

A Study on the Effect of Digital Finance on Firm Employment

Ma Xiaolin^{1*}, Di Chunyu², Xing Yuecong³

¹ Beijing Huixian School, Beijing, China

² Beijing Jiaotong University, Beijing, China

³ King's College London, UK

* Correspondence: Beijing Huixian School, Beijing, China.

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Abstract: Under the fast development of digital economy, the deep mixing of digital technology and financial system has created a new financial model called digital finance. This model is changing how firms use resources and make business decisions. Compared with traditional finance, digital finance uses big data, AI, and mobile internet to reduce information gaps, improve financial service efficiency, and make it easier for firms to get money. However, we still do not have enough micro-level evidence on how digital finance affects firm employment and through what channels. Using panel data of Chinese A-share listed firms from 2009 to 2024, together with the Peking University Digital Financial Inclusion Index, this paper studies the effect of digital finance on firm employment size. We also look at two possible channels: financing constraints and firm innovation. Our findings are: (1) Digital finance can significantly increase firm employment. This result stays strong after we control for firm fixed effects, year fixed effects, and many firm-level characteristics. (2) The mechanism analysis shows that digital finance raises employment mainly by easing financing constraints and promoting innovation activities. (3) The heterogeneity analysis shows that the employment effect differs across ownership types, technology levels, and regions. Firms with more resources and higher innovation ability benefit more. This paper expands the research on the economic effects of digital finance, adds new views to the study of digital economy and employment from the angle of financial resource allocation, and offers policy ideas for using digital finance to support the real economy and improve job quality.

Keywords: digital finance; employment; financing constraints; firm innovation

1. Introduction

In recent years, fast progress in digital technology is deeply changing how the world economy works and how firms do business. New information

technologies like big data, AI, cloud computing, and mobile internet are entering the financial field. They push traditional finance to become more digital and smart. This creates a new financial model based on data-driven decisions, algorithm-based judgment,

and platform services—called digital finance. Compared with old financial services, digital finance breaks limits of distance, information cost, and service access. It uses better information processing to make financial resources flow more efficiently. It gives firms, especially small and medium ones, easier ways to get money (Gomber et al., 2018). In China, thanks to fast-growing digital infrastructure, mobile payment systems, and fintech innovation, a world-leading digital finance environment has formed. Digital finance not only changes how financial services are provided but also becomes an important outside factor that affects firm investment, innovation, and performance. So, understanding how digital finance affects firm behavior is important for knowing how resources are arranged and how firms grow in the digital age. At the same time, employment is a key link between economic growth and social welfare. It is always a central topic in economics and management. However, under fast digital development, the effect of digital change on jobs is still hotly debated. On one hand, digital technology may replace some labor through automation, intelligence, and process optimization, reducing demand for some positions. This is called the “technology substitution effect” (Acemoglu & Restrepo, 2018). Especially with AI and automation growing fast, many studies ask whether digital technology will lower labor demand and change job structures. On the other hand, digital technology may also raise labor demand by improving efficiency, expanding markets, promoting innovation, and creating new business models. This is the “technology creation effect” (Autor, 2015). So, whether digital development leads to job loss or job growth is still an open question.

As a combined form of digital economy and finance, digital finance may affect firm employment through different paths than general digital technology. First, digital finance can use big data analysis, AI algorithms, and online credit scoring to reduce information problems in financial deals. It helps financial institutions better judge firm credit, thus easing outside funding difficulties for firms, especially those with tight financing (Bazarbash,

2019; Frost et al., 2019). Easier financing helps firms expand production, increase investment, and raise labor demand. Second, digital finance may affect employment by promoting firm innovation. It lowers the cost of funding for innovation and raises firms’ ability to take risks, making them more willing to do R&D and tech upgrades. Innovation often brings new products, new markets, and higher efficiency, which may create new jobs. However, digital finance may also reduce some jobs by improving efficiency, pushing capital to replace labor, and concentrating resources to high-efficiency firms. So, the final effect on employment depends on the balance between financing expansion, innovation creation, and technology substitution. More research is needed.

