How to Spend It: Resource Wealth and the Distribution of Resource Rents

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Abstract

Natural resource revenues differ from other government revenues both in their time profile, and in their political and legal status: they are volatile and exhaustible, and belong to all citizens of the country in which they are located. This paper discusses the theory of natural resource revenues and examines expenditure practices in a range of resource-rich countries. It considers both the distributional impact and the efficiency of expenditure policies, focusing on the extent to which they succeed in providing all citizens with their share of the benefits due to natural resources.

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1. Introduction

Resource rents are the closest we have to manna from heaven. They represent unearned income and provide a government with a potential source of revenue that should be easy to collect, enabling greater expenditures on behalf of citizens for a given tax burden. But natural resources are hard to manage. From the establishment of a productive resource sector, through the income flows to government and, finally, fiscal expenditures, resource revenues in practice are rarely uncontroversial. This paper focuses on hydrocarbons and minerals and picks up the question from the point at which revenues start to flow to the government.[2] Along with commodity prices, these revenues have risen dramatically since the early 2000's, making all the more urgent the question of how to spend them. I review both the theory of optimal expenditure and existing practices, with a focus on the extent to which, and the mechanisms by which, citizens of resource-producing countries benefit from their resources.

Resource revenues almost invariably flow through government budgets on their way to citizens. Their management is therefore a part of fiscal policy more broadly. But there are two features of resource revenues that set them apart from general revenues. First, their time profile is distinctive: revenues are volatile, driven largely by the volatility of commodity prices, and they are, in principle, temporary—though exploration and improved technology can lead to increases in recoverable stocks.[3]

The second unique feature of resource revenues is their ownership: all citizens have an equal claim on them. Moreover, unlike taxes that are raised on individuals and businesses in the economy, resource revenues have not been appropriated from anyone. In this sense resource revenues are *distributed*, but not *re-distributed*. Citizens of resource-rich countries typically know this and have a strong sense of entitlement to their resources, a sentiment sometimes known as *resource nationalism*. As I discuss below, in many

[2] Other natural resources, such as fisheries and agriculture, differ in their ownership structure and productive structure, and are not discussed here.
[3] For instance, according to data in the BP Statistical Review [www.bp.com/statisticalreview], proven reserves of oil increased every year but one (1990) since 1980.

countries this has the unfortunate effect of lending support to inefficient and regressive fuel subsidies.

A large literature exists on the "resource curse," the proposition that a large resource sector has adverse effects on a country's economy, politics and institutions. Reviews of this topic exist (e.g. van der Ploeg 2011) and I refer to these issues only to the extent that they are directly relevant to the question at hand. One strand of this literature that is pertinent to the present topic concerns the frequency with which resource revenues are wasted, mis-used, or lost to corruption. Karl (1997) argued that a large resource sector is itself likely to produce poor institutions of government, but this has been contested by Haber and Menaldo (2011), who find statistically that resource wealth does not cause poor political or institutional outcomes in general. Be this as it may, solving the larger question of systematic mis-use of resources involves fixing political systems and institutions, which is beyond the scope of this paper.

One motivation for this paper is that in discussions of resource rents there often emerge powerful intuitions that have little rational grounding. For instance, many citizens of oil producers believe that there is something undesirable about importing fuel. It is common for Mexicans and Iranians, for example, to object to the fact that their countries import refined oil products despite their substantial exports of crude oil. To an economist this reaction is irrational: if foreigners can refine their oil more cheaply, then the imports are preferable. Oil refineries are unlikely to produce high value added for the investment required, and while they may provide some domestic external linkages, there is no reason to think they are preferable to other industries in this respect. Moreover, they are much worse than many other industries in providing jobs, being highly capital intensive, and are therefore particularly unhelpful in low- or middle-income countries that are richer in labour than in capital.

Another strong intuition often expressed is that there is something immoral about living off rents without having to work. Kuwaiti nationals, for example, could easily afford to live off their oil rents without working; some interpret their system of public employment

as enabling just this. There may be good reasons for recipients of rent to work even if they do not have to, but I take the view that it is unrealistic and, indeed, patronising to advise them not to spend their wealth on leisure if they choose to do so. As I discuss below, however, the Kuwaiti system as it stands is certainly inefficient, regardless of any moral judgement on it.

The next section sets the stage by clarifying the concept of *resource rents* and discussing resource ownership. Section 3 discusses the intertemporal management of resource revenue. Since there exists a sizeable literature on the topic the section is relatively short, but I locate international experiences within the theory and highlight some common misperceptions. Section 4 is the core of the paper and discusses the distribution of resource revenues in theory and in practice.

2. Resource Rents and Ownership

The twentieth century saw a dramatic reorientation of resource ownership rights. First, the principle that subsoil resources are owned by governments as opposed to private landowners was settled in almost all countries (private land in the US being the only major exception), with private agents gaining access to them through regulated contracts of various kinds (Mommer 2002). More dramatically, decolonisation led to an assertion of the rights of developing country governments and a massive swing in bargaining power in their favour, away from the international mining companies and their rich-country owners that had dominated the industry. The development of national oil and mining companies was part of this trend.

This shift in power from mining companies to producer governments is the original sense of *resource nationalism*: the understanding that resources belong to the country in which they are located, and should be used to benefit that country. This principle has now been codified in numerous international human rights treaties (Wenar 2007, p. 14). Both the International Covenant on Civil and Political Rights and the International Covenant on Economic, Social, and Cultural Rights state in their Article 1 that "All peoples may, for

their own ends, freely dispose of their natural wealth and resources." 151 countries have adopted at least one of these treaties.

In practice, resource nationalism meant a rising share of total resource revenues going to national governments as opposed to international mining companies. So how much should a government expect to receive from its resources?

For clarification it should be noted that the term *resource revenues* is ambiguous. The broader sense refers to the total revenues due to natural resources—essentially the volume of the resource extracted times the international price—which have to cover actual costs (described below, and including exploration and any other ex-ante costs) as well as income flowing to the government. The narrower sense of *resource revenues* refers only to the revenues that flow to the government, after costs have been paid, and which are available for government spending. When there is any ambiguity I will refer to the former as total revenues and the latter as government revenues.

Theoretically, government revenues should be equal to the *resource rents*. Rents are defined as the payment to a factor of production over and above the sum necessary to induce it to do its work (Wessel, 1967, p. 1222). Considering a natural resource as a factor of production, any payment that remains after costs of extraction have been paid will be sufficient to 'induce it to do its work' because it has no opportunity cost—left in the ground, the resource cannot produce economic value.[4] This calculation assumes that the costs paid are *competitive*: if some party involved in extraction is being paid more than their competitive price then they are receiving some of the resource rents that should theoretically accrue to the resource owner.

