

Analysis on Modelling Method for China Coal Resource Tax Based on Compensation Mechanism

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Abstract. Suitable Modelling Method of coal resource tax in China is valuable and imperative because of huge output of coal in quantity. Through an in-depth analysis of the three main contents of the reform, i.e. changing of tax collection way, setting of tax rate and adjustment of resource tax and fees, it was found that adopting ad valorem collection in place of quantity-based collection can better embody the principles of equity and efficiency, and facilitate the rational establishment of the pricing and taxation adjustment mechanisms for resources products. However, the calculation of tax should be linked to the resources stopping rate to both play the advantages of ad valorem collection and promote the rational mining. At the same time, the tax collection and management and its use must be strengthened so that the revenues can be truly used for resource and environmental protection. Theoretically, only an average tax rate of no less than 5% can basically embody and compensate for resource depletion costs; the adjustment of resource tax and fees is far from being fulfilled. The rent, tax and fees of state-owned resources should be put in their right places separately based on a clarification of each theoretical base to construct a scientific structure, not abolishing fees in a rigid and uniform way. Guided by the goal of promoting sustainable development, the resource tax reform should be continuously deepened, thus to truly transform it from a gains tax in the traditional economic system into an environmental tax in the sustainable economic system.

Key words. modelling method, sustainable development, China coal resource tax, changing of tax collection way, user cost approach.

1. Introduction

According to the principle that Economy decides taxes, and taxes react to the economy, the reform of tax system each time is driven by the economic development without an exception, and in turn affects the further development of the economy. Due to the long-term extensive and denotative economic development, massive resource and environmental debts have been accumulated in China, although China's

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economy has been developing at a high speed. Resource and environmental pressure has been an unbearable burden for economic and social development. In this context, sustainable development is becoming an increasingly general consensus, economic growth mode is becoming more intensive and connotative, and efforts are also being made to explore a sustainable tax system mainly for the sustainable development of the economy. In this process, the resource tax which levies on natural resources, bears the burden of the reform, and is generally associated with high expectations.

Resource tax originated in the West, with the initial function of regulating differential incomes among enterprises under private resource ownership. In many countries, it has been completely transformed to the environmental tax for protecting and improving the environment [1]. In the era of economic globalization, China resource tax reform has been exploring its own developmental path, at the same time also gradually integrating itself into the globalized environmentalism trend. In recent years, the domestic academic circles have launched a heated discussion on the tax policies and resource tax system for sustainable development. X.L.Xu[2], Z.K. Zhang[3] earlier conducted a systematic study on tax policies for sustainable development. Then more discussion focused on establishing a resource tax system to promote the coordinated development of economy, resources and environment. The representative researches are as follows: the researches on the resource depletion cost measurement and resource tax collection level from the teams of R.G Newell[4] and L. Huang[5], the definition and distinguish of resource rents, resource taxes and resource fees by J.R.Shi[6] and X.J.Xiao[7] et al, and the researches on whole reform of resource tax by A Orlov[8] and L. Tang[9] et al. The wide ranges of theoretical researches have promoted the practices of resource tax reform. From the beginning of twenty-first Century, China entered the stage of deepening reform of resource tax, resources tax rates continue to rise till the end of 2014 to be truly pushed into its substantial stage through the Implementation of the Coal Resource Tax Reform. The reform has produced a strong reaction and different opinions. For example, adopting ad valorem collection in place of quantity-based collection can better facilitate the rational establishment of the pricing and taxation adjustment mechanisms for resources products, but the method for calculating tax need to be improved to better promote the rational mining. The resource tax reform has proved to be very effective in increasing the tax revenue, but the motive power to promote the reform by local governments may be to a large extent in private interests and the setting of the local tax rate is still based on financial interests as the primary consideration. In addition, the local tax rate calculation and adjustment of resource tax and fees have yet to be standardized, etc. Based on these, the paper will take China resource tax reform as the main object of study, starting with the evolutionary process of reform, and then focus on its substantive stage, i.e., the ad valorem collection reform of the coal resource tax launched in 2014. Through an in-depth analysis of the three main contents of the reform, i.e. changing of tax collection way, setting of tax rate and adjustment of resource tax and fees, the paper aims to study the reform's positive effects and existing problems, and to explore its future development.

