Scientific Research Publishing

Open Journal of Business and Management, 2023, 11, 358-375
https://www.scirp.org/journal/ojbm
ISSN Online: 2329-3292
ISSN Print: 2329-3284

Analysis of the Relationship between Digital Economy Response to Employment and Inter-Industry Impact Effects

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How to cite this paper: Zhu, F. Y., Shi, Y. X., & Luo, W. C. (2023). Analysis of the Relationship between Digital Economy Response to Employment and Inter-Industry Impact Effects. *Open Journal of Business and Management, 11,* 358-375.
https://doi.org/10.4236/ojbm.2023.111020

Received: December 21, 2022
Accepted: January 28, 2023
Published: January 31, 2023

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Abstract

Employment is the foundation of people's livelihood, and has always been a hot topic in society. Nowadays, there are both risks and opportunities for employment in China's digital economy. In this context, by studying the characteristics, development trends, and generation mechanisms of the digital economy, this paper uses national and provincial employment panel data from 2014-2019, establishes PVAR models and linear regression models, conducts empirical analysis, and explores the response relationship of the digital economy on employment, the aggregate effect, and the destruction and creation effects on employment among different industries, and uses the F-test with Hausman. The robustness test analysis was conducted using the F-test and the Hausman test. Conclusions: 1) The response of the digital economy to employment shows a positive trend, followed by a negative trend and finally stabilizes. 2) The digital economy has a destructive effect on employment in the primary and secondary industries. 3) The digital economy has a creation effect on employment in the tertiary industry. Based on this, policy recommendations are proposed: adjusting and improving existing legislation, vigorously developing the platform economy, and strengthening digital talent training and digital skills training.

Keywords

Digital Economy, Employment, Impact Effects, PVAR Model

1. Introduction

Employment is the foundation of people's livelihood and has always been a hot topic in society. As the digital economy advances day by day, employment also

presents a new trend. Nowadays, there are both risks and opportunities for employment in China's digital economy.

Due to the specific context of the new epidemic, General Secretary Xi Jinping attaches great importance to the drivers of employment, emphasizing the need to address socio-economic development challenges in an integrated manner, to achieve the "Six Stabilities" and to prevent and control the epidemic. In addition, the digital economy, with its network advantages, has become the most responsive and active labor market, which has a stabilizing effect on the labor market and effectively contributes to the normal development of other industries.

The digital economy is a pivotal part of employment. This is not only because of the outbreak of the new crown epidemic, but also because of the influence of the digital economy itself. According to the Digital Economy Employment Report released by the China Academy of Information and Communication Research (2021), the size of China's digital economy is $39.2 trillion, raising its share of GDP to 38.6% in 2020. By 2025, the number of jobs driven by the digital economy will reach 379 million. This fully reveals the creation effect on employment under the digital economy, whose strong employment demand is nowhere to be seen under big data.

With the rapid development of the digital economy and the emergence of new models and new business models, a large number of emerging market players have emerged in recent years to embrace employment and become the main driving force in creating new jobs and promoting the development of new employment.

1) From fixed employment to flexible employment

Information and communication technologies have broken through the limitations of working hours and workplaces, encouraging workers to use their time and telecommuting to carry out their work. New occupations are beginning to be born, and flexible employment groups such as freelancers and disabled youth are active in the job market, and this form of flexible employment promotes a shift from permanent to flexible employment. Practitioners can use their accumulated experience, knowledge, and skills to provide services for a fee. This is conducive to gaining a sense of personal fulfillment, happiness and dignity, and reflects the employment model of the digital economy with a high degree of freedom in terms of working hours and workplace.

2) From offline to online employment

In recent years, relying on the use of digitalization and the development of Internet platforms, the participation of raw material suppliers, raw material purchasers and platform operators has optimized the cross-platform economic system, created a large number of jobs and employment opportunities, and facilitated the transformation of the employment structure from traditional jobs to new platforms. E-commerce platform is a typical case of online employment. E-commerce platforms not only provide a broader trade channel for both parties, but also promote the employment of sales and logistics personnel; at the same

time, online stores must regularly upload product images, process product content, promote public accounts, provide real-time online product answers, including online store operations, customer service, and promote training management and other related work. Compared with traditional jobs, emerging jobs have the characteristics of platform economy and are popular among young people for their rich work forms, flexible working hours, and different and offline communication skills. This will provide employees with digital skills and expertise, offering independent and diverse employment opportunities for different groups.

