

The Digital Economy's Impact on the Coupling Coordination of New Quality Productive Forces

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Abstract. This study investigates the impact of the digital economy on the synergistic development (coupling coordination) of new quality productive forces using panel data from 31 Chinese provinces from 2015 to 2023. Employing the entropy-weighted TOPSIS method to construct a digital economy index and a coupling coordination degree model, it examines the coordination levels. A two-way fixed effects model, incorporating control variables like urbanization and infrastructure, analyzes the underlying mechanisms. Findings indicate that while the coupling coordination of new quality productive forces showed an unstable trend with significant regional disparities from 2015 to 2023, the digital economy exerted a substantial positive influence. Furthermore, this positive impact was found to be stronger in central and western regions than in the more developed eastern coastal areas, offering crucial insights for policymakers.

Keywords: Digital Economy, New Quality Productive Forces, Coupling Coordination Degree, Entropy Weighted TOPSIS Method.

1. Introduction

New Quality Productive Forces signify a paradigm shift in productivity, moving beyond traditional growth models. Driven by innovation, they are defined by their high-tech, high-efficiency, and high-quality nature, fully in line with the principles of the new development philosophy.: By fostering technological advancement, the rise of New Quality Productive Forces stimulates industrial innovation, cultivates fresh competitive advantages in emerging industries and business models, and builds new momentum for growth. This process is instrumental in realizing the high-quality development of China's economy, thereby contributing to comprehensively advancing Chinese modernization through high-quality development [1]. As a key domain for value creation and innovation, the tertiary industry's driving force is a crucial factor influencing New Quality Productive Forces. Among these forces, the digital economy, being the most concentrated manifestation of the current technological revolution and industrial transformation, serves as the core enabling technology and key metric for upgrading the "tertiary industry" and catalyzing "New Quality Productive Forces." The accelerated advancement of New Quality Productive Forces empowers the development of China's modern economic system by fostering better matching mechanisms and providing enhanced innovation incentives [2]. Consequently, it serves as a fundamental engine propelling the nation toward high-quality development.

On one hand, the development of the digital economy has garnered considerable attention in academia. For instance, XU Xianchun and ZHANG Meihui et al. have measured the scale of China's digital economy [3], whereas Guo and Duinvestigated its potential to advance common prosperity through improvements in the structure of household consumption [4]. On the other hand, current literature on New Quality Productive Forces largely concentrates on theoretical elaborations of its conceptual connotation, development level measurement, and realization pathways. For example, ZHOU Wen et al. (2023) examined the conceptual characteristics and future focal points of New Quality Productive Forces through a political economy perspective, discussing its relationship with high-quality development and investigating the mechanism through which it promotes high-quality economic development from a dynamic perspective [5]. DU Chuansong and SHU Shuang et al. (2023) revealed the mechanisms by which New Quality Productive Forces facilitate high-quality economic development across multiple dimensions and explored the pathways to achieve this [6]. Despite this, scholarly work specifically addressing the coupling coordination of New Quality Productive Forces remains limited, with even fewer studies examining how the digital economy influences this synergy.

This study explores how the digital economy influences the coupling coordination of New Quality Productive Forces (NQPF) in China from 2015 to 2023 using provincial panel data. It employs the CRITIC method and a coupling coordination model, followed by a fixed-

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effects model for empirical analysis. Key contributions include measuring the digital economy via the entropy-weighted TOPSIS method and examining the regional heterogeneity of its effects. Findings reveal an unstable, regionally divergent development path for NQPF, with the eastern coastal regions showing higher coordination. The digital economy significantly enhances NQPF coordination, with a more pronounced effect in central and western regions compared to the east. Policy recommendations include strengthening national strategic coordination, implementing differentiated regional strategies, and advancing the digital economy.

2. Research Hypotheses and Methodology Design

Research Hypotheses

As a revolutionary economic form, the digital economy, with its core element of data. Viewed statically, the digital economy establishes a concrete groundwork for expediting New Quality Productive Forces through two primary channels: digital industrialization and industrial digitization. These manifestations, coupled with pervasive digital infrastructure, collectively create a robust platform for this developmental process [7]. From a dynamic standpoint, the empowering influence of the digital economy extends throughout all stages of social reproduction. This influence operates across the entire cycle of social reproduction. In the production phase, it drives industrial transformation and upgrading. In the distribution phase, it broadens value distribution patterns. In the circulation phase, it enhances the efficiency of factor mobility. In the consumption phase, it strengthens technological innovation capabilities [8].

