

# The influence on enterprise value from Digital Inclusive Finance Coverage Breadth

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**Keywords:** Digital Finance, Coverage Breadth, Enterprise value, Empirical Research.

**Abstract:** The earliest that Inclusive Finance had been proposed by the United Nations in 2005. The Chinese government introduced Inclusive Finance development as a national strategic goal in 2013. It follows that digital finance is still a new concept. In recent years, with the development of electronic information technology. Finance services started to speed up the digital transformation. The digital finance coverage breadth of cities in China is increasing year by year. This paper will research that if the digital finance coverage breadth has a positive influence on the enterprise's value. This paper uses the PKU Digital Financial Inclusion index and collects 337 cities' indexes in China from 2011 to 2018. On the side of enterprises, this paper collects A-share listed companies as object information. This paper chose the OLS regression analysis model to research the digital coverage influence on enterprises and use the fixed-effects model to do the robustness test. The result shows that the digital finance coverage breadth has a positive influence on increasing the enterprise's value on the share market. This paper also does the heterogeneity analyses to research if the digital finance coverage has a different influence on large-scale and small-scale enterprises. The result shows that coverage breadth influence on large-scale and small-scale enterprises does not have a significant difference or heterogeneous influence. At last, concluding the whole paper, conclude that digital finance coverage breadth has a positive influence on large-scale and small-scale enterprises' value on the share market.

## 1. Introduction

### A. Research Background

Production management of enterprises cannot out of the macroeconomy environment, meanwhile, financial support is the key for enterprises to keep healthy running and development. In recent years, with the rapid development of the internet and technology, finance support has started the digital transformation.[1] According to the Peking University Inclusive Financial Index report. The index of most cities in China which are increased year by year from 2011 to 2018.[2] But even in the same year, there was still a large gap in the index in different cities. Digitalization has narrowed the income gap between urban and rural areas over the past few years, stimulating consumption and making income growth. After its positive role, it also provides some ideas for entrepreneurs and gives valuable ways to improve their business performance. Mckinnon and Shaw [3] pointed that the economic cycle was stopped by the financial barriers. The planned market would disturb the dynamic economic environment by some strict policies or ban which would force on decreasing some market scale and the total production of some goods and services, moreover, the information given out are sometimes delayed and the entrepreneurs could not receive it as fast as possible.[4,5] The finance support which is caused by the digital technology by the internet from investors would increase the positive impact for the family business, and new investment exploitation by owners. Digital technology is going to expand the financial channel for small-scale companies. On the other hand, digital technology makes the information transform faster and easier to get, which means the private company would have less information than the MNC. The value of the company is related to the profit and the capital scale. Moreover, means the digital technology would help them to make more money with more competitive advantages. Digital technology would help them to set up new work.

[7,8].

The concept of Digital Financial Inclusion has been put forward by the United Nations, it aimed to provide financial services to vulnerable groups, such as micro-enterprises and individual households, at low cost.[9] The Chinese government put forward the policy of Digital Financial Inclusion on the Third Plenary Session of the 18th Central Committee in 2013. And in the following years, the environment of digital finance based on the internet received the support from Chinese national government.[10] The prime minister of China, Li KeQiang, lunch the “Internet plus” plan in 2015, to help the financing of small and micro-enterprise. In 2016, the State Council of China officially released the document, The development program of Digital Financial Inclusion; the Digital Financial Inclusion of China has been officially placed on the agenda. It means the availability, coverage degree satisfaction of Digital Financial Inclusion would be improved to a large extent by using big data analysis, mobile internet, etc. In September 2016, G20 High-Level Principles for Digital Financial Inclusion was passed at G20 Summit. This was the first time that the Digital Financial Inclusion developing plan, which the Chinese government participate in making and promoting, was launched to the international community. It marked the one step of globalization of Chinese Digital Financial Inclusion development. [11, 12]

Compare with traditional finance, Digital finance own four advantages:

1) Channel advantage

Digital finance can integrate idle funds and redistribution, which could meet the various needs of fragmented funds management and demand of enterprises.

2) Efficiency advantage

Based on the big data analysis and cloud computing platform, the process of finance could be further improved. The system can inspect the qualification of enterprises quickly, to realize the rapid issuing of loans to the enterprise. Shortened the financing time cost of companies.

