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HOW TO USE OIL REVENUES EFFICIENTLY

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Abstract

Oil-rich countries systematically misallocate public expenditures relative to non-oil countries--by favoring consumption over capital, and within consumption, inefficient subsidies and public-sector wages over targeted transfers. Furthermore, for given levels of expenditure, value-for-money is considerably less in oil-rich countries. This paper argues that the reason for this inefficiency is that oil revenues go directly to the government without passing through the hands of the citizens, as is the case with tax revenues. As a result, governments in oil countries are less accountable for public expenditure, which leads to inefficient spending. To improve public-spending efficiency, we propose that all oil revenues be distributed directly to citizens, and the resources that government needs be raised through taxation. We show that such a scheme improves the efficiency of public spending. We consider possible obstacles to such a reform and show that they have been overcome by technology, politics, and global events.

JEL Classifications: H2, H5, O13, D8

Keywords: oil revenues, public expenditure, accountability, transfers.

ملخص

درجت البلدان الغنية بالنفط على إساءة توجيه الإنفاق العام مقارنة بالبلدان غير النفطية، وذلك بتفضيلها الاستهلاك على رأس المال، وحتى ضمن الاستهلاك تسيء التخصيص بتفضيلها الدعم غير الكفوء وأجور القطاع العام على توجيه الإنفاق توجيهها هادفاً. وبالنسبة لمستويات الإنفاق، فإن مردودية الإنفاق أقل بكثير في البلدان الغنية بالنفط. تجادل هذه الورقة بأن سبب عدم الكفاءة هذه يرجع إلى أن عائدات النفط تذهب مباشرة إلى الحكومة دون المرور عبر أيدي المواطنين، كما هو الحال مع إيرادات الضرائب. ونتيجة لذلك، تكون الحكومات في البلدان النفطية أقل عرضة للمساءلة عن الإنفاق العام، الأمر الذي يؤدي إلى عدم كفاءة الإنفاق. لتحسين كفاءة الإنفاق العام، نقترح أن يتم توزيع كل عائدات النفط مباشرة على المواطنين، وتحصل الحكومة على الموارد التي تحتاجها الحكومة من خلال الضرائب. ونبين أن من شأن مثل هذا النظام أن يحسن كفاءة الإنفاق العام. ونحن ننظر أيضاً في العقبات المحتملة لمثل هذا الإصلاح ونبين أنه تم التغلب عليها من خلال التكنولوجيا والسياسة والأحداث العالمية.

1. Introduction

Are natural resources a blessing or a curse? In the three decades since Gelb (1988) posed this question, there has emerged a rich and often conflicting literature aimed at an answer. Whereas Sachs and Warner (1995, 2001), Gylfason et al. (1999), Auty (2001), among others, provide evidence that natural-resource-rich countries performed worse than their non-resource-rich counterparts, Lederman and Maloney (2007) argue that the resource curse is not “destiny”, because *how* goods are produced is more important than *what* goods are produced. Others point to confounding factors that lead resource-rich countries into the curse. For example, ethnically or politically fractionalized countries face the resource curse more often than homogenous countries do (Montalvo and Reynal-Querol, 2005); Lessmann and Steinkraus (2017) show that the spatial distribution of resource endowments within countries can drive the curse of natural resources. In his comprehensive and balanced survey of the evidence, van der Ploeg (2011) concludes that either outcome is possible, and depends critically on the quality of institutions in the country.

However, the quality of institutions may be influenced by the presence of natural resources. In their seminal book, Acemoglu and Robinson (2012) distinguish between “extractive” and “inclusive” institutions, where the former is often associated with natural resources. Elbadawi and Selim (2016) argue that inclusive political institutional and strong political checks and balances can turn the resource curse into a blessing in resource-rich economies including those of the Arab World. Empirical results for Arab countries by Selim and Zaki (2016) confirm that the curse is largely “institutional” and that improved political institutions, when interacted with natural resources, can reduce the negative effects of natural resources on growth, but do not entirely offset it.

Others have examined the effect of resources on the quality of public services, which is an indicator of the quality of public institutions. For instance, Hong (2014) finds that resource-abundant Chinese divisions provide fewer services such as education, transportation and housing construction relative to cities with fewer resources. Even when oil revenues translate into increased spending on education, Caselli and Michaels (2013) find no evidence that this spending leads to improved delivery of education services—another sign of institutional weakness. Gylfason (2001) and Behbudi et al. (2010) find a negative correlation between resource rents and enrollment rates. Bhattacharyya and Collier (2014) find that natural resource rents are associated with reduced investment in public capital. Another strand of the political economy literature shows that oil abundance can lead to a lower quality of investment projects. Robinson and Torvik (2005) provide a theory in which “white elephants”, investment projects with negative social surplus, may be preferred to socially efficient projects if the political benefits are large compared to the surplus generated by efficient projects. Moreover, Collier and Hoeffler (2009) show that large supplies of natural resources combined with weak checks and balances (like Saudi Arabia) may improve the provision of public goods, even if the rate of embezzlement of public revenue is large. However, countries such as Norway with modest resources but benefiting from well-established institutions with strong checks and balances may also experience an improvement in the provision for public goods associated with natural resource discoveries because the rate of embezzlement of public revenues is small.

