ECONOMIC RESEARCH - EKONOMSKA ISTRAŽIVANJA
2025, VOL. 38 NO. 1, (167 - 215)
https://doi.org/10.32728/er-ei.38.1.7

FET Faculty of Economics and Tourism "Dr. Mijo Mirković"

ARTICLE HISTORY
Received 30 July 2022
Accepted 04 March 2025

DOES BANK PROFITABILITY MATTER FOR FIRM PRODUCTIVITY? —— EVIDENCE FROM CHINA

Danning Lu, Sichuan Administration Institute, Chengdu, PR China, ludanning@yeah.net, ORCID: 0000-0002-7136-0914

Jing Yang*, China Center for Special Economic Zone Research, Shenzhen University, Shenzhen, PR China, and Science, Technology and Innovation Service Center of Shenzhen Guangming, Shenzhen, PR China, ailsa_yj@163.com, ORCID: 0009-0004-1715-4513

Jianxun Shi, School of Economics·and Management Tongji University, Shanghai, PR China, jianxuns@126.com, ORCID: 0009-0004-5322-9922

KEYWORDS:
bank profitability; total factor productivity; corporate financialization; high-quality labor

JEL CLASSIFICATIONS:
D24; G21; O47

* Corresponding Author Email: ailsa_yj@163.com

ABSTRACT

The role of financial development has garnered significant attention. However, the pro-cyclicality of financial development has emerged as a contentious issue, especially in the aftermath of the financial crisis. The micro-level impact of bank profitability on economic growth remains a topic of ongoing debate with inconclusive evidence. This study investigates the impact of bank profitability on firm productivity using a panel dataset comprising 131,021 firm-year observations, derived from microdata of industrial firms and banks. Our findings suggest that bank profitability diminishes the total factor productivity of firms by encouraging financialization, which in turn displaces productive investment, and attracts high-quality labor from firms to the banking sector. These consequences are particularly evident in firms located in central and eastern regions, as well as in foreign and private firms. Additionally, the impact is more pronounced in state-owned banks and large-scale banks, whereas high-technology firms and state-owned firms appear to be less affected. These findings emphasize the potential detrimental implications of excessive bank profitability on firm productivity, shedding light on crucial factors related to financialization, investment, and labor distribution. Policymakers are urged to meticulously assess these repercussions to achieve equilibrium between the financial sector and the real economy, thereby fostering sustainable economic growth.

1. INTRODUCTION

The banking system is universally recognized as one of the most pivotal financial intermediaries for enhancing resource allocation efficiency by the expansion of credit, diminution of transaction costs and risks, and the execution of supervisory measures, thereby promoting economic development and sharing profits from the real economy (King and Levine, 1993; Levine et al., 1998; Rajan and Zingales, 1998). Nonetheless, since the beginning of the 21st century, the profits of the banking sector have escalated at a rate markedly surpassing that of the real economy in most developed countries. High profitability within the financial sector has become a crucial driver of financial speculation and "irrational exuberance" during the subprime mortgage crisis (Shiller, 2015).

Bank profitability is not merely a reflection of the development of the banking sector but also intricately linked to the development of the real economy. Thus, the profitability of banks and their relationship with the real economy have attracted extensive scholarly interest. Several studies have identified a significant positive correlation between bank profitability and economic growth, demonstrating strong procyclicality (Demirguc-Kunt & Huizinga, 1999; Tan and Tuo, 2016). Economic expansion bolsters and increases the bank's net interest income (Albertazzi and Gambacorta, 2009). Whereas economic downturns, characterized by heightened credit

defaults, precipitate a decline in profitability (Bolt et al., 2012). Other studies have found that the development of the financial system, especially the banking system, can induce a reduction in firms' labor productivity, which in some cases can exhibit a negative correlation with economic growth (Tridico and Pariboni, 2018; Barradas, 2020; Pariboni et al., 2020; Correia and Barradas,2021; Barradas, 2022). However, research on the impact of bank profitability on the real economy is relatively limited. As part of the financial sector, banks inherently do not generate surplus value. Its profits ultimately stem from the surplus value and transfer profits of the real economy, which originate from firms' costs (Boratav, 2009). Feyzioglu (2009) utilized data from China's banking sector to demonstrate that superior performance does not inherently ensure effective resource allocation. The high profitability of China's banking sector may be indicative of economic distortions.

As the most prominent developing nation and emerging economy, China has experienced consistent economic growth for four decades. Nevertheless, China's real economy currently confronts numerous challenges, including sluggish growth and financing difficulties for small enterprises, which are hindering their expansion, innovation, and job creation. Concurrently, the banking sector has been maintaining high profits, prompting concerns regarding resource allocation and the potential misalignment of priorities between the financial sector and the real economy. In 2020, the average return on capital for China's top 500 manufacturing companies was a mere 2.49%, in stark contrast to the banking sector's 10.49%, which is over fourfold higher. This disparity in profitability has sparked significant academic debate, with some scholars questioning the implications of the high profitability of banks on the real economy (Kuang, 2012; Mo, 2017).

However, existing research is predominantly mainly at the theoretical level and lacks empirical evidence to substantiate the effect of bank profitability on productive firms. In the few studies that quantitatively analyze the impact of bank profitability on the real economy, some have explored basic statistical indicators (Xie, 2013), while others use data from listed banks and GDP to analyze the relationship between bank profitability and the real economy (Jiang and Liu, 2012). Macro-level data, however, are insufficient to probe into micro-mechanism questions and examine micro-level heterogeneity. Thousands of banks operate in China, with smaller entities like unlisted city banks and rural banks forming the bulk of China's banking sector. Their impact on entity firms, particularly small and medium-sized firms, is significant and may differ from that of larger listed banks. Furthermore, existing research emphasizes that excessive profitability in the banking sector raises the costs of productive firms and decreases their profit margins (Kuang, 2012). However, it is crucial to recognize that increased costs such as corporate loan interest or handling fees should be considered as a source of the bank's high profits rather than as consequences of them, suggesting a potential issue of reverse causality. Therefore, this paper aims to address three pivotal questions: (1) How does high bank profitability affect firms' productivity? (2) What mechanisms facilitate the impact of high bank profitability on firms' productivity? (3)

How does the effect of bank profitability on firm productivity vary across different regions and firm characteristics?

This paper endeavors to investigate the effects of bank profitability on firm productivity based on microdata and identify the influence mechanism. Initially, we employ the Olley-Pakes and Levinsohn-Petrin methods to measure firms' total factor productivity (TFP) using the China Industry Business Performance Data from 2000-2007, with the exception of 2003-2004. Subsequently, we match microdata on Chinese commercial banks and enterprises based on city and geographical proximity, obtaining 131,021 firm-year observations from 133 cities. This data is used to estimate the impact of bank profitability on firm productivity using the least squares method. Finally, the paper explores the impact mechanisms from three perspectives: the financialization of firms, labor attraction, and financing constraints, and further conducts a comparative analyzes of the effects across different regions, banks, and firms.

Compared to the existing literature, this study has a threefold contribution: Firstly, it provides micro-level empirical evidence on the impact of financial development on the real economy, in contrast to previous macro-level investigations. By analyzing the effect of bank profitability on the productivity of local and neighboring firms, using micro data from both listed and non-listed banks, as well as Chinese industrial firms, this study enhances our comprehension of these relationships. Secondly, the study sheds light on the determinants of firms' total factor productivity (TFP) from the perspective of bank profitability, addressing a gap in previous macro-level research that overlooked bank profitability and firm heterogeneity, and providing theoretical support for policy implementation of China's innovation-driven development strategy. Lastly, this study positions bank profitability as a causal factor impacting the real economy, a departure from previous literature, which predominantly viewed bank profitability as an outcome and focused on the factors influencing it.

The remainder of the paper is organized as follows. Section 2 provides a literature review, Section 3 outlines empirical facts and theoretical hypotheses. Section 4 details research methodologies, data, variables, and summary statistics. Section 5 presents the benchmark results, robustness checks, and mechanism analysis. Section 6 further discusses the heterogeneity among regions, banks, and firms. Section 7 condenses the main conclusions. Finally, Section 8 explores the implications of the paper and future research directions.

2. RELATED LITERATURE

This paper intersects with three strands of literature. The first strand examines the effects of banking development on the real economy, a topic of ongoing scholarly debate. Historically, banks have been considered active drivers of innovation and economic growth by optimizing resource allocation and productive investments

(Bagehot, 1873; Schumpeter, 1911; Taddese and Abebaw, 2021; Guo, 2022). Beck et al. (2000) posit that variances in banking sector development are a crucial cause of productivity disparities among countries. Conversely, some economists contend that banks respond passively to economic growth (Robinson, 1952). Additionally, Chen (2006) posits that inefficient loan allocation by Chinese banks hinders economic growth. Our primary contribution is to explore the impact of bank profitability on the real economy, given the high profits in China's banking sector.

The second strand of literature supported by our study focuses on financial sector profits and their repercussions on the real economy. Krippner (2005) suggests that analyzing the growth of the financial sector and its effect on other sectors necessitates an examination of the evolution of financial sector profits. Over the past two decades, the proportion of financial sector profits in the United States and major European economies has doubled (Freeman, 2010; Hsu, 2012; Popov, 2018; Rossi and Scalise, 2022). Khatiwada (2010) finds that the larger the disparity between financial and real economic profits, the greater the detrimental effect on the economy. Duman (2014) argues that financial sector profits far exceeding those of the real economy were the root cause of the 2009 global economic crisis. This paper contributes to this strand of literature by dissecting financial profit into banking profit and providing empirical evidence for the mechanism through which bank profitability impacts the real economy, as demonstrated by microdata.

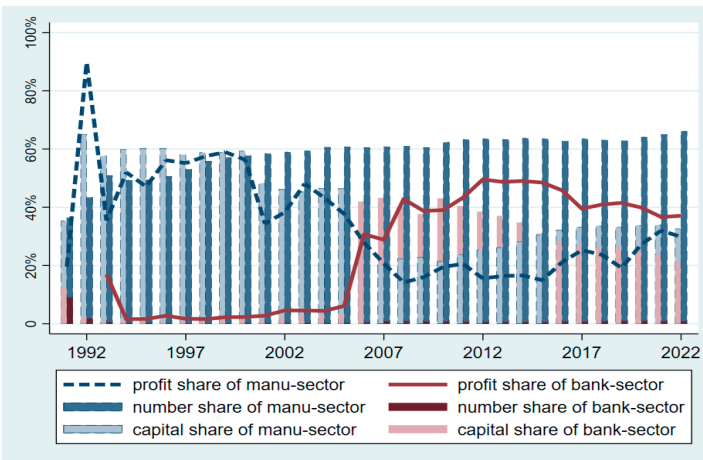
Lastly, our paper contributes to the literature on banking sector profitability. This research area primarily focuses on the persistence of high profits and its influencing factors, which can be categorized into macro, industry, and individual bank perspectives. Macroscopically, bank profitability is mainly affected by inflation (Boyd et al., 2001) and interest rate levels (Demirguc-Kunt and Huizinga, 1999; Ding et al., 2017), alongside macroeconomic growth. From an industry perspective, existing research primarily investigates the relationship between bank agglomeration and profitability, with findings by Agostino et al. (2005) and Franz and Hahn (2008) indicating a positive correlation. Nevertheless, some scholars dispute this finding, arguing for an absence of significant correlation (Athanasoglou et al., 2008) or positing a potential negative correlation (Fang and Liu, 2011). Regarding individual bank profitability, extensive discussions center on how various factors impact profitability and its endurance. These include bank assets (García-Herrero and Vázquez, 2013; Al-Matari, 2023), capital adequacy ratios (Estrella, 2004; Duan and Liu, 2020), product and income diversification (DeYoung and Rice 2004), non-performing loan ratios (Brock and Suarez, 2000), ownership (Molyneux and Thomton, 1992; Huang, 2020), and other factors on bank profitability and its persistence (Pessarossi et al., 2020). Our paper uniquely contributes to this body of literature by conceptualizing bank profitability as a causal factor rather than an outcome, and by elucidating its influence on the real economy as well as the underlying mechanisms of this relationship.

3. EMPIRICAL FACTS AND THEORETICAL HYPOTHESES

3.1. Banking and manufacturing sectors

In China, the banking sector, despite its smaller number compared to listed manufacturing firms, has demonstrated a remarkable trend in profits. Since 2007, the total profit of the banking sector has surpassed that of the manufacturing sector. Additionally, the capital share of the banking sector tends to be higher than its profit share, whereas the situation is reversed in manufacturing firms. Figure 1 illustrates the trends in total industrial net profit, number, and capital share of listed manufacturing and banking industries among all listed firms from 1991 to 2022. This figure reveals that the profit share of manufacturing firms has been on a decline since 1999 (58.95%), plummeting to 14.17% between 2006 and 2008. Although it has rebounded slightly in recent years, it remains below 30%. In contrast, the profit share of listed banks grew modestly until 2005 (6.10%) and surged to 42.83% between 2006 and 2008. In recent years, its fluctuation has stabilized, remaining between 35% and 50%. Trends in these two sectors exhibit a negative relationship. Furthermore, the number share of listed banks in China has been under 1%, while the number share of listed manufacturing firms has consistently stayed above 60% after 2004.

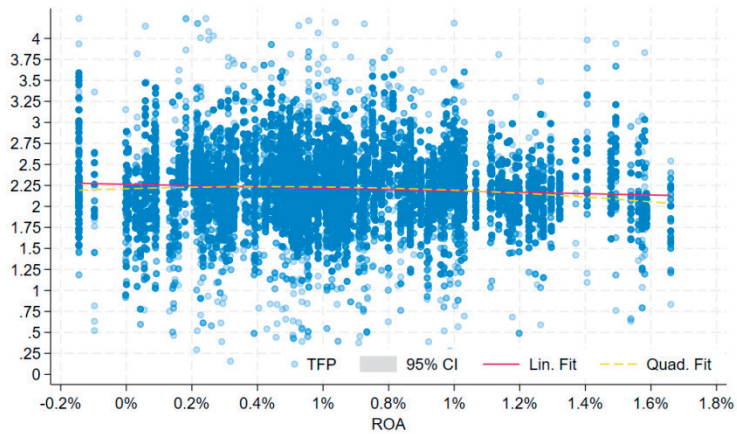
Figure 1. The industrial net profit, number, and capital of listed banks and listed manufacturing firms in China.



