

Thad Dunning: Academic perspectives on the effects of commodities booms have changed sharply in the last several decades. To analysts of the 1970s, a sustained petroleum boom implied an unwelcome source of inflationary pressure for oil-importing countries, at a time of slowing economic growth. Yet it seemed common sense that an oil boom could only boost the fortunes of petroleum exporters. In the oil-price shocks of the 1970s, some analysts even foresaw the twentieth century's largest transfer of wealth from developed to developing countries.

By the 1990s, scholars had begun to question the economic benefits of the first two oil shocks. Jeffrey Sachs and Andrew Warner, among others, presented research showing that the resource-rich countries had grown less, not more, than similar resource-poor countries.¹ In another influential early discussion, Terry Lynn Karl asked why, “after benefiting from the largest transfer of wealth ever to occur without war... have most oil-exporting developing countries suffered from economic deterioration and political decay?”² The answer seemed to be that a massive flow of natural resource revenues into the fiscal coffers of the state engendered perverse economic and political effects. Not only did natural resource booms cripple nonresource export sectors and inhibit various forms of productive economic activity, but they also fostered corruption, weakened accountability, and heightened incentives for rent seeking. The idea of a resource curse has gradually solidified into nearly conventional wisdom among political economists.

Lederman and Maloney take aim at this conventional wisdom. They identify significant problems with the copious literature on the resource curse, in terms of both theory and data, leaving us with a wide range of possibilities about the true effects of natural resources. One possibility is that natural resources hurt economic growth (along with democracy, transparency,

1. Sachs and Warner (1995).

2. Karl (1997, p. xv).

peace, and other desirable outcomes); a second is that they help growth; a third is that they have little effect on growth one way or another. A fourth possibility that may be consistent with each of the first three is that the effects of resources are highly conditional—that is, whatever the central tendency or average of the distribution of the effect, there are conditions under which natural resources may enhance growth and conditions under which they will inhibit growth. Lederman and Maloney step energetically into this slew of possibilities, summarizing a large body of literature, contributing several different ideas, and estimating many of the conceivable econometric models linking natural resources to growth.

There are at least three main lessons to draw from their paper and their previous related work, in my view.³ First, findings in the previous econometric literature on the resource curse are not very robust. One of the earliest and most influential set of papers in that literature comes from Sachs and Warner, who find that natural resource exports as a percentage of GDP are negatively related to growth in both cross-sectional and time-series cross-sectional data.⁴ Sachs and Warner's independent variable is gross resource exports over GDP; consequently, resource transshipment points like Singapore and Trinidad and Tobago look like major exporters in the data. To deal with this, Sachs and Warner set the value of exports over GDP to zero for those two countries, without adjusting the values for other countries. In their earlier work, Lederman and Maloney show that Sachs and Warner's result does not hold when they use either a measure of net resource exports over GDP or the original unadjusted gross export measures with the two excluded cases included—in other words, the case of Singapore, with high exports over GDP and also high growth, appears hugely influential.⁵ They further show that Sachs and Warner's results are not robust to the inclusion of country fixed effects, suggesting a weak within-country

3. See Lederman and Maloney (2007).

4. Sachs and Warner (1995, 1997).

5. Lederman and Maloney (2007); Sachs and Warner (1995).

relationship between natural resource exports and growth. While this could admittedly be due either to the relatively short time periods involved in the estimation samples or to the relative lack of within-country variation off of which to identify the relationship of interest, it also suggests that omitted time-invariant, country-specific factors could be driving the result.

In their current paper, Lederman and Maloney emphasize the difficulty of finding good proxies for resource abundance. The early literature on the resource curse clearly did not use appropriate measures; for one thing, most of the measures are patently not measures of resource abundance, but rather measures of economic dependence on natural resources. This is true both for measures of resource exports as a percentage of GDP and for resource exports as a percentage of total merchandise exports. With alternative measures, such as resource exports normalized by population or by the number of workers as in the current paper, the negative relationship between resources and growth appears substantially attenuated. The econometric results in the previous resource curse literature thus appear quite fragile—shockingly fragile in fact, given the disproportionate influence of this literature on policy and in scholarly circles.

Lederman and Maloney's second main point is that natural resources may affect growth through a wide range of mechanisms. The authors lay out an aggregate production function for a two-sector economy, in which output in the nonresource sector is a function of labor and a productivity parameter, while output in the resource sector is a function of labor, the resource capital stock, and a productivity parameter for that sector. Totally differentiating this production function with respect to the resource capital stock yields useful observations about the variety of ways through which resources may shape output. For instance, resources may influence productivity in the nonresource sector as well as the resource sector, or they may affect the allocation of labor across sectors. They also directly and positively affect output, because total

output is an increasing function of output in the resource sector, which in turn is an increasing function of the natural resource capital stock.