This paper focuses on a particular reason why public spending in resource-rich countries is inefficient. That reason is that, unlike in other countries, the oil revenues go directly to the government without passing through the hands of the citizens. As a result, citizens may not know the extent of oil revenues. Moreover, they may not have as much of an incentive to scrutinize how

government spends the oil revenues because they may not consider it as “their” money (in contrast with, say, tax revenues). Without citizen knowledge or scrutiny over oil revenues, governments have greater leeway in spending, often resulting in waste and fraud.

In section II of the paper, we review the evidence on the inefficiency of public spending in oil-rich countries. Next, we identify the underlying problem, namely that governments are not as accountable for spending oil revenues as they are for tax revenues. Specifically, we show how oil rents are negatively, and taxation is positively, associated with accountability; and that accountability is associated with better public expenditure outcomes.

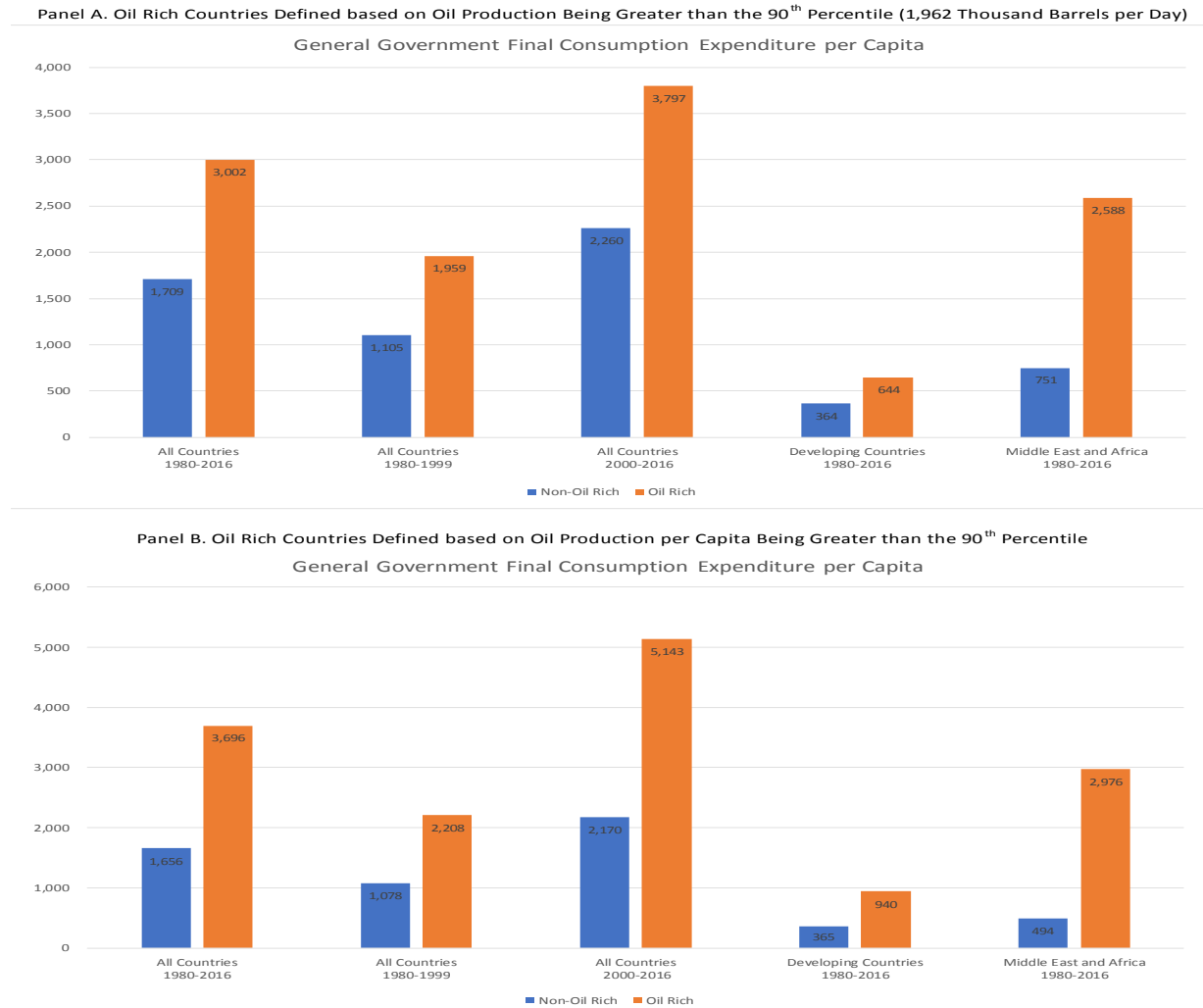
Having identified the problem and its possible causes, in section IV, we propose a solution. We show that, by transferring oil revenues directly to citizens and then taxing them, it is possible to achieve an improvement in the efficiency of public spending.