Existing studies have looked at digital finance from many angles, but we still know little about its link with firm employment. Most research focuses on financial inclusion, entrepreneurship, firm financing, and economic growth. For example, Suri and Jack (2016) found that digital finance greatly improves access to financial services and promotes equal economic opportunities. Some recent studies further point out that digital finance lowers funding costs and raises investment efficiency and performance (Feng et al., 2022). At the same time, studies on digital technology and jobs mainly focus on AI, industrial robots, and automation (Acemoglu & Restrepo, 2020). But different from production-side technology that directly affects labor, digital finance works more through financial resource allocation, better financing conditions, and improved innovation ability. Its employment effect has a more complex logic. Current research has not fully shown whether digital finance can create jobs by improving financing and innovation, and we lack systematic firm-level evidence.

This paper tries to fill this gap. Using micro-level panel data of Chinese listed firms, we study the effect of digital finance on firm employment. Specifically, we use the Peking University Digital Financial Inclusion Index to measure digital finance development in each region, and match it with firm-level data on employee numbers, financial traits,

and governance structures. We use a two-way fixed effects model to identify the effect. Then we test the mechanisms through financing constraints and innovation. We also look at differences by ownership, high-tech status, and regional development.

Our main findings are threefold. First, digital finance significantly boosts firm employment. This holds after controlling for firm and year fixed effects and many firm traits. Second, the mechanism analysis shows that digital finance raises employment mainly by easing financing constraints and promoting innovation. That is, digital finance not only improves firms' ability to get money but also strengthens their future growth capacity, creating lasting job creation. Third, the heterogeneity analysis shows that the employment effect differs across firm types and regions. This suggests that digital finance does not affect all firms equally; its effect depends on firm resources, technology ability, and outside conditions.

Our contributions are threefold. First, we extend the research on economic effects of digital finance. Existing work mainly looks at inclusion, financing, and growth, while we add employment as an important labor market outcome, providing new micro evidence. Second, we enrich the study of digital technology and jobs. Unlike studies on automation and substitution, we reveal that digital finance may create jobs through financing support and innovation, offering a new explanation. Third, we identify the specific channels through which digital finance affects employment, giving policy makers empirical support on how to use digital finance to promote jobs and integrate digital with real economy. Our paper also has practical policy meaning. Today, the world economy is going through digital change and labor market adjustment. How to promote digital growth while achieving better and higher-quality jobs is a major policy challenge. In developing countries, because traditional finance is not enough, many firms—especially small ones—face financing limits that restrict production and hiring. Digital finance offers a new possible solution. By lowering service

barriers, improving capital allocation, and supporting innovation, digital finance may become a key driver of firm growth and job creation. So, our study not only enriches firm behavior research in the digital age but also provides theoretical support for policies that use digital finance to boost jobs and growth.

The rest of this paper is organized as follows. Section 2 reviews related literature on digital finance, firm development, and digital technology's effect on jobs, and points out the research gap. Section 3 builds theoretical analysis based on financing constraint theory, innovation theory, and resource allocation theory, and proposes hypotheses. Section 4 describes the research design, including model, variables, and data. Section 5 reports empirical results, including baseline, robustness, heterogeneity, and mechanism tests. Section 6 concludes and offers policy suggestions.

2. Literature Review

Digital finance, as a product of mixing digital technology with financial services, has become an important research area in economics, finance, and management. Existing studies mainly discuss its economic effects from angles like financial inclusion, firm financing, innovation, and growth. But whether digital finance can change firm labor demand and affect job creation is still little studied. We first review research on how digital finance affects firm behavior, then discuss studies on digital technology and employment, and finally point out the gaps and our research position.