As an integrated framework, New Quality Productive Forces encompass various interconnected components. Beyond its direct contributions, the digital economy plays a pivotal role in shaping the synergistic relationships among these subsystems. On one hand, through its transformative impact on both labor objects and production means, the digital economy significantly enhances the interaction and interdependence between these two major subsystems. On the other hand, through the construction of an interconnected digital ecosystem, the digital economy enables the seamless circulation and optimized deployment of diverse innovation resources—including technology, capital, and talent—across all subsystems of New Quality Productive Forces. Overall, the digital economy enhances the orderliness and synergistic efficiency of the New Quality Productive Forces system, ultimately driving the coupling coordination degree to evolve towards a higher level.

H1: The digital economy has a significant positive impact on the coupling coordination degree of New Quality Productive Forces.

However, while the digital economy demonstrates a significant promotive effect on the coupling coordination degree of New Quality Productive Forces from a macro perspective, this impact is not uniformly distributed

across all geographical spaces. The theory of unbalanced regional development profoundly reveals that due to differences in resource endowments, locational conditions, and developmental stages, economic and social activities inevitably exhibit characteristics of clustering and divergence in space. Unbalanced development between different regions hinders the long-term healthy development of the digital economy [9]. Analyzing China's reality, the eastern coastal regions, leveraging superior locational conditions, early policy support, and a robust industrial base, have established significant advantages in digital infrastructure, agglomeration of high-end talent, maturity of the innovation ecosystem, and market development.

Despite their rapid development under national strategic support, still face practical constraints such as digital access costs, path dependency in traditional industries, and the structure of their talent pool. From the perspective of technological absorptive capacity, a region's ability to effectively utilize new technologies fundamentally depends on its existing knowledge stock and resource conditions. As digital technology diffuses to central and western regions, a mismatch between their human capital and industrial makeup may hinder their ability to effectively assimilate and apply these technologies. Consequently, the enabling effects of the digital economy in these regions might manifest more as localized efficiency improvements, making it more difficult for digitalization to penetrate comprehensively into the core links of innovation and trigger systematic, synergistic transformation, as seen in the eastern region [10].

Therefore, the regional context, shaped collectively by locational conditions, developmental stage, and factor endowments, will systematically moderate the intensity.

H2: The impact of the digital economy on the coupling coordination degree of New Quality Productive Forces exhibits regional heterogeneity.

3. Research Methodology Design

3.1 Selection and Quantification of Research Indicators

This study constructs a comprehensive index system for New Quality Productive Forces (NQP) based on two main dimensions: Objects of Labor and Means of Production. The Objects of Labor dimension includes 12 indicators covering aspects like education level, labor human capital structure, high-tech industry development, environmental protection, and pollution control. For example, high-tech development is measured by the number of enterprises per 10,000 people and investment growth rates. The Means of Production dimension includes 5 indicators such as traditional infrastructure, energy consumption efficiency, green consumption, technological innovation achievements, and technology market activity. Innovation achievements are gauged by the sales revenue of new high-tech products. This system provides a framework to quantitatively assess NQP.

Table 1: New Quality Productive Forces Indicator System

Level 1	Level 2	Level 3
Objects of Labor	Laborer Skills	Per Capita Education Level Laborer Human Capital Structure Laborer Human Support
	Labor Productivity	Per Capita GDP Per Capita Wage
	Laborer Awareness	Proportion of Employees in the Tertiary Industry New Quality Industries Number of Robots
	Ecological Environment	Green Coverage Rate Environmental Protection Capacity Pollution Reduction Volume Pollution Governance Intensity
Means of Production	Physical Means of Production	Traditional Infrastructure Overall Energy Consumption Green Consumption Situation
	Intangible Means of Production	Scientific and Technological Innovation Achievements Technology Market Vitality

