

Study on How Digital Finance Affect Growth of Small and Micro Enterprises in Manufacturing Industry Based on the Perspective of Enterprise Financialization

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Abstract: Under the background of vigorous development of digital finance, the combination of digital technology and traditional finance will help alleviate and expensive the financing difficulties of small and micro enterprises, and provide new development opportunities for them. Therefore, based on the research perspective of enterprise financialization, this paper studies the impact of digital finance on enterprise growth, using the data of A-share listed manufacturing small and micro enterprises in Shanghai and Shenzhen stock markets from 2011 to 2020 for empirical research. It is found that, first, the development of digital Inclusive Financing can significantly enhance the short-term growth of enterprises. Secondly, by analyzing the mechanism, the development of digital finance can increase the proportion of financial investment of enterprises, provide high liquidity funds for enterprises, meet the investment and financing needs of small and micro enterprises, and boost the growth of enterprises. Third, the influence of digital finance on enterprise growth is heterogeneous, which is mainly due to the differences in factors such as the nature of enterprise ownership and regional development. In addition, for enterprises of different sizes, there is no significant difference in the role of digital finance development, which indicates that the development of digital finance has strong inclusiveness. Finally, this paper gives some policy suggestions.

1 INTRODUCTION

According to the definition in the Digital Financial Services Report released by the World Bank in 2020, digital finance is a financial model in which traditional financial departments and financial technology enterprises use digital technology to provide financial services. Digitalization reduces the cost of financial services and improves the coverage and alleviates regional restrictions, which can greatly "bail out" small and micro enterprises in financing. However, many studies have shown that financing constraints are an important factor restricting the growth and development of enterprises. At present, the financing constraints of manufacturing enterprises are in an excessive state, which will seriously hinder the high-quality development of enterprises (Shuguang Xiao et al., 2020). Thus, this paper will further explore whether digital finance has a positive impact on the growth of small and micro manufacturing enterprises under the background of continuous and accelerated development of digital finance. If so, through what

mechanism does it affect the growth of enterprises? Therefore, this paper analyzes the above problems based on the data of A-share listed manufacturing small and micro enterprises and the data of The Peking University Digital Financial Inclusion Index of China, innovatively put forward the action path of financialization, and analyzed the heterogeneity, in order to provide useful reference for relevant government departments or enterprises to grasp the growth and development direction of enterprises and realize the rapid and healthy development of small and micro enterprises.

Compared with the existing literature, the possible marginal contribution of this study lies in three aspects: First, predecessors mostly focused on micro-level management (Zhui Liu et al., 2017 and Lingsha Zhang et al., 2022), finance (Xiaolong Ma, 2014 and Weiwei Song et al., 2021), financing (Ziqing Chen et al., 2015 and Zheng Chi, 2021) and macro-level policy environment (Chuanxian Li et al.). This paper innovatively incorporates digital finance into the analysis framework of enterprise growth, and

empirically tests the impact of digital finance on the growth of small and micro manufacturing enterprises from a macro level, enriching the related research on enterprise growth; Secondly, this paper discusses the influence mechanism of digital finance on enterprise growth from the perspective of enterprise financialization, that is, digital finance can maintain enterprise liquidity and enhance enterprise growth in a short time by promoting enterprise financialization. By clarifying this mechanism, it provides micro empirical evidence for the rationality of enterprise asset allocation; Thirdly, considering the influence of internal and external differences of different micro-subjects on the research results, this paper further analyzes the heterogeneity from two angles of property rights attributes and regional development, and provides certain policy suggestions for the application of digital finance.

2 MATERIALS AND METHODS

2.1 Benchmark Regression Model

In order to test the relationship between the development of digital finance and the performance of manufacturing enterprises, this paper refers to the research of Weicheng Xu et al. (2022) and constructs the following regression model:

$$Perf_{i,t} = \alpha + \beta_1 Dif_{i,t} + \beta_2 Controls_{i,t} + \sum Company + \sum Industry + \sum Year + \epsilon_{i,t} \tag{1}$$

According to the existing theories and literature, this paper controls the influencing factors of enterprise performance, $Controls_{i,t}$ including the following variables: enterprise age, asset-liability ratio, return on assets, ownership concentration, Tobin's Q value, institutional investor's shareholding ratio, asset scale, total number of employees, employee quality, equity nature. At the same time, this paper also controls the fixed effects of individuals, industries and years.

