

# Differential Analysis of the Efficiency of Fixed Assets Investment in the Primary Industry in Ningxia Province

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**Abstract.** This paper selects data from 18 counties in Ningxia province from 2003 to 2017, and uses the incremental capital-output ratio to measure the efficiency of fixed asset investment in the primary industry. Then we analyze the differences between poor and non-poor counties from the time and cross-section. The results show that from 2003 to 2017, the efficiency of fixed asset investment in the primary industry in Ningxia was significantly different between poor and non-poor counties, and poor counties was lower than non-poor counties. Therefore, there is great potential for improving the efficiency of fixed asset investment in the primary industries of poor counties.

**Keywords:** Fixed Asset Investment in the Primary Industry; Investment Efficiency; ICOR.

## 1. Introduction

Increasing the income of the primary industry and improving the efficiency of the primary industry are important measures to increase the comprehensive production capacity of the primary industry and maintain the coordinated and stable development of the primary industry. And it is the main driving force for the economic growth of the primary industry. The input of the primary industry includes capital, labor, technology, and management level. The investment of the primary industry includes fixed asset investment, and fixed asset investment is important material basis to change the production conditions of the primary industry, improve the comprehensive production capacity, and achieve stable development of the primary industry. Ningxia's natural resource endowment is poor. Drought and sandstorms often occur in Ningxia. And the level of modernization of the primary industry is low, and the cultural level of workers is also low. Therefore, the development of the primary industry requires a large amount of fixed asset investment centered on water conservancy construction. In particular, how to improve the efficiency of fixed asset investment in the primary industry has become a problem that must be solved in the development of the primary industry in Ningxia.

## 2. Literature Review

In foreign studies, investment efficiency is mainly limited to the micro-enterprise level, and the concept of the macro-level has not been widely used, because the fixed asset investment in developed countries is mainly dominated by private individuals, and the scale of government investment is small. At the same time, the government's intervention in private investment is small, and it basically relies on the market to allocate investment. On the contrary, in developing countries, due to imperfect markets and the establishment of a market economic system, not only the scale of government investment is large, but also private investment is vulnerable to government intervention. At the same time, the investment and financing system has a significant impact on the efficiency of fixed asset investment. Government intervention and the investment and financing system have caused a loss in investment efficiency. Radelet and Sachs (1998) studied the investment efficiency of Southeast Asian countries and found that capital deepening, industrial structure upgrade, and infrastructure construction will lead to a rapid increase in capital-output ratio indicators. The rise in capital-output ratio is not the cause of the financial crisis, nor can we simply take the rise in capital-output ratio as evidence of deterioration in investment efficiency.

Among domestic scholars, Yongjun Zhang (2004) measures the efficiency of fixed asset investment based on the incremental capital output rate, and analyzes in depth the reasons for the

decline in investment efficiency in China. Duo Qin(2002) used a panel data model to calculate and analyze the investment efficiency at the provincial level in China from 1989 to 2000. Ying Zhang(2017) used the incremental capital output rate to conduct an empirical analysis of the three industries' investment efficiency in Hebei Province from 2000 to 2015, combined with supply-side structural reforms, and analyzed the reasons for the low investment efficiency in Hebei Province. Finally, suggestions were given to optimize investment structure and improve economic benefits.

Scholars at home and abroad have done a lot of research on the issue of agricultural investment efficiency from the theoretical and empirical aspects, and provide theoretical basis and methodological guidance for the research of this paper. However, perhaps because of data acquisition difficulties, empirical research on the efficiency of fixed asset investment at the county level is lacking. So far, we have not searched for research on the efficiency of fixed asset investment in Ningxia county. Therefore, this article takes Ningxia's primary industry fixed asset investment efficiency as the research object, and focuses on analyzing the differences between poor and non-poor counties. The ultimate goal is to provide decision support to improve the efficiency of Ningxia's primary industry investment in fixed assets.