Section V takes up the problems with the solution. In addition to administrative difficulties in implementing the solution, there is a political problem: why would a rentier government voluntarily choose to hand out all the oil revenues and tax some of them back from the citizens, eliciting greater scrutiny of public finances? We derive conditions under which such a scheme may be in a government’s interest—because it enables even greater public expenditure than before. Section VI concludes.

2. The Problem: Inefficient Public Spending

There is considerable evidence, around the world and over time, that oil-rich countries spend government revenues more inefficiently than non-oil countries. The extent of the difference depends on the definition of “oil-rich” and on the indicator of public-expenditure inefficiency used. As a first cut, we consider the allocation of public resources between consumption and investment. We confirm the Bhattacharyya and Collier (2014) finding that resource-rich governments underspend on capital and overspend on consumption relative to their non-resource-rich counterparts. When “oil-rich” is defined as oil production or oil production per capita above certain thresholds, oil-rich countries have higher government consumption per capita relative to non-oil-rich countries, over time and across regions (Figure 1).

Figure 1. High Consumption Spending in the Large Oil-Producing Countries



Sources: World Bank's World Development Indicators (WDI) and U.S. Energy Information Administration (EIA).

When oil-rich is defined in terms of the concentration of oil in the country's export basket, then the difference is mainly among countries in the Middle East and Africa, which will be the regions of focus in this paper (Figure 2). In countries with large rents, like most of the Gulf Cooperation Council (GCC) economies, public consumption is around 20 percent of GDP. In Kuwait and Saudi Arabia, this ratio exceeds 25 percent.

Figure 2. High Consumption Spending in the Large Oil-Exporting Countries



Note: The figure considers exports of petroleum, petroleum products and related materials (all goods with a classification code starting with 33 in the SITC Revision 2 classification at the 4-digit level).

Sources: World Bank's World Development Indicators (WDI) and World Integrated Trade Solution (WITS).

To be sure, the volume of public consumption is not necessarily a sign of inefficiency; what matters is the composition. At the aggregate level, we find that developing oil-producers spend a higher percentage of public consumption on subsidies and transfers, which is a sign of inefficiency (Table 1).

Table 1. Composition of Public Expenditures, 1990-2015

	Developing Countries		Middle East and Africa		Kuwait
	Non-Oil Rich	Oil Rich	Non-Oil Rich	Oil Rich	
Public Expenditures (% of GDP)	21.6%	22.8%	25.4%	25.5%	44.8%
Compensation of Government Employees (% of GDP)	7.3%	6.1%	8.1%	8.7%	12.4%
Subsidies & Transfers (% of GDP)	7.9%	10.4%	8.7%	9.6%	26.8%
(Comp. Govt. Employ. + Subsidies + Transfers) / Total Govt. Exp.	70.5%	72.2%	66.2%	71.8%	87.6%

Note: The table shows the expenses of the central government, including social security funds. If the data are not available, then statistics for the budgetary central government are used. Subsidies & Transfers include the following: subsidies, grants, social benefits, and other expenses. Oil-rich countries are those for which oil production per capita is above the sample median, calculated over the period of 1980-2016.

Sources: EIA, WDI, and IMF's Government Finance Statistics (GFS).

The inefficiency is best illustrated by energy subsidies, which are particularly high in the Middle East and North Africa (Sdrulevich et al., 2014, Devarajan and Mottaghi, 2015), and especially high among oil exporters in the region. Large oil rents have provided the means to GCC rulers to afford high-levels of public employment and a generous welfare system. The wage bill of civil servants in Bahrain, Kuwait and Saudi Arabia averages 12 percent of GDP (Table 1). Hodson (2011) describes these as jobs for life, paying high wages and entailing short working hours and generous benefits. Beyond explicit subsidies and transfers, citizens in the GCC are provided free healthcare, education and social security. Utilities (electricity, water and fuel) are also subsidized.

The case of Kuwait reinforces the point even more sharply. Subsidies amount to about 20 percent of GDP, with spending on public employment another 16 percent. The subsidies cover almost every aspect of a Kuwaiti's life, from cradle to grave (Box 1). For future reference, note that these low-population/high-oil-rent countries such as Kuwait are in effect transferring oil revenues to their citizens. However, by using public-sector wages and energy subsidies as the main instruments, they are transferring revenues in an extremely inefficient manner.

Box 1: Cradle-to-grave subsidies in Kuwait

- Before a Kuwaiti is born, he/she is subsidized through the health system.
- Upon birth, the father gets a “child allowance”.
- Growing up, education and health services are free.
- Going to a university, the student gets an allowance on top of free education. If sent abroad, full education costs are covered in addition to a generous allowance.
- When joining the labor force, public sector employment is almost guaranteed, with generous pay and benefits.
- For the one in five Kuwaitis joining the private sector, the employee gets a generous and steady government subsidy in addition to the private sector salary.
- Kuwaiti businesses get subsidized inputs (land, loans, energy, public procurement, etc.)
- Some basic food items, petroleum products, water, and electricity are heavily subsidized.
- A Kuwaiti male gets a “marriage gift” from the government, in addition to the right to heavily subsidized housing.
- Those requiring health treatment abroad can count on the government’s covering the cost.
- Social welfare transfers are provided to those needing it.
- A generous retirement is assured through continuously large transfers to the social insurance authority.

