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Why do some resource-abundant countries succeed while others do not?

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Abstract On average, resource-abundant countries have experienced lower growth over the last four decades than their resource-poor counterparts. But the most interesting aspect of the paradox of plenty is not the average effect of natural resources, but its variation. For every Nigeria or Venezuela there is a Norway or a Botswana. Why do natural resources induce prosperity in some countries but stagnation in others? This paper gives an overview of the dimensions along which resource-abundant winners and losers differ. In light of this, it then discusses different theory models of the resource curse, with a particular emphasis on recent developments in political economy.

Key words: resource curse, political economy

JEL classification: O13, O43

I. Introduction

With recent rates of economic growth half of the world's population has doubled its income every decade. The countries that grow the most have relatively few natural resources and relatively many people. This has led to a sharp increase in the prices of natural resources relative to the prices of industrial goods. The resource-abundant countries, exporting natural resources and importing finished goods, have had massive improvements in their terms of trade. Everyone wants to buy what these countries are selling—and everyone wants to sell what they are buying.

But as the literature on the resource curse shows, such good news for resource-abundant countries also comes with challenges. In recent decades those countries richly endowed with valuable resources have had a worse economic development than countries poor in resources. Van der Ploeg (2007) provides an interesting overview of the empirical and theoretical research on the resource curse.

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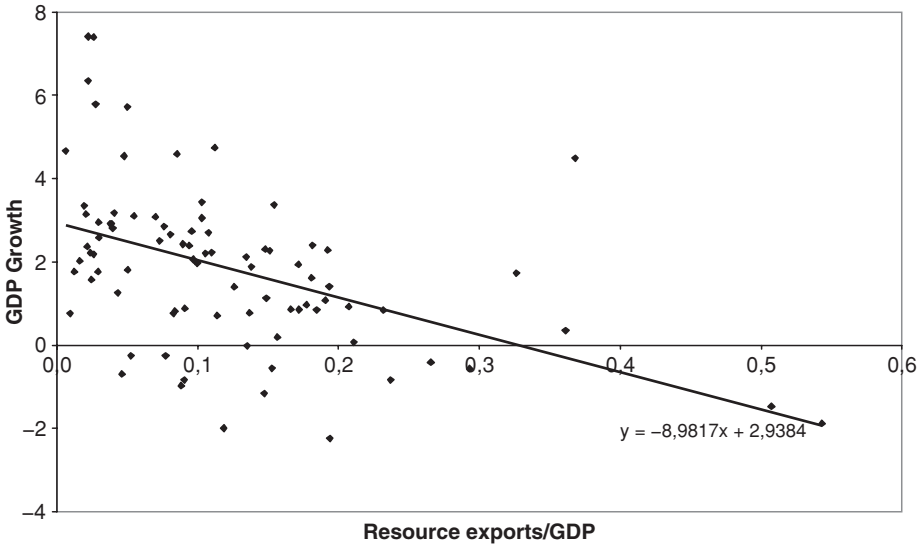
Figure 1: Resource abundance and growth



Source: Data used in Mehlum *et al*. (2006).

Recently we have seen a shift in the resource-curse literature. Rather than investigating the average economic effects of resources, researchers have turned to the perhaps more important question: why do some resource-abundant countries succeed while others do not? The most interesting aspect of resource-abundant countries is not their average performance, but their huge variation. Resource-abundant countries constitute some of the richest and some of the poorest countries in the world.

This paper discusses some reasons why we might observe these differences. It then, in light of this, discusses some recent theory developments in the research on the resource curse. The paper will probably leave more questions than answers—and, in part, that is the intention. We still have a quite limited knowledge along which dimensions the resource-abundant winners and losers differ, and about what the mechanisms behind these differences are. It is to be hoped that this limited knowledge and the speculations below will stimulate further interest in the topic.

Section II reviews some basics of the resource curse, where the important topic is the difference between correlation and causality. Section III sets out six dimensions that might help explain the variation in experiences among resource-abundant countries, while section IV, in light of this, discusses recent theories of the resource curse. Section V concludes.

II. Resource abundance and growth—correlation and causality

The most famous typical picture of the resource curse is reproduced in Figure 1. Each point in the figure represents one country. The horizontal axis shows the share of natural resource exports in GDP while the vertical axis shows the average annual growth after 1965.

