



Analysis of Financial Marketization and Economic Development based on Fixed Effect Model

Yijun Xia, Yingkai Yin*

School of Economics, Shanghai University, Shanghai, 200444, China

yijunxia@shu.edu.cn, *yinyk@shu.edu.cn

Abstract. In order to reveal the micro-transmission mechanism of financial marketization affecting economic development, we empirically test the impact and mechanism of financial marketization on firms' total factor productivity based on the panel data of China's A-share listed companies from 2010 to 2020. The results show that there is a significant positive relationship between financial marketization and total factor productivity, which still holds after endogeneity and robustness tests. Financing constraints and financing costs are two important channels through which financial marketization affects firms' total factor productivity. In addition, there is variability in the impact of financial marketization on total factor productivity in different regions.

Keywords: financial marketization, economic development, total factor productivity of enterprises

1 Introduction

Against the backdrop of deep changes in the financial market, financial marketization, as a key force in promoting high-quality economic development, is profoundly reshaping the operating environment and development trajectory of enterprises. The objective of marketization is to maximize the market's primary role in allocating resources and minimize distortions in capital allocation caused by government interference. Financial marketization drives market players to maximize profits as the pursuit of the goal, meaning that the allocation of financial resources is more efficient (McKinnon, 1973; Shaw, 1973)^[17,20], the “invisible hand” will promote the flow of financial resources to the highest efficiency, products and services are more diversified (Allen et al., 2005; Shen, 2019)^[1,22], the fastest pace of development and the greatest growth potential. Specifically, financial marketization has manifested itself in increased competition in the industry and a more rationalized allocation of financial resources such as credit. Increased competition in the financial sector may, on the one hand, improve competitiveness by expanding the scale of financing, and on the other hand, enhance attractiveness by reducing financing costs, and attain high-quality economic development alongside sustainable quantitative expansion while pursuing the goal of profit maximization. Financial marketization as the core engine of resource allocation efficiency enhancement,

the scope of its operational mechanism has gradually broadened from macroeconomic growth to include research on enterprise-level conduct. For enterprises on the demand side of funds, effective capital deployment relaxes credit constraints on firms, cuts financial costs, elevates productive capacity, and supports high-caliber corporate advancement. Does financial marketization help to increase the total factor productivity of firms? This is the focus of this paper.

The intricate relationship between financial sector liberalization and economic expansion remains a fundamental research question in economic scholarship, and many scholars have conducted in-depth studies on it from different dimensions (Neaime and Gaysset, 2018; Yu et al., 2022)^[18,23]. The post-2008 crisis period saw unprecedented government interventions worldwide. China's massive 4 trillion RMB stimulus stood out for its immediate economic stabilization effects, though it raised concerns about the sustainability of such debt-fueled expansion (Bo et al., 2021; Caggese and Cuñat, 2013; Chan et al. 2012)^[4-6]. Prior research has thoroughly examined how financial liberalization affects key macroeconomic measures, particularly economic output expansion (Galindo et al., 2007; Huang et al. 2020; Jin et al., 2019; Levine et al., 2000)^[9,11,12,14], and the effects of financial liberalization on fundamental economic indicators like price stability and employment levels (Jin and Zhong, 2022; Li and Qin, 2021; Zhu et al., 2022)^[13,16,24]. This body of research establishes both conceptual frameworks and data-driven support for analyzing financial liberalization's macroeconomic consequences. Research further investigates how financial sector development influences individual enterprises, with findings suggesting progressive marketization diminishes asymmetric information problems (Stiglitz, 2000; Laeven, 2003)^[21,15] and promotes firms' level of innovation (Benfratello et al., 2008; Hanley, 2011)^[3,10]. Some studies also reveal that financial marketization significantly reshapes corporate financing dynamics through three interconnected channels. First, it reforms the institutional bias favoring state-owned enterprises (SOEs), thereby leveling the playing field and enhancing financial access for non-SOEs (Laeven, 2003)^[15]. Second, by intensifying industry competition—particularly interbank rivalry—it expands both the depth (loan volumes) and breadth (firm coverage) of credit allocation while reducing resource misallocation (Chava, 2013)^[7]. Third, within the banking sector, marketization specifically amplifies competition among joint-stock banks, creating a spillover effect that disproportionately eases financing constraints for non-SOEs (Chong et al., 2013; Zhang et al., 2017)^[8,25]. However, while research has revealed the multifaceted macroeconomic impacts of financial marketization and some micro-level effects, our understanding of how it affects firms' behavior through the micro level remains inadequate. While existing research predominantly examines financial liberalization's economic effects through capital return margins and corporate investment patterns, relatively few investigations have systematically analyzed its efficiency implications via firm-level total factor productivity. Micro-level analysis of financial liberalization's effect on firm productivity offers dual benefits: enhancing comprehension of reform impacts at the enterprise level while yielding targeted policy insights for advancing quality growth through financial sector transformation. This study aims to address gaps in current literature by employing empirical methods to investigate how financial liberalization affects firm-

