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The Digital Inclusive Finance and Investment Efficiency of Enterprises: Evidence from Perspective of Financialization

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Abstract: Digital inclusive finance, a byproduct of traditional banking and digital technology, has a substantial effect on the financial standing of businesses. Using information from Chinese Ashare listed firms between 2011 and 2018, this paper empirically investigates the connection between the emergence of digital financial inclusion and investment efficiency and financialization of real enterprises, as well as their underlying mechanisms. The results show that digital financial inclusion rises a suppressive effect on the investment efficiency of enterprises. Further, this effect is influenced by other control factors. The mechanism test shows that digital financial inclusion enhances the process of financialization of corporations. Findings of this paper help clarify the mechanism of the role of digital inclusive finance. Based on the empirical findings, this paper recommends controlling the unrestricted promotion of digital inclusive finance but encouraging balanced expand.

Keywords: Digital Financial Inclusion, Corporate finance, Financialization, Investment Efficiency.

1. Introduction

1.1. Background

Finance is an important driving force for the development and operation of the real economy. It exerts the function of resource allocation to provide financial services for real enterprises, injects liquidity resources, and enables real enterprises to carry out production and operation activities. The evolution of internet information technology has led to the emergence of technologies, and the popularization and application of digital innovation in the financial field has formed digital finance.

Financial inclusion means a financial system that can deliver services effectively and comprehensively for all social strata and groups. The development of financial inclusion has been an important issue for governments around the world for a long time. At the same time, the study discovered the accelerated integration of digital technology and inclusive finance can not only increase its scope and depth of services, but also assist in lowering the transaction costs associated with inclusive finance and financial services. Then, will the development of digital financial inclusion help to broaden the direct financing channels of enterprises, improve the investment efficiency of enterprises, and will it have an impact on the process of enterprise financialization?

Taking China as an example, at present, Chinese SMEs are still faced with the problem of difficult and expensive financing, while nonfinancial enterprises with financing advantages can obtain

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financing at low cost and engage in shadow banking activities through bridge loans, entrusted loans, etc. Excess funds are lent to mediumsized and small business facing financing difficulties, which results in the continuous extension of the capital supply chain of the real economy and improves the degree of financialization of enterprises [1]. Therefore, exploring digital financial inclusion's effects on the financialization of nonfinancial listed companies can help solve the problem of capital mismatch faced by traditional finance, and prevent and resolve financial risks brought by shadow banking and other businesses.

At the same time, the link between digital financial inclusion is the main topic of this study, corporate financialization, and investment efficiency. This paper examines the relationship and differential performance of financialization and cash holdings from the perspective of internal corporate financialization motives, combining external environment and internal governance, digital financial inclusion's effects as an external moderating variable on them, and further analyzes how financialization has affected the effectiveness of investments and how they are realized.

Therefore, the influence of the growth of digital financial inclusion in Chinese real enterprises on investment efficiency is empirically examined in this paper. This paper expects practical evidence to prove that the growth of digital financial inclusion helps realworld businesses "get out of the virtual and into the real" in their economic operations, which is manifested as restraining the financialization of enterprises and promoting the development of enterprise industrialization investment. Digital financial inclusion restrains the financialization of enterprises by reducing the financial expense ratio of enterprises, promoting the industrialization investment of enterprises, and improving investment efficiency. This paper will further demonstrate the impact of financial inclusion through digital method.

1.2. Literature Review

The impact of digital financial inclusion on society and the economy is characterized by diversity. The majority of the research now in circulation examines how macroeconomic growth is affected by digital financial inclusion, income distribution, corporate financial decisionmaking, and household finance. According to certain academics, macroeconomic development can be stabilized and financial resource allocation can be done more effectively thanks to digital financial inclusion [2]. In terms of the income distribution, many scholars believe that the growth of financial inclusion in digital form will help reduce rural poverty levels and narrow the disparity between urban and rural income [3]. In terms of corporate financial decisions, currently available research indicates that digital financial inclusion is more inclined to provide loan support to MSMEs [4], alleviate their financing constraints, and promote corporate investment and innovative R&D activities [5]. In terms of household finance, the growth of digital financial inclusion accelerates the development of residential credit support [6] and entrepreneurship, residential consumption [7].