Table 1: Resource abundance and growth (dependent variable: yearly average GDP growth)

	Regression 1	Regression 2	Regression 3
Initial income	−0.79*	−1.02*	−1.28*
Trade openness	3.06*	2.49*	1.45*
Resource abundance	−6.16*	−5.74*	−6.69*
Institutional quality		2.20*	0.60
Investments			0.15*
Number of countries	87	87	87
Adjusted R^2	0.50	0.52	0.69

Note: *indicates that estimate is significant at 5 per cent level.
Source: Mehlum *et al*. (2006).

The regression line shows that on average there is a negative correlation between resource abundance and economic growth.

But can we from this conclude that resource abundance *leads to* lower growth? No, and as we will see there are several reasons for that. First, consider a hypothetical case where all countries in the world had the same amount of resource exports, but some countries were rich while others were poor. Then, since the measure of resource abundance is exports relative to GDP the poor countries would be measured as resource abundant while the rich ones would be measured as resource poor. Then if rich countries for some reason had faster growth than poor countries this would show up as a pattern like that in Figure 1—but obviously we could on the basis of this say nothing about the connection between resource abundance and growth. Or consider the growth prescriptions of the 1950s. Then there was a concern that resource-rich countries would face decreasing terms of trade and, as a result of that, low growth in income. The prescription was import substitution—that more likely reduced growth than increased it. Therefore, if countries with natural resources tended to follow a more inward-looking policy—and if such a policy reduces growth—it would be misleading to blame the bad growth on resource abundance. The problem was policy, not resources.

These examples bring with them the lesson that there is a difference between correlation and causality. Figure 1 can tell us nothing about whether low growth leads to a high measure of resource abundance, or if resource abundance leads to low growth, or if there is a third factor, for instance policy, that correlates with both resource abundance and growth. To make some progress on this we must control for other factors—we cannot just isolate the two variables we are interested in.

In Table 1, we report the result of a regression with average annual GDP growth as the dependent variable. In Regression 1 we note that resource abundance is negatively correlated with growth also when we control for initial income level and trade policy, thus reducing the concerns raised above.

Nevertheless, it may be reasonable to believe that many countries that export natural resources have a weak protection of property rights, much corruption, and poor-quality public bureaucracy. Then, if we did not control for that we could misleadingly blame resources for the low growth when, in fact, it was the quality of institutions that was the problem. In regression 2 we try to control for this by using an index for the quality of institutions. This index runs from zero to one, with one being the best possible institutional quality. We see that still the effect of resource abundance is about the same. However, another problem may be that in resource-rich countries the investment climate may be worse than in other

countries. In Regression 3 we control for this by including the share of investments in GDP. We note that still the effect of the resource abundance term is basically the same. Indeed, we could go on and on controlling for more and more factors, and this is precisely what the empirical literature on the resource curse has done. We may conclude from this literature that:

In the last 40 years there is a negative robust correlation between the share of resource exports in GDP and economic growth. This correlation remains even when many other factors are controlled for.

The robustness of the correlation between resource abundance and growth, even when we control for many other factors, gives us an indication that there may be a causal effect from resources to growth—but only an indication. And this is the main challenge of the empirical literature on the resource curse as it now stands. It is not hard to predict that the empirics of the resource curse will continue to attract considerable research interest; there are simply still so many unanswered questions—in particular, the most important: is there a *causal* effect from resource abundance to growth?

The empirical literature will probably develop in at least two main directions—the first has already started, the second not yet.

(i) Panel data with country fixed effects

Some countries do well—others less so. Although we know a great deal about why countries differ, and can control for that in regressions, we will never be able to know if we have controlled for all relevant country-specific effects. The obvious solution to this is to undertake panel-data analysis with country fixed effects. In this way we can pick up fixed country-specific characteristics, and if the correlation between resource abundance and growth still holds, we can be more confident that this is not a result of some country specific effect that we have not controlled for. The first studies using this approach are under way. Aslaksen (2006) shows that the well-established correlation between resource abundance and corruption continues to survive when using panel data with country fixed effects, while Aslaksen (2009) shows that the tendency for oil to impede democracy is also valid in a similar approach. Collier and Goderis (2007) investigate the growth effects of resource price booms, and with country fixed effects also they find strong evidence of a resource curse in the long run. In the short run, on the other hand, resource booms increases income.

