Financial Economics Research; Vol.3, No.2; 2026
E-ISSN: 3006-3663 P-ISSN: 3006-3655
DOI: https://doi.org/10.70267/fer.250302.8597
Published by: Zeus Press

How the Digital Economy Shapes Workers' Employment Choices: Internal Mechanisms and Empirical Evidence on Informal Employment

Yunshan Xie*

School of International Business, Tianjin Foreign Studies University, Tianjin, China

**Corresponding author: Yunshan Xie.*

Abstract

Using data from the Chinese General Social Survey (CGSS) from 2017 to 2023, this study employs a Probit model to examine the impact of digital economy development on informal employment among the labor force. The results indicate that the development of the digital economy significantly increases the probability of engaging in informal employment. Mechanism analysis shows that the digital economy improves individuals' internet usage, which in turn enhances human capital, reduces information barriers and transaction costs in the labor market, and ultimately raises the likelihood of informal employment. Heterogeneity analysis further reveals that the employment effects of the digital economy are not universally inclusive: the impacts are more pronounced among individuals with non-agricultural household registration, higher educational attainment, and the self-employed. Moreover, regions with higher levels of economic development benefit more from the promotion effect of the digital economy on informal employment.

Keywords

digital economy, informal employment, internet use

1. Introduction

The report of the 20th National Congress of the Communist Party of China emphasizes that employment is the most fundamental component of people's well-being. Employment constitutes the cornerstone of social security and serves as a fundamental driver of economic development. However, against the backdrop of deepening population aging, structural transformation of the demographic dividend, and rising operational costs under traditional employment models, many firms have adopted measures such as hiring freezes and layoffs to reduce labor costs, thereby exerting adverse effects on the employment environment. In July 2020, the *Opinions of the General Office of the State Council on Supporting Multi-Channel Flexible Employment* (Guobanfa [2020] No. 27) explicitly proposed fostering new forms of employment, including part-time work and remote home-based work. As a key mechanism for maintaining labor market resilience, informal employment has increasingly become an indispensable means of expanding employment capacity and improving employment quality.

According to the definition of the International Labour Organization (ILO), informal employment mainly refers to flexible forms of work characterized by the absence of formal labor contracts, fixed working hours,

and direct managerial supervision. It typically includes employment without formal contracts, untaxed income, and a lack of social security coverage and employment benefits. With the acceleration of globalization and marketization, the scale of informal employment in China has continued to expand, playing a positive role in absorbing urban labor, increasing household income, and reducing income inequality. It has gradually become one of the major forms of employment in China [1].

The digital economy, supported by a new generation of information technologies, promotes the evolution of the socio-economic system toward digitalization, networking, and intelligence through deep integration with the real economy [2]. With the advancement of a new round of technological revolution and industrial transformation, the scale of China's digital economy has continued to expand. According to the *China Digital Economy Development Report (2024)*, the size of China's digital economy reached 53.9 trillion yuan in 2023, accounting for 42.8% of GDP, up from 32.9% in 2017, and contributing 66.45% to GDP growth. In recent years, under the macro environment of continuous digital economy expansion, informal employment forms such as self-employment and flexible work have developed rapidly [3]. During the COVID-19 pandemic, the digital economy played a crucial role. In particular, its cross-regional and time-independent online advantages effectively mitigated transmission risks associated with physical gatherings, enabling it to recover earlier and remain more active in the labor market, thereby functioning as a key stabilizer of employment [4].

The rapid development of the digital economy not only creates a large number of new jobs but also profoundly reshapes employment structure and job quality. On the one hand, it accelerates industrial upgrading through digital transformation, thereby optimizing the employment structure [5]. On the other hand, it enhances the efficiency of information transmission, expands access to educational resources, and creates favorable conditions for broadening social capital and improving human capital, which in turn enhances overall employment quality [6]. In addition, new forms of employment emerging from the digital economy diversify the employment choices of younger generations in informal sectors, weakening the intergenerational transmission of employment preferences from parents to children. Meanwhile, the rapid development of the digital economy has gradually narrowed the income gap between informal and formal employment [7].

At present, no unified consensus has been reached in the academic literature regarding the definition of informal employment, and findings on the impact of the digital economy remain mixed. Some scholars argue that the digital economy encourages individuals to choose informal employment. Based on CLDS data, Zhao Xinyu and Zhu Rui find that the development of the digital economy significantly increases the probability of entering informal employment only when individuals are proficient in or frequently use the internet [8]. Using data from the China Family Panel Studies (CFPS), He Zongyue and Song Xuguang further confirm that digital economy development promotes informal employment to a certain extent and has a significant job-creation effect in informal sectors [4]. In contrast, other scholars hold the opposite view. Kuhn and Mansour argue that digital technologies establish network bridges between workers and firms, significantly expanding access to formal employment opportunities [9]. Using provincial panel data from 2002 to 2016, Zeng Xiangjin and Luo Yan find that increased internet penetration facilitates unemployed individuals' access to formal job information, thereby promoting the transition from informal to formal employment [10]. Song Lin and He Yang, based on CFPS 2018 data, demonstrate that internet use improves job matching efficiency and expands employment choices, thus increasing the rate of formal employment [11]. Therefore, exploring the mechanisms through which the digital economy influences labor force decisions regarding informal employment, and accurately identifying the intrinsic relationship between the two, is of important practical significance for better leveraging the role of the digital economy in stabilizing employment and safeguarding livelihoods.