level productivity, while examining geographical variations. This study is not only important for understanding the financial marketization process and its economic effects in China and other developing countries, but also provides a new perspective and basis for future financial policy formulation and adjustment.

The main contribution of this study is to examine the impact of financial liberalization on economic growth through the new perspective of increasing firm productivity, which is different from the traditional outcome-oriented research approach. This study enriches the conceptual understanding of financial liberalization while providing valuable insights that complement and improve existing research on its economic outcomes. Second, the study investigates the transmission channels through which financial liberalization affects firm productivity, specifically examining credit constraints and capital costs to elucidate the previously opaque linkage mechanism. Building upon this foundation, we examine regional variations in how financial liberalization affects enterprise productivity across China. Third, this study extends the economic development literature by analyzing the role of financial liberalization in increasing micro-productivity as an indicator of growth. The study not only broadens the understanding of the determinants of economic growth, but also provides empirical support for policy formulation.

2 Methodology and Empirical Results

This section employs 2010-2020 data from Chinese listed firms for baseline regression analysis, examining financial liberalization's lagged effects on enterprise productivity. In order to prevent multicollinearity, all independent variables and other control variables in the model were delayed by one period according to Ayyagari et al.(2011)^[2], and the following basic regression model was established:

$$TFP_{i,j,p,t} = \alpha_0 + \alpha_1 Fin_{p,t-1} + \alpha_2 X_{i,j,p,t-1} + \lambda_i + \lambda_j + \lambda_p + \lambda_t + \varepsilon_{i,j,p,t} \quad (1)$$

Where $TFP_{i,j,p,t}$ denotes the total factor productivity. $Fin_{p,t}$ is the financial marketization, $X_{i,j,p,t}$ is a vector of firm-level and macroeconomic level controls. $\varepsilon_{i,j,p,t}$ is the error term. The subscript i represents firm, j represents industry, p represents province, and t represents year. We also include firm, industry, province and time fixed effects (λ_i , λ_j , λ_p , λ_t).

2.1 Explanatory Variable

Among the total factor productivity estimation methods for enterprises, the semiparametric methods, such as OP method and LP method, are commonly used estimation methods. Considering that in the traditional measurement methods some of the firms' data are observable in the current period, there will be strong endogeneity between factor inputs and total factor productivity, and at the same time, there will be a problem of sample selective bias between the productivity shocks and the firms' exits, and the semiparametric estimation methods show a parametric and semiparametric methods, such as OP method and LP method, are commonly used estimation methods. Considering

that in the traditional measurement methods some of the firms' data are observable in the current period, there will be strong endogeneity between factor inputs and total factor productivity, and at the same time, there will be a problem of sample selective bias between the productivity shocks and the firms' exits, and the semiparametric estimation methods show a The semiparametric estimation method shows better advantages in dealing with the endogeneity and sample selection problems, and effectively compensates for the limitations of the traditional measurement methods.