2.2 Instrumental Variable: Internet Development Level

Therefore, this paper attempts to alleviate the endogenous problems by means of instrumental variable method. Referring to the research of Huali

Xie et al. (2018), the article selects the provincial Internet development level as the tool variable of the provincial digital finance development level index. Referring to the method of Yunhui Zhang et al. (2022) and the practice of Qunhui Huang et al. (2019) to construct the Internet Development Level Index, this paper uses four indexes after standardized treatment, including the proportion of employees in information transmission, software and information technology services in the whole industry, the number of Internet broadband access ports, and the total amount of telecommunication services per capita and the penetration rate of mobile phones, to comprehensively calculate the Internet Development Index (*net*) by entropy method, for measuring the Internet development level of various provinces.

3 RESULTS & DISCUSSION

3.1 Basic Results

Table 1 shows the estimated results of the impact of digital finance development on enterprise growth. Column (1) is the estimated result of the impact of the digital financial total index on the growth of enterprises. It is found that the coefficient of the digital Inclusive Financing total index (*Dif*) is significantly positive at the level of 5% after controlling the characteristics of enterprises, indicating that when the development level of digital Inclusive Financing in the province where enterprises are located improves, it will increase the growth rate of total profits of enterprises and promote the growth of enterprises.

Regression of three first-class indicators under the digital Inclusive Financing total index. Referring to Sixian Feng's (2021) practice, considering that there may be errors if only the total index is used to measure the development of digital finance, in order to make the research results more stable, it should be more appropriate to choose the digital degree index (*digit*) which is more related to financial friction among the three first-level indicators to re-depict the development of digital finance. Columns (2) to (4) are estimated results. Only the digital Inclusive Financing Digitalization Index (*digit*) is significantly positive at the level of 1%, which is consistent with the expected results.

Table 1: Digital Finance Development and Enterprise Growth: Basic Regression

	(1) <i>Perf</i>	(2) <i>Perf</i>	(3) <i>Perf</i>	(4) <i>Perf</i>
<i>Dif</i>	1.552** (2.15)			

<i>cover</i>		1.074		
		(0.90)		
<i>depth</i>			0.404	
			(1.10)	
<i>digit</i>				0.667***
				(2.77)
<i>Constant</i>	-2.1 e+03***	-1.9e +03***	-1.8 e+03***	-1.9e +03***
	(-3.67)	(-3.31)	(-3.28)	(-3.54)
<i>N</i>	12421	12421	12421	12421
<i>adj R2</i>	0.141	0.141	0.141	0.142
<i>Controls</i>	YES	YES	YES	YES
<i>Firm FE</i>	YES	YES	YES	YES
<i>Ind FE</i>	YES	YES	YES	YES
<i>Year FE</i>	YES	YES	YES	YES

3.2 Instrumental Variable Method

The instrumental variable method is used to reduce the endogenous influence. As mentioned above, this study uses provincial Internet penetration rate as tool variable. Table 2 reports the estimation results using the instrumental variable method. In the first stage of regression, the coefficient of Internet development level (*net*), an instrumental variable, is significantly positive at the confidence level of 1%, which is highly positively correlated with the development level of digital finance (*Dif*). The Kleibergen-Paap rk LM statistic was 28.925 with a p value of 0.00, which passed the unrecognizable test at the level of 1%.

In the test of instrumental variables, Cragg-Donald Wald F statistic is 42.36, Kleibergen-Paap rk Wald F statistic is 24.164, both of which are greater than the critical value of 16.38 at the 10% level, which significantly rejects the hypothesis of weak instrumental variables. Because the number of endogenous variables is equal to that of tool variables, tool variables are just identified and tool variable construction is valid. In the two-stage estimation, the regression estimation coefficient of digital Inclusive Financing development index to enterprise growth is still significantly greater than 0 at the level of 5%, indicating that the conclusion of benchmark regression after using instrumental variables is still very stable, indicating that the development of digital Inclusive Financing can promote enterprise growth.

Table 2: Digital Finance Development and Enterprise Growth: Linear Model 2SLS.