3) From individual employment to multiple employment

With the rapid rise of the digital economy, there are many digital models in the fields of transportation, tourism, logistics, education and training, and daily life. Especially in our daily life, the digital economy has been developed rapidly. Online platforms can accommodate a large number of low-income people in new positions such as delivery riders, online taxi drivers, and webcast operations. These occupations have three characteristics: low barriers to employment, low education, no requirement for previous work experience, and rapid entry through short-term training to become a qualified worker. This requires the ability to learn and practice, and can absorb a large number of former service providers, poverty alleviation and migrant workers, and people working part-time. At the same time, the development of the digital economy can also provide employment opportunities for short-term unemployed people and expand secondary employment, etc., which is important for the stability of social security.

4) From technical employment to integrated employment

Cloud computing, big data, the Internet of Things and a large number of general-purpose technologies have gradually evolved from industrial technology innovation to integrated innovation, deeply integrated into all areas of the economy and society. The range of products and enterprises is rapidly expanding, and the employment demand has also undergone structural changes, transitioning from technical employment to integrated employment. Blockchain technology is a typical representative with the characteristics of distributed storage, decentralization, operability and openness and transparency, and has been studied and applied to more and more industries. For example, data storage, file management, commodity traceability, property rights protection, anti-counterfeiting security and other blockchain-based applications in primary, secondary and tertiary industries.

In this context, through studying the characteristics and development trend of the digital economy, this paper empirically analyzes and explores the responsive relationship of the digital economy to employment, the aggregate effect, and the disruptive and creative effects on the industrial structure of employment, so as to promote the smooth development of employment in the digital economy and enhance the new dynamics of employment.

2. Review of the Literature

Abroad, scholars have more often studied the impact of digital economy development on employment at the macro level, where broadband coverage or the specifics of Internet use are key explanatory variables. Lehr et al. (2006) examine the importance of early Internet expansion in the United States using panel data from 1998 to 2002. The results suggest that Internet penetration and use were key factors in increasing employment; Crandall et al. (2007) explores the impact of digital life on infrastructure construction employment in the United States. A core explanatory variable was established: broadband lines. Using a least squares approach to empirical analysis, broadband use is effective in creating jobs in industry and services. Kolko (2012) analyzes U.S. interstate data from 1992 to 2006 and finds that broadband coverage contributes to employment growth, particularly in technology-dependent industries; Czernich (2014) argues that the Internet primarily creates new jobs and increases the efficiency of coordinating work from Two aspects affect employment.

In terms of employment in the digital economy, China has conducted more comprehensive surveys. The China Internet Network Information Center regularly releases statistical indicators and corresponding survey reports to measure the level of Internet development in China, which provides research support for various scholars' studies; Niu (2017) and Ji (2017) link the digital economy with employment from the dimension of digital economy to study its impact mechanism on employment. In order to explore the relationship between platform economy and employment quality. Li et al. (2021) studied the development of platform economy with industrial structure upgrading as a mediating variable, and the results showed that the development of platform economy promoted the improvement of employment quality played a significant positive role.

Part of the literature examines the heterogeneous effects of technological progress on different industries. Li et al. (2010) analyzed the impact of technological progress on employment in different types of industries and concluded that capital-intensive and technology-intensive firms caused negative employment effects under technological progress, while the net effect of technological progress was not significant for labor-intensive industries. Ma et al. (2013) analyzed the employment phenomenon of manufacturing firms in China from the perspective of employment creation and employment disappearance. Jiang et al. (2015) discuss the dynamic effects of technological progress on employment in 34 industries in China, and point out that technological progress has a "destructive" effect on labor-intensive industries and a "creative" effect on technology-intensive industries in the short term. Liu (2018) examines the impact of technological progress on employment in the energy industry in China from 1986 to 2015 and points out that it has a time lag. In the short run, the crowding out effect dominates, but in the long run, technological progress is beneficial to increase employment in the energy sector.

As far as the research on the measurement of digital economy is concerned, the concentration of domestic digital economy measurement started in 2017. Various data agencies as well as Internet business giants began to measure the digital economy and establish measurement systems based on different dimensional indicators. This paper adopts the Peking University Digital Inclusive Finance Index to measure the digital economy due to its various advantages such as long research time and wide range of aspects.

In general, the research results on the effect of the digital economy on employment are relatively fruitful, but there are still the following shortcomings: Firstly, there is no consistent theory on the impact of the digital economy on employment, and there is a lack of detailed analysis of the mechanism. Secondly, the existing research mainly focuses on the theoretical description of the impact of the digital economy on employment, while its empirical research is still lacking. Third, most of the studies on the degree of impact of digital economy on employment take digital economy as the research object, without subdividing the employment of various industries, and the analysis of industrial employment heterogeneity is lacking.

