TFP. On the one hand, the more financing-constrained enterprises engage in SBB, the greater the crowding-out effect on real investment, and the greater the potential damage to their TFP. On the other hand, SBB are characterized by high risk, high leverage and pro-cyclicality, and their chain of credit entities is extremely complex. Enterprises with lower financing constraints are less dependent on shadow credit, have smaller financing gaps, and benefit from shadow banking as “profit-eaters”. When enterprises with higher financing constraints participate in SBB, this increases the uncertainty within the organization. Suppose enterprises cannot recover their entrusted loans and private loans in time. In that case, they will be inevitably in financial distress, which will negatively affect their productive investments, and thus inhibit their TFP growth.

To verify the relationship between financing constraints, non-FEs’ SBB, and TFP of enterprises, referring to Hadlock and Pierce [45], we take the SA index to measure the financing constraint. Further, we took out the groups with higher and lower financing...
constraints according to the upper and lower quartiles of the SA index for regression analysis, respectively. As is evident from columns (1) and (2) of Table 8, the coefficient of lnShadow is significantly negative at the 5% level in groups experiencing higher financing constraints. As a result, enterprises engaging in SBB experience a more significant negative effect on their TFP with higher financing constraints.

Table 8. Non-FEs' SBB and TFP of enterprises: Extended analysis.

| Variable       | (1) Higher Finishing Constraint | (2) Lower Finishing Constraint | (3) Higher Information Asymmetry | (4) Lower Information Asymmetry | (5) Higher Financial Mismatch | (6) Lower Financial Mismatch |
|----------------|--------------------------------|--------------------------------|---------------------------------|--------------------------------|-------------------------------|-----------------------------|
| lnShadow       | −0.0813 **                     | −0.0071                        | −0.0907 ***                     | −0.0380                        | −0.0725 *                     | −0.0221                     |
|                | (−2.4376)                      | (−0.3307)                      | (−3.3882)                       | (−1.0763)                      | (−1.7985)                     | (−1.3638)                   |
| Size           | 0.1587 ***                     | 0.2271                         | 0.2207 ***                      | 0.2522 ***                     | 0.2649 ***                    | 0.2012 ***                  |
|                | (12.1103)                      | (11.5939)                      | (17.2787)                       | (19.9572)                      | (22.8707)                     | (16.5352)                   |
| Age            | 0.0180                         | −0.0813 ***                    | 0.0208                          | −0.1285 ***                    | −0.0467 *                     | −0.0231                     |
|                | (0.8021)                       | (−3.7075)                      | (0.8826)                        | (−4.4832)                      | (−1.7679)                     | (−1.1425)                   |
| Lev            | −0.1820 ***                    | 0.0574                         | −0.1207 **                      | 0.1082 **                      | −0.0653                       | 0.0890 *                    |
|                | (−10.6760)                     | (−12.7727)                     | (−12.7049)                      | (−11.0890)                     | (−11.8473)                    | (−8.6499)                   |
| Growth         | 0.1448 ***                     | 0.2838 ***                     | 0.2757 ***                      | 0.2068 ***                     | 0.2322 ***                    | 0.2353 ***                  |
|                | (20.5924)                      | (30.9107)                      | (22.1975)                       | (21.5153)                      | (22.5001)                     | (26.9524)                   |
| Cash           | 0.7807 ***                     | 0.3822 ***                     | 0.7245 ***                      | 0.4451 ***                     | 0.6548 ***                    | 0.5642 ***                  |
|                | (12.9645)                      | (5.7958)                       | (10.1642)                       | (5.0460)                       | (8.8070)                      | (8.8749)                    |
| Board          | 0.0169                         | −0.0575                        | −0.0149                         | −0.0850                        | 0.0216                        | −0.0613                     |
|                | (0.4592)                       | (−1.1781)                      | (−0.3394)                       | (−1.3415)                      | (0.4249)                      | (−1.2460)                   |
| Indep          | 0.3266 ***                     | −0.2680 *                      | 0.2440 *                        | 0.1610                         | −0.2255                       | 0.2079                      |
|                | (2.9918)                       | (−1.7885)                      | (1.9270)                        | (0.8448)                       | (−1.4888)                     | (1.4562)                    |
| Lshare         | −0.0952                        | −0.0668                        | 0.0332                          | 0.0258                         | −0.0807                       | 0.1457 **                   |
|                | (−1.5685)                      | (−0.7003)                      | (0.4333)                        | (0.3116)                       | (−1.0134)                     | (1.9728)                    |
| Soe            | 0.0784 **                      | −0.0387                        | −0.0958 ***                     | −0.0270                        | −0.1270 ***                   | −0.1589 ***                 |
|                | (2.4620)                       | (−1.0459)                      | (−0.2789)                       | (−0.7136)                      | (−4.5233)                     | (−3.9436)                   |
| _cons          | 0.4674                         | −0.8275 **                     | −0.8915 ***                     | −1.3704 ***                    | −1.6799 ***                   | −0.5423 *                   |
|                | (1.5184)                       | (−2.0292)                      | (−3.0934)                       | (−4.5624)                      | (−6.2147)                     | (−1.9396)                   |
| Firm/Year      | Yes                            | Yes                            | Yes                             | Yes                            | Yes                           | Yes                         |
| N              | 6414                           | 6422                           | 6267                            | 6275                           | 6385                          | 6599                        |
| R²             | 0.1645                         | 0.2642                         | 0.2437                          | 0.2671                         | 0.2479                        | 0.2642                      |