This paper employs the CRITIC method and linear weighting to measure the scores of the New Quality Productive Forces subsystems, and uses a coupling coordination model to measure the coupling coordination degree of New Quality Productive Forces. The CRITIC method is an objective weighting technique that considers both the comparative intensity (standard deviation) of the indicators and the conflict (correlation coefficient) between them, making it more comprehensive than the entropy weight method. The calculation steps are as follows: First, standardize the indicators. Next, determine the weights. First, calculate the comparative intensity, which is the standard deviation σ_j of the j -th indicator, and then calculate the conflict $r_{jk} = \sum_{k=1}^n (1 - |r_{jk}|)$. Then, calculate the information content $C_j = \sigma_j \sum_{k=1}^n (1 - |r_{jk}|)$.

$$w_j = \frac{C_j}{\sum_{j=1}^n C_j} \quad (1)$$

After calculating the CRITIC weights for the indicators within the "Objects of Labor" and "Means of Production" subsystems respectively, the linear weighting method is used to calculate the comprehensive score for each subsystem. For a given subsystem, its comprehensive score U is calculated using the formula:

$$U = \sum_{j=1}^k (w_j \cdot y_j) \quad (2)$$

Using the method described above, we can obtain the "Objects of Labor" subsystem score (denoted as U_L) and the "Means of Production" subsystem score (denoted as U_P) for each province. The coupling degree reflects the intensity of interdependence and mutual influence among the various subsystems. Drawing on the concept of capacity coupling from physics, a coupling degree model for the two systems is constructed as follows:

$$C = \frac{2\sqrt{U_L \cdot U_P}}{U_L + U_P} \quad (3)$$

$$D = \sqrt{C \times T} \quad (4)$$

$$T = \alpha U_L + \beta U_P \quad (5)$$

α and β are undetermined weights. Given that "Objects of Labor" and "Means of Production" hold equally fundamental status in the composition of New Quality Productive Forces, this paper sets $\alpha = \beta = 0.5$.

Digital Economy (DIG): With reference to the methodology of Zhang Yun and Chi Xiaonan [13], a comprehensive evaluation index system comprising four dimensions and a total of 23 indicators was constructed. The specific evaluation index system is presented in Table 2.

Table 2: Digital Economy Development Evaluation Indicator System

Level 1	Level 2	Level 3	Attribute
Digital Infrastructure Level	Internet Penetration	Number of Internet Broadband Access Ports	Positive
		Number of Internet Broadband Access Users	Positive
	Mobile Phone Penetration	Number of Internet Domain Names	Positive
		Mobile Telephone Exchange Capacity	Positive
Digital Industrialization	Information Transmission Reach	Mobile Phone Penetration Rate	Positive
	Software and IT Services	Length of Long-Distance Optical Cable Lines	Positive
		Software Business Revenue as % of GDP	Positive
	Development Level of Electronic Information Manufacturing	Number of Employees in Information Transmission, Software, and IT Services	Positive
		IT Service Revenue as % of GDP	Positive
		Telecom Business Volume as % of GDP	Positive
		Per Capita Telecom Business Volume	Positive
	Development Level of Postal Services	Per Capita Postal Business Volume	Positive
		Express Delivery Volume	Positive
		E-commerce Transaction Volume of Enterprises	Positive
Proportion of Enterprises Engaged in E-commerce Transactions		Positive	
Industrial Digitalization	Enterprise Digitalization Level	Number of Computers per 100 Employees	Positive
		Number of Websites per 100 Enterprises	Positive
Digital Innovation Capability	Digital Inclusive Finance	Digital Inclusive Finance Index	Positive
	R&D Level	Full-time Equivalent of R&D Personnel in Industrial Enterprises above Designated Size	Positive
		R&D Expenditure of Industrial Enterprises above Designated Size (or E-commerce Transaction Volume)	Positive
	Technological Innovation Capability	Number of R&D Projects in Industrial Enterprises above Designated Size	Positive
		Number of Domestic Patent Applications Received	Positive
			Number of Patents Granted

