

The Usage Depth of Digital Finance and SMEs' Inefficient Investment: Evidence from the A-share Market

Yinan Zhang

Department of Economics, Pepperdine University, California, the United States

*Corresponding author: Yinan.zhang@pepperdine.edu

Abstract. In recent years, digital inclusive finance has developed rapidly in China. The academic community generally believes that digital finance, as a supplement to traditional financial institutions, has eased the financing constraints of enterprises. But from another point of view, digital finance may cause enterprises to be over-financialized and thus lose efficiency. This paper tries to verify this channel. Through OLS estimation and panel fixed effect regression, this paper finds that an increase of 1% in usage depth of digital inclusive finance will lead to a rise of 0.0029 in the inefficient investment level of middle-sized and small enterprises (SMEs). Heterogeneity analysis shows that digital inclusive finance has a greater impact on the inefficient investment level of large enterprises. This study helps to clarify the negative effects of digital finance.

Keywords: Digital finance, Inefficient investment, Financialization.

1. Introduction

2003 was the watershed year in China's digital finance development history during the last 30 years. Before 2003, digital finance first appeared in the financial sector, specifically in the banking, securities electronation, and informatization processes. The process and business model of the financial sector had not, however, been altered by the electronic and informational transformation of the sector. When Alipay first appeared in 2003, it signaled the beginning of a new phase in China's growth of digital finance. Alipay was not the earliest innovation in the world, but the reasons for its success in China were intimately tied to people's purchasing habits and business structure. Taobao, which enabled consumers and small businesses to purchase and sell goods online, was part of Alipay's business. But in the beginning, building trust online was difficult and China's overall credit situation was unstable. To solve the credit problem, Taobao acted as a credit intermediary, facilitating transactions between small sellers and consumers to build trust between merchants and customers through Alipay, which led to a rapid increase in Taobao's transaction volume. The market for mobile payments changed in 2013 owing to the introduction of WeChat payment. A certain transfer fee developed as consumers grew accustomed to utilizing Alipay as a payment method. So far, Alipay and WeChat Payments have been China's two most significant and common mobile payment channels. Nevertheless, the formation of the two electronic payment channels was different. WeChat built payment channels through social networking, whereas Alipay established payment channels through credit intermediaries. Emerging financial models, such as Internet small loans, P2P Internet Finance, and Internet crowdfunding, also emerged as Internet companies entered the financial payment industry. In China's financial system, digital finance started to take hold and soon spread to all areas of the financial sector [1].

Whether the scarce capital can be effectively allocated in micro-enterprises was related to the effective operation of the capital market and the high-quality development of the economy. Due to the availability of financing, Chinese enterprises often had problems, such as excessive or insufficient investment and low investment efficiency. The foundation of economic growth was finance. Digital finance has recently made full use of information technology, including big data, cloud computing, and blockchain, all of which can significantly lower financing costs, widen the range of available financing options, and lessen information asymmetry. As a result, the financing availability of enterprises has improved. These characteristics of digital finance can theoretically change the long-standing inefficient investment phenomenon of Chinese enterprises. Therefore, research into how

digital finance may increase the investment effectiveness of micro-enterprises is beneficial to the long-term growth of such businesses and increases digital finance's capacity to support the real economy [2].

The investment decisions of enterprises were mainly affected by the availability of financing. First of all, when facing good investment opportunities, enterprises will increase their investment in innovation, and innovation will bring more benefits to enterprises. Innovation means a large investment, a long cycle, and a high risk. Traditional financial institutions usually difficult to meet the capital needs of enterprise innovation due to risk considerations. Secondly, when the financing cost of enterprises decreases or the availability of financing increases, the investment of enterprises will be promoted. However, due to the monopolistic market structure, the financing cost of traditional financial services is relatively high. At the same time, the bank-led financial system will lead to credit rationing and cause small and medium-sized enterprises to reduce their financing availability. Information asymmetry has existed in financial service institutions and enterprises for a long time, and resources have not been effectively allocated.