Based on the above analysis, this study utilizes data from the Chinese General Social Survey to empirically examine the impact of digital economy development on informal employment, constructing a digital economy index system. Compared with existing studies, the marginal contributions of this paper are threefold. First, it enriches the literature on digital economy development and informal employment. Most existing studies on the employment effects of the digital economy focus on macro-level analysis or the overall labor force perspective [5][12], paying insufficient attention to employment issues in the digital era. This study serves as both an extension of current digital economy research and an empirical response to the role of the digital economy in enhancing social welfare. Second, it supplements the empirical evidence on informal employment under the new economic landscape. Previous studies have mainly examined informal employment from single perspectives such as digital finance or industrial intelligence [13][14]. This paper constructs a digital economy index from two dimensions—internet development and digital inclusive finance—thereby providing new

evidence on how the digital economy promotes informal employment. Third, it reveals the underlying mechanisms through which digital economy development affects informal employment. By examining individuals' internet usage, this study analyzes the micro-level mechanisms of how the digital economy facilitates informal employment. Furthermore, to test whether the positive effects of the digital economy are universally inclusive, this study conducts heterogeneity analyses based on regional development levels, human capital endowments, and household registration status, thereby providing more nuanced empirical evidence on the employment effects of the digital economy.

2. Theoretical Analysis and Hypothesis Development

2.1 The Impact of Digital Economy Development on Informal Employment

The development of the digital economy weakens the rigid constraints of formal employment systems, strengthens firms' preference for hiring informal workers, and increases the probability of informal employment. By breaking spatial and temporal limitations, the digital economy enables firms to overcome physical constraints in local labor supply, allowing for cross-regional and project-based dynamic allocation of labor. It also promotes the de-formalization of employment relationships, reducing the necessity for long-term labor contracts and social insurance contributions, thereby enhancing flexibility in employment decisions [15]. Intensified market competition under the digital economy further incentivizes firms to reduce costs by hiring temporary workers or outsourcing business activities to informal enterprises, which in turn increases the likelihood of workers entering informal employment [16]. Compared with formal employment, the flexibility, diversity, and lower cost of informal employment make it more attractive to firms. Meanwhile, the development of the labor market and the rise of various intermediary institutions provide organizational support for the expansion of informal employment [17]. Yin Zhifeng et al. further confirm that, after digital empowerment, private enterprises are more inclined to adopt informal employment arrangements to reduce costs [18].

The digital economy also fosters new forms of employment, lowers entry barriers for workers, and increases the probability of informal employment. While improving productivity, the digital economy reduces the prices of goods and services, enhances consumers' real income and consumption levels, and thereby generates greater market demand for informal employment [19]. In this context, a large number of flexible jobs—such as express delivery and food delivery services—have emerged based on digital platforms. These jobs attract young workers who were previously employed in factories due to their flexibility, autonomy, and relatively higher income, thus increasing the share of informal employment [20]. In addition, the rapid development of inclusive financial systems enabled by digital technologies has significantly alleviated financing constraints faced by individuals engaging in self-employment or entrepreneurship, thereby increasing the likelihood of choosing informal employment [8]. Compared with the formal sector, informal employment demonstrates stronger labor absorption capacity: under the same level of capital investment, it can generate two to three times as many jobs as the formal sector [21]. Groups such as individuals with rural household registration, non-members of the Communist Party of China, and those with lower educational attainment often face disadvantages due to weaker factor endowments and higher entry barriers to formal employment, which limits their ability to equally benefit from economic growth. Informal employment, characterized by flexibility and low entry thresholds, provides these groups with opportunities to share in the benefits of digital economy development [7].

Furthermore, the digital economy improves the efficiency of resource allocation, expands access to high-quality employment channels, and increases the probability of informal employment. Since income from informal employment is approximately 1.5 times that of formal employment, and given its higher autonomy, lower entry barriers, and lower operating costs, more migrant workers tend to move from formal to informal employment than vice versa. This pathway has gradually evolved into an important channel for self-employed informal workers to accumulate capital and achieve upward mobility [22]. Leveraging the efficient resource-matching capabilities of digital platforms, informal workers in the digital economy context generally earn higher incomes and enjoy greater autonomy in value orientation and lifestyle choices. As a result, such employment forms are more likely to attract young workers who are proficient in internet use and possess higher education and professional skills to actively choose informal employment [23].

