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Research on the Influence of Digital Finance Development on Entrepreneurial Engagement Among New Citizens

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Abstract

The new citizen demographic constitutes a substantial and expanding segment of the urban workforce, playing a pivotal role in urban economic dynamics. Despite facing financing barriers during entrepreneurial ventures, this group has witnessed novel opportunities arising from the rapid evolution of digital finance. Utilizing data from the 2019 China Household Finance Survey (CHFS), this study examines the effect of digital finance development on entrepreneurial behavior among new citizens through empirical analysis via the Probit model. Results indicate that digital finance development significantly encourages entrepreneurial activity within this group, a finding robust to endogeneity controls and multiple robustness validations. Mechanistic analyse further demonstrates that this effect is mediated by the pathway: increased adoption of digital payment systems.

Keywords: digital finance, new citizens, entrepreneurial behavior

1. Introduction

China's accelerated urbanization has driven sustained expansion of the new citizen demographic, now indispensable for urban socioeconomic development. The term originated from Qingdao's 2006 migrant worker policy that systematically extended social welfare provisions—including but not limited to social insurance coverage, preferential housing credit, and equal education eligibility—ultimately symbolizing institutionalized progress in social recognition and civic integration. (Note 1) Nationally, it encompasses rural migrants, non-local hukou holders, and new graduates.

Urbanization grew at 0.93% annually (past 5 years), with more than 10 million rural migrants moving to cities yearly. By 2021, urban migrant workers reached 172 million; (Note 2) total new citizens approximate 300 million, exceeding 20% of China's population. (Note 3)

This cohort constitutes a vital labor force while demonstrating significantly higher entrepreneurial activity, with micro-level data from the China Household Finance Survey revealing a 17.76% entrepreneurship rate that substantially exceeds the national average of 13.14%. Yet they face systemic barriers: hukou restrictions, unequal education/healthcare access, social exclusion (Deng, 2022), and financial exclusion due to information asymmetry, credit deficits, and collateral shortages (Zhang & Zhang, 2023), compounded by narrow information channels and rising transaction costs (Sun, 2016).

Traditional credit markets suffer adverse selection and moral hazard (Stiglitz & Weiss, 1981). Pre-digital inclusive finance failed to reduce urban-rural disparities (Jiao, 2015; Ni & Cheng, 2020). Fintech-enabled digital finance enhances financial inclusion through artificial intelligence and big data analytics, while stimulating entrepreneurial activity by facilitating resource aggregation in economically disadvantaged areas and enabling diversified financing channels in developed financial markets (Zhang et al., 2023). Thus, examining digital finance's impact on new citizens' entrepreneurship holds significant academic and practical value for urban development and common prosperity.

This study extends the literature through three contributions: First, diverging from conventional financial institution optimization approaches, we systematically examine digital finance's impact on new citizens' entrepreneurship using Peking University's 2018 Digital Financial Inclusion Index. Second, leveraging 2019 CHFS data, we address the empirical gap regarding digital finance's role for rural migrants transitioning to urban entrepreneurship under the Rural Revitalization Strategy. Third, adopting the standardized Ministry of Housing

and Urban-Rural Development (2018) definition—validated by Li & Wu (2019)—ensures methodological rigor in cohort delineation and enhances findings robustness.

2. Literature Review and Theoretical Hypotheses

2.1 Digital Finance and New Citizens' Entrepreneurship

Existing studies consistently demonstrate the inclusive nature of digital finance in China and its positive correlation with entrepreneurial activities. New citizens—typically rural migrants with temporary urban residency, low income, and limited credit access—are systematically excluded from traditional financial services. Digital finance addresses these barriers through technological advantages like intelligent algorithms and big data analytics, offering greater coverage, lower thresholds, and operational efficiency. Empirical evidence from Xie et al. (2018), Feng and Cai (2021), and Xie and Li (2024) confirms digital finance's general entrepreneurship-promoting effects. Specific studies on rural migrants by Zou and Zhang (2024) reveal stronger impacts among disadvantaged groups, while Wu et al. (2024) using CLDS data specifically verify its efficacy for new citizens. These findings collectively support H_1: Digital finance development significantly promotes new citizens' entrepreneurship.