Note: The sample contains firms listed in either the Shanghai Stock Exchange or the Shenzhen Stock Exchange. The number (or capital/ profit) share of manu-sector (or bank-sector) is calculated by the ratio of the number (or capital/ profit) of listed manufacturing firms (or listed banks) to all listed firms, respectively. China's capital market was established in December 1990, and the first bank went public in April 1991.
Source: CSMAR database.

Figure 2 illustrates the correlation between bank profitability and local firms' productivity. In order to be consistent with the main regression sample period, this figure presents data for 2000-2007 (excluding 2003 and 2004). The trend depicted in Figure 2 indicates a significant negative correlation between bank profitability and firm productivity without any notable squared term correlation trend.

Figure 2. Scatter diagram of the relationship between the firm productivity and bank profitability.



Note: The vertical axis of the diagram is firm productivity, calculated using the Olley-Pakes method, with a bilateral 1% tail reduction to remove extreme values. To ensure a reasonable number of data points and enhance the trend's clarity and intuitiveness, the firm productivity is averaged across city, industry, and year. The horizontal axis denotes the average bank profitability for the city in which the firm is located, measured using the ROA metric.
Source: China Industry Business Performance Data, Wind database, the CSMAR database, and the iFinD database.

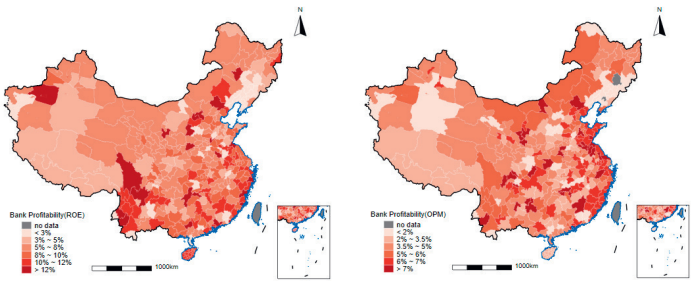
3.2. Bank profitability distribution

Geographical disparities are also evident in bank profitability, as depicted in Figure 3, which illustrates the average profitability of banks across cities using ROE and OPM as proxies for profitability[1]. Banks with higher profitability are predominantly concentrated in the south of the Hu Huanyong Line. Overall, the profitability of banks on the eastern coast is higher than that in inland areas, and it is higher in the southern region than in the western region. The average ROE of banks in the four municipalities (Beijing, Tianjin, Shanghai, and Chongqing) remains at a moderate

1 In addition, this study uses POA and OPM as proxies for profitability to map the distribution of bank profitability, which has similar distributional characteristics as ROE and OPM.

level. This demonstrates that bank profitability is not directly proportional to local economic development.

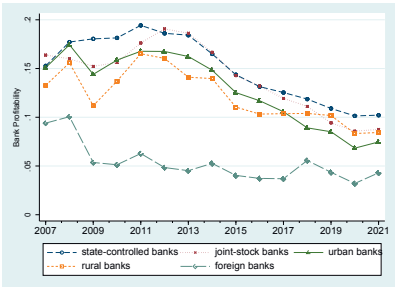
Figure 3. Distribution of bank profitability in 2021.



Note: The average ROE and OPM are used to measure city-level bank profitability. Missing data at the city level is filled with the average ROE and OPM of the province.
Source: CSMAR database.

Ownership differences also play a significant role in bank profitability, as shown in Figure 4, which portrays the trend of the average ROE of banks grouped by ownership from 2007 to 2021. State-controlled banks exhibit the highest profitability, while foreign banks have the lowest profitability. It is evident that state-controlled banks have maintained the highest profitability throughout the entire sample period, followed by joint-stock banks, with urban and rural banks in the middle. In contrast, the profitability of foreign banks was significantly lower than that of other ownership banks. Furthermore, the gap in bank profitability among different ownership types is gradually narrowing, primarily attributed to a general decline in the average ROE of banks, excluding foreign-owned banks, in recent years.

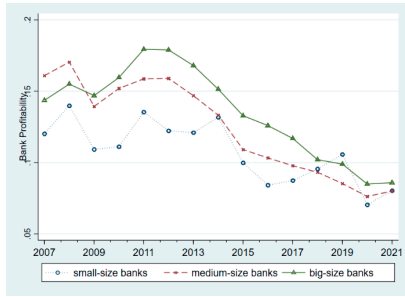
Figure 4. Average bank profitability of different ownership in China.



Note: The sample contains 7854 bank-year observations from around 378 banks covering 2007 to 2021. The ROE is used to measure bank profitability. Policy banks, rural cooperative banks, rural credit cooperatives, and three types of new rural financial institutions are excluded from the sample.
Source: CSMAR database.

Finally, bank size is a determinant of profitability levels, as illustrated in Figure 5. This figure presents the average ROE of banks grouped by the operating income size from 2007 to 2021. It reveals that the profitability of small-sized banks is considerably lower than that of other banks throughout the period, and the medium-sized banks are less profitable than large-sized banks for most of the periods. Additionally, the gap in bank profitability among different sizes is also diminishing over time.

Figure 5. Average bank profitability of different sizes in China.



Note: The sample contains 7854 bank-year observations from around 378 banks covering 2007 to 2021. The ROE is used to measure bank profitability. The logarithm of bank operating income is used as the scale indicator, dividing the banks into three groups: large, medium, and small banks.
Source: CSMAR database.

3.3. Theoretical hypotheses

Research indicates that the high profitability of the financial sector attracts firms' investment, thereby reducing investment in production. If speculative profit significantly exceeds productive profit, many non-financial firms are inclined to benefit from financial speculation, often at the expense of production survival and innovation (Tobin, 1965). This shift adversely affects the productivity of these firms (Krippner, 2005; Huang et al., 2022; Barradas, 2023) and restricts economic development (Khatiwada, 2010; Hsu, 2012). In China, the lucrative return in the financial sector, particularly in the banking sector, entices an increasing number of non-financial firms to deviate from their primary business and participate in financial activities (Wang et al., 2017; Rabinovich and Pérez, 2022). Since banks prefer to provide loans to state-controlled and large-sized firms, increased bank profitability may encourage these firms with easier access to bank loans to invest their excess funds in the shadow banking system based on stronger speculative motives (Wang et al., 2015). Such practices not only elevate financing costs but also accelerate the financialization of productive firms, thereby crowding out productive investment (Zhan, 2012) and damaging the main business performance of firms (Qi and Zhang, 2018). Numerous

studies using China's data have proven that firms exhibit an "alternative" motivation. In other words, to pursue financial asset returns, firms will increase financial assets to substitute investment in production (Hu et al., 2017; Du et al., 2017; Wang and Mao, 2022). Moreover, the higher the return on financial assets, the more likely it will hinder firms from investing in production (Zhang and Zhang, 2016). Based on the analysis above, this paper proposes Hypothesis 1 as follows:

H1. Banks' high profitability will reduce firm productivity by promoting their financialization and crowding out productive investment.

The rapid expansion of the financial sector can detrimentally affect the real economy by diverting critical resources, including high-quality labor (Hu and Liu, 2019). The growing wage disparity between financial and non-financial firms, driven by the increased profitability of the financial sector, results in inefficient labor allocation and hampers real economic growth (Hsu, 2012; Lee & Siddique, 2021). Nobel Prize winner James Tobin stated that more and more capital, including skilled young labor, is excessively invested in financial activities (Tobin, 1984). In China, the high profitability of the banking sector, evidenced by relatively high salaries, attracts a significant influx of high-quality labor from the productive sector, thereby inflating labor market costs. The average salary in the Chinese banking sector (measured by the ratio of industry per capita salary to per capita GDP indicator) reaches approximately 5.0, markedly higher than the average ratio of 2.3 in developed countries (China Social Science Institute, 2020). Based on the analysis above, this paper proposes Hypothesis 2 as follows:

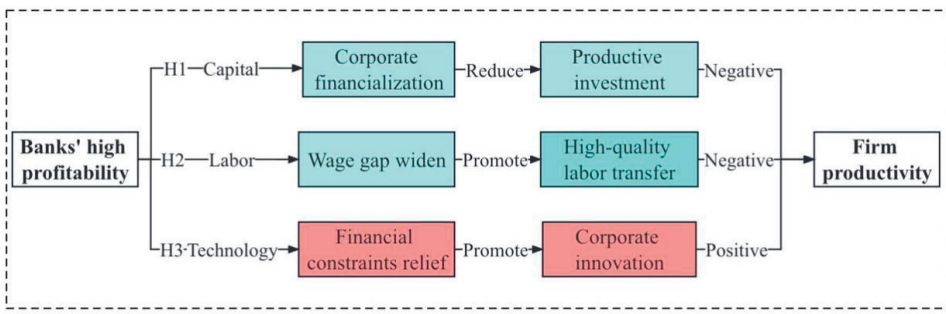
H2. High profitability in the banking sector will reduce firm productivity by promoting the transfer of high-quality labor from the productive sector to the banking sector.

High bank profitability may also impact firm productivity through firms' financial constraints and R&D intensity. Existing research shows that capital constraints on banks will reduce their loan offerings (Berger et al., 2001; Huang and Wu, 2009). Therefore, to meet the growing demand for loans in the real economy, banks must obtain continuous capital replenishment (Sheng, 2013). In China, approximately 60% of bank profits are reinvested as core capital to expand credit support for the real economy (Research Group of Hulunbuir Central Sub-branch, The People's Bank of China et al., 2021). Therefore, high bank profitability can enhance banks' capacity and willingness to provide loans, thereby supporting firm innovation and productivity, as R&D departments require sustained funding for technological advancements. However, financing for R&D projects typically faces higher risks compared to conventional financing, leading to financial constraints that will hinder investment in technological innovation and reduce firm productivity (Gorodnichenko and Schnitzer, 2013; Hai et al., 2022). This effect is particularly evident in developing countries such as China (Liu and Wu, 2009; Zhao and Zhang, 2023), especially among non-state-controlled firms (He and You, 2008). Based on the above analysis, this paper proposes Hypothesis 3 as follows:

H3. Banks' high profitability will enhance firm productivity by promoting corporate innovation and alleviating financial constraints.

The proposed hypotheses are clearly illustrated in the theoretical model (see Figure 5). Based on the theory of factor endowment (Solow, 1957; Acemoglu and Zilibotti, 2001), this paper aims to analyze the impact of high bank profits on firm productivity from the perspectives of labor, capital, and technology. As outlined in Hypotheses 1, 2, and 3, the effects of bank profitability on firm productivity are multifaceted. Therefore, this paper posits that the overall effect of high bank profitability on firm productivity depends on the balance between its role in alleviating financial constraints for innovation, fostering corporate financialization, and absorbing high-quality labor.

Figure 6. Theoretical model.



Source: The authors.

4. METHODOLOGY AND THE DATA

4.1. Model

A basic premise of our empirical research is that firms primarily associate with local and neighboring banks. There are at least two reasons why distance should serve as a deterrent. First, information about a nonlocal borrower is more limited and less precise than that about a similar local firm (Almazan, 2002; Knyazeva and Knyazeva, 2012). Hauswald and Marquez (2006) find that lending decisions become less efficient as distance increases. Second, delegated monitors face higher costs of collecting information about nonlocal firms due to the difficulty of obtaining and verifying soft information over distances, thus close banks have considerable market power (Petersen and Rajan, 1995; Degryse and Ongena, 2005). Moreover, the higher information collection and monitoring costs associated with distance are reflected in more restrictive contracts (Hollander and Verriest, 2016). Furthermore, it has been proven using Chinese data that the distance from banks to firms significantly increases

firms' financial constraints and reduces the loan scale (He and Wang, 2008; Song et al., 2021). Therefore, this paper indicates that matching banks and firms by city level and distance can better identify the impact of bank profitability on firm TFP.

To explore the causal effects of bank profitability on firm TFP, we reference Liu and Li (2022) and construct the following econometric model:

$$TFP_{ijpt} = \alpha + \beta ROA_{pt} + \gamma_1 X_{it} + \gamma_2 X_{jt} + \gamma_3 X_{pt} + \tau_j + \theta_{pt} + \varepsilon_{it} \quad (1)$$

The subscript i represents firms, j represents industries, p represents region, and t represents year. TFP_{ijpt} is the total factor productivity measured in year t for firm i in industry j in region p. To ensure the robustness of the results, this article uses both Olley-Pakes (OP) and Levinsohn-Petrin (LP) methods to estimate firms' TFP. ROA_{pt} is the average profit rate of banks in region p in year t, measured by the ratio of bank's net profit to total assets. X_{it}, X_{jt}, X_{pt} and represent the vector of control variables grouped at the enterprise level, industry level, and city level,respectively. In addition, τ_j is industry effect at four-digit industry code, θ_{pt} is region*year fixed effect and εit is the random disturbance item.

4.2. Variable selection and measurement

Regarding the calculation methods of total factor productivity, there are several common methods such as Ordinary Least Squares (OLS), Fixed Effects (FE), Olley-Pakes (OP), Levinsohn-Petrin (LP), Generalized Method of Moments (GMM), etc. There is a debate in academia about which method is better. Generally, OLS and FE methods have significant drawbacks, as they cannot solve the endogenous problem and will lose effective information. Olley and Pakes (1996) have developed a consistent semiparametric estimator, which solves the simultaneity problem by using the firm's investment decision to proxy for unobserved productivity shocks. Selection issues are addressed by incorporating an exit rule into the model. However, the monotonicity condition of the OP method requires that investment is strictly increasing in productivity, and if firms report zero investment in a significant number of cases, this casts doubt on the validity of the monotonicity condition. Consequently, Levinsohn and Petrin (2003, LP) use intermediate inputs rather than investment as a proxy. Since firms typically report positive use of materials and energy each year, it is possible to retain most observations, which also implies that the monotonicity condition is more likely to hold. An alternative method to achieve consistency of coefficients in the production function is by instrumenting the independent variables that cause the endogeneity problems by regressors that are correlated with these inputs but uncorrelated with unobserved productivity. Blundell and Bond (1999) propose an extended GMM estimator using lagged first differences of the variables as instruments

in the level equations and find that this estimator yields more reasonable parameter estimates. Thus, in this paper, the OP and LP methods are used to calculate TFP in the benchmark analysis, and the GMM method is used for calculating TFP in robustness checks. Referring to the methods from Lu and Lian (2012) and Song et al. (2021), this paper uses the OP method to estimate the following model:

$$lnY_{it} = \beta_0 + \beta_k lnK_{it} + \beta_l lnL_{it} + \beta_m lnM_{it} + \beta_a Age_{it} + \beta_p State_{it} + \beta_e ET_{it} + \beta_q Quit_{it} + \sum_k \gamma_k Ind_k + \sum_n \vartheta_n Prov_n + \theta t + \delta i + \varepsilon_{it} \quad (2)$$

Among them, based on industrial enterprise database, is the output measured by industrial added value after de-inflation; stands for the capital measured by the net value of fixed assets of the firm; represents the labor input measured by the average annual number of employees in the firm; represents the invest measured by the value-added of fixed assets over the previous year plus the depreciation of the current year in the OP method and represents intermediate inputs in the LP method. represents the survival time of the firm, which is equal to the sample year minus the year of establishment of the firm plus 1. and are industries and provinces dummy variables of firms, is a dummy variable of a state-controlled firm, which is equal 1 when the percentage of the state capital and collective capital more than 50%. and are the dummy variables of whether the firm participates in foreign trade and whether the enterprise exits the market, respectively. For the exit variable, if the industry of a firm changed, the firm is considered to have exit from the market, then the last year when it did not change in industry is marked as 1 and the remaining years as 0. If there is no change in the industry of a firm throughout the sample period, the exit variables are marked 0. and are industry dummy variable and province dummy variable, respectively. and are the year fixed effects and firm fixed effects, respectively, and is the random disturbance term and measurement error that cannot be reflected in the production function. In addition, the output is deflated by the ex-factory price index of the province where the firm is located, capital input is deflated by the fixed asset investment price index, and the intermediate product input is deflated by the industrial producer purchase price index, and these deflation indexes are taken from the *CSMAR* database. Where the state variables are *lnK* and *age*; the free variables are *lnL*, *Ind* and *Prov*; the control variables are *State*, *ET* and *Quit*; the proxy variable for unobservable productivity or technical efficiency is *lnM*. Then, we obtain the TFP by using the estimated residuals.