Notes: t statistics in parentheses; * p < 0.1, ** p < 0.05, *** p < 0.01.

6.2. From the Perspective of Information Asymmetry

Due to information asymmetry in an incomplete market, there will be serious moral hazards and adverse selection problems for enterprises, and such conditions will not be conducive to furthering their TFP. On the one hand, with low information asymmetry, the supply side of funds (savers) can better evaluate the operating conditions and creditworthiness of the demand side of funds (borrowers), thus reducing the size of non-FEs' SBB. On the other hand, enterprises with a lower degree of information asymmetry may, to a certain extent, avoid the adverse impact of highly leveraged and potentially risky SBB on its production and operations.

To further examine information asymmetry, non-FEs' SBB, and TFP of enterprises. Referring to Xu et al. [46], Gul et al. [47] and Lai et al. [48], we adopt stock price synchronization to measure the degree of information asymmetry. Specifically, a higher degree of stock price synchronization corresponds to a lower degree of stock price idiosyncratic information, as well as a higher degree of information asymmetry. Further, we took out the groups with higher and lower information asymmetry based on the upper and lower quartile of stock price synchronization and conducted regression analysis. According to columns (3) and (4) of Table 8, the coefficient of lnShadow is significantly negative at the
1% level in the higher information asymmetry group. The result indicates that the negative effect is more significant at higher levels of information asymmetry.

6.3. From the Perspective of Financial Mismatch

Financial mismatch arises from the failure to allocate financial resources to the most efficient sectors, which is a significant motivation for non-FEs to engage in SBB. There exists a series of structural mismatches in the traditional financial sector, such as “attribute mismatch”, “field mismatch”, and “stage mismatch”. SMEs and non-SOEs suffer from severe budgetary constraints [7]. On the one hand, if enterprises facing a high degree of financial mismatch participate in SBB, their main business advantages will further be weakened. On the other hand, enterprises facing high levels of financial mismatch are engaged in high-risk, illiquid, and over-nested product shadow banking activities, and their financial mismatch characteristics will greatly exacerbate internal instability. Consequently, with a high degree of financial mismatch, when enterprises engage in shadow banking activities, they are more susceptible to negative shocks resulting from uncertainty in shadow credit funding, which reduces their TFP.