Lim et al. show that an equityoriented financial system has a more profound impact on business economic expansion and innovation [8]. Honohan argues that by making it simpler for micro and small businesses to acquire credit assistance, the growth of digital financial inclusion can increase the effectiveness of resource allocation and economic growth [9]. In promoting economic growth and development, the payment and financing functions of digital financial inclusion are of great interest [10].

Consequently, this work expands on the body of previous research, will analyze the effect of digital financial inclusion on real businesses' financialization and realization in the context of developing it, and further explore the effect on investment efficiency.

The remaining portions of this essay are arranged as follows: part 2 is research design, which includes data sources, model specification, and summary statistics; Part 3 is Results & Discussion, in which empirical results and relevant tests are provided. The final chapter presents a conclusion.

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2. Research Design

2.1. Data sources

The Digital financial inclusion Index from 2011 to 2018 is obtained from the Digital financial inclusion Index, Peking University.

Data of Ashare firms in Shanghai and Shenzhen are obtained from CSMAR database, with data intervals from 2011 to 2018.

These are the data processing steps: first, due to the special nature of the financial industry, listed companies in the financial industry are excluded; second, ST and ST* listed companies are excluded; third, missing samples of independent, dependent, and control variables are excluded; fourth, the continuous variables are winsorized by 1% before and after. After the above processing, this paper obtained 18643 research samples.

2.2. Model specification

To more conclusively demonstrate how digital financial inclusion affects businesses' financialization and investment efficiency, this paper conducts an empirical study through the following model (1).

$$Invest_{it} = \beta_0 + \beta_1 \times AggIndex_{it-1} + \beta_2 \times Asset_{it} + \beta_3 \times Debt_{it} + \beta_4 \times Top_{it} + \beta_5 \times Age_{it} + \beta_6 \times \mathrm{SOE}_{it} + \beta_7 \times \mathrm{Foreign}_{it} + \beta_8 \times \mathrm{Salary}_{it} + \beta_9 \times \mathrm{Director}_{it} + \beta_6 \times \mathrm{ROA}_{it} + \varepsilon_{it} \quad (1)$$

In which the level of inefficient investment is to be estimated using a different equation. The estimation is done in the following model (2).

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

The residual term in model (2) > 0 indicates overinvestment and < 0 indicates underinvestment. We take the absolute value of this residual and make it the level of inefficient investment.

In model (1), Aggregate Index is the core explanatory variable, and Inefficient investment and Degree of Financialization are the dependent variables. model (1) is used to measure the optimal investment size of the firm in the current period, and then the actual investment size is subtracted from the optimal investment size, and the residual (absolute value) represents the level of inefficient investment of the firm. In particular, the absolute value of the residual indicates the level of inefficient investment, and if the residual is greater than 0, it indicates overinvestment, and if the residual is less than 0, it indicates underinvestment.

The table below displays descriptive statistics for the variables.

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Table 1: Variables' definition.

variables	Variable Type	Definition
Aggregate Index	Core explanatory variables	Peking University Digital financial inclusion Index 2018
Inefficient investment	Dependent variable	An index for judging investment inefficiency
Degree of Financialization		The ratio (percentage) of financial assets held by firms to their total assets at the conclusion of the term is how much they are financed. Financial assets are defined as the sum of tradable financial assets, derivative financial assets, net loans and advances made, net financial assets that are available for sale, net investments that are held to maturity, and net investment properties.
Asset, unit: 10000 Yuan	Control variables	At the end of the time period, total assets
Debt, unit: 10000 Yuan		Liabilities totaled at the end of the time period
Age		Length of time that the enterprise has been listed
Top1		The shareholding ratio of the first largest shareholder (%)
SOE=1		Stateowned enterprises=1, otherwise 0
Foreign=1		Foreignfunded enterprises=1, otherwise 0
Board Size		Size of the board of directors
No. of Independent Director		Number of independent directors
Salary, unit: 10000 Yuan		Executive remuneration
ROA, %		Return on Assets

2.3. Summary Statistics

The mean value of Aggregate Index is 193.8573 and the mean value of Inefficient investment is 2.7197. The residuals of model (1) took the absolute value so the larger the value, the less efficient the investment.

The results of the control variables are within reasonable limits as seen from the descriptive analysis.

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Table 2: Summary Statistics.