Hypothesis 1: The development of the digital economy increases the probability of informal employment among workers.

2.2 Mechanisms Through Which the Digital Economy Increases Informal Employment

The development of the digital economy relies fundamentally on internet technologies, and the realization of its employment effects depends critically on workers' access to the internet [24]. Individuals who use the internet can overcome spatial and temporal constraints, efficiently obtain employment information, reduce job search costs, accelerate job matching, and increase employment opportunities. Internet use plays a partial mediating role in rural labor participation in informal employment, primarily through enhancing human capital [25]. Through online platforms, rural workers can independently acquire new knowledge and skills, thereby improving their human capital and strengthening their competitiveness in non-agricultural employment [26]. Only for groups that are proficient in or frequently exposed to the internet does the digital economy exert a more significant positive effect on informal employment, which further increases their likelihood of choosing informal employment [8].

Hypothesis 2: The development of the digital economy increases internet use among workers, thereby raising the probability of informal employment.

3. Research Design

3.1 Data Sources

The micro-level data used in this study are drawn from the Chinese General Social Survey (CGSS). Initiated in 2003, the CGSS is the first nationwide, comprehensive, and continuous large-scale social survey project in China, covering multiple levels such as society, households, and individuals, with strong sample representativeness. Based on data availability, this study selects four waves of CGSS data from 2017, 2018, 2021, and 2023. The data are processed as follows: individuals who are currently unemployed are excluded; individuals engaged in agriculture are excluded; individuals under the age of 16 are excluded; and unpaid family workers are excluded. Among the retained samples, individuals without employees (self-employed employers), self-employed business owners, employees without formal labor contracts, casual laborers, dispatched workers, paid family workers, and freelancers are classified as informal workers, while the remaining individuals are classified as formal workers.

The macro-level data are obtained from the *China Statistical Yearbook* and the *Peking University Digital Financial Inclusion Index*. Provincial-level digital economy indicators for the years 2017, 2018, 2021, and 2023 are matched with micro-level informal employment data, yielding a final sample of 8,633 observations.

3.2 Variable Definitions

3.2.1 Dependent Variable

The dependent variable is whether an individual is engaged in informal employment (*informal*). Specifically, *informal* = 1 indicates that the individual is in informal employment, while *informal* = 0 indicates formal employment. Informal employment generally refers to workers who are not fully covered by formal institutional frameworks, including labor regulations, social security systems, statistical registration, and tax supervision, typically excluding the agricultural sector. This study primarily follows the definition proposed by Xue Jinjun and Gao Wenshu, while also incorporating the general framework of the International Labour Organization. Individuals categorized as informal workers include: employees or wage earners without formal labor contracts, employers with zero employees, self-employed workers, and family workers [27]. After excluding unemployed individuals and those engaged in agriculture, the following groups are classified as informal employment (assigned a value of 1): self-employed employers without employees, individual business owners, freelancers, gig workers, casual laborers, paid family workers, employees without labor contracts, and contract-based laborers. All other workers are classified as formal employment (assigned a value of 0).

3.2.2 Core Explanatory Variable

Digital economy development level. Drawing on the framework proposed by Liu Jun et al. and considering the availability of city-level data, this study measures the overall level of digital economy development from two dimensions: internet development and digital financial inclusion [28]. The measurement of internet development follows Huang Qunhui et al., using indicators such as internet penetration rate, employment in related industries, output of related industries, and mobile phone penetration rate [29]. Digital financial inclusion is measured using the *Peking University Digital Financial Inclusion Index*, jointly compiled by the Institute of Digital Finance at Peking University and Ant Group. All indicators are standardized to eliminate differences in measurement units, and the objective entropy weighting method is applied to assign weights and construct a composite digital economy development index.

3.2.3 Mediating Variable

Internet use. Following existing studies, this paper uses internet media usage as a proxy variable for internet use, constructed as a dummy variable [26]. Specifically, individuals who report "never" or "only a few times a year or less" using the internet are defined as infrequent users and assigned a value of 0, while those who report using the internet "several times a week" or "daily" are defined as frequent users and assigned a value of 1.

