



# Impact of the Distribution Industry on the Development of the Country's Rural Economy

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**Abstract.** In the context of rural revitalization, the rapid development of the circulation industry has become an important force in promoting rural economic development and contributing to rural revitalization. Firstly, from the theoretical point of view, the circulation industry can promote the development of the rural economy, from the empirical research, every unit of the circulation industry improves, the rural economic development improves by 0.808 units, and the results are confirmed to be credible by the robustness test, and secondly, the intermediary effect of the e-commerce has also been verified. Finally, this paper puts forward corresponding countermeasures recommendations given this.

**Keywords:** Distribution industry; rural economy; e-commerce;

## 1 Introduction

The 2023 central document, the Guiding Opinions of the Central Finance Office and Other Departments on Promoting High-Quality Development of Rural Circulation, points out that accelerating the construction of an efficient modern rural circulation system, comprehensively consolidates the results of poverty alleviation, and advancing rural revitalization make the construction of a modern rural circulation system an important element in grasping the revitalization of the countryside. For the development of the rural economy, the circulation industry not only provides convenient sales channels for agricultural products and increases the income of farmers, but also provides a large number of jobs, alleviates the serious unemployment problem of rural labor and drives the rapid development of the rural economy. Therefore, in the context of rural revitalization, it is of great practical significance to explore the impact of the circulation industry on the development of China's rural economy, to help revitalize the countryside and build a modern rural circulation system.

## 2 Literature review

In terms of rural economic development, research scholars have mainly studied rural finance and rural consumption. Awadhesh Kumar (2007)<sup>1</sup> and Bob Saint (2009)<sup>2</sup> not

only elaborated the full application of smart network technology in rural distribution system but also provided effective data support for the development of rural distribution system and pointed out that the development of transportation and communication will make rural distribution system more convenient. C. S. G. Krishnamacharyulu (2010)<sup>3</sup>, through examples of four different types of firms' distribution in rural markets, shows how good firms deliver their product services to rural consumers and illustrates the importance of distribution organization choice for rural market strategies. T.M. Schmit and M.I. Gómez (2010)<sup>4</sup>, for the New York area's rural market, argues that rural trade markets, known as the home of fresh food, are attracting increasing attention and should be promoted through public policy interventions, products and suppliers, and marketing.

Yao Changlin (Yao Changlin, 2021)<sup>5</sup> argues that a sound legal framework must be established for rural economic and financial development and that an unsound legal environment and system will lead to serious impacts on financial and economic development. Han Changhong (Han Changhong, 2021)<sup>6</sup> shows that the two concepts of rural finance and rural economy are interrelated and mutually reinforcing and that proper handling of their relationship will lead to rural development in the true sense of the word. Huang Hengjun and Wang Ziyuan (Huang Hengjun & Wang Ziyuan, 2024)<sup>7</sup> used a threshold regression model to empirically study the mechanism of rural consumption on rural economic development, and the results showed that the level of rural residents' consumption has a significant impact on the development of China's rural economy, regardless of whether or not it crosses the threshold.

In recent years as the development of the circulation industry continues to deepen, scholars have begun to pay attention to the study of the link between the circulation industry and rural economic development. Xu Xiaoli (Xu Xiaoli, 2019)<sup>8</sup> theoretically argued that the business and trade circulation industry affects rural economic development through the three levels of agricultural transportation facilities, trading facilities and storage facilities. Liu Yang (Liu Yang, 2022)<sup>9</sup> argued that the development of the rural circulation industry has a positive effect on the changes in farmers' consumption willingness and consumption characteristics. Xiang Songlin et al. (Xiang Songlin & Qiang Yifei, 2022)<sup>10</sup> found that the construction of a two-way urban-rural circulation system is an inevitable choice in the context of the new development model and the expansion of rural capital flows and that it is an important channel for connecting markets and stimulating rural consumption potential. Zeng Hong (Zeng Hong, 2021)<sup>11</sup> showed that due to economic development, media discrimination, personnel literacy, infrastructure development and other factors, China faces the phenomenon of urban-rural digital divide, which negatively affects the rural circulation there are certain obstacles in processing. Wu Xuepin and Li Junyang (Wu Xuepin & Li Junyang, 2014)<sup>12</sup> conducted a study on the promotion of rural economic development through a variety of perspectives, such as total rural economic output value, farm household income, and industrial structure, etc., and their results showed that the circulation industry can directly promote rural economic development by increasing rural economic output value and rural employment, etc., and it can also contribute to the development of the rural economy by increasing the income of farm households and promoting urbanization, etc. It can also indirectly promote rural economic development by increasing the

