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An assessment of proposed energy resource tax reform in Russia: A static general equilibrium analysis☆

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ABSTRACT

A large part of government revenues in Russia comes from royalties and export taxes on crude oil, oil products, and gas. Recently, the Russian government has considered reducing export taxes on crude oil and oil products compensated by an increase in the royalty on crude oil. The objective of the paper is to analyse the economy-wide effects of this proposal. Moreover, a hypothetical replacement of export taxes and royalties with a pure rent tax is analysed. A static, single-country, multi-sector computable generation equilibrium (CGE) model is employed. The primary findings are as follows. A replacement of export taxes on crude oil and oil products with a royalty on crude oil provides substantial allocative efficiency gains, but this policy is not a superior one. Welfare could be substantially improved when the export taxes and royalty are replaced with a pure rent tax that can be implemented in the form of a cash-flow tax. On the negative side, reducing export taxes on crude oil and oil products results in a strong appreciation of the currency. As a result, domestic producers become less competitive in domestic markets, and there is a massive increase in import demand.

1. Introduction

Russia is one of the world's largest producers and exporters of fossil fuels. The Russian economy is very energy and carbon intensive (EIA, 2014). A large part of total government revenues comes from export taxes, excise taxes and the mineral extraction taxes on gas, crude oil and oil products. For example, export taxes on crude oil, oil products, and gas accounted for approximately 21% of total government revenues in 2012 (Roskazna, 2012).

The main purpose of resource taxation is to capture resource rents. As known, taxation of resource rents is neutral because supply of exhaustible resources is fixed. Moreover, high taxes on energy resources could be motivated by income distribution considerations. The theory suggests that the government should use a pure rent tax, which could be implemented in the form of a cash-flow tax (Boadway and Flatters, 1993); however, the implementation of a cash-flow tax is problematic in some respects. For example, revenues from a cash-flow tax may be quite unpredictable and unstable. Moreover, a cash-flow tax could lead to the so-called transfer-shifting problem. Therefore, authorities often rely on sub-optimal taxes such as royalties and export taxes, which has been the case in Russia.

Recently, the Russian government considered reducing export taxes on crude oil and oil products compensated by an increase in the mineral extraction tax on crude oil to increase government tax revenues (ITAR-TASS, 2014; Reuters, 2013). The objective of this paper is to analyse the economy-wide effects of this proposal. Furthermore, we analyse the welfare and sectoral impacts of a hypothetical replacement of export taxes and royalties with pure rent taxes. We use a static single-country, multi-sector, computable general equilibrium (CGE) model.

Even though the theory claims that pure rent taxes are superior to royalties and export taxes, not much numerical analysis has been performed on this issue. Recently, there have been several publications related to pricing of energy resources in Russia based on a CGE analysis

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(e.g., Heydrickx et al., 2012; Orlov, 2015); however, none of them has explicitly analysed the welfare and sectoral impacts on the Russian economy of royalties and export taxes on energy resources. To our knowledge, this paper is one of the few that provides a welfare analysis of different schemes of energy resource taxation for Russia by using a CGE model. Moreover, the paper shows how to model royalties and pure rent taxes in a static CGE model.

The paper is organised as follows. Section 2 gives a theoretical background for the analysis. Section 3 provides a brief description of the current tax regimes implemented in Russia with respect to the energy sector. Section 4 presents the database as well as an informal description of the numerical model and model modifications. Section 5 provides the results from policy simulations followed by their discussion. The final section presents the conclusions.

2. Theoretical background

The main purpose of taxation of non-renewable natural resources is to capture resource rents. Coal, gas, and crude oil are non-renewable natural resources whose supply is fixed (immobile); hence, rent taxes can provide government revenues without distorting the economy. Pure rent taxes are imposed on economic profits, i.e., revenues less all explicit and implicit costs (opportunity costs) (Boadway and Keen, 2014).

There are different approaches to how rent taxes can be designed. For example, a pure rent tax can be implemented in the form of a cash-flow tax or the so-called Brown (1948) tax. Other types of rent taxes are the allowance for corporate equity (ACE) tax and the resource rent tax (RRT). The ACE and RRT are basically equivalent in present value to a cash-flow tax (Boadway and Keen, 2014). One important advantage of ACE over RRT is that ACE is able to generate revenues earlier than RRT (Boadway and Keen, 2009). It is important to note that a rent tax is not only a theoretical concept but also a feasible instrument in practice (e.g., in Norway).