As for the key explanatory variable, i.e., bank profitability, we reference Gul et al. (2011) and measure it by the average of the banks' ROA in the city where the firm is located in the benchmark regression. In the robustness checks, first, the ratio of bank net profit to owner's equity (ROE), the ratio of the total profit to the total assets (POA), and the ratio of operating profit to operating income (OPM) are used as

alternative measures of bank profitability. Second, the weighted average of their ROA is used to measure the bank's profitability, where the weight is measured by banks' total assets. Finally, the average ROA of banks within 10km and 20km around the firm is used to measure bank profitability, which refers to the Survey of Small Business Finance (SSBF). Kwast, Starr-McCluer, and Wolken (1997) report that the median distance between a small business and its lender is six miles or less for lines of credit, mortgage loans, equipment loans, motor vehicle loans, and other loans. Specifically, based on the specific office address of the bank, Baidu Map Search is used to analyze the corresponding latitude and longitude. In combination with the latitude and longitude of the office address of industrial firms, the distance between the firms and all banks is calculated using the spatial coordinate distance formula. Furthermore, the banks within 10km and 20km from each firm are screened out, and then the average ROA is used to measure the bank profitability.

In terms of control variables, this paper follows the existing literature (Coad et al., 2016; Li et al., 2018) and adopts three levels of control variables to avoid interference through the impact of other factors on firm productivity and to mitigate endogeneity problems caused by omitted variables: (1) at the firm level, it controls the firms' financial indicators such as the leverage rate (*Lev*), financing costs *(Fincost)*, value-added rate (*Adoutrt*), expense ratio (*Exprt*), per capita salary expense ratio (*Wages*), and tax burden level (*Tax*), as well as the firm characteristic variables such as the firm size (*Size*), firm age (*Age*), ownership nature (*State*), the ratio of fixed assets to total assets (*Fixassrt*), capital intensity (*Capintensity*), and the degree of openness *(Openness)*. (2) at the city level, the economic development level (*Eco*), industrial structure (*Indstru*), and population (*Pop*)of the city where the firm is located are controlled. (3) at the industry level, we control the industrial agglomeration (*Agglo*) measured by the Herfindal index. The calculation formula is as follows:

In terms of control variables, this paper follows the existing literature (Coad et al., 2016; Li et al., 2018) and adopts three levels of control variables to avoid interference through the impact of other factors on firm productivity and to mitigate endogeneity problems caused by omitted variables: (1) at the firm level, it controls the firms' financial indicators such as the leverage rate (Lev), financing costs (*Fincost*), value-added rate (*Adoutrt*), expense ratio (*Exprt*), per capita salary expense ratio (Wages), and tax burden level (Tax), as well as the firm characteristic variables such as the firm size (*Size*), firm age (*Age*), ownership nature (*State*), the ratio of fixed assets to total assets (*Fixassrt*), capital intensity (*Capintensity*), and the degree of openness (*Openness*). (2) at the city level, the economic development level (*Eco*), industrial structure (*Indstru*), and population (*Pop*)of the city where the firm is located are controlled. (3) at the industry level, we control the industrial agglomeration (*Agglo*) measured by the Herfindal index. The calculation formula is as follows:

$$hhi_{jt} = \sum_{i \in I_j} \left(\frac{sale_{it}}{sale_{jt}}\right)^2 = \sum_{i \in I_j} {S_{it}}^2 \tag{3}$$

The represents the sales revenue of enterprise *i*'s main business products in year t, represents the market share of enterprise *i* in year *t*. Appendix A presents the definition and specific measurement method of each variable.

4.3. Data and sample

The firm-level data used in this paper primarily comes from the China Industry Business Performance Data (hereinafter referred to as the industrial enterprise database) maintained by the National Bureau of Statistics. Because the main component of the database is manufacturing firms, which is consistent with the industrial classification of other countries in terms of statistical caliber, and some variables (such as capital, R&D investment, and export delivery value) are easier to measure, this paper only selects manufacturing firms to make the results reliable. Referring to the previous literature (Lu and Lian, 2012), the data are cleaned up as follows: (1) Firms located in Tibet, Qinghai, and Hainan are excluded due to the limited number of firms with data. (2) The observations with missing and abnormal values of important variables are excluded, such as observations with total output value, added value, fixed assets, total assets, owner's equity, intermediate investment, employee compensation, and other values less than or equal to zero. (3) Unreasonable observations are eliminated, such as fixed assets or current assets being greater than total assets, industrial added value being greater than total output value, depreciation of the current year being greater than accumulated depreciation, and firms' establishment time being later than the sample year. (4) The observations of small-size firms, i.e., firms with fixed assets less than 10 million, product sales revenue less than 5 million, and all employees less than 8, are excluded. (5) Finally, all continuous variables in the sample are subjected to a bilateral 1% tail reduction. Although the latest available data for the Industrial Enterprise Database is from 2013, our main regression sample is composed of manufacturing firms for the period 2000-2007 and excludes observations from 2003-2004, due to the lack of output data (firms' industrial value added) and input data (firms' intermediate inputs) required to calculate TFP in other years. In total, our whole sample contains 131,021 firm-year observations from 72,630 firms. The sample is also well-represented geographically, as it includes firms located in 133 cities across 28 provinces of mainland China.

To ensure the robustness of the research, another sample of this paper is composed of firms listed in either the Shanghai Stock Exchange or Shenzhen Stock Exchange covering 2012-2016, which are obtained from the *CSMAR* database. In order to ensure the reliability of the results, the data were screened as follows: (1) Firms located in Tibet and Qinghai were excluded. (2) The observations with missing values and abnormal values were excluded, as well as unreasonable values (the deal process is similar to the sample of the industrial enterprise database). (3) Excluding firms suffering from continuous losses (known as ST and *ST firms). (4) The observations

with manufacturing firms whose industry code is C are only used. (5) All continuous variables in the sample were subjected to a bilateral 1% tail reduction. In the end, the sample of listed firms contains 2,996 firm-year observations from around 1,037 listed firms, which are located in 104 cities across 28 provinces of mainland China.

The bank-level data in this paper comes from the *Wind* database, the *CSMAR* database, and the *iFinD* database. Specifically, it includes bank characteristic data such as bank name, ownership nature, registered capital, detailed address, and bank financial data in the income statement, the statement of changes in owner's equity, statement of cash flow, as well as loan structure and important business indicators data. After merging and filling the vacancies using the three databases, a total of 3,438 banks, which are located in 133 cities across 28 provinces, are matched with firm-level data in our sample. In addition, the control variables at the regional level in this paper are all sourced from the *CSMAR* database.

4.4. Descriptive statistic

Table 1 presents summary statistics for the main variables. All continuous variables are winsorized at 1% and 99%, and all real variables are inflation-adjusted. Table 1 shows, when taking the industrial added value as output, that the average TFP of Chinese industrial firms measured by the LP method during the sample period is 7.6979, which is higher than the average value of 2.1988 calculated by the OP method. While taking the total industrial output value as output, the average TFP calculated by the LP method is 1.8776, which is lower than the average TFP calculated by the OP method (3.1936). The Pearson and Spearman test shows that the correlation coefficients between bank profitability and firm productivity are significantly negative at the 1% level, and the correlation coefficients between other control variables are small.

Table 1. Summary statistics.

VarName	Obs	Mean	SD	Min	Median	Max
Dependent variables						
TFP_OP	131021	2.1988	0.8412	-0.0071	2.2156	4.2365
TFP_LP	131021	7.6979	1.0294	5.4332	7.7111	9.6789
TFP_OPGO	131021	3.1936	0.8014	1.2646	3.1834	5.2173
TFP_LPGO	131021	1.8776	0.2241	1.3388	1.8552	2.6004
Key independent variables						
BROA	131021	0.007	0.0042	-0.0014	0.0064	0.0216
BPOA	131021	0.0105	0.0056	-0.0004	0.0102	0.0277
BROE	131021	0.1385	0.0823	-0.0547	0.135	0.3693

BOPM	131021	0.3093	0.1583	-0.0032	0.3062	1.1636
Control variables at firm level						
Size	131021	11.3723	1.1706	9.4214	11.3039	13.7286
Age	131021	2.0452	0.7869	0	2.0794	4.6821
State	131021	0.0496	0.217	0	0	1
Wages	131021	2.9769	0.5402	-0.8764	2.9349	6.7124
Lev	131021	0.5283	0.2305	0.0034	0.5571	1
Fixassrt	131021	0.4133	0.1906	0.0136	0.3905	1
Fincost	131021	0.0119	0.0213	0	0.005	0.837
Capintensity	131021	-0.0274	0.7669	-3.6083	-0.0503	4.1696
Openness	131021	0.2608	0.3845	0	0	1
Adoutrt	131021	0.2738	0.1296	0.0024	0.253	2.9704
Exprt	131021	0.1062	0.0988	0.0003	0.0816	3.8286
Tax	131021	0.0303	0.03	0	0.0247	0.6142
Control variables at regional level and industry level						
Eco	131021	2.1192	2.4217	0.0195	1.5126	11.4085
Indstru	131021	0.7697	0.2719	0.3459	0.7272	1.8252
Pop	131021	6.0215	0.6537	3.9923	6.3113	7.0384
Agglo	131021	0.0001	0.0002	0	0.0001	0.001
Mediator variables						
Finli	74959	0.0287	2.5353	-46.0000	0.0000	586.0000
Indinv	74959	8.2981	1.6575	-0.2426	8.3792	12.4767
Labor	23666	1.0834	1.0965	0.0000	0.6931	8.9619
Fincon	125592	-2.8673	0.2686	-3.2688	-2.9512	-2.0738
RandD	125592	0.0019	0.0075	0.0000	0.0000	0.1580

Source: The authors.

5. RESULTS

5.1. Benchmark regression

The baseline results are presented in Table 2. Columns (1)-(3) display the TFP calculated using the OP method, with column (2) controlling for additional variables based on column (1), and column (3) controlling industry fixed effects based on column (2). Column (4) depicts the TFP calculated using the LP method. Each column controls for

region*year fixed effects and employs industry clustering to correct standard errors. The results of Table 2 indicate that the estimated coefficient of bank profitability is significantly negative at the 1% level, suggesting that increased bank profitability negatively impacts firm productivity. Higher average profitability of regional banks corresponds with lower local firm productivity. Furthermore, the significance and signs of the coefficients for other control variables align with existing literature.

Table 2. The response of corporate TFP to the bank profits.

	(1)	(2)	(3)	(4)
	TFP_OP	**TFP_OP**	**TFP_OP**	**TFP_LP**
BROA	-4.0482***	-7.3587***	-6.0107***	-3.1467***
	(-4.5093)	(-9.2289)	(-9.7241)	(-8.9302)
Size	0.1739***	0.2151***	0.2330***	0.7306***
	(27.1674)	(40.8606)	(66.5597)	(455.4117)
Age	-0.1073***	-0.1315***	-0.1309***	0.0336***
	(-21.2277)	(-28.2718)	(-43.2046)	-19.1754
State	0.4365***	0.3990***	0.3992***	0.1517***
	(37.5195)	(46.2443)	(50.3627)	(28.9487)
Wages	0.2726***	0.2161***	0.2040***	0.0468***
	(32.4994)	(30.2602)	(40.8975)	(17.6303)
Lev	-0.2486***	-0.0693***	-0.0689***	-0.0071
	(-14.8481)	(-5.7169)	(-8.0641)	(-1.4228)
Fixassrt	-0.9906***	-1.0636***	-1.1042***	-0.3711***
	(-27.1674)	(-32.6571)	(-54.7653)	(-40.4236)
Fincost	-0.4450***	0.5111***	0.19	-0.7564***
	(-3.0607)	-2.761	-1.1748	(-5.5207)
Capintensity	-0.4922***	-0.5079***	-0.5126***	-0.1619***
	(-65.2893)	(-76.6236)	(-1.1e+02)	(-60.8485)
Eco	-0.0425***	-0.0280***	-0.0334***	-0.0485***
	(-5.2694)	(-3.6211)	(-5.9830)	(-15.0966)
Indstru	-0.0165	0.0197	0.0063	-0.0290***
	(-0.7253)	-1.1691	-0.5553	(-4.0056)
Agglo	-142.2624**	-143.6280***	261.3495***	-282.1114***
	(-2.5241)	(-2.6917)	-31.3073	(-52.0356)
Pop	0.0321***	0.0041	0.0043	-0.0083*
	(2.6652)	(0.4326)	(0.5879)	(-1.8711)

Openness		-0.1399***	-0.1015***	-0.0858***
		(-13.1493)	(-12.0222)	(-25.4991)
Adoutrt		3.1640***	3.2160***	3.4039***
		(50.8877)	(56.7180)	(70.0350)
Exprt		-0.6940***	-0.5777***	-0.0721***
		(-10.7875)	(-11.6587)	(-3.0694)
Tax		0.3091*	-0.0764	0.0468
		(1.8067)	(-0.6983)	(0.7232)
Constant	0.1201	-0.8358***	-0.9849***	-1.4769***
	(1.0671)	(-9.3111)	(-13.9118)	(-37.1054)
Region*year Fixed Effect	Yes	Yes	Yes	Yes
Industry Fixed Effect	No	No	Yes	Yes
With R-sq.	0.55	0.76	0.79	0.93
N	131021	131021	131021	131021

Notes: t-statistics are in parentheses. Statistically significant at 1% (***), 5% (**) and 10% (*).
Source: The authors.