3) Cost advantage

Digital finance is based on the internet platform, and there is no need to place the physical premises and employees. It could reduce the running cost platform, meanwhile, the finance cost of enterprises also could be reduced.

4) Information advantage

Digital finance is based on the internet and big data analysis. The customers’ information, include consumption habit, trading data, and personal preference, which can be recorded and collected correctly. And it is helpful to solve the information asymmetry between enterprises. Ultimately, clear and remove the financing barriers of the enterprise.

Even the applying of digital finance in China started relatively late, we still can find that the Chinese government strives to develop it. According to the Peking University Inclusive Financial Index report, the increasing index year by year from 2011 to 2018, can prove that the Chinese government carry out digital finance and rise the coverage rate of digital finance.[13] The previous research about digital finance also shows that it is helpful to enterprises and promotes their value.[14]

However, there is widespread uneven economic development in China. Economic and human resources are pooled to the developed economy cities, according to the index, the coverage rate of digital finance also shows a similar situation. The coverage rate in different cities in China is uneven.[15] This paper will research the digital finance coverage rate in different cities, and the influence on local enterprise. It can provide the suggestions about site selection of enterprises and if the local government needs to put more attention to developing digital finance. It also provides the reference to enterprises and government that if the coverage rate of digital finance is an important reference index for rising enterprise value.

B. Paper Structure

This paper is composed of six sections:

Section 2 is part of the empirical specification. Introduce the data source and collect and screen the necessary variables that regression analysis needs and finish the descriptive statistics.

Section 3 is the part of the empirical analysis; this part will choose the appropriate regression method and create a regression model. This paper will use Ordinary Least Squares (OLS) to do the

regression analysis.

Section 4 is the robustness test. To test the robustness of the result of the OLS analysis. This part will use the fixed effects model to do regression analysis and compare it with the OLS model.

Section 5 is heterogeneity analysis. To test if the result of analyses has the feature of universality if the digital finance coverage rate has a different influence on the large-scale and small-scale companies. This paper will introduce a new dummy variable and a new explanatory variable in the regression model to verify the guess.

Section 6 is conclusion. This part will summarize and give the conclusion based on the empirical result.

## 2. Empirical research

### A. Data Source

To quantify the degree of digital economy coverage, this paper will take the PKU Digital Financial Inclusion index as the quantitative criteria and reference. The index list covers 337 cities' indexes in China from 2011 to 2018.

PKU Digital Financial Inclusion index was launched by the Institute of Digital Finance, Peking University. It was calculated and developed based on the Ant Financial Services Group's data. The index is directed at 3 aspects - coverage breadth, depth, and digital degree. In 2016, PKU launched the first phase of the index, evaluated the digital finance development of each city in China during 2011-2015. In 2019, PKU launched the second phase index, increased the data of each city during 2016-2018. On the aspect of evaluating coverage breadth, PKU takes a full account of the new financial modeling, which is based on the internet, and used the total amount of the electronic accounts as the secondary indicators. PKU Digital Financial Inclusion index is the most extensive use index in the field of Chinese digital financial inclusion research. [2, 10]

To research and analyze the degree of infection to the enterprises from Digital Financial Inclusion. This paper will take all the A-share listed enterprises listed in Shenzhen and Shanghai Stock Exchange (eliminate the ST companies and financial industry-related companies) as the research samples. Meanwhile, due to the limited availability of data, remove the enterprises' samples with missing variables. The data include the financial situation of the listed companies from 2011 to 2018

The enterprises' financial data are recorded and collected from the CSMAR Database. CSMAR Economy and Finance Research Database was established by Shenzhen GTA Education Tech Ltd. (GTAFE). Full reference to the standard of existing databases, such as University of Chicago CRSP, Standard & Poor Compustat, New York Stock Exchange TAQ, I/B/E/S, Thomson, etc., and combine with the situation in the Chinese market, to set up the first economic and financial database in China. CSMAR Database involves the plates of stock, enterprise, fund, bond, derivative, economy, industry, currency market, and other finance-related information. It also owns 121 subsidiary databases. It follows then that the authority and information integrity of CSMAR. [16]

### B. Model Specification and Variable Definition

To analysis the influence on enterprise value from digital finance coverage, this paper will set the regression model, the following is a formula:

$$y_i = \alpha_0 + \alpha_1 * Coverage\ Breadth_i + \mathbf{x}'_i \boldsymbol{\beta} + \varepsilon_i$$

$y_i$  is the dependent variable;  $\alpha_0$  is constant;  $Coverage\ Breadth_i$  is the independent variable (The Coverage breadth of digital finance);  $\mathbf{x}'_i$  is the control variables (enterprises' feature).

