



Full length article

Resource tax reform and economic structure transition of resource-based economies

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ABSTRACT

As the resource tax will be extended to the occupation of natural ecological space in China, this paper takes Shanxi Province as an example to calculate the ecological footprint and ecological service value of energy consumption; it then constructs a Computable General Equilibrium model of tax on ecological occupation and analyzes the impact of resource tax reform on a resource-based economy from the structure of factor, output, and trade. The results show that the tax scheme has an obvious effect on promoting economic transition under a static situation, but it also has a greater negative impact. In a dynamic scenario, the negative effect is small, but it affects long-term economic growth. In terms of factor structure, ecological footprint steadily declines, while investment growth is rapid. In terms of output structure, the proportion of the secondary industry increases, but the growth rate is slower, and the growth rate of the tertiary industry continues to improve. In terms of trade structure, although the coal mining industry shows increased export, the growth rate is declining, and there is increase in net exports of tertiary industry. Thus, the tax scheme has the effect of promoting the transformation of a resource-based economy. We propose levying a resource tax based on ecological occupation to protect the ecological service function of natural resources, reduce the capital and labor factor tax, and promote the development of non-resource type industry.

1. Preface

A resource-based economy is an industrial model where development heavily depends on the exploitation of energy or mineral resources. In the process of industrialization, exploitation of natural resources would provide raw materials and growth momentum for the national economy, and either a resource-based region or a resource-based city would be formed consequently. The long-term reliance on exploitation of natural resources would result in not only the deterioration of the natural environment but also a distorted industrial structure that would eventually lead to the depletion of natural resources and negative effect on environment. In a post-industrial society, economic growth is increasingly driven by technological innovation and reliance on the improvement of human capital, investment efficiency, and total factor productivity, whereas the growth relying on factor input and exploitation of the natural resources is not sustainable in the long term. Therefore, there is a need to provide solutions to resolve the environmental and economic issues faced by resource-based economy. The transition of a resource-based economy was suggested against this background, and a series of studies were conducted (Fan

et al., 2017a,b; Dong et al., 2018). This strategy attempts to minimize the depletion of natural resources and prevent environmental deterioration through a change in industrial model by achieving a balance between economic growth and environmental protection through a change in growth patterns.

In China, the government has been paying attention to the plight of the resource-based economy and has been trying to enforce transitions. At the city level, 69 resource-exhausted cities have been designated by the State Council since the first case of economic transition in Fuxin city was undertaken as an experimental resource-based city. In 2013, the State Council published the “Sustainable development plan of national resource-based cities (2013–2020)”, and designated 262 resource-based cities nationwide. At the province level, the State Council approved construction of a National Comprehensive Reform Pilot Area for the transition of resource-based economy in Shanxi Province in November 2010. There are 11 resource-based cities in Shanxi Province, and 94 out of 119 towns have coal resources. These towns are facing resource depletion to various degrees due to long-term exploitation of natural resources, thereby making Shanxi Province the representative case of a resource-based economy and the first province-wide National

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Comprehensive Reform Pilot Area. With the advancement of ecological civilization construction, institutional arrangements are urgently needed to promote the transition of resource-based regions through green development to balance economic growth and environmental protection. The transition path of Shanxi Province can be considered as a case study for the transition of resource-based economy.

Resource tax is the tax on exploitation of natural resources; it is closely related to a resource-based economy that heavily depends on exploitation of natural resources. Reformation of resource tax could play a functional role in adjusting economic growth and realizing the transition. Resource tax was first collected in China in 1984; it was primarily imposed on coal, petroleum, and natural gas mining enterprises. In 1994, the Chinese government conducted a tax reform that extended the scope of the resource tax to include all mineral resources, classifying them into 7 categories of taxation, including minerals and salt. This formed the basic framework of the current resource tax. In recent years, the resource tax has accelerated the reform in terms of the levying method and the scope of levying collection. The ad valorem collection on oil and gas started in Xinjiang Province in June 2010 on a trial basis and has been implemented nationwide since November 2012. The ad valorem collection on coal resource tax has been implemented nationwide since December 2014. In May 2016, the Ministry of Finance and State Administration of Taxation published the Notice on Comprehensively Promoting the Reform of Resources Tax. Together with the Ministry of Water Resources, it began a trial on collecting water resource tax in Hebei Province. The notice also required local governments to create the conditions for resource tax reform and provide tax plans on natural resources such as forests, meadows, and beaches. The implementation and reform of the resource tax helped to realize the paid use of resources, which played a positive role in resource conservation and effective use of energy. For a resource-based economy, a resource tax affects the cost and profit of enterprises exploiting natural resources, and it would also impact regional industrial structure, economic growth, and resources and environment. Empirical analysis on the effect of resource tax reform on a resource-based economy is therefore of great practical significance.