5.2. Robustness checks

First, to address endogeneity issues such as omitted variables, measurement errors, or reverse causation, this paper follows the approaches of Chong et al. (2013) and Song (2021) and uses the average bank ROA of two other cities within the same province, with household saving rates closest to the city where the firm is located, as an instrumental variable (IV) for endogenous variables (i.e., bank profitability). Regarding the relevance assumption, cities in the same province are subject to the same provincial policies. Moreover, since resident savings deposits are a primary business for banks, banks in cities with similar savings deposit balances are considered to have comparable profitability. Thus, bank profitability among target cities is highly correlated. In terms of the exogeneity assumption, the connection between resident savings deposits and firm productivity is weak, and bank profitability in cities with similar savings deposit balances is unlikely to directly affect target city firm productivity. Consequently, the IV selected in this paper satisfies correlation and exogeneity assumptions. Appendix B contains the results. The first-stage regression result reveals a significantly positive coefficient for the IV at the 5% level, indicating that higher average bank profitability in two cities with similar resident savings deposits within the same province corresponds with higher bank profitability in the target city. The two-stage regression results demonstrate that bank profitability coefficients are significantly negative at the 1% and 5% levels, suggesting that the paper's main conclusion remains valid after

addressing endogeneity. Additionally, the under-identification test's p-value is 0.000, rejecting the unrecognizable null hypothesis. The CD and KP Wald-F statistical values from the Weak identification test significantly exceed all critical values, indicating no weak instrumental variable problem. Furthermore, the endogeneity issue of the model was examined using the generalized method of moments (GMM) for dynamic systems, which instrumentalized potential endogenous variables using their one-period-lagged values and the results are shown in Appendix F. After adding the lagged term, the results are consistent with the original findings.

Second, concerning variable measurement: (1) For firm productivity measurement, this paper first calculates TFP using the OP and LP methods, based on firms' total output value instead of value-added. Next, the system GMM method is employed to measure firm TFP after estimating the coefficients of labor input, capital input, and intermediate input. Upon re-estimation, bank profitability coefficients remain significantly negative at the 1% level (details in Appendix C). (2) For explanatory variables, average ROA is replaced with average POA, average ROE, average OPM, and weighted average ROA using bank assets as weights (variable definitions in Appendix 1). The coefficients of bank profitability are significantly negative at the 1%, 1%, 1%, and 5% levels, respectively (results detailed in Appendix D). (3) For control variables, this paper modifies the measurement methods for firm size, credit constraints, and capital intensity and adds control variables for local financial development level, infrastructure, and savings rate. The estimated coefficients of bank profitability remain significantly negative at the 1% confidence level (Appendix E for details).

Third, regarding model setting: (1) The paper re-runs the benchmark model using a fixed-effects model, resulting in a significantly negative coefficient for bank profitability rate at the 1% level. (2) Based on the benchmark model, this paper substitutes the regional clustering effect for the industry clustering effect to correct standard errors, resulting in a significantly negative coefficient for bank profitability at the 5% level. (3) The baseline model in this paper does not include the lagged values of firm productivity among the independent variables, which suggests that there might exist the risk of potentially inconsistent and biased estimates due to the problem of omitted relevant variables (Kutner 2005; Brooks 2009). Considering potential lag effects, the first- and second-period lags of bank profitability are used as independent variables, respectively. This approach also helps mitigate endogeneity issues arising from reverse causality to some extent. The coefficients of bank profitability are significantly negative at the 1% and 5% levels, respectively. Furthermore, when current-period, first-, and second-period lags of bank profitability are included in the model simultaneously, only the current-period variable's coefficient is significantly negative at the 1% level, confirming the benchmark model's reasonableness (Appendix F for details).

Fourth, addressing the matching of banks and firms: acknowledging that the influence of banks on firms may diminish with geographic distance, this paper also examines the effect of surrounding banks' profitability on firm productivity. This

approach better identifies banks closely interacting with target firms within the same area and alleviates endogeneity problems caused by correlations between regional data and regional macroeconomic variables. Specifically, we use Baidu Maps to convert office addresses of firms and banks into corresponding latitudes and longitudes, and employ the space coordinate distance formula to filter banks within 10 and 20 kilometers of each firm (Li et al., 2020). The average ROA of surrounding banks serves as the independent variable, with the dependent variable (i.e., productivity) measured by both the OP and LP methods. The results reveal that the impact of bank profitability on firm productivity remains significantly negative (details in Appendix G).

Lastly, concerning the sample source: considering the sample period predates the global economic crisis, this paper further investigates whether the main conclusions remain valid in recent years by utilizing data from firms listed on the Shanghai Stock Exchange or Shenzhen Stock Exchange and matching firm-level data with city-level banks from 2012 to 2016. The results demonstrate that the effect of bank profitability on firm TFP remains significantly negative (see Appendix H).

5.3. Mechanism analysis

This paper explores the impact mechanism of bank high profitability on firm productivity from three perspectives: corporate financialization, high-quality labor, and financial constraints.

5.3.1. financialization and productive investment

Hypothesis 1 posits that increased bank profitability will crowd out firms' production investment by attracting firms to invest in the financial sector, such as the shadow banking system, resulting in decreased productivity. To test this, we use the ratio of corporate financial investment income to gross profits as a proxy for financial investment (*Finli*) and the logarithm of increased fixed investment as a proxy for productive investment (*Indinv*). We estimate the impact of bank profitability on firms' financial and productive investments and construct interaction terms (*Finli#Indinv*) to examine their mediating effect on the impact of bank profitability on firm productivity. The regression results are reported in Panel A of Table 3.

Columns (1) and (2) display the effects of bank profitability on firms' financial and productive investments, respectively. The coefficients of bank ROA are 2.2045 at the 5% significance level and -7.8875 at the 1% significance level, respectively, suggesting that higher bank profitability correlates with increased financial investment and reduced productive investment by firms. This supports to some extent the previous research literature that financialization reduces physical investment in real firms (Davis, 2018). The TFP, shown in columns (3) and (4), is measured by the OP and LP methods,

respectively. In columns (3) and (4), we add interaction variables for firms' financial and productive investments based on the benchmark regression. The coefficients of these interaction variables are both significantly negative, indicating that an increase in firms' financial investment indeed leads to a decline in firm productivity by reducing productive investment. The coefficients of bank profitability in columns (3) and (4) remain significantly negative, and their absolute values are significantly lower than those in the benchmark regression. In other words, after controlling for firms' financial and productive investments, the negative marginal effect of bank profitability on firm productivity has decreased. Taken together, these results confirm that increased bank profitability attracts firms to increase financial investment instead of productive investment, leading to a decline in their productivity.

5.3.2. High-quality labor

Hypothesis 2 suggests that high bank profitability may result in higher salaries, attracting high-quality workforces away from productive firms and harming firm productivity. To verify this hypothesis, we use the logarithm of the number of employees with postgraduate degrees or higher as a proxy for high-quality workforces (*Labor*). We then estimate the impact of bank profitability on firms' high-quality labor forces and subsequently add the high-quality labor force index to the benchmark regression. Panel B of Table 3 reports the results.

Column (1) shows that the coefficient of bank profitability is significantly negative at the 10% level, indicating that increased bank profitability indeed reduces firms' high-quality labor. Columns (2) and (3) present the results for firms' TFP measured by the OP and LP methods, respectively. The coefficients of high-quality labor are significant and positive, implying that high-quality labor significantly improves firm productivity. Furthermore, the estimated coefficients of bank profitability remain significantly negative at the 1% level, and their absolute values are relatively lower compared to the benchmark regression results. This suggests that after controlling for firms' high-quality labor, the negative marginal effect of bank profitability on firm productivity has decreased. These results collectively indicate that increased bank profitability reduces firm productivity by transferring high-quality labor from firms to banks.

5.3.3. Financial constraints and R&D intensity

According to Hypothesis 3, increased bank profitability may raise the bank capital adequacy ratio, strengthening banks' capacity and willingness to lend, thereby relieving firms' financial constraints and promoting innovation, ultimately increasing their productivity. We test this hypothesis in two steps: first, estimating the impact of

bank profitability on firm financial constraints and R&D intensity. Following Hadlock and Piere (2010) and Song et al. (2021), we calculate the SA index[2] as an annual index of firms' financial constraints (Fincon). A negative SA index indicates that larger values correspond to higher degrees of financial constraints. The proxy for R&D expenditures is measured using the ratio of research and development expenses to operating income (R&D). Second, we construct interaction terms for firms' financial constraints and R&D intensity (R&D#Fincon) and add them to the benchmark regression. Panel C of Table 3 reports the regression results.

The results in columns (1) and (2) show that the coefficients of bank profitability on financial constraints and R&D intensity are -1.4031 at the 1% significance level and 0.0275 at the 5% significance level, respectively, indicating that increased bank profitability significantly relieves firms' financial constraints and raises their R&D intensity. Firms' TFP in columns (3) and (4) is measured by the OP and LP methods, respectively. The estimated coefficients of the interaction term between firms' financial constraints and R&D intensity are significantly negative at the 1% level, suggesting that financial constraints decrease firms' TFP by reducing R&D intensity. The coefficients of bank profitability are still significantly negative at the 1% level, and their absolute values are slightly higher than those in the benchmark regression, which implies that controlling for financial constraints and R&D intensity strengthens the negative marginal effect of bank profitability on firm productivity. Taken together, these results suggest that rising bank profitability can increase firms' R&D intensity by alleviating their financial constraints, thereby slightly mitigating the negative impact on firm productivity.

Table 3. The mediating effect of financialization and productive investment.

	(1)	**(2)**	**(3)**	**(4)**
Panel A: The mediating effect of financialization and productive investment				
	Finli	Indinv	TFP_OP	TFP_LP
BROA	2.2045**	-7.8875***	-4.7688***	-2.3611***
	(2.3305)	(-4.1671)	(-6.2732)	(-5.1890)
Finli#Indinv			-0.0001*	-0.0002*
			(-1.8635)	(-1.9326)
Control variables	Yes	Yes	Yes	Yes
*Region*year Fixed Effect / Industry Fixed Effect*	Yes	Yes	Yes	Yes
R2	0.02	0.38	0.78	0.93
Obs	479637	71829	74959	74959

Panel B: The mediating effect of labor resources

2 SA = -0.737*ln(asset)+0.043*$ln^{2(asset)-0.04*age}$

	Labor	TFP_OP	TFP_LP
BROA	-5.4891*	-3.1587***	-2.4586***
	(-1.7823)	(-2.8015)	(-3.3054)
Labor		0.0084***	0.0067**
		(2.9305)	(2.4102)
Control variables	Yes	Yes	Yes
*Region*year Fixed Effect / Industry Fixed Effect*	Yes	Yes	Yes
R2	0.23	0.77	0.92
Obs	25321	23666	23666

Panel C: The mediating effect of financing constrains and R&D

	Fincon	RandD	TFP_OP	TFP_LP
BROA	-1.4031***	0.0275**	-6.0186***	-3.2096***
	(-3.4904)	-2.5538	(-9.7685)	(-8.9721)
R&D#Fincon			-0.2995***	-0.1261***
			(-4.8030)	(-2.9615)
Control variables	Yes	Yes	Yes	Yes
*Region*year Fixed Effect / Industry Fixed Effect*	Yes	Yes	Yes	Yes
R2	0.36	0.15	0.79	0.93
Obs	131021	125592	125592	125592

Notes: t-statistics are in parentheses. Statistically significant at 1% (***), 5% (**) and 10% (*).
Source: The authors.

6. DISCUSSION

This paper has demonstrated the impact of bank profitability on firm productivity and its underlying mechanism. However, these results only suggest that high bank profitability adversely affects firm productivity at the average level for our total sample. A critical question emerges: will the relationship between bank profitability and firm productivity vary across different regions, banks, and firms? Addressing this issue will facilitate a deeper understanding of the boundary conditions of bank profitability effects. To this end, heterogeneity analyses are conducted for geographic regions, bank characteristics, and enterprise characteristics.

6.1. Regional heterogeneity

Regarding the heterogeneity of geographic distribution, it is essential to consider China's long-standing uneven regional economic development. Accordingly, the samples are divided into four regions (Northeast, East, Central, and West) to test the heterogeneity impact in these areas. The regression results are reported in columns (1)-(4) of Panel A of Table 4, respectively. The findings reveal that in the eastern and central regions, increased bank profitability continues to significantly reduce firm Total Factor Productivity (TFP), with a stronger negative effect in the eastern region. One possible explanation is that rapid economic development and high labor turnover in these regions have promoted firms' financialization and the transfer of high-quality labor from the production sector (Hu & Liu, 2019; Huang et al., 2022). In contrast, the coefficient of bank profitability is significantly positive in the western region, suggesting that high bank profitability helps alleviate financial constraints and fosters innovation in western firms, thereby enhancing their productivity (Liu & Wu, 2009; Zhao & Zhang, 2023).