Source: Shaban (2016).

The clearest evidence of inefficient public spending emerges when we look at the outputs generated by the higher levels of public consumption spending in oil-rich countries. On a number of dimensions, these outputs are either lower, or worse in quality. For instance, in the Middle East and Africa, the oil-rich countries, despite substantial subsidies to energy, have higher power outages per month, and lose a greater share of sales due to those power outages (Table 2).

Table 2. Public Expenditures Outputs: Middle East and Africa

	Non-Oil Rich	Oil Rich
No. of Power Outages in Firms (per month)	8.7	25.5
Value Lost due to Electrical Outages (% of Sales)	6.5	9.3

Note: Oil-rich countries are those for which oil production is above the 90th percentile (1,962 thousand barrels per day), calculated over the period of 1980-2016.

Sources: EIA and World Bank's Enterprise Surveys.

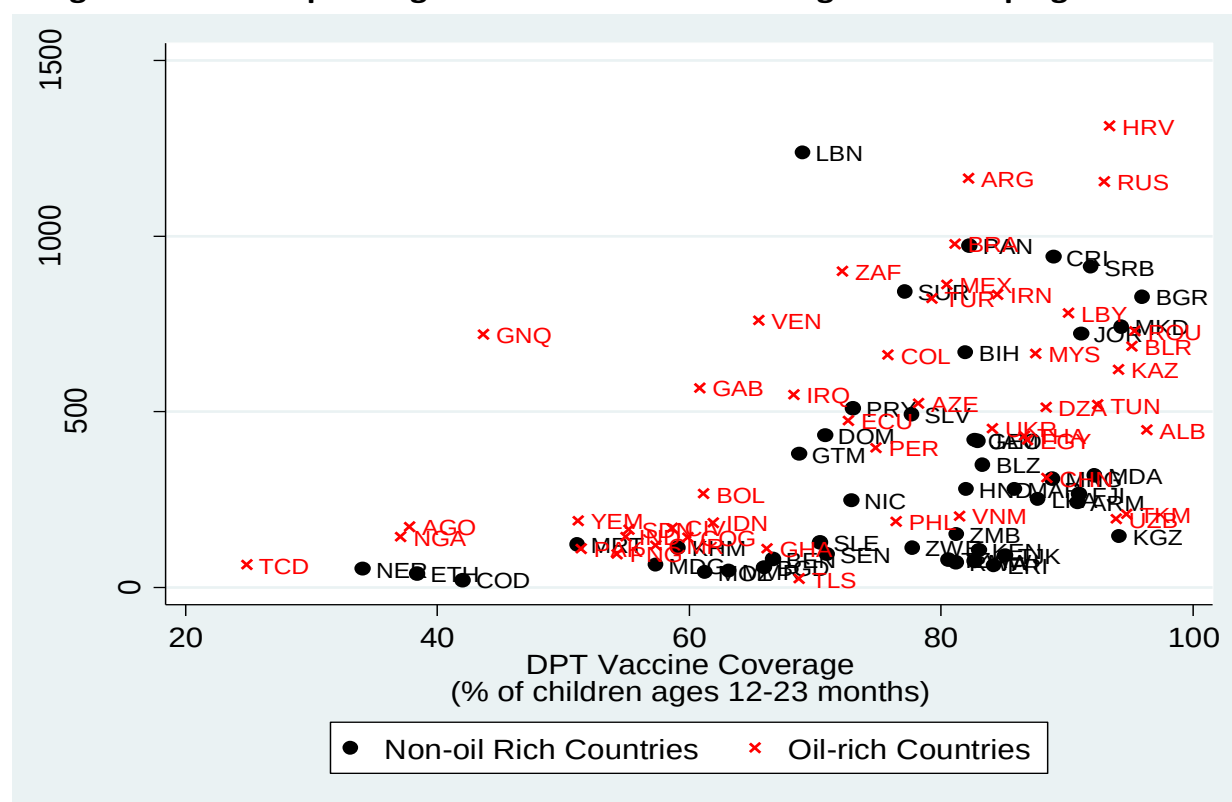
The higher unit costs (or lower value for money) can be seen among the oil exporters of Central Africa (Devarajan and Singh, 2012). Chad has the highest cost of classroom construction in Africa—four times the next most expensive country. It also has the highest leakage rate in the world (90 percent) of nonwage health spending (Gauthier and Wane, 2009). Cameroon spends

\$50 per capita on health, but has the epidemiological profile of countries that spend \$10. Its road maintenance costs are double the African average. And the Republic of Congo loses 47 percent of its electricity in transmission, compared with the African average of 27 percent.

