Digital Finance and China's Foreign Trade Development: Theory and Empirical Evidence

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Abstract. The rapid advancement of digital finance has injected fresh impetus into the transformation and upgrading of foreign trade development models. Utilizing panel data from 31 provinces and municipalities across China between 2011 and 2021, this research conducts a systematic investigation into the mechanisms and key factors through which digital finance influences the evolution of foreign trade. The analysis demonstrates that digital finance plays a vital role in advancing regional foreign trade by facilitating industrial restructuring and boosting innovation capability. Moreover, both the quality of the business environment and the extent of urbanization act as positive moderating variables in strengthening the impact of digital finance on foreign trade expansion. Significant regional differences are observed: the eastern region benefits most from digital finance, while the central and western regions exhibit comparatively weaker effects, largely due to slower progress in industrial digital transformation. Among the components of digital finance, coverage breadth exerts the most substantial effect, followed by digitalization level and usage depth. The identified "industrial structure – innovation capacity" dual-driver framework not only enriches the theoretical understanding of digital finance's role in foreign trade promotion but also offers actionable insights for shaping region-specific investment attraction strategies within the context of the dual circulation economic model.

Keywords: Digital Finance; Foreign Trade Development; Mechanism Analysis; Moderating Effect.

1. Introduction

Digital finance, born from the profound integration of digital technology with financial services, is being increasingly recognized as a vital driver for achieving high-quality growth in international trade. In particular, within areas such as cross-border payments, supply chain finance, and risk management, digital finance—by virtue of its efficiency, low cost, and traceability—has significantly enhanced the convenience of global foreign trade. By breaking through conventional financial limitations related to time, geography, and cost, digital finance significantly enhances the ability of trade participants — particularly small and medium-sized foreign trade enterprises — to obtain diversified financing resources and access richer market intelligence. (Zhang et al., 2023). Against this backdrop, digital finance has become an essential pillar in improving the trade environment and is reshaping the global trade landscape as well as China's role within it.

In recent years, China's foreign trade has maintained a steady and positive growth trajectory, with continuous optimization in the structure of export products and increasingly diversified regional market layouts. At the same time, the rapid development of new business forms and models—such as cross-border e-commerce — has injected new vitality into foreign trade (Yang et al., 2023). Nevertheless, China's foreign trade still faces multiple challenges and constraints. On one hand, the unstable global economic recovery, rising geopolitical risks, and the resurgence of trade protectionism have intensified the operational pressures on foreign trade enterprises. On the other hand, persistent issues such as financing difficulties, settlement barriers, and information asymmetries continue to hinder the ability of small and medium-sized foreign trade enterprises to participate effectively in international markets. In this context, there is an urgent need for China to enhance the resilience and global competitiveness of its foreign trade enterprises, thereby promoting high-quality development of foreign trade.

The rise of digital finance offers promising new avenues for addressing the challenges facing the development of China's foreign trade. The financial service capabilities of digital platforms help

reduce transaction costs, shorten capital turnover cycles, and enhance firms' flexibility and sustainability in participating in international markets. This is particularly evident in their ability to mitigate external shocks such as exchange rate volatility and disruptions in international logistics (Song et al., 2021). At the same time, growing policy support for the deep integration of digital finance and trade provides an institutional foundation for its widespread application. Therefore, exploring the impact of digital finance on the development of China's foreign trade is not only of significant theoretical value, but also holds practical importance for building a more open, inclusive, and sustainable foreign trade system.

Given the strategic importance of both digital finance and foreign trade in China's economic development, this study begins by examining the relationship between digital finance and the growth of China's foreign trade. Using provincial-level panel data from 31 regions in China spanning the period from 2011 to 2021, this paper investigates the role of digital finance in driving foreign trade. In particular, it focuses on identifying the specific pathways through which digital finance influences foreign trade performance and empirically analyzes potential external enabling factors. The goal is to uncover the intrinsic links and mechanisms between digital finance and foreign trade development. This research contributes to the expansion of the theoretical framework surrounding digital finance and provides practical insights for local governments in formulating policies that integrate digital economy development with greater openness in foreign trade.

2. Literature Review

For a long time, scholars have extensively explored the key factors influencing China's foreign trade from various perspectives, including the trade gravity model, regional economic structure, and the level of industrial development. These studies have revealed that macroeconomic indicators, policy environment, industrial structure, and even educational attainment exert profound impacts on export trade.

