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Natural resource abundance, natural resource-oriented industry dependence, and economic growth: Evidence from the provincial level in China

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ABSTRACT

The “natural resource curse” thesis states that having an abundant natural resource is not a favorable condition but is rather a limitation on economic growth. This study, which distinguishes the difference between natural resource abundance and natural resource-oriented industry dependence, proposes relevant hypotheses and conducts empirical tests using panel data at the provincial level in China. The research findings are as follows: first, an abundant natural resource is a favorable basis for economic growth. Second, the “natural resource curse” refers to a situation in which a region’s economic development is overly dependent on its natural resource-oriented industries, which leads to negative effects on both medium and long-term economic growth. Third, natural resource-oriented industry dependence indirectly inhibits economic growth through three transmission mechanisms: the crowding-out effect by inhibiting human capital, technology innovation and foreign investment; the Dutch disease effect, which cripples the development of manufacturing; and the institution weakening effect, reflected by the increase in government intervention. This study has further enriched our understanding of the “natural resource curse” thesis.

1. Introduction

In 1993, [Auty \(1993\)](#) introduced the thesis of the “natural resource curse”. According to this thesis, having an abundant natural resource is not a favorable condition for all countries; in some, it can limit their long-term economic growth. As [Frankel \(2010\)](#) points out, “It is striking how often countries with or other natural resource wealth have failed to grow rapidly than those without”. Subsequently, [Sachs and Warner \(1995, 2001\)](#), [Gylfason \(2001\)](#); [Wright and Czelusta \(2004\)](#); [Gylfason and Zoega \(2006\)](#); [Papyrakis and Gerlagh \(2004, 2006, 2007\)](#), [Carmignani \(2013\)](#); [Farhadi et al., 2015](#); [Zuo and Schieffer \(2014\)](#), and [Badeeb et al. \(2016\)](#) proved this thesis in empirical studies.

Although a large volume of literature has proven the negative correlation between natural resource abundance and economic growth, it is not absolute ([Rosser, 1999](#)). [Arin and Braunfels \(2018\)](#) showed that the effects of oil rents on growth are mixed, and they did not find empirical evidence for the existence of a “natural resource curse”. There is no innate aspect of natural resource abundance that makes it the

reason for a country’s low or unsustainable growth ([Mikesell, 1997](#)). Natural resource abundance is not an inevitable curse, and it could be a blessing conducive to economic growth ([Aragon and Rud, 2013](#); [Allcott and Keniston, 2014](#)). [Alexeev and Conrad \(2009\)](#) concluded that oil and mineral resources have positive effects on per capita income (with some variables in control). [Boschini and Pettersson \(2007\)](#) believed that the type of resources owned by a country and the quality of its institutions determine, to a large extent, the impact of natural resources on economic growth. Through combing a large number of experimental studies, we find that the impact of natural resources on economic growth is uncertain. The factors that affect long-term economic growth do not seem to be natural resources, but, rather, the quality of management and institutions ([Gylfason, 2001](#)). The existence of a “natural resource curse” is not caused by natural resources but is due to the lack of good governance and democracy. The most interesting aspect of the “natural resource curse” is not the impact of natural resources on negative growth but, rather, the difference in economic and political performance of resource-rich countries ([Mohammed and EEP, 2005](#)). The

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poor performance of resource-rich countries is attributed to policy failure (Lal and Myint, 1996).

Therefore, it can be seen that whether natural resource abundance is a “blessing” or a “curse” on economic growth remains controversial. In fact, countries or regions that suffer from the “natural resource curse” are widespread. However, there are also some examples where natural resource abundance is a blessing instead of a curse. For instance, countries such as Canada, Australia, and Norway have maintained rapid economic growth (Ross, 2001).

China’s economy has entered a new phase of economic development, a new normal, in which the developmental model has changed significantly; namely, economic expansion has changed from high to medium speed (NDRCC, 2016). The growth rate of China’s economy has declined from 14.7% in 2007 to 6.7% in 2015 (NBSC, 2017). This economic downturn has been more prominent in some resource oriented regions. For example, in Shanxi province, with abundant coal resources, the economic growth rate was only 3.1% in 2015. In Heilongjiang province, with rich oil resources, the economic growth rate was 5.7% in 2015 (NBSC, 2017). Moreover, other resource-oriented provinces such as Inner Mongolia and Shaanxi are all facing sharp decreases in their economic growth rates. Thus, China is currently confronting the pressing problem of how to realize sustainable economic growth in these resource-oriented regions.

In summary, further study of the thesis of the “natural resource curse” is necessary to enrich our understanding of this concept and, more important, to test whether it exists at the provincial level in China. Based on the definitions of natural resource abundance and natural resource-oriented industry dependence, this study proposes relevant hypotheses, conducts empirical tests using panel data at the provincial level in China, analyzes the transmission mechanism of the effects of “natural resource curse”, and proposes policy advice to promote sustainable economic growth in resource-oriented regions in China.

