

## **The Curse: Why Natural Resources Are Not Always a Good Thing**

By Jeffrey Frankel

---

*Jeff Frankel is the Harpel Professor of Capital Formation and Growth at Harvard University. This article summarizes research surveyed in a more technical paper to be published, with full references, in *Beyond the Resource Curse*, edited by Brenda Shaffer and Taleh Ziyadov (University of Pennsylvania Press), also available as NBER Working Paper No. 15836.*

It is striking how often countries that are rich with oil, minerals or fertile land have failed to grow more rapidly than those without. Angola, Nigeria and Sudan are all awash in petroleum, yet most of their citizens are bitterly poor. Meanwhile, the East Asian economies including Japan, Korea, Taiwan, Singapore and Hong Kong have achieved western-level standards of living despite being rocky islands (or peninsulas) with virtually no exportable natural resources.

This is the phenomenon known to economists as the Natural Resource Curse. The evidence for its existence is more than anecdotal. The curse shows up in econometric tests of the determinants of economic performance across a comprehensive sample of countries.

Consider the figure below, which plots the relationship between non-agricultural resource exports as a portion of total goods exports and average economic growth rates over the last four decades. The usual suspects – China, Korea, Thailand -- are conspicuously high in growth and low in natural resources. Likewise, resource-rich Liberia, Venezuela and Zambia have little to show for their wealth in terms of economic development. The negative correlation is not very strong because some countries – think Chile and Saudi Arabia – have managed to have it both ways. But the data certainly suggest no positive correlation between natural resource wealth and economic growth.

Figure 1: Statistical relationship between mineral exports and growth.



Source: *World Development Indicators*, World Bank

How could abundance of materials that the world is eager to buy be anything but a blessing? Social scientists offer a variety of ways resource-dependence could lead to sub-standard economic performance.

### The Commodity-Price Rollercoaster

Commodity markets make the stock market look tame. Prices for oil and natural gas are the most volatile of all, but aluminum, bananas, coffee, copper, sugar and others are close behind. And some analysts argue that the resulting boom and bust cycles undermine the potential for economic growth in countries that heavily depend on resource exports, as labor, land and capital bounce back and forth across sectors in response to price changes.

Why are commodity prices more volatile than, say, manufactures? In economists' jargon: low short-run supply and demand elasticities. When there is a gap between supply and demand at the current price, markets respond by driving the price up or down to the level that closes the gap. But in the near term, users of natural resources – say oil – have a hard time finding substitutes, so it takes a pretty big change in price to alter their behavior. Likewise, suppliers can't respond quickly to price incentives because it takes a long time to drill a new well when prices rise and it often pays to keep on pumping when prices fall. The result is that when there is a supply shock (a war that disrupts tanker

traffic) or a demand shock (a very cold winter), the price has to rise by a lot in order to clear the market.

## **Crowding out Manufacturing**

Along with introducing more uncertainty to export revenues, dependence on natural resource production typically comes at the expense of sectors that compete for labor, land, and capital – think manufacturing. And to some analysts that's the end of the story: diversification out of primary commodities into manufacturing is generally viewed self-evidently necessary for long term growth.

That's surely the conventional wisdom, but is industrialization really an essential prerequisite to reaching the high-income stage of economic development? Classical economics counsels specialization. If a country is really, really good at growing coffee, why pull labor and capital out of agriculture to make products that can be bought at lower cost abroad? By this logic, Brazil's determination to industrialize was as misguided as it would have been for Great Britain to grow oranges in hothouses.

But who are you going to believe: classical economics or your lying eyes? Most rich countries are (or were along the path to development) major producers of manufactures. What's more, somewhere along the way, most of them used government policy to encourage diversification away from natural resource-based production.

In economic models used to justify such an industrial policy, manufacturing is assumed to experience "learning by doing," – growing more efficient with experience -- while the resource sector does not. So by using tariffs (or subsidies, or any of a dozen other incentives), a country that isn't initially competitive at manufacturing eventually makes the grade.

It can't be that simple, though. For one thing, there is no obvious reason why learning by doing should be the exclusive preserve of manufacturing. Mineral and agricultural sectors ought to be subject to similar forces. Indeed, some countries have experienced tremendous productivity growth in the oil, mineral and agricultural sectors. Again, using the United States as the example: Since the mid-19<sup>th</sup> century, non-manufacturing productivity has been spurred by public investment in institutions ranging from the U.S. Geological Survey to the Department of Agriculture's Extension Service, to the Land-Grant Colleges (specializing in promoting agriculture) that were funded by the sale of federal lands.