Zhou and Cao (2022) employed the trade gravity model to analyze the factors influencing China's export trade to developing countries, such as India. Their findings indicate that per capita national income, the proportion of intercontinental-oriented exports, and the signing of regional trade agreements exert significant positive effects on China's export trade, whereas exchange rate fluctuations and anti-circumvention investigations have negative impacts. Wang Min et al. (2022) found that the proportion of the tertiary industry, foreign trade development, the education level of the workforce, and the number of internet access ports positively influence the efficiency of foreign trade in the Yangtze River Economic Belt. Based on these findings, they proposed enhancing regional foreign trade development through four key measures: strengthening inter-provincial cooperation, optimizing industrial structure, promoting technological advancement, and improving infrastructure. Zhai et al. (2020), from the perspective of agricultural product trade, found that regional economic development, the level of foreign capital utilization, investment in science and technology, and logistics infrastructure significantly affect agricultural foreign trade performance.

In summary, the factors influencing foreign trade can be broadly categorized into several dimensions, including the level of economic development, degree of openness, technological innovation capacity, characteristics of industrial structure, and the quality of infrastructure. Among these, technological progress and financial accessibility play particularly critical roles. Notably, with the widespread application of digital technologies in recent years, digital finance—as a key product of the integration between finance and technology—has increasingly demonstrated its potential in promoting foreign trade.

As a key outcome of the new wave of technological revolution, digital finance not only inherits the inclusive characteristics of traditional financial services—such as low cost, broad coverage, and strong accessibility—but also integrates advanced technologies including big data, intelligent analytics, and cloud computing (Hu, 2025). Research has shown that the development of digital finance can effectively reduce market segmentation in regional consumption and support the

construction of a unified national consumer market. Moreover, its positive effects are more pronounced in regions with abundant human resources and higher technical efficiency (Zhan et al., 2025). At the same time, the advancement of digital finance can significantly enhance the level of new regional productivity by stimulating entrepreneurial activity and optimizing industrial structures (Zhu & Zeng, 2024). Furthermore, digital finance improves enterprises' performance in seeking foreign markets and operational efficiency by lowering barriers to capital and information access. The presence of a favorable legal environment and firms' digital transformation further amplifies the positive impact of digital finance on market-seeking performance (Xue et al., 2025).

Currently, scholarly exploration of the link between digital finance and the development of foreign trade remains relatively sparse. Cheng et al. (2024), utilizing panel data from 29 provinces in China, demonstrated that digital finance contributes to increasing export volumes and improving the technological complexity of export goods, although the degree of impact varies significantly across different regions. Hu and Zhang (2022) analyzed the present role of digital finance in supporting export growth among manufacturing enterprises and further delved into its dynamic influence across four developmental phases: initial accumulation, rapid expansion, structural upgrading, and advanced development. In a related study, Zhang et al. (2022) assessed how digital finance affects firms' export activities, revealing that the main channel lies in its ability to stimulate domestic consumption, which in turn enhances firms' import capacity. Drawing on multiple datasets—including the China Customs Database, the China Industrial Enterprise Database, and indices measuring digital finance—Jin and Zhang (2022) found that digital finance markedly boosts export performance at the enterprise level by raising export margins and improving both the scale and pricing structure of exports.

While "technological innovation" has been a recurring theme in a wide range of studies, digital finance—emerging from the profound fusion of technology and financial services—has not yet become a central analytical focus in the relevant literature. A number of researchers have started to explore the externalities of digital finance, recognizing its beneficial role in alleviating market inefficiencies, refining industrial structures, and strengthening firms' export competitiveness. Nevertheless, most current research remains concentrated on its effects at the macroeconomic level, corporate financing channels, or consumer behavior. Comprehensive inquiries into the mechanisms through which digital finance influences foreign trade are still scarce, especially regarding the construction of an integrated theoretical model and the provision of multi-dimensional empirical validation.

3. Data and Model Specification

3.1 Variable Selection

This study employs panel data from 31 Chinese provinces during the period 2011–2021. The original data are primarily sourced from the statistical yearbooks of each city. A small number of missing values were imputed using interpolation methods.