2. Main process of China resource tax reform

With the change of China's economic environment and according to the demand by economic development, the resource tax is going through a process of continuous reform, in which its functional evolution also presents a trend of transition from the initial focus on the regulation of differential incomes to the current emphasis on resource and environmental protection and sustainable development. The resource tax was first levied in 1984, which was only partially imposed on the sale profits from natural gas, petroleum and coal, on sales profit rates above 12%, with the purpose of regulating differential incomes from resource exploitation and promoting rational mining. The first reform was launched in 1994, where the scope of taxation expanded to seven taxable items. For different items, variable tax rates were set to levy based on quantity, thus embodying the taxation principle of general levying and differential regulation. Over the years, this quantity-based collection system of the resource tax has exerted a certain positive effect on adjusting income distribution and promoting rational utilization of resources. However, with increasingly acute resource and environmental problems and increasingly closer attention being paid to the scientific outlook on development in China, this system is trapped in criticism from many aspects: excessively low tax rates, lack of revenue elasticity in the taxation basis, inflexibility of the regulation system, disorder in the relation of resource tax and fees, serious waste of resources, etc.. Along with this criticism the appeal for a reform in this field is higher and higher. In fact, since the beginning of the 21st century, after several increases of the coal resource tax rate, China has begun to deepen the exploration for the resource tax reform. However, due to social and economic stability considerations, as well as the actual situation of tax collection and management, the reform didn't immediately hit its important defect, namely, the way of tax collection. In May of 2010, the icebreaking trial of the ad valorem collection reform of the resource tax on petroleum and natural gas was first launched in Xinjiang. The reform was formally carried out nationwide in 2011, and ushered China into a new era of the resource tax and fees reform. Coal is the principal energy in China, and its pricing mechanism is different from the internationally compatible prices of petroleum and the uniform pricing of natural gas, so the coal resource tax reform will certainly exert a more significant effect on the prices of resources. On that account, it is very important to select a better opportunity for such a reform. Since 2012, impacted by comprehensive factors of the slowing growth of the macro economy, excess capacity of coal, downturn of the global economy and continuous increase of coal import, coupled with the constant regulation of China's energy structure, the coal market began to witness continued weakness, and the coal price remained low, thus creating an optimal opportunity for the coal resource tax reform. The effect of the ad valorem collection reform of the coal resource tax at that moment was basically limited to the coal industry. It was not easy for coal enterprises to transfer their cost to downstream industries through raising the price, and the adverse impact of the reform was relatively controllable. On October 9 of 2014, the Ministry of Finance and State Administration of Taxation jointly announced the Notice on the Implementation of the Coal Resource Tax Reform, and decided to

launch the ad valorem collection reform of the coal resource tax nationwide starting December 1. According to the Notice, the range of tax rate was 2%-10%, and the specific tax rates would be determined by provincial governments within the specified range. At the same time, related fees and funds would be abolished as well. So far, the deepened resource tax reform of China, first launched in the beginning of the 21th century, has truly entered its substantial stage.

significance of this reform for China's social and economic development. As both a key link to the deepened resource tax reform and an important breakthrough in the recent financial and tax system reform, this reform aims to rationalize the relation between the coal resource tax and fees in China, perfect the pricing mechanism of resource products, promote the rational utilization of resources and accelerate the transformation of the economic development mode. It also constitutes an important step in the further perfection of the tax and fees system and paid use system of mineral resources (see the main steps in China's resource tax reform in Table 1).

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Table 1. Main steps in China's reform of the resource tax.

Date	Object of taxation	Standard of taxation	Aim of taxation
1984	Natural gas, petroleum and coal	Accumulative taxation on the part of the sales profits above 12% in sales profit rate	Regulation of the differential incomes of mining
1994	Crude oil, natural gas, coal, other non-metallic raw ores, ferrous metallic raw ores, non-ferrous metallic raw ores and salts	Fixed amount tax and quantity-based collection (several increases in the coal resource tax rate happened after the beginning of the 21th century, i.e., the tax rate on coking coal 8 Yuan/t, and steam coal 2-4 Yuan/t)	General levying and differential regulation
November, 2011	Crude oil and natural gas	Fixed-rate ad valorem collection, with a tax rate of 5%-10% of sales amounts	Differential regulation and promotion of rational mining
December, 2014	Coal	Fixed-rate ad valorem collection, with a tax rate of 2%-10% of sales amounts; abolishment of related fees and funds at the same time	To rationalize the relation of the resource tax and fees, perfect the pricing mechanism of resource products, promote rational utilization of resources and accelerate the transformation of the economic development mode

3. Analysis of the ad valorem collection reform of coal resource tax

Several months have passed since the ad valorem collection reform of coal resource tax was first launched. How about the practical effects of the reform? To what extent has the original intention of the reform been realized? Are there any questions worth reflecting on the reform? In the following section, we will conduct an in-depth analysis of the three main contents of the reform, namely, changing of tax collection way, setting of tax rate and adjustment of resource tax and fees, comprehensively analyse its positive effects and existing problems, and explore its future development.

3.1. Changing of tax collection way

The ad valorem collection of the coal resource tax constitutes the main content of this tax reform. The quantity-based collection of the coal resource tax, originated from the tax system reform in 1994, is still in use today. However, it badly lags behind the development of the current coal market which cannot truthfully reflect the variations of coal prices and goes against the formation of a rational resource price transmission mechanism. It violates the principle of tax equity. In such collection way, the tax revenue is incapable to automatically adjust to economic gains or losses, lacking revenue elasticity, so it also violates the principle of tax efficiency. In addition, it also hinders the rational exploitation of resources and reasonable growth of local financial revenue.

