

Summary of Dissertation

**Title: The Effect of Tax Assignment in an Exhaustible Resource Economy
on Long Lived Public Goods**

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Federal countries continually deal with the issue of sharing natural resource rents. The problem is not limited to federal countries only but is a valid issue in unitary states also. Federations offer an easy setting to study the impact of level of assignment of resource rent tax powers on public asset investment. They have clearly defined fiscal authority and the units in a federation are often ethnic entities with a strong sense of belonging limited to individuals in each region. Both for the purposes of tax assignment and ownership of natural resources, therefore federal constitutions offer a good field of study.

The claims on natural resource rent are frequently cause of instability and sometimes lead to conflict. In my work I am aiming to do two things: first, establish a fundamental model to further promote an understanding of federation, how it comes into being, what factors contribute to it, under what conditions it is guaranteed stability. For this part of my work, I rely on theories of social choice, political philosophy and cooperative microeconomics. In the second part, I develop a model of natural resource rent tax assignment in a federation to predict effects on long-lived public goods. The model provides a testable hypothesis that I use for empirical testing.

The discussion is being presented in three chapters starting from the basic notions culminating with empirical application of the theoretical model to real life data.

In Chapter 1 there is a brief introduction of the research hypothesis and scope of the study. It introduces the research question. At the same time, I summarize the main points of the subsequent discussion. In addition I provide a narration of the main discussions in the economics of exhaustible natural resources with a view to posit the research question namely that the level of assignment of taxation rights in a nation affects the quantity of long-lived public goods generated from the revenue. Here I use the Kolm triangle for portraying the effects of taxation rights on the level of public good production in an economy, under some stark assumptions.

Different nations deal with the question of assigning resource rent taxation to various levels of government. The question has been mostly studied from a tax efficiency point of view. It is almost axiomatic that economic rent generated from resource extraction should be taxed to allow all individuals in a community share the benefits of the endowment. The literature presents various options to tax resource rents. It is deemed more efficient than allowing private owners exclusively reap the benefits of extraction. On the other hand, it has also been argued that the tax revenue should be invested in reproducible capital to ensure that the inter-temporal production capacity and consumer welfare remain constant. For this to happen a 'Hartwick Rule' (attributed to John Hartwick) specifies that total revenue accruing from resource rent taxes should be invested in producible capital, to keep production capacity, and consumer welfare in turn, constant over time. But even if efficient taxation operates in an exhaustible resource economy, is it possible to follow the Hartwick Rule and if so under what conditions?

I am presenting a discussion of these issues and concretizing the notion that the level of government to which resource rent taxation authority is assigned in a nation has an effect on the amount of investment made in long-lived public assets. This is a question which is germane to policy debates in many countries of the world, where ordinarily resource ownership is contested and flagged as being the font of taxation rights. Most of the discussion in the literature focuses on types of tax instruments and whether some of them are administratively more suited to federal or sub-national assignment. For most of the discussion I abstract from this discussion for the purposes of the research question, since it is possible to design efficient instruments suited to either level of government.

The discussions in the literature do not give any rationale for the prescriptive Hartwick Rule. There is also no discussion of the conditions under which it will be adopted as a policy. In Chapter 1 I present a detailed discussion on why it should be more than a prescription and in fact amounts to a natural outcome under certain conditions. The essence of this discussion is that endowments identified as common property by a community will be extracted under a bequest motive, allowing for the Hartwick Rule to be a natural outcome. There is considerable theoretical acceptance and empirical evidence that bequest motive operates when individuals own private assets.

The discussion of natural resource rent taxes and investment of revenue in producible capital is followed by a theoretical model of public good provision in a federal setting, with public revenue accumulating from natural resource rent taxes exclusively. The hypothesis assumes that there is a difference in the bequest motives of individuals belonging to the resource regions as opposed to the non-resource regions. This characterization of individuals refers to the 'endowment effect' literature and the demonstrated differences between willingness to pay and willingness to accept. The model incorporates a number of constraints which bring in the federal realities as well as particularities relating to exhaustible natural resources. For the theoretical model, I assume that there are two regions in a country and that they are diverse. Each region is a community unto itself. Only one of the two owns an exhaustible resource endowment. The resource region does

not include the non-resource region in its perception of ‘community’ and vice versa. I also assume that the resource rent tax base is shared between the resource region and the national government, an efficient tax is levied and that the national government provides a grant to the non-resource region. The grant is unconditional. The model shows that there is a negative relationship between the federal tax rate increase (at the expense of the regional tax rate) and investment in long term public good. This result from the theoretical model is a testable hypothesis also. The discussion culminates in a testable hypothesis.

Building on the earlier discussions, Chapter 2 is an empirical test of the theoretical predictions. I am using data from the 89 Regions of Russia to see if there is any effect of change of the tax regime, awarding more revenue to the federal government at the expense of regions, on long-lived fixed capital formation in the regions. In this discussion I present the empirical results based on the data from Russian regions. The data are arranged in a panel for 89 Regions of Russia. Oil, gas and coal extractions for 6 years from 1997 to 1999 and 2001 to 2004 have been included. Investment in fixed capital formation by the public sector for the same years is also part of the panel. The fact that a tax regime change in 2002 allowed the federal government to have a larger share of the tax base at the cost of sub-national government presents an opportunity for studying the hypothesis in a natural experiment. I use a difference-in-difference estimator to find that the increase in federal share of the tax is negatively related to investment in fixed capital formation.

To round of the discussion, Chapter 3 addresses the need of studying natural resource rent assignment with reference to the federal context. It addresses the fundamental issues facing the federal scheme, incentives for its coming into being, conditions for stability and as a mechanism for enhancing welfare. The chapter presents a discussion of the federal arrangement as a cooperative game. The individuals are modeled as rational agents and a device akin to Hobbes’ *state of nature* or Rawl’s *original position* is used to bring them into a ‘convention’ for deciding on the federal arrangement. The assumptions used for characterization of the individual are based on discussions contained both in the contractarianism (Hobbes, Locke, Buchanan, Binmore) and contractualism (Rawls, Gauthier) literature in an attempt to reconcile the two strands. The cooperative game model allows me to set out conditions for the stability of federation. It uses exhaustible natural resources as endowments that are unequally distributed among the individuals or coalitions.

In conclusion I highlight the policy implications of the theoretical and empirical results in the earlier chapters. The discussion is laid out in the context of major federations in the world, with allusions to their natural resource tax assignments.