3.2.4 Control Variables

Following prior literature, this study includes control variables at the individual, household, and regional levels [30]. At the individual level, the control variables include: age and the square of age (the square of age is divided by 100); ethnicity (Han = 1, other ethnic groups = 0); education level (coded from 1 to 13, corresponding to no formal education, private tutoring or literacy classes, primary school, junior high school, vocational high school, general high school, secondary vocational school, technical school, adult junior college, regular junior college, adult undergraduate, regular undergraduate, and postgraduate or above); and household registration status (agricultural hukou = 0, non-agricultural hukou = 1). At the household level, the control variable is family economic status, measured by the logarithm of household income. At the regional level, the control variables include: fiscal support (measured by the ratio of general public budget expenditure to GDP); economic development level (measured by the logarithm of GDP per capita); industrial structure upgrading (measured as the weighted sum of the shares of value added by the primary, secondary, and tertiary industries in GDP, with weights of 1, 2, and 3, respectively); and the urban–rural income gap (measured by the ratio of per capita disposable income of urban residents to that of rural residents).

Descriptive statistics for the above variables are reported in Table 1.

Table 1: Descriptive Statistics of Variables

Variable	Observations	Mean	Std. Dev.	Min	Max
Informal employment	8633	0.576	0.494	0.000	1.000
Digital economy index	8633	0.280	0.114	0.140	0.659
Age	8633	48.676	11.792	22.000	93.000
Age squared	8633	25.084	11.992	4.840	86.490
Ethnicity	8633	0.950	0.218	0.000	1.000
Education level	8633	6.340	3.347	1.000	13.000
Hukou status	8633	0.384	0.486	0.000	1.000
Household income	8633	11.196	0.962	2.079	16.118
Fiscal support	8633	0.214	0.075	0.105	0.608
Economic development level	8633	11.193	0.438	10.319	12.239
Urban–rural income gap	8633	2.376	0.313	1.718	3.438
Industrial structure upgrading	8633	2.506	0.412	2.233	7.430

3.3 Model Specification

To empirically examine the impact of digital economy development on informal employment, this study constructs the following baseline regression model:

$$p^t(informal_{hi}=1)=\alpha_0+\alpha_1 digit_{ht}+\sum_{j=1}^{n}\lambda_j X_{hit}+\delta_t+\theta_h+\mu_{hit} \quad (1)$$

where $informal_{hi}=1$ indicates that individual i in province h at time t is engaged in informal employment. $digit_{ht}$ denotes the level of digital economy development in province h at time t. X_{hit} represents a set of control variables, including individual-, household-, and regional-level characteristics. In addition, year and province fixed effects are included in the model, where δ_t captures year fixed effects and θ_h captures province fixed effects. μ_{hit} is the random error term.

To test the mediating effect, the following model is constructed based on Equation (1):

$$p^t(informal_{hi}=1)=\alpha_0+\alpha_1 digit_{ht}+\alpha_2 internet_{ht}+\sum_{j=1}^{n}\lambda_j X_{hit}+\delta_t+\theta_h+\mu_{hit} \quad (2)$$

where $internet_{ht}$ represents internet use. In this study, internet use is measured as a dummy variable based on individuals' usage of internet media.

4. Empirical Analysis

4.1 Baseline Regression

This study employs a Probit model for the baseline regression analysis. Since the coefficients estimated by the Probit model cannot directly represent the marginal effects of explanatory variables on the dependent variable, Margins estimation is conducted to calculate marginal effects. The coefficients reported in the table therefore reflect the marginal effects of each variable on informal employment. For continuous variables, the marginal effects are evaluated at their mean values. Column (1) reports the regression results including only the digital economy development variable. Columns (2), (3), and (4) present the regression results of digital economy development and informal employment after sequentially controlling for individual-, household-, and regional-level characteristics. The results show that although the absolute values of the coefficients vary across specifications, the direction and statistical significance of the core explanatory variable remain unchanged, indicating that the model estimation results are relatively robust. The main patterns are as follows.

As shown in column (4), holding other factors constant, the digital economy has a positive impact on informal employment and is statistically significant at the 1% level. This indicates that the higher the level of digital economy development in a city, the greater the probability that workers engage in informal employment. Therefore, Hypothesis 1 is supported.

Table 2: Baseline Model: Stepwise Regression

	(1)	(2)	(3)	(4)
Digital economy index	0.948**	1.458***	1.543***	1.700***
	(0.434)	(0.377)	(0.420)	(0.465)
Age		-0.003	-0.004	-0.004
		(0.003)	(0.004)	(0.004)
Age squared		0.005	0.005	0.005
		(0.003)	(0.004)	(0.004)
Ethnicity		-0.006	-0.001	-0.002
		(0.020)	(0.021)	(0.021)
Education level		-0.047***	-0.045***	-0.045***
		(0.002)	(0.002)	(0.002)
Hukou status		-0.117***	-0.114***	-0.114***
		(0.014)	(0.014)	(0.014)
Household income			-0.035***	-0.035***
			(0.007)	(0.007)
Fiscal support				0.477
				(0.615)
Economic development level				-0.286**
				(0.124)
Urban–rural income gap				-0.190
				(0.170)
Industrial structure upgrading				0.010
				(0.016)
Province fixed effects	Yes	Yes	Yes	Yes

