

The Empirical Research on Impact of Digital Finance Development on the Performance of Small and Medium-sized Company in Manufacture Industry in China

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Abstract: Based on Digital Financial Inclusion Index of China (DIFI) established by research group of the Digital Finance Research Center of Peking University, this paper chose the panel data of samples from 2011-2020 Chinese manufacture industry from CSMAR gem data, analysis the digital finance development impact on the performance of Chinese SMEs in manufacture industry, Test the impact of enterprise performance, and the heterogeneity analysis of different companies in different regions in China, and conduct the necessary endogeneity analysis and robustness test. The empirical research results show that: digital finance development improve the performance of Chinese manufacture industry SMEs, and there is regional heterogeneity, the promotion effect is more effective in western region of China. Also there exist significant lag effect on performance improvement.

Keywords: Digital Inclusion Finance, Manufacture Industry, Corporation Performance.

1. Introduction

At the end of 2015, The State Council issued the Development Plan for Promoting Inclusive Finance (2016-2020), which formally defined inclusive finance. The 2016 G20 summit established a detailed plan for the development of digital financial inclusion. Digital services enable groups to access corresponding financial services through mobile electronic devices. At the same time, the online storage of data ensures the convenience of data acquisition and accuracy of storage, reduce the threshold of borrowing loan. To achieve high-quality economic development, the development of SMEs is an indispensable component, which is conducive to the construction of a complete and active market economy system. Although the SMEs developed rapidly, there still are some problems that need to be solved the quickly the better. Due to the small scale and weak ability of risk resistance, the SMEs face difficult finance problem which makes it difficult to conduct digital innovation and transformation. The digital innovation and transformation are the key factors for entities to improve the produce efficiency and corporation performance.

2. Theory Analysis and Research Assumption

According to previous research, it is more easily for the corporation who disclosed its performance information strictly comply with specific standards to obtain commercial credit and loan [1]. The SMEs face more retrains when obtain finance support due to lack of high value collateral and reliability of information disclosed. For SMEs in manufacture industry, constantly updated technology is necessary for the survival. They need enough capital to implement technical renovation. However, due to the characteristics of long recovery waiting period of the research and development cost, high risk of return and huge initial investment, the SMEs lack capability of internal finance, they have great level of reliance

on external finance.

The development of digital finance makes use of many IT technology to achieve high level of information sharing, which increase the integrity and credibility of information, reduce the cost of information transform and exchange [2]. On the other hand, it helps more transparent governance of management. In addition to the function of reducing finance constrain and helping maintain innovation of SMEs, digital finance can also increase the sufficiency of production. The first assumption is that:

H1: Digital finance development promote the performance of China SMEs in manufacture industry.

The aggregate development of economy and technology of east, center and west of China exist big difference. The development of economy and digital finance become weakens from east to west. The advantage of gathering of high talented people and rapid increase rate of regional overall economy level, make the factors affecting performance of enterprises in the eastern region more complicated. Comparing with western region, the percentage of influence of digital finance among all factors is smaller than in eastern region. It is reasonable that the influence of increase level of digital finance has bigger influence on western company than those in east region. Second assumption:

H2: the impact of promotion function of digital finance to the performance of small and medium company in manufacture industry is more obvious in west than east.

The main purpose of SMEs finance behavior is to get enough capital to support research and development activities and reform manufacture technology. The inherent features of research and development cost are that it needs huge amounts of initial investment, the developing period is long, and there is risk of success [3], which indicate that the investment may end up as loss. Even though the development is extremely successful, before make use of the new technology, the cost of retraining employees and the refrain strategy would bother the company as well [4]. Therefore, it takes a long period for

the influence of digital finance reflect on the corporation performance. The third assumption is:

H3: the impact of digital finance to corporation performance exists lag effect.

3. Design of Research

3.1. Sample selection and data sources

The enterprise data in the paper comes from the Cathay Pacific Security Database (CSMAR), chose information of listed SMEs in manufacturing industry from 2011 to 2020 as empirical research sample. Data of the development level of digital financial inclusion is compiled by the Digital Finance Research Center of Peking University (DIFI) [5]. Process the data as follows: the sample data of ST listed companies is removed; the samples of listed companies which have incomplete key data are removed.

3.2. Variable Design

Explained variables. corporation operating performance. The paper use return on total assets (ROA= Net profit/total assets) to measure the business performance of enterprises.

Explanatory variables. The paper selects the digital financial inclusion index which is compiled by the Digital Finance Research Center of Peking University to measure the

development level of digital financial inclusion. To solve the problem of too large value related to the explained variables, divided the digital financial inclusion index by 500.