2. Proposed hypotheses

The empirical results obtained by using these different indicators to measure natural resource abundance have enriched the thesis of the “natural resource curse” thesis. However, this has also led some scholars to doubt the “natural resource curse” thesis. Stijns (2005) proposed that the proportion of primary product exports to total exports is not a good indicator to measure natural resource abundance. The more exports of primary products do not mean the more abundant natural resources. Brunnschweiler and Bulte (2009) noted that the “natural resource curse” has been measured in most literature by the proportion of natural resource exports to GDP. However, this index is not so much a measurement of natural resource abundance as it is a measurement of natural resource dependence.

Natural resource abundance and natural resource dependence are actually two different concepts. Natural resource abundance refers to how much natural resources a country possesses. In other words, the amounts of natural resource that can be used for social and economic development. The natural resource dependence can also be called natural resource-oriented industry dependence, which refers to the degree of dependence of a country or region economy on natural resources industries (Arezki and van der Ploeg, 2011). This dependence is mainly reflected in the impact of natural resource-based industries on industrial structure, employment structure and technological progress.

After distinguishing the difference between natural resource abundance and natural resource-oriented industry dependence, we review the literatures on the empirical research of “natural resource curse”. We find that most of the empirical studies using natural resource-oriented industry dependence as the independent variable prove the existence of the “natural resource curse”, and the empirical studies using natural resource abundance as the independent variable did not find evidence for the existence of a “natural resource curse”.

For example, Ding and Field (2005) found that natural resources

had a negative impact on economic growth when taking the proportion of natural capital in total productive capital as the index of natural resource abundance, but a positive effect when using the stock of per capita natural resource as the index. Cerny and Filer (2007) proved the existence of a “natural resource curse” based on the results of empirical analysis using the proportion of primary production export, but the curse vanished when per capita primary production export was used for analysis. Therefore, the “natural resource curse” should be such a phenomenon, that is, due to the excessive dependence of natural resource-oriented industries in a region, which leads to a series of negative effects that are not conducive to long-term growth (Sao and Yang, 2010). Based on the above-mentioned analysis, this study proposes the following hypotheses:

Hypothesis 1. Abundant natural resources are beneficial for economic growth.

Natural resource superiority is not always a blessing for economic development, nor is it necessarily a curse. A natural resource is like a double-edged sword. Whether it is beneficial or harmful for economic development depends heavily on the scientific and rational exploration, exploitation, and management of the resources. An abundant natural resource is a favorable basis for economic development. With rational and abstemious exploitation of natural resources and extensive promotion of capital accumulation and innovation activities that take advantage of natural resources at the initial stage, a region’s economic development can enter a virtuous cycle, and the natural resource advantage of the area will be established. From the historical point of view, natural resources played a crucial role in the early development of. Economic historians (North and Thomas, 1973; Pomeranz, 2000) believe that Western European countries achieved rapid development through the trade of natural resource-intensive products and finally came out of the “dark” in the Middle Ages. In the next few hundred years, they completed the transformation from “periphery” to “center”. Barbier (2005) believed that the first reason for the industrial revolution in Britain was that Britain took the lead in both the coal mining industry and the ironmaking industry. Similarly, abundant natural resources are important factors in promoting economic transformation in early Europe and later in the United States, Canada, Australia, and New Zealand. Habakkuk (1962) believes that the industrialization of the United States was based on abundant natural resources and that these abundant natural resources made the United States prosperous in the Nineteenth Century.

Hypothesis 2. Over-dependence on resource-oriented industries will result in the “natural resource curse”.

Many countries and regions with abundant natural resources show unsatisfactory development performance, caused, to a large extent, by the transitional dependence on natural resource-oriented industries. If a region focuses exclusively on utilizing its natural resource advantages, and its economic development is over-dependent on the exploitation and output of its natural resources, as opposed to the accumulation of human resources and the development of technological and institution innovations, then the formation and accumulation of other economic advantages may slow down and hinder the advancement of industrialization. There may be apparent economic growth in these economic entities at the initial stage, but these improvements are always short-lived and unsustainable. They may even be just a flash in the pan, because this early economic growth is likely to be affected by a series of adverse effects resulting from the irrational exploitation of the natural resources. This early economic growth may also take a downturn due to the exhaustion of natural resources, and the region cannot avoid falling into the trap of natural resource superiority. The development of China’s Shanxi and Zhejiang Provinces has proved the negative impact of natural resource-oriented industries on economic growth. Shanxi is a typical resource-dependent, industry-dependent province in China. In 2015, the added value of extractive industries accounted for 51.30% of

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