Therefore, this paper chooses the OP method proposed by Olley & Pakes (1996)^[19] to measure the total factor productivity of listed firms as follows: the indicator construction of the OP method adopts the natural logarithm of gross sales to measure the output of the enterprise, the natural logarithm of the number of employees to measure the labor input of the enterprise, the natural logarithm of the net fixed assets to measure the capital input of the enterprise, the natural logarithm of the net fixed assets of the enterprise, the natural logarithm of the net fixed assets of the enterprise, and the investment indicator of the enterprise. The enterprise investment indicator is measured by the natural logarithm of the number of employees, and capital investment is measured by the natural logarithm of net fixed assets. The investment indicator for enterprises is measured by the natural logarithm of cash paid for the acquisition and construction of fixed assets, intangible assets, and other long-term assets.

2.2 Core Explanatory Variables

The core explanatory variable of this paper is the financial marketization index from the Chinese Provinces Marketization Index Report published by Fan et al. The financial marketization index consists of two key components: financial sector competitiveness and credit allocation marketization. In the measurements prior to 2014, financial sector competitiveness was quantified by the share of deposits of non-big five commercial banks (excluding policy banks) in the total banking deposits of each province. An increase in the level of the share is inversely related to financial market concentration and correlates with an increase in competitive dynamics within the industry. After 2014, the above data are not available. As an alternative, we used the total assets of these financial institutions as a proportion of provincial financial sector assets. The analysis shows a strong correlation between the two calculations, confirming the substitutability of the latter method.

The marketization index of credit fund allocation prior to 2014 used the ratio of loans to private enterprises by financial institutions in each province as the basic indicator. This indicator measures the allocation of credit funds under the action of market forces. After 2014, due to the unavailability of data, the share of provincial private enterprises' debt in the total amount of enterprises' debt is used as an alternative indicator. The empirical analysis confirms that there is a strong correlation between these two indicators, thus validating their interchangeability.

2.3 Control Variables

To minimize the impact of extraneous variables and enhance the precision and robustness of the findings, this study draws on prior literature to identify potential determinants of enterprise total factor productivity (TFP) across two levels: firm-specific and regional factors. At the firm level, the selected variables include: At the firm level, this study incorporates six key variables: (1) size (logarithm of year-end total assets); (2) growth (annual operating revenue growth rate); (3) age (logarithm of years since incorporation plus one); (4) profitability (return on total assets); (5) leverage (total liabilities-to-assets ratio); and (6) fixed asset investment (ratio of capital expenditures on fixed/intangible/long-term assets to total assets).The level of regional economic development (measured using GDP per capita) was selected at the regional level.

3 Baseline Results

First, this paper uses Hausman test to determine the panel model, which yields a chi-square of 103.820 and a corresponding p-value of 0.000, so the fixed effect model is selected for regression analysis. In order to empirically test the impact of financial marketization on economic development, FE model was first adopted as the starting point of analysis. As can be seen from the first column (Table 1), the coefficient is significantly positive, indicating that financial marketization can significantly promote economic development. To minimize the possibility of missing variables, control variables are added to the results reported in column 2. Financial marketization is positively correlated with total factor productivity. And significant at the 1% level.

Table 1. Regression results of benchmark model.

Variables	TFP	
	(1)	(2)
L.Fin	0.0054*** (0.0021)	0.0170*** (0.0044)
L.ln_size		0.5573*** (0.0108)
L.ln_age		-0.0411*** (0.0513)
L.grow		0.0097*** (0.0010)
L.ROA		0.0004*** (0.0001)
L.lev		0.1470*** (0.0394)
L.ln_perGDP		-0.0892 (0.0890)
L.Invest		-0.1936*** (0.0586)

Constant		3.3313*** (1.0086)
Year FE	No	Yes
Firm FE	No	Yes
Province FE	No	Yes
Industry FE	No	Yes
R ²	0.0008	0.9197
Observations	7483	5681

Note: ***, **, * denote significance of 1%, 5% and 10%, respectively; Figures in square parentheses are T values.