	(1) <i>First Dif</i>	(2) <i>Second Perf</i>
<i>net</i>	0.006*** (4.92)	
<i>Dif</i>		24.567** (2.04)
<i>Constant</i>	252.365***	

		(37.97)
<i>N</i>	12421	12421
<i>adj R2</i>	0.996	-0.208
<i>Controls</i>	YES	YES
<i>Firm FE</i>	YES	YES
<i>Ind FE</i>	YES	YES
<i>Year FE</i>	YES	YES

3.3 Heterogeneity Analysis

It has been verified that the development of digital finance can significantly enhance the growth of enterprises. In view of the importance of the nature of internal property rights and the influence of external economic environment on the growth of enterprises, this part will test the heterogeneity around the nature of property rights, the scale of enterprises and the GDP of the provinces where they are located.

3.3.1 Property Right Nature

In order to explore the influence of enterprise nature on digital finance to enhance enterprise growth, this paper divides sample enterprises into state-owned enterprises and non-state-owned enterprises according to the nature of property rights. If the enterprise is ultimately controlled by state-owned enterprises, the value *soe* is 1, otherwise it is 0, and the analysis is carried out by adding interactive items.

The regression results in column (1) of Table 3 show that the coefficient of interaction term is significantly negative at the level of 1%, while the main effect coefficient is significantly positive, indicating that compared with state-owned enterprises, the development of digital finance promotes the growth of non-state-owned enterprises more strongly, and the hypothesis H2 is verified.

3.3.2 Enterprise Scale

According to the "Small and Medium-sized Enterprise Classification Standard", the industrial sector identifies enterprises with 20-300 employees or 3-20 million operating income as small enterprises, with value *size* of 1; If the number of employees is less than 300 or the operating income is less than 3 million, it is a micro-enterprise with value *size* of 0. Analyze by adding interactive items.

The regression results in column (2) of Table 3 show that the coefficient of interactive items is not significant, indicating that there is no significant difference in the promotion of digital finance development to enterprise growth among enterprises of different sizes. The possible reasons are as follows: on the one hand, among the listed companies in manufacturing industry, the smaller enterprises face greater survival risks, but usually have higher return on scale, so the surviving enterprises have higher growth rates; However, the growth of large enterprises is relatively stable (Hongya Li, 2022). On the whole, the growth of small and micro enterprises may be distributed evenly under the influence of scale. On the other hand, the development of digital finance may tend to balance the growth differences among enterprises of different sizes, and its inclusiveness enables all small and micro enterprises to obtain more fair financing opportunities, so there is no significant difference between small and micro enterprises in the heterogeneous impact of digital finance development on the growth of enterprises.

3.3.3 Regional GDP

In order to confirm whether the promotion of growth is different among regions with different economic conditions and development levels, this paper takes logarithm of GDP of each province and adds interactive items for analysis. The regression results in column (3) of Table 3 show that the coefficient of interaction term is significantly positive at the level of 5%, which is the same as the symbol of main effect coefficient, indicating that higher regional GDP can enhance the promotion of digital finance development to enterprise growth. This conclusion is similar to that of Ning Gu (2022). The reason may be that the promotion of digital finance to the growth is not completely inclusive, but partially inclusive. Digital finance is based on the development of traditional finance, and its development level is still partially limited by the local financial development level, while the development of finance is also limited by the local developed level. Therefore, the alleviating effect of digital finance on the growth constraints of small and

micro enterprises in underdeveloped areas will be weaker than those in developed areas. Also, the promoting effect of digital finance on the growth of small and micro enterprises will be inclined to developed areas.

Table 3: Digital Finance Development and Enterprise Growth: Heterogeneity Analysis.

	(1) <i>Perf</i>	(2) <i>Perf</i>	(3) <i>Perf</i>
<i>Dif</i>	1.573** (2.19)	1.397* (1.94)	1.366* (1.69)
<i>soe</i> × <i>Dif</i>	-0.397*** (-3.59)		
<i>size</i> × <i>Dif</i>		0.251 (1.41)	
<i>lnGDP</i> × <i>Dif</i>			0.179** (2.41)
<i>soe</i>	179.779*** (3.65)		
<i>size</i>		48.242** (2.04)	
<i>lnGDP</i>			-70.523 (-1.06)
<i>Constant</i>	-1.9e +03*** (-3.32)	-2.1 e+03*** (-3.70)	-1.3 e +03 (-1.57)
<i>N</i>	12421	12421	12421
<i>adj R2</i>	YES	YES	YES
<i>Controls</i>	YES	YES	YES
<i>Firm FE</i>	YES	YES	YES
<i>Ind FE</i>	YES	YES	YES

4 MECHANISM ANALYSIS

According to the test above, this paper finds that digital finance can promote the growth of enterprises, but the mechanism is not clear yet. This part will try to make further analysis from the perspective of enterprise financialization, and try to provide further empirical evidence of the mechanism of digital finance affecting enterprise growth.