The period of 2002-2011 was regarded as the *Golden Decade* in the history of China's coal industry. Except its abrupt drop caused by the sharp cut-off of domestic demand in 2009, coal price basically presented a continuous uptrend in this period, and the overall market demand remained vigorous. However, under the combined influence of domestic and foreign factors, China's coal market entered its continuous downturn since 2012, and the industry as a whole also entered the period of transformation development. The present paper collected the coal prices(based on considerations regarding the diversity of coal types and quality and the representativeness and availability of data, the coal prices adopted in the following analysis are all the exit prices of blended coal from Qinhuangdao Coal Exchange Centre) and coal resource taxes data in 2002-2013 related to the coal industry from its golden development period to the transformation development period before this tax reform to investigate the relation between the taxation and economy under the quantity-based collection of the coal resource tax, as shown in Figures 1 and 2. (Data source: Financial database of iFeng.com and Tax Statistics Yearbooks of China of previous years.)

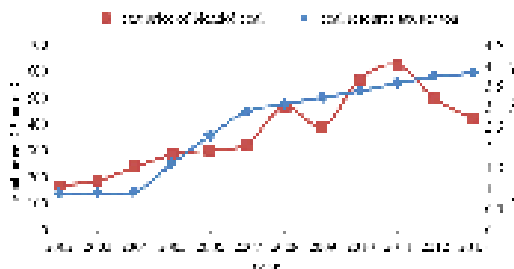


Fig. 1. Correlation between the coal price and coal resource tax.

As can be clearly seen from the trend comparison between the coal price and coal resource tax in Figure 1, for nearly 12 years, except its low point in 2009, the coal price basically presented a continuous uptrend in the *Golden Decade* of 2002-2011. In 2011, the coal price began its continuous fall, but the coal resource tax went up all the way, so there was a lack of correlation between the two. The main reason for this

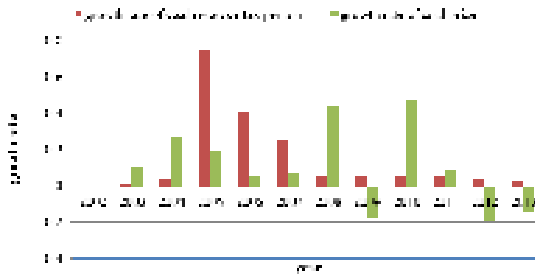


Fig. 2. Comparison on the variation in between coal price and coal resource tax

was that the initial coal resource tax collection adopted a quantity-based form, and tax would increase year by year with the increase of coal yield, having no correlation with the variations in the coal price. A further analysis of Figure 2 shows that in 2003, 2004, 2008, 2010 and 2011, the overall growth rate of the coal price was far greater than that of the coal resource tax, and the contrary was true for other years. Besides, we can observe a deviation of the growth directions in 2009, 2012 and 2013. The vast differences between the coal prices and coal resource taxes suggest a lack of changing rules between the two, and once again prove the lack of correlation between the coal resource tax and coal price under the quantity-based collection form. That is, under the quantity-based collection way, the resource tax failed to effectively participate in the resource pricing mechanism or bring into play the leverage of taxation through the price transmission mechanism. As a result, the resource tax lost its elasticity with respect to price fluctuations of resource products and gains and losses of resources economy. Consequently, in the golden decade of high coal prices, the absence of the resource tax regulation shifted a majority of excess profits into the pockets of coal enterprise owners, and further stimulated the damaging mining. Also, the lack of financial funds caused by the absence of tax regulations also significantly weakened resource protection. Under the new ad valorem collection way, the resource tax is associated with the price, which will certainly better facilitate the establishment of rational resource pricing and tax regulation mechanisms, truly embody the equity and efficiency of tax regulations and more effectively promote healthy development of the coal industry.

An in-depth analysis is needed to determine whether the change from the quantity-based collection to ad valorem collection of the coal resource tax can directly promote the rational mining of coal resources. The previous quantity-based collection used the sales quantity of taxable coal (instead of its exploitation quantity or actual output) as the basis for computation of tax, which would drive some coal enterprises to make a manipulation of their output or sales quantity by understating taxable quantities. At the same time, to reduce costs and increase profits, they usually selected rich ores or ores easy to exploit, and abandoned lean ores or those difficult to exploit, which resulted in serious waste of resources. Under the ad valorem collection way, the basis of taxation is the sales volume (unit price×sales quantity) of taxable resources. However, simply changing the basis of taxation from the sales quantity