1. Foreign Trade Development Level (*Export*)

The level of foreign trade development serves as the dependent variable in this paper. Following the approach of Ma and Shi (2021), provincial export values are used to represent this variable. The export data are converted to billion RMB using the annual RMB to USD exchange rates published by the National Bureau of Statistics.

2. Digital Finance (*Digi_Fin*)

Digital finance is the core explanatory variable in this study. Referring to Zhang and Huang (2025), the Peking University Digital Inclusive Finance Index released by the Digital Finance Research Center of Peking University is employed as the measurement. This index also provides sub-indices for coverage breadth (*Coverage*), usage depth (*Depth*), and degree of digitalization (*Digitalization*) at the provincial level.

3. Business Environment (*Environment*) and Urbanization Rate (*Urban*)

In a market economy, a favorable business environment attracts enterprises, talents, capital, and projects to cluster in cities, enhancing urban competitiveness and creativity. Following Yang and Wei (2021), this study constructs a comprehensive business environment evaluation system encompassing four primary indicators—macroeconomic environment, market environment, infrastructure, and policy environment—with 15 secondary indicators. The entropy method is used to assign weights, enabling a relatively objective and accurate measurement of the business environment index for the 31 provincial-level administrative regions, which is then used to analyze the impact of regional business environments on local foreign trade.

Against the backdrop of ongoing urbanization, improved infrastructure and public services attract populations, resources, and industries to urban areas, thereby strengthening urban carrying capacity and vitality. Drawing on Wang et al. (2025), the urbanization rate is selected as a proxy to measure local social development levels and to explore its moderating role in the relationship between digital finance and foreign trade development.

4. Industrial Structure (*High_str*) and Innovation Capability (*Innovation*)

The popularization of digital finance may contribute to optimizing industrial structure by promoting the transformation towards higher value-added and higher-technology industries, thereby enhancing export competitiveness and facilitating high-quality foreign trade development. Accordingly, the proportion of tertiary industry value added is used as a proxy for industrial structure.

Innovation capability, as another potential mediating variable, reflects how digital finance enhances firms' independent innovation through mechanisms such as lowering financing barriers and incentivizing technological investment. This, in turn, strengthens the international competitiveness of products and services, thereby promoting sustained growth in China's foreign trade. The number of patent applications accepted (in ten thousands) is adopted as its proxy variable.

5. Control Variables

Following Wang et al. (2023) and Liu et al. (2022), the model controls for several variables: government governance capacity (*Govern*), financial development (*Finance*), industrial development level (*Industry*), infrastructure quality (*Infra*), and economic development level (*GDP_per*). Additionally, year and provincial fixed effects are included in the regression models.

The main variables used in this study are summarized in Table 1.

Table 1 Description of key variables

Variable Name	Symbol	Definition
Foreign trade development level	*Export*	Total export value (hundred billion RMB)
Digital finance	*Digi_Fin*	Peking University Digital Inclusive Finance Index
Business environment	*Environment*	Business environment index calculated by the entropy method
Urbanization rate	*Urban*	Proportion of urban population (%)
Industrial structure	*High_str*	Proportion of value added by the tertiary industry
Innovation capability	*Innovation*	Number of patent applications accepted (ten thousand units)
Government governance capacity	*Govern*	Fiscal expenditure / GDP
Financial development	*Finance*	Deposits and loans / GDP
Industrial development	*Industry*	Proportion of value added by the secondary industry
Economic development	*GDP_per*	Per capita GDP (ten thousand RMB)
Infrastructure level	*Infra*	Density of highways and railways

3.2 Model Specification

To examine the relationship between digital finance and foreign trade development, this paper establishes the following baseline model:

$$Export_{it} = \beta_0 + \beta_1 Digi\_Fin_{it} + \Phi Control_{it} + \eta_i + \mu_t + \varepsilon_{it} \quad (1)$$

where $Export_{it}$ denotes the level of foreign trade development; $Digi\_Fin_{it}$ represents the level of digital finance development; $Control_{it}$ is a vector of control variables; η_i and μ_t are province and year fixed effects, respectively; and ε_{it} is the error term.