#### a. Digital finance coverage breadth

PKU Digital Financial Inclusion index records the 337 cities' degree of digital finance development in three dimensions (coverage, usage, and digital). This paper will research the influence on enterprise from digital financial coverage. So, the variable we used is the coverage breadth of digital finance. For the numerical value of coverage breadth, the bigger the better coverage of digital finance. The coverage index in PKU Digital Financial Inclusion is mainly reflected in the number of digital finance accounts in the local city.

## b. Company-level data

To research and analyze the degree of infection to the enterprises from Digital Financial Inclusion. This paper will use several variable values about companies' financial situations.

### (1) Tobin-Q

Tobin's q is the ratio between a physical asset's market value and its replacement value. When the rate is over 1, buying newly produced capital products is more profitable, which can increase the requirement of investing. When the rate is lower than 1, which means buying ready-made capital products is cheaper than newly produced capital products, and it will decrease the requirement of investing.

### (2) Coverage breadth

The digital finance coverage breadth index of each city. Data from the Institute of Digital Finance, Peking University.

### (3) Age

Until 31st Dec 2018, the listed period for the company (unit: year).

### (4) Ln asset

Ln asset means the natural logarithm of the total asset. Total asset means the economic assets that a company owns or is under control and can bring economic interest to the company. Due to the scale of listed companies and the total assets for listed companies are too huge. For convenience, this paper will take the natural logarithm of total assets as a new variable.

### (5) Ln debt

Ln asset means the natural logarithm of total debt. Due to the total debts for listed companies being too huge. For convenience, this paper will take the natural logarithm of total debt as a new variable.

### (6) Top 1

The variable value includes the shareholding ratio first strong shareholder of one company from 2011 to 2018.

### (7) SOE=1

SOE means the state-owned enterprises, SOE=1 means mark the state-owned enterprise as 1.

### (8) Foreign =1

Foreign =1 means mark the Foreign-owned enterprise as 1.

### (9) Board size

Board size means the number of board seats.

### (10) No. of Independent Director

Independent director means the director in the company who does not serve as other any position. This variable means the number of independent directors.

### (11) Ln salary

The salary means the senior executive's salary. For convenience, this paper will take the natural logarithm of salary as a new variable.

### (12) Total Net Return on Assets (ROA)

Total Net Return on Assets means the net profit to the total asset. This ratio can reflect the profitability of the company. A higher ratio means the better profitability of the company, and the more investment value of the company.

## C. Descriptive statistics

From the year 2011 to 2018, there are 18144 effective samples. The maximum and minimum of digital finance coverage breath are 290.3175 and -10.49, and the standard deviation is 61.1409. It means the existing major difference in different cities in China about the degree of digital finance coverage development.

The maximum and minimum of Tobin Q are 9.0216 and 0.8932, and the standard deviation is 1.3507. The mean value is 2.0643. The rate of standard deviation to mean value is 0.6543. It means the enterprise's value on the share market is positive for most listed enterprises. Ln asset and Ln debt and the natural logarithm of asset and debt. It can reflect the size of enterprises. The maximum and minimum Ln assets are 26.8421 and 19.0444. The maximum and minimum Ln debt are 26.5411 and 17.4067, which means the existing scale difference between different listed companies.

Table 1. Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Tobin Q	18144	2.0643	1.3507	.8932	9.0216
Coverage Breadth	18144	193.0351	61.1409	-10.49	290.3175
Age	18144	9.5826	7.2468	0	25
Age-sq	18144	144.339	163.3615	0	625
Ln asset	18144	22.105	1.3299	19.0444	26.8421
Ln debt	18144	21.0707	1.7436	17.4067	26.5411
top1	18144	35.0463	15.1574	.29	89.99
SOE=1	18144	.3822	.4859	0	1
Foreign=1	18144	.0483	.2145	0	1
Board Size	18144	8.6366	1.7229	5	15
No. of Independent Director	18144	3.1888	.5718	2	5
Ln salary	18144	14.8177	.7837	11.9685	16.9982
ROA	18144	.0436	.0628	-.3281	.2342

### 3. Empirical analysis

This paper will do regression analysis about the A-share market listed companies, to verify the positive influence of digital finance coverage on enterprise value. The explained variable is enterprise value (expressed as Tobin's Q ratio); explaining variable is digital finance coverage breadth; all the control variables recorded as X. Industry variable recorded as industry; year variable recorded as year.

