

The Impact of Digital Financial Inclusion on Local Employment Rate—Evidences from China

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Abstract. With the deep integration of digital economy and financial innovation, the degree of digital inclusive finance in a city has become a key factor affecting local employment rate. Based on various indicators at the city level from 2011 to 2023, this study constructs a two-way fixed effect model to systematically investigate the mechanism and heterogeneous impact of digital inclusive finance on local employment rate. The empirical results show that: (1) Digital inclusive finance can significantly improve local employment rate, which is mainly reflected in expanding the coverage width of digital inclusive finance, and its action path is mainly reflected in two aspects: improving the level of industrial structure and the overall industrial upgrading; (2) the heterogeneity analysis shows, digital inclusive finance has a more obvious effect on improving the local employment rate in the eastern region, based on the above conclusions, this paper puts forward the following suggestions: Firstly, in view of the significant effect of digital inclusive finance in the eastern region, it is suggested that digital finance innovation demonstration zones be established in the Yangtze River Delta and the Pearl River Delta to pilot cross-border digital currency settlement and data asset trading. Secondly, the digital skill cultivation ecology of "basic education-vocational training-lifelong learning" should be built. Thirdly, improve the digital financial service standard system, focusing on the regulation of mobile payment interface, online credit risk control model and other key links.

Keywords: digital inclusive finance, Local employment rate, Two-effect fixed effects model

1. Introduction

Employment is a fundamental issue concerning people's livelihood, people's vital interests, sound economic and social development and long-term stability of the country. The report to the 20th National Congress of the Communist Party of China clearly stated that we should implement the strategy of giving priority to employment, improve the employment promotion mechanism, and promote high-quality and full employment.

At present, the relationship between social and economic activities and digitalization is getting closer and closer. With the in-depth integration of digital economy and financial innovation, digital financial system, which is reshaping the regional economic development pattern with technology-driven inclusive service model. Through innovative business forms such as mobile payment, online credit and digital insurance, it has broken through the geographical and cost constraints of traditional

financial services, providing unprecedented financial accessibility for small and micro enterprises, rural areas and low-income groups. This transformative force not only promotes the democratic allocation of financial resources, but also reconstructs the supply-demand relationship and operation logic of the job market at the micro level.

In the deep integration of digital economy and real economy, digital inclusive finance, as a combination of financial innovation and inclusive concept, is reshaping regional economic ecology and employment market pattern. As the main carrier of the development of digital inclusive finance, the changes in the employment rate of Chinese cities not only reflect the macroeconomic trend, but also become an important window to observe the social effects of financial innovation. Although existing studies have confirmed the promotion effect of digital inclusive finance on employment, there is no systematic understanding of the differentiated impact of its internal structure. Based on the panel data of Chinese cities, this paper for the first time deconstruction the employment effect of digital inclusive finance from the dual dimensions of coverage width and depth of use, and reveals the asymmetric impact mechanism of the two on the employment rate.

From the theoretical perspective, traditional employment theories mostly focus on macroeconomic policies, industrial restructuring and other explicit factors, but have not yet formed a complete analysis framework for the fintech-driven employment creation mechanism. Digital inclusive finance is building a new transmission path from access to financial resources to the improvement of employment quality by lowering the threshold of entrepreneurship, activating the hidden employment potential, and promoting human capital investment. Understanding the impact mechanism of digital inclusive finance on local employment rates not only helps to reveal the unique role of digital inclusive finance in promoting employment, but also helps to understand how financial innovation can empower regional employment growth in the context of the digital economy.

At the practical level, China's employment market is facing dual challenges: on the one hand, economic transformation and upgrading have led to a decline in the employment absorption capacity of traditional industries. On the other hand, there is a structural mismatch between the skill demand and labor supply of emerging industries. By building a flexible employment platform, promoting the digital transformation of small and micro enterprises, and enhancing the digital capabilities of vulnerable groups, digital inclusive finance is an effective way to solve the structural contradiction of "difficult employment" and "difficult recruitment".