(ii) True exogenous variation in resource abundance

Even with panel data there is a concern that causality may run from economic variables to the measure of resource abundance, rather than the other way around. For instance, under some circumstances it may be more tempting to extract natural resources, or to explore the potential for doing so, than under other circumstances. And these circumstances are, in turn, likely to be related to economic conditions that prevail or are expected to prevail. Thus it may always be the case that causality runs from economic conditions to the existing measures of resource abundance. This is so irrespective of whether the measure used is exports, production, value, known reserves, or any other economic variable. It could be argued that an exogenous measure of resource abundance is mineral reserves—these are the result of geological characteristics. Although the literature that uses such measures is clearly interesting (see, for example,

Stijns, 2005, and Brunnschweiler and Bulte, 2008), the measures used are not exogenous and are likely to bias the estimates of resource abundance: the countries with the longest period as industrialized and with the best institutions may have explored and found more of their reserves than other countries—thus well-functioning countries may, other things equal, be measured as more resource abundant than less well-functioning countries. As a consequence, using these measures may underestimate an eventual negative growth effect of natural resources.

So what is a measure of natural resources that is truly exogenous? Finding such a measure would allow a natural experiment on the causal effect from resource abundance to growth. To my knowledge there exists no paper that has come up with a true exogenous measure of resource abundance. One possibility could be to use variation in geology—clearly exogenous. For instance, for oil deposits to exist, particular geological features, such as a sedimentary pool in addition to geological formations able to hold on to the reserves, must exist. The problem with this approach, however, is that the conditional probability of finding oil with known necessary geological characteristics in place is simply too small to use geology as a proxy for oil.

III. Correct answer—uninteresting question?

Although we do not know for sure, it might be the case that resource abundance on average reduces growth. Nevertheless, this may not be the most interesting question: rather than studying the average effect of resources, recent research has turned to its variation—when does resource abundance breed success and when does it breed economic failure? So far, at least six dimensions in which the winners and losers differ have been identified:

(i) saving of resource income;
(ii) presidentialism versus parliamentarism;
(iii) institutional quality;
(iv) type of resources;
(v) offshore versus onshore oil; and
(vi) early versus late industrialization.

(i) Saving of resource income

A key mechanism in several of the possible explanations of the resource curse rests on overspending of resource income. Thus it is important to investigate if the resource-abundant winners have a different saving behaviour compared to the losers. A main obstacle of such an analysis, however, is that income from non-renewable resources in the national accounts is misleadingly classified as income. For this reason it does not make sense to simply compare the savings rates of different countries. A comparison with a person selling an apartment makes the problem transparent.

Consider a person who owns a flat worth $100,000. If today this person sells his flat and deposits the money in the bank, we do not conclude that the person received an income of $100,000 today. Yesterday he had a flat worth $100,000, today he has no flat but $100,000 in the bank—the person is neither richer nor poorer than he was yesterday. The same logic

Table 2: Resource-adjusted savings rates as percentage of gross national income, average 1972–2000

Countries claimed to have escaped the resource curse		Countries claimed not to have escaped the resource curse	
Australia	18.0	Algeria	6.11
Botswana	33.0	Congo	−11.9
Canada	15.7	Mexico	10.8
Chile	7.4	Nigeria	−22.0
Ireland	22.0	Saudi Arabia	−21.5
Malaysia	19.9	Sierra Leone	−1.8
New Zealand	18.4	Trinidad and Tobago	−3.9
Norway	17.0	Venezuela	−1.8
Oman	−26.6	Zambia	−5.8
Thailand	20.0	Ecuador	n.a.
USA	15.1		

Source: Matsen and Torvik (2005).

can be applied to sales of non-renewable natural resources. When a country sells its oil and puts the proceeds in the financial market, it reduces the natural capital of the country while it increases the financial capital of the country. The wealth of the country is unchanged. Should it happen to consume all the proceeds from the sale of oil, the correct understanding is that its savings rate is negative—but the savings rate in the national accounts is calculated as zero: the country had an 'income' which it used for consumption hence the savings rate equals zero (of that 'income').

Thus in national accounts a fundamental problem with sales of non-renewable resources is that such sales are recorded as income, in turn overestimating the true savings rates. We therefore need savings rates that take changes in counties' resource wealth into account. In constructing that, we take as a starting point the traditional savings rates from national accounts, and then subtract net extraction of oil, gas, minerals, and timber. We term these savings rates 'resource-adjusted savings rates'. The question is now if there are systematic differences in the resource-adjusted savings rates between those countries that have escaped the resource curse and those which have not.

In Table 2 we sort countries into those that, according to Abidin (2001) and Mehlum *et al*. (2006), have escaped the resource curse in the left-hand column, and those that have been claimed not to escape the curse in the right-hand column.