Earlier studies focus on the effect of digital finance on financial resource allocation efficiency and inclusion. Traditional finance usually relies on firm collateral, financial statements, and long credit records for lending decisions. This often makes firms with less transparent information, especially small ones, face high financing barriers (Stiglitz & Weiss, 1981). Digital finance, by using big data, AI, and online credit scoring, can collect information from many sources like transaction records, supply chain relations, and online behavior. This reduces information problems and improves risk assessment

(Bazarbash, 2019). So, digital finance expands financial service coverage and increases firms' chances to get outside money.

In recent years, many empirical studies have confirmed that digital finance improves firm financing. For example, it lowers funding costs, speeds up credit approval, and reduces financial exclusion, effectively easing financing constraints (Frost et al., 2019). Especially in China, because regional financial development differs a lot, digital finance becomes an important supplement to fill gaps. These studies show that digital finance first changes firms' outside resource access, and then affects their decisions.

Besides financing, more studies start to look at digital finance's effect on firm innovation. Innovation usually has high risk, high uncertainty, and long-term returns, so it is often limited by financing constraints. Digital finance, by improving resource allocation and lowering innovation funding costs, enables firms to invest more in R&D, thus promoting tech and product innovation (Feng et al., 2022). Furthermore, innovation not only affects production efficiency but also changes labor demand structure. On one hand, innovation may reduce repetitive jobs by raising efficiency; on the other hand, it may create new jobs through new products, markets, and business models. So, the innovation channel may have both substitution and creation effects, which need testing with firm data.

Another group of studies looks at how digital technology affects labor markets. Traditional economic theory says technology has two effects on jobs. One is substitution: capital and tech may replace some labor, especially for routine and standardized jobs (Acemoglu & Restrepo, 2018). With AI and robots growing, some studies warn that smart production may pressure low-skilled workers (Acemoglu & Restrepo, 2020). The other is creation: technology can raise efficiency, lower costs, expand markets, and create new products and services, thus generating new jobs (Aghion et al., 2020). For example, digital platform economy not only changes business models but also creates many new job types. Related studies show that digital

technology does not necessarily reduce jobs; the final effect depends on the balance between substitution and expansion (Autor, 2015). However, unlike AI and robots that directly affect production, digital finance works mainly through financial resource allocation. So its effect on jobs has a more complex logic. On one hand, better financing allows firms to expand and hire more; on the other hand, digital finance may push digital transformation and capital efficiency, reducing reliance on some labor. Thus, simply copying the framework from automation studies cannot fully explain digital finance's employment effect.

Although existing studies have separately discussed digital finance's firm effects and digital technology's employment effects, there is still a clear gap. First, current digital finance research mainly focuses on financial development, financing, and innovation, but rarely on employment—an important economic outcome. Firm employment not only reflects firm size and performance but also shows the social impact of digital economy. So, studying how digital finance affects employment helps us better understand its micro consequences. Second, existing studies on digitalization and jobs mainly focus on production technology like robots and automation, ignoring financial digitalization. In fact, firm development is limited not only by production tech but also by financing ability. Digital finance, by improving capital access, may change firm growth paths and thus affect labor demand. So, looking at employment from the digital finance angle can broaden the research scope. Third, current studies have not fully revealed the specific mechanisms. In particular, whether digital finance mainly works through easing financing constraints to support expansion, or through promoting innovation to create new jobs, lacks systematic theory and micro evidence. Based on these gaps, we put digital finance and firm employment into one framework, use Chinese firm data to test the effect, and identify the two channels. This paper not only adds to digital finance research but also provides new evidence on how financial innovation affects labor markets in the digital age.