### 3. Analysis on the Development Status of Ningxia County Primary Industry

There are 18 counties in Ningxia Province, including 8 poor counties, which are Yanchi County, Tongxin County, Haiyuan County, Xiji County, Longde County, Wuyuan County, Pengyang County, and Yuanzhou District. Ningxia's landforms are complex, with mountains overlapping and basins scattered. Ningxia has the characteristics of transition from flowing landform to wind erosion landform from south to north. The climate of Ningxia is dry, with less precipitation and large evaporation, and the primary industry is greatly affected by natural endowments. Since the reform and opening up, fixed asset investment in the primary industry in Ningxia has continued to grow, and major changes have taken place in the primary industry. In 2000, the total output value of Ningxia's primary industry was 7.8 billion yuan, and in 2017, the total output value of Ningxia's primary industry increased to 51.7 billion yuan, with an average annual increase of 6.3 billion yuan. In addition, the fixed asset investment in Ningxia's primary industry in 2000 was 0.25 billion yuan, and the fixed asset investment in Ningxia's primary industry in 2017 reached 24.7 billion yuan, with an average annual growth of 3.5 billion yuan.

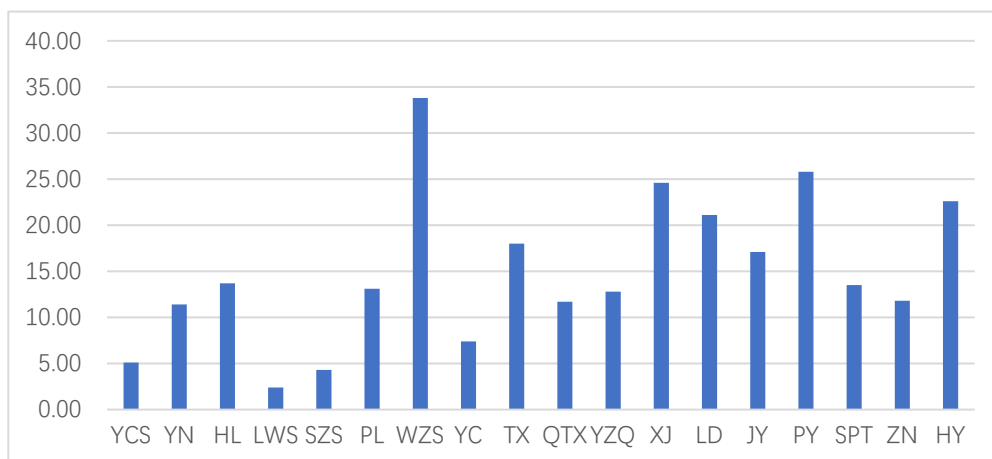


Fig 1. Percentage of gross output value of primary industry in Ningxia counties in 2017 [9]

Figure 1 shows the percentage of the gross output value of the primary industry in each county in Ningxia in 2017. It can be seen from the figure that the proportion of primary industries in Wuzhong City is the highest, at 33.8%. In Tongxin County, Xiji County, Longde County, Wuyuan County, Pengyang County, Haiyuan County, the gross output value of the primary industry accounted for more than 15% of the regional GDP. Improving the efficiency of fixed assets investment in the

primary industry has important practical significance for the economic growth of the primary industry in Ningxia.

#### 4. Efficiency Analysis of Fixed Assets Investment in the Primary Industry

The efficiency of fixed asset investment in the primary industry can be measured using the incremental capital-output ratio (ICOR). Incremental capital-output ratio (ICOR) refers to the incremental capital required to increase total unit output. The calculation formula is shown in equation (1).

$$ICOR = \frac{DK}{DY} \tag{1}$$

In formula (1), K represents the capital stock, DK represents the capital increase, Y represents the annual total output, and DY represents the total output increase.

If the capital stock of the primary industry investment is used to represent the capital stock, and the annual gross output is represented by the GDP, then ICOR is the efficiency of the primary industry investment in fixed assets. If the ICOR value rises, it means that the amount of investment required to increase the unit's total output gradually increases, which means that the efficiency of investment in fixed assets in the primary industry has decreased.