Digital finance provides more convenient financial services for a wider population, and the cost of allocating financial assets for small and micro enterprises is significantly reduced. Therefore, small and micro enterprises are more inclined to allocate financial assets for two reasons: "preventive motivation" and "profit-seeking motivation".

Similarly, the deepening of financialization will provide support for the growth and development of small and micro enterprises from the same two aspects. The capital cycle of manufacturing industry is generally high. From the perspective of prevention, the liquidity management function of financial assets

can make up for the problem of insufficient liquidity of manufacturing enterprises, alleviate the capital pressure of small and micro enterprises and improve the internal environment of enterprise development. From the perspective of profit, the return on investment of financial assets is generally higher than that of physical investment. Moderate financialization can meet their industrial investment needs by broadening financing channels (Mingyu Li et al., 2019), and enhance the resource allocation ability of small and micro enterprises, thus enhancing the growth of enterprises.

Referring to the research of Yong Du et al. (2017), this paper constructs the variable of "financialization degree (fa)". The specific definition is: financialization degree (fa) = (transactional financial assets + derivative financial assets + net loans and advances + net available-for-sale financial assets + net held-to-maturity investment + net investment real estate)/total assets × 100%. Table 4 shows the regression results of the impact of digital finance development on the financialization level of enterprises. It can be seen that the development of digital finance has significantly deepened the financialization of enterprises.

Table 4: Digital Finance Development and Enterprise Financialization Degree.

	(1) <i>fa</i>	(2) <i>fa</i>
<i>Dif</i>	0.030*** (3.57)	
<i>digit</i>		0.007** (2.40)
<i>Constant</i>	-11.656** (-2.05)	-6.130 (-1.14)
<i>N</i>	12421	12421
<i>Controls</i>	YES	YES
<i>Firm FE</i>	YES	YES
<i>Ind FE</i>	YES	YES
<i>Year FE</i>	YES	YES

5 CONCLUSIONS

There are still great restrictions on the development environment of small and micro enterprises in China. Ensuring the healthy growth and development of small and micro enterprises plays a key role in economic development. Exploring the impact of digital finance development on small and micro manufacturing enterprises has important reference significance for enterprise strategy and policy direction.

Based on the micro data of small and micro enterprises in manufacturing industry and The Peking University Digital Financial Inclusion Index of China, this article empirically analyzes the impact of digital Inclusive Financing development on the short-term growth of enterprises. The main conclusions are as follows: first, the development of digital finance can significantly promote the short-term growth of small and micro manufacturing enterprises. Second, With the improvement of the development level of digital finance, the financialization degree of enterprises in this region has deepened, and the financing environment and liquidity of small and micro manufacturing enterprises have been improved, thus enhancing the short-term growth of enterprises. Third, The impact of the development of digital Inclusive Financing on the short-term growth of enterprises shows strong heterogeneity, and the growth of non-state-owned enterprises is more significant; There is no significant difference in the impact on small and micro enterprises of different sizes; In areas with higher economic development level, the promotion of enterprise growth is stronger.

At present, China's digital economy is in a period of rapid development. It is of great significance to discuss the impact of the development of digital Inclusive Financing on the main force of China's real economy development, that is, small and micro manufacturing enterprises. According to the conclusion of this paper, the following policy suggestions are given: first, the government should further deepen the reform of digital finance to continuously help the development of small and micro enterprises. Second, Small and micro enterprises can give play to the advantages of financial assets in the process of growth. They can adjust the strategic planning accordingly. Third, the development policy of digital finance can be appropriately tilted. The policy should adaptation to local condition according to regional characteristics in order to guide enterprises to rationally apply digital finance and develop rapidly and healthily.

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