Variable	N	Mean	Std. Dev.	Min	Max
Inefficient investment	18643	2.7197	5.6847	0	37.0242
Degree of Financialization	18643	.0327	.0697	0	.5748
Aggregate Index	18643	193.8573	64.597	23.1	302.9827
Asset, unit: 10000 Yuan	18643	1319074.4	4190242.3	18657.975	45434239
Debt, unit: 10000 Yuan	18643	807851.61	2976068.7	3627.572	33624640
Age	18643	9.6204	7.2536	0	25
top1	18643	34.9478	15.1419	.29	89.99
SOE=1	18643	.3799	.4854	0	1
Foreign=1	18643	.0477	.2132	0	1
Board Size	18643	8.6277	1.7213	5	15
No. of Independent Director	18643	3.1866	.5705	2	5
Salary, unit: 10000 Yuan	18643	371.2091	358.3207	15.7712	2411.08
ROA, %	18643	4.3175	6.2884	32.8121	23.4179

3. Results & Discussion

3.1. Benchmark Regression

The effects of digital inclusion on businesses' financialized and industrialized investments are seen in the following table. Column (1) is the univariate regression including the core variables. The findings indicate that corporate inefficient investment has a 0.0045 regression coefficient for digital financial inclusion. and passes the 1% statistical significance test, this suggests that the degree of corporate wasteful investment rises as digital financial inclusion develops. This shows that as digital financial inclusion develops, the amount of unproductive investment rises. After the inclusion of control variables, as shown in column (2), the above findings are not significant. Compared with the first two columns, columns (3) and (4) control industry and time fixed effect. According to column (3), digital financial inclusion has a 0.0015 regression coefficient on inefficient investment, but the result is not significant. Once the control variables have been added, as shown in column (4), the correlation between corporate inefficient investment and digital financial inclusion is 0.0064. and passes the 1% statistical significance test. The above findings indicate that enterprise investment behavior is impacted by the emergence of digital inclusion, which is reflected in the suppression of financial investment and the reduction of the efficiency of enterprises' investment.

For the control variables, in column (4), the coefficient between the length of time the firm has been listed and the firm's inefficient investment is 0.1914, which at the 1 percent level, is substantial, showing that the longer the firm has been listed, the more it inhibits the firm's investment efficiency. The coefficient between the return on total assets and financialized investment is 0.0498 and significant at the 1 percent level, demonstrating that the more profitable a firm is, the more it will increase its industrial investment, and also indicates that the profitability of a firm has an important influence on the development direction of real enterprises. The above results are in line with the expected results.

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Table 3: Benchmark regression.

VARIABLES	(1) OLS Inefficient Investment	(2) OLS Inefficient Investment	(3) OLS Inefficient Investment	(4) OLS Inefficient Investment
Aggregate Index	0.0009	0.0013**	0.0037	0.0046**
	(0.0007)	(0.0007)	(0.0023)	(0.0024)
Dummy	1.4244	3.0928**	1.3654	0.8285
	(1.2919)	(1.3123)	(1.4176)	(1.4279)
Dummy × Aggregate Index	0.0060	0.0100**	0.0048	0.0016
	(0.0048)	(0.0049)	(0.0052)	(0.0053)
Age		0.1301***		0.1481***
		(0.0232)		(0.0241)
Agesq		0.0007		0.0022**
		(0.0011)		(0.0011)
Ln asset		0.3649***		0.2466**
		(0.1159)		(0.1215)
Ln debt		0.4102***		0.2283**
		(0.0851)		(0.0896)
top1		0.0040		0.0001
		(0.0030)		(0.0032)
SOE=1		0.0440		0.1159
		(0.1170)		(0.1254)
Foreign=1		0.3365**		0.3239**
		(0.1508)		(0.1515)
Board Size		0.1396***		0.1046***
		(0.0375)		(0.0384)
No. of Independent Director		0.3711***		0.3456***
		(0.1166)		(0.1176)
Ln salary		0.2211***		0.3156***
		(0.0673)		(0.0708)
ROA, %		0.0559***		0.0504***
		(0.0100)		(0.0102)
Constant	2.5302***	4.1655***	2.4532***	6.7180***
	(0.1304)	(1.2237)	(0.5232)	(1.3881)
Observations	18,643	18,643	18,643	18,643
Rsquared	0.0003	0.0421	0.0366	0.0624
Data	Unbalanced	Unbalanced	Unbalanced	Unbalanced
Industry Dummy	No	No	Yes	Yes
Year Dummy	No	No	Yes	Yes

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3.2. Heterogeneity Analysis

The following table shows the results of the heterogeneity test of the effects of inefficient investment and digital financial inclusion of firms. The heterogeneity analysis can examine whether the effects of digital finance are different for different firms.