To sum up, there is some room for improvement in the study of employment in the digital economy. Based on this, this paper has the following marginal contributions: 1) Exploring the mechanism of the impact of the digital economy on employment. It explores the mechanism of intrinsic creation and destruction from the elements of the digital economy and provides a theoretical basis for empirical research. 2) Combining the PVAR model with a linear model. The PVAR model is constructed using inter-provincial panel data in China to explore the response relationship between the digital economy and employment, and a linear regression model is applied to subdivide the effects of the digital economy on employment in various industries to conduct a combined empirical analysis, with a view to providing reference for industrial restructuring and the development of digital economy industries. 3) Industrial employment and the digital economy are linked. From the perspective of industrial employment and the digital economy, it promotes the smooth development of employment in the digital economy and enhances new employment dynamics.

The structure of this paper is as follows: The first part is an introduction, which explains the characteristics and development trend of the digital economy. The second part is a research overview, which summarises the research gaps from the level of domestic and international research and explains the research contribution of this paper. The third part is the mechanism of the impact of the digital economy on employment, based on the creation and destruction effects on an in-depth analysis of the mechanism of the impact of the digital economy on employment. The fourth part is the research design, with the selection of indicators, data description and model setting description. The fifth section presents the empirical results and analysis, using inter-provincial panel data in China to construct a PVAR model to explore the response relationship between the digital

economy and employment, followed by further breakdown of the effects of the digital economy on employment in various industries using a linear regression model. The sixth section presents the main conclusions of the paper and suggests suggestions for the development of employment in the digital economy based on the conclusions.

3. Mechanisms of the Impact of the Digital Economy on Employment

3.1. Analysis of the Mechanism of Job Creation Effect in the Digital Economy

Digital economy job creation effect is a conduction empowerment process, digital elements generated, the application of digital technology has generated new jobs new business model, resulting in industrial integration and economic model changes, creating a large number of jobs, expanding the scale of employment.

1) Factor changes create new jobs and employment patterns.

Factor change phase. Data has become an emerging factor of production and occupies an important position in the factor system. The traditional factors of production are overlapped with the new factors of data, such as land, labor, capital and technology. This factor change can have a multiplier effect and create a variety of new business models. New job opportunities and employment patterns are also created.

2) Technological changes promote field breakthroughs and solve employment problems.

Technology change stage. In this stage, a new generation of ICT has achieved qualitative breakthroughs, such as mobile Internet, cloud computing, big data, artificial intelligence and other fields have made breakthroughs. With this, various means of digital innovation have penetrated into various industries to fully assist society in solving employment challenges. Technological advances have created new jobs, increased productivity, and opened up new opportunities for effective supporting public facilities and services. The number of digital industrialized jobs has increased, and the scale of employment in the digital economy has expanded rapidly.

3) Integrating changes to empower more employment in the tertiary sector.

The stage of convergence and change. In this stage, the digital economy realizes the development of technology-driven, vertically integrated, convergent development, open system and ecosystem combination. From mobile Internet, to shared mobility, autonomous driving, to industrial Internet and cloud economy, each economic form is presented in the classic paradigm of technology convergence economy. Technology convergence empowers more tertiary industries.

4) Economic changes have created a new employment situation.

The stage of economic change. Productivity and production relations are now transformed. Data has become a completely new factor of production. The re-

lations of production are reflected in three aspects: emerging organizational models, new market forms and new governance models. After the agricultural economy, and industrial economy, the digital economy is taking shape as a more advanced economic form. It breaks the boundaries of time and space, forming a more open and collaborative economic model. This economic form brings a new employment gap of new digital talents, thus creating a new employment situation.

3.2. Analysis of the Mechanism of the Job Destruction Effect of the Digital Economy

The job-disrupting effects of the digital economy are based more on different dimensions of the blow, reducing low-skilled jobs as well as employment in the real economy.

1) Reduce low-skilled employment opportunities.

The growth of the digital economy has raised the bar for employment and accelerated the elimination of low-skilled talent. With the development of artificial intelligence and digital management, the demand for low-skilled jobs is decreasing and is being replaced. The technology threshold is increasing and the wage income of labor factors is decreasing, widening the income gap between high-skilled and low-skilled talents.

2) Impact on employment in the real economy

The emergence of e-commerce and digital modes of operation has had a huge impact on the real economy, which relies on offline consumption, and has caused massive job losses.

Traditional manufacturing industry, traditional retail industry, traditional wholesale industry, traditional logistics industry, traditional finance industry, etc. are all squeezed by the digital economy industry for survival space due to the single business model caused by information asymmetry. Many real enterprises have failed to transform under the impact of the Internet and thus face elimination. The bankruptcy and collapse of enterprises generate a large number of unemployed people, and the pressure of employment increases accordingly.