To be sure, many of these Central-African countries have experienced years of conflict and instability, which clearly undermine public-spending efficiency. The same is true at present for the developing oil exporters in the Middle East and North Africa, such as Yemen, Iraq, Syria, and Libya. By contrast, the high-income oil states of the GCC have achieved high levels of education attainment (measured in number of years of schooling) and life expectancy (Iqbal and Kiendrebeogo, 2015, 2016). Yet, even these countries face serious problems with the quality of education and health services. Teacher absenteeism in many GCC countries is high, and students in Qatar, for example, fare much worse on standardized tests than their counterparts in Vietnam (Brix et al., 2015).

One of the purposes of public spending is to provide public goods to citizens, including health. Here, too, oil-rich countries spend more on health, but achieve less in terms of, say, immunization coverage (Figure 3).

Figure 3. Health Spending and Immunization Coverage in Developing Countries



Note: Oil-rich countries are those for which oil production is above the sample median (40 thousand barrels per day), calculated over the period of 1980-2016. DPT = diphtheria, pertussis (whooping cough), and tetanus.

Source: EAI, WDI, and World Health Organization (WHO).

Regression analysis shown in Table 3, using a variety of explanatory variables and controlling for a number of factors, consistently reveals a negative relationship between oil rents (as a percentage

of GDP) and DPT immunization rates. Even more troubling is the fact that oil rents have a positive relationship with child mortality rates¹.

Table 3. Oil Rents and Health Outcomes

Dependent Variables (avg. 2006-2015):	DPT Coverage				Child Mortality Rate			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>Independent Variables (avg. 1995-2005):</i>								
Oil Rents (% of GDP)	-0.39*** [0.105]	-0.42*** [0.108]	-0.57*** [0.120]	-0.56*** [0.120]	0.74** [0.307]	0.80** [0.344]	1.03** [0.397]	0.79* [0.411]
GDP per capita (logs)	3.44*** [0.542]	4.45*** [0.837]	5.61*** [0.859]	4.41*** [0.662]	-15.23*** [1.347]	-16.08*** [2.057]	-18.75*** [2.245]	-15.58*** [1.703]
Trade Openness	-2.90 [2.445]	-3.26 [2.407]	-2.74 [2.264]	-3.25 [2.394]	2.35 [3.347]	1.96 [3.441]	2.12 [3.346]	3.49 [3.501]
Govt. Spending on Health, per capita (% of GDP per capita)		-1.24** [0.575]				0.88 [1.546]		
Voice and Accountability			-4.85*** [1.276]				7.84** [3.567]	
Executive Constraints Index (1=no restrictions, 7= highest accountability)				-1.71*** [0.531]				0.80 [1.601]
Constant	66.38*** [4.649]	63.01*** [5.166]	49.72*** [6.735]	68.42*** [4.770]	145.91*** [11.887]	150.31*** [13.271]	172.97*** [17.927]	143.80*** [12.245]
No. of Observations	138	136	138	129	139	136	139	129
R-squared	0.39	0.40	0.45	0.43	0.55	0.56	0.57	0.55

Note: DPT vaccine coverage measured as percentage of children, ages between 12 and 23 months. Robust standard errors are shown in brackets. *** p<0.01, ** p<0.05, * p<0.1
Sources: Author's calculations based on data from Polity IV, WDI, WHO, and World Governance Indicators (WGI).

In terms of education—another objective of public spending—again, there is a negative association between oil rents and literacy rates, although the relationship is not statistically significant in all the specifications (Table 4).

Table 4. Oil Rents and Education Outcomes

Dependent Variable (avg. 2006-2015):	Literacy Rate			
	(1)	(2)	(3)	(4)
<i>Independent Variables (avg. 1995-2005):</i>				
Oil Rents (% of GDP)	-0.16** [0.075]	-0.17* [0.088]	-0.25** [0.116]	-0.10 [0.119]
GDP per capita (logs)	7.22*** [1.087]	6.53*** [1.086]	8.17*** [1.349]	7.09*** [1.156]
Trade Openness	2.51 [2.634]	3.52 [2.629]	2.66 [2.804]	3.28 [2.799]
Govt. Spending on Education (% of GDP)		0.14 [0.587]		
Voice and Accountability			-2.56 [2.179]	
Executive Constraints Index (1=no restrictions, 7= highest accountability)				0.62 [0.885]
Constant		30.94*** [9.039]	34.84*** [10.134]	27.88*** [9.975]
No. of Observations		116	97	116
R-squared		0.35	0.35	0.36

Note: Literacy rate measured as percentage of adults, (people ages 15 and above). Robust standard errors are shown in brackets. *** p<0.01, ** p<0.05, * p<0.1

Sources: Author's calculations based on data from Polity IV, UNESCO, WDI, WGI.

Improvements in health and education are part of the ultimate goal, which is the elimination of extreme poverty. Devarajan et al. (2013) look at the efficiency of public spending towards this

¹ That the variable Voice and Accountability (V&A) appears to have a negative relationship with health outcomes may seem puzzling. The reason is that this variable has a strongly negative correlation with another independent variable, Oil Rents. The negative coefficient on Oil Rents in the regressions embeds the positive relationship between V&A and health outcomes. When V&A is removed from the regression (not reported here), the coefficient on Oil Rents increases for DPT and decreases for child mortality. Moreover, when Oil Rents are removed from the regression and V&A included, the coefficient on V&A has the expected sign, although it is not always statistically significant.

goal in oil-rich countries in Sub-Saharan Africa. Despite relatively high per-capita incomes, and substantial oil revenues over a long period, these countries also have high levels of poverty. Devarajan et al. (2013) show that, if these countries transfer a fraction of their oil revenues as equal payments to the entire population, they could eliminate extreme poverty. The fraction varies from a low of 6 percent for the low-population countries such as Gabon and Equatorial Guinea, to about 35 percent in South Sudan and Chad (Table 5).