to sales volume still cannot prevent enterprises from seeking policy loopholes caused by the inconsistency between yields and sales quantities. Besides, given that the ad valorem collection reform has elevated the taxation level, to reduce costs, some enterprises are less willing to invest funds in deep mining, thus aggravating the waste of resources. The effect of changing the tax collection way alone is actually very limited in promoting rational mining. The resources stopping rate is an important index to measure exploitation efficiency of resources. Some scholars suggest that the calculation of the coal resource tax should refer to the calculation of the mineral resource compensation and be linked to the resources stopping rate, that is, the tax can be calculated according to the formula $\text{sales volume} \times \text{resource tax rate} \times \text{ratio of resources stopping rate}$ (where $\text{ratio of resources stopping rate} = \frac{\text{approved resources stopping rate}}{\text{actual resources stopping rate}}$)^[10]. This seems to be a good method that can combine tax policies with the reality of coal mining. According to this method, the higher the stopping rate (i.e., the exploitation and utilization efficiency of resources) of coal enterprises, the less the resource tax they will have to pay, and vice versa. Therefore, this method can not only play the advantages of the ad valorem collection of the resource tax, but also establish a source incentive mechanism, truly promoting economical utilization of resources.

With regard to the effects of the ad valorem collection reform of the coal resource tax on promoting the growth of the local fiscal revenue, we also need to conduct a comprehensive analysis. While yielding incomes, resource exploitation also generates resource depletion and environmental pollution costs besides the normal production costs. Therefore, it is necessary to provide adequate compensation for these internal and external costs while obtaining resource exploitation incomes, to realize sustainable exploitation and utilization of resources. As a local tax, the resource tax is intended to make resource areas share more resources exploitation gains to raise money for resource conservation, renewal and substitution, also for pollution abatement and environmental protection (the latter two depending to a larger extent on the environmental tax). However, the reality is that, the excessively low resource tax revenue in the past failed to satisfactorily embody the cost-benefit principle, and the resource areas did not get adequate compensation funds and had to undertake huge external costs on their own to fall into the resource advantage trap. After launching the ad valorem collection reform of the coal resource tax, the taxation is directly linked to the coal price to increase the local fiscal revenue with no doubt, which is of great importance for alleviating local fiscal difficulties, promoting the protection of local resources and environment, and maintaining inter-regional harmony. According to the statistics of the State Administration of Taxation, in the first two months after the ad valorem taxation reform, the total coal resource tax paid by 25 coal-producing provinces reached 6.589 billion Yuan, with an increase of 4.817 billion Yuan in comparison to that under the quantity-based collection way. Therefore, the tax reform has proved to be very effective in increasing the tax revenue. As a matter of fact, resource-based regional governments have widely placed high hopes on the resource tax for the purpose of solving local fiscal difficulties, and this is why many resource-rich provinces like Gansu, Inner Mongolia and others are willing to promote the coal resource tax reform. However, the high hopes placed on the resource

tax by local governments may be to a large extent in private interests as well, and behind the huge drive there are hidden worries. Driven by the stubborn localism and selfish departmentalism existing in the real world, local governments tend to be short-sighted. They usually treat the resource tax as a fiscal instrument, while neglecting its environmental protection function, and further attempt to achieve local economic development at the cost of resources and environment. We have already paid a heavy price for this eagerness for quick success and instant benefits, so it is very urgent for us to constantly ring the alarm. The ad valorem collection reform of the coal resource tax must be combined with the reform of tax collection and management, and the collection and management and use of resources tax must be strengthened to be truly used for resource and environmental protection. This way, it can really become a part of green taxation reform in China, and be transformed from gains tax of local governments into the environmental tax, to promote resource conservation and inter-generational equity in the context of sustainable development.

3.2. Setting of tax rate

According to this reform, the coal resource tax will adopt a fixed-rate ad valorem collection, with the tax rate of 2%-10% of the taxable coal sales volume. Regarding the specific tax rates to be applied, the provincial fiscal and taxation authorities will present their proposals to provincial governments for a decision to be made within the specified range according to the abolishment of local resource fees, endurable abilities of enterprises, conditions of coal resources, etc.

Seen from the practical implementation view of point, there are relatively significant differences among various provinces in terms of tax rates. For instance, Inner Mongolia, the mainly coal mine province of China, adopts the tax rate of 9%; Shanxi, Ningxia, Shaanxi and Shandong respectively adopt 8%, 6.5%, 6% and 4%; Guangxi and Hunan both adopt 2.5%; Henan, Anhui and nine other provinces adopt the minimum tax rate of 2%. Different policies of adjustment of resource tax and fees constitute an important factor influencing the resource tax rates in various provinces. Seen from the tax rate calculation basis defined by some regions, Shanxi Province has included the previous resource tax, mineral resource compensation, coal price regulation fund and sustainable development fund into the calculation of the coal resource tax rate, Anhui Province has included the previous resource tax, mineral resource compensation and coal price regulation fund into the calculation, Jilin Province and Henan Province have only included the previous resource tax and mineral resource compensation into the calculation, etc. In addition, the differences among various provinces in terms of the fiscal capacities, coal resource conditions and coal enterprise operations are all main factors influencing the formulation of the resource tax rates. For instance, the coal produced in Inner Mongolia has high quality and low mining costs, and the coal enterprises there are mainly central government-owned companies and private enterprises with a relatively weak game power, so the tax rate there is the highest. The fiscal revenue of Shanxi Province relies heavily on the coal industry, and a high tax rate has to be set. The coal industry of Shaanxi Province competes with Shanxi Province, but Shaanxi is farther away from the