4. Study Design

4.1. Indicator Selection and Data Description

In 2014, China's economy officially entered a critical period, the opening year of comprehensive deepening reform, accelerating transformation, upgrading and structural adjustment. Therefore, to prevent the huge data changes brought by the policy, this paper chooses Eviews 7.2 software and Stata16 software to analyze the digital economy and employment-related indicators from 2014-2019, organized as panel data, to study the effect of digital economy on employment after China entered the economic transformation .The digital economy and employment indicators are shown below (**Table 1**):

Table 1. Indicators and indicator descriptions.

Tier 1 Indicators	Secondary indicators	Indicator representation	Indicator Description
Employment	Primary Industry Employment	DYCY	Number of people employed in the primary industry (10,000 people)
	Secondary Industry Employment	DRCY	Employment in the secondary industry (10,000 people)
	Tertiary Industry Employment	DSCY	Tertiary industry employment (10,000 people)
Digital Economy	Coverage Promotion	FGTG	Payment services, money fund services, credit services, insurance services, investment services and credit services combined.
	Depth of use	SYSD	This includes indicators of total actual usage (the percentage of people using these services per 10,000 Alipay users), as well as indicators of active usage (number of transactions per capita, amount of transactions per capita).
	Degree of digitization	SZHCD	Mobility; Affordability; Credit; Convenience

Note: Employment indicators based on statistical yearbooks, digital economy indicators based on Digital Inclusion Index notes.

1) Digital economy. Since the measurement of digital economy is more inconsistent, different countries, regions and institutions have formed several indicators based on different calculation methods, which are controversial. In this paper, the Digital Inclusion Index of Peking University is adopted as the measurement indicator of the level of digital economy.

2) Employment. In this paper, the statistical yearbook data from the national database and the provincial databases are organized into a panel data format. Based on the total number of employment to measure the employment level, the data of employment in primary, secondary and tertiary industries are added to reflect the changes of employment structure and employment quality.

4.2. Model Setup

4.2.1. PVAR Model

Introducing the PVAR model to verify the dynamic relationship between the digital economy and employment.

$$y_{it} = \lambda_0 + \sum_{j=1}^{k} \lambda_{it-j} + \alpha_i + \beta_t + \varepsilon_{it} \quad (1)$$

where y_{it} includes two column vectors, which are logarithmically transformed (lnSZJJ, lnJY) for digital economic indicators and employment indicators to eliminate the effect of heteroskedasticity on the model. λ_0 is the intercept term, j is the lag order, λ_j represents the parameter matrix with lag j order, α_i and β_t are the individual fixed effect term and the time effect term, respectively, and ε_{it} is the random disturbance term.

4.2.2. Multiple Linear Regression Model

Next, based on the study of the impact of digital economy on total employment, primary industry employment, secondary industry employment and tertiary industry employment, the effect of each dimension of digital economy on employment in each industry is further subdivided, and this paper uses a multiple linear regression model to analyze the sub-effects of digital economy on three indicators of employment in primary, secondary and tertiary industries. The measurement equations are designed as follows.

$$\ln DYCY_{i,t} = C_1 + \alpha_1 \ln FGTG_{i,t} + \beta_1 \ln SYSD_{i,t} + \theta_1 \ln SZHCD_{i,t} + \mu_1 \quad (2)$$

$$\ln DRCY_{i,t} = C_2 + \alpha_2 \ln FGTG_{i,t} + \beta_2 \ln SYSD_{i,t} + \theta_2 \ln SZHCD_{i,t} + \mu_2 \quad (3)$$

$$\ln DSCY_{i,t} = C_3 + \alpha_3 \ln FGTG_{i,t} + \beta_3 \ln SYSD_{i,t} + \theta_3 \ln SZHCD_{i,t} + \mu_3 \quad (4)$$

where i denotes province, t denotes time, α, β, and θ are the variable coefficients, and μ is the random perturbation term.

5. Empirical Results and Analysis

5.1. Descriptive Statistics Results

The results of the statistical analysis are shown in Table 2: After logging the indicators related to the digital economy and employment, the mean, median, maximum, minimum and standard error of these eight indicators were calculated (Table 2).