Moreover, in the modern era, the track record of industrial policies devoted to expanding manufacturing has been mixed. Take India, which in the wake of independence used strict import quotas to spur the growth of sectors ranging from steel to consumer electronics. By most accounts, the policy was a failure because, without the discipline foreign competition, productivity and quality control lagged badly behind world standards.

Or consider Saudi Arabia, which commands the largest oil reserves in the world. The Saudis have been trying to diversify their economy for decades, via subsidized capital and energy. And in some senses, the results have impressive: The South Arabian Basic Industries Corporation (SABIC), which makes petrochemicals, plastics and fertilizer, is the 5<sup>th</sup> largest company of its type in the world, employs very advanced technology and is very profitable. But this does not necessarily mean that Saudi Arabia has become an efficient producer of petroleum-based manufactures, because the inputs are heavily subsidized.

Note, too, that SABIC employs relatively few people (33,000 worldwide). That's understandable – chemical production is highly automated. But Saudi Arabia is facing daunting levels of unemployment and underemployment, and an economic diversification strategy that doesn't address this issue is problematic.

## **Inhibiting Institutional Development**

Development economists used to focus on the accumulation of capital (physical and human) as the driver of economic growth. Today, development analysts generally give more weight to the quality of institutions – everything from the enforcement of contract law to the honesty of government officials – in assaying the prospects for growth. They consider it futile to demand fiscal discipline, price stability and efficient markets if the institutional structure is not there to support them. Weak institutions, they argue, lead to wealth and income inequality, authoritarian rule and lack of constraints on elites inclined to plunder the country.

Indeed, those who see natural resource dependence as a curse to long-run development, usually point to the negative impact on the quality of institutions and governance – especially the temptations of corruption. Natural resource production often generates a lot economic rent, the difference between the cost of production and the market price. Saudi Arabia (admittedly an extreme case) can deliver oil to the loading dock for \$4-6 a barrel, implying that over 90 percent of the revenue from oil is rent.

In high-rent countries, the natural resource elicits a political contest to capture ownership. In low-rent countries the government must motivate people to create wealth -- for example by pursuing comparative advantage in open trade, by promoting equality, and by fostering civil society.

This theory is related to the explanation offered by some economic historians for why industrialization took place in North America before Latin America. They argue that lands endowed with extractive industries (“point source” sectors: oil, minerals, and plantation crops, as in Latin America) developed institutions of slavery, inequality, dictatorship, and state control. Meanwhile, other countries (in those climates originally suited to fishing and small farms, as in the Northeast United States) developed institutions based on individualism, democracy, egalitarianism, and capitalism.

When the industrial revolution came along, the latter areas were well-suited to make the most of new technologies and new ways to manage production. By contrast, regions specialized in extractive industries were not, because society had come to depend on class structure and authoritarianism, rather than on individual incentive and decentralized decision-making. This theory is thought also to fit Middle Eastern oil exporters like Iran especially well.

## **Long Term Sustainability**

Two hundred years ago, much of the tiny (eight-square-mile) island-nation of Nauru in the South Pacific consisted of phosphate deposits, derived from thousands of year's accumulation of bird guano. Phosphates are manna for the fertilizer industry. And as a result of highly profitable mining for export, in the late 1960s and early 1970s Nauru could boast of the highest income per capita of any country in the world! Eventually (actually, very quickly), the deposits were depleted. Yet little of the proceeds had been saved --let alone well-invested -- during the period of abundance. Today, the money is gone and so is the tropical paradise: the residents are left with a narrow, environmentally precarious rim of land circling a wasteland where the open-pit phosphate mine used to be.

Nauru<sup>1</sup> is the poster economy for "Hartwick's rule," (named after John Hartwick, an economist at Queen's University in Canada), which says that all rents from exhaustible natural resources should be invested in reproducible capital, so that future generations do not suffer a diminution in total wealth (natural resource plus reproducible capital), and therefore in consumable income.