This paper selects various indicators at the city level from 2011 to 2023 and uses two-way fixed effect model for empirical analysis. The results show that: (1) Digital inclusive finance has a significantly positive effect on the local employment rate, mainly reflected in the coverage width of digital inclusive finance, and its mechanism is mainly through optimizing the employment structure and improving the quality of employment; (2) Heterogeneity test shows that the promotion effect of digital inclusive finance coverage width on employment rate is more significant in the eastern region ($p=0.001$); (3) The mediating effect test finds that the improvement of industrial structure and the overall industrial upgrading are the key transmission paths that constitute the impact of digital inclusive finance on local employment rate. This provides new empirical evidence for understanding the economic consequences of digital inclusive finance practice, helps the government to formulate more accurate and effective employment policies, and reveals the positive role of digital inclusive finance in promoting employment, so as to enhance the awareness and confidence of all sectors of society in digital inclusive finance, and create a good environment for the healthy development of digital inclusive finance.

The following contents of this paper are arranged as follows: the second part is literature review and theoretical analysis; The third part is research design; The fourth part is the empirical results analysis; The fifth part is the conclusion and suggestions.

2. Literature review

Digital inclusive finance combines the concept of inclusive finance with digital technology, which can reduce the cost of financial services and transactions, alleviate the financing constraints of the real economy. Its development is a supplement and expansion of existing financial services and is conducive to financial services for the real economy. Rin and Hellmann proposed that financial services are boosters for the efficient allocation of resources [1]. Under the background of the new era, digital inclusive finance, as a brand-new form of financial service, is becoming an important force for China's high-quality economic development. The earliest literature on the relationship between financial development and the real economy can be traced back to Schumpeter [2]. Since Mckinnon, Shaw and others proposed the concept of "financial deepening", scholars at home and abroad have conducted a large number of studies on the relationship between finance and economic growth. Many scholars have conducted extensive research on how digital inclusive finance affects the real economy [3,4]. Previous studies have shown that digital inclusive finance has a significant effect on promoting regional economic growth, facilitating technological innovation in enterprises, promoting innovation and entrepreneurship, boosting consumption, and alleviating financing constraints [5]. Due to its unique features, digital inclusive finance can enhance the financial accessibility of all social strata, strengthen financial support, optimize the industrial structure, provide a better development environment for innovation and entrepreneurship, and also promote the in-depth integration of digital inclusive finance and the real economy by stimulating domestic demand.

In recent years, the employment problem in our country has become increasingly prominent. In terms of labor supply, the number of university graduates has reached a record high, and the transfer of rural labor to cities has led to an increase in employment pressure. On the employment demand side, facing the severe tests of economic downturn and rising labor costs, many enterprises have reduced their operating costs by cutting the number of employees. Feng Yun , Shuai Wang and Yongwei Ye believe that holding financial institutions significantly expands corporate employment, especially during tight monetary policy, in financially underdeveloped areas, and for enterprises with high financing constraints, weak external supervision, and high labor intensity [6]. Facing the increasingly prominent employment issue, the digital economy, defined by data as the core production factor and the internet as the primary carrier, is transforming production, lifestyle, and governance models [7]. The digital economy stimulates the emergence of new job types while upgrading existing industrial structures [8]. From this perspective, with the in-depth integration of intelligent technology and the real economy, a large number of new industries and new business forms will emerge, thereby significantly increasing the number of employed people.

Existing literature, against the backdrop of digitalization, has conducted research on the mechanism of employment opportunities for workers in the formal sector from aspects such as human capital, social capital, efficiency wages, and search costs [9]. Meanwhile, the digital economy has also injected new vitality into employment in China for key groups such as women, migrant workers, college graduates and people with disabilities [10].

In conclusion, digital inclusive finance optimizes the employment structure and improves the quality of employment, supports the development of new business forms and models, provides important financial support for new business forms such as the sharing economy, platform economy,

and gig economy, helps traditional industries undergo digital transformation, supports enterprises in technological transformation and equipment upgrading, and has created a large number of new employment opportunities. However, does digital inclusive finance have a direct and significant impact on local employment rates? Through what mechanism is this influence achieved?

Based on the theoretical correlation between digital inclusive finance and local employment rates, this paper constructs research hypotheses from two dimensions: direct impact and intermediary path:

H1: Digital inclusive finance can optimize the employment structure and enhance the quality of employment, thereby increasing local employment rates.