2.2 Mechanisms of Influence

As the core function of digital finance, payment systems exhibit network externalities where consumer benefits surpass costs at scale (Xie and Liu, 2013). Tian et al. (2023) and Zhang et al. (2024) demonstrate how digital payments expand market access and operational capacity, directly boosting regional entrepreneurship rates. This underpins H_2: Digital payments facilitate new citizens' entrepreneurship through transactional efficiency gains.

3. Research Design

3.1 Data Sources

The study synthesizes data from three authoritative sources: the 2019 China Household Finance Survey (CHFS) by Southwestern University of Finance and Economics, the Peking University Digital Financial Inclusion Index, and the 2019 China City Statistical Yearbook. The CHFS dataset encompasses 34,643 households across 343 county-level units in 29 provinces, with rigorous data processing applied. Specifically, the sample was restricted to new citizen households, continuous variables were winsorized at 1% to control outliers, and 2018 urban statistics were matched to address retrospective reporting in CHFS economic data. After eliminating incomplete records, the final analytical sample consisted of 3,424 qualified households.

3.2 Variable Definitions

The dependent variable measures new citizens' entrepreneurship status, defined through two criteria from the 2018 national housing survey: non-local hukou urban citizens and rural-to-urban migrants. Entrepreneurship identification derives from CHFS business operation responses, with sub-categorization based on motivation (necessity-driven versus opportunity-driven) and employment scale (self-employment versus employer-entrepreneurship).

The core independent variable is the lagged city-level Digital Financial Inclusion Index, addressing potential endogeneity. Control variables span household head characteristics (age, gender, education, marital status), family attributes (size, asset ownership, economic indicators), and city-level economic profiles (GDP per capita, industrial structure). Mechanism variables include telecommunications expenditure (proxy for information acquisition) and third-party payment account ownership (digital payment adoption).

3.3 Empirical Methodology

A Probit model was employed to analyze the binary entrepreneurship outcome:

$$P(Y_i=1)=\Phi(\beta_0+\beta_1 X_i+\beta_2 C_i+u_i) \quad (1)$$

In the model, Y_i denotes the dependent variable (a dummy variable indicating whether the i-th new citizen engages in entrepreneurship), X_i represents the core explanatory variable (the Digital Financial Development Index of the respondent's residence location), C_i constitutes the vector of control variables accounting for other determinants of entrepreneurial behavior, and u_i is the stochastic error term.

4. Empirical Tests and Results Analysis

4.1 Descriptive Statistics

Descriptive statistics for all variables are summarized in Table 1. New citizens exhibit a 17.76% entrepreneurship rate, primarily characterized by opportunity-driven ventures at 12.2% and self-employment at 13.6%. This contrasts with the comparatively lower incidence rates of necessity -driven entrepreneurship at 3.4% and

employer-based entrepreneurship at 4.2%. This indicates new citizens predominantly pursue autonomy and opportunity-based entrepreneurship rather than necessity-driven or expansion-oriented ventures.

The city-level Digital Financial Development Index, serving as the core explanatory variable, demonstrates a mean value of 2.388 with a standard deviation of 0.231, indicating substantial inter-city variation.Regarding demographic characteristics: the average age is 51 years, with mean educational attainment of 9 years, suggesting potential educational constraints. Approximately 53.8% reported poor health status.

Annual household income and consumption average RMB 78,130 and RMB 82,160 respectively. The consumption-income gap implies partial reliance on borrowing to maintain consumption levels, consistent with expectations of future income growth or temporary income fluctuations.