Building upon the baseline model, this study incorporates a moderating variable and its interaction term with the core explanatory variable. Considering the potential multicollinearity caused by including interaction terms and to eliminate the interference of differing units of measurement on coefficient interpretation, both the moderating variable and the core explanatory variable are mean-centered. Mean-centering improves the interpretability of the coefficients associated with the core explanatory variable (Rasoolimanesh et al., 2021). The specific model is specified as follows:

$$Export_{it} = \beta_0 + \beta_2 c\_Digi\_Fin_{it} + \vartheta c\_M_{it} + \sigma c\_Digi\_Fin_{it} \times c\_M_{it} + \Phi Control_{it} + \eta_i + \mu_t + \varepsilon_{it} \quad (2)$$

where $c\_Digi\_Fin_{it}$ and c_M_{it} denote the mean-centered core explanatory and moderating variables, respectively; other variables are as defined in equation (1).

To delve deeper into the mechanisms by which digital inclusive finance contributes to the advancement of regional foreign trade, this study follows the analytical framework of Jiang (2022) and employs a mediation model to trace the transmission paths of digital finance's impact. Specifically, industrial structure upgrading (*High_str*) and innovation capability enhancement (*Innovation*) are introduced as potential mediating variables ($Mediator_{it}$), with the mediation model specified as follows:

$$Mediation_{it} = \beta_0 + \beta_3 Digi\_Fin_{it} + \Lambda Control_{it} + \eta_i + \mu_t + \varepsilon_{it} \quad (3)$$

where the variables are as defined previously in equation (1).

4. Empirical Analysis

4.1 Model Specification

The descriptive statistics of the main variables used in this study are presented in Table 2. The average level of foreign trade development (*Export*) is 2.684, with a standard deviation of 4.786, indicating significant regional disparities. Similarly, the development level of digital finance (*Digi_Fin*) also exhibits notable regional variation, ranging from a minimum value of 18.330 in Qinghai Province in 2011 to a maximum value of 459.000 in Shanghai Municipality in 2021.

Table 2 Descriptive Statistics

Variables	Obs	Average	Standard error	Minimum	Maximum
Export	341	2.684	4.786	0.000	24.380
Digi_Fin	330	231.500	103.300	18.330	459.000
Environment	310	0.099	0.047	0.048	0.731
Urban	330	0.596	0.121	0.350	0.896
High_str	330	0.476	0.097	0.297	0.839
Innovation	341	10.410	15.120	0.000	98.060
Govern	330	0.249	0.103	0.107	0.643
Finance	330	3.274	1.148	1.518	8.131
Industry	330	0.426	0.088	0.158	0.590
GDP_per	330	5.857	2.890	1.641	18.400
Infra	330	0.983	0.523	0.092	2.264

4.2 Baseline Regression

Table 3 presents the core regression outcomes examining the relationship between digital finance and regional foreign trade development. Column (4), which incorporates the full set of control variables along with year and province fixed effects, is designated as the benchmark regression model. The findings reveal that digital finance has a statistically significant positive impact on foreign trade development. Specifically, after controlling for other influencing factors, a one-unit rise in the digital finance index corresponds to a 0.036-unit increase in the level of foreign trade development. This finding highlights the potential of digital financial tools to promote regional economic openness and trade growth. The underlying reasons can be explained from several aspects: first, digital inclusive

finance substantially alleviates financing difficulties faced by small and medium-sized enterprises; second, digital finance improves payment settlement and cross-border transaction efficiency, thereby effectively stimulating regional foreign trade vitality.

Table 3 Baseline regression results

Export	(1)	(2)	(3)	(4)
Digi_Fin	0.012***	0.066***	0.008***	0.036***
	(0.002)	(0.007)	(0.003)	(0.010)
Govern			-17.979***	7.783**
			(3.426)	(3.146)
Finance			0.803**	0.381
			(0.341)	(0.267)
Industry			14.915***	5.248**
			(3.838)	(2.396)
GDP_per			0.428***	0.505***
			(0.134)	(0.100)
Infra			-0.579	-0.808
			(0.587)	(0.728)
Constant	-0.098	-12.571***	-5.519**	-13.076***
	(0.632)	(1.656)	(2.651)	(2.461)
Year FE	NO	YES	NO	YES
Province FE	NO	YES	NO	YES
N	330	330	330	330
R^2	0.070	0.970	0.356	0.975

Note: *** , ** , and * indicate significance at the 1%, 5%, and 10% levels, respectively. Robust standard errors are reported in parentheses.