5.2. Responsive Relationship between Digital Economy and Employment

5.2.1. Unit Root and Cointegration Tests

In order to accurately describe the logical relationship between the variables of the PVAR model and to investigate whether the variables are smooth, this paper selects the LLC and IPS unit root tests based on the principles of applicability and availability, effectively avoiding problems such as "pseudo-regression" and preventing the regression coefficients of the digital economy (LnSZJJ) and employment (LnJY) variables without any relationship. The results of the tests are shown in Table 3, and they all pass the stationarity test (Table 3).

In this paper, two methods, Pedroni test and Westlund test, are selected for cointegration testing. After testing, it can be found that all three tests reject the original hypothesis at the 1% significance level (Table 4).

The estimation of the PVAR model is carried out based on the results of the panel data smoothness test, and the lag order of the PVAR model is chosen to be 3rd order in this paper by comprehensive evaluation through the AIC, BIC and HQIC criteria (Table 5).

5.2.2. PVAR Model Estimation

The GMM estimation of the PVAR model was performed by Stata 16 software as follows (Table 6).

Table 2. Descriptive statistics and analysis of variables.

Variables	Number	Average value	Median	Maximum value	Minimum value	Standard Error
LnJY	193	7.620	7.640	8.870	5.360	0.843
LnDYCY	193	6.348	6.620	7.880	3.710	1.099
LnDRCY	193	6.174	6.140	7.860	3.440	1.087
LnDSCY	193	6.723	6.840	8.130	4.490	0.796
LnSZJJ	193	5.511	5.540	6.020	4.910	0.227
LnFGTG	193	5.425	5.450	5.950	4.840	0.247
LnSYSD	193	5.431	5.490	6.090	4.680	0.319
LnSZHCD	193	5.839	5.870	6.140	5.440	0.164

Note: Data compiled by Eviews 7.2 software.

Table 3. Unit root test results.

Variables	LLC Inspection	IPS Inspection	Results
LnJY	−30.7810***	−5.7245***	Smooth and stable
LnSZJJ	−40.5138***	−17.3832***	Smooth and stable

Note: Data compiled by Stata16 software. ***indicates statistically significant at the 1% level.

Table 4. Results of panel data co-integration test.

Inspection method	Statistic
Modified Phillips-Perron	7.1008***
Augmented Dickey-Fuller	−13.0177***
Variance ratio	−2.4823***

Note: Data compiled by Stata16 software. ***indicates statistically significant at the 1% level.

Table 5. Results of panel data co-integration test.

lag	AIC	BIC	HQIC
1	−7.35786	−5.85675*	−6.74807
2	−4.20805	−2.30179	−3.43836
3	−8.37979*	−5.84095	−7.38298*
4	−2.14278	1.46531	−0.966633

Note: Data compiled by Stata16 software. *indicates statistically significant at the 10% level.

Table 6. PVAR model estimation results.

Variables	h_lnJY	h_lnSZJJ
L1. h_lnJY	0.618618 (0.4113864)	−1.481144** (0.8669924)
L2. h_lnJY	−0.3847953*** (0.141375)	0.1459594 (0.3293178)

Continued

L3. h_lnJY	0.1450714	0.2904207
	(0.0940794)	(0.2076237)
L1. h_lnSZJJ	0.0469005	0.8219398***
	(0.091927)	(0.1891843)
L2. h_lnSZJJ	−0.0107988	−0.075432
	(0.0254122)	(0.0614461)
L3. h_lnSZJJ	−0.0164003	−0.1466672**
	(0.032067)	(0.0699992)

Note: L1., L2., and L3. denote the first-order lag term, second-order lag term, and third-order lag term, respectively. The values in parentheses are standard errors, and the superscript ***indicates statistically significant at the 1% level, **indicates statistically significant at the 5% level, and *indicates statistically significant at the 10% level. Data compiled by Stata16 software.

When employment level (lnJY) is the explanatory variable, the first-order lagged term coefficient of digital economy development (lnSZJJ) is −1.481144 and significant at the 5% level, and the second-order lagged term coefficient and the third-order lagged term coefficient are positive. It indicates that the employment level shows a significant negative correlation with a significant downward trend in period 1 of the digital economy development, and then resumes rising in period 2. The digital economy development has a significant inhibitory effect on the employment level in lag 1 period, but then changes to a smaller driving effect in the next two periods of development. It is thus clear that digital economy development causes a decline in employment in one period followed by a rebounding trend in the new period immediately following, causing a rapid increase in employment levels.

5.2.3. Impulse Response Analysis

Before conducting the impulse response function analysis, the stability test of the PVAR model was first performed. As shown in the figure below, all unit roots lie within the unit circle and the two variables form a smooth system. Therefore, the system is considered stable and impulse response analysis can be performed (**Figure 1**).