3. Theoretical Analysis and Research Hypotheses

3.1 Digital Finance and Firm Employment

First, digital finance can boost employment by improving firm financing conditions. In traditional finance, lending decisions rely on firm financials, collateral, and credit history. But because of information problems, many firms—especially growing ones and private ones—cannot get enough outside money (Stiglitz & Weiss, 1981). Financing limits not only restrict capital investment but also affect production scale and labor demand. With digital finance growth, institutions can use transaction data, supply chain info, and online behavior for more accurate credit assessment, thus reducing barriers from information opacity (Berg et al., 2020). Compared with traditional finance, digital finance has stronger information processing and lower information costs. On one hand, big data helps institutions identify real firm conditions and improve credit allocation. On the other hand, online services reduce time and transaction costs for firms, allowing more to get funding (Jiang et al., 2023). Recent studies further find that digital finance significantly eases financing constraints and promotes investment and scale expansion (Li et al., 2023). So, by improving capital access, digital finance enables firms to increase inputs, expand operations, and raise labor demand.

Second, digital finance can create new jobs by promoting firm innovation. Innovation usually needs high investment, bears high risk, and brings long-term returns, so its funding needs often exceed normal operations. However, because future returns are uncertain, traditional institutions find it hard to value innovative firms, leading to tighter financing for them. Digital finance changes this. Through data analysis and smart risk control, it improves institutions' ability to assess innovation risk and allocates more financial resources to innovative firms. Many recent studies look at the link between digital finance and firm innovation. For example, Zhang et al. (2024) find that digital finance significantly boosts innovation of Chinese listed firms, mainly through better credit access and lower

funding costs. Similarly, Li et al. (2023) point out that digital economy promotes innovation by easing financing constraints, especially for breakthrough innovation. Zhu (2024) further finds that digital finance improves capital allocation efficiency and thus raises innovation ability. These studies show that digital finance not only changes current financing but also affects long-term development.

From the employment side, innovation may affect labor demand in two ways. On one hand, it may raise efficiency and reduce reliance on low-productivity labor, causing substitution. On the other hand, innovation helps firms develop new products, enter new markets, and form new business models, thus expanding scale and creating jobs. Especially in knowledge-intensive industries, innovation often comes with more demand for R&D, technical, and managerial staff. So the creation effect may outweigh substitution. Thus, digital finance through innovation may further raise employment. Moreover, digital finance may affect hiring decisions by improving firm growth expectations and reducing uncertainty. Hiring depends not only on current production needs but also on future market conditions. In traditional finance, because funding sources are limited, firms often adopt cautious expansion strategies. Even with market opportunities, they may not expand due to lack of money. Digital finance increases financing flexibility, helping firms better respond to market changes and making them more willing to expand and add long-term labor. Based on the above, we propose:

H1: Digital finance development can significantly promote firm employment growth.

3.2 Digital Finance, Financing Constraints, and Firm Employment

One important channel through which digital finance affects employment is easing financing constraints. Financing constraint theory says that because outside funding costs more than inside funding, firms cannot reach the optimal investment level through market financing alone. When constrained, their investment and production

expansion are limited, reducing labor demand. So, lower financing constraints are a key mechanism. Digital finance eases constraints in three ways. First, it uses data to raise information transparency, allowing institutions to assess credit more accurately and reduce adverse selection. Second, it lowers service costs, making credit more accessible. Third, it expands coverage, giving more firms—especially those outside traditional finance—better opportunities. Recent studies confirm this. For example, Liu et al. (2023) find that fintech development facilitates firm financing by reducing information asymmetry and improving service efficiency. At the same time, the effect is stronger for firms with higher constraints, because they were more limited before. When constraints drop, firms gain better liquidity and investment ability. On one hand, they can expand production and supply. On the other hand, they can hire more and invest in human capital. Thus, lower financing constraints become a key transmission channel. We propose:

H2: Digital finance promotes firm employment growth by easing financing constraints.