Theoretical mechanism: Digital inclusive finance provides significant financial support for new business forms such as the sharing economy, platform economy, and gig economy, giving rise to a large number of new job opportunities, such as ride-hailing drivers, food delivery riders, and online content creators. Moreover, digital inclusive finance helps traditional industries to undergo digital transformation. For instance, by providing supply chain financial services, it supports enterprises in technological transformation and equipment upgrading, thereby enhancing industrial added value and creating more high-skilled jobs.

Digital inclusive finance can optimize the employment structure and enhance the quality of employment by promoting industrial upgrading and transformation.

Intermediary path (Promoting industrial upgrading and transformation): Digital inclusive finance promotes industrial upgrading and transformation, mainly manifested in enhancing the level of industrial structure and overall industrial upgrading, thereby increasing local employment rates.

3. Research design

3.1. Sample selection and data sources

The original data from 2011 to 2023 are selected from the National Bureau of Statistics of China, the Statistical yearbooks of Chinese cities and local cities, and the Digital Inclusive Financial Index published by Peking University. The regions with serious missing data such as Xinjiang and Tibet were removed. Refer to the relevant yearbooks of each province to supplement some missing values using the linear interpolation method, and eliminate the outliers existing in the data.

3.2. Data definition

This paper mainly discusses the impact of digital inclusive finance on local employment rate. In order to verify the hypothesis, this paper constructs a two-way fixed effect empirical model to estimate the causal relationship by controlling both city fixed effect and time fixed effect:

$$Employment_{ct} = \partial_0 + \partial_1 Dfi_{ct} + \gamma_t + \delta_c + \varepsilon_{ct}$$

(1) Explanatory variable: digital financial inclusion (Dfi). Digital financial inclusion generally refers to all actions to promote financial inclusion through the use of digital financial services. The index system of digital inclusive finance includes three dimensions: the coverage of digital finance (Coverage), the depth of digital finance use (Depth) and the digitalization degree of inclusive finance (Digit). This paper selects two dimensions of digital finance coverage (Coverage) and the depth of digital finance use (Depth).

(2) Explained variable: local employment (Employment). The local employment rate is the percentage of the total number of people employed in the local area.

(3) Control variables: Referring to relevant research on local employment rate, this paper mainly sets up four control variables: economic development level (LnGDPP), which is expressed by log per capita regional GDP; The degree of government intervention (GOV) is measured by the ratio of government fiscal expenditure to regional GDP; Financial development level (FDL), which is measured by the ratio of the balance of deposits and loans of financial institutions to GDP at the end of the year; Urbanization level (UR) is measured by the proportion of urban population in the total population.

(4) Intermediary variables: industrial structure level (str1) and overall industrial upgrading (str2). The level of industrial structure (str1) is represented by the ratio of the added value of the tertiary industry to the industrial structure of regional GDP. Overall

industrial upgrading (str2) is represented by the ratio of primary industry's added value to GDP *1+ the ratio of secondary industry's added value to GDP *2+ the ratio of tertiary industry's added value to GDP.

(5) γ_t and δ_c represent time and city fixed effects, which can effectively solve the problem of missing data with time and city changes and effectively alleviate endogeneity.

3.3. Descriptive statistics

The descriptive statistics of the main variables are shown in Table 1. During the sample period, a total of 4,369 data were collected for Dfi, with a mean of 198.42, a standard deviation of 78.39 and a range of 304.21. The mean value of Coverage was 194.54, the standard deviation was 86.40, and the range was 349.32. The mean value of Depth is 186.77, the standard deviation is 71.93, and the range is 279.33, indicating that there are significant differences in the degree of digital inclusive finance among cities, mainly in the coverage width and depth of digital finance use; A total of 3,422 data of local Employment rate were collected, with the mean value of 0.1174684, the standard deviation of 0.1120695, and the range of 0.668907, which were consistent with the typical problems of various cities facing employment difficulties and large local employment gap nationwide.

