EMPIRICAL ANALYSIS ON RESOURCE CURSE COEFFICIENT OF CHINESE WESTERN AREAS

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ARTICLE DETAILS

Article History:

Received 02 october 2017
 Accepted 06 october 2017
 Available online 11 october 2017

Keywords:

resource curse coefficient;
 investment level; human capital;
 R&D investment

ABSTRACT

The transmission channel of the resource curse has been studied by numerous Chinese and international scholars. The resource curse influences different areas at different degrees. This paper examines the seriousness of resource curse in different provinces on basis of the resource curse coefficient. The empirical outcome reveals Chinese western areas are major suffers of serious resource curse. Then, this paper studies relationships between resource curse coefficient and investment level, human capital, R&D investment, marketization level, as well as opening level. On the whole, Rapid development of western mining industries generates crowding-out effect on investment, human capital, R&D investment, marketization, and foreign trade. Investment growth and economic development of western areas can relieve resource curse to a large extent. However, economic growth on basis of infrastructure investment can't sustained. In a long run, technical progress and human capital increase are key factors of sustainable development of western areas. This help us come up with theoretical guidance and suggestions for countering resource curse.

1. INTRODUCTION

In order to describe the degree of resource curse in different areas, this paper draw experience from literature research achievements of Yao Yulong¹ and other people and define the degree of resource curse in different areas on basis of improved resource curse coefficient. According to the definition, resource curse coefficient serves as an indicator for us to evaluate inconsistency between economic development and resource advantages in an area. It could reflect the degree of local recourse curse. Higher value of the resource curse indicates higher intensity of that. As to original application of the resource curse coefficient, this paper could evaluate the degree of local resource curse according to local resource reserves and the contribution of resource to local economic growth.

Chinese researches about resource curse mainly target at energy resources (including coal, oil, natural gas and other unrennewable energy). Therefore, resource curse in China mainly refer to curse of the energy resources. Current researches illustrate the primary industry and the tertiary industry are negatively correlated in Chinese energy consumption structure in terms of their added value. As to the secondary industry, its industrial added value is positively correlated to its energy consumption. In addition, the secondary industry remains a major consumer of energy resources. Hence, resource curse coefficient put forward in this paper refers to the proportion of local energy reserves to the industrial added value. Just as mentioned above, this paper evaluates resource reserves of an area on basis of unrennewable energy production capacity. Based on previous research achievements, this paper further improves the resource curse coefficient, evaluating the resource curse coefficient on basis of the proportion of local energy reserves to the local industrial percentage in national industries.

Therefore, resource curse coefficient of energy refers to the proportion of the percentage of local unrennewable energy production capacity in that of the whole nation to the percentage of local industrial added value in that of the country. It can be represented as:

$$\rho = \frac{E_i / \sum_{i=1}^n E_i}{Ind_i / \sum_{i=1}^n Ind_i}$$

Where, ρ stands for resource curse coefficient of energy in area i; E_i represents unrennewable energy production capacity of area i; Ind_i indicates industrial added value of area i. It can be found resource curse coefficient of energy can reflect inconsistency between economic development and resource advantages in an area. If the percentage of local unrennewable energy production capacity in that of the whole area appears larger than the percentage of local industrial added value in that of the whole area, we can infer local resource curse coefficient is bigger than 1. The value illustrates local resource advantages have not been turned into economic strengths because of resource curse. Higher resource curse coefficient indicates more serious resource curse of an area. In case the resource curse coefficient is less than 1, we can infer this area suffers no resource curse.

2. Empirical Analysis

This paper uses data of various provinces to calculate the resource curse coefficient of every province over the period from 1991 to 2010 and then determine their average values, so as to work out the average resource curse coefficient of each province around the whole country. Details are shown in the following Table. In addition, this paper determines seriousness of resource curse in an area according to local resource curse coefficient and provides the following definitions:

In case of $\rho \geq 5$, we can infer this area suffers very serious resource curse. Resource advantages of this area have not been turned into economic strengths and natural resources seriously inhabit local economic boom.

In case of $2 \leq \rho < 5$, we can infer this area suffers serious resource curse. Most resource advantages of this area have not been turned into economic strengths and natural resources seriously inhabit local economic boom.

In case of $1 \leq \rho < 2$, we can infer this area is subject average level of resource curse. Part of resource advantages of this area have not been turned into economic strengths and natural resources inhabit local economic boom to some extents.

In case of $\rho < 1$, we can infer this area is subject to none of resource curse.