6.2. Bank heterogeneity

Previous research suggests that compared to private firms and Small and Medium-sized Enterprises (SMEs), state-controlled and large-sized banks are more likely to provide credit to state-controlled and large-sized firms because of their strong political connections (Khwaja & Mian, 2005; Fu et al. 2017). In contrast, due to information asymmetry and "forced" choice, private and small-sized banks' credit becomes the primary option for private firms and SMEs (Lin & Sun, 2008). This section further investigates whether the impact of bank profitability on firm productivity varies based on bank attributes. We re-estimate the effect of profitability on firm TFP, with the results reported in Panel B of Table 4. The findings indicate that the profitability of state-controlled and large-sized banks has a more significant impact on firm productivity. A possible explanation for the heterogeneous impact is that, compared to private banks, state-controlled banks under administrative monopoly protection are influenced by macro policies. Consequently, even with increased profitability, they still prefer to provide loans to larger firms with inherently lower financial constraints. This result is consistent with the findings of the existing literature and supports the conclusion that SOEs are strongly politically connected (Gerschenkron, 1962; Shleifer & Vishny, 1994). This discrimination encourages larger firms to invest in the financial sector, such as shadow banking systems, to achieve higher profits, thereby reducing their productivity (Wang & Mao, 2022). Moreover, state-controlled and large-sized banks are more attractive to high-quality workers than other banks, because of their lower turnover rates and easier to achieve the highest positions in the wage distribution for workers (von Wachter & Bender, 2006). This leads to a stronger

mediating effect of labor attractiveness, which further hinders the productivity of local firms. On the contrary, increased profitability for private banks can relatively alleviate financial constraints for SMEs, providing more capital for their R&D and productive investment, offsetting part of the negative impact of bank profitability on firm TFP (Gorodnichenko & Schnitzer, 2013; Hai et al., 2022). These results align with hypotheses 1-3 in this paper.

Table 4. Heterogeneous impact for region and banks.

	(1)	(2)	(3)	(4)
Panel A: Heterogeneous impact for region				
	Northeast	East	Central	West
BROA	-0.6953	-6.2791***	-5.4337***	4.0464*
	(-0.7481)	(-8.3765)	(-3.4456)	(1.9577)
Control variables	Yes	Yes	Yes	Yes
*Region*year Fixed Effect / Industry Fixed Effect*	Yes	Yes	Yes	Yes
R2	0.7977	0.7891	0.8119	0.785
Obs	30854	70216	11165	5385
Panel B: Heterogeneous impact for bank ownership				
	State-contorlled	Private	Big-sized	Small-sized
BROA	-6.2729***	-0.6821***	-14.2981***	-6.6603***
	(-7.9041)	(-4.0666)	(-8.2183)	(-6.3118)
Control variables	Yes	Yes	Yes	Yes
*Region*year Fixed Effect / Industry Fixed Effect*	Yes	Yes	Yes	Yes
R2	0.78	0.79	0.78	0.79
Obs	51836	25931	36130	45641

Notes: t-statistics are in parentheses. Statistically significant at 1% (***), 5% (**) and 10% (*)
Source: The authors.

6.3. Firm heterogeneity

In this section, we investigate whether the negative impact of bank profitability on firm productivity differs based on firm attributes. To analyze firm heterogeneity, the paper classifies the sample into distinct groups according to ownership (foreign-funded, private, and state-owned), size (small, medium, and large), and technology intensity (high technology intensity and low technology intensity) of the firms. Firstly,

to examine the heterogeneous impact of bank profitability on firm productivity across different ownership types, our sample is separated into three groups: state-controlled firms, private firms, and foreign-funded firms[3]. The results are reported in Panel A of Table 5, where the estimated coefficients of bank profitability are significant at the 1% confidence level for foreign and private firm samples, but not for the SOE sample. Moreover, the absolute values of the coefficients are much larger for the former two groups than for the latter. This finding implies that the negative impact of high bank profitability on firm productivity predominantly affects foreign-funded and private firms. A possible explanation is that increased bank profitability encourages these firms to invest in the financial sector, thus reducing productivity investment (Wang et al., 2017; Rabinovich and Pérez, 2022). This result supports to some extent the previous research literature that financialization reduces physical investment in real firms (Davis, 2018). Furthermore, private firms experience higher labor turnover, making their high-quality labor more susceptible to the banking sector's allure (Hu and Liu, 2019). As for state-controlled firms, with inherently low financial constraints, obtaining more loans has a weaker effect on promoting productivity. Additionally, due to policy restrictions, state-controlled firms face limitations in profiting from financial investments, rendering the negative effect on their productivity insignificant (Li et al., 2020).

Secondly, based on asset size within the industry and year, the sample is divided into three subsamples for regression analysis. The results reveal that the estimated coefficient of bank profitability is significantly negative at the 1% confidence level for all samples of different-sized firms. The absolute value of the coefficient increases from column (1) to column (3), indicating that the larger the firm, the stronger the negative impact. Notably, despite a high overlap between state-controlled firms and large-sized firms, high bank profitability remains detrimental to the productivity of large-scale firms when controlling for firm ownership. The t-value of the estimated coefficient of bank profitability is substantially higher than that of small and medium-sized firms. One plausible explanation is that large-sized firms, compared to their smaller counterparts, possess greater financial resources to invest in the financial sector, such as shadow banking, for higher profits (Qi and Zhang, 2018). Additionally, large-sized firms face relatively fewer financial constraints than small-sized firms, thereby weakening the positive relationship between bank profitability and firm productivity, which is consistent with previous studies (Lin & Hong Bo, 2012).

Thirdly, according to the *High-tech Industry Statistical Classification Catalogue* of the National Bureau of Statistics, our sample is separated into high-tech industry groups and non-high-tech industry groups for regression analysis based on the four-digit industry code classification. The results, reported in columns (1) and (2) of Panel

3 This paper regards firms with the state capital and collective capital accounting for more than 50% of their paid-in capital as a state-controlled enterprise. Firms with the individual capital accounting for more than 50% of the company's paid-in capital are regarded as a private enterprise. Firms with capital from Foreign, Hong Kong, Macao and Taiwan accounting for more than 25% are regarded as foreign-funded firms.

C of Table 5, show that although the estimated coefficients on bank profitability are negative for both groups, they are significant only for non-high-tech firms. A potential explanation is that high-tech firms typically have a larger proportion of R&D investment and stringent requirements for professional skills, which weaken the mediating effect of financialization and labor transfer (Hu and Liu, 2019; Huang et al., 2022). However, most of the R&D projects of high-tech firms cannot make it, so it is difficult to obtain bank credit. Above all, the positive impact on firms in alleviating financial constraints and promoting R&D investment is not significant for high-tech firms (Liu & Wu,2009; Zhao & Zhang, 2023).

In addition, the paper further analyses the differences in the regression results between the sample of zombie and non-zombie firms. Zombie firms with characteristics of high leverage and low efficiency always seize the credit resources from the other firms, which causes a large negative impact on the allocation of credit resources, and the upgrading of economic structure (Wang et al., 2015). Therefore, this paper divides the sample into a zombie firm sample and a non-zombie firm sample for regression. The results are reported in columns (3) and (4) of Panel C of Table 5, which show that the coefficients for zombie firms and non-zombie firms are both negative at 5%. The coefficient of the zombie firm is slightly smaller than that of the non-zombie firm in absolute value, but the difference in coefficient between columns (3) and (4) is not statistically significant.

Table 5. Heterogeneous impact for firms.

	(1)	**(2)**	**(3)**
Panel A: Heterogeneous impact for firm ownership			
	Foreign-funded	Private	State-owned
BROA	-7.7317***	-4.6106***	-3.4867
	(-8.9085)	(-7.0674)	(-1.5985)
Control variables	Yes	Yes	Yes
*Region*year Fixed Effect /Industry Fixed Effect*	Yes	Yes	Yes
R2	0.79	0.82	0.8
Obs	39139	42617	5420
Panel B: Heterogeneous impact for firm size			
	Small-sized	Medium-sized	Big-sized
BROA	-5.8895***	-5.9402***	-6.2243***
	(-6.0955)	(-5.0670)	(-8.6404)
Control variables	Yes	Yes	Yes
*Region*year Fixed Effect /Industry Fixed Effect*	Yes	Yes	Yes

R2	0.83	0.8	0.78
Obs	11773	9905	95042

Panel C: Heterogeneous impact for whether they are high-tech industry firms and zombie firms

	High-tech	Non high-tech	Zombie	Non-zombie
BROA	-4.8914	-6.1487**	-5.9599**	-6.1906**
	(-1.6214)	(-2.7082)	(-2.3051)	(-2.7060)
Control variables	Yes	Yes	Yes	Yes
*Region*year Fixed Effect /Industry Fixed Effect*	Yes	Yes	Yes	Yes
R2	0.78	0.79	0.79	0.79
Obs	14040	106109	25279	94870

Notes: t-statistics are in parentheses. Statistically significant at 1% (***), 5% (**) and 10% (*).
Source: The authors.

7. CONCLUSIONS

Bank profitability is closely related to the development of the real economy. Currently, the profitability of banks and its relationship with the real economy have attracted widespread attention from scholars. This paper utilizes microdata from both firms and banks in China to investigate the impact of high bank profitability on firm productivity. The results generated by pooled OLS present negative coefficients of bank profitability to firm productivity, TFP, which confirms our hypotheses that bank profitability exerts its impact on productive firms by reducing their productivity. This conclusion holds after conducting a series of robustness checks.

This paper extends the study by exploring whether corporate financialization, high-quality labor, and financial constraints have a meditating role in bank high profitability reducing firm productivity. We use the mediation effects model to empirically test it and find that banks' high profitability will reduce firm productivity by promoting their financialization and the transfer of high-quality labor from the productive sector to the banking sector. What's more, the results of the mechanism analysis also reveal that banks' high profitability will increase firm productivity by promoting corporate innovation and alleviating financial constraints. Our findings shed light on the prominent role of corporate financialization, high-quality labor, and financial constraints in influencing the detrimental consequences of bank high profitability on firm productivity, thereby enriching research on banking sector profitability and providing new insights and empirical evidence for financial supply-side reforms in China. Furthermore, heterogeneity analysis demonstrates that the negative impact of bank profitability on firm productivity is more pronounced in

the eastern and central regions of China. The negative influence of bank profitability is stronger on private, foreign-funded, and non-high-tech firms compared to their counterparts. Moreover, the effect of profitability is more robust for state-controlled and large-sized banks relative to other banks.

8. IMPLICATIONS

The conclusions mentioned previously confirm that, from the perspective of manufacturing firm productivity, the current high profitability of China's banking sector has adversely affected the development of the real economy. Our findings carry significant policy implications. First, banks' excessively high profitability should be structurally moderated and redirected to support productive firms, such as by reducing financing costs or enhancing credit provision for local firms. Such profitability constraints should primarily target state-controlled banks, large-sized banks, and joint-stock banks, especially those in eastern and central regions. In contrast, the development of banks in the western region should be encouraged by the government. Second, it is imperative for governments to supervise the credit distribution to the financial and real estate sectors. Such supervision should aim at directing banks to increase credit support to productive firms, especially private, small, and medium-sized enterprises, and to prioritize their research and development (R&D) initiatives. Finally, manufacturing firms, especially large, foreign, and private firms, should be discouraged from excessive investment in the financial sector, such as shadow banking systems. Instead, these firms should be incentivized to invest more resources into production and R&D projects.

There are some limitations in this study that should be acknowledged and inform the direction of future research. First, the identification mechanism employed in this paper associates a firm's productivity with the average profitability of banks within a ten-kilometer radius. However, with the diminishing relevance of geographical constraints due to reduced information and transportation costs, future research could more accurately identify the impact of bank profitability on firms by employing specific business transaction data between banks and firms. Second, this paper encompasses all industries in its analysis, distinguishing their exposure to bank profits solely by whether they are high-technology industries. Future research could further refine the examination of industry heterogeneity, for example, by considering the degree of association between a firm's industry and its bank, based on input-output tables. Third, this paper uses ROA as a proxy for the core explanatory variable (bank profitability). In order to maintain coherence in the discussion of heterogeneity, ROA is also used to assess the profitability of banks across different regions, banks, and firms. Further research could expand on this by using ROE, POA, and OPM as explanatory variables to evaluate the profitability of banks and compare their impact effect across different geographic regions, bank characteristics, and enterprise characteristics. Fourth, the

firm-level data used in this paper is primarily sourced from the China Industry Business Performance Data, maintained by the National Bureau of Statistics. Given the absence of an official sample update for the China Industry Business Performance Data, future research could either update the sample or replace it with more complete databases to ensure the relevance and applicability of the research findings.

DISCLOSURE STATEMENT

No potential conflict of interest was reported by the authors.

REFERENCES

Acemoglu, D., & Zilibotti, F. (2001). Productivity differences. *The Quarterly Journal of Economics, 116(2), 563-606.* https://doi.org/10.1162/003355301751144104

Agostino, M., Leonida, L., & Francesco, T. (2005). Profits persistence and ownership: evidence from the Italian banking sector. *Applied Economics, 37(14),1615-1621.* https://doi.org/10.1080/00036840500214223

Albertazzi, U., & Gambacorta, L. (2009). Bank profitability and the business cycle. *Journal of Financial Stability, 5(4), 393-409. https://doi.org/10.1016/j.jfs.2008.10.002*

Al-Matari, E. M. (2023). The determinants of bank profitability of GCC: The role of bank liquidity as moderating variable--further analysis. *International Journal of Finance & Economics, 28(2), 1423-1435.* https://doi.org/10.1002/ijfe.2485

Almazan, A. (2002). A model of competition in banking: Bank capital vs expertise. *Journal of Financial Intermediation, 11(1), 87-121.* https://doi.org/10.1006/jfin.2001.0327

Athanasoglou, P. P., Brissimis, S. N., & Delis M. D. (2008). Bank-specific, industry-specific and macroeconomic determinants of bank profitability. *Journal of International Financial Markets Institutions & Money, 18(2), 121-136. https://doi.org/10.1016/j.intfin.2006.07.001*

Bagehot, W. (1873). Lombard Street: A description of the money market. *History of Economic Thought Books, 13*(1), 11445-11448.