While, in theory, governments should receive resource rents, in practice it is very difficult to identify what counts as resource rents because it is very difficult to specify precisely how much the relevant costs should be. Costs of extraction arise from the employment of

[4] If resource extraction has negative environmental or social effects then they should also count as a cost, to be internalised by the government, and would therefore come out of rents.

land, labour and capital, embodying human capital and technology. These are typically provided by the mining company that is contracted by the government or, in the case of national mining companies, may be owned by the government. They must also include the costs of exploration, which build in the risk of finding no resources. But all these costs vary over time. Moreover, mining companies require at least a normal return to their capital over time, but will put up with large swings over the cycles of rising and falling prices. That is, what may appear an excessively high return on capital in one period may be making up for very low returns in the past or future, and vice versa.

For these reasons there is no *a priori* way to determine how much of total resource revenues count as rents. The only practical way to ensure that governments receive the rents they are due is to ensure that the processes by which contracts are awarded are competitive and transparent. When they are, competition between companies will bid down what they charge and bid up the amount received by the government. If the process is fair, then one may even say that whatever the government gets after such a bidding process counts, by definition, as the rents, because the process has revealed what the correct (competitive) costs are.[5]

3. When to Spend It: Revenue Smoothing and Saving

The intertemporal expenditure of resource revenues demands particular attention for two reasons: first, revenues tend to be highly volatile, reflecting the volatility of commodity prices. Second, they are in principle exhaustible and in many cases will be expected to run out in the foreseeable future.

The volatility of resource revenues is driven primarily by the volatility of commodity prices. The standard intertemporal economic model of consumption, based on the assumption of diminishing marginal returns to income, implies that it is optimal to consume the same amount each period, requiring saving in periods of high revenues and dissaving (or borrowing) in periods of low revenues. This does not take into account

[5] Radon (2007) discusses the challenges faced by resource-rich countries in negotiating with oil companies, while Johnston (2007) describes how to analyse the terms of a contract.

macroeconomic cycles, however, and standard macroeconomic analysis suggests that fiscal policy should still be counter-cyclical where possible. Thus the point is not exactly to smooth expenditures, but rather to vary total expenditures according to macroeconomic needs, and not according to the level of current resource revenues.

There are also important practical reasons to avoid expenditure volatility. These are due to frictions both in government expenditures and in the economy, which imply that volatile expenditures can have real costs. Economic frictions imply that a rise in expenditures may lead to bottlenecks as productive resources (labour and capital) cannot move quickly enough to fulfil all new demands, causing inflation in sectors with shortages. Conversely, a decline in expenditure will lead to unemployment and idle capacity.

Frictions in government expenditures, both bureaucratic and due to political pressures, imply that when revenues fall it is difficult to make expenditure cuts, or to impose cuts in private consumption. This is likely to lead to fiscal and/or current account deficits and, over time, to unsustainable debts. This was the experience of Zambia from the mid-1970s through the 1980s, when national expenditures did not adjust to declining copper revenues, leading to crises in the late 1980s (Adam and Simpasa, 2009). All of these problems can be mitigated by effective smoothing of revenues.

The difficulty with smoothing is that it requires an estimate of the long-run value of revenues, which in turn requires estimating the long-run commodity price (as well as extraction costs). This is impossible to do with certainty. Chile takes two different approaches for two different minerals, the revenues of which are managed in its *Fund for Social and Economic Stabilization*. Its major export, copper, has comprised 14–21% of GDP as value added since 2005, while government revenues due to the resource are 1.7–5.7% of GDP, or 9–22% of total government revenue. Chile employs a panel of experts to estimate the long-run price of copper in order to smooth the expenditure of these revenues. For revenues from molybdenum, a much smaller export, Chile takes the moving average of the monthly prices for the past four years (Fuentes 2009). The

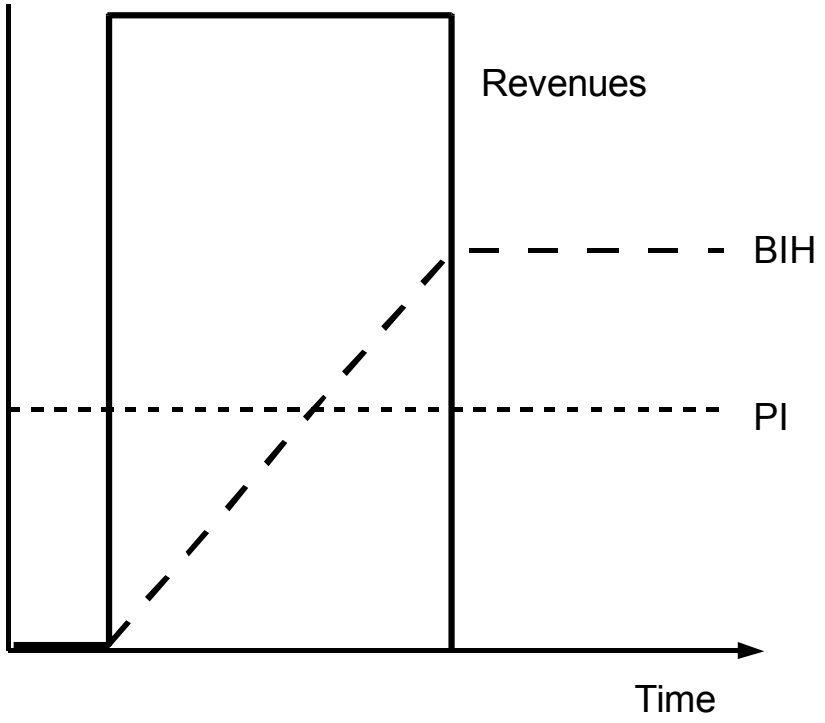
government successfully saved much of the rise in copper revenues after 2003 despite popular pressure to spend them, on the basis of the judgement that they might be temporary. In retrospect, commodity prices remained very high so it appears that this was unduly pessimistic. But, rightly or wrongly, the mechanism did appear to work as a constraint on government.

The question of saving revenues for the future is somewhat different from short-term smoothing. The intertemporal economic model referred to above is also known as the permanent income (PI) approach, and this highlights the second standard recommendation for revenue management: that revenues due to an exhaustible resource should be saved, with only their permanent or annuity value spent each year. A still more conservative approach than this is the *bird-in-hand* (BIH) rule, which states that all revenues should go into a fund, and that current consumption should come only from the real return to that fund. Under BIH it is therefore the real return to already-extracted resources, as opposed to the expected real return on the value of the entire resource stock, that is spent. Therefore once the resource is exhausted BIH collapses to the PI rule, but expenditures start off lower than under PI and on a rising path, levelling out only once the resource is exhausted. The two paths are illustrated in figure 1.