places of consumption than Shanxi Province geographically, so its coal resource tax rate is slightly lower than that of Shanxi Province. The tax rate of Henan Province is the lowest, which may be explained in the first place by both the lower degree of dependency of the local fiscal revenue on the coal industry and higher difficulty and costs of coal mining. As can be seen from actual tax rates set by various regions, besides superficial market causes (like the differences of coal enterprise operations and coal quality, etc.) and policy differences (adjustment of resource tax and fees, etc.), the differences among various provinces in terms of the coal resource tax rate at a deeper level depend on local governments, that is, the degree of dependency of the fiscal revenue of the province on its coal industry. Accordingly, some scholars have pointed out that the main determinants of the coal resource tax rate are the dependency degree of the fiscal revenue of the province on its coal industry and the game power of its coal enterprises.

Given that raising the fiscal revenue constitutes an intrinsic function of the taxation, it gives no cause for criticism when the fiscal principle is taken into account in the taxation design. However, in view of regulating economic operations also constitutes an important function of the taxation and economy decides taxation, establishing a sustainable tax system that can adapt and promote sustainable economic development will be the goal of tax reform under the background of current China's economic transformation. Because the resource tax reform constitutes one of its important links, it is very essential to transform it from a gains tax focusing on the regulation of differential incomes under the traditional economy into an environmental tax aimed to environmental protection under the sustainable economy. However, as reflected by the setting of local coal resource tax rates, there is still high interdependency between the resource tax revenues and local fiscal revenues. The determination of tax rates in various regions mainly focuses on satisfying the needs of the local fiscal revenues instead of compensating for the resource depletion costs. And, to a larger extent, the resource tax is treated by local governments only as a fiscal instrument instead of an economic instrument advocating resource and environmental protection, so it is still a gains tax.

To realize sustainable utilization of non-renewable resources, the key lies in providing an adequate compensation for the depletion cost of resource exploitation (also called the resource cost or user cost). Guided by the aim of sustainable development, the resource tax should be functioned as embodying the real depletion cost of resource exploitation and raising compensation funds for achieving resource conservation, renewal and substitution. A number of domestic scholars conducted researches on the user cost of non-renewable resources and its compensation, for example, the research team of China Center for Energy Economics Research at Xiamen University led by Boqiang Lin and the research team of Xi'an Jiaotong University led by Guoping Li. Boqiang Lin et al (2012) adopted a revised EI Serafy user cost method to estimate the theoretical rate of the ad valorem coal resource tax under the premise of full compensation for the user cost in China between 1992 and 2009 (which fluctuated between 2% and 14%). In addition, by using the dynamic CGE model, they concluded if the ad valorem resource tax on coal is levied at the rate of 5%-12%, the depletion cost of coal as a scarce resource can be compensated. At the

same time, the macroeconomic cost will be within the affordable range[4]. Xianfeng Zeng and Guoping Li (2013) revised the user cost method again to estimate the user costs of coal, petroleum, natural gas and other resources in China between 1985 and 2010. They pointed out that the current resource tax and fees can only partially compensate for their user costs, and that there was a severe cross-generational negative externality in the exploitation of coal, petroleum and natural gas. According to the average price standard of raw coal in 2010, the rate of the ad valorem resource tax on coal should be set at 5.73% to fully compensate for the user cost^[5]. It is then clear that, to truly play the resource protection role of the resource tax and provide an adequate compensation for resource depletion costs, the full costs of resource exploitation must be scientifically calculated and used in the design of the actual tax rate, together with the market conditions and fiscal principle taken into consideration. The accurate calculation of resource depletion cost and their adequate compensation should be employed by various regions as the main determinants of the resource tax rate, instead of fiscal interests. Although the formulation of the Ministry of Finance about the range of the coal resource tax rate nationwide is based on comprehensive considerations of a series of factors such as the average coal resource depletion cost, local fiscal capacity, enterprise burden level and so forth, the range of 2%-10% still leaves a huge selection space for local governments. When setting the local tax rate, they tend to start with the narrow localism and selfish departmentalism and thus deviate from the function of the resource tax set up under the sustainable development goals. According to existing academic studies conducted by Lin and Li, theoretically, only the average rate of the ad valorem coal resource tax no less than 5% can basically embody and compensate for resource depletion cost and achieve resource protection. The practical field once adopted the coking coal of Shanxi Province as an example to calculate the tax burden of coal enterprises after this reform, and the results indicated that selecting the minimum tax rate of 2% cannot embody the regulation function of the ad valorem tax at all, but if the tax rate become excessively high, the burden of coal enterprises is correspondingly increased. Calculated using the coal price of 800 Yuan/t at the time and the ad valorem tax rate of 7%, the imposing of ad valorem resource tax barely increases the burden of coal enterprises after adjustment of resource tax and fees.

