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Empirical Study on the Impact of the Digital Economy on High-Quality Employment

-- On the Governance Role of Audit Supervision

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Abstract

Based on China's provincial panel data from 2011 to 2022, this paper explores the impact mechanism and nonlinear characteristics of the digital economy on high-quality employment. By constructing a comprehensive indicator system and adopting methods such as mechanism testing and the panel threshold model, the study finds that: first, the digital economy exerts a robust direct promoting effect on high-quality employment; second, the digital economy functions through two paths-labor productivity improvement and industrial structure upgrading, with the labor productivity path exhibiting a "masking effect"; third, the impact of the digital economy features a dual threshold characteristic based on its own development level and regional population density. This research provides empirical evidence for understanding the evolution of the employment structure in the digital era and formulating differentiated employment policies. Meanwhile, as an important tool for national governance and economic supervision, audit supervision can play a supplementary governance role in regulating employment practices, safeguarding labor rights and interests, and preventing risks, thus providing an institutional guarantee for the digital economy to boost high-quality employment.

Keywords

Digital Economy; High-quality Employment; Audit Supervision.

1. Research Background and Significance

1.1. Research Background

At present, digital technologies represented by big data and artificial intelligence are profoundly reshaping the global economic pattern and employment structure. China attaches great importance to the development of the digital economy, having elevated the construction of a "Digital China" to a national strategy, and explicitly proposed in the 14th Five-Year Plan to "drive the transformation of production modes, lifestyles and governance modes in an all-round way through digital transformation". Against this backdrop, exploring how the digital economy advances high-quality employment is not only an inevitable requirement to respond to the national development orientation, but also a crucial path to achieve high-quality economic development.

However, while the development of the digital economy creates new forms of employment, it also brings structural challenges such as technological substitution, skill mismatch and regional differentiation. Some traditional jobs are facing shocks, and the structural contradiction between supply and demand in the labor market is becoming increasingly prominent. How to effectively guide the digital economy to empower the improvement of employment quality has become an urgent problem to be solved. This paper focuses on the impact mechanism and

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nonlinear characteristics of the digital economy on high-quality employment, aiming to provide empirical evidence and decision-making reference for optimizing employment policies in the digital era. Audit supervision has the functions of prevention, revelation and resistance in the national governance system, and can effectively supervise the implementation of employment policies, the use of fiscal funds and the compliance of enterprise employment. Existing studies show that audit can indirectly improve the employment environment and enhance employment stability by restricting irregular behaviors, optimizing resource allocation and ensuring distribution fairness.

1.2. Research Significance

First, this paper enriches the empirical research on the relationship between digital economy and high-quality employment. It breaks through the limitations of existing studies that mostly focus on linear analysis, and systematically verifies the dual transmission mechanism of digital economy on high-quality employment through labor productivity and industrial structure upgrading, as well as the dual threshold characteristics based on its own development level and population density, opening the "black box" of the internal influence path and supplementing the theoretical system of digital economy's employment effect. Second, it expands the research perspective of high-quality employment governance by incorporating audit supervision into the analytical framework, revealing its supplementary governance role in the process of digital economy promoting high-quality employment, and providing a new theoretical perspective for the institutional guarantee of high-quality employment in the digital era.

First, the research conclusions can provide scientific decision-making references for the government to formulate differentiated digital economy and employment policies. According to the threshold characteristics of digital economy development and regional population density, it can guide all regions to implement targeted development strategies, such as consolidating digital infrastructure in less developed regions and alleviating digital divide and crowding effect in high-density regions, to maximize the employment dividend of digital economy. Second, it provides practical guidance for coping with the structural employment challenges brought by digital transformation. Aiming at the "substitution effect" in the labor productivity path, it can help the government optimize the vocational skill training system, focus on improving the digital literacy of laborers, and promote the matching of labor supply and demand. Third, it provides a practical path for improving the governance system of high-quality employment. It clarifies the important role of audit supervision in standardizing enterprise employment behavior, safeguarding labor rights and interests and improving the efficiency of fiscal fund use, which can promote the construction of a multi-dimensional employment governance system and provide institutional support for the stable and high-quality development of the labor market in the digital era.