Sometimes, as in the Nauru example, the government controls the natural resource, and excessive depletion is another instance of a failure in governance. Politicians tend to extract at a rate in excess of the efficient (value-maximizing) path because they undervalue the claims of future generations. They discount the future because they are intent on surviving the next election -- or coup attempt.

Privatization would be a possible remedy for the problem of excessive depletion, if a full assignment of property rights were possible. That would give the owners adequate incentive to maximize the value of the resource in question. But often this is not possible. The difficulty in enforcing property rights over non-renewable resources in the long run constitutes a category of natural resource curse of its own.

In some circumstances, the physical possession of mineral wealth undermines the motivation for the government to establish a broad-based regime of property rights for the rest of the economy. This constitutes a double whammy: The lack of enforceable property rights undermines the development of an efficient market economy, even as it discourages the value-maximizing exploitation of the natural resource.

---

<sup>1</sup> The island subsequently tried to promote itself as a tax haven and money laundering center for the Russian mafia, but that's an entirely different -- if equally sad and bizarre -- tale.

In other circumstances, the natural resources do not lend themselves to a simple system of property rights even if the government has the means and the will to enforce one. Overfishing, overgrazing and over-use of well water are classic examples of the “tragedy of the commons” that generally applies to “open access” resources. Individual fisherman, ranchers and farmers have no incentive to restrain themselves because others can’t be expected to restrain themselves, even as fisheries or pastureland or aquifers are being depleted.

The difficulty in imposing property rights on open access resources is particularly severe when the resource is dispersed over a wide area, as is timberland. Even the classic point-source resource, oil, can suffer the problem -- especially when wells drilled from different plots of land hit the same underground deposit.

One obvious implication of unenforceability is that the resource will be used more rapidly than the value-maximizing calculations call for. For example, over-grazing may reduce the total amount of grass grown on common land, and will certainly reduce the size of the sustainable herd of animals that can graze on it.

Enforcement of property rights is all the more difficult in a frontier situation. America’s “Wild West” was dogged by claim-jumping during the gold or silver rushes of the late 19<sup>th</sup> and early 20<sup>th</sup> century. Today, similarly anarchic conditions often apply in the tropical forest frontiers of the Amazon, Borneo and the Congo.

Where a valuable resource such as oil or diamonds is there for the taking, factions are more likely to fight over it, compared to cases in which production requires substantial inputs of labor and capital investment. And violent domestic conflict (or the risk of it) is certainly bad for economic development. Researchers have found that economic dependence on oil and mineral wealth is correlated with civil war. Endless conflicts in oil-rich Angola and Sudan come to mind.

## **Dutch Disease**

The name was coined by *The Economist* in the 1970s to describe a condition faced by the Netherlands (and later, many other countries) after the discovery of huge reserves of natural gas offshore. The mechanics of Dutch disease can be complicated. But, at root, the condition refers to the decline in competitiveness of a country’s other exports after revenues from a natural resource export lead to a real appreciation of the currency.

Note some distinctions here. Dutch disease is a macroeconomic phenomenon linked to changes in real exchange rates. It shouldn’t be confused with the volatility problem discussed above, where unpredictable fluctuations in natural resource prices create economic uncertainty and, one way or another, reduces productivity in the economy. Nor should it be necessarily the same as the “crowding out” scenario, where the natural resource sector sucks labor and capital away from manufacturing; this could happen without a change in exchange rates.

Dutch disease does raise the question of whether it is really a problem for the economy as a whole, as opposed to a problem for interests with a stake in sectors that compete with natural resource production. It is possible that there are positive spillovers to having a large manufacturing sector – that in one way or another, experience in manufacturing leads to gains in productivity. On the other side of the coin, however, is the principle of comparative advantage: some countries may do better specializing in non-manufacturing sectors if nature so suits them.

But, whatever the net effect of the movement of labor and capital into non-traded goods and services that are free from the competitive pressures created by currency appreciation, there is no question that upward pressure on the currency from a resource boom requires a thoughtful response from the monetary authorities. Just “letting the markets work” is not a fully adequate guide to monetary or exchange rate policy.

### **The Case for Skepticism**

Some economists question the reality of the natural resource curse. They point to examples of commodity-exporting countries that have done well -- evidence that natural resource endowments do not necessarily doom a country to slow growth.