Control variables. This article chose following control variables: total assets (TA= Natural logarithm of total assets), financial leverage (Lev= Total liability / total assets), the proportion of cash and cash equivalents to total asset (Cash= Cash and cash equivalents /total assets), the turnover rate of current assets (Liq= Main operating benefit / current asset), and the ownership of the largest shareholder (TOP1) as control variables.

Model design. The model is designed as follows:

$$ROA_{it} = \beta_0 + \beta_1 DIFI_{it} + \beta_2 X_{it} + \epsilon_{it}$$

Where: i is enterprise; t is the year; ROA_{it} is the operating performance of i enterprises in year t; DIFI_{it} is the digital financial inclusion index in the province of enterprises I in year t; X_{it} is the collection of control variables, ϵ_{it} is random perturbation term,

4. Empirical Analysis

4.1. Descriptive statistics

The descriptive statistics of all variables are in table 1.

Table 1. Descriptive statistics

Variables	observations	mean	Standard deviation	minimum	maximum
ROA	1,936	0.0620	0.0412	-0.126	0.379
DIFI	1,936	0.0504	0.0187	0.00377	0.0864
TA	1,936	9.261	0.363	8.217	10.90
cash	1,936	0.218	0.164	0.00382	0.883
lev	1,936	1.143	1.611	-5.758	60.08
liq	1,936	0.825	0.399	0.0778	3.879
TOP1	1,936	0.321	0.132	0.0559	0.898

4.2. Correlation analysis

The correlation analysis results are in table 2.

Table 2. Correlation analysis

	ROA	DIFI	TA	lev	cash	TOP1	liq
DIFI	-0.070***	1					
TA	-0.165***	0.456***	1				
lev	-0.127***	0.105***	0.091***	1			
cash	0.187***	-0.487***	-0.361***	-0.127***	1		
TOP1	0.091***	-0.214***	-0.110***	0.00400	0.096***	1	
liq	0.089***	0.164***	0.119***	0.078***	-0.442***	-0.0320	1

4.3. Basic regression

To make the test results more credible, carry out regression with control variables.

Before the benchmark regression, the variance inflation factor (VIF) was calculated, and the VIF value was much less than 10, indicating that there was no multicollinearity problem in the model.

The regression results are shown in table 3(1). When a

series of control variables are considered, the coefficient of digital financial inclusion development level is significantly positive. Digital inclusive finance has a significant role in promoting the performance of SMEs in manufacturing industry. The influence of total assets on return on assets is significant and negative, which supports that the decline of ROA is due to the excessive growth of total assets. In addition, the more concentrated the ownership, the better the company performance.

Table 3. Basic regression and regional heterogeneity analysis

VARIABLES	(1) ROA	(3) West	(3) Mid	(4) East
DIFI	0.248*** (3.79)	0.585** (2.59)	0.385*** (3.13)	0.244*** (2.80)
TA	-0.014*** (-4.41)	0.019 (1.11)	-0.026*** (-5.36)	-0.015*** (-3.78)
lev	-0.003** (-2.03)	-0.012 (-1.23)	-0.013*** (-2.79)	-0.002* (-1.79)
cash	0.068*** (9.15)	0.097*** (3.12)	0.071*** (5.08)	0.070*** (7.25)
TOP1	0.026*** (3.48)	0.049 (1.58)	0.052*** (4.01)	0.014 (1.43)
liq	0.022*** (8.14)	0.062*** (4.21)	0.022*** (5.38)	0.019*** (5.09)
Constant	0.143*** (4.90)	-0.208 (-1.26)	0.242*** (5.81)	0.160*** (4.34)
Observations	1,936	130	326	1,233
R-squared	0.104	0.234	0.249	0.097

Robust t-statistics in parentheses

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

4.4. Regional heterogeneity analysis

The impact of digital finance development on corporation performance varies with the province of the companies. The regional heterogeneity analysis results show in table 3 (2) (3) and (4). The impact of digital inclusive finance on the performance of enterprises in the west of China is more obvious.

4.5. Problem of endogeneity

To alleviate the potential endogeneity problem, this paper

adopts the method of re-regression of the core explanatory variables with one-period lag and two-period treatment respectively to analyze the endogeneity of the results of the benchmark regression. The regression results of the core variables with a lag of one and two periods are shown in table 5 (1) and (2). The coefficient of the core explanatory variable in the lag one period is larger than that in the original regression, and the coefficient of the core explanatory variable of lag two period is more positively correlated than that lag one period, indicating that digital financial inclusion has a lag effect on the development of SMEs.