To further investigate financial mismatch, non-FEs’ SBB, and TFP of enterprises, referring to Han and Li [18], we measure the degree of financial mismatch using the deviation degree of the capital cost of an enterprise from the average capital use cost of its industry. Specifically, the degree of financial mismatch is quantified as financial mismatch = (interest expense/(liabilities – accounts payable) − industry average interest rate)/industry average interest rate. Further, we took out the group with higher and lower financial mismatch based on the upper and lower quartile of financial mismatch and conducted regression analysis. From columns (3) and (4) of Table 8, it is clear that the coefficient of lnShadow is significantly negative at the 10% level in the higher financial mismatch group. Accordingly, the negative effect is more significant with a higher degree of financial mismatch.

7. Heterogeneity Analysis

We examine three different contexts, including the macroeconomic level (monetary policy), industry characteristics (industry competition), and firm-level (nature of equity), to determine whether there are significant differences in the negative effects of non-FEs’ SBB on their TFP.

7.1. Heterogeneous Analysis of Monetary Policy

Taking a monetary policy perspective, monetary policy, as a key instrument of regulating economic activity, has a direct impact on money supply and, ultimately, enterprises’ financing decisions. There may be differences in the impact of non-FEs’ SBB on their TFP in different periods of monetary policy. During periods of monetary policy easing, excess money issuance is an important inducement for enterprises to engage in SBB [49]. Due to long-term financial repression in China, the bank-led financial system suffers from severe credit discrimination. Enterprises with financing advantages integrate more funds from the financial system than they are required for production and operation. They then engage in SBB through entrusted loans, entrust finance, and other means, which breeds excessive lending behavior in the non-FEs. As a consequence of the secondary allocation of credit funds, there will be higher debt levels, increased systemic risks, and potential for financial crises [33], which would inhibit the development of TFP. Therefore, we contend that the negative effect is more significant during periods of monetary policy easing.

Referring to Dai and Yue [50], we use the difference between the nominal GDP growth rate and the growth rate of money (M1) and quasi-money (M2) supply to measure the easing and tightening of monetary policy. If the difference is greater than the median, it is taken as 1, indicating tightening of monetary policy; otherwise, it is taken as 0, showing easing of monetary policy. In the column (1)–(2) of Table 9, it is shown that the coefficient of lnShadow is significantly negatively correlated at the 1% level during the period of monetary policy.
easing. Although they are negatively correlated during the period of monetary policy tightening, the correlation fails to satisfy the significance test. Consequently, the negative effect is greater in the period of monetary policy easing.

Table 9. Lagged explanatory variables, subsample regressions, and changing parameter estimation methods.