For the study on how digital finance affects businesses' inefficient investment, the previous research generally presents two parts of the research field: one is how digital finance affects financial development, and the other one is how financial development affects enterprise efficiency. Even if the early results of these two parts are examined separately, the conclusions are not completely consistent [3].

In essence, digital finance focuses on solving the high-risk premium caused by the lack of risk screening ability in traditional finance and the high transaction cost caused by the lack of cost control ability [4]. On the one hand, with the popularity of mobile communication terminals, it continuously embeds various application scenarios and penetrates various fields to strengthen the supply capacity of financial services. On the other hand, it uses the accumulation of big data information and algorithms to continuously improve risk control schemes and excessive marginal costs, thus expanding the demand scale of financial services [5]. Taking this as an opportunity, in recent years, digital finance has improved the risk identification efficiency and disposal efficiency of financial enterprises at the micro-level, thus enriching the supply and availability of financial products, and promoting the continuous progress of the depth and breadth of the financial market at the macro level, so as to continuously improve the financial ecology of the real economy, especially the small, medium and micro enterprises [6]. However, digital finance is not equal to policy finance in essence. Commercial banks and other financial institutions still cannot ignore the basic contradiction between cost and income, risk and income in the process of digitalization [7]. Therefore, there are many constraints on the improvement of China's financial system through digital finance, which is limited by the fact that information cannot be completely symmetrical, as a result, the interest rate cannot fully cover the risk, resulting in credit failure, and the fixed cost of digital facilities also determines the solvency constraints [8-9]. Therefore, although the positive role of digital technology in promoting financial development has been supported by a large number of studies, the trend of its role has also been questioned by some scholars [10]. Therefore, the effectiveness of the impact of digital Finance on inefficient investment still needs further empirical testing.

The rest of this paper is organized as follows: Part 2 is the research design, which includes data sources and model specification; Part 3 is the empirical results; Part 4 is discussion and Part 5 is conclusion.

2. Research Design

2.1 Data sources

The digital inclusive financial index utilized in this study was taken from the Peking University publication of the digital inclusive financial index (2011-2018). The data of Shanghai and Shenzhen A-share enterprises comes from CSMAR database, and the data range is from 2011 to 2018. CSMAR economic and financial research database is an economic and financial database developed based on

the professional standards of CRSP of the University of Chicago, standard & Poor's Compustat, Taq of the New York Stock Exchange, i/b/e/s, Thomson, and other internationally renowned databases in combination with China's actual national conditions. The CSMAR database contains 18 series covered after 18 years of continuous improvement and accumulation, including 130+ databases, more than 4000 tables, and more than 40000 fields. These series include factor research, character characteristics, the green economy, stocks, companies, etc.

This paper selects samples according to the following rules: (1) exclude samples from the financial industry; (2) Samples with ST and ST* excluded; (3) Eliminate samples with missing values of variables; (4) Consider the influence of extreme values, the winsorize method is used to treat continuous variables with 1% bilateral tailing.

2.2 Model specification

$$y_i = \alpha_0 + \alpha_1 \times Usage\ Depth_{ic} + x_i' \beta + \varepsilon_i \quad (1)$$

In formula (1), y_i is an inefficient investment level. $Usage\ Depth_{ic}$ is the core dependent variable, which indicates the depth of the use of digital inclusive finance in City c where enterprise i is located. x_i' is a control variable vector at the enterprise level, including total asset, total debt, enterprise age (taking the listing years as the proxy variable), the shareholding ratio of the largest shareholder, the dummy variable of state-owned enterprises, the dummy variable of foreign-funded enterprises, the size of the board of directors, the number of independent directors, executive compensation and ROA (%).