Table 1. Descriptive Statistics

Variable Name	Variable Definition	Mean	Standard Deviation
Entrepreneurship	Whether engaged in agricultural or industrial and commercial entrepreneurship, 1 for yes; 0 for no	0.178	0.382
Necessity-Driven Entrepreneurship	The main reason for engaging in industrial and commercial activities is the lack of other employment opportunities, 1 for yes; 0 for no	0.034	0.181
Opportunity-Driven Entrepreneurship	Engaging in industrial and commercial activities to earn more, pursue personal ideals, become one's own boss, or for flexibility and freedom, 1 for yes; 0 for no	0.122	0.327
Self-Employment Entrepreneurship	The number of employees in industrial and commercial projects is 0, 1 for yes; 0 for no	0.136	0.342
Employer Entrepreneurship	The number of employees in industrial and commercial projects is greater than 0, 1 for yes; 0 for no	0.042	0.201
Digital Finance Development Level	Compiled based on the coverage breadth, usage depth, and digitalization level, the city-level Digital Inclusive Finance Index / 100	2.388	0.231
Coverage Breadth	Measured by account coverage, the city-level secondary dimension sub-index of Digital Inclusive Finance / 100	2.251	0.271
Usage Depth	Including payments, money market funds, credit, insurance, investment, and credit services, the city-level secondary dimension sub-index of Digital Inclusive Finance / 100	2.388	0.272
Payment	Including per capita payment transactions, per capita payment amount, and the ratio of high-frequency (active 50 times or more per year) active users to those active 1 time or more per year, the city-level tertiary dimension sub-index of Digital Inclusive Finance usage depth / 100	2.607	0.444
Credit	Including personal consumer loans and micro-and-small enterprise operator credit business, the city-level tertiary dimension sub-index of Digital Inclusive Finance usage depth / 100	1.543	0.106
Male	Gender of the household head	0.802	0.399
Age	Age of the household head	50.729	13.739
Education	Education level of the household head (PhD = 9, Master = 8, Bachelor = 7, Junior College = 6, Secondary Vocational School = 5, High School = 4, Junior High School = 3, Elementary School = 2, No Schooling = 1)	9.336	3.763
Health	Health status of the household head (Excellent = 5, Good = 4, Average = 3, Poor = 2, Very Poor = 1)	0.462	0.499
Married	Marital status of the household head (Married = 1, Other = 0)	0.876	0.329
Family Size	Total number of household members	2.669	1.131
House Ownership	Whether the household head owns their own housing or	0.858	0.35

	lives in housing owned by family members, 1 for yes; 0 for no		
Car Ownership	Number of household-owned cars, greater than 0 for yes; 0 for no	0.315	0.465
Total Income	Total income of the previous year (in 10,000 yuan)	7.813	7.889
Total Consumption	Non-industrial and commercial assets of the household (in 10,000 yuan)	8.216	6.851
Household Assets	Non-industrial and commercial assets of the household (in 10,000 yuan)	82.159	102.006

4.2 Baseline Regression Analysis

The baseline regression results in Table 2 demonstrate that digital finance exerts a statistically significant positive effect on new citizens' entrepreneurship in Model (1), confirming Hypothesis 1. Robustness checks further validate this finding across both secondary dimensions and tertiary sub-indices. Notably, the credit dimension emerges as the most influential factor, where a 1% improvement in credit services increases entrepreneurial probability by 1.398 percentage points, highlighting its pivotal role in facilitating entrepreneurship.

Control variables reveal nuanced patterns: Age exhibits an inverted U-shaped relationship, suggesting initial resource accumulation benefits entrepreneurship but eventually gives way to risk aversion. Health status shows positive correlation, while education negatively impacts entrepreneurship, likely due to better alternative employment options. Asset-related variables demonstrate that homeownership and higher income reduce entrepreneurial incentives, whereas car ownership enhances operational flexibility. Regional economic development, measured by GDP per capita and tertiary sector share, inversely correlates with entrepreneurship due to increased market competition and operational costs in developed areas.