| Variable          | (1) Tightening of Monetary Policy | (2) Easing of Monetary Policy | (3) Higher Industry Competition | (4) Lower Industry Competition | (5) SOEs | (6) Non-SOEs |
|-------------------|----------------------------------|------------------------------|---------------------------------|--------------------------------|---------|-------------|
| lnShadow          | -0.0344                          | -0.0632***                   | -0.0279                        | -0.0440***                    | -0.0250 | -0.0338**   |
|                   | (-1.6440)                        | (-3.5939)                    | (-1.1501)                      | (-3.1553)                     | (-0.9268) | (-2.4534)   |
| Size              | 0.2318***                        | 0.2140***                    | 0.1987***                      | 0.2361***                     | 0.2173*** | 0.2382***   |
|                   | (31.9423)                        | (26.7396)                    | (18.9534)                      | (40.1108)                     | (26.1976) | (36.2791)   |
| Age               | -0.0330**                        | -0.0301*                     | -0.0295                        | -0.0444***                    | -0.0213 | -0.0553***   |
|                   | (-2.2337)                        | (-1.7272)                    | (-1.4710)                      | (-3.5915)                     | (-1.0764) | (-4.1606)   |
| Lev               | -0.0943***                       | 0.0096                       | -0.1418***                     | 0.0124                        | 0.0495 | -0.0193     |
|                   | (-2.9667)                        | (0.3180)                     | (-3.7105)                      | (0.5010)                      | (-1.4521) | (-0.7319)   |
| GOP               | -0.8073***                       | -0.4960***                   | -0.3632***                     | -0.6765***                    | -0.8049*** | -0.5318***   |
|                   | (-20.6196)                       | (-12.8345)                   | (-7.1110)                      | (-22.6891)                    | (-18.7768) | (-16.0782)  |
| Growth            | 0.2232**                        | 0.2000***                    | 0.2017***                      | 0.2088***                     | 0.1980*** | 0.2060***   |
|                   | (29.8996)                        | (37.2542)                    | (21.6861)                      | (43.5658)                     | (28.2832) | (39.0364)   |
| Cash              | 0.4330***                        | 0.5249***                    | 0.6339***                      | 0.4994***                     | 0.7695*** | 0.4415***   |
|                   | (8.6682)                         | (11.4062)                    | (10.1474)                      | (12.9730)                     | (15.3525) | (10.2547)   |
| Board             | 0.0125                           | 0.0194                       | -0.0444                        | 0.0318                        | 0.0305 | -0.0050     |
|                   | (0.3830)                         | (0.6200)                     | (-1.0617)                      | (1.2263)                      | (0.9421) | (-1.6960)   |
| Indep             | 0.1981**                         | 0.0252                       | 0.2294*                        | 0.1497*                       | 0.1439 | 0.0850      |
|                   | (2.0126)                         | (0.2719)                     | (1.8463)                       | (1.9198)                      | (1.5886) | (0.9154)    |
| Lshare            | 0.0049                           | -0.0123                      | -0.1026                        | -0.0524                       | -0.1212** | 0.1287***   |
|                   | (0.0995)                         | (-0.2475)                    | (-1.5562)                      | (-1.3370)                     | (-2.3316) | (2.9299)    |
| Soe               | -0.1179***                       | -0.0891***                   | -0.0723***                     | -0.0893*                      | -0.0893* | -0.0893*    |
|                   | (-5.9076)                        | (-3.7780)                    | (-2.5844)                      | (-5.0613)                     | (-5.0613) | (-5.0613)   |
| _cons             | -1.0776***                       | -0.8326***                   | -0.2734                        | -1.2964***                    | -0.8909*** | -1.2381***   |
|                   | (-6.4170)                        | (-4.5085)                    | (-1.1376)                      | (-9.4731)                     | (-4.5881) | (-8.0317)   |
| Firm/Year         | Yes                              | Yes                          | Yes                            | Yes                            | Yes                  | Yes         |
| N                 | 13,137                           | 12,534                       | 5842                           | 19,829                        | 9757    | 15,914      |
| R²                | 0.2234                           | 0.2626                       | 0.2272                         | 0.2405                        | 0.2365 | 0.2383      |

Notes: t statistics in parentheses; * p < 0.1, ** p < 0.05, *** p < 0.01.

7.2. Heterogeneity Analysis of Industry Competition

Considering the industry competition perspective, there may be differences in the impact of non-FEs’ SBB on their TFP based on the industry competition level. Due to market competition, enterprises usually try to minimize the information asymmetry between the supply and demand side of funding to obtain funding from external sources at a lower cost [51]. Therefore, enterprises in industries with a higher degree of competition are better able to respond and adjust to shadow credit market risks, which may dampen the negative impact of systemic financial risks on their TFP. Conversely, the negative effects are greater in industries with lower levels of competition, as they are more susceptible to information asymmetry and moral hazards. Therefore, we contend that the negative effect is more significant in industries with lower competition.

Referring to existing studies, we use the Herfindahl index, which is the sum of the squared operating revenues of companies in the industry as a percentage of the operating revenues of all companies in the industry, to measure industry competition. We grouped them by their annual median of the Herfindahl index and then ran a regression analysis separately. If the Herfindahl index is less than the median, then 1 is taken as high competition for the product market; otherwise, it is 0. The column (3) and (4) of Table 9 indicate that the coefficient of lnShadow is significantly negative at the 1% level in the
lower industry competition group. Therefore, the negative effect is more significant in the lower industry competition.