This paper is an empirical study that examines the effect of resource tax reform on the transition of a resource-based economy in a Computable General Equilibrium (CGE) model by using Shanxi Province as an example. This paper makes two innovative contributions. First, we replace the ecological footprint of energy consumption with the demand for land used in carbon fixation, calculate the value of the ecological service provided with the ecological space occupied, and then empirically analyze the effects of resource tax reform on ecological space use in Shanxi Province. Second, we simulate resource tax reform from both static and dynamic perspectives and then analyze the effect of resource tax reform on the transition of a resource-based economy from the perspectives of factor structure, output structure, and trade structure according to the process of economic activity. The rest of this paper is organized as follows: Section II presents a review of the literature on resource-based economies and transitions. Section III calculates the ecological footprint and its values. Section IV lays out a CGE analytical model and describes the data set and the methods used. Section V gives the simulation results. Section VI concludes the findings of the study.

2. Analytical framework of the transition of resource-based economy

The key to the transition of a resource-based economy is the transformation of the economic growth pattern. The well-documented phenomenon of the depletion of natural resources is not only the outstanding issue of a resource-based economy but also the internal cause for a transition. Kronenberg (2004), Alexeev and Conrad (2011), and Song et al. (2018) studied the transition of a resource-based economy based on the depletion of natural resources, and they identified

corruption and neglect of investment in human capital as the primary reasons for this phenomenon. Zhang and Jing (2008) considered investment preference in the early stage as the cause for the formation of a resource-based economy; after the industry of resource exploitation grows to become the dominant industry in an economy, the effects of industrial viscosity, absorption of productive factors, and locking of fixed cost would lead the economy to a pattern of self-reinforcement, which manifests as severe dependence on natural resources. Zhang et al. (2016) confirmed the existence of path-dependence on the level of resource-based cities and suggested that excessive accumulation of technology and institutional arrangements blocked the transformation process of resource-based economies. Wan and Wang (2016) postulated that the source of the depletion of natural resources is path-dependence on the exploitation of natural resources, which represses the accumulation of human capital and technological innovations. Thus, the intention behind the transition of a resource-based economy is for the economy to wean itself off the dependence on natural resources, innovate in growth models, realize momentum conversion in economic growth, and alleviate the negative effects of energy exhaustion through the development of continual and substituted industries.

There are single and multiple indicators in the evaluation of transition. Guo et al (2016) analyzed the effects of technological progress on the transition of Shanxi Province from the structure of energy consumption using a single indicator. (Tan et al., 2016) evaluated the efficiency of transition of resource-based cities in Northeast China from economic, social, and environmental perspectives by using multi-dimensional indicators. Economic structure is the key indicator in evaluating economic transition. Brainerd (1998) and Li (2003) separately examined the wage structure in the economic transition of Russia and China. Keister (1998) and Park et al. (2006) examined corporate organization and ownership structure in Chinese economic transition. Majumdar and Chhibber (1999); Nivorozhkin (2004); Delcours (2007), and Jøeveer (2013) studied the capital structure in transition economies. Bevan and Estrin (2004) studied the foreign investment and trade structure in European transitional economies. Awokuse (2007) studied the import and export structure and market structure in transitional economies. Du and Yang (2014) investigated the structure of the labor market in Chinese economic transition. The present paper is based on economic activities and evaluates economic transition from the process of input, output, and trade through factor structure, output structure, and trade structure.

2.1. Factor structure

Resource-based economy primarily depends on natural resources, and it is led by natural resource-intensive industries. Realizing the transition of the whole economy requires the reduction of natural resource input, increase in the input of labor and capital without pollution, and transformation of the growth momentum of the economy. Investors should reduce their investment in resource-based industries, so that investment flows to non-resource-based industries and benefits their development.

2.2. Output structure

The output share of a resource-based industry in a national economy is usually high because of its dominant position in a resource-based economy. Therefore, to reduce their reliance on resource-based industries, resource-based economies should take steps to reduce the proportion of resource-based industries. In the composition of output, when the proportion of secondary industry decreases, the dominant position of resource-based industry weakens and the proportion of tertiary industry increases; this can make more contribution to the economy and enable its transition.

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