4.3 Mediation Mechanism

Columns (1) and (2) of Table 4 present the regression results using industrial structure as the mediating variable. The findings suggest that digital finance facilitates industrial upgrading, thereby promoting regional foreign trade development. This may be attributed to the role of technologies such as big data and artificial intelligence, which help firms gain better access to financial resources. As a result, regions can shift from traditional export-oriented industries to more technology- and knowledge-intensive sectors, increasing the added value of export products and enhancing their international competitiveness.

Columns (3) and (4) show that digital inclusive finance significantly improves regional innovation capacity. The innovation-driven advantages in product diversification and differentiation strengthen firms' ability to connect with international markets, granting them greater bargaining power and a stronger voice in global trade.

Table 4 Results of Mediation Effect Tests

	High_str	*High_str*	*Innovation*	*Innovation*
Digi_Fin	0.001**	0.001***	0.039***	0.228***
	(0.000)	(0.000)	(0.009)	(0.060)
Constant	0.552***	0.770***	-14.856*	-78.982***
	(0.014)	(0.029)	(7.992)	(15.578)
Control variables	YES	YES	YES	YES
Year FE	NO	YES	NO	YES
Province FE	NO	YES	NO	YES
N	330	330	330	330
R^2	0.955	0.992	0.410	0.898

Note: *** , ** , and * indicate significance at the 1%, 5%, and 10% levels, respectively. Robust standard errors are reported in parentheses.

4.4 Moderating Effects

The effectiveness of digital finance in advancing foreign trade is contingent upon supportive economic and social conditions. To capture this contextual influence, the study performs a moderating effect analysis focusing on two key dimensions: the business environment and the degree of urbanization. As indicated in Table 5, both factors amplify the positive relationship between digital finance and regional foreign trade development.

This can be attributed to the fact that a sound business environment provides institutional support for the development of digital inclusive finance. Transparent policies, fair law enforcement, and trade facilitation measures effectively reduce transaction costs, thereby creating favorable conditions for the application of digital financial tools in cross-border settlement, risk management, and financing support.

Meanwhile, higher levels of urbanization imply improved infrastructure and population concentration, which contribute to consumption upgrading and the emergence of more foreign trade-oriented enterprises. This, in turn, stimulates the demand for digital financial services, forming a virtuous cycle between urban development and foreign trade growth.

Table 5 Moderating effects results

Export	(1)	(2)	(3)	(4)
c_Digi_Fin	0.027***	0.014*	0.049***	0.035***
	(0.006)	(0.007)	(0.008)	(0.009)
c_Environment	-5.923***	-5.556***		
	(1.064)	(1.047)		
c_Digi_Fin×c_Environment	0.182***	0.173***		
	(0.014)	(0.015)		
c_Urban			12.828**	15.829**
			(6.502)	(6.665)
c_Digi_Fin×c_Urban			0.032***	0.022***
			(0.008)	(0.008)
Constant	2.947***	0.048	2.574***	-3.738*
	(0.094)	(1.567)	(0.069)	(1.976)
Control variables	NO	YES	NO	YES
Year FE	YES	YES	YES	YES
Province FE	YES	YES	YES	YES
N	300	300	330	330
R^2	0.985	0.986	0.973	0.975

Note: ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively. Robust standard errors are reported in parentheses.

5. Heterogeneity Analysis

To empirically examine the varying effects of digital finance on foreign trade development, this research performs a heterogeneity analysis from two angles. First, the data sample is categorized into three regional clusters—eastern, central, and western China—according to their geographical and economic traits. Second, digital finance is broken down into three components: coverage breadth, usage depth, and digitalization level, aiming to investigate how each dimension uniquely affects foreign trade outcomes.

Table 6 Heterogeneity analysis results

Export	Eastern China	Central China	Western China
Digi_Fin	0.048**	-0.004	0.003
	(0.021)	(0.012)	(0.003)
Constant	-8.553	-1.773	-0.176
	(7.275)	(2.983)	(0.645)
Control variables	YES	YES	YES
Year FE	YES	YES	YES

Province FE	YES	YES	YES
N	143	66	121
R^2	0.973	0.900	0.927

Note: *** , ** , and * indicate significance at the 1%, 5%, and 10% levels, respectively. Robust standard errors are reported in parentheses.