Nevertheless, there are few caveats related to pure rent taxes. For example, due to information asymmetry rent taxation may raise incentives for transfer shifting (or income shifting, or transfer pricing), e.g., overestimation of production costs to reduce the tax base (Lund, 2002). Typically, costs are more difficult to observe than revenues. Lund (2002) found that an optimal cash-flow tax could be less than 100% given the possibility of transfer pricing. He also concluded that due to the transfer-pricing problem it may be optimal to combine a rent tax (e.g., cash-flow tax) with a royalty. It should be noted that state participation could guarantee more control over the resource sector to at least partially solve the problem with transfer pricing. State participation in gas and oil industries is quite common (e.g., Russia and Norway). Another problem associated with cash-flow taxes is discounting. The choice of the appropriate discount rate may not be a trivial task for authorities due to large uncertainties.

Despite all the advantages of pure rent taxes, some energy rich countries (e.g., Russia) still rely on alternative tax instruments such as royalties and export taxes. In theory, it is recognised that royalties and export taxes are pure substitutes for pure rent taxes because royalties and export taxes may result in large distortions. In essence, royalties operate as production taxes. Royalties distort the extraction path, shutdown decisions, and investment decisions. Boadway and Flatters (1993) noted that royalties tend to overestimate economic rents, discouraging some socially describable investments. This is because some production costs, especially implicit capital costs, may not be deducted. Typically, royalties tend to discriminate against capital-intensive projects in favour of less capital-intensive projects (i.e., so-called high grading), meaning that royalties create a wedge between the marginal returns of different investment projects. Royalties can be specific or ad valorem: specific royalties are imposed on the volume of extracted resources, while ad valorem royalties are levied on the revenues. Specific and ad valorem royalties have different economic implications. For example, energy resources are taxed more highly under an ad valorem tax than under a specific one if the price increases; the opposite holds true if the price decreases (Boadway and Flatters, 1993). It is rather ambiguous which tax is less distortionary, especially if uncertainties are taken into account.

Often, authorities implement a more elaborated design of royalties. For example, by calculating ad valorem royalties, some production cost can be deducted. In the case of specific royalties, the government can use a sliding system, where tax rates differ with respect to the quality of resources (Boadway and Flatters, 1993). Such measures may reduce the distortion associated with the implementation of royalties, but it cannot eliminate all of them. Hence, even an elaborated royalty system may be far from being neutral.

Nevertheless, royalties have several important advantages (Boadway and Keen, 2009). For example, royalties (i) are easy to implement, (ii) provide revenues from the beginning of extraction, (iii) provide more stable and predictable revenues, and (iv) are typically not associated with the transfer shifting problem.

Another imperfect instrument for the taxation of resource rents is export taxes. As noted by Boadway and Flatters (1993), like royalties export taxes distort investment decisions. In addition, export taxes distort domestic markets because a higher export tax results in a lower domestic price. Typically, export taxes are considered to be more distortionary than royalties are. In fact, resource rents captured by export taxes are spent on subsidising domestic consumers. This may encourage wasteful behaviour by domestic consumers. The efficiency cost arising from such an implicit subsidy on domestic consumption depends on the export tax rate and the price elasticity of domestic demand. The higher the export tax and the price elasticity of demand, the higher the welfare cost. Nevertheless, there are arguments that may justify the use of export taxes, e.g., the presence of market power in export markets and the infant industry argument (Boadway and Flatters, 1993). Export taxes are frequently implemented to encourage high value added (processing) industries. In both cases, export taxes are not the best policy instrument to achieve this objective (Devarajan et al., 1996). For example, consumption taxes, such as value added taxes or income taxes, are considered to be more efficient revenue-generating instruments than production taxes (taxes on intermediates) (Diamond and Mirrlees, 1971). The idea behind this is that consumption taxes distort only the consumption-leisure choice, while taxes on intermediates distort both production and consumption decisions.

The more fundamental conclusion from the literature on resource taxation is likely that there is no unique tax regime that would be optimal for all countries (Boadway and Keen, 2009; Lund, 2014). Uncertainty is an important aspect in taxation; taking into account uncertainty may substantially reframe the design of optimal resource taxation. Due to information asymmetry and imperfect capital markets, risk may not be optimally allocated (e.g., excessively risk-adverse behaviour). Different tax regimes have different implications on risk allocation. The design of an optimal tax system under uncertainty depends especially on the relation between the risk aversion shown by the government and investors (Leland, 1984). Although pure rent taxes are considered the most efficient instrument to capture resource rents, pure rent taxes such as cash-flow taxes are associated with high risks. As noted by Lund (2014), there is a trade-off between higher tax revenues and higher risk. Low-income countries may be risk averse, discounting the future at a higher discount rate. This may explain why some countries rely on royalties, which guarantee a stable and predictable income, even though they may result in large asymmetries (distortions) (Lund, 2014). A transition from an asymmetric to a symmetric tax regime based on rent taxation is a development process of a tax system.

3. Taxation of energy resources in Russia

3.1. Trade taxes on energy resources

Apart from conventional taxes (e.g., value added tax and corporate profit tax), a large part of Russian government revenue comes from