Table 1, Average Resource Curse Coefficients of Provinces around the Country During 1991-2010

No.	Province	Resource Curse Coefficient	Seriousness
1	Shanxi	9.41	Very Serious
2	Guizhou	3.97	Serious
3	Inner Mongolia	3.96	Serious
4	Ningxia	3.93	Serious
5	Xinjiang	3.77	Serious
6	Qinghai	2.85	Serious
7	Shaanxi	2.65	Serious
8	Heilongjiang	2.31	Serious
9	Gansu	1.82	Average
10	Yunnan	1.67	Average
11	Henan	1.18	Average
12	Sichuan	1.08	Average
13	Anhui	1.02	Average
14	Jilin	0.92	None
15	Hunan	0.80	None
16	Liaoning	0.80	None
17	Shandong	0.79	None
18	Hebei	0.75	None
19	Jiangxi	0.62	None
20	Tianjin	0.49	None
21	Hubei	0.43	None
22	Guangxi	0.39	None
23	Fujian	0.32	None
24	Beijing	0.21	None
25	Guangdong	0.20	None
26	Hainan	0.18	None
27	Jiangsu	0.13	None
28	Zhejiang	0.06	None
29	Shanghai	0.01	None

3. Analysis about the Reason

Figure 1 shows Chinese resource curse mainly influences western areas. Therefore, this paper carries out in-depth research about western areas. By studying the relationship between resource curse and investment level, human capital, R&D investment, marketization, as well as opening degree, this paper sums up resource curse coefficients of every year of ten provinces in western areas as the total number of resource curse coefficient, so as to study its relationship with every variable.

(1) As shown in Figure 1, resource curse seriousness and material capital investment are positively correlated before Western Development. Increasing investment often leads to serious resource curse, because local economic growth mainly relies on the energy industry before Western Development. Investment of fixed assets crowds into the mining industry, which intensifies the seriousness of resource curse. Although material capital investment increases year by year after Western Development, the seriousness of resource curse gets further intensified. Local government changed its investment targets after Western Development. This weakens the influence of investment on resource curse. In recent ten years, western investment mainly targets at the manufacturing industry and real estate industry. Investment in these two areas occupies more than 40% of the total investment. The mining industry only takes up 6.8% of total investment. It can be found the investment alleviates western resource curse to a large extent. In order to eliminate western resource curse, the central government must give full play to its strong regulation ability. It is suggested to eliminate drawbacks of the market mechanism. However, we should conduct more researches about the influence of investment sustainability on economic growth.

Fig. 1, Line Chart of Western Material Capital Investment and Resource Curse Coefficients

Data Source: Statistical Yearbook of China 1991-2010

(2) Figure 2 reveals western areas sustain a stable increase in human capital due to slow growth rate before 1999. Economic growth of western areas mainly relies on the mining industry. Therefore, resource curse generates significant crowding-out effect on human capital. Local government improves its investment in education after Western Development, which greatly increases human capital of western areas. In addition, the mining industry in western areas also witnesses a remarkable growth. On the whole, the influence of resource curse on human capital has been weakened.

Fig. 2, Relationship between Increase of Western Human Capital and Local Resource Curse Coefficients

Data Source: Statistical Yearbook of China 1991-2010 and Statistical Yearbook of Chinese Education 1991-2010

(3) R&D investment and resource curse is negatively correlated before Western Development. In other words, resource curse of western areas generates crowding-out effect on R&D investment. Figure 3 demonstrates R&D investment takes up a smaller and smaller percentage in GDP before Western Development. However, resource curse remains on a rise in terms of its seriousness, which illustrates remarkable development of the mining industry generates strong crowding-out effect on R&D investment. Local government improves R&D investment after Western Development, so the investment in research and development witnesses a stable increase. However, resource curse gets enhanced to some degrees. The crowding-out effect of resource curse on R&D investment has been enlarged. Therefore, government should continue strengthening its investment in R&D, so as to weaken the crowding-out effect of resource curse on science and research.

Fig. 3, R&D of Western Areas and Seriousness of Resource Curse

Data Source: Statistical Yearbook of China 1991-2010 and Statistical

Yearbook of Chinese Science and Technology 1991-2010

(4) In an overall view, marketization (the proportion of investment in non-state-owned fixed assets to investment in social fixed assets) and resource curse are positively correlated. Figure 4 shows the marketization of western areas remains at a poor level before Western Development, but resource curse is closely correlated to marketization. The marketization level has been elevated and resource curse has been weakened after Western Development. With accelerated marketization, non-public economic sectors can weaken resource curse to some extents, so it is an effective approach for us to eliminate resource curse of western areas.

Fig. 4, Western Marketization Level and Seriousness of Resource Curse

Data Source: Statistical Yearbook of China 1991-2010

(5) Figure 5 shows increasing seriousness of resource curse before 1991 intensifies the crowding-out effect on foreign trade. With progress of Western Development, foreign trade witnesses a remarkable growth. Local resource curse has been weakened to some degrees, which illustrates vigorous development of foreign trade can effectively eliminate resource curse. In order to reduce the influence of resource curse on western areas, we must push forward local foreign trade.

Fig. 5 Opening Extensiveness of Western Areas and Seriousness of Resource Curse

Data Source: Statistical Yearbook of China 1991-2010

4. Conclusion

Through above empirical analysis, this paper illustrates the crowding out-effect of remarkable development of western mining industry on human capital, R&D investment, marketization and foreign trade. At the same time, investment increase of western development greatly weakens resource curse effect. However, such economic growth on basis of infrastructure investment can't be sustained. For a long term, technical progress and increase of human capital are key factors for sustainable development of western areas. They help us put forward theoretical guidance and suggestions for countering resource curse.

References

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