income of rural households and promoting urbanization. Hao Aimin (Hao Aimin, 2022)<sup>13</sup> found that the digitalization of circulation can effectively promote the development of the rural economy, and is an important mechanism for promoting the integration of rural three industries. Chen Yongqing (Chen Yongqing, 2022)<sup>14</sup> based on China's rural economic development around the state of uneven, through the circulation of digital circulation efficiency, information transformation circulation efficiency two dimensions, research circulation efficiency rural economic development of balanced impact, the results show that the efficiency of the circulation industry can be dominated by the western opening up to the outside world to promote the development of rural economic development in the central and western parts of the country, and to fundamentally improve the status quo of the east is strong and the west is weak. It can be seen that existing research results have begun to pay attention to the impact of the circulation industry on rural economic development.

It can be seen that the existing research results have begun to pay attention to the impact of the distribution industry on rural economic development, based on this, this paper will take the panel data of 26 provinces across the country as a research sample, and study the impact of the distribution industry on rural economic development as a whole.

### 3 Theoretical Mechanisms

In the process of helping to revitalize the countryside, the circulation industry is a major industry in China's rural economic development. The circulation industry is an important intermediary link between production and consumption and is an important vehicle for obtaining information and transporting products in the rural market, with its level of development directly affecting the level of China's rural economic development. With the development of the circulation industry, the mode of transport is no longer limited to a single mode such as highway and railway, but is more diversified, which shortens the time of transporting agricultural products, greatly reduces the cost of transport, and improves the efficiency of transporting agricultural products. At the same time, in the context of digitalization, the establishment of e-commerce platforms has solved the problems of long-distance and a long time of trading activities, to meet the diversified needs of consumers, and e-commerce platforms have become a bridge between rural and urban areas, fully realizing the two-way distribution of e-commerce products.

In summary, the following hypotheses are presented in this paper:

Hypothesis 1: The distribution sector contributes to rural economic development.

Hypothesis 2: E-commerce is an important transmission mechanism for this facilitation.

## 4 Variable Selection, Model Construction and Data Sources

### 4.1 Selection of Variables

Explanatory variables: rural economic development level: based on the results of previous research literature, this paper selects the capita disposable income of rural residents (yuan), total agricultural output value (billion yuan), and regional gross domestic product (billion yuan) as the indicators to measure the level of rural economic development.

Explanatory variables: Circulation industry: Due to the limited data sources, this paper selects total retail sales of social consumer goods (yuan) as the indicator to measure the circulation industry.

Mediating variable: e-commerce industry: this paper selects express delivery volume (million pieces) as an indicator to measure the e-commerce industry.

Control variables: Since the level of rural economic development is also affected by other factors, this paper selects the level of transportation infrastructure, the level of logistics construction, and the level of mechanization as the control variables. Based on previous research results, this paper chooses highway mileage to measure the level of transportation infrastructure; rural delivery routes (kilometers) to measure the level of logistics construction; and total power of agricultural machinery (10,000 kilowatts) to measure the level of regional mechanization.