Table 2. Baseline Regression Results of the Impact of Digital Finance Development on Entrepreneurial Behavior Among New Citizens

	(1)	(2)	(3)	(4)	(5)
Digital Financial Inclusion Index	0.692*** (-0.230)				
Coverage Breadth		0.316* (-0.178)			
Usage Depth			0.578*** (-0.149)		
Credit				1.398*** (-0.341)	
Mobile Payment					0.339*** (0.083)
Gender	0.055 (0.072)	0.057(0.072)	0.047(0.072)	0.044(0.072)	0.048(0.072)
Age	0.024 (0.015)	0.024 (0.015)	0.025 (0.015)	0.025 (0.015)	0.025* (0.015)
Age Squared/100	-0.038** (0.015)	-0.037** (0.015)	-0.038** (0.015)	-0.038** (0.015)	-0.039** (0.015)
Education	-0.055*** (0.009)	-0.055*** (0.009)	-0.053*** (0.009)	-0.054*** (0.009)	-0.054*** (0.009)
Health	0.125** (0.058)	0.121** (0.058)	0.129** (0.058)	0.131** (0.058)	0.130** (0.058)
Married	0.111 (0.097)	0.106 (0.098)	0.112 (0.097)	0.118 (0.098)	0.108 (0.097)
Family Size	0.004 (0.028)	0.003 (0.028)	0.004 (0.028)	0.002 (0.027)	0.003 (0.028)

House Ownership	-0.737***	-0.751***	-0.718***	-0.711***	-0.718***
	(0.097)	(0.097)	(0.097)	(0.098)	(0.098)
Car Ownership	0.261***	0.252***	0.275***	0.276***	0.273***
	(0.063)	(0.063)	(0.063)	(0.063)	(0.063)
Household Assets	0.352***	0.357***	0.346***	0.345***	0.347***
	(0.030)	(0.030)	(0.030)	(0.030)	(0.030)
Total Income	-0.076***	-0.075***	-0.077***	-0.076***	-0.077***
	(0.018)	(0.018)	(0.018)	(0.018)	(0.018)
Total Consumption	0.110**	0.116***	0.102**	0.102**	0.106**
	(0.044)	(0.044)	(0.045)	(0.045)	(0.045)
Regional GDP per Capita	-0.080***	-0.065***	-0.075***	-0.072***	-0.073***
	(0.013)	(0.013)	(0.011)	(0.011)	(0.011)
Proportion of Added Value of Tertiary Industry	-0.013***	-0.010***	-0.011***	-0.010***	-0.010***
	(0.004)	(0.004)	(0.003)	(0.003)	(0.003)
Pseudo R^2	0.128	0.126	0.130	0.131	0.131
N	3424	3424	3424	3424	3424

Note: Heteroskedasticity-robust standard errors in parentheses; *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively. This convention applies throughout all subsequent tables.

4.3 Robustness Checks

Supplementary analyses were conducted to verify the resilience of baseline findings. First, a Logit specification was employed as the counterpart to the Probit model to assess whether digital finance consistently promotes entrepreneurship across alternative estimation frameworks (Table 3, Column 1). Second, sample robustness was examined by excluding observations from municipalities directly administered by the central government to mitigate potential institutional heterogeneity (Column 2). Both approaches—model substitution and restricted sampling—yielded statistically congruent results: the core explanatory variable maintained its significant positive coefficient with negligible magnitude variation. This dual-confirmation underscores the empirical stability of DFI's catalytic effect on new citizens' entrepreneurial engagement, dispelling methodological or sample-composition concerns.