Table 5. Share of Resources Revenue Needed to Eliminate Poverty

Angola	6
Chad	34
Congo	11
Equatorial Guinea	6
Gabon	6
Nigeria	19
South Sudan	32

Source: Devarajan et al. (2013).

3. The Real Problem: Weak Accountability

Why do oil-rich countries systematically underperform on public spending efficiency? The simple statement that it is due to weak institutions is not convincing since there are non-oil economies with weak institutions, such as Bangladesh, Dominican Republic and El Salvador, that appear to spend public resources more effectively (Herrera and Pang, 2005). The answer must lie in the nature of oil revenues and how they affect the institutions that govern public spending efficiency. A part of the answer as presented in Chapter 4 is the argument that commodity price volatility combined with weak fiscal institutions undermine the sustainability of public spending. More fundamentally, Henry and Springborg (2001) observed that governments in oil-rich countries earn less revenue from domestic taxation. Moore (2004) and Bornhorst et al. (2008) suggested that this fact makes governments in oil economies less accountable. Scholars have long observed that the fiscal link between citizens and their governments is a strong determinant of government accountability (Bates and Lien, 1985; North and Weingast, 1989). Governments that derive their revenue from natural resources face limited fiscal pressure from their citizens, undermining accountability. Moore (2001) introduced the idea of resource wealth as a source of “unearned state income” that gives rise to state autonomy and a lack of accountability, which in turn influences the efficiency of public spending. Investigating the link between taxation and representation, Ross (2004) finds that the larger is the share of government expenditure that is financed through taxation, the more likely is the government to become representative.

We empirically confirm this line of reasoning in two steps. First, using a variety of estimation techniques (pooled OLS, fixed effects), we show that there is a positive relationship between tax revenues and a widely-used measure of voice and accountability, from the Worldwide Governance Indicators (Kaufmann et al., 2011) (Table 6). We also show that there is a negative relationship between oil rents and the same measure of voice and accountability. These relationships are even more pronounced for the oil-rich Arab countries (Table 7).

Table 7. Tax Revenues and Voice and Accountability

	Average Country		Median Country	
	Voice and Accountability	Tax Revenue	Voice and Accountability	Tax Revenue
	<i>Index</i>	<i>% of GDP</i>	<i>Index</i>	<i>% of GDP</i>
Oil Rich Arab Countries	-1.07	5.06	-0.94	2.45
Oil Rich Non-Arab Countries	-0.08	17.54	-0.70	14.31
Non-Oil Rich Countries	-0.05	17.38	-0.07	15.64

Note: Oil-rich countries are those for which oil production per capita is above the 90th percentile, calculated over the period 1980-2016.

Next, we find that there is a positive and statistically significant relationship between accountability and one measure of public-spending outcomes, namely, secondary enrolment rates (Table 8). Taken together, these results corroborate the proposition that oil revenues, by accruing directly to the government without passing through the hands of the citizens, lead to public-spending decisions that are lacking in accountability and therefore inefficient.

Table 6. Oil Revenues and Accountability

Dependent Variable: Estimation Method:	Voice and Accountability			
	Pooled OLS		Fixed Effects	
	(1)	(2)	(3)	(4)
Tax revenues	1.41** [0.680]	5.81 [4.762]	0.20 [0.156]	3.70** [1.860]
(Tax Revenues)^2		-1.74 [1.670]		-1.22* [0.619]
Oil Rents (<i>% of GDP</i>)	-0.04*** [0.006]	-0.04*** [0.006]	-0.01** [0.003]	-0.01** [0.003]
GDP per capita (<i>logs</i>)	0.41*** [0.029]	0.41*** [0.031]	0.01 [0.020]	0.01 [0.020]
Trade Openness	-0.19* [0.097]	-0.19* [0.097]	-0.04 [0.060]	-0.05 [0.058]
Constant	-3.24*** [0.233]	-3.31*** [0.235]	0.18 [0.183]	0.08 [0.195]
No. of Observations	1,644	1,644	1,644	1,644
R-squared	0.66	0.67	0.01	0.02
No. of Countries	119	119	119	119

Note: Robust standard errors, clustered at the country level, are shown in brackets. *** p<0.01, ** p<0.05, * p<0.1

Sources: Author's calculations based on data from WDI and WGI.