7.3. Heterogeneity Analysis of the Nature of Equity

Depending on the firm’s equity nature, the impact of non-FEs’ SBB on their TFP may vary. Although mixed-ownership reforms have been promoted in China, there are still problems with “ownership discrimination” in the credit market [23]. These problems are concrete manifestation of capital market distortions that have led to the misallocation of financial resources [52]. SOEs enjoy a natural competitive edge when it comes to financing since their access to a range of financing channels allows them to obtain more funds than they need for their business. As a result, SOEs are less likely to suffer liquidity crises due to investment losses on shadow credit markets. In comparison with SOEs, however, non-SOEs are treated more harshly, receive less support from the government [53], and face greater financial restrictions. Furthermore, non-SOEs are also subject to more severe information asymmetry [54], which hinders the improvement of TFP. Thus, we argue that the negative effect is more significant among the non-SOEs.

Accordingly, our study further divides the sample into SOEs and non-SOEs, taking 1 and 0, respectively. In columns (5) and (6) of Table 9, it is shown that the coefficient of lnShadow is significantly negatively correlated at the 5% level, whereas that of SOEs is not significant. Therefore, the negative effect is more significant for non-SOEs.

8. Conclusions and Implications

8.1. Main Conclusions

A shift from crude factor input growth to a TFP driven green growth model is urgently needed in China. However, the “financial-like” behavior of non-financial enterprises has contributed to the “off real to virtual”, which has seriously restricted the virtuous cycle of finance and economy. We examine the impact of non-FEs’ SBB on their TFP based on the detailed data of entrusted loans issued by listed companies in Shanghai and Shenzhen, and the financial data of A-share non-FEs from 2008 to 2019. The study finds that non-FEs’ SBB significantly suppresses their TFP. Our findings remain valid even after considering the endogeneity issue and a series of robustness tests, including the replacement variable measure and lagged explanatory variables. Further analysis reveals that the negative effect of non-FEs’ SBB on TFP is influenced by financing constraints, information asymmetry, and financial mismatch, etc. Easing financing constraints, reducing information asymmetry, and optimizing financial resource allocation are likely to alleviate the negative effect. Additionally, the negative effect is more significant in periods of easy monetary policy, in industries lacking competition, and in non-SOEs.

8.2. Implications

Our findings have certain implications. We should:

1) Reinforce the monitoring and risk control of the shadow banking market in real-time, curb the excessive expansion of the shadow credit market, encourage real investment, and enhance the main business capacities of enterprises. In particular, it is necessary to emphasize the leading role of SOEs in supporting the real economy. We should strive to encourage a steady, healthy, orderly development of the financial markets and real economy, as well as long-term, high-quality, and sustainable economic development;

2) Emphasize enterprises that are facing higher financing constraints, information asymmetry and financial mismatch. The government should commit to providing a conducive environment for real investment in order to restrain non-FEs from excessively engaging in SBB. First, ease financing constraints. We will progress the reform of the financial sector in an orderly manner, broaden the financing channels for enterprises, address long-standing problems, such as the difficulty and high cost of financing for SMEs, and help the real economy move from the virtual to the real. Second, reduce the degree of information asymmetry. It is crucial to grasp the market competition envi-
ronment, strengthen the information disclosure system of listed companies, improve the information transparency of the capital market, and promote the orderly operation and the healthy development of the capital market. Third, optimize the credit allocation structure. Efforts should be made to eliminate bank credit discrimination, improve the marketization degree of credit resource allocation, and curb financial mismatches that result from the biased resource allocation of financial intermediaries, so as to promote the continuous improvement of TFP;

(3) Ensure that monetary policy is implemented effectively. It is imperative to develop an organic combination of macro-prudential supervision and micro-governance, and implement effective macroeconomic policies to regulate and control according to economic development realities. Monetary policy authorities should integrate the shadow banking market into the target system, innovate and enhance monetary policy tools, guide financial innovation to benefit the real economy, and better promote the sustainable and healthy development of the economy and society.