2. Literature Review

2.1. Research on the Economic and Social Impacts of the Digital Economy

Zhang et al. (2021) measured urban digital economy (infrastructure, industry, integration) via panel data. All boost TFP (integration largest), tech progress explaining 14.69%; higher marginal contribution in the east. Indirect TFP gains via cost optimization, economies of scale [1].Ding et al. (2022) used spatial Durbin/mediating models: digital economy directly advances high-quality growth, spills over to neighbors. Tech innovation is core path, enhancing regional innovation to lift economic quality [2].Li & Liu (2021) used ESDA and GWR models across eight economic zones. Digital economy shows significant spatial positive correlation (coastal > inland) with heterogeneous drivers-physical capital matters most in coastal areas, human capital in the west [3].

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2.2. Research on the Measurement and Influencing Factors of High-Quality Employment

Employment quality is a multi-dimensional construct (subjective/objective) with a complete research vein. Peckham et al. (2019) classified it into 8 types via latent class analysis (U.S. data), linking to health/injuries; material deprivation, pressure, risks are core channels [4]. Su, Jinqi et al. (2021): Digital economy boosts industrial upgrading, with heterogeneous tech innovation as key-utility model innovation most prominent [5].

2.3. Research on the Relationship between the Digital Economy and High-Quality Employment

Zhao & Said (2023): Digital economy reduces secondary industry employment share, raises tertiary share, with heterogeneous impacts across regions and negative effects on manufacturing/construction [6]. Cai et al. (2024): Urban digital economy boosts individual employment quality (air quality positively moderates), more effective for males, young workers (≤40) and Party members [7]. Chen & Xiong (2025): Digital economy improves employment quality via human capital and salaries, stronger in eastern China [8].

2.4. Literature Review and Summary of Research Gaps

Through combing the existing literature, it can be found that the academic community has carried out beneficial explorations on the digital economy and high-quality employment, but there are the following obvious research gaps:The "mechanism black box": most studies only discuss the direct effects, lacking strict empirical tests on the intermediate mechanisms of the digital economy's impact on high-quality employment, such as labor productivity and industrial structure upgrading, and even failing to reveal their complex nonlinear relationships.The linear assumption: linear models are generally adopted, ignoring the possible "threshold characteristics" or critical points of the digital economy's impact, and failing to depict its nonlinear impact laws.

To sum up, the research value of this paper lies in: by constructing a mediating effect model and a panel threshold regression model, it systematically and empirically tests the transmission channels of the digital economy's impact on high-quality employment (such as labor productivity and industrial structure upgrading) and critical conditions (such as the threshold effect based on its own development level and population agglomeration degree), so as to provide a scientific basis for formulating more targeted and differentiated policies.

3. Relevant Systems and Theoretical Basis

3.1. Relevant Systems

3.1.1. Digital Economy Development-Related Systems

China has established a multi-level institutional framework to promote digital economy development, including the national strategy of "Digital China" and relevant policies in the 14th Five-Year Plan that emphasize digital transformation-driven development. At the local level, provincial governments have formulated targeted measures such as digital infrastructure construction plans and digital industry support policies to standardize and guide the orderly development of the digital economy. These systems provide institutional guarantees for the popularization of digital technologies, the development of digital industries, and the integration of digitalization with traditional industries, laying a foundation for exploring the impact of the digital economy on high-quality employment.

3.1.2. Employment Quality Guarantee Systems

The existing employment-related systems cover labor protection, social security, and skill training. Core systems such as the Labor Contract Law and the Social Insurance Law

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standardize employment relationships and safeguard the legitimate rights and interests of workers in terms of remuneration, social security, and labor protection. In addition, the national vocational skill training system and policies for key groups (e.g., migrant workers, college graduates) aim to improve laborers' skill levels and adaptability to the digital economy, providing institutional support for improving employment quality.

3.1.3. Audit Supervision-Related Systems

As an important part of national governance, audit supervision systems include government audit regulations and enterprise internal audit norms. Relevant systems clearly require audits on the implementation of employment policies, the use of fiscal funds for employment support, and the compliance of enterprise employment, which help to standardize employment behaviors, ensure the effective use of public resources, and mitigate employment risks brought by digital transformation, thus forming a supplementary governance mechanism for the digital economy to promote high-quality employment.