3.3 Digital Finance, Firm Innovation, and Firm Employment

Besides financing, digital finance may affect employment through promoting innovation. Innovation is a key source of long-term competitive advantage and an important driver of new jobs. According to endogenous growth theory, innovation raises productivity and creates new labor demand through market expansion. Digital finance lowers innovation funding barriers, making it easier for firms to get R&D money. At the same time, better data flow and information sharing increase firms' access to tech and market information, boosting innovation willingness. Recent studies find that digital finance not only increases innovation input but also improves output quality. Zhao et al. (2023) using Chinese firm data find that digital finance significantly raises R&D investment and innovation output, and promotes breakthrough innovation. Also, studies on digital transformation show that fintech development

pushes firms to upgrade digitally by easing financing, improving talent, and increasing R&D. From the employment side, innovation creates new tasks and positions. For example, new product development needs more R&D staff, new market expansion needs more sales and management staff, and business model innovation may create new job types. So, digital finance through innovation can further raise labor demand. We propose:

H3: Digital finance raises firm employment by promoting firm innovation.

4. Research Design

4.1 Model Specification

To study the effect of digital finance on firm employment, we build a firm-year panel model using Chinese A-share listed firm micro data, and use a two-way fixed effects model. The model is:

$$EM_{i,t} = \alpha + \beta DF_{i,t} + \gamma Controls_{i,t} + \mu_i + \lambda_t + \varepsilon_{i,t}$$

Where i is firm, t is year; EM is firm employment size; DF is digital finance level in the firm's region; $Controls$ are firm-level control variables; μ_i is firm fixed effect (controls for time-invariant firm traits); λ_t is year fixed effect (controls for macro environment, policy changes, and common time shocks); ε is the error term.

We focus on the coefficient β of DF . If β is significantly positive, digital finance promotes employment; if significantly negative, it may strengthen capital-labor substitution and reduce labor demand.

4.2 Variable Definition and Measurement

Our key explanatory variable is digital finance development (DF). Digital finance, as a new financial model mixing traditional finance and digital tech, is not only about service scale but also about service modes, information processing, and allocation efficiency. So, we use the Peking University Digital Financial Inclusion Index to measure the digital finance level in each firm's region.

To reduce omitted variable bias, we include a set of firm-level controls based on employment

determinants and digital finance studies. Specifically, we control for firm age (Age) to reflect lifecycle. Older firms may have more stable operations and resources, possibly stronger employment capacity; but mature firms may also face rigidity and less flexibility, so we need to control for age. We also control for leverage (Lev) to capture capital structure and financial risk. Higher debt may increase repayment pressure and reduce ability to expand and hire. We add profitability (ROA) and cash flow (Cashflow) to control for operating performance and internal funding. More profitable firms usually have more internal funds for expansion and job creation; ample cash flow supports daily operations and investment, providing funds for hiring. We also control for growth opportunities (TobinQ), which reflects market expectations of future potential. Firms with higher growth opportunities tend to have stronger drive and investment willingness, possibly increasing labor demand. Besides these financial variables, we consider governance factors that may affect hiring decisions, including board size (Board), independent director ratio (Indep), CEO duality (Dual), and largest shareholder share (Top1). Governance structure affects management decisions, resource allocation, and long-term strategy, thus influencing expansion and employment adjustment. By controlling these, we

can better isolate the independent effect of digital finance on employment.

4.3 Sample and Data Sources

We choose Chinese A-share listed firms as our sample, mainly because China has seen rapid digital finance growth and has rich firm micro data. In recent years, mobile payments, online credit, and fintech platforms have grown fast, with significant regional differences in digital finance development, providing a good background for research. Our data sources: firm financial and governance data from CSMAR; digital finance index from Peking University; employment data from annual reports (number of employees). In sample processing, we exclude financial firms, ST and *ST firms, and observations with missing key variables. We winsorize continuous variables at the 1st and 99th percentiles to reduce extreme value effects. After processing, we get 42,047 firm-year observations for analysis.

4.4 Descriptive Statistics

Table 1 reports descriptive statistics. EM has max 10.9515 and min 4.8442, showing variation in employment across firms. DF has max 4.0308 and min 0.2126, showing variation in digital finance across cities. Other variables are within normal ranges, with no extreme values.