Utilizing the indicator weights obtained from the entropy weight method to assist the TOPSIS method in calculating the target level can avoid subjective weighting and eliminate the impact of dimensional differences through data standardization, making the results more objective and accurate. Based on this, after normalizing each indicator, this paper employs the entropy-weighted TOPSIS method to establish an evaluation index system to assess the digital economy development level of 30 Chinese provinces from 2015 to 2023. The specific calculation method is as follows: First, as the dimensions and units of measurement vary across the evaluation indicators, the raw data needs to be subjected to dimensionless processing. Assuming there are m evaluation objects (provinces/cities) and n evaluation indicators, the raw data matrix is formed: $X = (x_{ij})_{m \times n}$. For positive indicators:

$$y_{ij} = \frac{x_{ij} - \min(x_j)}{\max(x_j) - \min(x_j)} \quad (6)$$

For negative indicators:

$$y_{ij} = \frac{\max(x_j) - x_{ij}}{\max(x_j) - \min(x_j)} \quad (7)$$

After this processing, the standardized matrix $Y = (Y_{ij})_{m \times n}$ is obtained. Next, based on the entropy weight method, the indicator weights are determined. Calculate the indicator proportion p_{ij} :

$$p_{ij} = \frac{y_{ij}}{\sum_{i=1}^m y_{ij}} \quad (8)$$

Calculate the information entropy E_j for the j -th indicator using the entropy method

$$e_j = -\frac{1}{\ln m} \sum_{i=1}^m p_{ij} \ln p_{ij} \quad (9)$$

It is stipulated that when $p_{ij}=0$, $p_{ij} \ln p_{ij}=0$. Calculate the degree of divergence g_j for the j -th indicator based on e_j : $g_j = 1 - e_j$. Then, calculate the weight w_j for the j -th indicator using g_j .

$$C_i = \frac{D_i^-}{D_i^+ + D_i^-} \quad (10)$$

The relative closeness C_i obtained from the final calculation is defined in this paper as the comprehensive score for digital economy development level (DigEco), and it serves as the core explanatory variable in subsequent empirical analysis. To improve the accuracy of the regression results, the following control variables are included: Urbanization Level (UL); Consumption Level (CL); Capital Input (CI); Foreign Capital Dependence (FDI/GDP ratio) by destination and source within China to GDP.

3.2 Econometric Regression Model Construction

This paper constructs the following two-way fixed effects model as the baseline regression model:

$$D_{it} = \beta_0 + \beta_1 \text{Dig}_{it} + \sum_{k=1}^K \gamma_k \text{Control}_{kit} + \mu_i + \lambda_t + \varepsilon_{it} \quad (11)$$

In this specification, D_{it} represents the coupling coordination degree of New Quality Productive Forces for province i in year t , serving as the dependent variable. The core explanatory variable Dig_{it} denotes the comprehensive development score of the digital economy for province i in year t . A set of control variables Control_{kit} refers to a set of K control variables selected to control other factors that may affect new-quality productive forces. The model includes β_0 as the constant term and β_1 as the primary coefficient of interest, which captures the net effect of digital economy development on the coupling coordination degree after controlling for other factors. The statistical significance and positive direction of β_1 would provide empirical support for Hypothesis H1. The coefficients γ_k represent the estimated effects of the respective control variables. To address potential omitted variable bias, the model incorporates μ_i representing province-specific fixed effects that control for time-invariant regional characteristics such as geographical location and cultural endowment. Simultaneously, λ_t represents time-fixed effects that capture common temporal shocks affecting all provinces, including macroeconomic fluctuations and nationwide policy changes. The term ε_{it} denotes the idiosyncratic error component. The control variables operationalized in this study include: urbanization level (measured by the urban population share of total resident population), consumption level (represented by per capita retail sales of consumer goods), capital input (measured by the year-on-year growth rate of fixed-asset investment), and foreign capital dependence (calculated as the ratio of total import-export value to GDP).

4. Empirical Analysis

4.1 Data Sources and Descriptive Statistical Analysis

Primary data were sourced from authoritative Chinese statistical yearbooks, with missing values addressed using mean imputation. The descriptive statistics (Table 3) reveal significant disparities in the development of New

Quality Productive Forces across provinces and an overall need for enhanced coordination between its subsystems. The average Digital Economy Development Level (0.4617) indicates notable progress from 2015-2023, yet shows substantial room for improvement and a large standard deviation, suggesting a significant inter-provincial "digital divide." This supports the study's hypothesis (H2) regarding potential regional heterogeneity in the digital economy's impact. Control variable statistics align with existing literature.