From Table 2 we note the tendency for those countries that have escaped the resource curse to have higher resource-adjusted savings rates than those which have not. Among the countries listed as escapers, 10 out of 11 have positive resource-adjusted savings rates (and it is questionable whether the one that has not—Oman—really has escaped the resource curse as Abidin (2001) claims—see Matsen and Torvik (2005)). In contrast, among the countries that have not escaped the curse, seven out of the nine countries we have data for have negative resource-adjusted savings rates over the period.

Table 2 is an indication that one dimension in which winners and losers among resource-abundant countries differ is that of saving. Note, however, that the table says nothing about causality—we cannot know if overspending of resource income has resulted in bad economic development, or if bad economic development has resulted in overspending of resource income. Thus all we are left with from this is a correlation, albeit an interesting one.

(ii) Presidentialism versus parliamentarism

In a new and interesting paper, Andersen and Aslaksen (2008) find the following: the resource curse is relevant in democratic countries with presidentialism, but not in democratic countries with parliamentarism. Furthermore, being parliamentary or presidential matters more for the growth effects of natural resources than being democratic or autocratic.

The results in Andersen and Aslaksen (2008) are again a strong indication that there is a close connection between political incentives and the resource curse, although we still have a limited understanding of why resource abundance has a worse growth effect in presidential countries than in parliamentary ones. Persson *et al*. (2000) find that, compared to parliamentary regimes, presidential ones imply less rent extraction by politicians, a smaller public sector, and public spending targeted towards powerful minorities rather than broad spending programmes. One hypothesis, therefore, may be that in presidential countries the size and allocation of spending resource income is less growth-promoting than in parliamentary countries. While presidentialism may be more of a 'one man show' that can be captured by special interests, parliamentary regimes with their continuous vote of confidence and broader representation in the making of policy, may be better suited to putting proceeds from resources into productive use.

(iii) Institutional quality

Mehlum *et al*. (2006) argue that resource wealth will give the private sector different incentives in countries where institutions are 'grabber friendly' compared to countries where they are 'producer friendly'. In countries with good protection of property rights and little corruption, natural resources may contribute to growth. More natural resources provide private agents with productive investment opportunities, in turn creating positive externalities for other agents. On the other hand, with poor protection of property rights and much corruption, more natural resources may hinder growth. In such countries more natural resources may stimulate predation, rent-seeking, and other destructive and/or non-productive activities, in turn creating negative externalities for the rest of the economy.

Thus a prediction of this theory is that resource abundance should work in the opposite way on growth in countries with good compared to countries with bad institutions. The regressions reported in Table 1 cannot be used to discuss this issue, as there only the average effect of natural resources is available. To investigate whether resources work differently in countries with good and bad institutions we include an interaction term of the form:

$$(\text{Resource Abundance} \bullet \text{Institutional Quality}).$$

In Regression 4 in Table 3 the regression from Table 1 is extended with such a term. The interaction term is highly significant (p-value 0.0017) and the effect of resource abundance on growth is now given by:

$$-14.34 + 15.40\ (\text{Institutional Quality}).$$

This result supports the theory that resource abundance has different growth implications dependent on institutions. In countries with the worst possible quality of institutions the index for institutional quality takes the value zero. Thus in such a country the effect through the interaction term disappears and the growth implication of resource abundance is given by -14.34. In such countries resource abundance is very damaging to growth. In countries

Table 3: Institutions, resource abundance, and growth (dependent variable: yearly average GDP growth)

	Regression 4	Regression 5	Regression 6
Initial income	−1.26*	−1.88*	−1.33*
Trade openness	1.66*	1.34*	1.87*
Resource abundance	−14.34*	−10.92*	
Institutional quality	−1.30	1.83	−0.20
Investments	0.16*	0.11*	0.15*
(Resource abundance • Institutional quality)	15.40*	11.01	29.43*
Oil and mineral abundance			−17.71*
Africa excluded	No	Yes	No
Number of countries	87	59	87
Adjusted R^2	0.71	0.79	0.63

Note: *indicates that estimate is significant at 5 per cent level.
Source: Mehlum *et al*. (2006).

with the best possible quality of institutions the index for institutional quality takes the value one—thus the effect of resource abundance in such countries is given by $-14.34 + 15.40 = 1.06$. If anything, in such countries resource abundance thus stimulates growth. The growth effect of resource abundance seems to be the opposite in countries with good and bad institutions. In countries with good institutions there is no resource curse.