Table 1. Descriptive Statistics

Variable	Obs	Mean	Sd	Min	Max
EM	42,047	7.57565	1.26098	4.84419	10.95149
DF	42,047	2.66650	0.83574	0.21260	4.030792
FirmAge_w	42,047	2.97660	0.32397	2.87944	3.610918
Lev_w	42,047	0.41489	0.28898	0.05648	0.8961091
ROA_w	42,047	0.03736	0.86514	-0.20839	0.209495
Cashflow_w	42,047	0.04493	0.86751	-0.15100	0.2258802
TobinQ_w	42,047	1.97724	1.28495	0.83395	7.431908
Board_w	42,047	2.10554	0.19671	1.60944	2.564949
Indep_w	42,047	0.37793	0.05345	0.33330	0.57140
Dual_w	42,047	0.30385	0.45992	0.00000	1.00000
Top1_w	42,047	0.34027	0.14728	0.08991	0.72718

5. Empirical Results and Analysis

5.1 Baseline Regression Results

Table 2 reports baseline results. We add controls step by step, controlling for firm and year fixed effects. The coefficient of DF is significantly positive at the 1% level in all models. Specifically, as we add firm traits, financial variables, and governance variables, the coefficients are 0.6010, 0.5756, 0.4955, and 0.4873,

all significant. This shows that digital finance significantly promotes employment. So digital finance does not show a clear labor substitution effect; instead, it improves financing, resource allocation, and firm growth, raising labor demand. Thus, H1 is supported. For control variables, age, leverage, profitability, and cash flow all have significant effects, showing that firm conditions also matter for employment.

Table 2. Baseline Regression Results

Variables	(1) EM	(2) EM	(3) EM	(4) EM
DF	0.6010*** (0.1080)	0.5756*** (0.0968)	0.4955*** (0.0957)	0.4873*** (0.0947)
Age		0.9503*** (0.1601)	0.7773*** (0.1347)	0.8178*** (0.1359)
Lev			1.0750*** (0.0619)	1.0683*** (0.0615)
Roa			0.9749*** (0.0805)	0.9388*** (0.0819)
Cashflow			0.1770** (0.0759)	0.1839** (0.0767)
TobinQ			-0.0844*** (0.0067)	-0.0824*** (0.0065)
Board				0.3820*** (0.0525)
Indep				0.4251*** (0.1426)
Dual				-0.0005 (0.0120)
Top1				0.1317 (0.1326)
Constant	5.9730*** (0.2880)	3.2121*** (0.5299)	3.6171*** (0.4858)	2.5089*** (0.4669)
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
N	42,047	42,047	42,047	42,047
R ²	0.900	0.901	0.910	0.910

5.2 Robustness Tests

5.2.1 Adding More Fixed Effects

Table 3 shows results after adding industry, city-industry, province, and province-industry fixed

effects. The DF coefficient remains significantly positive, so our conclusion is not affected by regional or industry differences.

Table 3. Results with Additional Fixed Effects

	(1)	(2)	(3)	(4)
Variables	EM	EM	EM	EM
DF	0.4873*** (0.0948)	0.4873*** (0.0947)	0.4873*** (0.0948)	0.4873*** (0.0952)
Constant	2.5089*** (0.4670)	2.5089*** (0.4669)	2.5089*** (0.4671)	2.5089*** (0.4693)
Controls	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Ind FE	Yes			
Cityind FE		Yes		
Procode FE			Yes	
Proind FE				Yes
N	42,047	42,047	42,047	42,047
R ²	0.910	0.910	0.910	0.910

5.2.2 Changing Clustering Levels

Table 4 shows results with different clustering levels (city-industry, city-year, province, province-industry, province-year). The DF coefficient remains significant.