The choice of a specific coal resource tax rate by various regions indicates that currently fiscal interest still constitutes the major influence factor in the setting of local resource tax rate, and that it will take time for the resource tax to be truly transformed from a gains tax into an environmental tax.

3.3. Adjustment of resource tax and fees

According to statistics, there were a total of 109 coal-related tax and fee items nationwide before the coal resource tax reform in 2014, including 21 taxes and 88 fees. And some fees paid by coal enterprises were basically the same as the coal resource tax in terms of their nature, tax payment stages, objects, forms, etc. There were prominent problems like heavy fees and light taxes, irrational taxes and fees structure, repetitive collections and so on, which led to enterprises' constant com-

plains. Therefore, the collection of coal resource taxes and fees was in urgent need of a reform. At the same time, in the face of the slumping downstream demand in the coal industry, and in order to avoid coal enterprises' fulsome cost pressure brought by the tax burden increase in the coal ad valorem tax reform and to relieve the slump of the coal industry, another important reform measure, adjustment of resource tax and fees, was introduced together with the ad valorem tax reform. The specific contents included abolishing coal charges and funds, reducing the rate of the mineral resource compensation to zero, stopping the collection of coal price regulation fund, cancelling Shanxi Province's coal sustainable development fund, native mineral products ecological compensation fee, coal resource local economic development fee and others, and banning illegal coal charges and funds by local governments below the provincial level.

In the first two months after the coal resource tax reform, the total coal resource taxes paid by the coal enterprises of 25 coal-producing provinces (Inner Mongolia, Shaanxi, etc.) reached 6.589 billion Yuan, with an increase of 4.817 billion Yuan compared to that before the reform. At the same time, the coal charges and funds lost 7.051 billion Yuan, so the decrease in fees was obviously higher than the increase in taxes (i.e., the overall tax and fees burden of coal resources was reduced by 2.23 billion Yuan, equivalent to the average burden alleviation of about 4 Yuan/t). Calculated by the proportion of the resource tax and fees in the sales revenue, the nationwide coal resource tax and fees burden declined by about 25% on the year-on-year basis, therefore, the expectations of the reform has been realized. However, with the reform being carried forward, new doubts emerged. According to the survey conducted by China Coal Economic Research Association (CCERA), due to the differences among various coal-producing provinces in terms of both the coal resource tax rate and conversion rate of washed coal, some coal enterprises saw a decline in their actual tax burden while other witnessed a rise. Also, quite a few coal-producing provinces included into the calculation basis some fees which were collected in the past but had been already cancelled at the time. In addition, some fees included in the calculation base of the coal resource tax rate were continuously and repetitively collected beyond the tax system. Moreover, many regions have not yet defined the calculation basis of the coal resource tax rate. Xiang'en Chen, the Chairman of Henan Energy and Chemical Industry Group Co., Ltd., carried out a specific survey on the coal enterprises of Henan Province, and found that many fees were retained after the reform, and repetitive collections still existed. The reform should be strengthened with regard to the collection and management of some fees for the purposes of truly realizing the original intentions and the preferential tax policies should be further refined to increase manoeuvrability. Through the survey on the coal resource tax reform, the Institute for Fiscal Science of Ministry of Finance found that, after the launching of the ad valorem coal resource tax reform, the coal price declined, irrational fees were abolished, and the overall tax burden of coal enterprises ultimately declined to a certain extent in comparison to the level before the reform. However, the regulation role of the resource tax did not see any significant improvement after the reform, it is still necessary to further the reform of tax species, and facilitate the introduction of the environmental tax, carbon tax,

etc.

Assuming that the proceeds are generated at the end of the period, the discount of the net income of the non-renewable resources at each stage of the sales period, namely, the value of the resource reserve at the beginning of the period can be expressed as:

$$V_0 = \left\{ Q_1 (P_1 - C_1) / (1 + r) + Q_2 (P_2 - C_2) / (1 + r)^2 + \dots + Q_T (P_T - C_T) / (1 + R)^T \right\}$$

Where Q_t , P_t , C_t are the amount of non-renewable resources, the selling price and the mining cost in t th period, respectively; r is the market discount rate, and T is the years of exploitation of resources.