The BIH rule underlies Norway's *fiscal rule* for oil revenues, under which all of the net cash flow from the extraction of petroleum is saved in the *Government Pension Fund – Global* in order to finance pensions in the future. Since 2005 oil and gas production have comprised 19–25% of GDP as value added, of which government revenues from the sector comprised 4–6% of GDP, and 7–10% of total fiscal revenues. The *fiscal rule* states that for current expenditures, only "the expected return on the fund can be used. The expected real rate of return on the fund is estimated at 4 per cent. This means that the fiscal budget can be settled with a deficit corresponding to this rate of return."[6] In practice, however, this rule has been breached in most years (Jafarov and Leigh 2007).

[6] Statistics Norway webpage, "Focus on Public Finances – Petroleum revenue", http://www.ssb.no/off_finans_en/read_more.html

Figure 1: Alternative expenditure profiles



Intuitively it seems prudent to save the capital due to resource revenues for the future, while spending only the sustainable permanent return on that capital in each period. Barnett and Ossowski (2003, p. 47) put this viewpoint when they state that "The long-run challenge for fiscal policy... reflecting a concern for intergenerational equity, should be met by targeting a fiscal policy that preserves government wealth—appropriately defined, inter alia, to include oil." The argument that an exhaustible resource should not be consumed but should be transformed into an income-yielding asset is appealing.

However, this is not in fact optimal even under the assumptions of the permanent income approach: the judgement of how much to save has to be made in the light of expectations of future levels of income and the stock of capital more generally. In particular, the higher the expected rate of per capita economic growth, the less it makes sense to defer consumption for the future. If it is optimal to smooth consumption over time, including across generations, then the fact that people will be richer in the future implies that

people today should be consuming more of the finite resource revenues than people in the future. Moreover, while at first blush it may seem unfair for current generations to consume the value of finite natural assets, they will in any case leave most of their physical assets to future generations, in the form of the capital stock. Indeed, it is not only efficiency, but also intergenerational equity, a core principle of sustainable development (e.g. Jordan, 2008), that demands that current generations consume more of finite resources than richer generations in the future.

When we drop the assumption of a representative agent then this argument becomes even stronger for countries with significant levels of poverty. If our social welfare function is sensitive to extreme poverty, and we expect that growth will lift people above this poverty line in the future, then spending resource revenues on poverty reduction in the short term is likely to be optimal.

Supposing that some share of resource revenues are to be invested, what should it be invested in? Standard economic advice, typically given by the IMF, favours the use of sovereign wealth funds (SWFs), like those of Norway or Chile, that invest abroad in a variety of financial instruments. The advantage of investing abroad is that the returns to a SWF are supposed to be uncorrelated with most shocks that hit the country.[7] So while a decline in copper prices will reduce Chile's copper revenues, it should not adversely affect the real return accruing to its fund. However, it has been argued (e.g. by Collier et al., 2009; van der Ploeg and Venables 2011) that many developing countries can achieve higher social returns by investing domestically in infrastructure, public goods, education, and other public services than by investing abroad.[8] This is partly because the positive spill-overs of such investments can imply that their total return to the country is higher than just the direct financial return. Moreover, many countries under-invest in these areas because of credit constraints, and resource revenues loosen this constraint.

[7] "Supposed to be" because in the financial crisis of 2008–09 almost all asset classes, including stock markets and commodities, declined at the same time.
[8] This research is part of the background to the *Natural Resource Charter*, an organisation set up to establish norms and guidelines for resource rich countries.

On the other hand, domestic investment may be inefficient in practice. Robinson and Torvik (2005) discuss a range of examples of "white elephant" projects that, they argue, should be understood as clientelistic payments by politicians to their supporters. Also, as mentioned above, bottlenecks may imply limited absorptive capacity, where too much investment may lead to inflation rather than increased output. Clearly, domestic investment should always be subject to thorough cost-benefit analysis to minimize these risks. But the point remains that there is no reason to assume that investment in international financial instruments will be optimal.

4. How to Spend It: The Distribution of Resource Revenues

How are resource revenues spent, and who benefits from them? The distribution of resource revenues across the economy deserves special attention for the political-legal reason that citizens typically view them differently from other sources of tax revenue. It follows from the earlier definition of *rents* that no individual citizen or group of citizens have a special claim to them. All citizens have an equal claim, and for this reason they often have strong feelings of entitlement to their resources and the revenues they provide.

Before discussing how resource revenues are spent, it should be noted that they have a general equilibrium effect on incomes almost independently of their distribution. When national income rises due to the resource, demand rises for both tradable and non-tradable goods and services. This rise in demand for non-tradeables causes Dutch Disease, or a rise in the real exchange rate.[9] This is usually lamented as causing a loss in competitiveness of non-resource exports, including manufacturing. However, what is rarely appreciated is the fact that manufacturing becomes uncompetitive only because the payments to domestic factors of production, such as wages, have risen. So it occurs only if citizens have become richer.[10]

[9] The economic processes underlying these changes are examined in a trade-theoretic context by Corden and Neary (1982) and using duality theory by Neary (1988).

[10] One legitimate concern is that a decline in manufacturing may be bad for future economic growth, inducing the 'Resource curse' (van Wijnbergen 1984, Sachs and Warner 1995, 1997). However, this proposition has been contested by research that has found no association between resource wealth and

To illustrate, the rise in demand for non-tradables might imply a rise in demand for construction and transport. This will raise real wages in these sectors, and workers that were producing tradable manufactured goods (whose prices have not risen in terms of international currency) will be attracted away from the factory and into construction or transport. The factory owner cannot afford the higher real wage to keep the workers because he has to compete with imported manufactured goods, so he produces less, and marginal producers will go out of business. This is bad for the factory owner, but good for the workers who have got higher-paid jobs elsewhere, and also good for business owners in the non-traded sectors.

Despite the general equilibrium impact of resource revenues, fiscal expenditures are the most important means through which citizens benefit from their natural resources. As already discussed, resource revenues are *distributed*, but not *redistributed*. However, Segal (2012) considers the 'redistribution' of resource revenues from the baseline of *resource entitlements*: the idea that every citizen has a right to their per capita share of their country's resource rents. On this basis one can use the term *redistribution* of resource revenues in the following way. If a policy implies that one subset of citizens benefits from the fiscal system by less than their population share of revenues, and another by more, this can be considered a redistribution away from the former and to the latter, relative to their resource entitlements.