To verify the hypothesis that digital finance coverage breadth can influence the enterprise value, this paper used regression analysis by Ordinary Least Squares (OLS).

According to the result in Table 2, the data in the first column, there is a significant positive correlation between digital finance coverage breadth and enterprise value. This means when the local digital finance coverage rises by 1 unit, the enterprise value will rise by 0.0011 units. It shows the coverage of digital finance has a positive impact on enterprise value.

According to the result in Table 2, the data is in the second column. After adding the control variable, variable X, the significant positive correlation still existing between digital finance coverage breadth and enterprise value. When the local digital finance coverage rises 1 unit, the enterprise value will rise 0.0018 units.

Based on the regression model, a significant positive correlation still existing between digital finance coverage breadth and Tobin Q. The rising of the Tobin Q ratio means the value of enterprises on the share market is increasing. I think the reason for this phenomenon, could be the increase of digital finance coverage lets more companies can access the financial service.

Table 2. OLS regression analysis

	(1)	(2)
	OLS	OLS
VARIABLES	Tobin Q	Tobin Q
Coverage Breadth	0.0011***	0.0018***
	(0.0004)	(0.0003)
Age		0.1547***
		(0.0048)
Age-sq		-0.0048***
		(0.0002)
Ln asset		-0.4603***
		(0.0271)
Ln debt		-0.1053***
		(0.0203)
top1		0.0007
		(0.0005)
SOE=1		-0.1471***
		(0.0213)
Foreign=1		0.0676
		(0.0444)
Board Size		-0.0546***
		(0.0072)
No. of Independent Director		0.1846***
		(0.0213)
Ln salary		0.1094***
		(0.0136)
ROA		2.0401***
		(0.2244)
Constant	1.8179***	11.3951***
	(0.0480)	(0.2729)
Observations	18,144	18,144
R-squared	0.1422	0.3964
Year Dummy	Yes	Yes
Industry Effect	Yes	Yes

Robust standard errors in parentheses

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

#### 4. Robustness test

This paper will use the fixed effects model to do regression analysis, and compare it with the OLS model, to finish the stability test. Fixed effects model regression is a model that spatial panel data changes with the change of individual data, not time.

The variables will continue to use the mentioned variables.

According to the result in Table 3, the data in the first column, there is a significant positive correlation between digital finance coverage breadth and enterprise value. This means when the local digital finance coverage rises 1 unit, the Tobin Q will rise 0.0062 units. It still shows the coverage of digital finance has a positive impact on enterprise value.

According to the result in Table 3, the data is in the second column. After adding the control variable, variable X, the significant positive correlation still existing between digital finance coverage breadth and enterprise value. When the local digital finance coverage rises 1 unit, the enterprise value will rise by 0.0051 units.

Based on the FE regression model, a significant positive correlation still existing between digital

finance coverage breadth and Tobin Q. It shows that the environment of digital finance coverage breadth is still effective in rising the enterprise value. The result also proves the hypothesis, digital finance coverage breadth has the function of promotion about rising enterprise value. The result is the same as the OLS regression model, which confirmed the stability of the empirical result.

Table 3. Robustness test

	(1)	(2)
VARIABLES	Panel FE Tobin Q	Panel FE Tobin Q
Coverage Breadth	0.0062*** (0.0017)	0.0051*** (0.0016)
Age		-0.0932 (0.1151)
Age-sq		-0.0030*** (0.0003)
Ln asset		-1.0115*** (0.0631)
Ln debt		0.3118*** (0.0421)
top1		-0.0061*** (0.0020)
SOE=1		-0.1551* (0.0930)
Foreign=1		-0.0702 (0.1514)
Board Size		-0.0008 (0.0148)
No. of Independent Director		0.0373 (0.0380)
Ln salary		0.0877*** (0.0302)
ROA		3.6099*** (0.3411)
Constant	1.1374*** (0.1427)	16.5922*** (1.2201)
Observations	10,720	10,720
R-squared	0.2815	0.3695
Number of ids	1,340	1,340
Year Dummy	Yes	Yes
Industry Effect	Yes	Yes

Robust standard errors in parentheses

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

## 5. Heterogeneity analyses

The empirical analysis result is given above, which analyses the influence on enterprise value due to the increasing digital finance coverage breadth. To do the further analyses, for the digital finance, if the effect on the large-scale corporation and small-scale corporation is different. Now, this paper will do the heterogeneity analyses.