Norway ought to be a candidate for the curse – oil and gas generate half the country’s export revenues and yield 30 percent of the revenues used to fund a very generous welfare state. Yet the Norwegian economy is healthy by almost any criterion and is at or near the top of every international comparison of the quality of governance. Or consider Botswana and the Congo, both of which are rich in diamonds. Botswana is the best performer in continental Africa in terms of democracy, stability and growth of income, while the Congo is among the very worst.

Of course most general rules have their individual exceptions, even if statistically it holds true on average. Some skeptics go further, however, arguing that the negative statistical relationship between resource dependence and long term economic growth doesn’t show what people think it shows. Lack of industrialization may determine dependence on commodity exports, rather than the other way around. To put it another way, countries that fail at manufacturing have a comparative advantage at commodity exports by default. Another set of skeptics point out that some countries are both strong resource exporters and strong economic performers – think Canada, Australia and Chile. Their interpretation is that good institutions are just as useful for developing natural resources as they are for the other sectors of the economy.

### **Avoiding the Pitfalls**

Commodity abundance is a double-edged sword, one that brings both benefits and risks. It sometimes does lead to setbacks in economic or political development, but it need not. Thus, the first priority for any country with the good luck/bad luck to come into

a mineral windfall should be on finding ways to sidestep the pitfalls that have afflicted other commodity producers in the past.

Governments often adopt policies in the name of dealing with commodity price instability that do not work, or are actually counterproductive. For example, marketing boards and cartels among commodity exporters have failed. When grain prices are high, India places export controls on rice and Argentina and Russia put export controls on wheat, thereby giving up useful foreign exchange and driving the world prices still higher. Many food-importing countries legislate price controls, with the effect of either creating artificial shortages or adding to imports and thereby putting further upward pressure on international prices. Many blame speculators for price volatility, and pursue policies to shoot the messengers. And so forth.

Now, it's true that the prices of commodities are not determined solely by current economic fundamentals such as disruptions from weather. Rather, they are increasingly determined by expectations about a variety of other factors such as growth in China or changes in interest rates – in other words, by speculation. But speculators are not necessarily destabilizing. More often than not, speculators act as advance detectors of changes in economic fundamentals, and provide the signals that actually smooth fluctuations.

That said, a host of policy innovations could help to weight the deck against the natural resource curse and in favor of natural resource blessings. Some of the most promising ideas:

- Hedge export proceeds on derivatives markets (in particular, options markets), as Mexico has done with oil. That way, exporting countries can plan government budgets around firm expectations of revenues and, as important, dampen shocks caused by unanticipated changes in price.
- Denominate debt in terms of the world price of the export commodity. Exporting countries can (and, in some cases, should) borrow abroad, e.g., to develop infrastructure. By writing debt contracts in which the principle is indexed to the price of their export commodity borrowing countries can share the risk of commodity price volatility with lenders. (In effect, the commodity export proceeds act as a sort of national collateral against the loan.)
- Adopt Chilean-style fiscal rules, which prescribe a structural budget surplus and use independent panels of experts to determine what future price of the export commodity – in Chile's case, copper -- should be assumed in forecasting the structural budget. Thus when the independent experts determine that copper prices have fallen below long-term expectations, the government is authorized to offset the impact with temporary fiscal stimulus. But when copper prices are above the long-term trend, and the bonanza is determined to be entirely temporary, the government must save the proceeds.



- Intervene in foreign exchange markets to dampen upward pressure on an exporter's currency in the early stages of commodity booms, while seeking to prevent the money supply from swelling. Subsequently, allow gradual appreciation when the commodity boom has proved to be long-lived or when domestic inflation is no longer contained.
- Establish transparent sovereign wealth funds with the proceeds of commodity exports in order to assure that future generations share the bounty. Botswana's "Pula Fund," built on earnings from the sale of diamonds, is a good model. The fund, invested entirely in securities denominated in other currencies, serves both as a sinking fund to offset the depletion of diamonds and as a buffer to smooth economic fluctuations.
- Make lump-sum per capita distribution of revenues from mineral exports in order to make sure it doesn't end up in the bank accounts of corrupt officials.

Technical fixes like these can't solve problems that derive from more fundamental failure of the economic culture, any more than regular elections shielded Soviet citizens from authoritarian rule. But where there is aspiration to better governance, smart policy and institutional innovation can make a difference. And where economic institutions are up to the task, they really can assure that natural resources have a positive impact on economic growth and living standards.