Table 3 Descriptive Statistical Analysis

Variable	Obs.	Mean	Std. Dev.	Min	Max
DIG	279	0.4828	0.1757	0	1
CCD_NQP	279	0.4617	0.2250	0	1
UL	279	0.5507	0.1915	0	1
CL	279	0.2680	0.2279	0	1
CI	279	0.6695	0.0997	0	1
FDI/GDP ratio	279	0.2320	0.2257	0	1

4.2 Distribution of the Coupling Coordination of New Quality Productive Forces

To more intuitively present the spatiotemporal evolution characteristics of the coupling coordination degree of New Quality Productive Forces, this study further constructs dynamic distribution maps. The graphical results clearly reveal the instability and complexity inherent in the synergistic development within the New Quality Productive Forces system, thereby highlighting the necessity of this research to conduct an in-depth investigation into its underlying driving mechanisms.

As shown in Figure 1, the kernel density distribution curves of China's Coupling Coordination Degree of New Quality Productive Forces (CCD_NQP) from 2015 to 2023 exhibit a complex fluctuating pattern characterized by significant multimodal coexistence and alternating rightward-leftward shifts. This phenomenon indicates that the synergistic development of the New Quality Productive Forces system across Chinese provinces did not demonstrate a stable convergence or continuous improvement trend but instead experienced noticeable periodic fluctuations. Specifically, the lateral movement of the main peak's position reflects the volatility in the overall level of synergistic development during different periods. The persistent multimodal structure suggests a continuous differentiation among provinces into "advanced," "catching-up," and "lagging" groups. This unstable developmental pattern demonstrates that the formation of New Quality Productive Forces is not a linear, spontaneous process, and the coordination among its internal subsystems is highly susceptible to disturbances from both external environments and internal conditions. Therefore, it is imperative to identify key driving forces that can effectively stabilize and enhance this synergistic level.

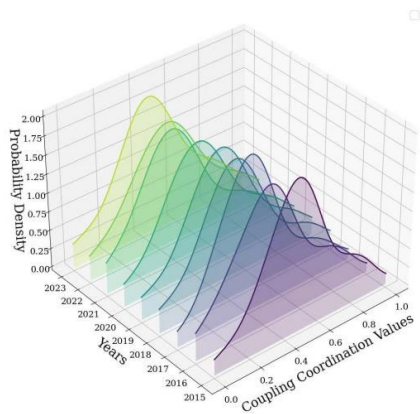


Figure 1. Spatiotemporal Dynamic Distribution of the Coupling Coordination Degree (CCD_NQP) of New Quality Productive Forces

Figure 2 provides further evidence supporting the above assessment from the perspective of coordination levels. The figure displays the annual distribution of regions across different coordination levels (e.g., disorder, transition, coordination). It can be observed that the proportion of regions classified at the "preliminary coordination" level and below fluctuates significantly across different years, failing to demonstrate a clear and sustained trend toward higher coordination levels. In some years, there was even a reversal in the proportional structure of high, medium, and low coordination levels. This profoundly reveals the fragility and path uncertainty inherent in the synergistic development of New Quality Productive Forces. A healthy and mature productive forces system should exhibit a steady progression toward higher coordination levels. The current volatile pattern indicates that its development model has not yet stabilized, and the internal synergistic mechanisms still require consolidation.

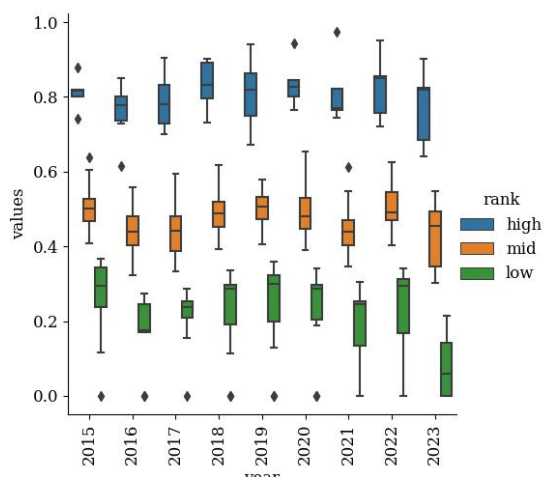


Figure 2. Evolution of Regional Distribution by Coordination Level for New Quality Productive Forces