Barradas R. (2020). Does the financial system support economic growth in times of financialisation? Evidence for Portugal. *International Review of Applied Economics, 34(6): 785-806.* https://doi.org/10.1080/02692171.2020.1782854

Barradas R. (2022). The finance-growth nexus in the age of financialisation: An empirical reassessment for the European Union countries. *PanoEconomicus, 69(4): 527-554. https://doi.org/10.2298/PAN180927014B*

Barradas R. (2023) Why Has Labor Productivity Slowed Down in the Era of Financialization?: Insights from the post-Keynesians for the European Union Countries. *Review of Radical Political Economics,* 55(3), 390-422. https://doi.org/10.1177/04866134231158851

Beck, T., Levine, R., & Loayza, N. (2000). Finance and the Sources of Growth. *Journal of Financial Economics, 58(1-2), 261-300.* https://doi.org/10.1016/S0304-405X(00)00072-6

Berger, A. N., Goldberg, L. G., & White, L. J. (2001). The effects of dynamic changes in bank competition on the supply of small business credit. *Review of Finance, 5(1-2), 115-139.* https://doi.org/10.1023/A:1012776427175

Bolt, W., Haan, L. D., Hoeberichts, M., Oordt, M., & Swank, J. (2012). Bank profitability during recessions. *Journal of Banking & Finance, 36(9), 2552-2564. https://doi.org/10.1016/j.jbankfin.2012.05.011*

Boratav, K. (2009). Uluslararası kriz üzerine birka? glem Observations on international crisis. *Eğitim Bilim Toplum Education Science Society (in Turkish), 7(27), 9-15.*

Boyd, J. H., Levine, R., & BD Smith. (2001). The impact of inflation on financial sector performance. *Journal of Monetary Economics, 47(2), 221-248.* https://doi.org/10.1016/S0304-3932(01)00049-6

Brock, P. L., & Suarez, L. R. (2000). Understanding the Behavior of Bank Spreads in Latin America[J]. *Journal of Development Economics, 63(1), 113-134.* https://doi.org/10.1016/S0304-3878(00)00102-4

Brooks, C. (2019). *Introductory econometrics for finance (4th ed.). Cambridge university press. https://doi.org/10.1017/9781108524872*

Chen, H. (2006). Development of financial intermediation and economic growth: the Chinese experience. *China Economic Review, 17(4), 347-362.* https://doi.org/10.1016/j.chieco.2006.01.001

China Social Science Institute. (2020-12-27) The extremely high profits of China's banking industry can give entities close to one trillion yuan in profits [EB/OL].[2021-11-19] http://bank.hexun.com/2020-12-27/202706413.html

Chong, T. T. L., Lu, L. P., & Ongena, S. (2013). Does banking competition alleviate or worsen credit constraints faced by small- and medium-sized firms? evidence from china. *Journal of Banking & Finance, 37(9), 3412-3424.* https://doi.org/10.1016/j.jbankfin.2013.05.006

Coad, A., Pellegrino, G., & Savona, M. (2016). Barriers to innovation and firm productivity. *Economics of Innovation and New Technology, 25(3), 321-334. https://doi.org/10.1080/10438599.2015.1076193*

Correia, D., & Barradas R. (2021). Financialisation and the slowdown of labour productivity in Portugal: A Post-Keynesian approach. *Psl Quartely Review, 74(299): 325-346.* https://doi.org/10.15847/dinamiacet-iul.wp.2021.07

Davis L E. (2018). Financialization and investment: A survey of the empirical literature. In R. Veneziani & L. Zamparelli (Eds.), *Analytical Political Economy*, (pp. 207-235). John Wiley & Sons, Ltd. https://doi.org/10.1002/9781119483328.ch8

Degryse, H., & Ongena, S. (2005). Distance, lending relationships, and competition. *Journal of Finance, 60(1), 231-266.* https://doi.org/10.1111/j.1540-6261.2005.00729.x

Demirguc-Kunt, A., & Huizinga, H. (1999). Determinants of commercial bank interest margins and profitability: some international evidence. *The World Bank Economic Review, 13(2), 379-408.* https://doi.org/10.1093/wber/13.2.379

DeYoung, R., & Rice, T. (2004). Noninterest income and financial performance at US commercial banks. *Financial Review, 39(1), 101-127. https://doi.org/10.1111/j.0732-8516.2004.00069.x*

Ding, N., Fung, H. G., & Jia, J. (2017). Comparison of Bank Profitability in China and the USA. *China & World Economy, 25(1), 90-108.* https://doi.org/10.1111/cwe.12188

Du, Y., Zhang, H., & Chen, J. Y. (2017). The impact of financialization on the future development of real enterprises' main business: Promote or inhibit. *China Industrial Economics, (12), 113-131.*

Duan, Y., & Niu, J. (2020). *Liquidity creation and bank profitability. The North American Journal of Economics and Finance, 54, 101250. https://doi.org/10.1016/j.najef.2020.101250*

Duman, S. O. (2014). A theoretical framework for the analysis of the current global economic crisis: the financial market and the real economy. *Economic and Labour Relations Review, 25(2), 240-252.* https://doi.org/10.1177/1035304614520669

Estrella, A. (2004). The cyclical behavior of optimal bank capital. *Journal of Banking & Finance, 28(6), 1469-1498.* https://doi.org/10.1016/S0378-4266(03)00130-4

Fang, C. F., & Liu, S. L. (2011). Commercial bank performance influencing factors: industrial structure, governance structure and macroeconomic environment. *Finance Forum, (6), 9-17.*

Feyzioglu, T. (2009). *Does good financial performance mean good financial intermediation in China?. IMF Working Papers, 2009(170), 1-32.* https://doi.org/10.5089/9781451873177.001

Franz, R. H. (2008). Testing for profitability and contestability in banking: evidence from Austria. *International Review of Applied Economics, 22*(5), 639-653. https://doi.org/10.1080/02692170802287722

Freeman, R. B. (2010). It's financialization! *International Labour Review, 149(2), 163-183.* https://doi.org/10.1111/j.1564-913X.2010.00082.x

Fu, J., Shimamoto, D., & Todo, Y. (2017). Can firms with political connections borrow more than those without? Evidence from firm-level data for Indonesia. *Journal of Asian Economics, 52, 45-55. https://doi.org/10.1016/j.asieco.2017.08.003*

García-Herrero, A., & Vázquez, F. (2013). International diversification gains and home bias in banking. *Journal of Banking & Finance, 37(7), 2560-2571.* https://doi.org/10.1016/j.jbankfin.2013.02.024

Gerschenkron, A. (2015). Economic backwardness in historical perspective (1962). In J. T. Roberts, A. B. Hite & N. Chorev (Eds.), *The globalization and development Reader: Perspectives on development and global change,* 2nd ed. (pp. 62-78). Wiley-Blackwell.

Gorodnichenko, Y., & Schnitzer, M. (2013). *Financial constraints and innovation: why poor countries don't catch up. Journal of the European Economic Association*, 11(5), 1115-1152. https://doi.org/10.1111/jeea.12033

Gul, S., Irshad, F., & Zaman, K. (2011). Factors Affecting Bank Profitability in Pakistan. *Romanian Economic Journal, 14(39), 61-87.*

Guo, X. (2022). The Data Analytics of Finance Impact on the Rural Development Combining Financial Constraint and Economic Growth Theory. Computational Intelligence and Neuroscience, 2022(1), 9989076. https://doi.org/10.1155/2022/9989076

Hadlock, C. J., & Pierce, J. R. (2010). New evidence on measuring financial constraints: moving beyond the KZ index. *Review of Financial Studies, 23*(5), *1909-1940. https://doi.org/10.1093/rfs/hhq009*

Hai, B., Yin, X., Xiong, J., & Chen, J. (2022). Could more innovation output bring better financial performance? The role of financial constraints. *Financial Innovation, 8(1), 1-26.* https://doi.org/10.1186/s40854-021-00309-2

Hauswald, R., & Marquez, R. (2006). Competition and strategic information acquisition in credit markets. *The Review of Financial Studies, 19*(3), *967-1000.* https://doi.org/10.1093/rfs/hhj021

He, C., & You, R. Z. (2008). A comparative study on the production efficiency of industrial enterprises with different ownership in China. *The Journal of Quantitative & Technical Economics, (8), 29-42.*

He, W. T., & Wang, S. H. (2008). Geographical credit rationing analysis of branches of large commercial banks. Journal of Audit & Economics, (4),104-108.

Hollander, S., & Verriest, A. (2016). Bridging the gap: the design of bank loan contracts and distance. Journal of Financial Economics, 119(2), 399-419. https://doi.org/10.1016/j.jfineco.2015.09.006

Hsu, S. (2012). Financial capital overaccumulation. *MPRA Paper, 380(3), 300–304.*

Hu, J. B., & Liu, Y. Q. (2019). Research on the impact of financial industry development on macroeconomic growth: based on the perspective of the continuous transfer of high-quality labor. Review of Economy and Management, (4), 64-74.

Hu, Y. M., Wang, X. T., & Zhang, J. (2017). Motivation for Financial Asset Allocation: "Reservoir" or "Replacement"? - Evidence from Listed Companies in China. Economic Research Journal, (1), 181-194.

Huang, B., Cui, Y., & Chan, K. C. (2022). Firm-level financialization: contributing factors, sources, and economic consequences. International Review of Economics & Finance, 80, 1153-1162. https://doi.org/10.1016/j.iref.2022.04.007

Huang, Q. (2020). Ownership concentration and bank profitability in China. *Economics Letters, 196, 109525.* https://doi.org/10.1016/j.econlet.2020.109525

Huang, X., & Wu, K. B. (2009). Research on the Sensitivity of my country's Commercial Banks to Capital Constraints——Based on the Empirical Analysis of the Credit Behavior of Small and Medium-sized Enterprises. *Journal of Financial Research, (11), 103-118.*

Jiang, R., & Liu, X. J. (2012). An Empirical Analysis of the Impact of Bank Profits on Economic Growth——Based on the Comparison of Data from China and the United States. Journal of International Trade, (5), 43-52.

Khatiwada, S. (2010). Did the financial sector profit at the expense of the rest of the economy? Evidence from the United States. International Institute for Labour Studies Discussion Paper, 206(12), 1-28.

Khwaja, A. I., & Mian, A. (2005). Do lenders favor politically connected firms? Rent provision in an emerging financial market. The Quarterly Journal of Economics, 120(4), 1371-1411. https://doi.org/10.1162/003355305775097524

King, R. G., & Levine, R. (1993). Finance, entrepreneurship and growth. *Journal of Monetary Economics, 32(3), 513-542.* https://doi.org/10.1016/0304-3932(93)90028-E

Knyazeva, A., & Knyazeva, D. (2012). Does being your bank's neighbor matter? *Journal of Banking & Finance, 36(4), 1194-1209.* https://doi.org/10.1016/j.jbankfin.2011.11.011

Krippner, G. (2005). The financialization of the American economy. *Socio-Economic Review, 3(2), 173–208.* https://doi.org/10.1093/SER/mwi008

Kuang, Z. H. (2012). Causes of high profits in my country's banking industry and its impact on the economy. *Frontier Economy and Culture, (11), 12-13.*

Senter, H. F. (2008). Applied Linear Statistical Models. *Journal of the American Statistical Association*, 103(482), 880. https://doi.org/10.1198/016214508000000300

Lee, K. K., & Siddique, M. A. B. (2021). Financialization and income inequality: An empirical analysis. *The Japanese Political Economy, 47(2-3), 121-145.* https://doi.org/10.1080/2329194X.2021.1945465

Leng, T., Liu, Y., Xiao, Y., & Hou, C. (2023). Does firm financialization affect optimal real investment decisions? Evidence from China. *Pacific-Basin Finance Journal, 79, 101970.* https://doi.org/10.1016/j.pacfin.2023.101970

Levine, R., & Zervos, S. (1998). Stock markets, banks, and economic growth, *American Economic Review, 88(3), 537-558.*

Li, Y. A., Liao, W., & Zhao, C. C. (2018). Credit constraints and firm productivity: Microeconomic evidence from China. Research in International Business and Finance, 45, 134-149. https://doi.org/10.1016/j.ribaf.2017.07.142

Li, Z. S., Jin, L., & Kong, D. M. (2020). Spatial distribution of branches, bank competition and corporate debt decision-making. *Economic Research Journal, (10), 141-158.*

Lin, H. C. M., & Bo, H. (2012). *State-ownership and financial constraints on investment of Chinese-listed firms: New evidence. The European Journal of Finance, 18(6): 497-513.* https://doi.org/10.1080/1351847X.2011.611523

Lin, Y. F., & Sun, X. F. (2008). Banking Industry Structure and Economic Growth. *Economic Research Journal, 43(09):31-45.*

Liu, P., & Li, H. (2022). The impact of banking competition on firm total factor productivity. Economic Research-Ekonomska Istraživanja, 35(1), 4008-4028. https://doi.org/10.1080/1331677X.2021.2010109

Liu, X. X., & Wu Y. B. (2009). Enterprise productivity growth and its source: innovation or demand-driven. *Economic Research Journal, (7), 45-54.*

Lu, X. D., & Lian, Y. J. (2012). China's industrial enterprise total factor productivity estimation: 1999-2007. China Economic Quarterly, (2), 541-558.

Mo, K. W. (2017). It is not a good thing for banks to become the most profitable industry. Securities Times, A03.

Molyneux, P., & Thornton, J. (1992). Determinants of European bank profitability: A note. *Journal of Banking & Finance, 16(6), 1173-1178.* https://doi.org/10.1016/0378-4266(92)90065-8

Niinimaki, J. P. (2016). Spatial competition in the banking system: Alternative lending technologies and collateral assets. *Journal of Multinational Financial Management, 35, 93-109.* https://doi.org/10.1016/j.mulfin.2016.03.003

Pariboni R., Paternesi Meloni W., & Tridico P. (2020). When melius abundare is no longer true: Excessive financialization and inequality as drivers of stagnation. *Review of Political Economy, 32(2), 216-242.* https://doi.org/10.1080/09538259.2020.1769282

Pessarossi, P., Thevenon, J. L., & Weill, L. (2020). Does high profitability improve stability for European banks?. *Research in International Business and Finance, 53, 101220.* https://doi.org/10.1016/j.ribaf.2020.101220

Petersen, M. A., & Rajan, R. G. (1995). The effect of credit market competition on lending relationships. *The Quarterly Journal of Economics, 110(2), 407-443.* https://doi.org/10.2307/2118445

Popov, A. (2018). Evidence on finance and economic growth. In T. Beck & R. Levine (Eds.), *Handbook of finance and development, (pp. 63-104). Cheltenham, UK: Edward Elgar Publishing.* https://doi.org/10.4337/9781785360510.00009

Qi, Y. D., & Zhang, R. Z. (2018). An empirical research on the impact of financial asset allocation on firm value. *Finance & Trade Economics, (5), 38-52.*

Rabinovich, J., & Pérez Artica, R. (2022). Cash holdings and corporate financialization: Evidence from listed Latin American firms. Competition & Change, 27(3-4), 635-655. https://doi.org/10.1177/10245294221117275

Rajan, R., & Zingales, L. (1996). Financial dependence and growth. *Social ence Electronic Publishing, 88(3), 559-586.*

Research Group of Hulunbuir Central Sub-branch, The People's Bank of China, Wang, Y. X., & Narenmandula. (2021). The impact of bank profit growth and distribution on the real economy: A case study of joint-stock commercial banks. *Northern Finance,* (4), 55–62. doi:10.16459/j.cnki.15-1370/f.2021.04.011