If X represents a constant stream of fixed income, the present value of the initial revenue flow is expressed as:

$$W_0 = X / (1 + r) + X / (1 + r)^2 + X / (1 + r)^3 + \dots \quad (1)$$

If for all the period t , $Q_t = q$, $P_t = P$, $C_t = C$, and let R is net income, then $R = Q(P - C)$, and let $d = 1 / (1 + r)$, then equation (??) can be expressed as:

$$V_0 = R (d + d^2 + \dots + d^T) \quad (2)$$

As a main content of this coal resource tax reform, the measure of adjustment of resource tax and fees is designed to alleviate the tax and fees burden of coal enterprises, rationalize the relation between the resource tax and fees on coal, and regulate the fiscal and taxation order. Based on the above responses of various parties after the reform, it is still too early to evaluate whether the original intentions of the reform have been realized. And it still takes time to regulate the actual relation between taxes and fees in enterprises and improve the overall system of resource tax and fees through scientific design and steady promotion. Attention needs to be paid to the following aspects in carrying forward the reform:

(1) The abolishment of fees cannot be a sweeping approach. Because either the resource rent or tax and fees have its own existence basis, it is necessary to clarify their different basis and function to construct a scientific and rational resource tax and fees structure. The original tax and fees levied on mineral resources in China mainly include the resource tax, mineral resource compensation, mining royalty, petroleum revenue tax, usufruct outlay and cost of exploration right, usufruct outlay and cost of mining right, mining and exploration registration fees and other administrative fees. After the tax reform of 1994, the resource tax adopted the general levying and differential regulation principle of taxation, no longer purely targeted at differential regulation, so it became compensatory revenue levied on the basis of resource ownership. Additionally, because the differential regulation role of the resource tax was offset to some extent by its type as a local tax, the nature and role of the resource tax tended to be the same with those of mineral resource compensation. After becoming overlapping, the resource tax also became a constituent part of the paid use system of resources and further confused the nature and functions of the tax

with those of resource incomes^[7]. The disorder relation and repetitive collection of the resource tax and fees became a prominent problem in China's resource tax and fees system. In the face of growing calls for the merging collection of the mineral resource compensation and resource tax, this tax reform has formally incorporated the mineral resource compensation into the resource tax, and taking a substantial and important step in the reform of adjustment of resource tax and fees. The direction of this reform is correct, but in-depth reflections and prudent policy-making are needed to determine how to adjust. To clarify the relationship between the resource rent, tax and fees constitutes the theoretical basis of constructing a rational mineral resource tax and fees system. In-depth discussions have taken place by the academic circle, which provided many valuable ideas. Wendong Chen (2007) started with the rent theory, and held that incorporating the mineral resource compensation into the resource tax based on the strengthening of normativity and coerciveness only emphasized on tax management but failed to take into account the more essential economic nature. A more logical way is to incorporate the differential regulation function of the resource tax into royalty, and to impose all the property incomes belonging to the resource owners (including absolute rent and differential rent) in the form of royalty. After separating the differential incomes, the resource tax, as the social public revenue instead of the rent of state-owned resources, will take sustainable development as its basic foothold and can be coordinated with environmental protection policies to focus on correcting externality, maintaining inter-generational resource utilization equity, regulating the difference between private and social discount rates, eliminating the damage done by monopolies to social equity and achieving energy conservation and consumption reduction. To sum up, the basic identity and reform orientation of the resource tax should be set as described above^[6]. Yanqin Lv et al (2010) also claimed that the resource tax reform must conform to the requirements of sustainable development, the resource tax must be restored to the tax status (instead of a constituent part of the paid use system of resources), and that efforts should be made to reinforce its basic functions of resource conservation and environmental protection, internalize the external cost brought by resource exploitation, merge mineral resource compensation, mining royalty, and petroleum revenue tax into royalty, gear to the internationally accepted compensated mining system of mineral resources and regulate the income form and system structure of mineral resources^[7]. In brief, the measure of adjustment of resource tax and fees cannot aim at reducing the tax burden of enterprises alone, and should instead be considered in the integrated framework of the construction of scientific and rational mineral resource tax and fees system and paid use system, to correctly deal with the rent, tax and fees of state-owned resources, based on an accurate clarification of their individual bases, and comprehensively conduct top-level design and long-term planning. First, for now, the mineral resource compensation can be retained, and the long-term reform can refer to the practice of developed countries to establish the royalty system, so that the central government can uniformly levy state-owned resource royalty as the owner of natural resources, levy special state-owned resource royalty from monopolized industries and over specific resources, and nationalize the absolute rent and differential rent of mineral resources. Second, the resource tax

embodying scarcity rent should take the promotion of sustainable development as its aim, and correct negative externality and maintain inter-generational resource utilization equity. Third, local governments should collect administrative fees and government funds over local public services provided to specific groups.