### 4.2 Modelling

To further study the impact of the distribution industry on rural economic development, the following econometric model is first constructed to investigate the impact of the distribution industry on rural economic development:

$$\text{Ln}P_{it}=\alpha_0+\text{Ln}\alpha_1P_{it}+\text{Ln}\alpha_2G_{it}+\text{Ln}\alpha_3K_{it}+\text{Ln}\alpha_4X_{it}+\varepsilon_{it} \quad (1)$$

$$\text{Ln}B_{it}=\alpha_0+\text{Ln}\alpha_1P_{it}+\text{Ln}\alpha_2G_{it}+\text{Ln}\alpha_3K_{it}+\text{Ln}\alpha_4X_{it}+\varepsilon_{it} \quad (2)$$

$$\text{Ln}C_{it}=\alpha_0+\text{Ln}\alpha_1P_{it}+\text{Ln}\alpha_2G_{it}+\text{Ln}\alpha_3K_{it}+\text{Ln}\alpha_4X_{it}+\varepsilon_{it} \quad (3)$$

Where  $\text{Ln}N_{it}$ ,  $\text{Ln}B_{it}$ ,  $\text{Ln}C_{it}$  it are three explanatory variables representing the level of rural economic development of the  $i$ th city at the moment  $t$ ,  $\text{Ln}\alpha_1P_{it}$  it is the core explanatory variable representing the level of development of the distribution industry representing the  $i$ th city at the moment  $t$ , and  $\text{Ln}\alpha_2G_{it}$ ,  $\text{Ln}\alpha_3K_{it}$ ,  $\text{Ln}\alpha_4X_{it}$  it are the three control variables representing the level of distribution industry representing the  $i$ th city at the moment  $t$  respectively. represent the level of transportation infrastructure, the level of logistics construction and the level of mechanization of the  $i$ th city at the representative moment  $t$ , and  $\varepsilon_{it}$  is a random disturbance term.

In addition to exploring the above effects, this paper also hypothesizes that the distribution industry improves the level of rural economic development by promoting the development of the e-commerce industry. To test the correctness of the hypothesis, this

paper constructs the following mediation effect model to explore the mediation role of the e-commerce industry:

$$\text{Ln}D_{it}=\beta_0+\text{Ln}\beta_1P_{it}+\text{Ln}\beta_2G_{it}+\text{Ln}\beta_3K_{it}+\text{Ln}\beta_4X_{it}+\varepsilon_{it} \quad (4)$$

$$\text{Ln}N_{it}=\gamma_0+\text{Ln}\gamma_1P_{it}+\text{Ln}\gamma_1D_{it}+\text{Ln}\gamma_2G_{it}+\text{Ln}\beta_3K_{it}+\text{Ln}\beta_4X_{it}+\varepsilon_{it} \quad (5)$$

Based on exploring the promotion effect of the distribution industry on rural economic development, mediating variables are added to study the influence of the distribution industry on the e-commerce industry, and finally, the mediating variables are included in the econometric model to explore the mediating effect of the e-commerce industry.

### 4.3 Data Sources

This paper selects the panel data of 26 provinces in China (except autonomous regions, Hong Kong, Macao and Taiwan) as the research object, the data comes from the relevant data of the China Statistical Yearbook from 2003 to 2022. To eliminate the heteroskedasticity and to ensure the reliability of the empirical results, the data on the level of rural economic development and the circulation industry do logarithmic processing.

## 5 Empirical Research

### 5.1 Baseline Regression Analysis

Firstly, the impact of the circulation industry on rural economic development is tested and the results are shown. As can be seen from **Table 1**. Baseline regression analysis, regardless of whether to add control variables, the circulation industry on the level of rural economic development of various indicators plays a significant positive impact, after adding control variables, the level of development of the circulation industry to increase the level of rural economic development of each unit, respectively, 0.808, 0.534, 0.837 units, while the results are significant at the 1% level, in addition to the level of logistics construction as a whole. passed the test of significance at the 5% level, although the results of the level of transportation construction and mechanization level are less significant, but also have a positive impact on the development of the rural economy, this empirical result shows that the research hypothesis I is valid. The regression results show that with the continuous development of the circulation industry, the construction of the rural circulation system is constantly improved, which enhances the efficiency of the circulation of agricultural products, but also eases the pressure of rural employment and promotes the urbanization of the countryside, the regression results fully indicate that the development of the circulation industry plays an important role in promoting the development of the rural economy.