8.3. Limitations and Prospects

We discuss the limitations of our study as well as potential directions for future research. There is a degree of noise in the data regarding the size of non-FEs’ SBB due to data availability. In fact, non-FEs may engage in more SBB, underestimating the possible consequences of their participation in SBB. There is a need to investigate a more precise way to measure the size of non-FEs’ SBB in the future. Our sample consists of non-FEs in China, and it is not known whether the findings are directly applicable to the SBB of non-FEs in other developing countries. Future research can conduct in-depth cross-sectional and longitudinal studies using firm samples from other developing countries to provide a more generalized theoretical basis and practical reference for shadow banking governance in developing countries. Our study focuses only on the negative effects of non-FEs’ SBB on their TFP. Non-FEs’ SBB, however, has been shown in some studies to not be completely undesirable. It is crucial to determine whether there is an optimal share of SBB for non-FEs in future research. Meanwhile, it is essential to the economic consequences of non-FEs’ SBBs to require further investigation in order to provide a better theoretical basis.

Author Contributions: Conceptualization, C.Y. and W.S.; methodology, C.Y.; software, C.Y.; validation, C.Y.; formal analysis, C.Y.; investigation, C.Y.; resources, C.Y.; data curation, C.Y.; writing—original draft preparation, C.Y.; writing—review and editing, C.Y.; visualization, C.Y.; supervision, W.S.; project administration, W.S.; funding acquisition, W.S. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: The data presented in this study are available upon request from the corresponding author.

Acknowledgments: We would like to thank editors and reviewers for their comments and suggestions that greatly improved our studying.

Conflicts of Interest: The authors declare no conflict of interest.

References
1. Acharya, V.V.; Schnabl, P.; Suarez, G. Securitization without risk transfer. *J. Financ. Econ.* 2013, 107, 515–536. [CrossRef]
2. Guo, L.; Xia, D. In Search of a place in the sun: The shadow banking system with Chinese characteristics. *Eur. Bus. Organ. Law Rev.* 2014, 15, 387–418. [CrossRef]
3. Li, J.J.; Han, X. Non-financial enterprises’ shadow banking business and operating risk. *Econ. Res. J.* 2019, 54, 21–35.
4. Han, X.; Li, J.J.; Peng, Y.C. Policy discontinuity, non-financial enterprises’ shadow banking activities and cooperate innovation. *J. World Econ.* 2022, 45, 31–53.
5. Han, X.; Hus, S.; Li, J.J. The impact of enterprises’ shadow banking activities on business performance: A test based on mediator effect of investment scale and investment efficiency. *Emerg. Mark. Financ. Trade* 2019, 55, 3258–3274. [CrossRef]

6. Wang, Y.Q.; Liu, Z.H.; Li, C.; Du, J.L. Identifying shadow banking activities of non-financial enterprises in China: Evidence from consolidated balance sheets. *Manag. World* 2015, 18, 8.

7. Tsai, K.S. When shadow banking can be productive: Financing small and medium enterprises in China. *J. Dev. Stud.* 2017, 53, 2005–2028. [CrossRef]

8. Liang, Y. Inside shadow banking in China: Credit driven growth vs. financial stability. *J. Econ. Issues* 2016, 50, 461–470. [CrossRef]

9. Han, X.; Hus, S.; Li, J.J. The impact of enterprises’ shadow banking activities on business performance: A test based on mediator effect of investment scale and investment efficiency. *Emerg. Mark. Financ. Trade* 2019, 55, 3258–3274. [CrossRef]

10. Yan, E.D.; Yan, J.J. Supply chain relationship, information superiority and shadow banking—Empirical evidence based on listed firms. *China Ind. Econ.* 2018, 174–187. [CrossRef]

11. Yan, E.D.; Yan, J.J. Supply chain relationship, information superiority and shadow banking—Empirical evidence based on listed firms. *China Ind. Econ.* 2018, 174–187. [CrossRef]

12. Yan, E.D.; Yan, J.J. Supply chain relationship, information superiority and shadow banking—Empirical evidence based on listed firms. *China Ind. Econ.* 2018, 174–187. [CrossRef]

13. Allen, F.; Gu, X. Shadow banking in China compared to other countries. *Manch. Sch.* 2020, 89, 407–419. [CrossRef]

14. Han, X.; Tian, G.N.; Li, J.J. Shadow banking business and financial structure of non-financing enterprises: Empirical evidence from Chinese listed companies. *Stud. Int. Financ.* 2017, 10, 44–54.