Year fixed effects	Yes	Yes	Yes	Yes
Observations	9704	9704	8633	8633
Pseudo R^2	0.078	0.222	0.233	0.234

*Note: ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. Robust standard errors are reported in parentheses. The same applies to the tables below.*

From the regression results of the micro-level individual characteristics, the coefficient of education level is significantly negative at the 1% level, indicating that workers with higher education are less likely to engage in informal employment. The coefficient of the hukou variable is also significantly negative, suggesting that urban residents have a lower probability of participating in informal employment than rural residents. On average, urban workers are about 11 percentage points less likely to engage in informal employment than rural workers.

From the household-level control variables, the coefficient of household income is negative and significant at the 1% level. Compared with workers from lower-income households, those with higher household income tend to place greater emphasis on job quality and social status, and are therefore more likely to choose formal employment.

From the perspective of macro-level regional characteristics, the coefficient of economic development level is negative and significant at the 1% level, indicating that the more economically developed a region is, the lower the probability that workers engage in informal employment.

4.2 Robustness Checks

To ensure the robustness of the regression results, this study conducts a series of robustness checks from multiple perspectives. The corresponding results are reported in Table 3.

Table 3: Robustness Checks

Sample Treatment	(1) Instrumental Variable	(2) Alternative Sample and Winsorization	(3) Logit
Digital economy index	2.808**	1.205*	1.705***
	(1.326)	(0.645)	(0.449)
Individual controls	Controls	Controls	Controls
Household controls	Controls	Controls	Controls
Regional controls	Controls	Controls	Controls
Province fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
Observations	6953	6953	8633
Pseudo R^2	.	0.179	0.235

4.2.1 Endogeneity Issues

Potential endogeneity may arise from reverse causality and omitted variables. This study examines the impact of the overall level of urban digital economy development on individuals' informal employment decisions. While the level of digital economy development may influence individual employment choices, the reverse causal mechanism is unlikely to be significant. Therefore, severe reverse causality is not expected in this context. To further mitigate endogeneity concerns arising from omitted variables, an instrumental variable approach is employed. Following Zhao Tao et al. [31], this study constructs an instrument by interacting the number of fixed telephones per 100 people in each province in 1984 with the national information technology service revenue in the previous period. First, the endogeneity test rejects the null hypothesis that the explanatory variable is exogenous. Second, weak instrument tests indicate that the p-values of the AR and Wald statistics are both significant at the 1% level, suggesting that the selected instrument does not suffer from weak instrument problems. After addressing endogeneity using the instrumental variable, the regression results remain consistent with the baseline findings, confirming that digital economy development significantly promotes informal employment.

4.2.2 Alternative Sample and Winsorization

Considering that municipalities directly under the central government (Beijing, Tianjin, Shanghai, and Chongqing) possess greater autonomy in resource allocation, the employment effects of the digital economy in these regions may exhibit particular characteristics. To ensure the generalizability of the results, these four

municipalities are excluded from the baseline sample. In addition, to mitigate the influence of outliers and extreme values, all continuous variables are winsorized at the 1% level on both tails after excluding the four municipalities. The results are reported in column (2) of Table 3. The findings indicate that, even after excluding municipalities and performing winsorization, the development of the digital economy continues to have a significantly positive impact on informal employment, suggesting that the baseline results are robust.

4.2.3 Alternative Empirical Model

Since the dependent variable is binary, the baseline regression adopts a Probit model. To further verify the robustness of the empirical results, a Logit model—also suitable for binary outcomes—is employed. As shown in column (3) of Table 3, the coefficient of the digital economy index remains significant at the 1% level, indicating that digital economy development continues to increase the probability of informal employment. This further supports the baseline findings of this study.

4.3 Mechanism Analysis

Why does the development of the digital economy increase the probability of informal employment? This study analyzes the underlying mechanism from a micro-level perspective. The development of the digital economy enhances individuals' internet use, which in turn improves human capital, reduces information barriers and transaction costs in the labor market, and expands opportunities for informal employment. This section empirically tests this mechanism, with the results reported in Table 4.