The results presented in Table 6 indicate that the development of digital finance significantly promotes the level of foreign trade in the eastern region, whereas no significant effects are observed in the central and western regions. This disparity can be attributed to a combination of factors such as geographical advantages, industrial foundations, technological conditions, and the degree of openness. Meanwhile, the findings in Table 7 demonstrate that the breadth of coverage, usage depth, and degree of digitalization all significantly enhance the development of foreign trade at the regional level. Specifically, the impact of coverage breadth is the strongest, followed by digitalization degree, while usage depth has the least effect. The underlying reason is that the coverage breadth of digital finance determines the accessibility and inclusiveness of financial services. This transition from absence to presence substantially broadens the beneficiary base of financial resources, providing fundamental support to enterprises that were previously unable to participate in foreign trade, thereby overall increasing regional participation in foreign trade activities.

Table 7 Heterogeneity analysis results

Export	(1)	(2)	(3)
Coverage	0.036***		
	(0.010)		
Depth		0.009*	
		(0.005)	
Digitalization			0.011***
			(0.003)
Constant	-13.076***	-8.033***	-9.005***
	(2.461)	(1.959)	(1.921)
Control variables	YES	YES	YES
Year FE	YES	YES	YES
Province FE	YES	YES	YES
N	330	330	330
R^2	0.975	0.974	0.974

Note: *** , ** , and * indicate significance at the 1%, 5%, and 10% levels, respectively. Robust standard errors are reported in parentheses.

6. Robustness Tests

To verify the robustness of the study's findings, multiple robustness checks are performed. First, the dependent variable is winsorized to eliminate the influence of extreme values. The regression results reported in Column (1) demonstrate that even after removing outliers, the coefficient for digital finance on foreign trade development remains positive and statistically significant at 0.033, confirming the stability of the baseline estimates.

Second, to control for the potential distortions caused by the COVID-19 pandemic, observations from the year 2020 are excluded. As shown in Column (2), the coefficient on digital finance remains significantly positive at 0.024, indicating that the findings are reliable even when pandemic effects are accounted for.

Lastly, to address endogeneity issues, the lagged value of the digital inclusive finance index is employed as an instrumental variable, and the analysis uses an instrumental variables two-stage least squares (IV-2SLS) method. The first-stage regression results in Column (3) reveal a strong positive correlation between the instrument (*L_Digi_Fin*) and digital finance at the 1% significance level. In the second stage, shown in Column (4), digital finance continues to exhibit a significantly positive effect on foreign trade development at the 1% level. Moreover, diagnostic tests such as the

Kleibergen-Paap rk LM and Stock-Wright LM S statistics are significant, supporting the validity of the instrumental variable chosen.

Table 8 Robustness test results

	OLS *Export*	OLS *Export*	IV-2SLS *First-stage*	IV-2SLS *Second-stage*
Digi_Fin	0.033*** (0.009)	0.024*** (0.010)		0.068*** (0.010)
L_Digi_Fin			0.582*** (0.053)	
Constant	-12.306*** (2.385)	-10.898*** (2.524)		-12.553*** (0.020)
Kleibergen-Paap rk LM statistic				61.250***
Stock-Wright LM S statistic				21.160***
Control variables	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
Province FE	YES	YES	YES	YES
N	330	300		300
R^2	0.976	0.975		0.980

Note: *** , ** , and * indicate significance at the 1%, 5%, and 10% levels, respectively. Robust standard errors are reported in parentheses.

7. Conclusion and Suggestions

Utilizing panel data across China covering the period 2011 to 2021, this research applies both mechanism and moderating effect analyses to uncover how digital finance propels foreign trade growth. Results demonstrate that digital finance plays a crucial role in boosting regional foreign trade by primarily optimizing the industrial structure and enhancing innovation capacity. Additionally, the positive impact of digital finance on foreign trade development is further amplified by a favorable business environment and higher urbanization levels. When comparing regions, the eastern provinces exhibit a markedly stronger effect of digital finance in promoting foreign trade relative to the central and western areas. Among the various aspects of digital finance, the breadth of coverage stands out as the most influential driver, followed by the degree of digitalization.

This study breaks through traditional theoretical boundaries by clarifying how the dual engines of "industrial structure upgrading and innovation capability" reshape the logic of foreign trade flows, offering a new paradigm for regional coordination. Future research should deepen the study of the synergy between digital finance and institutional openness, incorporating micro-level enterprise data to explore targeted strategies that support policy innovation in foreign investment attraction under the "dual circulation" development framework.

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