Table 1. Descriptive statistics of variables

Variable	Obs	Mean	Std. dev.	Min	Max
Dfi	4,369	198.4166	78.38959	32.36	336.5708
Coverage	4,369	194.5375	86.39933	16.97	366.2873
Depth	4,369	186.7738	71.92941	31.18	310.5109
Employment	3,422	0.1174684	0.1120695	0	0.668907
LnGDPP	3,935	56398.47	34095.66	12617	177505
GOV	3,553	0.0775002	0.0279363	0.032601	0.1858148
FDL	2,947	2.477595	1.190415	0	6.907068
UR	3,322	0.5637001	0.1476	0.2622	0.9474
str1	3,862	0.4387648	0.1096032	0	0.8934282
str2	3,862	2.303277	0.2807735	0	4.150245

4. Analysis of empirical results

4.1. Benchmark regression

Table 2 shows the impact of digital inclusive finance on local employment rate, mainly from two aspects: the coverage width of digital finance and the depth of digital finance use. It can be seen that the Coverage width has a more significant impact on the local Employment rate, which is positively correlated, while the use Depth has no significant impact on the local Employment rate, which indicates that improving the coverage width of digital finance can significantly improve the local employment rate.

Table 2. Basic regression results

Variable 1	Employment	Variable 2	Employment
Coverage	0.0004** (0.03)	Depth	-0.0000 (0.77)
LnGDPP	9.7990*** (0.00)	LnGDPP	11.9464*** (0.00)
GOV	0.1564*** (0.00)	GOV	0.1652*** (0.00)
FDL	0.0029** (0.13)	FDL	0.0025 (0.18)
UR	0.0116 (0.54)	UR	0.0160 (0.38)
_cons	0.0114 (0.67)	_cons	0.0704*** (0.00)
City	yes	City	yes
Year	yes	Year	yes
Observation	2,451	Observation	2,451
R ²	0.9184	R ²	0.9182

Note: The figures in parentheses are the robust standard errors of the regression coefficients. *, ** and *** indicate that the regression coefficients are significant at the levels of 10%, 5% and 1%, respectively.

4.2. Mechanism test

Table 3 lists the test results of the effect mechanism of industrial structure level (str1) and overall industrial upgrading (str2) on the relationship between digital inclusive finance and local employment rate. Among them, the level of industrial structure and the industry as a whole to upgrade index to reflect the ability and level of transformation and upgrading of industry, the higher the index on behalf of the ability, the higher the transformation and upgrading of industry.

In Column (1), we can see that the regression coefficient of the coverage width of digital inclusive finance on the level of industrial structure is 0.0005, which is significantly positive correlated at the level of 1%; The regression coefficient of the coverage width of digital inclusive finance on the overall industrial upgrading is 0.0016, which is significantly positive correlation at

the level of 1%. This indicates that the increase in the coverage width of digital inclusive finance can promote industrial upgrading and transformation.

Table 3. Regression results of mediating effect

	(1)	(2)
Variable	Industrial structure level	Overall industrial upgrading
Coverage	0.0005*** (0.00)	0.0016*** (0.00)
LnGDPP	-9.6425*** (0.00)	-11.1104*** (0.00)
GOV	-0.1102 (0.10)	-0.6620*** (0.00)
FDL	0.0077*** (0.00)	0.0062 (0.13)
UR	0.0058 (0.77)	-0.0500 (0.23)
_cons	0.4024*** (0.00)	2.2181*** (0.00)
City	yes	yes
Year	yes	yes
Observation	2,729	2,729
R ²	0.9117	0.7925

Note: The figures in parentheses are the robust standard errors of the regression coefficients. *, ** and *** indicate that the regression coefficients are significant at the levels of 10%, 5% and 1%, respectively.

4.3. Heterogeneity test

Table 4. Regression results of heterogeneity test for enterprises in the eastern, central and western regions

variable	East	Midland	West
Coverage	0.0009*** (0.01)	0.0007*** (0.00)	-0.0003 (0.23)
LnGDPP	6.4283** (0.02)	4.6342*** (0.01)	5.3954** (0.03)
GOV	0.1453 (0.38)	0.1545 (0.12)	0.1878 (0.17)
FDL	0.0012 (0.79)	0.0018 (0.20)	0.0054* (0.08)
UR	-0.06920* (0.14)	0.0738** (0.01)	0.0451 (0.28)
_cons	0.0029 (0.97)	-0.0846** (0.01)	0.0820* (0.10)
City	yes	yes	yes
Year	yes	yes	yes
Observation	987	753	711
R ²	0.9178	0.7723	0.8347

Note: the brackets for the robust standard error of regression coefficient, *, **, ***, respectively regression coefficient significantly in 10%, 5% and 1% level.