Table 4. Results with Different Clustering

	(1)	(2)	(3)	(4)	(5)
Variables	EM	EM	EM	EM	EM
DF	0.4873*** (0.0988)	0.4873*** (0.0555)	0.4873*** (0.0956)	0.4873*** (0.1000)	0.4873*** (0.0581)
Constant	2.5089*** (0.4621)	2.5089*** (0.2438)	2.5089*** (0.5299)	2.5089*** (0.4629)	2.5089*** (0.2560)
Cluster	Cityind	Cityyear	Procode	Proind	Proyear
Controls	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
N	42,047	42,047	42,047	42,047	42,047
R ²	0.910	0.910	0.910	0.910	0.910

5.2.3 Replacing the Key Explanatory Variable

Table 5 shows results using sub-indicators of digital finance: coverage breadth (DF1), usage depth (DF2), and digitalization degree (DF3). All are significantly positive, so our conclusion is not driven by indicator choice.

Table 5. Results with Alternative Key Variables

	(1)	(2)	(3)
Variables	EM	EM	EM
DF1	0.2737*** (0.0804)		
DF2		0.2489*** (0.0615)	
DF3			0.1089*** (0.0307)
Constant	3.0480*** (0.4897)	3.1302*** (0.4096)	3.5030*** (0.4201)
Controls	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes

Year FE	Yes	Yes	Yes
N	42,047	42,047	42,047
R ²	0.910	0.910	0.910

5.2.4 Considering Lag Effects

Table 6 shows results using one-year and two-year lags of DF. Both are significantly positive, confirming a lasting effect.

Table 6. Results with Lagged Variables

Variables	(1)	(2)
	EM	EM
l1DF	0.3211*** (0.0881)	
l2DF		0.2357*** (0.0796)
Constant	3.4088*** (0.5163)	4.0020*** (0.6069)
Controls	Yes	Yes
Firm FE	Yes	Yes
Year FE	Yes	Yes
N	36,070	31,157
R ²	0.920	0.927

5.2.5 Dropping Subsamples

Table 7 shows results after dropping municipalities and dropping COVID-19 period samples. The results remain stable.

Table 7. Results with Dropped Samples

Variables	(1) Drop municipalities	(2) Drop COVID period
	EM	EM
DF	0.5601*** (0.1029)	0.4857*** (0.0953)
Constant	2.3013*** (0.5366)	3.4254*** (0.5183)
Controls	Yes	Yes
Firm FE	Yes	Yes
Year FE	Yes	Yes
N	32,915	21,555
R ²	0.906	0.917

5.3 Heterogeneity Tests

Table 8 reports heterogeneity results. We look at ownership, high-tech status, and region. First, for ownership, digital finance significantly promotes employment in both SOEs and non-SOEs, but the effect is stronger for SOEs. This may be because SOEs are larger and have better resource integration, so they can make more use of digital finance's benefits. Second, for industry, the effect is stronger for high-tech firms. High-tech firms have stronger innovation needs and growth potential; after financing improves, they more easily increase R&D and expansion, creating more jobs. Third, for region, digital finance has positive effects in both eastern and non-eastern areas, but the effect is larger in the east, likely because of better digital infrastructure and financial ecosystems.

Table 8. Heterogeneity Test Results

Variables	(1) SOE	(2) Non-SOE	(3) High-Tech	(4) Low-Tech	(5) East	(6) Non-East
	EM	EM	EM	EM	EM	EM
DF	0.5491*** (0.1166)	0.4077*** (0.1366)	0.5813*** (0.1220)	0.3259** (0.1592)	0.3817*** (0.1380)	0.5151*** (0.1777)
Constant	3.7350*** (0.6392)	2.6447*** (0.4955)	1.8575*** (0.5881)	3.9053*** (0.8299)	2.9360*** (0.5437)	2.1360** (0.9003)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
N	14,065	27,923	25,280	16,767	29,708	12,339

R ²	0.926	0.898	0.913	0.909	0.910	0.910
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5.4 Mechanism Tests

Table 9 reports mechanism test results. We test two channels: financing constraints (FC) and innovation (PA). For financing constraints, DF significantly reduces FC, showing that digital finance eases firms' funding pressure, helping them expand and hire. For innovation, DF significantly increases innovation output, showing that digital finance boosts firms' ability to innovate, which then raises labor demand. Thus, both channels are confirmed, supporting H2 and H3.