3.2. Theoretical Basis

3.2.1. Digital Economy Theory

Digital economy theory emphasizes that digital technologies represented by big data and artificial intelligence have become core production factors, which can optimize resource allocation, improve production efficiency, and promote industrial structure upgrading. This theory provides a theoretical basis for analyzing how the digital economy directly creates new employment forms and indirectly affects employment quality through paths such as labor productivity improvement and industrial structure advancedizaction.

3.2.2. Labor Market Segmentation Theory

This theory holds that the labor market is divided into different segments due to factors such as industry attributes, skill requirements, and regional differences, and the mobility of laborers between segments is limited. The development of the digital economy may break traditional market segmentation or form new segmentation, which helps to explain the group and regional heterogeneity of the impact of the digital economy on employment quality, such as differences in the impact on workers of different skill levels and regions.

3.2.3. Institutional Governance Theory

Institutional governance theory highlights the role of institutional arrangements in regulating economic and social behaviors. Audit supervision, as an important institutional governance tool, can constrain irregular behaviors, ensure the implementation of policies, and safeguard the fairness of resource allocation. This theory provides a theoretical support for exploring the supplementary governance role of audit supervision in the process of the digital economy promoting high-quality employment, explaining how institutional guarantees can optimize the employment effect of the digital economy.

3.2.4. Threshold Effect Theory

Threshold effect theory suggests that the impact of an explanatory variable on the explained variable may change significantly when the explanatory variable or other relevant variables cross a specific threshold value. This theory lays a theoretical foundation for analyzing the nonlinear relationship between the digital economy and high-quality employment, helping to reveal the critical conditions and stage characteristics of the digital economy's impact on employment quality.

3.3. Research Hypotheses

First, by providing advanced technical tools and factor allocation platforms, the digital economy can directly optimize production processes and create new forms of employment, thereby improving employment quality. Accordingly, this paper puts forward the basic hypothesis:

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H1: The development level of the digital economy has a significant promoting effect on high-quality employment.

Second, the impact of the digital economy is not a single direct path. On the one hand, it empowers workers and capital to improve total factor productivity, thus creating higher-value jobs, but it may also replace some routine tasks due to automation, and its net effect needs to be tested empirically. On the other hand, the digital economy drives the transfer of resources to high-value-added service industries and technology-intensive industries, and this process of industrial structure upgrading itself is a carrier of high-quality employment. Therefore, this paper puts forward the dual-path hypothesis on the impact mechanism:

H2: The digital economy affects high-quality employment through two paths: improving labor productivity and promoting industrial structure upgrading.

Finally, the impact of the digital economy may not be linearly consistent, but restricted by regional characteristics and development stages. When the digital economy develops to a certain level, its effect may undergo structural changes; at the same time, the knowledge spillover effect or crowding effect brought by population agglomeration will also regulate the employment impact of the digital economy. Therefore, this paper puts forward the hypothesis on the nonlinear threshold effect:

H3: The promoting effect of the digital economy on high-quality employment has nonlinear threshold characteristics.

4. Research Design and Empirical Analysis

4.1. Research Design

4.1.1. Sample Selection and Data Sources

This study uses panel data of provincial-level administrative regions in China's mainland as the research sample. The time span of the sample is determined according to data availability, selecting data of 31 provincial-level administrative regions (22 provinces, 5 autonomous regions and 4 municipalities directly under the Central Government) in China from 2011 to 2022.

Explained Variable: High-Quality Employment Drawing on Zhang Xiaowang (2025) et al., a multi-dimensional evaluation system is constructed, covering per capita GDP, traffic accessibility, average wage of urban employees, and urban employee medical insurance coverage-reflecting macro environment, working conditions, income, and social security. Principal Component Analysis is adopted for objective weighting to synthesize a single index with a mean of 0 for easy coefficient interpretation. Core Explanatory Variable: Digital Economy Development Level Referring to Xu Song et al. and Fan Yuying et al., 8 indicators from digital infrastructure, industrial scale, and technology application are selected. PCA is used to calculate the comprehensive index. For robustness, the entropy method (DE_Entropy_Std) is adopted to re-measure and regress, supplementing PCA via information dispersion-based weighting. Control Variables Following Wang Fang and Ning Ning, control variables include: urban-rural income ratio, tertiary/secondary industry output ratio, and logarithmic population density. These traditional factors are included to isolate the digital economy’s "net effect" and avoid omitted variable bias. See Table 1 for detailed definitions, measurements, and data sources.