If the firm's total assets are above the 50th percentile in the current year, those are considered largescale firms, and others are considered small firms.

Regressions involving control variables are not included in columns (1) and (3), while control variable grouping regressions are included in columns (2) and (4). Similar to the regression in the previous section, column (3) and (4) control industry and time fixed effect. The results of the interaction term in the table Dummy × Aggregate show that the interaction term is not significant, indicating that there is no scale heterogeneity in the effect of digital finance development on inefficient corporate investment.

Table 4: Heterogeneity analysis.

VARIABLES	(1) OLS Inefficient Investment	(2) OLS Inefficient Investment	(3) OLS Inefficient Investment	(4) OLS Inefficient Investment
Aggregate Index	0.0009	0.0013**	0.0037	0.0046**
	(0.0007)	(0.0007)	(0.0023)	(0.0024)
Dummy	1.4244	3.0928**	1.3654	0.8285
	(1.2919)	(1.3123)	(1.4176)	(1.4279)
Dummy × Aggregate Index	0.0060	0.0100**	0.0048	0.0016
	(0.0048)	(0.0049)	(0.0052)	(0.0053)
Age		0.1301***		0.1481***
		(0.0232)		(0.0241)
Agesq		0.0007		0.0022**
		(0.0011)		(0.0011)
Ln asset		0.3649***		0.2466**
		(0.1159)		(0.1215)
Ln debt		0.4102***		0.2283**
		(0.0851)		(0.0896)
top1		0.0040		0.0001
		(0.0030)		(0.0032)
SOE=1		0.0440		0.1159
		(0.1170)		(0.1254)
Foreign=1		0.3365**		0.3239**
		(0.1508)		(0.1515)
Board Size		0.1396***		0.1046***
		(0.0375)		(0.0384)
No. of Independent Director		0.3711***		0.3456***
		(0.1166)		(0.1176)
Ln salary		0.2211***		0.3156***
		(0.0673)		(0.0708)

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Table 4: （continued）

VARIABLES	(1) OLS Inefficient Investment	(2) OLS Inefficient Investment	(3) OLS Inefficient Investment	(4) OLS Inefficient Investment
ROA, %		0.0559***		0.0504***
		(0.0100)		(0.0102)
Constant	2.5302***	4.1655***	2.4532***	6.7180***
	(0.1304)	(1.2237)	(0.5232)	(1.3881)
Observations	18,643	18,643	18,643	18,643
Rsquared	0.0003	0.0421	0.0366	0.0624
Data	Unbalanced	Unbalanced	Unbalanced	Unbalanced
Industry Dummy	No	No	Yes	Yes
Year Dummy	No	No	Yes	Yes

3.3. Robustness test

In this part, the model is reestimated using balanced panel data and fixedeffect estimation, considering that the results obtained from the measures of the explanatory variables may be subject to change and error. As mentioned earlier, Panel fixedeffect Inefficient Investment is regressed on the other variables as shown in the table below. The regression results of digital financial inclusion on firms' inefficient investment show that the findings are found to be robust the conclusions of this paper still hold.

Table 5:Robustness test.

VARIABLES	(1) Panel FE Inefficient Investment	(2) Panel FE Inefficient Investment	(3) Panel FE Inefficient Investment	(4) Panel FE Inefficient Investment
Aggregate Index	0.0042***	0.0001	0.0016	0.0060**
	(0.0008)	(0.0011)	(0.0035)	(0.0029)
Age		0.1776***		0.2077***
		(0.0393)		(0.0415)
Agesq		0.0033**		0.0052***
		(0.0016)		(0.0016)
Ln asset		0.2780		0.1612
		(0.1812)		(0.1894)
Ln debt		0.3950***		0.2260
		(0.1334)		(0.1389)
top1		0.0063		0.0020
		(0.0043)		(0.0045)

