Finders, Keepers?

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Abstract

Natural resource taxation and investment very often exhibit cyclical behavior, and these cycles are a key driver of political turmoil and shifts in political power. Why do finders get to keep more of their discoveries in some periods than others? Using a rational-expectations model, we show cycles result from governments' inability to commit to future taxes and firms' inability to credibly exit a country indefinitely. In a cycle, large resource revenues induce a high tax which lowers exploration investment and thereby future findings, which in turn leads governments to reduce tax rates again. This induces high investment and high future taxes and so on. We investigate which factors reinforce cycles and present ways of avoiding them. Tax oscillations are more pronounced for resources which take longer to develop, or following one-time resource-price shocks. We document evidence of cyclical behavior in a large number of countries, and provide detailed case studies of two Latin American countries.

Overview

Taxation of natural resources is a dominant source of government revenue in many countries. More than twenty resource-rich countries obtain three-quarters of their export revenues from oil and gas. The quest for obtaining resource profits is often the single most important public policy issue in these countries. These matters are sufficiently salient to shift political sentiments, to drive political platforms, to determine election outcomes, and to even cause coups or civil wars.

This paper aims to explain a prominent feature of resource markets: cyclicality in resource taxation. A stylized description of such cycles is that taxes start out low to induce high investment. Then there is typically a shift in political power, either democratically or not, to a party with a high-tax agenda. The government thus changes the current fiscal terms, either through tax increases or through direct expropriation, which deters investment. Subsequently there is another shift in political power or the incumbent party's platform, now to politicians setting low taxes, which increases investment, and so on. Thus, resource taxation is a key driver of political turmoil, instability and shifts in power in resource-rich countries. To explain this cyclical tax and investment behavior, we develop the first model of time-consistent resource taxation under limited ability of governments to commit to resource tax rates and firms to commit to exiting. Thus, apart from our main contribution of explaining the empirically prevalent taxation cycles, we also fill an important gap in the resource-economics literature.

Model

In our simple simple infinite-horizon model with rational expectations, resources are developed through costly exploration investments, but the government cannot commit to not taxing the

resulting resource rents beyond a single period. In any given period, two types of mines generate resource profits: old mines discovered in the previous period and new mines discovered in the current period. Each government faces a trade-off: high taxes maximize profits from old mines but harm new investments and hence profits from new mines. Since mines are long-lived, firms naturally choose investment based both on current and expected future taxes. As a result, a rational government that is unable to commit, when choosing its current tax rate, has to consider the impact of today's tax rate on all future taxes and on all future investment decisions by firms.

The model predicts that, following an earlier large discovery, the government will set a high tax to ensure getting a large share of the bonanza. This in turn will inhibit new investments which lowers the future tax base. Hence, in the next period the government refocuses to encouraging new investment and therefore lowers the tax. These high new investments imply a large inelastic tax base in the period after and hence an increase in the tax and so on. The model thus predicts cycles in resource taxation and investment in line with the observations described earlier.

The model yields a number of additional predictions. A backloaded mining profile – i.e., a large share of the mining profits coming with a lag – implies a high tax level and limited investment. This scenario would apply to projects with large lead times, such as drilling for oil and gas at deep offshore fields or in the Arctic. Conversely, the model predicts that quickly depleted discoveries, such as shale oil, should incur a low tax. The model also predicts that the cycles will be more pronounced in countries that are new exporters of resources. We also offer predictions about the interaction of prices and investment in creating cycles.

Finally, we show that the result that equilibria will exhibit tax oscillations is not inevitable: Equilibria without cyclicality can be sustained under certain conditions. This could account for why, in practice, tax cycles are very prevalent but not ubiquitous across countries.

Conclusion

Our model is cast in terms of exhaustible natural resources like oil, gas, metals, and gems, but applies to any setting in which capital is immobile and has a productive lifetime that exceeds the government's commitment period. Our model is rich enough to reflect tax and investment cycles with agents that hold rational expectations, but without the need to exogenously assume expropriations. It is also simple enough to serve as a starting point for further analysis of optimal natural resource taxation under imperfect commitment. For example, the model can be extended to consider stochastic resource discoveries, changing land prospectivity, imperfect competition among resource extraction firms, and much else.