15. Deng, K.; Gu, X.; H. Inside debt and shadow banking. *J. Corp. Financ.* 2021, 69, 102038. [CrossRef]

16. Du, L.; Qian, X.S. Shadow banking, credit channel and effectiveness of monetary policy—Evidence from microcredit entrust loans of listed companies. *China Ind. Econ.* 2021, 6, 152–170. [CrossRef]

17. Arora, R.U.; Zhang, Q. Banking in the shadows: A comparative study of China and India. *Aust. Econ. Hist. Rev.* 2019, 59, 103–131. [CrossRef]

18. Han, X.; Li, J.J. Financial mismatch, the shadow banking activities of non-financial enterprises and funds being diverted out of the real economy. *J. Financ. Res.* 2020, 482, 93–111.

19. Yan, E.D.; Yan, J.J. Supply chain relationship, information superiority and shadow banking—Empirical evidence based on listed non-financial companies. *Bus. Rev.* 2021, 33, 291–300.

20. Yang, C.; Shen, W. CEOs’ financial background and non-financial enterprises’ shadow banking business. *Front. Psychol.* 2022, 13, 903697. [CrossRef]

21. Niu, S.K.; Yuan, C.S.; Zhao, Y. D&O liability insurance and the shadow banking of non-financial enterprise—Governance effect or boost effect. *J. Stat.* 2022, 3, 57–72.

22. Cheng, X.K.; Jiang, Y.S.; Zheng, L.D. Shadow banking system, corporate risk taking and financing constraints. *Econ. Manag.* J. 2015, 37, 106–115. [CrossRef]

23. Allen, F.; Qian, Y.; Tu, G.; Yu, F. Entrusted loans: A close look at China’s shadow banking system. *J. Financ. Econ.* 2019, 133, 18–41. [CrossRef]

24. Si, D.K.; Li, X.L.; Zhao, Z.K. Non-financial enterprises’ shadow banking business and stock price crash risk. *China Ind. Econ.* 2021, 6, 174–192. [CrossRef]

25. Midrigan, V.; Xu, D.Y. Finance and misallocation: Evidence from plant-level data. *Am. Econ. Rev.* 2014, 104, 422–458. [CrossRef]

26. Giannetti, M.; Liao, G.; Yu, X. The brain gain of corporate boards: Evidence from China. *J. Financ.* 2015, 70, 1629–1682. [CrossRef]

27. Cheng, H.F.; Lu, J.J. The empirical analysis of knowledge capital impact on total factor productivity of industry enterprises. *Econ. Res. J.* 2014, 49, 174–187.

28. Buera, F.J.; Shin, Y. Self-insurance vs. self-financing: A welfare analysis of the persistence of shocks. *J. Econ. Theory* 2011, 146, 845–862. [CrossRef]

29. Jeong, H.; Townsend, R.M. Sources of TFP growth: Occupational choice and financial deepening. *Econ. Theory* 2007, 32, 179–221. [CrossRef]

30. Hsieh, C.; Klenow, P.J. Misallocation and manufacturing TFP in China and India. Q. J. Econ. 2009, 124, 1403–1448. [CrossRef]

31. Song, M.; Zhou, P.; Si, H.T. Financial technology and enterprise total factor productivity—Perspective of “enabling” and credit rationing. *China Ind. Econ.* 2021, 4, 138–155. [CrossRef]

32. Caggese, A.; Cuñat, V. Financing constraints, firm dynamics, export decisions, and aggregate productivity. *Rev. Econ. Dyn.* 2013, 16, 177–193. [CrossRef]

33. Coricelli, F.; Driffield, N.; Pal, S.; Roland, I. When does leverage hurt productivity growth? A firm-level analysis. *J. Int. Money Financ.* 2012, 31, 1674–1694. [CrossRef]

34. Cupertino, S.; Consolandi, C.; Vercelli, A. Corporate social performance, financialization, and real investment in US manufacturing firms. *Sustainability* 2019, 11, 1836. [CrossRef]

35. Tori, D.; Oraran, O. The effects of financialization on investment: Evidence from firm-level data for the UK. *Camb. J. Econ.* 2018, 42, 1393–1416. [CrossRef]

36. Brown, J.R.; Martinsson, G.; Petersen, B.C. Do financing constraints matter for R&D? *Eur. Econ. Rev.* 2012, 56, 1512–1529.