Robinson, J. (1952). *The Generalization of the General Theory. The Rate of Interest and Other Essays, London: Macmillan.*

Rossi, P., & Scalise, D. (2022). *Financial development and growth in European regions. Journal of Regional Science, 62(2), 389-411.* https://doi.org/10.1111/jors.12572

Schumpeter, J. A. (1912). The Theory of Economic Development, translated by Redvers Opie. Cambridge, *MA: Harvard University Press, 1934.*

Sheng, S. C. (2013). *Where did the profits of Chinese banks come from and where did they go?. China Finance (9), 43-45.*

Shiller, R. J. (2015). Irrational exuberance. Princeton University Press. https://doi.org/10.2307/j.ctt1287kz5

Shleifer, A., & Vishny, R. W. (1994). Politicians and firms. *The Quarterly Journal of Economics, 109(4), 995-1025.* https://doi.org/10.2307/2118354

Solow, R. M. (1957). Technical change and the aggregate production function. *The review of Economics and Statistics, 39(3), 312-320.* https://doi.org/10.2307/1926047

Song, C. Y., Li, T., & Li, G. P. (2021). The impact of geographical distance on bank loans of private enterprises in China. *Acta Geographica Sinica, 76(8), 1835-1847.* https://doi.org/10.11821/dlxb202108002

Song, M., Zhou, P., & Si H. T. (2021). Financial Technology and Enterprise Total Factor Productivity: The Perspective of "Enablement" and Credit Rationing. *China Industrial Economics (04), 138-155.*

Taddese Bekele, D., & Abebaw Degu, A. (2021). The effect of financial sector development on economic growth of selected sub- Saharan Africa countries. International Journal of Finance & Economics, 28(3), 2834-2842. https://doi.org/10.1002/ijfe.2566

Tan, Y. Y., Tan, Z. B., Huang, Y. P. & Hu, Y. T. (2017). The crowding-out effect of zombie companies: Evidence from Chinese industrial companies. *Economic Research Journal, (5), 175-188.*

Tan, Z. X., & Tuo, M. X. (2016). *Non-performing loans, capital adequacy ratio and commercial bank efficiency. Financial Forum, (10), 40-50.*

Tobin, J. (1965). *Money and economic growth. Econometrica, 33(4), 671–84.* https://doi.org/10.2307/1910352

Tobin, J. (1984). Price stability and public policy (overview).

Tridico P., & Pariboni, R. (2018). Inequality, financialization, and economic decline. *Journal of Post Keynesian Economics, 41(2), 236-259.* https://doi.org/10.1080/01603477.2017.1338966

Wachter, T. V., & Bender, S. (2006). In the right place at the wrong time: The role of firms and luck in young workers' careers. *American Economic Review, 96(5), 1679-1705.* https://doi.org/10.1257/aer.96.5.1679

Wang, H. J, Cao, Y. Q., Yang, Q., & Yang, Z. (2017). Whether the financialization of physical enterprises promotes or inhibits enterprise innovation: Based on the empirical research of listed Chinese manufacturing companies. *Nankai Business Review, (1), 155-166.*

Wang, J., & Mao, N. (2022). *Does financialization of non-financial corporations promote or prohibit corporate risk-taking?. Emerging Markets Finance and Trade, 58(7), 1913-1924.* https://doi.org/10.1080/1540496X.2021.1944853

Wang, Y. Q., Liu, Z. H., Li, C., & Du, J. L. (2015). Identifying the shadow banking activities of Chinese non-financial companies-evidence from consolidated balance sheets. *Management World (12), 24-40.*

Wooldridge, J. M. (2010).Econometric analysis of cross section and panel data. MIT press.

Xie, W. J. (2013). Research on the Causes of my country's Commercial Bank Profit Growth and Its Impact on the Real Economy. *Northern Finance Journal, (6), 54-59.*

Zhan, X. Y. (2012). *Beware of the potential threat of industry hollowing from turning into actual risks. China Finance, (20), 25-27.*

Zhang, C. S. & Zhang, B. T. (2016). *The mystery of China's industrial investment rate decline: a perspective of economic financialization. Economic Research Journal, (12), 32-46.*

Zhao, M., & Zhang, B. (2023). *Credit corruption, financial constraint and corporate innovation: Evidence on China. Finance Research Letters, 53, 103658.* https://doi.org/10.1016/j.frl.2023.103658

APPENDIX

Appendix A. Variables definition.

Variables	Definition
Dependent variable	
TFP_OP	Total factor productivity measure output by value-added, calculate by OP method.
TFP_LP	Total factor productivity measure output by value-added, calculate by LP method.
TFP_OPGO	Total factor productivity measure output by total output value, calculate by OP method.
TFP_LPGO	Total factor productivity measure output by total output value, calculate by LP method.
TFP_GMM	Total factor productivity measure output by value-added, calculate by system-GMM method.
Key independent variables	
ROA	The ratio of the bank's net profit to the bank's total assets.
POA	The ratio of the bank's total profit to the bank's total assets.

ROE	The ratio of bank net profit to bank owner's equity.
OPM	The ratio of bank operating profit margin to operating income.
Control variables at firm level	
Size	The logarithm of the sales revenue of the company's main business products.
Age	The logarithm of sample year minus the year of establishment of the company plus 1.
State	Equal 1 if the percentage of the sum of state capital and collective capital to paid-in capital more than 50%, and equal 0 otherwise.
Wages	The logarithm of the ratio of the sum of wages and salaries payable, welfare fees payable, and labor and unemployment insurance premiums to the average number of all employees.
Lev	The ratio of debt to total assets.
Fixassrt	The ratio of the net value of fixed assets of the enterprise to the total assets.
Fincost	The ratio of interest expenditure to sales output value.
Capintensity	The logarithm of the ratio of the total assets to the sales income of the main business products.
Openness	The percentage of the sum of foreign capital and Hong Kong, Macao and Taiwan capital in total capital.
Adoutrt	The ratio of the industrial added value to the total industrial output value.
Exprt	The ratio of the sum of the company's financial expenses, management expenses, and operating expenses to the sales revenue of the main business products.
Tax	The ratio of the value-added tax payable by the enterprise to the sales revenue of the main business product.
Control variables at regional level and industry level	
Eco	Regional GDP growth rate.
Indstru	The ratio of the total output of the region's tertiary industry to the secondary industry.
Pop	The logarithm of the total population of the region.
Agglo	Herfindahl Index.
Mediator variables	
Fincon	SA indicator (-0.737*corporate size 3+0.043*corporate size 3^2-0.04*corporate age).
R&D	The ratio of research and development expenses to operating income.
Finli	The ratio of financial investment income to total profit.
Indinv	The logarithm of new fixed investment.
Labor	The logarithm of the number of employees with a postgraduate degree or above.

Source: The authors.

Appendix B. Endogenous issues: instrumental variable method.

	(1)	(2)	(3)
	BROA	**TFP_OP**	**TFP_LP**
IV	0.2367**		
	(2.3616)		
BROA		-1.1170***	-0.5159**
		(-3.6178)	(-2.2660)
Size		0.2391***	0.7330***
		-58.917	-409.923
Age		-0.1307***	0.0298***
		(-35.6735)	(14.1547)
State		0.3983***	0.1457***
		(36.6320)	(17.3611)
Wages		0.1874***	0.0485***
		-32.2097	-15.0936
Lev		-0.0849***	-0.0148**
		(-8.7371)	(-2.5219)
Fixassrt		-1.0730***	-0.3716***
		(-49.7159)	(-35.4519)
Fincost		0.5048**	-0.5721***
		-2.4428	(-3.0862)
Capintensity		-0.5343***	-0.1752***
		(-98.8210)	(-51.6030)
Openness		-0.1235***	-0.0951***
		(-14.1527)	(-20.2953)
Adoutrt		3.2974***	3.4383***
		-49.7619	-64.5591
Exprt		-0.6981***	-0.1155***
		(-12.0147)	(-3.0453)
Tax		-0.2219*	(0.0146)
		(-1.8805)	(-0.2038)
Indstru		0.0212	-0.0232**
		-1.3427	(-2.2289)
Agglo		392.0895***	-193.6023***
		(46.7021)	(-32.8261)

Empsalary	0.0024		
	-0.8807		
Eco	-0.0004	-0.0213***	-0.0391***
	(-0.7367)	(-3.6196)	(-11.1437)
Pop	-0.0005	0.0176*	0.0054
	(-0.9611)	(1.9555)	(0.9161)
Constant	-0.011	-1.0453***	-1.4417***
	(-0.3961)	(-13.0617)	(-30.9918)
*Region*year Fixed Effect / Industry Fixed Effect*	Yes	Yes	Yes
R2	0.19	0.79	0.93
Obs	178	54349	54349

Notes: t-statistics are in parentheses. Statistically significant at 1% (***), 5% (**) and 10% (*).
Source: The authors.

Appendix C. Robustness Checks: Replacement of TFP Calculation Method.

	(1)	(2)	(3)
	TFP_OPGO	**TFP_LPGO**	**TFP_GMM**
BROA	-5.2104***	-0.7846***	-4.2444***
	(-9.2355)	(-5.3634)	(-7.8217)
Size	0.1704***	0.1043***	-0.2870***
	-40.2036	-30.0985	(-77.2457)
Age	-0.2074***	0.0069***	-0.0454***
	(-46.9004)	-5.6004	(-16.2277)
State	0.3621***	0.0760***	-0.0371***
	-42.8948	-31.9284	(-5.0265)
Wages	0.1946***	0.0105***	0.1199***
	-33.4877	-8.9208	-24.9523
Lev	-0.0361***	-0.0087***	-0.0041
	(-3.8875)	(-4.0998)	(-0.5462)
Fixassrt	-1.3238***	-0.1095***	-2.0651***
	(-51.8995)	(-22.6660)	(-63.8175)
Fincost	0.2232	-0.6350***	-0.4512***
	-1.634	(-14.5722)	(-3.3688)
Capintensity	-0.5110***	0.0174***	-0.7827***
	(-63.1500)	-5.4785	(-1.3e+02)

Openness	-0.0978***	-0.0284***	-0.1037***
	(-8.5779)	(-16.2495)	(-14.9817)
Adoutrt	-0.1058***	1.0083***	3.7457***
	(-3.2461)	-91.4428	-65.0147
Exprt	-0.6981***	-0.0998***	-0.5149***
	(-11.4531)	(-8.5086)	(-12.5744)
Tax	-0.091	-1.1722***	-0.5884***
	(-0.7996)	(-38.9892)	(-6.0604)
Eco	-0.0219***	-0.0043**	-0.0486***
	(-2.8549)	(-2.5886)	(-7.3723)
Indstru	-0.0069	0.0114***	-0.0459***
	(-0.3953)	-3.1289	(-3.1077)
Agglo	158.1863***	64.8093***	-76.3940***
	(14.7239)	(22.5118)	(-9.0432)
Pop	-0.0042	0.0008	-0.0153**
	(-0.5388)	(0.4016)	(-2.2376)
Constant	1.5090***	0.3350***	-1.0833***
	(14.7197)	(6.5500)	(-12.4737)
*Region*year Fixed Effect / Industry Fixed Effect*	Yes	Yes	Yes
R2	0.79	0.68	0.79
Obs	120149	120149	120149

Notes: t-statistics are in parentheses. Statistically significant at 1% (***), 5% (**) and 10% (*).
Source: The authors.

Appendix D. Robustness Checks: Replacement of Key Explanatory variables.

	(1)	(2)	(3)	(4)
	TFP_OP	**TFP_OP**	**TFP_OP**	**TFP_OP**
BPOA	-5.6220***			
	(-11.5811)			
BROE		-0.0895***		
		(-3.0428)		
BROE			-0.1896***	
			(-11.8610)	
Weighted Average of BROA				-1.9955***
				(-4.6355)
Size	0.2329***	0.2333***	0.2328***	0.2385***
	(66.5800)	(66.6882)	(67.0398)	(61.5165)
Age	-0.1308***	-0.1307***	-0.1304***	-0.1345***
	(-43.0582)	(-43.2043)	(-42.6335)	(-38.6815)
State	0.3984***	0.4012***	0.3995***	0.3959***
	(50.2575)	(50.5867)	(50.3701)	(38.1081)
Wages	0.2036***	0.2047***	0.2033***	0.1914***
	(40.8691)	(40.7914)	(40.8468)	(34.3568)
Lev	-0.0683***	-0.0675***	-0.0697***	-0.0709***
	(-8.0001)	(-7.9335)	(-8.2317)	(-7.4297)
Fixassrt	-1.1047***	-1.1033***	-1.1060***	-1.0875***
	(-54.7390)	(-55.0170)	(-54.3405)	(-52.3320)
Fincost	0.1874	0.197	0.208	0.067
	(1.1577)	(1.2183)	(1.3043)	(0.2503)
Capintensity	-0.5124***	-0.5139***	-0.5132***	-0.5253***
	(-1.1e+02)	(-1.1e+02)	(-1.1e+02)	(-96.1819)
Openness	-0.1021***	-0.1014***	-0.0999***	-0.1099***
	(-12.0374)	(-12.0241)	(-11.8158)	(-12.0296)
Adoutrt	3.2176***	3.2136***	3.2278***	3.3146***
	(56.8673)	(56.7510)	(57.0173)	(54.8814)
Exprt	-0.5778***	-0.5723***	-0.5736***	-0.6310***
	(-11.6539)	(-11.5932)	(-11.7363)	(-10.9319)
Tax	-0.0712	-0.0888	-0.1114	-0.2680**
	(-0.6520)	(-0.8082)	(-1.0104)	(-2.3112)

Eco	-0.0307***	-0.0413***	-0.0226***	-0.0237***
	(-5.5060)	(-7.1090)	(-4.0621)	(-4.5256)
Indstru	0.0077	0.0093	0.0242**	0.0112**
	(0.6795)	(0.8244)	(2.1577)	(2.1872)
Agglo	263.3493***	268.4335***	277.1253***	285.5810***
	(31.4937)	(31.8279)	(33.0787)	(31.6640)
Pop	0.0075	0.0032	0.0029	0.0174**
	(1.0135)	(0.4267)	(0.3967)	(2.3482)
Constant	-0.9989***	-1.0150***	-0.9558***	-1.1513***
	(-14.2353)	(-14.2150)	(-13.4522)	(-14.6167)
*Region*year Fixed Effect / Industry Fixed Effect*	Yes	Yes	Yes	Yes
R2	0.79	0.79	0.79	0.78
Obs	131021	131021	132670	61310

Notes: t-statistics are in parentheses. Statistically significant at 1% (***), 5% (**) and 10% (*).
Source: The authors.