Table 3. Results of Robustness Tests

	(1) Logit Model		(2) Further Sample Screening	
	Coefficient	Standard Error	Coefficient	Standard Error
Digital Finance Inclusion Index	1.162***	0.424	0.527**	0.244
Control Variables	Yes		Yes	
N	3424		3138	
Pseudo R2	0.129		0.125	

4.4 Endogeneity Tests

The endogeneity tests address potential estimation bias through instrumental variable approaches, drawing methodological insights from Fu & Huang (2018) and Chen & Xu (2022). Spherical distance to Hangzhou and local internet penetration rates were selected as instrumental variables (IVs) for their theoretical validity - the former captures geographic constraints in digital service diffusion while the latter reflects prerequisite infrastructure, both satisfying the exclusion restriction by influencing entrepreneurship solely through digital financial inclusion channels. The two-stage IVProbit analysis yields robust first-stage results, where spherical distance demonstrates a statistically significant negative correlation with DFI development as evidenced by an F-statistic of 2974.07, while internet penetration shows a positive association with an F-statistic of 4183.80, both substantially surpassing the Stock-Yogo weak instrument thresholds. Most importantly, the second-stage estimation reveals that DFI maintains a significant positive effect on new citizens' entrepreneurial activities, with a coefficient of 0.851 at the 1% significance level after accounting for endogeneity concerns. These findings

provide strong empirical support for the baseline results by effectively addressing potential simultaneity bias and omitted variable problems.

Table 4. Results of Endogeneity Test

	Spherical Distance to Hangzhou		Internet Penetration Rate	
	First Stage	Second Stage	First Stage	Second Stage
Explained Variable	Digital Finance Inclusion Index	Entrepreneurship	Digital Finance Inclusion ndex	Entrepreneurship
Spherical Distance / Internet Penetration Rate	-0.114*** (0.006)		0.445*** (0.035)	
Digital Finance Inclusion Index		1.726*** (0.505)		1.893*** (0.505)
F-statistic	2974.07		4183.80	
R^2	0.7673		0.7631	
IV T-value	-20.06		12.64	
Wald test		4.51		5.71
P-Value		0.034		0.017
City Control Variables	Yes		Yes	
N	3424		3424	

4.5 Mechanism Analysis

Empirical mediation analysis reveals digital payment adoption as a statistically significant channel through which digital financial development stimulates new citizens' entrepreneurship (Table 5). Sequential models demonstrate: (1) Digital Finance Inclusion Index exhibits a significantly positive baseline effect on entrepreneurship; (2) Digital Finance Inclusion Index strongly predicts digital payment adoption; (3) The simultaneous inclusion of both the Digital Finance Inclusion Index and digital payment measures yields statistically significant positive coefficients for both variables. The observed attenuation in the coefficient magnitude of the Digital Finance Inclusion Index from 0.692 to 0.641 provides quantitative evidence supporting digital payment's partial mediating role. These results suggest that the development of digital finance predominantly fosters entrepreneurial activity through its enhancement of payment infrastructure utilization.These results empirically validate Hypothesis 2 regarding the transmission mechanism.

Table 5. Mechanism of the Impact of Digital Finance Development on Entrepreneurial Behavior Among New Citizens

	(1) Entrepreneurship	(2) Digital payment	(3) Entrepreneurship
Digital Finance Inclusion Index	0.692*** (0.230)	0.367* (0.217)	0.641*** (0.229)
Digital payment			0.664*** (0.087)
Control Variables	Yes	Yes	Yes
N	3424	3424	3424
R^2	0.128	0.395	0.149

5. Further Research

5.1 Impact on Different Types of Entrepreneurship

This section examines how digital finance development affects new citizens' engagement in distinct entrepreneurial activities, with detailed results presented in Table 6. Findings indicate that digital finance

significantly promotes self-employed and opportunity-driven entrepreneurship among new citizens, while exhibiting no significant impact on employer-based or necessity-driven entrepreneurship.