The volatility of the Coupling Coordination Degree of New Quality Productive Forces (CCD_NQP) across time and its divergence in regional dimensions jointly form the practical starting point of this study. This unstable developmental state indicates that merely observing the existence of New Quality Productive Forces is

insufficient; it is more crucial to identify which forces can effectively promote stable and efficient synergy among its internal subsystems. Therefore, focusing on the digital economy as a key variable, this paper empirically examines whether it can serve as a core driving force to mitigate fluctuations, enhance coordination, and ultimately propel New Quality Productive Forces onto a high-level developmental trajectory. This investigation holds significant theoretical value and addresses an urgent practical need.

4.3 Analysis of Regression Results

Table 4 reports the baseline regression results. After incorporating both individual and time two-way fixed effects, the coefficient for the digital economy (DIG) is 0.2254 and is statistically significant at the 5% level. This result indicates that for every one-unit average increase in the digital economy development level, the coupling coordination degree of New Quality Productive Forces increases by an average of 0.2254 units. Consequently, research hypothesis H1 is validated.

Functioning as a novel production input, the digital economy significantly improves the coordination between the labor objects and production means subsystems. This integration forms new means of production and merges deeply with traditional production factors, thereby structurally strengthening integrated operations and internal coordination within the system.

The baseline findings substantiate that the digital economy is a fundamental driver, pushing the New Quality Productive Forces system toward a more advanced and orderly state. From Model (1) to Model (3), as control variables and fixed effects were progressively incorporated, the significance and direction of the DIG coefficient remained stable, fully demonstrating the robustness and reliability of the baseline regression results. The high R-squared value of 0.9591 in the final model also indicates that this specification explains the variation in the coupling coordination degree of New Quality Productive Forces very well.

Table 4. Baseline Regression Results

Variable	(1)	(2)	(3)
	CCD_NQP	CCD_NQP	CCD_NQP
DIG	0.9327*** (19.95)	0.3689*** (6.56)	0.2254*** (2.21)
Control Variables	No	Yes	Yes
Year FE	No	No	Yes
Province FE	No	No	Yes
Observations	279	279	279
R ²	0.5305	0.7817	0.9591

As the historical level of digital economy development is highly correlated with its current level. Simultaneously, it meets the exogeneity condition, since past economic conditions are unlikely to directly affect the current level of productivity synergy. Table 5 presents the regression results using the instrumental variable.

Table 5. Instrumental Variable Regression Results

Variable	(1) IV-I	(2) IV-II
	DIG	CCD NQP
DIG		0.2665** 1.96
LDIG(Instrumental Variable)	0.8125*** (16.52)	
Kleibergen-Paap rk LM statistic	32.31 <0.0000>	
Kleibergen-Paap rk Wald F statistic	273.03 [16.38]	
Control Variables	Yes	Yes
Year Fixed Effects	Yes	Yes
Province Fixed Effects	Yes	Yes
Observations	248	248
R ²	0.9854	0.9618

To ensure the reliability of the baseline regression results, this study further conducts robustness tests, with the results presented in Table 6.

Table 6. Robustness Test Results

Variable	(1) Alternative Variable Measurement	(2) 2015-2021
	CCD NQP	CCD NQP
DIG		0.2171*** 2.05
LnDIG	0.0575*** 2.05	
Control Variables	Yes	Yes
Year Fixed Effects	Yes	Yes
Province Fixed Effects	Yes	Yes
Observations	279	217
R ²	0.9585	0.9649

(1) Altering the measurement method of the explanatory variable: Using the logarithm of the digital economy development level as the explanatory variable yields a coefficient of 0.0575, which remains statistically significant at the 5% level. This result confirms that changing the measurement method of the core explanatory variable does not substantially alter the estimation results. The research findings demonstrate good adaptability to different model specifications and are not driven by specific measurement choices for the variables.