Such redistribution can be significantly regressive in practice, as Segal (2012) finds in the case of Mexico. Since 2005 hydrocarbon revenues received by the government have comprised 7.9–10.5% of GDP and 31–41% of government revenue. Mexico's fiscal system is progressive at first glance: poorer households receive more in benefits (including benefits in kind such as health and education services) than they pay in taxes, and vice versa for richer households. But if one makes the assumption that every Mexican citizen starts off entitled to her or his per capita share of government oil

economic growth, or found that it depends on the quality of institutions in the country (Ding and Field 2005, Stijns 2005, Mehlum et al. 2006, Boschini et al. 2007, Brunnschweiler 2007, Brunnschweiler and Bulte 2008).

revenues, official government estimates imply that it is regressive: in 2008, households in the bottom 90 percent of the income distribution received net benefits worth less than their share of oil revenues, while those in the top 10 percent received more. That is, the net effect of Mexico's fiscal system was to transfer oil entitlements from the bottom 90 percent to the richest 10 percent.[11]

Chile provides a different example of a group benefiting disproportionately from resource revenues. While it is widely praised for its intertemporal revenue management, its expenditure policies are still shaking off the remnants of the military dictatorship of Augusto Pinochet that was formally ended in 1989. Until 2012, the "Copper Reserve Law" dictated that the military receive 10% of the export revenues of the National Copper Corporation Codelco, with these expenditures under the sole control of the chiefs of the armed forces. This gave the military effective independence from democratic rule. Moreover, these funds were covered by secrecy laws and were not subject to government oversight until President Michelle Bachelet brought in transparency legislation in 2008. Even since then, the military has been reluctant to submit to civilian transparency laws.[12] Bachelet's government later initiated attempts to overturn the Reserve Law, and it was finally repealed in early 2012. Even so, the current government of President Sebastian Piñera has retained a high and binding floor on the military budget.[13]

A common way to pass resource rents on to citizens is to use them to substitute for existing taxes. Bornhorst et al. (2008) find that on average countries tend to reduce the collection of non-resource revenues (both taxes and other sources of income) by 0.2 percentage points of GDP for every 1 percentage point of GDP they receive in resource revenues. The benefits of lower taxes accrue to individuals according to how their own tax burden declines. Eliminating taxation altogether, for instance, is not a distribution-

[11] The paper finds that other estimates of the distributional impact of fiscal policy suggest less regressive effects.

[12] Defence Minister Jaime Ravinet resigned from his post on the 13th January 2011 amid controversy over his refusal to submit to transparency requests regarding the military's acquisition of a temporary bridge in the Bio Bio region, where the military had chosen a $16 million bid from a US company over a $14 million bid from a British company (Johnson 2011).

[13] This has been widely reported in the Chilean press, for instance: www.biobiochile.cl/2012/01/11/camara-de-diputados-aprueba-proyecto-que-deroga-ley-reservada-del-cobre.shtml/

neutral policy if the taxes being eliminated are not distribution-neutral. Where taxes are or would be relatively progressive, a proportionally-uniform tax reduction is regressive, and vice versa.

In the remainder of this section I discuss the expenditure side of fiscal policy. I consider two common routes through which governments channel resource rents to citizens, namely fuel subsidies and public employment, and compare them with policies that involve more direct means of distributing resource revenues.

Fuel subsidies

Fuel subsidies are a common and very popular policy in hydrocarbon-rich countries, where the population typically feels a sense of entitlement to hydrocarbons. Baig et al. (2007) find that net oil exporters tend to pass through much less of fuel price rises to consumers than net fuel importers. For gasoline, kerosene and diesel they find that net oil exporters passed through only 0.46, 0.43 and 0.7 times the rise in international prices between 2003 and 2006. These compare with 1.09, 0.91 and 1.15, respectively, for net oil importers.

The popularity of fuel subsidies is not deserved, however: they are both highly inefficient, and in most cases they are also regressive. Their inefficiency is easy to see if one considers the simple experiment of exchanging $1 of fuel subsidy for a cash transfer of $1. With the cash one can choose to spend the $1 on fuel, in which case one is in the same position as with the subsidy. But one can also choose to spend some share of the $1 on something else. So the fuel subsidy implies forced expenditure on fuel as opposed to on other goods and services that might be preferred. This inefficiency applies to both consumption of fuel, and when it is used as an input to production: both consumption and production will be skewed to an over-use of fuel relative to other goods or services.

The same thought experiment also implies that the correct definition of a subsidy is any policy that leads to the final cost being lower than the marginal social opportunity cost of

the resource: the argument applies as long as the price is below this level. For an exporter this will typically be the international price at which they could sell the resource, and not the marginal cost of production.[14]

The costs of subsidies can be very high. In Mexico in 2008 they rose to 1.8% of GDP (Segal 2012). For 2005 Coady et al. (2006) estimated them at 12.7% in Azerbaijan, 3.1% in Bolivia, 3.6% in Ecuador, 4.1% in Egypt, 3.2% in Indonesia, 5.8% in Jordan, and 9.2% in Yemen.[15] Fattouh and El-Katiri (2012) discuss the role of subsidies in Arab states in detail.

In addition to being inefficient, fuel subsidies also tend to be regressive because richer people tend to spend a higher share of their incomes on fuel, largely because richer people are more likely to own cars. In Mexico in 2006, for instance, over 70% of the benefits of fuel subsidies went to the top 30% of the population. In 2008, however, while still absolutely regressive, official estimates implied that they were not regressive in relative terms (Segal 2011b).

The distributional impact depends to some extent on which fuels are subsidized. Kerosene, for instance, tends to be used more by the poor than by the rich, whereas the opposite is true for gasoline. Coady et al. (2006) estimate that the share of total fuel subsidies received by the bottom 40% is always below 40%, implying they are absolutely regressive. Moreover, in Bolivia, Mali and Sri Lanka richer quintiles spend a higher share of their income on fuel, suggesting that subsidies are also relatively regressive in these countries (Coady et al, p. 16).

The popularity of fuel subsidies is presumably based on the assumption that the elimination of fuel subsidies will not be compensated through other fiscal means: citizens appear to assume that fiscal savings will be lost to waste or corruption. Indonesia in 1998

[14] Coady et al. (2006) demonstrate this point with economic theory.
[15] Note that these figures are costs to the government, but do not represent the value of lost GDP due to the inefficiency of subsidies. The net loss in value is smaller because, while $1 spent on fuel subsidies is worth less to a household than $1 in cash, it is nonetheless worth significantly more than nothing.

and Venezuela in 1989 faced riots when the government attempted to raise the price of gasoline. A recent attempt by the Bolivian government to reduce subsidies ended in failure, the policy withdrawn in the face of widespread protests (Mapstone and Schipani 2011). Other countries, however, have had more success in explaining the benefits of reform to their populations (Bacon and Kojima, 2006). Below I discuss Iran's ongoing efforts in this area.

Are subsidies always a bad way to spend money? There are two potential arguments in favour of subsidies, but neither applies to fuel. The first applies to goods or services with a positive externality, such as investment in technology. Since fuel consumption has strong negative externalities due to environmental pollution, this argument certainly cannot be used to justify fuel subsidies. On the contrary, the negative externalities justify taxation rather than subsidy, and this partly explains why so many fuel importers impose taxes on fuel.