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Table 1. Explanation of Variable Definitions and Measurement Indicators

Dimension	Variable/Method	Indicator/Variable	Description
Digital Economy	Digital Economy - Principal Component	Comprehensive Index	Comprehensive score of the digital economy constructed based on principal component analysis
	Number of Internet Broadband Access Users	Number of Users (10,000 households)	Reflecting the coverage rate of regional internet infrastructure
	Employed Persons in Urban Units	Number of Employed Persons (10,000 people)	Employment scale in urban areas of digital economy-related industries
	Total Telecom Business Volume	Business Volume (100 million yuan)	Measuring the scale of telecom services and economic contribution
	Digital Inclusive Finance Index	Index Value	Evaluating the popularization degree of digital financial services
	Number of International Internet Users per 100 People	Number of Users per 100 People	Reflecting the penetration rate of residents' international internet use
	Per Capita Total Telecom Business Volume	Business Volume per Capita (10,000 yuan/person)	Per capita level of telecom services
	Number of Mobile Phone Users per 100 People	Number of Users per 100 People	Popularization degree of mobile communication equipment
High-Quality Employment	Per Capita Regional Gross Domestic Product	Per Capita GDP (yuan/person)	Direct reflection of regional economic development level
	Traffic Accessibility	Highway/Railway Density (km/km^2)	Perfection degree of infrastructure
	Average Wage of Employed Persons in Urban Units	Average Wage (yuan/year)	Income level of employees
	Coverage Rate of Basic Medical Insurance for Urban Employees	Participation Rate (%)	Important indicator of social security level
Control Variables	Urban-Rural Income Gap	Urban-Rural Income Ratio (Urban/Rural)	Impact of the urban-rural income gap on the economy and employment
	Industrial Structure Upgrading	Proportion of the Tertiary Industry (%)	Reflecting the degree of industrial structure upgrading
	Population Density	Population/Area ($person/km^2$)	Regional population agglomeration effect

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4.1.2. Model Construction

To test Hypothesis 1 that the development level of the digital economy significantly promotes high-quality employment, a multiple linear regression model is established:

$$\text{High - Quality_i} = \beta_0 + \beta_1 Digital - Economy_i + \beta_2 Controls_i + \varepsilon_i$$

This model is selected as the benchmark because of its concise form and intuitive coefficient interpretation. It is a standard method to test the average causal effect between the core explanatory variable and the explained variable, which is convenient for us to initially judge whether the digital economy has a significant direct promoting effect on high-quality employment.

To test Hypothesis 2 that the digital economy affects high-quality employment through the indirect paths of labor productivity and industrial structure upgrading, referring to the methods of Wen Zhonglin et al and Preacher & Hayes , the following mechanism test model is constructed, and the Bootstrap sampling method is adopted with 1000 repeated samplings for testing:

$$M = \alpha_0 + \alpha_1 \text{Digital} - \text{Economy_i} + \alpha_2 \text{Controls_i} + \varepsilon_i$$
$$\text{High} - \text{Quality_i} = \gamma_0 + \gamma_1 \text{Digital} - \text{Economy}_i + \gamma_2 M_i + \gamma_3 Controls_i + \varepsilon_i$$

To test Hypothesis 3 that the impact of the digital economy has a nonlinear threshold effect,the panel threshold regression model proposed by Hansen is adopted. This model can endogenously determine the threshold value and group the samples, overcoming the bias of subjective grouping.

$$High - Quality_i = \mu_i + \beta_1 Digital - Economy_i * I(\text{q_i} \le \gamma)$$
$$+ \beta_2 \text{Digital} - Economy_i * I(\text{q_i} \succ \gamma) + \delta * \text{Controls_i} + \varepsilon_i$$

4.2. Empirical Results and Analysis

4.2.1. Descriptive Statistics

Table 2. Descriptive Statistical Results of Main Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
High_Quality	372	-0.001	1.646	-2.534	5.989
Digital_Economy	372	0.711	0.098	0.600	1.000
gdp	372	2.561	0.382	1.827	3.672
industry	372	1.365	0.734	0.527	5.244
ln_density	372	5.322	1.490	0.921	8.282

This paper has a total of 372 observations with a sufficient sample size to meet the requirements of regression analysis. The mean value of High_Quality is -9.89e-10, which is very close to 0 because the principal component score is standardized with a mean value of 0. The standard deviation is 1.646, indicating a significant difference in employment quality among

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different regions; the mean value of Digital_Economy is 0.711 with a standard deviation of 0.098, indicating that the overall development level of the digital economy in various provinces in China is relatively high, but there are certain regional differences with a smaller amplitude than employment quality.