From the table we may also find how good institutions must be for the resource curse to be irrelevant. The positive and negative growth implications of resource abundance cancel out when:

$$-14.34 + 15.40\ (\text{Institutional Quality}) = 0.$$

Thus in countries where the institutional quality exceeds $14.34/15.40 = 0.93$ resources do not contribute negatively to growth. Of the 87 countries in the analysis, 15 countries reach this threshold. For the top 20 per cent of countries with regard to institutional quality, resource abundance does not seem to push growth down.

One of several potential problems with this analysis is that of missing variables: there may be many other differences between Nigeria and Norway than institutional quality that we have not controlled for. Maybe the resource curse is only valid for Africa as the poorest and least developed continent. To shed light on this, in Regression 5 in Table 3 all African countries are excluded from the analysis. The main message is that basically the same results go through—the resource curse does not seem to be a phenomenon limited to Africa.

There may also be other important interactions between resources and institutions or policy. For instance, Arezki and van der Ploeg (2007) find that resources may work better in countries that are more open to trade, while van der Ploeg and Poelhekke (2007) find that resources work better in countries with well-developed financial systems.

(iv) Type of resources

It is unlikely that all types of resources have the same effect on growth. In the theories for why resource abundance may lower growth the mechanism is often in one way or another linked to the extraction of these resources being unusually valuable compared to other economic activities. This is the reason they strongly influence the intersectoral structure of the economy, generate much rent seeking, and have a large effect on political incentives. For oil and many

minerals it is clearly the case that they are very valuable; for agricultural goods it may not be the case. But in the regressions above, all natural resources are lumped together to create one measure for resource abundance. It therefore needs to be investigated whether different resources have different effects on growth—and, more importantly, which resources have the strongest growth effect.

In Regression 6 in Table 3 an alternative measure of resource abundance that only includes oil and minerals is used. There are two important lessons to take home from this regression. First, note that the direct term of resources on growth is still negative, and that the effect is stronger than in the case with the all-inclusive measure of resource abundance. Second, the interaction term is still positive, and it is stronger than when we used the all-inclusive resource measure. These two observations mean that compared with natural resources in general, oil and minerals have a stronger negative growth impact when institutions are bad, and a stronger positive growth impact when institutions are good. In oil and mineral economies the difference between success and fiasco is larger than in other economies.

Boschini *et al*. (2007) is probably the most detailed study on how different types of natural resources affect growth, and how this is linked to the quality of institutions. These authors use four different measures of resources and find that crucial for the growth implications is the combination of institutional quality and the 'lootability' of resources. The worst possible growth effect from natural resources stems from diamonds in countries with bad institutions.

(v) Offshore versus onshore oil

There are some indications that countries with offshore oil fare better than countries with onshore oil. For instance, Lujala (2009) finds that onshore oil increases the risk of violent conflict in a country, but that offshore oil has no effect on the risk of conflict onset. This finding may reflect that onshore oil represent different incentives and opportunities for rebel groups than offshore oil. Offshore oil installations are easier to protect and the operations of an oil field can be more or less independent of activities onshore. Onshore oil provides different actors with better possibilities of using violence and predation to grab part of the oil resources, which in turn may be socially destabilizing.

Other than the obvious link from social instability to low growth, there is also another argument that offshore oil may be more growth promoting than onshore oil. Offshore oil demands more complicated technical solutions—which may be an advantage. This is often claimed to be the main explanation for why in Norway the Dutch-disease theory, that predicts that resources slow productivity growth, is actually turned on its head: the challenging climate and deep-sea drilling have necessitated the development of a new high-tech industry that is today a world leader—while when oil drilling began in 1973 Norway had no such industry. This industry has generated positive knowledge externalities domestically. Furthermore, the value of this human capital by far exceeds its use on the Norwegian shelf—it is probably no coincidence that the largest Norwegian ownership of petroleum resources is in Angola, with sea depths of around 2,000 metres, or that the Norwegian StatoilHydro was recently selected as one of two main foreign companies to participate in Russia's Shtokman (one of the world's largest gas fields, located offshore in the Barents Sea). Thus a rough climate and demanding conditions for drilling, which were initially a main challenge, have turned into effects of resource abundance different from what standard Dutch-disease theory would predict.

(vi) Early versus late industrialization

Entering the 1900s Norway was (together with Ireland) one of poorest countries of Europe. Today, Norway is one of the richest countries in the world. This remarkable transition has been driven by exploitation of natural resources. It started with fish, timber, and minerals, continued with hydro-electrical power, and since the 1970s oil and natural gas have been key sectors. It is hard to argue that natural resources have historically been a disaster for Norway. Economic historians, in particular Gavin Wright (see, for example, David and Wright, 1997), have pointed out that, looking back in time, resource abundance has been a main driver of growth rather than the opposite. In, for example, Finland, Sweden, Norway, Australia, Canada, and the USA, there is little doubt that resources have historically promoted growth and industrialization. Contrasting the literature in economic history with the literature on the resource curse, one is led to question whether the effect of resource abundance has changed over time—and, if so, why?