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Table 5: （continued）

VARIABLES	(1) Panel FE Inefficient Investment	(2) Panel FE Inefficient Investment	(3) Panel FE Inefficient Investment	(4) Panel FE Inefficient Investment
SOE=1		0.0567		0.0114
		(0.1740)		(0.1824)
Foreign=1		0.2396		0.2273
		(0.3224)		(0.3024)
Board Size		0.1304**		0.0938*
		(0.0556)		(0.0548)
No. of Independent Director		0.3263**		0.3134**
		(0.1602)		(0.1575)
Ln salary		0.1929*		0.2952***
		(0.1018)		(0.1047)
ROA, %		0.0321**		0.0272**
		(0.0134)		(0.0136)
Constant	2.0268***	2.0948	2.4642	4.3961*
	(0.1546)	(2.0320)	(1.6008)	(2.5798)
Observations	13,200	13,200	13,200	13,200
Number of id	1,650	1,650	1,650	1,650
Data	Balanced	Balanced	Balanced	Balanced
Year Dummy	No	No	Yes	Yes

3.4. Mechanism analysis

The following table examines the mechanism of core variables through a model. The financialization of enterprises is measured as a percentage of their financialization. The next four columns including the regression coefficients for the digital inclusion index at the 1% level are highly beneficial, showing that digital inclusion has contributed to the financialization of enterprises to some extent. Combined with the previous results, there is a case to be made that the growth of digital financial inclusion has prompted the financialization of firms and eventually led to a decrease in investment efficiency as a possible cause.

Table 6: Mechanism analysis.

VARIABLES	(1) OLS DoF	(2) OLS DoF	(3) OLS DoF	(4) OLS DoF
Aggregate Index	0.0198***	0.0096***	0.0394***	0.0433***
	(0.0010)	(0.0011)	(0.0031)	(0.0032)
Age		0.2749***		0.3901***
		(0.0417)		(0.0423)
Agesq		0.0028		0.0041**

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Table 6: （continued）

VARIABLES	(1) OLS DoF	(2) OLS DoF	(3) OLS DoF	(4) OLS DoF
		(0.0018)		(0.0018)
Ln asset		0.6357***		1.1192***
		(0.1571)		(0.1642)
Ln debt		0.8545***		1.2623***
		(0.1249)		(0.1279)
top1		0.0057		0.0044
		(0.0049)		(0.0049)
SOE=1		0.5459***		0.1750
		(0.1653)		(0.1717)
Foreign=1		1.3134***		1.1403***
		(0.4327)		(0.4038)
Board Size		0.2803***		0.2184***
		(0.0524)		(0.0514)
No. of Independent Director		0.3354**		0.3222**
		(0.1464)		(0.1432)
Ln salary		0.1491		0.1556
		(0.0968)		(0.0977)
ROA, %		0.0230*		0.0302**
		(0.0132)		(0.0134)
Constant	0.0583	1.5820	1.4871*	0.5914
	(0.1663)	(1.4250)	(0.8088)	(1.5866)
Observations	13,200	13,200	13,200	13,200
Rsquared	0.0322	0.1072	0.1374	0.1883
Data	Unbalanced	Unbalanced	Unbalanced	Unbalanced
Industry Dummy	No	No	Yes	Yes
Year Dummy	No	No	Yes	Yes

4. Conclusion

Not only has the growth of digital financial inclusion greatly influenced the excellent development of the global economy, but also advanced the reform of traditional finance.

This study examines the mechanisms and economic effects of the expansion of digital financial inclusion on corporate investment efficiency and corporate financialization for a selection of nonfinancial Chinese Ashare listed businesses from 2011 to 2018. The findings demonstrate that the growth of digital financial inclusion has a catalytic impact on the financialization of actual businesses, but it hinders businesses' ability to maximize their investment efficiency. Moreover, The effects of the growth of digital financial inclusion on businesses' ineffective investments are not scale heterogeneous.

Based on the above findings, this paper has the following insights: Although the government should strengthen the construction of inclusive financial system and encourage the growth of financial inclusion. However, it is still important to manage the strength of the development of digital financial inclusion to prevent the consequences of financialization of some enterprises and decrease in the

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efficiency of enterprise investment caused by its uneven development. For listed companies, they should strengthen financial risk management and industrial investment to avoid excessive financialization. Crucially, listed companies should formulate longterm development strategies to enhance their core competitiveness.

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