According to the data in Table 4, there is significant heterogeneity in the impact of the coverage width of digital inclusive finance on local employment rate in the eastern, central and western regions. Specifically, the impact coefficients of the breadth of digital inclusive financial coverage in the eastern region, the central region and the western region on the local employment rate are 0.0009, 0.0007 and – 0.0003 respectively. For significance, the regression results in the eastern and central regions are significant at the 1% level, while those in the western region are not significant. For the eastern and central regions, a wider coverage of digital inclusive finance can significantly increase local employment rates. However, in terms of significance, the western region is not statistically significant. From the perspective of the influence coefficient, the coverage width of digital inclusive finance in the western region has a relatively small impact on the local employment rate.

The eastern region leads in infrastructure and digitalization, with a high proportion of the tertiary industry. Digital finance indirectly boosts employment by supporting e-commerce, fintech, green finance and other fields. Under policy support and market mechanisms, digital inclusive finance in the eastern region is significantly positively correlated with the employment rate. The central region takes over the industries from the eastern region, supports the upgrading of manufacturing through digital finance, and achieves a positive interaction between digital inclusive finance and employment through the improvement of infrastructure, the optimization of industrial structure and policy innovation. However, in the western regions, there is a digital divide and infrastructure

shortcomings, a single industrial structure, and insufficient product adaptability. This has led to the fact that the driving effect of digital inclusive finance on employment has not been fully released, resulting in relatively low statistical significance.

5. Research conclusions and suggestions

5.1. Research conclusion

This paper selects each city in China as the research object, and collects the original data from 2011 to 2023 from the National Bureau of Statistics, the Statistical yearbooks of Chinese cities and cities, and the Digital Inclusive Financial Index published by Peking University. The Two-way fixed effect Model is used to investigate the impact of digital inclusive finance on local employment rate. The benchmark regression results show that the improvement of digital inclusive finance is reflected in the coverage width of digital finance, which significantly improves the local employment rate. Further research shows that digital inclusive finance affects local employment rate by improving the level of industrial structure and the overall upgrading of the industry. Specifically, the increase in the coverage width of digital finance can promote the improvement of industrial structure and the overall upgrading of the industry, and then improve the local employment rate through these two factors.

In order to ensure the reliability of the research conclusion, this study analyzes the specific impact of digital inclusive finance on local employment rate from two dimensions. Moreover, the results of heterogeneity test show that in the regional dimension, digital inclusive finance has a more obvious effect on the improvement of local employment rate in the eastern region.

5.2. Research suggestions

As an important carrier of financial innovation in the new era, the positive effect of digital inclusive finance on the job market needs to be maximally released through systematic policy design. It is suggested that the policy framework be constructed from the following four dimensions:

Firstly, in view of the significant effect of digital inclusive finance in the eastern region, it is suggested to establish digital financial innovation demonstration zones in the Yangtze River Delta and Pearl River Delta to pilot cross-border digital currency settlement and data asset trading. For the central and western regions, a dual-wheel drive strategy of "digital infrastructure + characteristic industries" should be implemented. For instance, industrial Internet platforms should be set up in the Chengdu-Chongqing Economic Circle, and an agricultural product traceability system based on blockchain should be developed in the northwest region. Digital technology should be used to empower the transformation and upgrading of traditional industries.

Secondly, build a digital skills cultivation ecosystem of "basic education - vocational training - lifelong learning". In the compulsory education stage, programming thinking courses are added. Vocational colleges offer emerging majors such as intelligent operation and maintenance and data analysis. At the enterprise level, the "digital mentorship system" is implemented to cultivate compound talents. It is suggested that a special fund be established to offer a 20% tax deduction for individual income tax to workers participating in digital skills certification.

Finally, improve the standard system for digital financial services, with a focus on regulating key links such as mobile payment interfaces and risk control models for online credit. Digital transformation loans are designed for small and micro enterprises, providing low-interest loans with a term of 1 to 3 years based on the enterprises' digital investment. Additionally, establish a consumer

protection mechanism for digital inclusive finance, develop an intelligent complaint handling system, and safeguard the legitimate rights and interests of vulnerable groups.

This study shows that the employment effect of digital inclusive finance has significant spatial heterogeneity and the complexity of transmission mechanism. Future policy design should take into account both efficiency and fairness. It is necessary not only to stimulate the leading role of innovation in the eastern region but also to bridge the regional digital divide through institutional innovation, ultimately forming a differentiated development pattern under a unified national market.

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