The impulse response function is used to describe the time response caused by the action of the shock variable on the response variable. The specific estimation results are shown in the following figure (**Figure 2**).

From the graph IRF of LnSZJJ to LnJY, it can be seen that when the employment level (LnJY) is shocked by the development of digital economy (LnSZJJ), it reaches the maximum shock of 0.19 in the current period, and then gradually decreases to the negative shock in the 1st period, which is the result of the elimination of traditional industries under the development of emerging industries, and the negative shock starts to turn to the positive shock in the 4th period, and finally gradually tends to 0, indicating that traditional industries continue to seek changes to combine with new industries, which promotes the increase of employment and improves the employment level.

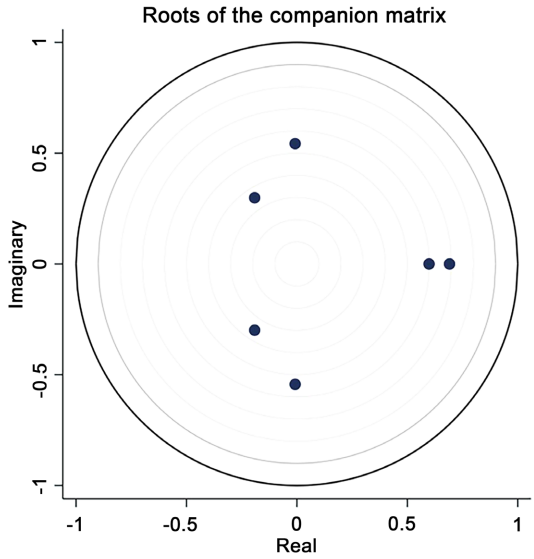

Figure 1. PVAR model stability test. Note: Figure drawn from Stata16 software.

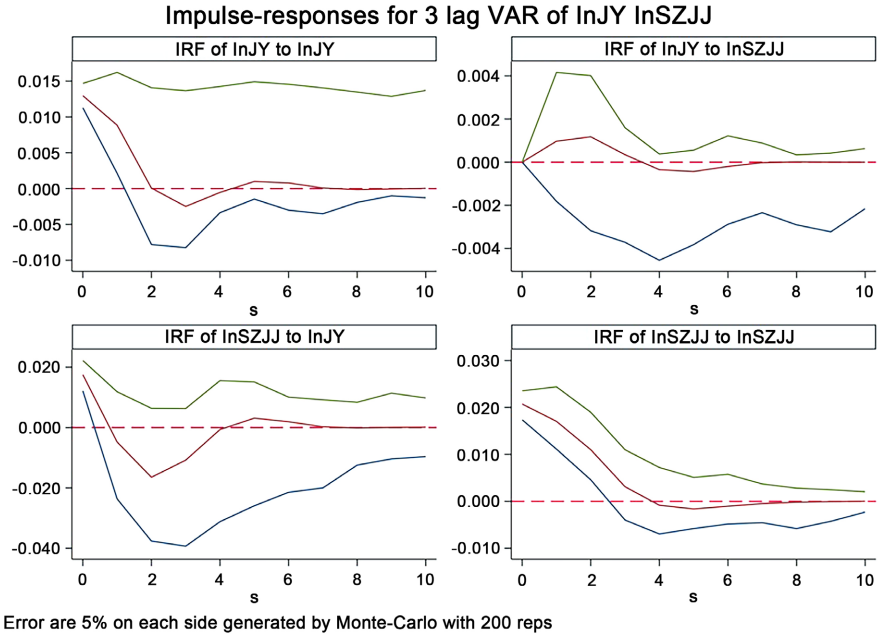

Figure 2. Impulse response estimation results. Note: Figure drawn from Stata16 software.

From the graph IRF of LnJY to LnSZJJ, it can be seen that when the digital economy development (LnSZJJ) is subjected to the shock of employment level (LnJY), it generates a positive shock from the current period, reaches a maximum positive shock of 0.001 in period 2, and starts to generate a negative shock in period 4, and the shock effect tends to zero by period 7, showing certain phase characteristics, but the lag effect is obvious. It may be that the development of digital economy (LnSZJJ) is influenced by the level of employment (LnJY), showing a trend of increasing, then decreasing and then stabilizing.

5.3. Effects of the Digital Economy on Employment in Various Industries

The relationship between national employment and the digital economy was first analyzed through a panel data one-dimensional linear regression equation, which was analyzed as an incremental effect according to Eviews 7.2, i.e., the overall effect of the digital economy on employment is an incremental effect.

Next, the least squares (OLS) method is applied to regress the model. In the regression process, the data are logarithmically calculated and weighted to increase the scientific validity of the regression results in order to facilitate the calculation, eliminate the heteroskedasticity problem and reduce the autocorrelation problem.