$$Invest_{it} = \beta_0 + \beta_1 Invest_{it-1} + \beta_2 Size_{it-1} + \beta_3 Lev_{it-1} + \beta_4 Growth_{it-1} + \beta_5 Ln\ Age_{it-1} + \beta_6 Ret_{it-1} + \beta_7 CFO_{it-1} + \sum \beta_i Industry + \sum \beta_j Year + \varepsilon_{it} \quad (2)$$

In model 1, investments are made at the enterprise's current investment scale; size represents the enterprise's scale; Lev represents the capital structure; growth represents the growth rate of the main business's income; age represents the enterprise's age; RET represents the stock return; CFO represents the net cash flow of operating activities; and, simultaneously, the fixed effect of the industry is taken into account. The optimal investment scale for the business during the current time is determined using model 1 in this study, which is then subtracted from the actual investment scale. The residual (absolute value) represents the inefficient investment level of the enterprise. In particular, the absolute value of the residual represents the inefficient investment level of the enterprise. If the residual is greater than 0, it means excessive investment; if the residual is less than 0, it means insufficient investment.

Table 1 shows descriptive statistics. It should be noted that in the empirical test part, this paper uses the logarithm of total assets, total liabilities, and executive compensation in the model.

Table 1. Summary statistics

Variable	N	Mean	Std. Dev.	Min	Max
Usage Depth	5096	189.3578	68.2047	12.49	325.6791
Inefficient investment	5096	1.7349	4.1753	0.0006	36.6238
Asset, unit: 10000 Yuan	5096	511747.62	1048682.1	18657.975	22776239
Debt, unit: 10000 Yuan	5096	252928.61	719779.93	3627.572	19140186
Age	5096	5.1517	3.2723	0	14
top1	5096	34.2534	14.6142	4.15	88.92
SOE=1	5096	0.1648	0.3711	0	1
Foreign=1	5096	0.0555	0.229	0	1
Board Size	5096	8.3958	1.461	5	15
No. of Independent Director	5096	3.0983	0.4637	2	5
Salary, unit: 10000 Yuan	5096	345.8397	309.7526	15.7712	2411.08
ROA, %	5096	4.708	6.2585	-32.8121	23.4179

3. Empirical results

3.1 Benchmark regression

The baseline regression results are displayed in Table 2. Column (1) is univariate regression, only including usage depth and constant term as explanatory variables, and column (2) contains explanatory variables at the company level. Compared with the first 2 columns, columns (3) and (4) include industry fixed effect and time fixed effect. This paper analyzes the regression results with the complete model in column (4). It can be seen that an increase of 1 unit in the depth of digital finance will lead to an increase of 0.0029 units in the inefficient investment level of enterprises. According to the empirical results, this paper believes that the development of digital finance has led to the reduction of enterprise investment efficiency. The possible reason is that digital finance has promoted enterprise financialization.

Table 2. Benchmark regression

VARIABLES	(1)	(2)	(3)	(4)
	OLS	OLS	OLS	OLS
	Inefficient Investment			
Usage Depth	0.0049*** (0.0008)	0.0027*** (0.0010)	0.0039*** (0.0004)	0.0029*** (0.0005)
Age		0.2063*** (0.0447)		0.2171*** (0.0533)
Age-sq		-0.0104*** (0.0037)		-0.0112*** (0.0042)
Ln asset		-0.1298 (0.1869)		-0.2096 (0.2009)
Ln debt		0.2341** (0.1143)		0.2282* (0.1262)
top1		0.0039 (0.0044)		0.0043 (0.0046)
SOE=1		0.0880 (0.1793)		-0.0203 (0.1878)
Foreign=1		-0.3537 (0.2170)		-0.2917 (0.2105)
Board Size		-0.1370** (0.0639)		-0.1718** (0.0682)
No. of Independent Director		0.2958 (0.1843)		0.3534* (0.1912)
Ln salary		-0.2405* (0.1237)		-0.1747 (0.1305)
ROA, %		-0.0440*** (0.0166)		-0.0422** (0.0171)
Constant	0.8131*** (0.1435)	2.4103 (2.3787)	0.5079 (0.4103)	2.8729 (2.3935)
Observations	5,096	5,096	5,096	5,096
R-squared	0.0063	0.0267	0.0260	0.0423
Data	Unbalanced	Unbalanced	Unbalanced	Unbalanced
Industry Dummy	No	No	Yes	Yes
Year Dummy	No	No	Yes	Yes

3.2 Robustness Test

Part 3.1 uses the method of cross-section regression to estimate the model. This part uses the balanced panel data and fixed effect regression to test the robustness. It can be found that there is no significant change in the size and significance of the coefficient, and the conclusion of this paper is robust.