4.2.2. Benchmark Regression Results

The regression coefficient of Digital_Economy is 5.37, which is significant at the 1% significance level. For each 1-unit increase in the comprehensive index of the digital economy, the high-quality employment score increases by an average of 5.37 units, with a significant and large positive effect.

The coefficient of gdp is -1.273, indicating that the expansion of the urban-rural gap will significantly inhibit high-quality employment. The coefficient of industry is 0.850, which is consistent with the promoting effect of industrial structure upgrading on employment quality. The coefficient of ln_density (logarithm of population density) is -0.141, significantly negative at the 5% level, which may reflect the negative effect of excessive population agglomeration.

Table 3. Benchmark Regression Results of the Impact of the Digital Economy on High-Quality Employment

Variable	Coefficient	Robust Std. Err.	t-value	P-value	95% Confidence Interval
Digital_Economy	5.370***	1.082	4.97	0.000	[3.243, 7.497]
gdp	-1.273***	0.171	-7.45	0.000	[-1.609, -0.936]
industry	0.850***	0.115	7.42	0.000	[0.625, 1.075]
ln_density	-0.141**	0.063	-2.24	0.026	[-0.265, -0.017]
Constant	-0.972	0.886	-1.10	0.273	[-2.713, 0.770]

4.2.3. Mechanism Analysis

After confirming the significant direct promoting effect of the digital economy on high-quality employment, this study further explores its internal impact mechanism.A mechanism test model is constructed, and a more robust Bootstrap sampling method (1000 repetitions) is used for estimation. This method does not require the sampling distribution of the mechanism test to follow a normal distribution and can provide a more reliable confidence interval.

The digital economy has a significant indirect promoting effect on high-quality employment by improving labor productivity, indicating that the application of digital technology improves production efficiency, thus creating more high-quality jobs. However, its direct effect is negative with a value of -3.272, which may reflect the "substitution effect" of digital technology on some low-skilled jobs. But the total effect is still significantly positive, indicating that the improvement of labor productivity completely offsets the negative impact of the substitution effect with a positive net effect. Digital technologies directly enhance the production efficiency of workers and capital, create more economic surpluses, and provide a material basis for raising wages and employment stability; digital technologies complement high-skilled labor, giving birth to a large number of high-value-added technology-intensive jobs and directly raising employment quality; the hardware investment and R&D investment accompanying digital transformation have expanded the demand for highly educated and high-skilled labor, optimizing the employment structure.

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Table 4. Mechanism Test Results

Path	Effect Type	Coefficient Estimation	Bootstrap Std. Err.	95% Confidence Interval
Labor Productivity	Indirect Effect	8.642***	1.032	[6.695, 10.922]
	Direct Effect	-3.272***	0.953	[-5.215, -1.458]
	Total Effect	5.370***	1.116	[3.244, 7.566]
Industrial Structure Upgrading	Indirect Effect	3.453***	0.694	[2.092, 4.790]
	Direct Effect	4.529***	0.991	[2.595, 6.581]
	Total Effect	7.982***	1.044	[5.807, 9.994]

4.2.4. Threshold Effect and Robustness Test

The aforementioned linear model reveals the average effect of the digital economy, but its impact may not be monotonically linear, but there is a critical point based on its own development stage.The threshold variable is Digital_Economy with a threshold value of 0.687, which means that the model divides the sample into the "low digital economy development level group (Region1)" and the "high digital economy development level group (Region2)" based on this value. Basic effect of the digital economy: In both groups, the basic promoting effect of the digital economy on high-quality employment is 3.915, significant at the 1% level. This means that after excluding regional differences, the digital economy itself is always the core driving force for promoting high-quality employment. In the low-level group Region1, the coefficient of industry is extremely large and significant, indicating that in the initial stage of digital economy development, economic growth and employment quality improvement mainly rely on the traditional path of industrial structure upgrading; the negative impact of gdp is relatively small- in the initial stage of development, although the imbalance problem exists, it is not the most important contradiction.