Table 4: Mechanism Test

Variables	(1)	(2)	(3)
	Informal Employment	Internet Use	Informal Employment
Digital economy index	0.693*	0.855**	0.693*
	(0.358)	(0.405)	(0.355)
Internet use			0.034**
			(0.016)
Individual controls	Controls	Controls	Controls
Household controls	Controls	Controls	Controls
Regional controls	Controls	Controls	Controls
Province fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
Observations	8033	8033	8033
Pseudo R^2	0.220	0.540	0.220

As shown in columns (2) and (3) of Table 4, the development of the digital economy significantly increases internet use among workers, which in turn raises the probability of informal employment. Therefore, Hypothesis 2 is supported. The development of the digital economy relies fundamentally on internet technologies, and the realization of its employment effects depends on workers' access to the internet [24]. The widespread use of the internet has fundamentally transformed traditional modes of social interaction by providing platforms and tools for online communication and network maintenance. It enables individuals to establish and sustain social connections and expand their social networks. For rural laborers, social interactions—such as participation in social activities—serve as important channels for accessing non-agricultural employment opportunities [32]. In traditional labor markets, migrant workers are often employed in temporary positions and experience high job mobility. The development of the digital economy has increased their use of the internet, thereby leveraging its advantages in providing employment information and reducing transaction and financing costs. This not only enhances their access to job opportunities but also increases the likelihood of informal workers entering more stable employment arrangements. Moreover, the application of internet technologies promotes the development of e-commerce, generating a large number of new forms of employment. Compared with formal employment, informal employment generally imposes lower requirements in terms of education and skills, thus providing more employment opportunities for individuals with lower levels of human capital.

4.4 Heterogeneity Analysis

This section examines the heterogeneous effects of digital economy development on informal employment from both macro- and micro-level perspectives, including regional economic development, hukou status, education level, and employment status. The regression results are reported in Table 5.

Table 5: Heterogeneity Analysis

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Low economic development	High economic development	Non-agricultural hukou	Agricultural hukou	High education	Low education	Employees	Self-employed
Digital economy index	0.797	0.867**	1.009**	0.953*	0.874*	0.647	0.803	0.682**
	(0.568)	(0.382)	(0.416)	(0.537)	(0.523)	(0.451)	(0.731)	(0.326)
Individual controls	Controls	Controls	Controls	Controls	Controls	Controls	Controls	Controls
Household controls	Controls	Controls	Controls	Controls	Controls	Controls	Controls	Controls
Regional controls	Controls	Controls	Controls	Controls	Controls	Controls	Controls	Controls
Province fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	4310	4523	3382	5451	3259	5610	1823	7031
Pseudo R^2	0.152	0.234	0.175	0.139	0.106	0.075	0.202	0.208

4.4.1 Heterogeneity by Regional Economic Development

Regional disparities in economic development lead to differences in labor market conditions, which may result in heterogeneous effects of the digital economy on informal employment. Accordingly, this study divides the sample into regions with low and high levels of economic development. Columns (1) and (2) of Table 5 report the regression results. The results indicate that the effect of the digital economy on informal employment is not statistically significant in regions with lower levels of economic development, whereas it is significantly positive at the 5% level in more economically developed regions. The digital economy relies heavily on platform ecosystems, logistics networks, consumption density, and digital infrastructure. In less developed regions, weaker digital infrastructure and insufficient local demand limit the transformation of digital economy development into informal employment opportunities, leading to insignificant effects. By contrast, the promotion effect of the digital economy on informal employment is mainly concentrated in economically developed regions where digital platforms are more prevalent and market demand is stronger.

4.4.2 Heterogeneity by Hukou Status

China's long-standing urban–rural dual structure has led to significant disparities in labor market conditions between individuals with agricultural and non-agricultural hukou, resulting in heterogeneous effects of the digital economy on their employment decisions. This study classifies workers into two groups based on hukou status: non-agricultural and agricultural. Columns (3) and (4) of Table 5 present the regression results. The findings show that the digital economy has a significantly positive effect on informal employment among workers with agricultural hukou at the 10% level, and a significantly positive effect among those with non-agricultural hukou at the 5% level. Relatively speaking, individuals with non-agricultural hukou generally enjoy more stable employment pathways, better social security systems, higher levels of education and public services, and greater advantages in information access, social capital accumulation, and participation in market activities. As a result, they are better positioned to identify, utilize, and convert the opportunities brought by the digital economy, leading to more stable and statistically significant effects.

4.4.3 Heterogeneity by Education Level

The impact of the digital economy on informal employment may differ across workers with varying levels of human capital, and its direction is not a priori clear. To examine this, individuals with a high school education or below are classified as low-education workers, while those with education above high school are classified as high-education workers. Columns (5) and (6) of Table 5 report the results. The findings indicate that the effect of the digital economy on informal employment among low-education workers is not statistically

significant, whereas it is significantly positive at the 10% level for high-education workers. This suggests that, in the digital economy era, low-education workers face difficulties entering skill-intensive digital informal jobs, while traditional manual jobs are more susceptible to replacement, resulting in an insignificant effect. In contrast, highly educated workers, equipped with digital skills and stronger learning capabilities, are better able to seize emerging flexible employment opportunities and adapt to new forms and models of employment generated by the digital economy.