This is clearly an under-researched area where we have mainly speculation. One further observation that may lead us to believe that the effect of resources may have shifted over time is the weak or non-existent connection between income *levels* and resource abundance, despite the close correlation between income *growth* and resource abundance over the last decades. One hypothesis is that the eventual change in the growth effect of natural resources is to be found because countries with different levels of institutional quality industrialized at different times. As shown by Acemoglu *et al*. (2001, 2002), the countries that industrialized first were those with the best quality of institutions. Therefore the countries that industrialized early had an institutional apparatus in place that prevented the negative growth effects of resources, while those that used their resources at a later stage did not have such institutions in place. Karl (1997) was an early proponent of the view that a resource discovery is worse for a country that has not yet developed its institutions. The following passage from *The Economist* (2006) also illustrates some possible mechanisms:

> Most countries with national firms used their oil wealth to develop the authority of the state, rather than the other way around. So NOCs (National Oil Companies) sprang up before their countries had institutions strong enough to regulate them, or to manage the money they generate—a recipe for inefficiency and corruption.
>
> These feeble governments, in turn, look to NOCs to perform tasks that would normally fall to the bureaucracy. Many oil-rich states rely on them to bankroll their budgets, rather than bothering to collect any tax. They also depend on them to do a lot of the spending: hence the tendency to draft state oil firms into distributing subsidies and providing social services. In the worst cases interference becomes a surrogate for economic growth, as governments demand they build uneconomic facilities and hire unneeded workers.
>
> No wonder then that Statoil, Norway's NOC, is generally thought to be the best of the lot. Norway, after all, was a rich, efficiently administered country long before Statoil produced its first drop of oil. It had plenty of educated citizens to help staff and regulate the company, a free press, well-funded police and impartial courts to guard against corruption. Norway also had demanding voters to limit waste and inefficiency.

Despite these initial speculations, however, the only conclusions we can draw on this point is really that, to date, we do not know to what extent the growth effect of resources has changed over time, and, if it has, why this change has taken place.

IV. Theory

The theoretical literature on the resource curse contains many mechanisms that may explain why 'more leads to less'—in the sense that the general equilibrium effect of more natural resources may actually be lower income. The first wave of theory models to explain this was within what might be termed Dutch disease theory. Van Wijnbergen (1984) developed the first model showing how oil may reduce aggregate income through a learning-by-doing mechanism. When a country discovers oil, its population wants to spend part of the value of this as consumption of non-traded goods. Demand for these increases, pulling resources out of traded sectors, and decreasing production here. The decreased traded sector in turns means less learning by doing, and lower productivity growth than would otherwise be the case. This effect may be sufficiently strong to outweigh the initial increase in income that the oil discovery generated. Other models within the Dutch disease tradition include Krugman (1987), Matsuyama (1992), Sachs and Warner (1995), Gylfason *et al*. (1999), Torvik (2001), and Matsen and Torvik (2005).

The second wave of models explaining the resource curse consisted of rent-seeking models. A standard result in the rent-seeking literature is that when a new income possibility arises, this may lead to increased rent seeking that reduces the net increase in income for society. However, the extent of rent dissipation falls short of one and so the net increase in income is still positive. The more agents that undertake rent seeking, the less total income increases. Note that these theories cannot explain what is normally understood as the resource curse—that more natural resources *decrease* total income. The literature on rent seeking and the resource curse thus models different reasons why the extent of rent dissipation may exceed one—in which case more natural resources may push total income down.

The most famous paper within the rent-seeking tradition of the resource curse is Tornell and Lane (1999). They show how, in an economy with many groups, an increase in the marginal productivity may actually reduce growth: when the marginal productivity increases this means more income available for redistribution. Each group in the economy demands higher transfers, and the sum of these demands may make the tax rate go up sufficiently that the net marginal productivity of capital, and thus growth, is reduced. In Torvik (2002) we see that entrepreneurs can use their talent running modern firms or otherwise to undertake rent seeking in the hope of capturing some of the resource income of the economy. With more natural resources fewer entrepreneurs will run firms and more engage in rent seeking. In turn, this means that production in modern firms fall, reducing income and demand further, making it even less profitable to run modern firms. Through rent seeking more natural resources generate a negative multiplier effect, and the net result is lower income. Other resource-curse models within the rent-seeking tradition include, among others, Baland and Francois (2000), Hodler (2006), Mehlum *et al*. (2006), and Wick and Bulte (2006).