The second potential argument is that a subsidy can be a *second best redistribution*: if we want to get income to a subset of the population, but targeting them directly with cash transfers is costly, then subsidizing some good that they use a lot of can be a form of indirect redistribution. This may apply to subsidizing basic food-stuffs as a poverty-reduction strategy. If the rich consume a larger absolute quantity of the subsidized good then the subsidy will remain regressive in the absolute sense, but it will be progressive in the relative sense as long as they spend a lower *share* of their income on it than do the poor. Again, however, this does not apply to fuel: we saw that fuel subsidies tend to be regressive in both absolute and relative terms.

Public employment

A second common way to spend resource revenues is through employment creation, including public employment. Karl (1997, p. 27) argues that "programs of employment creation" were a significant part of the reaction of Latin American oil exporters to the rise in oil prices in the 1970s, and that "in each country, middle classes made up of state

employees, small shopkeepers, and skilled labourers grew rapidly, fostered by oil-fuelled economic dynamism." El Katiri, Fattouh and Segal (2011) argue that Kuwait uses public employment and public pensions as the primary means of distributing resource rents to the population. A job in the public sector is guaranteed to Kuwaiti nationals and comes with attractive salaries and benefit packages, explaining the fact that 91 percent of the Kuwaiti national labour force works in the public sector, while 98 percent of private sector jobs are occupied by non-Kuwaitis.

There is a wide-spread perception that jobs so created tend to be unproductive, though measuring public sector productivity, where output does not have a market price, is extremely difficult. In private discussions observers of Kuwait, including Kuwaiti nationals, often claim (and complain) that many Kuwaiti public employees do essentially nothing in return for their wage. Morality aside, the problem with distributing rents through unproductive public employment is that it has a high opportunity cost: people who could be doing productive work elsewhere are attracted into unproductive public sector jobs because of the benefits they receive, funded by oil rents. Individuals do not have the option of working productively while also receiving their full share of resource rents, because in order to receive the rents they have to spend office hours doing an unproductive job. Effectively, they face the following choice: be unproductive in the public sector and be rewarded with oil rents, or be productive in the private sector and not be rewarded with oil rents. It would be more efficient to give citizens their wage, or their share of rents, unconditionally and allow them to take up another, productive, job in the private sector—which is one justification for direct revenue distribution, a policy I discuss below.

Another example is Mexico's refineries, owned and run by the national oil company Pemex. These refineries are among the least efficient in the world, partly because they employ six times the number of people as US refineries of comparable size and complexity, without higher levels of production.[16] It appears that most of these

[16] These data are from proprietary surveys produced by Salomon and are not publicly available.

employees are not being productive, but political pressures and the strength of the Pemex union preclude any reduction in the workforce.

Direct Distribution

The conceptually-simplest way to distribute resource revenues to the population is as an equal, universal and unconditional cash transfer. Such a policy, also known as a *Resource Dividend*, has several advantages.[17] First, since all citizens receive their per capita share of government resource revenues we can be sure that the distribution of the benefits of these revenues is fair: all citizens receive their resource entitlement by default.

While this implies that the resource dividend is not explicitly a poverty reduction scheme, Segal (2011a) finds that it would have a large impact on poverty: if all developing countries adopted it globally, then global poverty at the PPP$1-a-day line would be better-than halved. Even in some countries that are not particularly resource rich but have a lot of poverty, such as India where resource rents comprise around 5% of GDP, poverty would be approximately halved. Such a policy may therefore be a component of a poverty reduction strategy. Moreover, such a universal scheme may even be more effective at reducing poverty than a targeted scheme because targeted benefits often fail to reach their intended recipients.

Second, a resource dividend is the easiest form of expenditure to make transparent: once the media and population know the total quantity of resource revenues, and the size of the population, they know how much each individual should receive. It makes it very easy for citizens to know if they are receiving their due, and such transparency is likely to reduce 'leakage', or theft of revenues before they reach their intended recipients.[18]

[17] The following discussion draws on Segal (2011a), which also traces the history of the idea. Moss (2011) discusses the idea in the context of existing cash transfer schemes in developing countries, and is part of a project at the Center for Global Development on direct distribution.
[18] Gauthier (2006).

Third, removing revenues from government expenditure budgets eliminates some standard mechanisms of corruption such as over-bidding for contracts. Finally, unlike the salaries paid to unproductive workers discussed above, or targeted benefits that are conditional on low income, a resource dividend is not *distortionary* in the economic sense: since it is unconditional, it does not give any incentive for inefficient or unproductive behaviour.

Direct distribution may also mitigate some of the risks of resource wealth. For instance, Gelb & Associates (1988, p. 17) write that "a large rent component in national income, if not rapidly and widely dispersed across the population, is liable to divert scarce entrepreneurial talent away from commodity production into 'rent-seeking' activities." By rapidly and widely dispersing rents, direct distribution may reduce the risk of rent seeking.

It increases the risk, however, that the government may not be able to raise the tax revenues required to provide optimal levels of expenditure on infrastructure, public goods and public services. Baunsgaard and Keen (2005) find that developing countries that reduce trade tariffs are usually unable to fully compensate the lost revenue through other taxes, suggesting that governments face constraints in how much tax they can raise. In this case, keeping resource revenues on the government budget removes a potentially-costly constraint.

I now examine three policies that are forms of direct distribution, in Bolivia, Iran, and the US state of Alaska.

Bolivia: Bonosol and Renta Dignidad

Bolivia's primary export is gas, and hydrocarbon revenues have ranged between 26 and 42 percent of total government revenues in the last 5 years, while the hydrocarbon sector has comprised between 5.0 and 6.5% of GDP. The *Renta Dignidad* scheme is a universal pension funded by hydrocarbons, begun in 2008, which developed from the *Bono Solidario*, or *Bonosol*, created in the mid-1990s. Bonosol was created as part of the

privatizations (referred to as "capitalization") of major national companies, including the national hydrocarbon company YPFB, and other reforms implemented by President Gonzalo Sánchez de Lozada over 1993–1997. It was intended as a mechanism for distributing the proceeds of the privatizations to the population, and was implemented at least partly to reduce political opposition. As Whitehead (1997, pp. 15–16) puts it, "the capitalization formula was evidently designed with ...political economy constraints in mind".

Bonosol was a pension of 1,800 Bolivianos (currently about US$260) a year, paid to all citizens over the age of 65 who had already reached age 21 by the end of 1995. Thus it was not conceptualized as a universal pension based on the inherent merits of such a benefit, but rather as compensation for the sale of a national asset. It was correspondingly aimed only at those Bolivians who were adults by the time of the privatizations, and would expire with those Bolivians.

Its actual lifetime was considerably shorter still, however. It was initially paid in only one year, 1997, before Sánchez de Lozada's successor, President Hugo Banzer, declared it unaffordable. On his return to the presidency Sánchez de Losada attempted to bring it back in 2003 but was unable to finance it as originally planned owing to continuing poor returns from the capital raised through the privatizations. Nonetheless, by getting money from alternative sources it continued to be paid through to 2007 (Müller 2009).