4.4.4 Heterogeneity by Employment Status

Employment status reflects labor–capital relations, and the effects of the digital economy may vary accordingly. This study divides the sample into two groups—employees and self-employed individuals—and conducts separate regressions. Columns (7) and (8) of Table 5 present the results. The findings show that digital economy development significantly increases the probability of informal employment among the self-employed. This is because self-employed individuals generally exhibit higher flexibility and organizational adaptability. The advancement of the digital economy reduces institutional transaction costs, stimulates entrepreneurial incentives, and promotes the expansion of small and micro businesses as well as individual entrepreneurs. By contrast, the effect of the digital economy on informal employment among employees is positive but not statistically significant. On the one hand, the rise of digital platforms has indeed created diverse new employment opportunities. On the other hand, it has simultaneously prompted firms to optimize their employment structures, phasing out low-skilled informal positions. As a result, the net effect on employees' participation in informal employment is not statistically significant.

5. Conclusions and Implications

Employment is the most fundamental component of people's well-being. Against the backdrop of the profound impact of digital economy development on the labor market, this study uses data from the Chinese General Social Survey (CGSS) from 2017 to 2023 and employs a Probit model to examine the effect of digital economy development on the probability of informal employment, as well as its underlying mechanisms. The empirical results show that the development of the digital economy significantly increases the probability of informal employment. Specifically, the digital economy promotes informal employment by enhancing individuals' internet use, which in turn increases their likelihood of engaging in informal employment. Furthermore, the effect of the digital economy on informal employment exhibits significant heterogeneity. The impact is more pronounced among workers with non-agricultural hukou, those with higher levels of education, and the self-employed. The positive effect of the digital economy on informal employment is not universally inclusive, and regions with higher levels of economic development benefit more from this effect. Based on the above findings, the following policy implications are proposed:

First, it is essential to improve the regulatory and policy framework supporting informal employment. Efforts should be made to standardize the development of recruitment platforms to ensure dynamic matching between job information and job seekers' needs, thereby reducing information asymmetry between employers and employees. Policymakers should also pay close attention to the diverse forms of flexible employment emerging in the service sector under the rapid development of the digital economy, clarify labor relationships, and regulate the signing of employment contracts. In addition, it is necessary to explore labor protection systems distinct from traditional employment models, continuously improve social security and employment service systems for flexible workers, and provide institutional support for high-quality employment.

Second, employment-friendly digital transformation should be promoted. Governments should actively foster diverse employment forms derived from the new economy and emerging industries, fully leveraging the role of the digital economy in expanding employment opportunities, reducing physical labor intensity, and enhancing workplace safety. Greater efforts should be made to strengthen the application of internet technologies in key areas such as basic services, public services, and commercial transactions, thereby creating a digital ecosystem conducive to workers' development. At the same time, regulatory mechanisms for the digital economy should be improved, utilizing big data analytics and cloud-based platforms to enhance regulatory efficiency.

Third, the accessibility advantages of digital technology in education should be fully utilized. Governments should strengthen targeted support for informal workers, particularly low-education workers who are forced

into informal sectors due to industrial upgrading or limited digital skills. Through re-employment training and personalized career guidance, their knowledge and professional skills can be effectively improved. Moreover, market-oriented training institutions and industry associations should be encouraged to participate in capacity-building initiatives, providing training programs for informal workers and expanding employment choices for low-education labor groups.

Fourth, it is important to enhance the social recognition of informal workers. Psychological support and humanistic care should be strengthened to foster an inclusive, fair, and respectful working environment, reduce feelings of relative deprivation, and improve job satisfaction and a sense of professional achievement. This would help promote both material and psychological well-being. At the same time, the positive role of informal employment in stimulating market vitality should be objectively recognized, as it can facilitate social mobility, alleviate class solidification, and contribute to the development of more harmonious labor relations.

References

[1] Zhang, Y., & Zhang, L. (2017). Formation mechanisms and heterogeneity of informal employment in China: Applicability of three major theories. *Population Journal*, 39(2), 88–99.

[2] Bukht, R., & Heeks, R. (2017). Defining, conceptualising and measuring the digital economy. *SSRN Electronic Journal*.

[3] Huang, L., & Li, C. (2025). Cross-border e-commerce and urban informal employment. *Journal of International Trade Issues*, (3), 76–94.

[4] He, Z., & Song, X. (2020). Mechanisms and implications of digital economy in promoting employment: Reflections after the COVID-19 outbreak. *Economist*, (5), 58–68.

[5] Qi, Y., Liu, C., & Ding, S. (2020). Digital economy development, employment structure optimization, and employment quality improvement. *Economic Perspectives*, (11), 17–35.

[6] Cong, Y., & Yan, M. (2022). Digital economy, human capital investment, and high-quality employment. *Finance & Economics*, (3), 112–122.