(i) The political economy of the resource curse

We turn now to the third wave of models to explain the resource curse, namely political economy models. This is probably the most active research field on theories of the resource curse currently, and will probably continue to be so for a while, simply because there are so many political-economy characteristics of resource-rich countries that still cry out for an explanation.

Political science

Within political science it is, in particular, the contributions of Karl (1997) and Ross (2001*a*, *b*) that have attracted attention. In *The Paradox of Plenty*, Karl discusses how oil revenues contributed to bad economic and political development in Venezuela. Although the mechanisms described by Karl have later been criticized and claimed to be inconsistent (see, for example, Ross, 1999), it is beyond doubt that the book by Karl contributed more than a fancy title. It is now understood that political as well as economic forces are fundamental to an explanation of the resource curse. The contributions of Ross further extend the understanding of the politics of natural resources. In (2001*a*) Ross shows that, in several south-east Asian countries, timber booms had the result that politicians destroyed institutions on purpose. The timber gave politicians a way to earn big money—but to do so they had to dismantle the institutions that were set up to protect the forests. Rather than institution building, politicians engaged in institution destruction. In Ross (2001*b*) the topic is whether oil retards democracy. Countries rich in oil are on average less democratic than other countries, even when controlling for income, geography, religion, and so on.

The perception that political incentives are key to understanding the resource curse has also by now become integrated in the economics profession, although to date there are not many applied theory papers on the political economy of the resource curse. We review some of the mechanisms identified to date, before we point out some political-economy topics that still lack a formal treatment.

(ii) Civil conflict

Most political-economy models of the resource curse study civil conflict. Collier and Hoeffler (2004) explain their empirical findings of resource abundance causing conflict in a model assuming that more resource rents make fighting more possible owing to available financing, as well as more profitable since the prize for the 'winner' is larger. Skaperdas (2002) and Mehlum and Moene (2002) show how the fighting effort and the social waste of fighting increase with the size of natural resource rents. Aslaksen and Torvik (2006) discuss how resource rents affect the choice between competition for political power through elections versus through violent conflict. Violent competition is costly. An army must be set up, soldiers need to be paid, and property may be destroyed. However, competing through conflict also provides politicians with autonomy in case they win: that is, they are not accountable to voters. Competing in a democracy, on the other hand, is arguably less costly than competition through conflict. However, politicians in a democracy are accountable to voters, and for opportunistic politicians this is a cost: they get away with less rents than if they were not constrained by voters. Aslaksen and Torvik (2006) show that the *relative* pay-off to violent conflict is increasing in resource rents—thus in countries with more resource rents democracy is less likely to be self-enforcing. Furthermore, and as discussed in Acemoglu *et al*. (2004), greater resource rents make it easier for dictators to buy off political challengers.

(iii) Incumbency distortions and lobbying

The resource curse seems, however, not to be limited to autocracies. Acemoglu and Robinson (2006) model underdevelopment as the result of political elites blocking technological and institutional development because such development may erode the elites'

incumbency advantage. Such blocking is more likely to arise when the rents from maintaining power are high, such as where public income is derived from natural resources. Damania and Bulte (2003) show that when politicians maximize the surplus from a lobbying game, resource abundance may increase the income from lobbying, but divert the economy from its optimal path.

(iv) Short time horizons and large public sectors

Robinson *et al*. (2006) show how politicians have a too short time horizon because they discount the future by the probability they remain in power, which is irrelevant from a social perspective. Thus we get over-extraction of resources. With more (or more valuable) resources, however, the future utility of having political power will increase, and as a result politicians will change policy so that the probability they remain in power increases. To do so they employ people in the public sector, which in turn gets too large from an efficiency point of view. Thus although it may be politically efficient to over-expand the public sector in resource-abundant countries, it is not economically efficient. Similarly, Robinson and Torvik (2009) develop a political economy model of soft budget constraints, where the political desirability of soft budgets increases in resource wealth.

(v) White elephants

The greatest honour one could be shown by the King of Thailand was to receive as a present a white elephant. However, a white elephant could not be used for manual labour, and naturally had to be fed: thus it was big, expensive, and inefficient.