Further, to verify the robustness of the regression results, this paper adopts the instrumental variable approach, changing fixed effects with changing the clustering hierarchy for the analysis. First, the Bartik instrumental variable is constructed by using the interaction term between financial marketization in the lagged period and the growth rate of financial marketization at the national level to construct the Bartik instrumental variable, and the regression results are shown in Columns (1)-(2) of Table 2, and the test results reject the non-identifiable hypothesis and the weak instrumental variable problem, and the benchmark regression is valid. Second, further consider the impact of changes over time at the province level and add city and year interaction fixed effects, the regression results are shown in Column (3) of Table 2, and the results prove that the benchmark regression is robust. The third is to adjust the clustering robustness criteria error to the firm level, the regression results are shown in Column (4) of Table 2, and the results also prove that the benchmark regression is robust.

Table 2. Robustness check

VARIABLES	(1) L.Fin	(2) TFP	(3) TFP	(4) TFP
L.Fin		0.0314*** (0.0076)	0.0588*** (0.0161)	0.0170*** (0.0067)
Bartik_IV	1.8461*** (0.1084)			
Constant	-41.0265*** (2.3992)	-3.1820*** (0.4773)	-4.9134*** (0.3655)	-3.3313*** (1.7545)
Observations	4796	4796	5679	5681
R-squared	0.9368	0.6746	0.9222	0.9187
KP-LM test (p-value)	273.898*** [0.000]			
C-D Wald F test	289.94***			
year FE	YES	YES	YES	YES
firm FE	YES	YES	YES	YES
province FE	YES	YES	YES	YES
industry FE	YES	YES	YES	YES
province × year FE	NO	NO	YES	NO

4 Mechanism

It has been confirmed that financing constraints and financing costs are important forces in promoting the total factor productivity of enterprises. In order to verify the mechanism of this paper, financing constraint is measured by SA index (the larger it is, the larger the financing constraint is), and financing cost is measured by the ratio of firms' interest to total liabilities (the smaller it is, the lower the financing cost is). The regression results are shown in Table 3 below. The results show that the development of financial marketization can significantly reduce the financing constraints and financing costs of enterprises. It shows that financial marketization can promote the improvement of total factor productivity of enterprises by reducing their financing constraints and financing costs.

Table 3. Mechanism analysis.

VARIABLES	(1) Financing constraint	(2) Financing cost
L.Fin	-0.0022** (0.0011)	-0.0002*** (0.0001)
Constant	-4.6155*** (0.2498)	-6.1061*** (7.1080)
Observations	4941	3412
R-squared	0.9271	0.3501
year FE	YES	YES
firm FE	YES	YES
province FE	YES	YES
industry FE	YES	YES

5 Heterogeneity

At present, there are great differences in financial marketization in different regions of China. According to data released by China's Bureau of Statistics in 2020, 11 provinces in eastern China have a high degree of financial marketization. The degree of financial marketization in central and western China is generally low. At the same time, it should also be recognized that the impact of financial marketization on total factor productivity will be heterogeneous in different regions due to the significant differences in regional economic base and financial development level. On this basis, in order to further investigate the heterogeneous impact of financial marketization on total factor productivity in different regions, we divided regions into eastern and central regions (as shown in Table 4). The coefficient of the eastern region is larger than that of the western region, indicating that the eastern region is affected more by financial marketization.

Table 4. Heterogeneity analysis.

VARIABLES	(1)	(2)
	The eastern region	The central and western regions
L.Fin	0.0181*** (0.0066)	0.0165 (0.0102)
Constant	-1.1005 (1.5612)	-7.4548*** (1.5509)
Observations	3890	1791
R-squared	0.9209	0.9231
year FE	YES	YES
firm FE	YES	YES
province FE	YES	YES
industry FE	YES	YES

6 Conclusion

This paper examines how financial marketization affects economic development. The findings show that financial marketization significantly increases firms' total factor productivity (TFP). Mechanism analysis shows that financial marketization promotes enterprise total factor productivity through reducing financing constraints and financing costs. The regional analysis shows that the total factor productivity effect is stronger in East China compared with other regions. Based on the above research results, this paper proposes the following policy insights.