Table 3. Robustness test

VARIABLES	(1)	(2)	(3)	(4)
	OLS	OLS	OLS	OLS
	Inefficient Investment			
Usage Depth	0.0064***	0.0026***	0.0033***	0.0028***
	(0.0012)	(0.0001)	(0.0005)	(0.0008)
Age		0.2154***		0.2306**
		(0.0708)		(0.0987)
Age-sq		-0.0097*		-0.0117
		(0.0052)		(0.0071)
Ln asset		-0.1868		-0.3440
		(0.2728)		(0.2969)
Ln debt		0.2570*		0.2880*
		(0.1541)		(0.1745)
top1		0.0049		0.0064
		(0.0057)		(0.0064)
SOE=1		0.1427		0.1511
		(0.2237)		(0.2486)
Foreign=1		-0.1083		-0.0524
		(0.5085)		(0.4566)
Board Size		-0.2003*		-0.2177*
		(0.1128)		(0.1210)
No. of Independent Director		0.4230		0.4664
		(0.2744)		(0.2891)
Ln salary		-0.1745		-0.1087
		(0.1835)		(0.1960)
ROA, %		-0.0123		-0.0098
		(0.0146)		(0.0154)
Constant	0.5538***	1.9981	0.5150	2.8984
	(0.1732)	(4.1484)	(0.8144)	(3.7353)
Observations				
R-squared	3,896	3,896	3,896	3,896
Data	487	487	487	487
Industry Dummy	Balanced	Balanced	Balanced	Balanced
Year Dummy	No	No	Yes	Yes

3.3 Heterogeneity analysis

This part studies the heterogeneous effect of the usage depth of digital finance on the inefficient investment level. Dummy is a dummy variable of the company scale. When the total assets of the company in the current period are above the 50th percentile, it is taken as 1, otherwise, it is taken as 0. It can be seen from the estimation results of the interaction term that the marginal effects of the depth of digital Finance on the investment efficiency of large-scale and small and medium-sized enterprises are 0.0038 and 0.0012 respectively.

Table 4. Heterogeneity analysis

VARIABLES	(1)	(2)	(3)	(4)
	OLS	OLS	OLS	OLS
	Inefficient Investment			
Usage Depth	0.0048***	0.0028***	0.0020***	0.0012***
	(0.0009)	(0.0010)	(0.0006)	(0.0007)
Dummy	2.4238	0.9923	1.1643	0.5531
	(1.9644)	(2.0317)	(2.1983)	(2.2227)
Dummy × Usage Depth	0.0084***	0.0039***	0.0044***	0.0026***
	(0.0004)	(0.0006)	(0.0001)	(0.0001)
Age		0.2051***		0.2163***
		(0.0466)		(0.0537)
Age-sq		-0.0103***		-0.0111**
		(0.0039)		(0.0043)
Ln asset		-0.1258		-0.1961
		(0.1919)		(0.2071)
Ln debt		0.2333**		0.2260*
		(0.1151)		(0.1270)
top1		0.0040		0.0043
		(0.0045)		(0.0046)
SOE=1		0.0873		-0.0194
		(0.1793)		(0.1877)
Foreign=1		-0.3522		-0.2926
		(0.2166)		(0.2103)
Board Size		-0.1370**		-0.1715**
		(0.0640)		(0.0682)
No. of Independent Director		0.2954		0.3514*
		(0.1844)		(0.1914)
Ln salary		-0.2385*		-0.1753
		(0.1239)		(0.1307)
ROA, %		-0.0440***		-0.0421**
		(0.0167)		(0.0171)
Constant	0.8226***	2.2985	0.4603	2.6075
	(0.1515)	(2.4019)	(0.4329)	(2.4518)
Observations	5,096	5,096	5,096	5,096
R-squared	0.0066	0.0268	0.0260	0.0424
Data	Unbalanced	Unbalanced	Unbalanced	Unbalanced
Industry Dummy	No	No	Yes	Yes
Year Dummy	No	No	Yes	Yes