Table 5. Threshold Regression Results Based on the Development Level of the Digital Economy

High_Quality	Coef.	Std. Err.	z	P>|z|	[95%Conf.Interval]	
High_Quality Digital_Economy	3.915	1.323	2.960	0.003	1.323	6.508
Region1 gdp	-0.872	0.217	-4.020	0.000	-1.297	-0.447
industry	2.153	0.309	6.960	0.000	1.546	2.759
ln_density	-0.108	0.066	-1.630	0.102	-0.237	0.022
_cons	-2.883	1.285	-2.240	0.025	-5.401	-0.364
Region2 gdp	-1.781	0.362	-4.920	0.000	2.489	-1.071
industry	0.655	0.109	6.010	0.000	0.441	0.868
ln_density	0.136	0.126	1.080	0.282	-0.111	0.382
_cons	0.063	1.386	0.050	0.964	-2.653	2.779

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The threshold variable is ln_density with a threshold value of 5.412, dividing the sample into the "low population density area (Region1)" and the "high population density area (Region2)". Basic effect of the digital economy: The basic promoting effect is 5.634, highly significant, reconfirming the core role of the digital economy. In the low-density area Region1, the negative impact of the urban-rural gap and the positive impact of industrial structure are relatively moderate, with a digital economy coefficient of 5.634.

Table 6. Threshold Regression Results Based on Population Density

High_Quality	Coef.	Std. Err.	z	P>|z|	[95%Conf. Interval]	
High_Quality Digital_Economy	5.634	0.968	5.820	0.000	3.738	7.531
Region1 gdp	−0.824	0.223	−3.700	0.000	−1.260	−0.388
industry	1.748	0.338	5.170	0.000	1.086	2.410
_cons	−3.986	1.124	−3.550	0.000	−6.190	−1.782
Region2 gdp	−2.683	0.372	−7.220	0.000	−3.412	−1.954
industry	0.756	0.109	6.920	0.000	0.542	0.970
_cons	1.350	1.231	1.100	0.273	−1.062	3.763

4.2.5. Further Verification of the Interaction Term Model

To provide a complementary statistical verification for the aforementioned threshold effect and show the inter-group differences more intuitively, we construct a linear regression model containing an interaction term. On the basis of the benchmark regression, the model introduces a high development level dummy variable (high_group, generated according to the threshold value of 0.687) and its interaction term with the digital economy index (DE_high). The significance of the interaction term coefficient (DE_high) directly tests whether there is a statistically significant difference in the regression coefficient of the digital economy between the high and low groups.

Table 7. Regression Results with the Interaction Term of Digital Economy and High Development Level

Variable	Coefficient	Robust Std. Err.	t-value	P-value	95% Confidence Interval
Digital_Economy	-5.016	3.551	-1.410	0.159	[-11.999, 1.967]
high_group	-6.470**	2.528	-2.560	0.011	[-11.440, -1.499]
DE_high	10.145***	3.776	2.690	0.008	[2.721, 17.570]
gdp	-1.419***	0.175	-8.100	0.000	[-1.763, -1.075]
industry	0.818***	0.123	6.660	0.000	[0.576, 1.059]
ln_density	-0.115*	0.061	-1.900	0.059	[-0.235, 0.004]
Constant	5.988**	2.493	2.400	0.017	[1.085, 10.890]

The model is highly significant as a whole (F=53.16, p=0.0000), and R^2=0.4826, indicating strong explanatory power.When high_group=0 (low-level group), the coefficient of Digital_Economy is -5.016 (insignificant), meaning that the promoting effect of the digital

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economy is very weak or even negative.The coefficient of DE_high is 10.145 (significant at the 1% level), indicating that in the high-level group, the promoting effect of the digital economy on high-quality employment is significantly 10.145 units higher than that in the low-level group.The test of DE_high strongly rejects the null hypothesis (F=7.22, p=0.0075), providing decisive statistical evidence for the existence of the threshold effect.

4.2.6. Robustness Test

To ensure the reliability of the research conclusions, we conduct a series of robustness tests. The core measure is to replace the measurement method of the core explanatory variable-the development level of the digital economy from principal component analysis to the entropy method, reconstruct the comprehensive index, and repeat all major empirical analyses with it.The panel threshold model still identifies significant threshold values, and the coefficient change patterns of control variables are consistent with the previous analysis, indicating that the nonlinear characteristics are robust.