Appendix E. Robustness Checks: Replacement of Control variables.

	(1)	(2)	(3)	(4)	(5)
	TFP_OP	**TFP_OP**	**TFP_OP**	**TFP_OP**	**TFP_OP**
BROA	-6.5522***	-6.0107***	-5.7255***	-11.0118***	-10.2269***
	(-10.4829)	(-9.7241)	(-9.5534)	(-13.0264)	(-12.7567)
Size	0.1282***	0.2330***	0.2280***	0.3974***	0.3986***
	(35.2929)	(66.5597)	(67.4164)	(64.4804)	(62.1793)
Age	-0.1134***	-0.1309***	-0.1317***	-0.1354***	-0.1307***
	(-34.2994)	(-43.2046)	(-44.0216)	(-32.6980)	(-30.4531)
State	0.3637***	0.3992***	0.4034***	0.4452***	0.4421***
	(43.7086)	(50.3627)	(51.2441)	(39.9845)	(36.8236)
Wages	0.2607***	0.2040***	0.2090***	0.1966***	0.1951***
	(45.0966)	(40.8975)	(42.6058)	(30.5185)	(29.9465)
Lev	-0.0541***	-0.0689***	-0.1049***	-0.0530***	-0.0631***
	(-5.9303)	(-8.0641)	(-12.8233)	(-4.2302)	(-4.7571)
Fixassrt	-1.6165***	-1.1042***	-1.0290***	-0.7146***	-0.6911***
	(-65.7846)	(-54.7653)	(-53.8284)	(-25.9907)	(-25.2030)

Fincost	0.4390***	0.19	0.8669***	-2.8916***	-2.8291***
	(2.6078)	(1.1748)	(34.6008)	(-14.8602)	(-15.5623)
Capintensity	-0.7046***	-0.7456***	-0.5054***	-0.0093*	-0.0101**
	(-1.5e+02)	(-1.6e+02)	(-1.1e+02)	(-1.8518)	(-1.9734)
Openness	-0.1200***	-0.1015***	-0.0870***	-0.1059***	-0.1229***
	(-12.6754)	(-12.0222)	(-10.6044)	(-9.7863)	(-11.1890)
Adoutrt	3.1669***	3.2160***	3.2240***	3.1591***	3.1797***
	(57.4300)	(56.7180)	(56.8369)	(51.3628)	(48.8135)
Exprt	-0.7570***	-0.5777***	-0.6668***	-1.5171***	-1.6771***
	(-13.8357)	(-11.6587)	(-13.6281)	(-17.3233)	(-17.9760)
Tax	-0.2375**	-0.0764	-0.0686	-0.0496	-0.0542
	(-2.1685)	(-0.6983)	(-0.6293)	(-0.3462)	(-0.3649)
Eco	-0.0259***	-0.0334***	-0.0293***	-0.0515***	-0.2203***
	(-4.6057)	(-5.9830)	(-5.4290)	(-6.9009)	(-10.2595)
Indstru	0.0196	0.0063	0.0068	-0.0414***	-0.0900***
	(1.6197)	(0.5553)	(0.5974)	(-3.0809)	(-4.4322)
Agglo	219.4442***	261.3495***	266.4107***	145.9575***	201.9552***
	(24.2269)	(31.3073)	(31.9274)	(10.6072)	(12.7646)
Pop	-0.0014	0.0043	0.0065	0.0108	-0.1923***
	(-0.1847)	(0.5879)	(0.9320)	(1.1883)	(-7.2141)
Fin					-0.0001
					(-0.0056)
Infrastructure					0
					(-1.6084)
Savingrt					0.1892***
					(7.6300)
Constant	0.4179***	-0.9849***	-0.9958***	-2.7132***	-1.1119
	(5.6645)	(-13.9118)	(-14.6468)	(-28.0814)	(-0.5760)
*Region*year Fixed Effect / Industry Fixed Effect*	Yes	Yes	Yes	Yes	Yes
R2	0.76	0.79	0.79	0.68	0.68
Obs	131021	131021	131021	131021	118967

Notes: t-statistics are in parentheses. Statistically significant at 1% (***), 5% (**) and 10% (*).
Source: The authors.

Appendix F. Robustness Checks: Replacement of model settings.

	(1)	(2)	(3)	(4)	(5)	(6)
	Fixed effect	**Cluster in Province**	**One period Lagging**	**Two period Laging**	**Zero to Two period Laging**	**GMM**
BROA	-6.4613***	-6.0107**			-3.2358***	-3.7575***
	(-12.7951)	(-2.2939)			(-2.9883)	(-6.4684)
L.BROA			-5.2410***		-0.4077	-4.9511***
			(-7.6862)		(-0.3906)	(-10.1059)
L2.BROA				-3.4598***	-0.6845	
				(-4.0180)	(-0.8736)	
L.TFP						0.1200***
						(10.2222)
Size	0.2286***	0.2330***	0.2336***	0.2310***	0.2322***	0.6369***
	(126.7399)	(44.8132)	(62.7135)	(54.4781)	(52.1873)	(76.7372)
Age	-0.1192***	-0.1309***	-0.1530***	-0.1573***	-0.1597***	0.0148***
	(-62.0741)	(-16.9913)	(-42.0967)	(-34.1594)	(-33.0679)	(5.1836)
State	0.3866***	0.3992***	0.4116***	0.4005***	0.3966***	0.1000***
	(55.6368)	(31.2328)	(39.8257)	(33.1624)	(33.7923)	(12.8281)
Wages	0.2089***	0.2040***	0.2199***	0.2304***	0.2357***	0.0451***
	(63.4606)	(9.3247)	(31.8766)	(30.6874)	(28.5749)	(13.6672)
Lev	-0.0918***	-0.0689***	-0.0633***	-0.0643***	-0.0644***	0.0723***
	(-13.8142)	(-3.2123)	(-5.8816)	(-5.3223)	(-5.0063)	(9.8479)
Fixassrt	-1.0802***	-1.1042***	-1.2007***	-1.2704***	-1.2819***	-0.4266***
	(-1.2e+02)	(-14.9805)	(-51.0067)	(-47.6005)	(-46.5255)	(-43.1708)
Fincost	0.2624***	0.19	0.3196	0.5020***	0.4648***	-0.1650
	(3.3894)	(0.6622)	(1.3742)	(3.5781)	(3.1385)	(-0.8214)
Capintensity	-0.5224***	-0.5126***	-0.4889***	-0.4706***	-0.4644***	-0.1437***
	(-2.1e+02)	(-19.7574)	(-83.4163)	(-76.3844)	(-72.8779)	(-31.3370)
Openness	-0.1036***	-0.1015***	-0.0979***	-0.0962***	-0.0946***	-0.0858***
	(-23.2350)	(-8.8399)	(-11.2353)	(-9.6929)	(-9.5408)	(-21.6144)
Adoutrt	3.2042***	3.2160***	3.2079***	3.1479***	3.1326***	3.2065***
	(245.9394)	(28.9404)	(50.2379)	(45.9308)	(45.6424)	(131.7239)
Exprt	-0.5883***	-0.5777***	-0.6775***	-0.7180***	-0.7389***	-0.4054***
	(-31.1375)	(-5.8432)	(-10.3353)	(-10.7453)	(-10.1984)	(-12.2927)

Tax	-0.1703***	-0.0764	-0.0301	0.1219	0.1359	0.0015
	(-3.0406)	(-0.2859)	(-0.2269)	(0.8262)	(0.9124)	(0.8512)
Eco	-0.0174***	-0.0334	-0.0665***	-0.0614***	-0.0621***	-0.1244**
	(-5.2082)	(-1.5650)	(-8.0417)	(-6.1931)	(-6.0567)	(-2.0011)
Indstru	0.0337***	0.0063	-0.0202	-0.0656***	-0.0739***	0.0011
	(4.2749)	(0.0731)	(-1.6072)	(-3.7955)	(-4.1003)	(1.2046)
Agglo	278.0314***	261.3495***	285.5817***	217.1681***	271.3515***	-0.1037***
	(6.0724)	(3.0054)	(25.0301)	(15.6780)	(18.8081)	(-14.5074)
Pop	0.0062	0.0043	0.0182**	0.0618***	0.0665***	-128.5389***
	(1.4514)	(0.1609)	(2.0608)	(5.4888)	(5.9969)	(-13.2747)
Constant	-0.9908***	-0.9849***	-1.0137***	-0.4166***	-0.4191***	-1.2299***
	(-19.8873)	(-6.7955)	(-12.5359)	(-3.0687)	(-3.0165)	(-40.0177)
*Region*year Fixed Effect / Industry Fixed Effect*	Yes	Yes	Yes	Yes	Yes	Yes
R2	0.8	0.79	0.78	0.78	0.78	-
Obs	72630	131021	73175	42914	40299	55771

Notes: t-statistics are in parentheses. Statistically significant at 1% (***), 5% (**) and 10% (*).
Source: The authors.

Appendix G. Robustness Checks: Bank-firm matching by geographic distance.

	(1)	(2)	(3)	(4)
	10KM		20KM	
	TFP_OP	TFP_LP	TFP_OP	TFP_LP
BROA	-1.4612***	-0.7775*	-1.4482***	-0.6440**
	(-3.3184)	(-1.7536)	(-4.5810)	(-2.3853)
Size	0.2209***	0.7311***	0.2270***	0.7319***
	(41.6501)	(245.4361)	(56.6943)	(350.7239)
Age	-0.1450***	0.0405***	-0.1468***	0.0311***
	(-24.6428)	(11.6971)	(-30.5124)	(11.4603)
State	0.3708***	0.1407***	0.3843***	0.1394***
	(20.2162)	(9.7662)	(26.9133)	(13.0643)
Wages	0.2037***	0.0453***	0.1994***	0.0474***
	(20.9121)	(6.9932)	(28.7716)	(10.6820)
Lev	-0.0141	0.0195	-0.0468***	0.0007
	(-0.8141)	(1.6033)	(-3.5760)	(0.0862)
Fixassrt	-1.2049***	-0.3753***	-1.1717***	-0.3825***
	(-45.3502)	(-23.3116)	(-51.3476)	(-32.3784)
Fincost	-0.5296	-1.3883***	-0.0609	-0.9655***
	(-0.8941)	(-2.7904)	(-0.1654)	(-3.1134)
Capintensity	-0.5060***	-0.1575***	-0.5155***	-0.1642***
	(-68.0898)	(-29.9897)	(-76.9632)	(-38.7724)
Openness	-0.0820***	-0.0603***	-0.1126***	-0.0855***
	(-6.4714)	(-7.9106)	(-10.9976)	(-15.3750)
Adoutrt	3.2812***	3.3960***	3.2961***	3.4078***
	(49.5693)	(61.3019)	(51.0079)	(63.7100)
Exprt	-0.6591***	-0.0378	-0.6510***	-0.063
	(-7.8884)	(-0.5935)	(-9.5432)	(-1.4150)
Tax	-0.3853**	-0.1555	-0.2125	0.0267
	(-2.0801)	(-1.2284)	(-1.4118)	(0.2794)
Eco	-0.0413***	-0.0498***	-0.0375***	-0.0461***
	(-5.7574)	(-9.7209)	(-6.7092)	(-12.4118)

Indstru	-0.0088	-0.0054	-0.0101*	-0.0065
	(-0.9586)	(-0.6849)	(-1.8829)	(-1.3420)
Agglo	305.1251***	-225.2798***	314.3317***	-246.3225***
	(20.6474)	(-20.8267)	(25.5791)	(-29.3226)
Pop	0.007	-0.0147*	0.0164**	-0.0096*
	(0.6800)	(-1.8876)	(2.1298)	(-1.8445)
Constant	-0.7899***	-1.4943***	-0.9287***	-1.5508***
	(-7.2118)	(-20.7400)	(-11.1335)	(-31.4407)
*Region*year Fixed Effect / Industry Fixed Effect*	Yes	Yes	Yes	Yes
R2	0.78	0.92	0.78	0.92
Obs	16621	16621	34530	34530

Notes: t-statistics are in parentheses. Statistically significant at 1% (***), 5% (**) and 10% (*).
Source: The authors.

Appendix H. Robustness Checks: Data from listed companies.

	(1)	**(2)**	**(3)**	**(4)**
	TFP_OP	**TFP_OP**	**TFP_LP**	**TFP_LP**
BROA	-3.4600***		-0.3614**	
	(-2.7567)		(-2.2140)	
BROE		-4.5746**		-0.0969**
		(-2.3197)		(-2.0352)
Size	0.0647***	0.0646***	0.0643***	0.0646***
	(11.5324)	(11.5080)	(11.4587)	(11.5229)
Age	-0.2607***	-0.2613***	-0.2625***	-0.2614***
	(-17.2467)	(-17.2795)	(-17.3580)	(-17.2888)
State	-0.0687***	-0.0685***	-0.0669***	-0.0682***
	(-5.4025)	(-5.3816)	(-5.2469)	(-5.3578)
Lev	0.0002	0.0002	0.0002	0.0002
	(0.6541)	(0.6428)	(0.7286)	(0.7374)
Fixassrt	-0.8261***	-0.8242***	-0.8222***	-0.8258***
	(-17.2492)	(-17.2074)	(-17.1661)	(-17.2322)
Capintensity	-0.0938***	-0.0941***	-0.0940***	-0.0936***
	(-11.8160)	(-11.8448)	(-11.8279)	(-11.7864)

Eco	0.0163	0.0162	0.0197	0.0194
	(1.3890)	(1.3775)	(1.6179)	(1.5901)
Indstru	0.0013	0.003	0.0177	0.01
	(0.0527)	(0.1174)	(0.6926)	(0.3991)
Agglo	-70.3934	-69.2233	-65.3807	-63.8577
	(-0.8612)	(-0.8466)	(-0.8000)	(-0.7815)
Fin	-0.0007	-0.0002	-0.0029	0.0011
	(-0.0276)	(-0.0067)	(-0.1138)	(0.0442)
Constant	0.9289***	0.9255***	0.9211***	0.8864***
	(3.4367)	(3.4199)	(3.4041)	(3.2883)
*Region*year Fixed Effect / Industry Fixed Effect*	Yes	Yes	Yes	Yes
R2	0.39	0.39	0.39	0.39
Obs	2996	2996	2996	2997

Notes: t-statistics are in parentheses. Statistically significant at 1% (***), 5% (**) and 10% (*).
Source: The authors.