Table 7. Public Spending Outcomes and Accountability

	Gross Secondary Enrollement Ratio			
	Pooled OLS		Fixed Effects	
	(1)	(2)	(3)	(4)
Voice and Accountability	7.96*** [2.258]	8.88*** [2.586]	3.46* [1.978]	2.83 [2.055]
Control of Corruption		-2.72 [1.969]		1.58 [2.168]
Urban Population (<i>% of total population</i>)	0.23*** [0.073]	0.24*** [0.072]	1.08*** [0.407]	1.07*** [0.408]
GDP per capita (<i>log</i>)	8.01*** [1.540]	9.10*** [1.654]	5.85*** [1.835]	5.96*** [1.810]
Pupil/Teacher Ratio in Secondary Education	-0.23 [0.184]	-0.16 [0.187]	0.76** [0.312]	0.77** [0.312]
Govt. Spending on Secondary Education (<i>% of GDP</i>)	2.89 [1.923]	3.50* [2.023]	3.92** [1.826]	3.89** [1.798]
Constant	-5.53 [13.699]	-16.72 [14.709]	-54.61*** [19.904]	-55.44*** [20.023]
No. of Observations	795	795	795	795
R-squared	0.77	0.78	0.28	0.29
Number of Countries	127	127	127	127

Note: Robust standard errors, clustered at the country level, are shown in brackets. *** p<0.01, ** p<0.05, * p<0.1

Sources: Author's calculations based on data from UNESCO, WDI, and WGI.

4. A Proposed Solution: Direct Transfers of Oil Revenues with Taxation

If oil revenues have this effect of rendering public spending inefficient, what can be done? We propose an extension of an idea that has been suggested and implemented in resource-rich environments since the 1970s: transferring a portion of oil revenues directly to citizens. The state of Alaska in the U.S. adopted such a scheme, known as the Alaska Permanent Fund, in 1974; the Canadian province of Alberta and the country of Mongolia have introduced similar programs recently. Most of the scholarly literature (Sala-i-Martin and Subramanian, 2003) as well as the motivation behind these schemes (Anderson, 2002) have focused on redistribution or a way of transferring funds before they are embezzled. This begs the question of how public *spending*, which all countries need, can be made more efficient. The extension we propose is one where a substantial portion of oil revenues is transferred to citizens, who are then taxed to finance public goods. The fact that public spending would then be financed by taxation, rather than oil revenues, increases the chances that citizens will scrutinize this spending and thereby make it more efficient. In what follows, we show that it is possible for a scheme that transfers a portion of the oil revenues to citizens, and then taxes them, to lead to more efficient public spending. We do so by noting that citizens and the government may have different objectives (otherwise we would not have a problem in the first place). In this setting, it is natural to model the relationship between citizens and government as a game. The mathematical details of the model are given in Box 2. The basic intuition is as follows:

- Increased citizen scrutiny leads to more public goods.
- Citizens will scrutinize more when the benefits from scrutiny exceed the costs.
- The benefits are a function of citizens' knowledge about the extent of oil revenues (if they do not know the size of the revenues, they may not find it worthwhile to invest in scrutiny).
- With direct resource transfers and taxation, the benefits increase because citizens know more about the extent of revenues (since part of it is from taxes that they pay).

- At low levels of taxation, this added benefit is sufficient to increase scrutiny and hence public goods (see Figure 4).

Box 2 : A Model of Direct Resource Transfers and Taxation

The government has an objective function (ϕ) over its private consumption (s) and provision of a public good (g):

$$\phi = \ln(s) + g$$

The government's budget constraint is that oil revenues (R) have to equal private consumption (s) and spending on the public good, where the cost of the public good is lowered by citizen scrutiny (e) and the effectiveness of that scrutiny (γ):

$$R = s + \left(\frac{1}{\gamma e}\right)g$$

For a given level of scrutiny (e), the government's optimal level of public goods is given by

$$g^* = \gamma e R.$$

Citizens have an objective function (W) over their consumption (c) and the public good (g):

$$W = V(c) + U(g)$$

Citizens' budget constraint is based on exogenous income (Y) spent on consumption or scrutiny effort:

$$Y = c + e$$

Since the amount of oil revenues is unknown to the citizen, she maximizes expected utility subject to the budget constraint:

$$\text{Max } E[W] = V(Y-e) + EU(\gamma e \widetilde{R})$$

The optimal level of scrutiny has to satisfy

$$V'(Y-e) = \gamma RE[U'(\gamma e \widetilde{R})]$$

Note: a reduction in uncertainty will increase the optimal level of scrutiny.

Suppose the government transfers a share (α) of oil revenues to citizens, who then pay taxes (t) on this amount. The government budget constraint is