5.3.1. Robustness Tests

1) F-test

Determining the model selection mixed estimation model estimation or selecting a fixed effects model for estimation is where the F-test is tested for, and requires calculating the sum of squares of deviations, residuals, values of degrees of freedom, performing a series of correlation calculations, and checking the table against the F degrees of freedom.

The analysis using Stata16 software shows that Prob > F = 0.0000. The original hypothesis is rejected and the opposite fixed effects model is chosen for the empirical study.

2) Hausman test

Hausman's test was performed in the case of random effects, and by checking the significance of the p-values it is clear that the original hypothesis is rejected and the fixed effects model is chosen (Table 7).

After the F-test and Hausman test, it is clear that all three models choose fixed effects for the calculation, which indicates that the model setting and analysis results are robust.

5.3.2. Digital Economy Impact on the Primary Sector Employment Sub-Effects

Table 8 shows the final results of the analysis of the Eviews 7.2 weighted regression digital economy on the data of the primary sector. From the table, it can be concluded that the coefficient of the variable of the digital economy covering the promotion indicator on employment in the primary sector is −0.665 with a p-value of 0.000, which has a very significant correlation. The coefficient of the variable of the depth of use indicator on employment in the primary sector is 0.062 with a p-value of 0.175, which is not a significant result. The coefficient of the variable of the indicator of the degree of digitization on employment in the primary sector is −0.010 with a p-value of 0.708 and the result is highly insignificant. The results of the analysis indicate a strong negative correlation with the decrease in the level of employment in the primary sector in terms of the development of payments, monetary funds, credit, insurance, investment and credit

Table 7. Hausman test results.

	--Coefficients--			
	(b) FE	(B) RE	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E
LnFGTG	0.021	−0.025	0.046	0.002
LnSYSD	0.164	−0.011	0.176	0.002
LnSZHCD	0.076	−0.049	0.125	0.000
_cons	5.272	6.638	−1.365	-

Note: Data compiled by Stata16 software.

Table 8. Regression results of the digital economy on the primary sector.

Explained variables	Explanatory variables	Variable coefficients	Standard Error	t-statistic	p-value	Decidability factor
LnDYCY	LnFGTG	−0.665	0.062	(−10.669)	0.000***	0.998
	LnSYSD	0.063	0.046	(1.363)	0.175	
	LnSZHCD	−0.010	0.026	(−0.375)	0.708	
	C	1004.255	6.820	(147.258)	0.000	

Note: ***indicates the 1% significance level, the better the decidable coefficient indicates the better the goodness of fit. Data compiled by Eviews 7.2 software.

services. In contrast, the depth of use and the degree of digitization do not have a strong correlation with employment in the primary sector (Table 8).

5.3.3. Digital Economy Impact on Secondary Industry Employment Sub-Effects

Table 9 shows the final results of the data regression of Eviews 7.2 weighted digital economy on the secondary sector. From the table, it can be concluded that the coefficient of the variable of the depth of use of the digital economy indicator on employment in the secondary sector is −0.122 and its p-value is 0.032, which has a more significant correlation. The coefficient of the variable of the indicator of coverage promotion on employment in the secondary sector is −0.075 with a p-value of 0.071, with generally significant results. The coefficient of the variable of digitalization indicator on employment in the secondary sector is −0.036 with a p-value of 0.066 and the result is generally significant. The results of the analysis indicate that the development of payments, money funds, credit, insurance, investment and credit services has a strong negative impact on employment in the secondary sector. The depth of use and the level of digitization have a general negative effect on employment in the secondary sector (Table 9).

5.3.4. Digital Economy Impact on Employment in the Tertiary Sector Sub-Effects

Table 10 shows the final results of the data regression of Eviews 7.2 weighted digital economy on the tertiary sector. From the table, it can be concluded that the coefficient of the variable of the depth of use of the digital economy indicator

Table 9. Regression results of the digital economy on the secondary sector.

Explained variables	Explanatory variables	Variable coefficients	Standard Error	t-statistic	p-value	Decidability factor
LnDRCY	LnFGTG	−0.122	0.057	(−2.160)	0.032**	0.999
	LnSYSD	−0.075	0.042	(−1.823)	0.071*	
	LnSZHCD	−0.036	0.020	(−1.853)	0.066*	
	C	839.442	6.223	(134.870)	0.000	

Note: *is at the 10% significance level, **is at the 5% significance level, the better the decidable coefficient indicates the better the goodness of fit.Data compiled by Eviews 7.2 software.