Specifically, self-employed and opportunity-driven entrepreneurs typically demonstrate higher technology adoption rates and actively leverage digital financial services to enhance efficiency and reduce costs. In contrast, employer-based entrepreneurship requires larger capital investments and complex financial support systems, where current digital inclusive finance—primarily offering small-scale, short-term, and standardized products—fails to meet the depth and breadth of service demands. Additionally, necessity-driven entrepreneurs often lack essential technical knowledge, limiting their capacity to utilize digital financial conveniences effectively.

Digital finance generates substantial benefits for self-employed and opportunity-driven entrepreneurship but shows limited efficacy for employer-based and necessity-driven ventures.

Table 6. Impact of Digital Finance Development on Different Types of Entrepreneurship Among New Citizens

	(1) Self-Employment Entrepreneurship	(2) Employer Entrepreneurship	(3) Necessity-Driven Entrepreneurship	(4) Opportunity-Driven Entrepreneurship
Digital Financial Inclusion index	0.726***	0.069	0.028	0.643**
	(0.239)	(0.410)	(0.364)	(0.244)
Control Variables	Yes	Yes	Yes	Yes
Pseudo R^2	0.079	0.243	0.090	0.129
N	3424	3424	3424	3424

5.2 Comparative Impact on New vs. Non-migrant Urban Citizens

This section defines non-migrant urban citizens (old citizens) as individuals residing in urban areas without inter-county/district household registration transfers, maintaining consistent residency and registration status. Using CHFS2019 data, we identified 1,323 such citizens to compare digital finance's effects on their entrepreneurial behavior versus new citizens (Table 7).

Digital finance exerts a stronger catalytic effect on entrepreneurship among new citizens. This disparity likely stems from non-migrant citizens' inherent advantages: stable income streams, property assets, and established credit histories enhance their access to traditional financial services. Consequently, they exhibit greater reliance on cash transactions and physical banking facilities—perceived as more reliable—while traditional financial institutions prioritize lending to this demographic.

Table 7. Comparison of the Impact of Digital Finance Development on Entrepreneurship Between New and Old Citizens

	(1) Old Citizens	(2) New Citizens
Digital Financial Inclusion Index	0.595	0.692***
	(0.380)	(0.230)
Control Variables	Yes	Yes
N	1323	3424
Pseudo R^2	0.131	0.128

6. Conclusions and Policy Implications

The study demonstrates that digital finance development significantly promotes entrepreneurship among new citizens, primarily through enhanced digital payment adoption. While self-employed and opportunity-driven ventures benefit substantially from flexible funding and efficient information processing, employer-based and necessity-driven entrepreneurship show limited responsiveness due to their demands for large-scale capital or technical capacities. Notably, digital finance exhibits stronger effects on new citizens compared to non-migrant urban citizens, highlighting its potential in addressing financial inclusion gaps for marginalized populations. These findings underscore the transformative role of digital finance in empowering migrant populations' economic

participation, though its efficacy remains contingent on entrepreneurial types and beneficiaries' resource endowments.

To maximize digital finance's developmental impact, policymakers should prioritize infrastructure upgrades and targeted capacity-building programs in new citizen communities, coupled with streamlined financial services that lower entry barriers. Concurrently, establishing cross-regional social security coordination mechanisms and creating mentorship platforms can facilitate knowledge transfer between migrant and non-migrant groups. Regulatory frameworks must evolve to ensure service security and transparency while incentivizing fintech innovation for underserved segments. By integrating these measures with fiscal support mechanisms like venture funds and tax incentives, governments can foster an ecosystem where digital finance synergizes with urban integration policies to generate sustainable entrepreneurial growth among new citizens.

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Notes

Note 1. Accessible at: https://www.stats.gov.cn/xxgk/jd/sjjd2020/202401/t20240117_1946672.html

Note 2. Accessible at: https://www.stats.gov.cn/sj/zxfb/202302/t20230203_1901452.html

Note 3. Accessible at: https://www.gov.cn/zhengce/zhengceku/2022-03/06/content_5677508.htm