Table 5. Endogeneity results and robustness test results

VARIABLES	(1) Lag one period	(2) Lag two periods	(3) ROE	(4) Lag one period (Using ROE)	(5) Lag two period (Using ROE)
L.DIFI	0.317*** (4.63)	0.323*** (4.40)	0.191** (2.25)	0.308*** (3.52)	0.316*** (3.43)
TA	-0.008*** (-2.61)	-0.006* (-1.80)	0.007 (1.43)	0.018*** (3.81)	0.023*** (4.56)
lev	-0.003** (-2.08)	-0.003** (-2.04)	-0.004** (-2.16)	-0.004** (-2.20)	-0.004** (-2.15)
cash	0.073*** (8.53)	0.073*** (7.26)	0.056*** (5.58)	0.067*** (5.95)	0.068*** (5.32)
TOP1	0.017** (2.26)	0.018** (2.11)	0.046*** (4.26)	0.031*** (2.92)	0.032*** (2.71)
liq	0.020*** (7.30)	0.020*** (7.09)	0.039*** (9.24)	0.036*** (8.40)	0.037*** (8.30)
Constant	0.087*** (3.06)	0.067** (2.17)	-0.041 (-0.94)	-0.146*** (-3.34)	-0.194*** (-4.10)
Observations	1,687	1,464	1,936	1,687	1,464
R-squared	0.089	0.087	0.086	0.092	0.108

Robust t-statistics in parentheses

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

4.6. Robustness Test

To make results more credible, this paper adopts replacing explanatory variables to carry out the robustness test. Use return on equity (ROE) to replace return on total assets (ROA) to re-regression, lag the core explanatory variables to test

whether there still exist lag effect. As shown in table 5 (3) (4) (5), the impact of digital finance on corporation performance is still significantly positive, and there still exist an obvious lag effect. The results are still robust.

5. Conclusion

5.1. Research results

This paper chose the information of SMEs in manufacturing industry from 2011 to 2020 as empirical research samples to explore the influence of digital finance development on the performance of SMEs in manufacturing industry. The results of the empirical research are follows:

(1) The development of digital finance has positive influence on performance of SMEs in manufacturing industry. The development of digital finance reduces information asymmetry and increase finance speed and quality. Digital finance also maintains technical innovation and improve manufacture efficiency and reduce produce cost. Consequently, the operation performance can increase.

(2) The impact of promotion function of digital finance to the performance of SMEs in manufacture industry is more obvious in west than east. Heterogeneity analysis showed that the rapid development of digital finance has more obvious effect on the company in western region.

(3) The impact of digital finance to corporation performance exists lag effect. The coefficient of the core explanatory variable in the lag one period is larger than that in original regression, and coefficient of the core explanatory variable of lag two period is more positively correlated than that lag one period.

5.2. Recommendation

It is important to combine digital finance and inclusive finance, government should draw up different plan and strategies for the entities of various size in different province. Government can introduce relevant incentive policies, such as reducing taxes or increasing government subsidies or grants, to promote continuous innovation of SMEs in manufacturing industry.

Government should maintain stable policies to create a stable and favorable developing environment for the

corporations [6]. As it takes time for the facilitation of digital financial inclusion obviously reflect on business performance, the frequently changing and fluctuating political or economic environment can do great harm to companies.

It worth noting that SMEs should pay high attention to the coordination between digital technology and original resources when keeping up with technological development and innovation. Adopting digital finance and other new technologies does not mean to overthrow the current structure of production because the cost of giving up luxury exiting fixed asset is numerous. So, it is important to achieve harmony between new technology and original resources.

References

- [1] Tao, Z., Yahui, B. (2016) Research on influence of quality of SMEs information disclosure to constrain of debt finance. *Journal of Shandong University of Finance and Economics*, 28(1): 109-117.
- [2] Huan, T., Peng, T. (2021) Empirical analysis of digital financial inclusion alleviating financing constraints for SMEs: Based on data from 2011 to 2018. *Investment and Entrepreneurship*, 9: 1-5.
- [3] Zhengping, Z. (2021) The impact of digital finance on the operational efficiency of small and medium-sized enterprises: An empirical study based on the data of GEM in Shenzhen. *China's circulation economy*, 35: 30-39.
- [4] Yudong, Q., Chengwei, C. (2020) Research on the multiple effects of digitization on manufacturing enterprise performance and its mechanism. *Learning and Exploration*, 07: 108-119.
- [5] Feng, G., Jingyi, W., Fang, W., et al. (2020) Measuring China's Digital Financial Inclusion: Index Compilation and Spatial Characteristics. *China Economic Quarterly*, 19(4): 1401-1418.
- [6] Lulu, C., Jingjia, X., You, L. (2021) The impact of digital financial inclusion on business performance- Empirical research based on A-share listed companies. *Technology and Innovation management*, 42: 674-680.