**Table 1.** Baseline regression analysis

	(1) lnN	(2) lnB	(3) lnC
lnP	0.808*** (0.019)	0.534*** (0.019)	0.837*** (0.012)
lnK	0.116*** (0.038)	0.095** (0.038)	0.079*** (0.025)
lnG	0.012 (0.041)	0.051 (0.041)	0.131*** (0.027)
lnX	0.018 (0.036)	0.447*** (0.036)	0.011 (0.024)
_cons	0.634 (0.498)	-2.281*** (0.495)	1.073*** (0.328)
N	520.000	520.000	520.000
r2	0.940	0.912	0.977
r2 a	0.937	0.907	0.976

Standard errors in parentheses

\*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

Note: \*, \*\*, \*\*\* indicate significant at the 10 per cent, 5 per cent and 1 per cent levels, respectively.

## 5.2 Robustness Tests

After lagging the explanatory variables by one and two periods in this paper, the results are shown in **Table 2**. Robustness test, and the size of their impact coefficients do not differ much and are still significant at the 1% level, which indicates that the results of the impact of the distribution industry on the level of rural economic development are robust and reliable.

**Table 2.** Robustness test

	(1) lnN	(2) lnN	(3) lnN
lnP	0.808*** (0.019)		
L.lnP		0.785*** (0.016)	
L2.lnP			0.742*** (0.013)
lnG	0.012 (0.041)	0.003 (0.039)	0.053 (0.041)
lnK	0.116*** (0.038)	0.056* (0.034)	0.019 (0.030)
lnX	0.018 (0.036)	0.019 (0.033)	0.040 (0.031)

_cons	0.634 (0.498)	1.621*** (0.441)	2.223*** (0.394)
N	520.000	494.000	468.000
r2	0.940	0.950	0.957
r2_a	0.937	0.947	0.954

Standard errors in parentheses

\*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

Note: \*, \*\*, \*\*\* indicate significant at the 10 per cent, 5 per cent and 1 per cent levels, respectively.

### 5.3 Analysis of Intermediary Mechanisms

Under the premise of verifying the hypotheses in **Table 2**. Robustness test, the mediation mechanism is analyzed with the disposable income per capita of rural residents as the indicator of the level of rural economic development. From the results of the second column of **Table 3**. Analysis of intermediation effects, it can be seen that for every unit increase in the level of development of the circulation industry, the level of development of the e-commerce industry increases by 2.730 units and is significant at the level of 1%, and putting e-commerce and the circulation industry together into the econometric model, the results of the third column of Table 2 shows that for every unit increase in the level of development of the distribution industry, the level of development of the rural economy and the level of e-commerce development increase respectively by 0.292 and 0.189 units, while both the circulation industry and e-commerce industry pass the significance test at the 1% level, proving that the e-commerce industry is the mediating variable of the circulation industry to promote the rural economy and that the circulation industry can prosper the rural economy by boosting the development of the e-commerce platform.

**Table 3.** Analysis of intermediation effects

	(1) lnN	(2) lnD	(3) lnN
lnP	0.808*** (0.030)	2.730*** (0.143)	0.292*** (0.070)
lnD			0.189*** (0.026)
control	Yes	Yes	Yes
_cons	0.634 (1.051)	-9.752** (3.868)	2.478*** (0.491)
N	520.000	520.000	520.000
r2	0.940	0.900	0.976

Standard errors in parentheses

\*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

Note: \*, \*\*, \*\*\* indicate significant at the 10 per cent, 5 per cent and 1 per cent levels, respectively.