(2) In the sample adjustment test, this study considers the influence of temporal factors. As shown in Column (2), restricting the sample period to 2015–2021 helps eliminate potential structural disruptions caused by economic developments or policy shifts after 2022. This result further confirms that the baseline regression findings are not driven by unique factors specific to a particular sample period.

4.4 Heterogeneity Analysis

While the preceding sections have discussed in greater detail the impact of the digital economy on the coupling coordination degree of New Quality Productive Forces and its underlying mechanisms, the focus has primarily been at the aggregate level, without considering heterogeneous effects such as those arising from regional disparities. Therefore, this section extends the analysis to examine heterogeneity through further testing.

Table 7. Heterogeneity Analysis Results

Variable	(1) Eastern Coastal Regions	(2) Central-Western Regions
	CCD NQP	CCD NQP
DIG	0.1196* 1.81	0.3324* 1.71
Control Variables	Yes	Yes
Year Fixed Effects	Yes	Yes
Province Fixed Effects	Yes	Yes
Observations	90	153
R ²	0.9690	0.9088

Referring to the approach of Zhao Tao and Zhang Zhi [14], the regional division in this paper is as follows: The eastern coastal region includes 10 provinces and municipalities. This region represents the forefront of China's reform and opening-up, characterized by a developed economy, well-established digital infrastructure, and the agglomeration of innovative factors. Having long benefited from policy dividends, its digital economy development is at the leading level nationally. Notably, although Liaoning is geographically part of Northeast China, its current stage of economic development, industrial structure characteristics, and the economic transformation challenges it faces are more similar to those of central and western provinces. Therefore, it is included in the central and western sample for analysis. Overall, this region has a relatively weaker foundation for digital economy development, but it has shown a catching-up trend in recent years under the support of national regional coordinated development strategies.

The introduction of digital elements there has a more substantial transformative impact on traditional production systems, manifesting as a "latecomer advantage." Furthermore, the inclusion of Liaoning in the central and western sample reflects the practical need for old industrial bases to achieve productive leaps through digital transformation, thereby further corroborating the powerful enabling role of the digital economy in relatively less developed regions.

This heterogeneity finding not only validates research hypothesis H2 but, more importantly, provides valuable policy insights: full consideration should be given to developmental disparities between regions. Differentiated and targeted regional digital economy development strategies should be implemented.

5. Conclusions and Implications

The research yields the following conclusions: (1) The coupling coordination degree of NQP exhibited a fluctuating evolutionary characteristic between 2015 and 2023, with an overall unstable development trajectory and a pattern of regional divergence. (2) The digital economy has a significant positive impact on the coupling coordination of NQP. (3) The impact effect of the digital economy exhibits regional heterogeneity; compared to the high-productivity eastern coastal regions, the promoting effect of the digital economy on the coupling coordination level of NQP is more pronounced in the central and western regions. Based on the above research conclusions, this paper proposes the following policy recommendations:

Strengthen top-level design and strategic synergy to create an integrated national development pattern. The state should coordinate the formulation of development plans for the synergistic advancement of the digital economy and New Quality Productive Forces, break down departmental barriers and regional fragmentation, and establish cross-departmental and cross-regional coordination and promotion mechanisms. Concurrently, efforts to advance digital economy legislation should be intensified, and the market-based allocation mechanism for data factors should be improved to provide institutional guarantees for high-quality development.

Implement differentiated and targeted regional development strategies. For the eastern coastal regions, the focus should be on promoting the "quality and efficiency enhancement" of the digital economy, supporting the establishment of digital technology innovation hubs with global influence, and fostering digital industrial clusters. For the central and western regions, efforts should concentrate on "addressing weaknesses and strengthening foundations," involving increased investment in digital infrastructure construction. A mechanism for paired assistance in digital technology between eastern and western regions should be established to facilitate the cross-regional diffusion and inclusive sharing of digital technologies.

Focus on key factors and smooth the innovation cycle. It is essential to accelerate the market-oriented allocation process of data factors and establish sound systems for data property rights, circulation, and distribution. Support should be provided for enterprises to take the lead in forming innovation consortiums, optimizing the allocation of innovation resources, and guiding social capital toward critical and core technology breakthroughs. This will foster high-quality development at the national level.

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