In this context, the claim that there is a natural resource curse amounts to the claim that the partial derivatives of productivity with respect to the resource capital stock and of the size of the resource labor force with respect to the capital stock are negative, and that these effects outweigh the positive marginal effect stemming from the fact that output increases in resource capital. These various partial derivatives have natural interpretations in light of the previous literature on the resource curse. For example, the (possibly negative) partial derivative of productivity with respect to resources can be conceived in terms of institutions or the effect of resources on rent seeking, as in the voracity effect.⁶ The effect of resource endowments on labor reallocation can be thought of as a Dutch Disease effect. Simply specifying an aggregate production function and totally differentiating it with respect to capital therefore suggests a variety of mechanisms through which resources can shape growth.

The story may be even more complex than Lederman and Maloney suggest, because there are so many different channels through which resources might affect, say, productivity. Resources may shape rent seeking, but they could also influence the extent of taxation, the nature of spending on public goods, and other fiscal policies. The nature of these effects may, in turn, depend on large-scale institutions, like the political regime, or subtler institutions; much work in political economy emphasizes that these institutions may also be shaped by resource endowments in a multiplicity of ways.⁷ While Lederman and Maloney's total differentiation of a simple production function suggests several channels through which resources may affect growth, it may only begin to scratch the surface. Still, as a device for organizing thought, the

6. Tornell and Lane (1999).

⁷ Ross (2001), Dunning (2008).

approach is useful. In particular, it makes evident that the claim that the total or net effect of natural resources on growth is negative amounts to the claim that the negative partial effects outweigh the positive partial effects.

A third and final lesson to draw from this paper is that whatever the central tendency—that is, the average causal effect of natural resource endowments on growth—there may be substantial heterogeneity of treatment effects. In quantile regressions, the authors find different relationships between resources and growth at different quantiles of key conditioning variables; they also suggest that there may be substantial heterogeneity in effects across world regions.

Understanding the sources of these heterogeneous effects seems quite important. Lederman and Maloney focus mostly on the average effect of natural resources and growth. The average effect is surely an important parameter for both social-scientific and policy purposes, but the heterogeneity may be even more important. By way of analogy, the disciplines of political science and political economy have undertaken substantial efforts to understand heterogeneity in the effects of natural resources on democracy, violent conflict, corruption, and other political outcomes. Theoretical work in this vein suggests reasons why effects may differ and even change signs under different conditions and why these conditions may be proxied by, say, regional dummies. For instance, there may be reasons to believe that the authoritarian effects of natural resources are significantly lower than, and may even be outweighed by, the democratic effects of resource endowments in a region like Latin America. Could the same be true of the effects on growth? By contrast, are there other structural conditions under which the effects of resources would be substantially more negative? There is little in the paper in the way of empirics and even less in the way of theory to guide an inquiry into this topic.

In sum, Lederman and Maloney provide a framework that helps one think about the different channels through which resource endowments could shape growth. For instance, they contrast the direct, positive effects of resources on output with the indirect, possibly negative effects of resources working through productivity parameters or labor force allocation. It would be useful to know, as a theoretical as well as empirical matter, when each of these effects might be stronger or weaker. The authors take steps in this direction by looking at constraints on the executive, though one could imagine estimating a fuller set of interaction models in which the effect of resources is conditioned on executive constraints. The recent political economy literature suggests an array of other conditioning variables that should also affect the more proximate channels that Lederman and Maloney identify, including the political regime (the growth-relevant features of which go well beyond constraints on the executive), civil conflict, and so on. What is really lacking at this point is a deeper theoretical framework that would link the effects of natural resources to the mediating influence of this broader set of institutions. Lederman and Maloney provide an important starting point, contributing to an emerging research agenda that may lead to a deeper understanding of the conditional effects of natural resources.

References

- Dunning, Thad. 2008. *Crude Democracy: Natural Resource Wealth and Political Regimes*. Cambridge Studies in Comparative Politics. New York: Cambridge University Press.
- Karl, Terry Lynn. 1997. *The Paradox of Plenty: Oil Booms and Petro-States*. Berkeley, CA: University of California Press.
- Lederman, Daniel, and William F. Maloney, eds. 2007. *Natural Resources: Neither Curse nor Destiny*. Stanford University Press.
- Ross, Michael. 2001. "Does Oil Hinder Democracy?" *World Politics* 53.
- Sachs, Jeffrey D., and Andrew Warner. 1995. "Natural Resource Abundance and Economic Growth." Harvard Institute for International Development, Development Discussion Paper No. 517.
- Tornell, Aaron, and Philip R. Lane. 1999. "The Voracity Effect." *American Economic Review* 89(1): 22–46.