Table 8. Summary of Robustness Test Results

Test Type	Variable/Path	Coefficient Estimation	Std. Err.	Significance	95% Confidence Interval
Benchmark Regression	DE_Entropy_Std	2.767***	0.648	Yes	[1.494, 4.041]
Labor Productivity Mechanism	Indirect Effect	4.416***	0.564	Yes	[3.372, 5.621]
	Direct Effect	-1.649***	0.448	Yes	[-2.489,-0.763]
Industrial Structure Mechanism	Indirect Effect	2.357***	0.444	Yes	[1.460, 3.197]
	Direct Effect	2.767***	0.642	Yes	[1.688, 4.172]
Digital Economy Threshold (Threshold=0.203)	Region1: industry	2.519***	0.294	Yes	[1.943, 3.095]
	Region2: industry	0.384***	0.135	Yes	[0.119, 0.649]
Population Density Threshold (Threshold=5.412)	Region1: industry	1.627***	0.334	Yes	[0.972, 2.282]
	Region2: industry	0.572***	0.131	Yes	[0.316, 0.828]

5. Conclusion and Policy Recommendations

5.1. Research Conclusion

Based on China's provincial panel data from 2011 to 2022, this paper systematically examines the impact of the digital economy on high-quality employment and its internal mechanism. By constructing a comprehensive indicator system and conducting empirical tests using benchmark regression, mediating effect model, panel threshold model and other methods, this paper draws the following main conclusions.Direct promoting effect: The digital economy has

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a significant direct promoting effect on high-quality employment. After controlling relevant factors, for each 1-unit increase in the development level of the digital economy, the comprehensive score of high-quality employment increases by an average of about 5.37 units significantly. This conclusion is robust after multiple tests.Dual transmission mechanism: The digital economy affects high-quality employment through two paths:Labor productivity path: The indirect promoting effect is 8.64, but the direct effect is -3.27 (substitution effect), and the total effect is positive (creation effect > substitution effect).Industrial structure upgrading path: Both the indirect effect (3.45) and direct effect (4.53) are positive, providing a sustainable structural foundation for high-quality employment.

It exhibits significant dual threshold characteristics: when the digital economy development level crosses the threshold value of 0.687, its marginal effect is significantly enhanced; in regions with low population density, the digital economy's "geographic barrier-breaking" role is more prominent, while in high-density areas, its effect is mitigated by amplified digital divide and crowding effects.Additionally, audit supervision, as an important institutional guarantee, has supplementary governance value-it can effectively regulate enterprise employment compliance, safeguard labor rights and interests, and optimize the use of employment-related fiscal funds, complementing the digital economy's employment-promoting effect and enhancing the stability and inclusiveness of high-quality employment.

5.2. Policy Recommendations

The empirical results of this paper show that the digital economy is a key force in promoting high-quality employment, but its role is realized through the dual mechanisms of labor productivity improvement and industrial structure upgrading, and presents a significant dual threshold characteristic based on development level and population agglomeration degree. To maximize the employment dividend of the digital economy, policy formulation needs to shift to a new paradigm combining targeted policy implementation and systematic governance.Precise Hedging of Substitution Effect and Cultivation of Creation Effect.Target groups vulnerable to technological substitution (e.g., workers engaged in procedural tasks) and provide digital skill training and reemployment support.Strengthen institutional support for R&D innovation, data element marketization and platform economy development to cultivate more high-value-added new business forms and new jobs.Differentiated Regional Coordination Strategy.For areas with low digital economy development level: Consolidate infrastructure, popularize digital skills, and develop characteristic industries such as remote work and digital cultural tourism.For areas with high digital economy development level: Focus on technological innovation and income distribution reform, and establish a cross-regional digital industry coordination mechanism to guide the orderly flow of factors.Improving Social Security and Legal Framework.Explore a portable social insurance system adapted to flexible employment to safeguard the basic rights and interests of workers.

Strengthen the audit of employment policy implementation and fund performance to improve the efficiency of public resource use.Strengthen the compliance audit of platform employment and supervise the implementation of social security, remuneration and labor protection for flexible employees.Build a coordination mechanism between audit supervision and employment policies to promote problem rectification and system improvement.

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