[7] Li, S. (2025). How informal employment affects intergenerational mobility in the digital economy. *Economy and Management*, 39(4), 32–41.

[8] Zhao, X., & Zhu, R. (2022). Digital economy and informal employment: Evidence from the China Labor-force Dynamics Survey. *Jilin University Journal Social Sciences Edition*, 62(5), 72–83.

[9] Kuhn, P., & Mansour, H. (2014). Is internet job search still ineffective? *The Economic Journal*, 124(581), 1213–1233.

[10] Zeng, X., & Luo, Y. (2019). The impact of internet penetration on informal employment. *Journal of China Institute of Industrial Relations*, 33(3), 47–56.

[11] Song, L., & He, Y. (2020). The impact of internet use on rural labor employment choices in China. *Chinese Journal of Population Science*, (3), 61–74.

[12] Bai, P., & Zhang, Y. (2021). Digital economy, declining demographic dividend, and rights of low- and middle-skilled workers. *Economic Research Journal*, 56(5), 91–108.

[13] Guo, Q., Meng, S., & Mao, Y. (2022). Can digital financial inclusion improve employment quality? *Journal of Shanghai University of Finance and Economics*, 24(1), 61–75.

[14] Qi, L., & Tao, J. (2023). Industrial intelligence and the employment quality of migrant workers: Mechanisms and improvement paths. *Journal of Huazhong Agricultural University (Social Sciences Edition)*, (1), 34–46.

[15] Li, G. (2023). De-laborization of platform employment in the digital economy era: Characteristics, challenges, and responses. *Social Sciences in Yunnan*, (2), 151–160.

[16] Lü, K., Chen, S., & Jia, L. (2023). How does the digital economy affect employment choices? Evidence from work motivation mechanisms. *Research on Economics and Management*, 44(12), 24–43.

[17] Qian, J. (2022). “Formalization” of informality: Labor market segmentation and domestic service enterprises—Evidence from a 2019 survey in four cities. *Collection of Women’s Studies*, (1), 35–51.

[18] Yin, Z., Li, H., Liu, Z., & Zhou, M. (2025). Digital empowerment and flexible employment in Chinese private enterprises. *Labor Economics Research*, 13(3), 106–138.

[19] Zhao, X., & Zheng, G. (2020). Labor market distortions and informal employment: Evidence from the China Labor-force Dynamics Survey. *Jilin University Journal Social Sciences Edition*, 60(4), 163–173.

[20] Tang, X., & Wang, Z. (2025). The impact of urban service industry development on informal employment. *Shanghai Economic Review*, (10), 91–103.

[21] Zhang, Y. (2010). Informal employment: Conceptual clarification and value considerations. *Nanjing Journal of Social Sciences*, (4), 62–68.

[22] Wan, X. (2008). Entry conditions and effects of migrant workers’ informal employment. *Management World*, (1), 63–74.

[23] Qi, Y., Ding, S., & Liu, C. (2021). Internet use and labor supply of flexible workers in the digital economy: Theory and evidence. *Contemporary Finance & Economics*, (5), 3–16.

[24] He, Z., Zhang, X., & Wan, G. (2020). Digital finance, digital divide, and multidimensional poverty. *Statistical Research*, 37(10), 79–89.

[25] He, Q., Liu, G., & Zou, X. (2022). The impact of internet use on rural labor employment choices: Evidence from formal and informal employment. *Journal of Agro-Forestry Economics and Management*, 21(4), 385–394.

[26] Qi, Y., & Chu, X. (2021). Employment effects of digital life: Mechanisms and micro evidence. *Finance & Trade Economics*, 42(4), 98–114.

[27] Xue, J., & Gao, W. (2012). Informal employment in urban China: Scale, characteristics, and income inequality. *Comparative Economic & Social Systems*, (6), 59–69.

[28] Liu, J., Yang, Y., & Zhang, S. (2020). Measurement and driving factors of China’s digital economy. *Shanghai Economic Review*, (6), 81–96.

[29] Huang, Q., Yu, Y., & Zhang, S. (2019). Internet development and productivity improvement in manufacturing: Mechanisms and evidence from China. *China Industrial Economics*, (8), 5–23.

[30] He, Y., & Liu, Z. (2024). The impact of digital economy development on informal employment. *Economic Development Research*, (2), 77–90.

[31] Zhao, T., Zhang, Z., & Liang, S. (2020). Digital economy, entrepreneurial activity, and high-quality development: Evidence from Chinese cities. *Management World*, 36(10), 65–76.

[32] DiMaggio, P., & Bonikowski, B. (2008). Make money surfing the web? The impact of internet use on the earnings of U.S. workers. *American Sociological Review*, 73(2), 227–250.

Funding

This research received no external funding.

Conflicts of Interest

The authors declare no conflict of interest.

Acknowledgment

This paper is an output of the science project.