## 5.4 Heterogeneity Analysis

The results of the heterogeneity analysis in **Table 4**. Analysis of regional heterogeneity show that the promotion of rural economic development by the development of the circulation industry in the central and western regions is close to each other, probably because their regions belong to the regions with faster economic development, and the efficiency of the circulation industry is faster, which in turn has a stronger traction on the development of the rural economy. However, the Northeast region is a less economically developed region with a poorer level of circulation development, which still promotes the development of the rural economy, but its promotion effect is not significant. The circulation industry in the eastern region has a medium level of influence on rural economic development. It can be seen that the influence of circulation industry development on rural economic development varies greatly from region to region. At the same time, the policy document "Guiding Opinions on Relying on the Golden Waterway to Promote the Development of the Yangtze River Economic Belt" officially released by the State Council in 2014, which clarified the regional scope of the Yangtze River Economic Belt, so this paper divides the 26 provinces according to the coverage of the Yangtze River Economic Belt and carries out the test of heterogeneity, and the results of **Table 5**. Analysis of heterogeneity in regional economic levels show clearly that the provinces located in the Yangtze River Economic Belt have a stronger driving effect on the development of the rural economy. The driving role of the provinces located in the Yangtze River Economic Belt is stronger.

**Table 4.** Analysis of regional heterogeneity

	(1) Northwest	(2) West	(3) East	(4) Middle
lnP	0.434 (0.273)	0.792*** (0.062)	0.814*** (0.063)	0.828*** (0.043)
control	Yes	Yes	Yes	Yes
_cons	-5.287 (5.898)	-0.409 (2.413)	1.791* (0.797)	6.320 (5.087)
N	60.000	200.000	140.000	120.000
r2	0.891	0.961	0.978	0.985

Standard errors in parentheses

\*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

Note: \*, \*\*, \*\*\* indicate significant at the 10 per cent, 5 per cent and 1 per cent levels, respectively.

**Table 5.** Analysis of heterogeneity in regional economic levels

	(1) Yangtze River Economic Belt	(2) Non-Yangtze River Economic Belt
lnP	0.894*** (0.041)	0.544*** (0.069)
control	Yes	Yes
_cons	0.763 (1.385)	-1.292 (2.045)



N	20.000	20.000
r2	0.995	0.995

Standard errors in parentheses

\*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

Note: \*, \*\*, \*\*\* indicate significant at the 10 per cent, 5 per cent and 1 per cent levels, respectively.

## 6 Conclusions and Recommendations for Countermeasures

### 6.1 Conclusion

In the context of helping to revitalize the countryside, the problems of agriculture, rural areas and farmers are becoming increasingly complex and severe, and circulation is an important link in the production and consumption of the rural market, which is of great significance to the stable development of China's rural economy. Therefore, based on reading a large amount of literature, this paper combs through the theoretical foundations of rural economic development and the development of the circulation industry empirically researches the link between the circulation industry and rural economic development by constructing the benchmark regression model and the mediation effect model and carries out the test of heterogeneity to conclude that the promotion effect of the circulation industry has obvious differences between different areas and different levels of regional economic development. The results show that: first, the circulation industry has a positive and significant impact on rural economic development, and this result remains true after the robustness test of replacing the core explanatory variables. Second, the establishment of an e-commerce platform is the mechanism of action of the circulation industry to promote rural economic development. Third, for relatively economically developed regions, the circulation industry has a greater degree of influence on rural economic development.

### 6.2 Recommendations for countermeasures

Based on the above conclusions, it is necessary to adjust the structure of the rural industry and to promote the good development of the rural circulation industry and the rural industrial structure associated with it. Only by improving the rural circulation system and promoting the diversified management mode of the rural circulation industry can we make full use of the market resources of the circulation industry, so that the circulation industry can effectively promote the optimization and development of the established structure of the rural industry and contribute to the development of the rural economy. Strengthen the construction of road transport infrastructure, and vigorously develop modern rural logistics. China needs to develop road construction in rural areas, and the construction of transport facilities will increase the speed of distribution of agricultural products within and between regions.

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