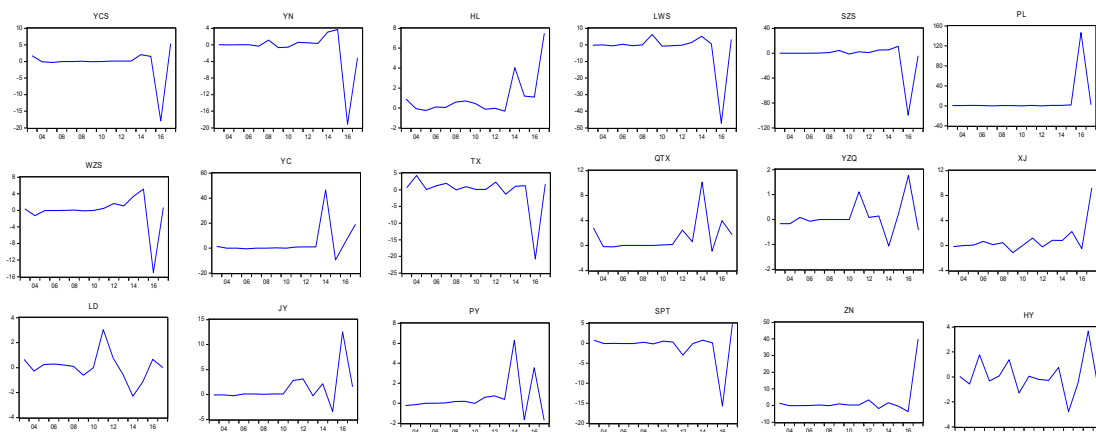


Fig 2. ICOR trends in Ningxia's counties from 2003 to 2017 [9]

Figure 2 shows the change trend of ICOR in 18 counties in Ningxia from 2003 to 2017. As can be seen from Figure 2, Yongning County, Lingwu City, Yinchuan City District, Shizuishan City District, Wuzhong City District, Shapotou District, and Tongxin County have the same trend in the efficiency of fixed asset investment in the primary industry. From 2003 to 2015, ICOR fluctuated near 0, and the efficiency of fixed asset investment in the primary industry was relatively stable. The ICOR value fell sharply in 2016, indicating that the efficiency of fixed asset investment in the primary industry has increased significantly, and the ICOR value rose sharply in 2017, indicating that the efficiency of investment in fixed assets in the primary industry has fallen sharply. ICOR in Yuanzhou District, Longde County, Wuyuan County, Pengyang County, Haiyuan County, Helan County and Qingtongxia City fluctuated greatly, and the efficiency of investment in fixed assets in the primary industry fluctuated greatly. In Xiji and Zhongning counties, the efficiency of fixed asset investment in the primary industry decreased significantly in 2017. Pingluo County's primary industry fixed asset investment efficiency declined in 2016 and primary industry fixed asset investment efficiency increased in 2017. The efficiency of fixed asset investment in the primary industry fluctuated greatly from 2014 to 2017 in Yanchi County. In summary, the efficiency of investment in fixed assets in the primary industry in poor counties in Ningxia fluctuated greatly and the investment efficiency was low.

## 5. Conclusion and Suggestion

The efficiency of fixed asset investment in primary industries in Ningxia poor counties is lower than that in non-poor counties. This is because the economic growth of primary industries brought by fixed asset investment in primary industries is not sustainable. Increasing the investment in fixed assets of the first industry will cause a bottleneck in the economic growth of the first industry. Therefore, it is necessary to optimize the allocation structure of fixed assets investment, promote industrial upgrading, and improve the efficiency of fixed asset investment.

In recent years, the Ningxia government has taken the issue of poverty as its primary task, greatly reduced the number of poor people, and vigorously developed special industries. The technological level of agriculture, forestry, animal husbandry, and fishery industries has been improved, and water conservancy infrastructure has been effectively improved. However, the primary industries in poor counties still face greater challenges. The primary industry is small in scale and the level of industrialized operation is not high. Based on the above conclusions, the following suggestions are made: Ningxia needs to actively develop local characteristic industries based on local resource endowments, industrial foundations, and the willingness of the poor to grow and raise. Actively develop primary processing of agricultural products in the place of origin of agricultural products, improve the comprehensive utilization level of agricultural by-products, extend the industrial chain, and form a pattern of processing to guide production. Develop agricultural multi-functions, promote the integration of characteristic industries with industries such as culture, education, and health care, and broaden the income channels for poor households.

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- [8]. YCS, YN, HL, LWS, SZS, PL, WZS, YC, TX, QTX, YZQ, XJ, LD, JY, PY, SPT, ZN, HY represent Yinchuan District, Yongning County, Helan County, Wonju District, respectively, Xiji County, Longde County, Wuyuan County, Pengyang County, Haiyuan County, Yanchi County, Tongxin County, Pingluo County, Zhongning County, Lingwu City, Qingtongxia City, Shizuishan District, Wuzhong District, Shapotou District. Data source: Ningxia Statistical Yearbook 2004-2018.