37. Hopenhayn, H.A. Firms, misallocation, and aggregate productivity: A review. *Ann. Rev. Econ.* 2014, 6, 735–770. [CrossRef]

38. Baum, C.F.; Caglayan, M.; Ozkan, N. The second moments matter: The impact of macroeconomic uncertainty on the allocation of loanable funds. *Econ. Lett.* 2009, 102, 87–89. [CrossRef]
39. Zhu, X.D. The varying shadow of China’s banking system. *J. Comp. Econ.* 2021, 49, 135–146. [CrossRef]
40. Lu, X.D.; Lian, Y.J. Estimation of total factor productivity of industrial enterprises in China: 1999–2007. *China Econ. Q.* 2012, 11, 541–558.
41. Olley, G.S.; Pakes, A. The dynamics of productivity in the telecommunications equipment industry. *Econometrica* 1996, 64, 1263–1297. [CrossRef]
42. Liu, T.H.; Kou, F.J.; Liu, X.; Elahi, E. Cluster commercial credit and total factor productivity of the manufacturing sector. *Sustainability* 2022, 14, 3601. [CrossRef]
43. Jiang, G.H.; Lee, C.M.C.; Yue, H. Tunneling through intercorporate loans: The China experience. *J. Financ. Econ.* 2010, 98, 1–20. [CrossRef]
44. Faccio, M.; Masulis, R.W.; Mcconnell, J.J. Political connections and corporate bailouts. *J. Financ.* 2006, 61, 2597–2635. [CrossRef]
45. Hadlock, C.J.; Pierce, J.R. New Evidence on Measuring Financial Constraints: Moving Beyond the KZ Index. *Rev. Financ. Stud.* 2010, 23, 1909–1940. [CrossRef]
46. Xu, N.H.; Chan, K.C.; Jiang, X.Y.; Yi, Z.H. Do star analysts know more firm-specific information? Evidence from China. *J. Bank. Financ.* 2012, 37, 89–102. [CrossRef]
47. Gul, F.A.; Kim, J.; Qiu, A.A. Ownership concentration, foreign shareholding, audit quality, and stock price synchronicity: Evidence from China. *J. Financ. Econ.* 2010, 95, 425–442. [CrossRef]
48. Lai, F.J.; Wang, Q.; Feng, Q.X. Does Chinese financial market information promote listed manufacturing firms’ productivity? *Sustainability* 2019, 11, 329. [CrossRef]
49. Yang, L.; Wijnbergen, S.V.; Qi, X.T.; Yi, Y.H. Chinese shadow banking, financial regulation and effectiveness of monetary policy. *Pac.-Basin Financ. J.* 2019, 57, 101169. [CrossRef]
50. Dai, B.B.; Yue, H. Monetary policy, liquidity shortage and stock price crash risk. *J. Financ. Res.* 2015, 7, 135–151.
51. Yi, Z.H.; Jiang, F.X.; Qin, Y.H. The market competition in products, the corporate governance and the quality of information disclosure. *Manag. World* 2010, 1, 133–141.
52. Chen, S.Y.; Lin, B. Dual-track interest rates and capital misallocation. *China Econ. Rev.* 2019, 57, 101338. [CrossRef]
53. Li, X.C.; Luo, D.M.; Jin, X.R. Misallocation of resources and characteristics of Chinese enterprise scale distribution. *Soc. Sci. China* 2017, 2, 25–43.
54. Shen, H.B.; Kou, H.; Zhang, C. An empirical study of financial development, financing constraints and corporate investment. *China Ind. Econ.* 2010, 6, 55–64. [CrossRef]