Bonosol was officially dropped in 2008 by the government of Evo Morales, to be replaced by the new *Renta Dignidad*. Renta is also a universal pension, but it differs from Bonosol in several key respects. First, unlike Bonosol it is conceptualized as a universal pension with no projected sunset period, and is explicitly linked to hydrocarbons rather than privatizations. It is financed by a fixed share (30%) of the *Impuesto Directo a los Hidrocarburos* (IDH), or Direct Hydrocarbon Tax. It is described by the Bolivian Ministry of Autonomy (2008), in implicit contrast to (and criticism of) Bonosol, as follows: "It is the concrete result of the nationalization of our natural resources. These resources now go directly to the hands of those who most need them. It is a sustainable

measure that does not represent the privatization of national companies nor the loss of our natural wealth and patrimony."

Second, it lowers the age at which Bolivians start to receive it from 65 to 60. Third, the payment remained the same for those who have some other source of pension in addition, but was raised by 25% to Bs2,400 (about US$340 or PPP$860[19]) per year for those with no other pension. A further important practical difference is that Bonosol had to be collected from branch offices of the pension scheme, which entailed significant collection costs for many poor people living far from urban areas, while the Renta Dignidad is also distributed by fixed and mobile military units (Müller 2009, p. 168).

Renta Dignidad cost 1.4% of GDP in 2008 and 1.5% in 2009 (IMF, 2010, p. 6). Poverty was reported to have been reduced by 4.8 percentage points in 2008, but systematic analyses of the impact of the policy on poverty and inequality do not yet seem to be available. However, the payment is larger in magnitude than the World Bank's PPP$2-a-day international poverty line and would be expected to have a significant impact on poverty.[20]

Iran: subsidies and direct distribution

Iran is a major producer of oil. Oil revenues provided about 70% of fiscal revenues over 2006–2009 and 18–22% of GDP (IMF 2010, p. 20). Fuel and other goods have been heavily subsidized, with the price of a litre of gasoline only about 10 US cents in recent years. However, in January 2010 the Parliament passed a bill to phase out these and other subsidies, phased in over 5 years, planning to partly replace them with universal cash transfers to the population (Tabatabai 2011a). On 20 December 2010 the subsidies were cut, with petrol prices nearly quadrupling to 38 US cents per litre. Households were given a one-off cash payment of about US$80 each, and since then all Iranians living in the

[19] Using the IMF's World Economic Outlook estimated PPP exchange rate for 2010 of Bs2.8/PPP$.
[20] This poverty line is actually $2.50 in 2005 PPP$.

country have been entitled to, and nearly all receive, a monthly cash transfer worth about $45 per person from the government (Tabatabai 2011b).[21]

One motivation given for the proposed cash transfer was to make it politically easier to withdraw the subsidies: it was "justified and perceived as a means of compensating the population for the removal of subsidies to which they have become accustomed. Many view cheap oil as a benefit to which they are entitled as a major oil producing nation, and the metamorphosis from price subsidies to cash transfers is seen as merely a change of form in that entitlement." (Tabatabai 2011a, p. 7). These unconditional transfers are officially known as 'cash subsidies', presumably to reinforce the perception that they are a replacement for the lost fuel and other subsidies.

Alaska: The Permanent Fund Dividend

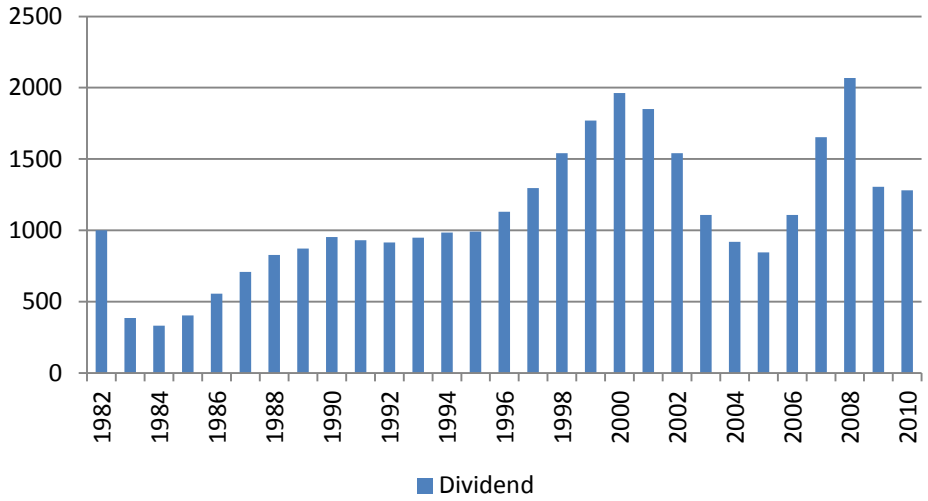
The US state of Alaska has a state-owned fund, called the *Alaska Permanent Fund*, that by law receives at least 25 percent of oil royalties received by the state government. Each year a dividend from this fund is given to all those have resided in the state for at least one calendar year. The dividend is calculated as 52.5% of the Fund's nominal investment income (hence not including the share of oil royalties that has been added to the fund) averaged over five years, divided by the number of eligible recipients.[22] In most years it has lain between US$800 and US$2,000 (figure 2). It is thus not really a direct distribution of oil revenues, but a cash payment financed by the return to an oil fund.

Since the state continues to pay royalties into the Fund, and will for as long as oil revenues flow, the dividend is a version of the bird-in-hand policy discussed above: it is based on revenues due to oil that has already been extracted, and gives no advance on the value of the oil that is yet to be produced. For this reason one would expect the Fund and the Dividend to grow over time. The Fund has indeed been growing (figure 3, where data

[21] Tabatabai (2011).
[22] Alaska Permanent Fund Corporation website: see http://www.apfc.org/home/Content/aboutFund/aboutPermFund.cfm and http://www.apfc.org/home/Content/dividend/dividend.cfm. .

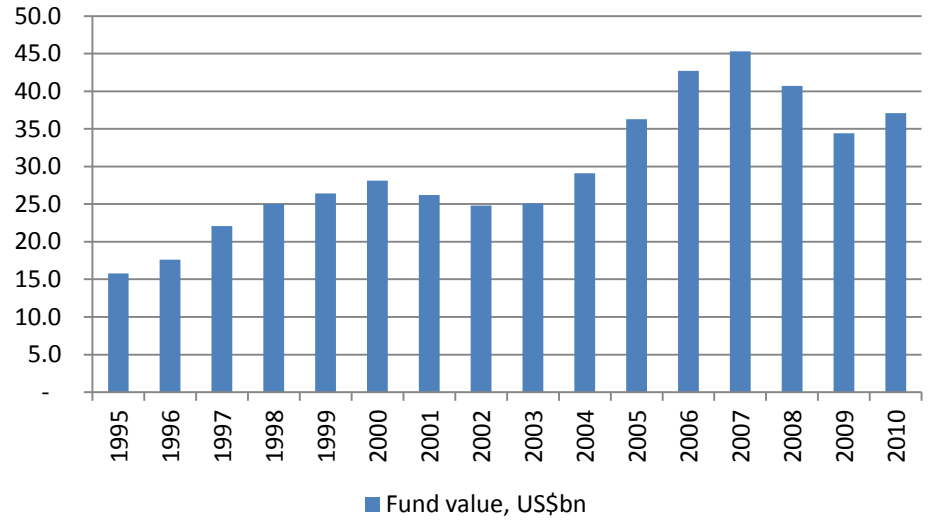
are available only from 1995), but the Dividend has been more volatile and the trend is less clear (figure 2).