Firstly, a balanced perspective on financial marketization's role in economic growth necessitates reforming investment and financing systems. This involves constructing a multi-tiered financial market ecosystem encompassing banking, securities, insurance, trusts, and funds, while diversifying financial instruments to serve heterogeneous enterprise and investor needs. Concurrently, expanding bond, equity, and futures markets will broaden financing channels, lower capital costs, and enhance allocation efficiency. Secondly, to foster high-quality economic growth, investment strategies should be tailored to regional characteristics, accounting for varying development levels, industrial structures, and resource endowments. The eastern region requires focused support for high-value sectors like advanced manufacturing and modern services to drive innovation and industrial upgrading, while central and western regions need targeted investments in infrastructure, specialized industries, and social development to enhance regional coordination and living standards. Thirdly, to enhance credit support, governments should facilitate bank-enterprise integration by establishing information-sharing platforms. These platforms would enable financial institutions to access real-time enterprise operational data and credit histories, improving lending efficiency and accuracy, while allowing businesses to compare financial products and select optimal financing solutions. Fourthly, to address resource allocation inefficiencies, financial market development must be accelerated through systemic reforms. This requires deepening interest rate and exchange rate liberalization to break financial monopolies while

fostering market competition and innovation. Concurrently, regional financial cooperation mechanisms should be established to facilitate cross-regional resource flows, particularly through structured partnerships between eastern and central/western regions, enabling financial resource complementarity and shared development.

References

1. Allen, F., Jun Q., Meijun Q. (2005). Law, finance, and economic growth in China. *Journal of financial economics* 77(1), 57-116. <https://doi.org/10.1016/j.jfineco.2004.06.010>.
2. Ayyagari, M., Demirguc-Kunt, A., Maksimovic, A. (2011). Firm innovation in emerging markets: the role of finance, governance, and competition. *Journal of Financial and Quantitative Analysis*. 46(6), 1545-1580. <https://doi.org/10.1017/S0022109011000378>.
3. Benfratello, L, Fabio S, Alessandro S. (2008). Banks and innovation: Microeconometric evidence on Italian firms. *Journal of Financial Economics*. 90(2), 197-217. <https://doi.org/10.1016/j.jfineco.2008.01.001>.
4. Bo, L., Yao, H. X., Mear, F. C. J. (2021). New development: Is China's local government debt problem getting better or worse? *Public Money & Management*. 41(8), 663-667. <https://doi.org/10.1080/09540962.2021.1881273>.
5. Caggese, A., Cuñat, V. (2013). Financing constraints, firm dynamics, export decisions, and aggregate productivity. *Review of Economic Dynamics*. 16(1), 177-193. <https://doi.org/10.1016/j.red.2012.10.004>.
6. Chan, K. S., Dang, V. Q. T., Yan, I. K. M. (2012). Financial Reform and Financing Constraints: Some Evidence from Listed Chinese Firms. *China Economic Review*. 23(2), 482-497. <https://doi.org/10.1016/j.chieco.2012.03.009>.
7. Chava, S., et al. (2013). Banking deregulation and innovation. *Journal of Financial economics*. 109(3), 759-774. <https://doi.org/10.1016/j.jfineco.2013.03.015>.
8. Chong, T T., Li, L., Steven O. (2013). Does banking competition alleviate or worsen credit constraints faced by small-and medium-sized enterprises? Evidence from China. *Journal of Banking & Finance*. 37(9), 3412-3424. <https://doi.org/10.1016/j.jbankfin.2013.05.006>.
9. Galindo, A., Schiantarelli, F., Weiss, A. (2007). Does financial liberalization improve the allocation of investment? Micro-evidence from developing countries. *Journal of development economics*. 83(2), 562-587. <https://doi.org/10.1016/j.jdevco.2005.09.008>.
10. Hanley, A., Wan-Hsin L., Andrea V. (2011). Financial development and innovation in China: Evidence from the provincial data. No. 1673. Kiel working paper. <https://hdl.handle.net/10419/45867>.
11. Huang, Y., Pagano, M., Panizza, U. (2020). Local crowding-out in China. *Journal of Finance*. 75(6), 2855-2898. <https://doi.org/10.1111/jofi.12966>.
12. Jin, M., Zhao, S. N., Kumbhakar, S. C. (2019). Financial constraints and firm productivity: evidence from Chinese manufacturing. *European Journal of Operational Research*. 275(3), 1139-1156. <https://doi.org/10.1016/j.ejor.2018.12.010>.
13. Jin, Y., Zhong S. (2022). The Impact of Local Government Debt on Total Factor Productivity. *Public finance research*, (04):87-99.
14. Levine, R., Loayza, N., Beck, T. (2000). Financial intermediation and growth: Causality and causes. *Journal of monetary economics*. 46(1), 31-77. [https://doi.org/10.1016/S0304-3932\(00\)00017-9](https://doi.org/10.1016/S0304-3932(00)00017-9).
15. Laeven, Luc. (2003). Does financial liberalization reduce financing constraints?. *Financial management* : 5-34. <https://doi.org/10.2307/3666202>.

