

## The Impact of Rural Industrial Integration on Rural Revitalization — Based on the Ten Cities in Northeast China

Bohan Ji, Yimin Zheng\* and Xinyu Xu

School of Economics and Management (School of Tourism), Dalian University, Dalian 116622, P. R. China

\*Corresponding author: 2311068927@qq.com

### Introduction

Rural revitalization is China's national strategy aimed at comprehensively upgrading the economic, social, cultural and ecological levels of rural areas and realizing the modernization of agriculture and the overall progress of rural areas. The core elements of the strategy include industrial prosperity, ecological livability, civilized rural customs, effective governance and affluent living, and the full implementation of the responsibility system for rural revitalization to ensure the effective implementation of the rural revitalization strategy. Meanwhile, industrial prosperity is one of the focuses of rural revitalization, and to achieve industrial prosperity, industrial integration must be promoted in a coordinated manner. Although there are differences in the understanding of industrial integration among different scholars or institutions, there are many common points in these understandings, that is, industrial integration has now become a new economic development phenomenon, which has an important impact on the development of China's rural economy and the optimization of the rural industrial structure. With the in-depth promotion of the rural revitalization strategy, the demand for the integration of the three industries in rural China has deepened, and the integrated development of rural industries has become the key to the construction of China's modern rural industrial system and the high-quality development of rural areas. Promote the high-quality development of rural industries, broaden the channels for farmers to increase their income and become rich, and solidly promote the construction of livable, workable and beautiful countryside. In summary, in order to promote the process of rural revitalization more efficiently and further explore whether rural industrial integration will have a positive promotion effect on rural revitalization, this paper uses the entropy weight method TOPSIS model to calculate the comprehensive evaluation value of the entropy value method for the Northeast Rural Revitalization and Rural Industrial Integration, analyzes the data from multiple perspectives, and uses OLS regression model using SPSS software to conduct linear regression analysis of the Northeast Rural Revitalization and Rural Industrial Integration to verify the moderating effect of the two.

### Research Questions

Industrial prosperity is one of the focuses of rural revitalization. To achieve the prosperity of the industry, it is necessary to coordinate the integration of the industry. The development of multi-type integration format has an important impact on the development of our country's rural economy and the optimization of the rural industrial structure, and accelerates the pace of rural revitalization. Emphasizing the value-added indicator of industrial integration, it can also reflect the laws of modern economic development in my country. It is also inherited. It is also a work orientation for promoting rural revitalization in various places. Therefore, in the process of promoting rural revitalization, we need to focus on improving the level of integration of rural industries and coordinate the development of the two. In summary, the following studies are made: the development of rural industrial integration and promoting the revitalization of the Northeast rural areas.

### Mathematical Formulas

This article considers the establishment of a TOPSIS model based on the entropy value method based on the indicator system, which evaluates our country's rural industrial integration and the revitalization of the Northeast rural village. The empirical part uses the OLS model to verify the relationship between the two.

$$e_j = -k \sum_{i=1}^n \left( \frac{r_{ij}}{\sum_{i=1}^n r_{ij}} \right) \ln \left( \frac{r_{ij}}{\sum_{i=1}^n r_{ij}} \right) \quad (1)$$

$$I = \sum_{j=1}^m \frac{x_{ij} - \min\{x_{ij}\}}{\max\{x_{ij}\} - \min\{x_{ij}\}} \frac{(1 - e_j)}{\sum_{j=1}^m (1 - e_j)} \quad (2)$$

$$y_i = \beta_0 + \sum_{k=1}^p \beta_k x_k + \sum_{j=1}^p \beta_j x_k + \varepsilon_{k,j} \quad (3)$$

(1) and (2) are the TOPSIS formulas of entropy method. After the dimensionless treatment of the data, the weighted proportion of each index is calculated and the comprehensive score is calculated according to the difference coefficient. (3) is the regression OLS model.

### Methodologies

- 1) Entropy value method TOPSIS model
- 2) OLS regression model

## Tables

Table 1. Indicators of rural revitalization index system and rural industrial integration system index

	Level 1 indicators	Secondary indicators	Indicator attributes
The index system for rural revitalization	Industry prosperity	Agricultural labor productivity (%)	+
		Agricultural development degree (%)	+
	Economy adequacy	Poverty in rural areas (thousands of people)	-
		Income level of rural residents (yuan)	+
	Ecological condition	Rural greening degree (%)	+
		Garbage disposal (Annual / ten thousand tons)	+
Rural industrial integration system index	Rural economic change	New employment population (thousands of people)	+
		Registered unemployment rate (%)	+
	Agricultural function change	Use of fertilizer (Ten thousand tons)	-
		Farm machinery production (Ten thousand kilowatts)	+
	Reform of agricultural production quality	Annual grain planting area (Ten thousand hectares)	+
		Total annual grain output (Ten thousand tons)	+

The explained variables are rejuvenation in the Northeast countryside, and the coverage of the revitalization of the Northeast rural village is widely measured by a single indicator. This article constructs the first-level indicator of the industrial prosperity, the wealthy life, and the ecological environment, and the northeast rural revitalization evaluation indicator system with six second-level indicators; the explanation variable is the integration of rural industries, this article is from rural economic changes, agricultural multifunctional changes, and agricultural product quality changes. Starting in 3 aspects, a relevant indicator system for the integration of rural industries is constructed.

## Figures

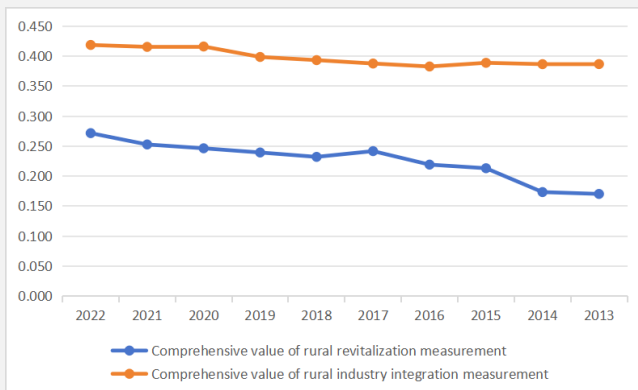


Figure 1.

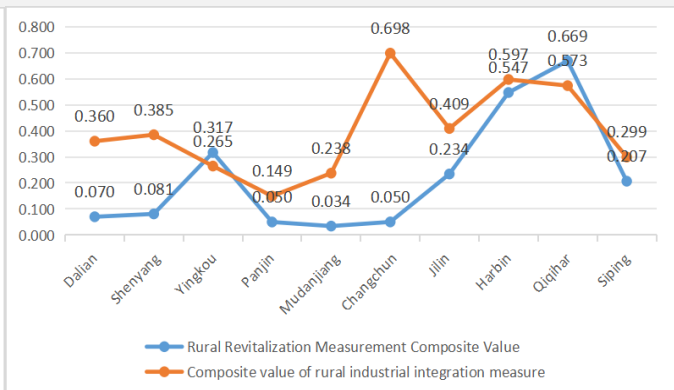


Figure 2.

Figure 1 is the graph of the comprehensive value of rural industrial integration and rural revitalization in all years in Northeast China and Figure 2 is the graph of the comprehensive value of rural industrial integration and rural revitalization in all cities in Northeast China.

## Conclusion

The integration of rural industries in the Northeast region has a significant impact on rural revitalization. In recent years, the degree of rural rejuvenation in the Northeast region and the level of rural industrial integration have been steadily rising. The rural industry integration comprehensive index curve of the northeast region is above the rural rejuvenation comprehensive index curve, but the fluctuations in the ten years are less than the rural revitalization curve.