Figure 2: Alaska Permanent Fund Dividend, current US$



Source: http://www.apfc.org/home/Content/dividend/dividendamounts.cfm

Figure 3: Alaska Permanent Fund, value in current US$bn



Note: Total liabilities and fund balances (reported as "Total liabilities, principal and earnings reserve" for 1995–2000).

Source: Alaska Permanent Fund Corporation, Annual Report (various years), downloaded from http://www.apfc.org/home/Content/publications/reportArchive.cfm.

It is difficult to identify the impact of this policy on the distribution of income, but the Dividend may partly explain the fact that in 2007 Alaska had the joint second lowest poverty rate of all the states of the US, despite having only the 19th highest per capita personal income (Segal 2011a).

The oil-rich Canadian province of Alberta once experimented with a similar policy, which they called a "prosperity bonus", distributing $400 as an un-taxed payment to each resident of the province in 2006. No more payments have been made since then.

5. Conclusion

Citizens of resource-producing countries rightly feel that their natural resources belong to them, and that they have the right to benefit from them. But government expenditures of resource revenues can easily fail to benefit citizens to the extent that they should. The time profile of resource revenues demands a certain amount of expenditure smoothing. Beyond this, how much should be saved for the future depends on the circumstances of the country. In rapidly-growing countries, and countries with substantial poverty, lower saving and more expenditure in the short term is likely to be optimal.

Resource producers also face the challenge of how to distribute resource rents to the population. Fuel subsidies as a form of rent distribution are widespread and both inefficient and regressive. Swelling the ranks of public sector employees can also be an inefficient way to spend resource rents when there is insufficient productive work for them to do. Direct distribution of resource revenues has the advantage of being non-distortionary and relatively egalitarian, with the potential to reduce poverty substantially. For countries that struggle to raise non-resource tax revenue, however, it has the risk of crowding out expenditures on public services and public goods that are essential to broader development goals.

References

Adam, Christopher and Anthony M. Simpasa (2009), "Harnessing Resource Revenues for Prosperity in Zambia", OxCarre Research Paper 36.

Atkinson, Anthony B. (1970), "On the Measurement of Inequality", *Journal of Economic Theory*, 2 (3), pp. 244–263.

Bacon, R. and Kojima, M. (2006). *Coping with Higher Oil Prices*, World Bank Energy Sector Management Assistance Programme (ESMAP), Report 323/06.

Barnett, Steven and Rolando Ossowski (2003), "Operational Aspects of Fiscal Policy in Oil-Producing Countries," in Jeffrey Davis, Rolando Ossowski and Annalisa Fedelino (eds.), *Fiscal Policy Formulation and Implementation in Oil-Producing Countries*, Washington, D. C.: International Monetary Fund.

Baunsgaard, T. and Keen, M. (2005), "Tax Revenue and (or?) Trade Liberalization", IMF Working Paper WP/05/112.

Baig, Taimur, Amine Mati, David Coady, and Joseph Ntamatungiro (2007), "Domestic Petroleum Product Prices and Subsidies: Recent Developments and Reform Strategies", IMF Working Paper WP/07/71.

Beckerman, Wilfred and Cameron Hepburn (2007), "Ethics of the Discount Rate in the Stern Review on the Economics of Climate Change", *World Economics*, 8 (1), pp. 187–210.

Bolivian Ministry of Autonomy (Ministerio de Autonomía Estado Plurinacional de Bolivia) (2008), "Qué es la Renta Dignidad?", 1 January 2008, downloaded 4 October 2010,[www.autonomia.gob.bo/portal2/index.php?option=com_content&task=view&id=393&Itemid=35http://www.autonomia.gob.bo/portal2/index.php?option=com_content&task=view&id=393&Itemid=35].

Bolivian Ministry of Economy and Public Finance (2008), "The ABC of the payment of Renta Dignidad", *Ministry News*, 30 January 2008.

Bornhorst, Fabian, Sanjeev Gupta and John Thornton (2009) "Natural Resource Endowments, Governance, and the Domestic Revenue Effort: Evidence from a Panel of Countries", *European Journal of Political Economy*, 25, pp. 439–446.

Boschini, A. D., Pettersson, J. and Roine, J. (2007), "Resource Curse or Not: A Question of Appropriability", *Scandinavian Journal of Economics*, 109 (3), 593–617.

Brunnschweiler, C. N. (2007), "Cursing the Blessings? Natural Resource Abundance, Institutions, and Economic Growth", *World Development*, 36 (3), 399–419.

Brunnschweiler, C. N. and Bulte, E. H. (2008), "The resource curse revisited and revised: A tale of paradoxes and red herrings", *Journal of Environmental Economics and Management*, 55, 248–264.

Coady, D., El-Said, M., Gillingham, R., Kpodar, K., Medas, P. and Newhouse, D. (2006), "The Magnitude and Distribution of Fuel Subsidies: Evidence from Bolivia, Ghana, Jordan, Mali, and Sri Lanka," IMF Working Paper WP/06/247.

Collier, Paul, Frederick van der Ploeg and Michael Spence (2009), "Managing Resource Revenues in Developing Economies," OxCarre Research Paper 15.

Corden, W. Max and J. Peter Neary (1982), "Booming Sector and De-Industrialisation in a Small Open Economy", *Economic Journal*, 92, pp. 825–848.

Ding, N. and Field, B. C. (2005), "Natural Resource Abundance and Economic Growth", *Land Economics*, 81 (4), 496–502.

El-Katiri, Laura, Bassam Fattouh and Paul Segal (2011), "Anatomy of an Oil-Based Welfare State: Rent Distribution in Kuwait", forthcoming in David Held and Kristian Ulrichsen (eds.), *The Transformation of the Gulf States: Politics, Economics and the Global Order*, 2011, Routledge.

Fattouh, Bassam and Laura El-Katiri (2012), "Energy Subsidies in the Arab World", *Arab Human Development Report Research Paper Series*.

Fuentes, J. Rodrigo (2009), "Managing Natural Resources Revenue: The Case of Chile", OxCarre Research Paper 40, October 2009.