4. Discussion

Based on the above, the policy recommendations of this paper are as follows:

First, we need further support the development of digital finance and provide beneficial financial support for enterprise technology improvement as well as efficiency improvement. The combination of big data technology, artificial intelligence technology and other technological innovations with finance should be further improved. The transformation of digital finance product achievements ought to be promoted and the mode together with mechanism for digital finance is supposed to be optimized to serve the real economy. We should strengthen the training of financial technology professionals,

especially those with compound professional backgrounds, so as to make the connection between the specific practical application of financial technology and related research more effective.

Second, we should further strengthen the inclusive characteristics of the development of digital finance, provide effective support for a large number of small, medium-sized, and micro-enterprises and even technology-based enterprises, and cover market areas that traditional finance cannot reach, so as to establish the precise financial support orientation of digital finance. We should improve the application of big data technology; effectively identify and predict the internal operation, external risks, and market technology succession path of small, medium-sized, and micro-enterprises and even technology-based enterprises, in order to create a good survival and development environment for such enterprises and improve their operational efficiency.

5. Conclusion

This paper investigates the impact of usage depth of inclusive finance on the investment efficiency of small and medium-sized enterprises using data from the digital inclusive financial index released by the digital finance research center of Peking University and data of Shanghai and Shenzhen A-share listed companies. The empirical findings indicate that firms' investment efficiency is decreased by the usage depth of inclusive financing utilization.

References

- [1] Huang Hao. The development of digital finance in China: integration and transformation [J]. China Development Observation,2018(16):27-28.
- [2] Wu Minghua. Digital Finance Affects the Investment Efficiency of Enterprises: Based on the Perspective of Financing Availability [J]. West China Finance, 2022(05):34-39+51.
- [3] Wang Juan & Zhu Weiwei. Can the Development of Digital Finance Correct the Inefficient Investment of Enterprises [J]. Finance & Economics,2020(03):14-25.
- [4] Huang Hao. The Formation and Challenges of Digital Financial Ecosystem Experience from China [J]. Economist,2018(4):80-85.
- [5] Bei Duoguang & Li Yan. New era of digital Inclusive Finance [M].Beijing: CITIC Publishing Group, 2017.
- [6] Wu Tong & Li Ming. New Dimension of Blockchain Financial Supervision and Governance [J]. Finance & Economics,2019(11):1-11.
- [7] Fu Qiuzi & Huang Yiping. Digital Finance s Heterogeneous Effects On R ural Financial Demand:Evidence From China Household Finance Survey andInclusive Digital Finance Index [J]. Journal of Financial Research,2018(11):68-84.
- [8] CF40 digital Inclusive Finance Research Group & Ji Zhihong. Inclusive mechanism and sustainable development of digital Finance [J]. New financial review,2019(1):122-148.
- [9] Li Haifeng, Peng Jiasheng & He Wei. Research on the impact of digital financial services on the development of Inclusive Finance: theoretical basis and empirical evidence [J]. Journal of Southwest Minzu University (Humanities and Social Science), 2019,40(6):139-145.
- [10] Ding Rijia, Liu Ruining & Zhang Qianqian. Research on the impact and mechanism of digital Inclusive Finance on the development of service industry: An Empirical Analysis Based on inter provincial panel data [J]. Finance and Economy,2019(7):4-10.