Table 9. Mechanism Test Results

Variables	(1) Financing Channel	(2) Innovation Channel
	FC	PA
DF	-0.1005*** (0.0340)	0.6019** (0.2610)
Constant	2.0225*** (0.1195)	-2.3728*** (0.8158)
Controls	Yes	Yes
Firm FE	Yes	Yes
Year FE	Yes	Yes
N	41,227	41,176
R ²	0.850	0.756

6. Conclusion and Policy Suggestions

6.1 Research Conclusions

In the context of rapid digital economy growth, digital finance, as an important form of financial system digitalization, is deeply changing how firms allocate resources and make decisions. Using micro data of Chinese A-share listed firms and the Peking University Digital Financial Inclusion Index, this paper empirically studies the effect of digital finance on firm employment, and further analyzes its mechanisms and heterogeneity. The results show that digital finance significantly promotes firm employment. After controlling for firm and year fixed effects and many firm traits, the coefficient of

DF remains positive and significant. This means digital finance not only raises financial service efficiency but also improves firms' development environment, thus increasing labor demand. Various robustness checks—adding fixed effects, changing clustering, replacing key variables, considering lags, and adjusting samples—all confirm the result, showing strong reliability.

Further analysis finds that the effect works mainly through two channels: financing constraints and innovation. On one hand, digital finance uses data tech and information processing to reduce information gaps in financial markets, improve firms' access to funding, ease capital constraints, and support production expansion and hiring. On the other hand, digital finance promotes innovation, which creates new job needs by improving firms' ability to innovate, expanding markets, and upgrading business models. Also, we find clear heterogeneity. For ownership, digital finance has positive effects on both SOEs and non-SOEs, but the effect is stronger for SOEs. For industry, high-tech firms benefit more, suggesting a strong complementarity between digital finance and innovation ability. For region, digital finance promotes employment in all areas, but the effect is larger in the east due to better infrastructure and financial ecosystems.

6.2 Policy Implications

Our findings offer several policy suggestions. First, we should further develop digital finance to improve its ability to serve the real economy. Digital finance not only changes service modes but also improves resource allocation to firms. Governments should continue to build digital infrastructure, promote data sharing, and encourage financial institutions to use AI and big data for better risk assessment, thus lowering funding costs, especially for small and innovative firms. Second, we should make full use of digital finance to ease financing constraints and improve the business environment. Under traditional finance, some firms lack collateral

and credit records and face long-term funding difficulties. In the future, we should improve digital credit systems, encourage institutions to use firm operational data, supply chain info, and digital records for more precise services, increase financial inclusion, and enable more firms to get support and expand employment. Third, we should strengthen the link between digital finance and firm innovation. This paper finds that innovation is a key channel. So policy makers should not only focus on the scale of digital finance but also its role in boosting innovation. By combining fintech with industrial innovation, supporting R&D, tech upgrades, and business model innovation, we can further release digital finance's job creation potential. Fourth, we should pay attention to regional differences and promote more balanced digital finance development. Because infrastructure, financial ecosystems, and industrial environments differ, firms in different regions do not benefit equally. So, when promoting digital finance, we should strengthen digital infrastructure and financial services in less developed areas, avoid widening the digital divide, and let digital finance better play its role in boosting jobs and growth.

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6.3 Limitations and Future Directions

Although this paper analyzes the effect of digital finance on employment at the firm level and identifies two mechanisms, it still has some limitations. First, we mainly focus on employment size. Future research could further analyze effects on employment structure, such as whether it changes demand for high-skilled vs. low-skilled workers, and whether it improves job quality. Second, we study firm-level employment, but digital finance may affect employment through supply chains, industrial networks, and regional development. Future studies could combine firm supply chain data and regional labor market data to examine broader employment effects. Third, as new digital technologies like AI and large models develop rapidly, the combination of digital finance and smart tech may bring new economic effects. Future research could explore how AI-empowered finance affects firm production modes, labor demand, and job structure changes.

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