16. Li, X. M., Qin, M. (2021). The joint effects of economic policy uncertainty and firm characteristics on capital structure: evidence from US firms. *Journal of International Money and Finance*. 110, 102279. <https://doi.org/10.1016/j.jimonfin.2020.102279>.
17. Mckinnon, R. 1973. *Money and Capital in Economic Development*. [M]. Washington DC: Brooking Institution Press.
18. Neaime, S., Gaysset, I. (2018). Financial inclusion and stability in MENA: Evidence from poverty and inequality. *Finance research letters*. 24, 230-237. <https://doi.org/10.1016/j.frl.2017.09.007>.
19. Olley, S., Pakes, A. (1996). The Dynamics of Productivity In the Telecommunications Equipment Industry. *Econometric*. 64(6), 1263-1297.
20. Shaw, E S. 1973. *Financial Deepening in Economic Development*. [M]. New York: Oxford University Press.
21. Stiglitz, Joseph E. (2000). Capital market liberalization, economic growth, and instability. *World development*. 28(6), 1075-1086. [https://doi.org/10.1016/S0305-750X\(00\)00006-1](https://doi.org/10.1016/S0305-750X(00)00006-1).
22. Shen, X. (2019). Has financial marketization reform promoted innovation?—an empirical test based on mediation effect. *Open Journal of Social Sciences*, 7(4),160-177. <https://doi.org/10.4236/jss.2019.74014>.
23. Yu, C., Hou, L. K., Lyu, Y. X., Zhang. Q. (2022). Political competition, spatial interactions, and default risk of local government debts in China. *Papers in regional science*. 101(3), 717-743. <https://doi.org/10.1111/pirs.12668>.
24. Zhu, J., Xu, H., & Zhang, Y. (2022). Local Government Debt and Firm Productivity: Evidence from China. *Research in International Business and Finance*, 101798. <https://doi.org/10.1016/j.ribaf.2022.101798>.
25. Zhang, J., Zheng, W. P., Xin, F. (2017). Banking Deregulation, Structural Competition and Firm Innovation in China. *China Industrial Economy*. (10):118-136. <https://doi.org/10.19581/j.cnki.ciejournal.2017.10.008>.

Open Access This chapter is licensed under the terms of the Creative Commons Attribution-NonCommercial 4.0 International License (<http://creativecommons.org/licenses/by-nc/4.0/>), which permits any noncommercial use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license and indicate if changes were made.

The images or other third party material in this chapter are included in the chapter's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the chapter's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder.