(2) To effectively safeguard legitimate rights and interests of the state over resource assets and truly realize the functional orientation of the resource tax as guided by the aim of sustainable development, the rational level of the mineral resource tax and fees system should be scientifically calculated and determined. Currently the design may take into account the following three goals: first, to determine the marginal cost price of resources based on the basic input into resource exploitation, thus to nationalize the absolute rent of resources and completely change the situation of unpaid exploitation and utilization; second, to regulate the differential incomes of exploitation enterprises, nationalize the differential rent of resources, and prevent enterprises from selecting rich ores and abandoning lean ores for the purpose of obtaining excess profit; third, to embody the sustainable value or user cost of resources (theoretically, the value should be equal to the total amount of funds needed to guarantee the integrity of the resource base for later generations [7]). The first two goals will be realized through the mineral resource compensation. In reference to international practices, the establishment of a normative royalty system will be taken into consideration in the future, additionally, the average rate level, only accounting for 1.18% of the sales revenue of mineral products, will be appropriately elevated. At the same time, the sliding rate system will be introduced, that is, within the established range of rate, the state may timely regulate it according to the price fluctuations of resources, profit level changes of mine enterprises, orientation of resource policies and other relevant factors [7]. The third goal will be regulated by the resource tax, to provide an adequate compensation for the user cost. When the time is right, a fourth goal may be considered, that is, the environmental tax may be imposed to embody external environmental costs, focus on the correction of negative environmental effects generated by resource exploitation and provide full costs compensation for resource exploitation together with the resource tax and royalty.

(3) Various previous resource-related fees and funds should be rearranged, and then integrated and put in place according to their individual nature and rationally determined tax burden. During the whole process, as many as possible unnecessary fees should be abolished to completely eradicate repetitive collection. In addition, the tax collection and management reform must be strengthened to effectively implement the measure of adjustment of resource tax and fees.

4. Conclusions

Given that the pursuit of economic sustainable development has become a global consensus, constructing a sustainable tax system that can promote economic sustainable development is inevitably becoming the aim and task of China tax system construction in the new era. The ad valorem collection reform of the coal resource tax launched in 2014 has truly pushed China resource tax reform into a substantial stage, taking a major step in tax system transformation at the request of economic

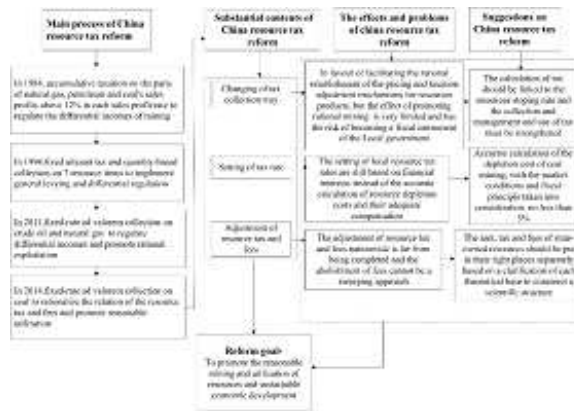


Fig. 3. Route and analysis of China coal resource tax reform

transformation and development. The reform has proved to be very effective. However, some problems have been exposed in the course as well.

(1)The tax way’s change for coal resource tax from quantity-based collection to ad valorem collection can better embody the principles of equity and efficiency, and facilitate the rational establishment of the pricing and taxation adjustment mechanisms for resources products. However, the effect of promoting rational mining of resources is actually very limited by changing the collection way alone. The calculation of tax should be linked to the resources stopping rate so as to both play the advantages of ad valorem collection and promote the rational exploitation of resources. Meanwhile, in combination with the reform, the collection and management and use of tax must be strengthened to truly use the resource tax for resource and environmental protection, instead of using it only as a fiscal instrument of local government.

(2)As can be seen from the selection of the specific coal resource tax rates in various regions, the local resource tax rates are still based on financial interests as the primary consideration, instead of the accurate calculation of resource depletion costs and their adequate compensation. Therefore, the local fiscal revenue still serves the role of mouth-feeding budget to a very large extent. The scientific determination of coal resource tax rate should be based on the accurate calculation of the depletion cost of coal mining, but, at the same time, with the market conditions and fiscal principle taken into consideration. Theoretically, only the average tax rate of no less than 5% can basically embody and compensate for resource depletion costs and achieve resource protection.

(3)The adjustment of resource tax and fees nationwide is far from being completed. The abolishment of fees cannot be a sweeping approach, and should be put in place separately, based on a clarification of each existence bases of the rent, tax and fees of state-owned resources, to construct a scientific resource tax and fees structure.

The construction of China’s sustainable tax system is a long-term systematic project. As an important link of this project, the resource tax reform should be con-

tinuously deepened, and, under the aim of promoting economic sustainable development, truly transformed from a gains tax into an environmental tax by scientifically designing of taxation elements, rationally arranging of tax and fees structures and reasonably establishing of tax collection and administration authority. Based on the construction of a sustainable resource tax system, the possibilities of levying environmental and carbon taxes in combination with the consumption tax and other existing specific tax reforms should be further explored, so as to realize the comprehensive greening of China tax system and promote sustainable economic development.

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