This paper will let the company whose total asset is over the median, which seemed as the large-scale corporation, record as the dummy variable d. Introduce a new explanatory variable, the product of the digital finance index, and variable d. Then, add the variable d and explanatory variable in the regression model. After that, the digital finance coverage influence on large-scale enterprises equals

coverage breadth index plus interaction item; for small-scale enterprises, the coverage influence only equals coverage breadth index. Repeat doing the regression analysis above.

According to the result in Table 4, after adding the variable *d* and explanatory variable, the significant positive correlation still existing between digital finance coverage breadth and enterprise value. According to the result in Table 5, the data in the first column, when the local digital finance coverage rises 1 unit, the enterprise value will rise 0.0011 units. According to the data in the second column, the local digital finance coverage rising 1 unit, the enterprise value will rise 0.0018 units.

Comparing Table 2 and Table 4, after adding the variable *d* and explanatory variable in the regression model, the results are the same. The result shows that the interaction item is inapparent. This means the digital finance coverage breadth influence to large-scale and small-scale enterprises does not have a significant difference or heterogeneous influence. The possible reasons could be that digital finance has the nature of inclusive. There is nothing to the scale of corporations. No matter a large-scale corporation or a small-scale corporation, all companies can access the financial service.

Table 4. Heterogeneity analyses

	(1)	(2)
	OLS	OLS
VARIABLES	Tobin Q	Tobin Q
Coverage Breadth	0.0011** (0.0004)	0.0018*** (0.0004)
Dummy	-0.4150** (0.1991)	0.1272 (0.2103)
Dummy # Coverage Breadth	-0.0004 (0.0008)	0.0009 (0.0008)
Age		0.1550*** (0.0048)
Age-sq		-0.0049*** (0.0002)
Ln asset		-0.4793*** (0.0273)
Ln debt		-0.1044*** (0.0203)
top1		0.0008 (0.0005)
SOE=1		-0.1420*** (0.0212)
Foreign=1		0.0694 (0.0443)
Board Size		-0.0549*** (0.0072)
No. of Independent Director		0.1884*** (0.0213)
Ln salary		0.1099*** (0.0136)
ROA		1.9940*** (0.2244)
Constant	1.8254*** (0.0496)	11.7702*** (0.2805)
Observations	18,144	18,144
R-squared	0.1482	0.3988
Year Dummy	Yes	Yes
Industry Effect	Yes	Yes

Robust standard errors in parentheses

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$



## 6. Conclusion

This paper let the A-share market listed companies from 2011 to 2018 as the research sample. Using descriptive statistics and empirical analysis to analyze the digital finance coverage breadth's effect on enterprise value. This paper also tests if the digital finance coverage breadth has a different effect on different scale corporations. Now summarize the conclusion:

(1) Digital finance coverage breadth can increase the enterprise market value

According to the OLS regression analysis, verify that the increase of the digital finance coverage rate can increase the Tobin Q ratio of listed enterprises. For the concrete manifestation of the increase their value on the share market. Digital finance based on advanced electronic digital technology increases the financing channel to the enterprises. Compare with traditional finance, digital finance can provide a more convenient way for enterprises to do financing. Furthermore, based on the development of the internet, enterprises' financing costs are expected to be reduced further.

(2) The influence of digital finance coverage breadth does not have a significant difference to large-scale and small-scale corporations

According to the heterogeneity analyses above. After adding the variable  $d$  and explanatory variable in the regression model. The results are the same as the original OLS regression analyses, the significant positive correlation still existing between digital finance coverage breadth and enterprise value. These analyses prove that there is no significant difference in digital finance coverage breadth to different scale corporations. Due to the digital finance have nature of inclusive, it is easily available for different companies. Compare with traditional financing, digital finance can help enterprises to remove asymmetric information by using cloud calculating can big data and let information transparency. This service is based on the internet, this feature also lowers the barriers for each company to do the financing.

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