A main puzzle in resource-rich economies is why the massive domestic investments have not given growth pay-off. Gelb (1988) shows that about half of the windfall gains from the OPEC shocks in the 1970s were invested domestically. Any growth model would then predict strong growth—but growth was not only weak, it was negative. GDP in OPEC countries fell by an average of 1.3 per cent per year from 1965 to 1998 (Gylfason, 2001). So how could a massive increase in investment result in negative growth rates? The explanation is probably that the problem was not the quantity but the quality of investments. The politicians decided on investments in projects that had political but not economic pay-off. For instance, Gavin (1993, p. 216) points out ‘the tendency for governments to invest in projects with high prestige or political payoff, but with little economic rationale’.

But this only raises another question—why should there be a conflict between what is politically efficient and what is economically efficient? If voters are irrational or have limited information about the economic effects of policies, it would perhaps not be surprising if economic inefficiency had political appeal. However, as discussed in Robinson and Torvik (2005), fully rational forward-looking voters may also reward politicians that promote inefficiency.

Consider the following example. We have two political parties—the Island Party and the Mainland Party. The Mainland Party is largely concerned with voters on the mainland, the Island Party with voters on the Island. Initially the Island Party is incumbent, and they have to decide if a bridge should be built from the island to the mainland. It is clear to everyone that the bridge is inefficient. Before the election the Island Party must decide whether to launch the building of the bridge or not. After the election, whichever party wins political power will

decide to complete or terminate the construction of the bridge. What has been built before the election is a sunk cost—thus the decision after the election will be should the bridge be completed, given the remaining costs. Since we assume voters to be fully rational, they see that after the election this is the relevant decision. Suppose that for the island population it is efficient that the bridge is completed, given that it is started. The mainland population is indifferent, given that the bridge has been started before the election. The Island Party will be most likely to complete the bridge—they are the ones who care the most about the island population. If the bridge is very efficient to complete, given that it is started, both parties will decide to complete should they be elected. However, if the bridge is only marginally efficient to complete, given that it is started, only the party that cares most about the island population will complete it. In the latter situation, therefore, the election result will matter a lot for the island population—the Island Party will get more votes from the island population than in a situation where the bridge is completed whoever wins the election.

What political incentives does this give the incumbent Island Party? First, to be able to tilt the re-election probability in its own favour, the bridge has to be sufficiently inefficient. Should the bridge be very efficient to complete, given that it is started, it will not be an issue in the election campaign at all—both parties will have the same opinion on the matter. To make the bridge an issue in the election campaign it has to be sufficiently inefficient that even when fixed costs are subtracted the Mainland Party will not complete the bridge. Thus to tilt the re-election probability in its own favour the incumbent has an incentive to launch inefficient investment projects—only then can the incumbent ensure that the voters become economically invested in its own political success.

Second, picking economic losers rather than winners is more tempting the more resource rents that accrue to the public sector. Resource rents assure that there is a lot of 'cheap money' that can be used on inefficient projects—at the same time as winning political power is of higher value. Thus in resource-abundant economies white elephants may be politically efficient—although they are economically disastrous. The mega-investments with the oil booms of the 1970s gave no growth effect. This is not in accordance with standard growth theory, but it is in accordance with models of political economy.

V. Concluding remarks

There seems to be at least four areas where the research on the resource curse should, and probably will, make progress. The first relates to the basic question of causality. We still simply do not know to what extent resource abundance *causes* slow growth. The second is to identify further along which dimensions the resource-abundant success and failure countries differ. For instance, is it the case that the amount of resource income saved predicts which countries do well and which do not—or is this just a spurious correlation? The third area, which has not been discussed in this paper, relates to policy implications. Although Matsen and Torvik (2005) is an exception, most studies of the resource curse to date are positive. Normative prescriptions may not follow easily from these, but will be crucial to allow countries to use their resource wealth in economically and politically better ways. The fourth area is further to develop applied modelling of the political economy of the resource curse. Regarding the theoretical modelling of the political economy of the resource curse, more remarkable than the research that has been done so far is that fact that so little research has been done. This field is still in its infancy. For instance, we have no clear understanding

of how resource wealth affects political accountability, how it affects the type of people that choose to become politicians, why presidential resource-abundant countries seems to do worse than parliamentary countries, how voters' views on efficiency-enhancing economic reforms are affected by resource abundance, the political implications of a larger non-traded and a smaller traded sector, or why voters in some resource-rich countries choose to remove checks and balances from the constitution. Nevertheless, simply based on casual observation, these topics, and many more, seem to be key to understanding the interplay between resource wealth, economics, and politics.

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