Table 10. Regression results of the digital economy on the tertiary sector.

Explained variables	Explanatory variables	Variable coefficients	Standard Error	t-statistic	p-value	Decidability factor
LnDSCY	LnFGTG	0.354	0.123	(2.860)	0.005***	0.998
	LnSYSD	0.473	0.089	(5.295)	0.000***	
	LnSZHCD	0.206	0.431	(4.772)	0.000***	
	C	804.503	11.707	(68.721)	0.000	

Note: ***indicates the 1% significance level, the better the decidable coefficient indicates the better the goodness of fit. Data compiled by Eviews 7.2 software.

on employment in the tertiary sector is 0.354 with a p-value of 0.005; the coefficient of the variable of the coverage promotion indicator on employment in the tertiary sector is 0.473 with a p-value of 0.000; the coefficient of the variable of the coverage promotion indicator on employment in the tertiary sector is 0.206 with a p-value of 0.000; in terms of significance has a very significant positive correlation. The results of the analysis show that coverage promotion, depth of use and digitization have a positive effect on employment in the tertiary sector, i.e., the creation effect (Table 10).

6. Conclusion and Policy Recommendations

This paper creatively proposes the mechanism of the impact of the digital economy on employment, and constructs a PVAR model using Chinese inter-provincial panel data to explore the response relationship between the digital economy and employment, and uses a linear regression model to break down the effect of the digital economy on employment in various industries, and conducts an empirical analysis, drawing the following main conclusions.

First, the response relationship of the digital economy to employment shows a negative trend followed by a positive trend. The development of the digital economy causes a decline in employment in a certain period and then a rebound in the new period immediately following, causing a rapid increase in employment levels, which eventually stabilizes and both the digital economy and employment

reach a stable state of development. Second, the total effect of the digital economy on employment is incremental. As for the analysis of the sub-effects of digital economy on the industrial structure of employment, it can be seen that 1) there is a destructive effect of digital economy on the primary industry and secondary industry, and its variable coefficient is negative, reflecting the negative correlation of digital economy on the primary industry and secondary industry. From the significance of p-value, it can be seen that the indicators of coverage promotion and depth of use in digital economy have a significant effect on the primary industry, and the indicators of coverage promotion, depth of use and digitization degree have a significant effect on the secondary industry. 2) The digital economy has a creation effect on the tertiary industry, and its variable coefficient is positive, which reflects the positive correlation of the digital economy on the primary industry. It can be seen from the p-value that the indicators of coverage promotion, depth of use, and degree of digitalization all have significant effects on the tertiary industry. 3) It can be found by the decidable coefficients that the fit of the three model analysis results is good, and the analysis is scientific and referable.

In today's world, the digital economy belt, as a new form of economy, is enhancing employment carrying capacity and has become a core driver of employment growth. The following policy recommendations are made based on the findings.

1) Adjust and improve existing legislation

The growth of the digital economy has far-reaching implications for employment patterns. The Internet is undergoing profound changes in the tertiary industry, and flexible job opportunities are increasing, but employment relationships based on online platforms are not adequately supported, and the digital economy does not provide good legal support for job creation. Considering the multifaceted forms of employment created by the digital economy, various social security systems should be actively explored to strengthen social security systems such as health insurance, accident insurance, and other social security systems to reduce the worries of entrepreneurs.

2) Vigorously develop the platform economy

Creating jobs and providing flexible employment based on entrepreneurship with the rapid development of modern information technology and the Internet, the platform economy has begun to emerge. While actively improving the business model of "the government governs the platform and the platform manages the individual", we will establish a comprehensive credit evaluation system for the platform economy, promote the development of related intermediaries, improve the capacity of support services, and realize individual entrepreneurial work.

3) Establish a digital talent training system

Actively promote the combination of industry, academia and research innovation, and widely accelerate the transformation and application of digital technology innovation services and digital excellence development. Actively develop

the vocational training system to improve the quality of workers and achieve cross-industry and cross-sector mobility, so as to meet the needs of new job skill requirements, industrial modernization and industrial restructuring, and establish a lifelong vocational training system for workers. Structural reform with an eye on the labor demand side.

4) Strengthen digital skills training

Strengthen the requirement of digital skills for structurally unemployed people. At present, digital vocational training still suffers from poor academic adaptability, uneven educational backgrounds, and insufficient supply of training services. Digital education should cover all workers and benefit all employed people, including newly employed people, unemployed people as well as employees of enterprises and institutions and flexibly employed employees. And improve their digital thinking, skills and the degree of digital qualifications such as big data analysis and software programming to promote the formation of digital literacy.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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