Gauthier, Bernard (2006), "PETS-QSDS in Sub-Saharan Africa: A Stocktaking Study", HEC Montreal and World Bank, AFTKL: Washington DC.

Gelb, A. & Associates (1988), *Oil Windfalls: Blessing or curse?*, New York: Oxford University Press for the World Bank.

Haber, Stephen and Victor Menaldo (2011), "Do Natural Resources Fuel Authoritarianism? A Reappraisal of the Resource Curse", *American Political Science Review*, February 2011, doi:10.1017/S0003055410000584.

IMF (2010), "Islamic Republic of Iran: Selected Issues Paper", IMF Country Report No. 10/76, March 2010.

Jafarov, Etibar and Daniel Leigh (2007), "Alternative Fiscal Rules for Norway", IMF Working Paper WP/07/241.

Johnson, Daisy (2011), "Developments regarding the Copper Reserve Fund in the Chilean Defence Funding Strategy", Defence Viewpoints, 21 January 2011, http://www.defenceviewpoints.co.uk/articles-and-analysis/developments-regarding-the-copper-reserve-fund-in-the-chilean-defence-funding-strategy.

Johnston, David (2007), "How to Evaluate the Fiscal Terms of Oil Contracts", in J. D. Sachs, J. E. Stiglitz and M. Humphreys (Eds.), *Escaping the Resource Curse*. New York: Columbia University Press, 53–88.

Jordan, Andrew (2008), "The governance of sustainable development: taking stock and looking forwards", *Environment and Planning C: Government and Policy*, Vol. 26, pp. 17–33.

Karl, Terry Lynn (1997), *The Paradox of Plenty: Oil Booms and Petro-States*, Berkeley: University of California Press.

Mapstone, Naomi and Andres Schipani (2011), "Morales drops plan to withdraw fuel subsidies, *Financial Times*, January 2.

Mehlum, H., Moene, K., & Torvik, R. (2006), "Institutions and the resource curse", *The Economic Journal*, 116, 1–20.

Mommer, B. (2002), *Global Oil and the Nation State*, Oxford: Oxford University Press for the Oxford Institute for Energy Studies.

Moss, Todd (2011), "Oil to Cash: Fighting the Resource Curse through Cash Transfers", Center for Global Development, Working Paper 237.

Müller, Katharina (2009), "Contested Universalism: From Bonosol to Renta Dignidad in Bolivia", *International Journal of Social Welfare*, Vol. 18, No. 2, pp. 163–172.

Myles, G. D (2000), "Taxation and Economic Growth", *Fiscal Studies* 21 (1), 141–168.
Neary, Peter (1988). "Determinants of the Equilibrium Real Exchange Rate", *American Economic Review*, 78 (1), pp. 210–215.

Obstfeld, Maurice and Kenneth Rogoff (1996), *Foundations of International Macroeconomics*, Cambridge, MA: The MIT Press.

Prichard, W. (2010), "Taxation and state building: Towards a governance focused tax reform agenda", Institute of Development Studies Working Paper 341.

Radon, Jenik (2007), "How to Negotiate an Oil Agreement", in J. D. Sachs, J. E. Stiglitz and M. Humphreys (Eds.), *Escaping the Resource Curse*. New York: Columbia University Press, 89–113.

Robinson, James A and Ragnar Torvik (2005), "White Elephants", *Journal of Public Economics*, 89, 197–210.

Sachs, J. D. and Warner, A. M. (1995), "Natural Resource Abundance and Economic Growth", NBER Working Paper 5398.

Sachs, J. D. and Warner, A. M. (1997), "Natural Resource Abundance and Economic Growth", *Mimeo*, Center for International Development and Harvard Institute for International Development.

Sala-i-Martín, X. and Subramanian, A. (2003), "Addressing the Natural Resource Curse: An Illustration From Nigeria", National Bureau of Economic Research, Working Paper 9804.

Segal, Paul (2011a), "Resource Rents, Redistribution, and Halving Global Poverty: The Resource Dividend", *World Development*, 39 (4), 475–489.

Segal, Paul (2011b), "El petróleo es nuestro: The Distribution of Oil Revenues in Mexico", prepared for the study "The Future of Oil in Mexico", James A. Baker III Institute for Public Policy and The Mexican Studies Programme at Nuffield College,

Oxford University, http://bakerinstitute.org/publications/EF-pub-SegalDistribution-04292011.pdf

Segal, Paul (2012), "Fiscal Policy and Natural Resource Entitlements: Who Benefits from Mexican Oil?", Oxford Institute for Energy Studies, Working Paper WPM 46. http://www.oxfordenergy.org/wpcms/wp-content/uploads/2012/05/WPM_46.pdf

Stern, N. H., Peters, S., Bakhshi, V., Bowen, A., Cameron, C., Catovsky, S., Crane, D., Cruickshank, S., Dietz, S., Edmonson, N., Garbett, S.-L., Hamid, L., Hoffman, G., Ingram, D., Jones, B., Patmore, N., Radcliffe, H., Sathiyarajah, R., Stock, M., Taylor, C., Vernon, T., Wanjie, H., and Zenghelis, D. (2006), *Stern Review: The Economics of Climate Change*, Cambridge, UK: Cambridge University Press.

Stijns, J.-P. C. (2005), "Natural Resource Abundance and Economic Growth Revisited", *Resources Policy*, 30 (2), 107–30.

Tabatabai, Hamid (2011a), "The basic income road to reforming Iran's price subsidies," *Basic Income Studies*, Vol. 6, Issue 1, Article 3, June, pp. 1–24.

Tabatabai, Hamid (2011b), "Iran: A Bumpy Road toward Basic Income", *mimeo*, October 2011.

van der Ploeg, Frederick (2010), "Natural Resources: Curse or Blessing?", OxCarre Research Paper 5, Revised, 13 June 2010.

van der Ploeg, Frederick and Anthony J. Venables (2011), "Harnessing Windfall Revenues: Optimal policies for resource-rich developing economies", *Economic Journal*, Vol. 121, pp. 1–30.

van der Ploeg, Frederick (2011), "Natural Resources: Curse or Blessing?," *Journal of Economic Literature*, 49(2), 366–420.

van Wijnbergen, S. (1984), "The 'Dutch Disease': A Disease After All?" *The Economic Journal*, 94, 41–55.

Wenar, L. (2007), "Property Rights and the Resource Curse," *Philosophy and Public Affairs*, 36 (1), 2–32.

Wessel, R. H. (1967), "A Note on Economic Rent", *American Economic Review*, 57 (5), pp. 1221–1226.

Whitehead, Laurence (1997), "Beyond Neo-Liberalism: Bolivia's Capitalization As a Route to Universal Entitlements and Substantive Citizenship Rights?" second draft (20 May 1997), *mimeo*, Nuffield College, Oxford.