$$(1-\alpha)R + \alpha R t = s + \left(\frac{1}{\gamma e}\right)g$$

The optimal level of the public good is now

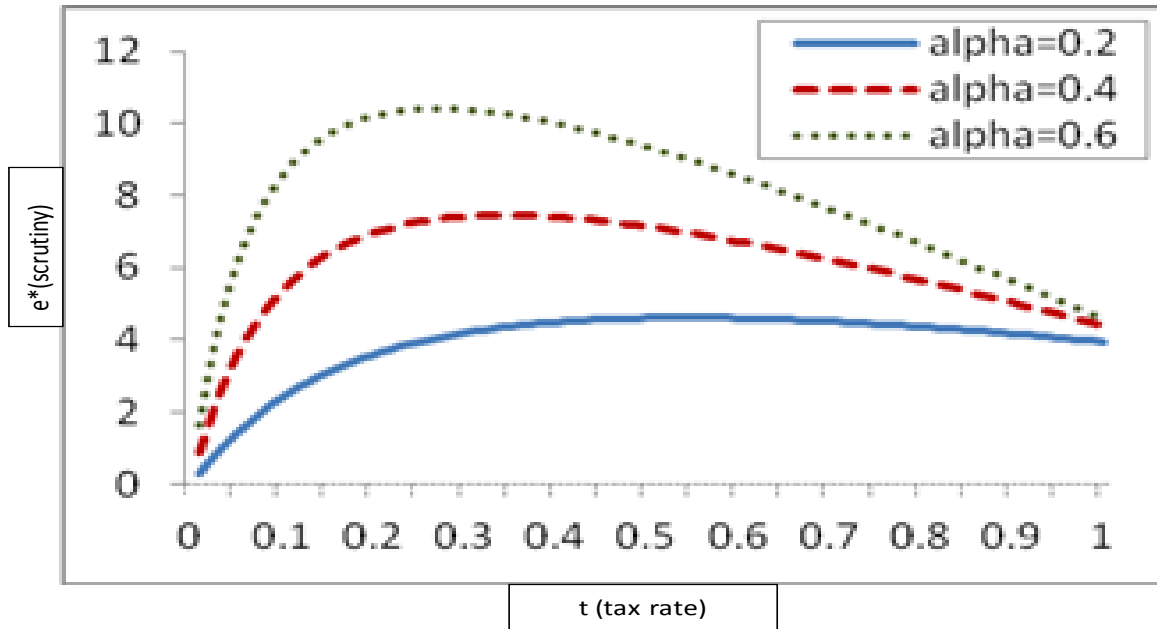
$$g^* = \gamma e [\alpha R t + (1-\alpha)R]$$

If the citizen further spends an amount proportional to δ (the degree of opacity) to learn about the rest of government revenues, the optimal degree of scrutiny becomes:

$$e^* = \frac{(\alpha R)^2 t(1-t) + \alpha R t Y}{\delta + \alpha R t} - \frac{1}{(\alpha R t + (1-\alpha)R)\gamma}$$

At low levels of taxation, the introduction of transfers and taxation increases citizens' scrutiny of public spending, leading more public goods. This is confirmed by simulation results (Figure 5).

Figure 4. The Relationship between Taxation of Transferred Oil Revenues and Citizen Scrutiny: Simulation Results



Note: $R=20$, $Y=5$, $\delta=1$, $\gamma=1$.

5. Problems with the Solution

As logical and analytically founded as it may be, this proposal can be, and has been, criticized on several grounds. One set of criticisms has to do with the feasibility of implementing a scheme of cash transfers to every citizen, especially in countries where a large number of people live in rural areas. While that may have been an issue ten years ago, two advances in technology make such schemes much more feasible today. The first is biometric technology that permits both the identification of each citizen by a biometric ID card and the issuing of payments to that citizen through the card (Gelb and Decker, 2012). The fact that India has issued biometric ID cards to over a billion citizens means that technology has already made direct transfers of oil revenues feasible. The second technical advance is mobile banking which has taken off in some countries such as Kenya, although not yet in others. In those countries with high cellphone penetration and mobile banking, the direct transfers of oil revenues and the collection of taxes should be eminently feasible.

A second type of criticism revolves around the response of citizens to receiving these transfers of cash. Some claim that citizens will flitter away the money in unproductive activities. But the evidence from unconditional cash transfers suggests that this is unlikely to be the case. In a review of nineteen cash transfer programs, Evans and Popova (2017) find no evidence of increased spending on “temptation goods,” such as alcohol and tobacco. This finding is confirmed by recent randomized control trials in Kenya and Liberia where beneficiaries spent their additional cash on investments in their house or businesses (Haushofer and Shapiro, 2017). A recent paper on the Alaska Permanent Fund shows that the program had no effects on employment, and even increased part-time work by a small amount (Jones and Marinescu, 2018).

The final and perhaps most compelling criticism is political. Why would a government that has benefited from oil rents (at the expense of public goods) change to a system where it distributes oil revenues to the citizens and then has to rely on taxation for public spending? Why would a

government switch to a system that elicits greater citizen scrutiny of its expenditure decisions? McGuirk et al. (2016) undertake a positive analysis to derive the characteristics of economies and governments that are more likely to adopt a revenue transfer scheme. These include a low advantage to the incumbent, high poverty and weak institutions, higher resource rents, free and independent media, and neighbors' adopting similar schemes. In addition, some recent work by Do and Devarajan (2017) shows that even corrupt or ineffective governments may find it in their interest to adopt a transfer scheme. Modeling the relationship between government and citizens as a game, they show the following: If the government needs resources over and above what it receives in oil revenues (for example to finance a large public project), then it can raise these additional resources by transferring part of the oil revenues to citizens and taxing them for a larger amount than they received in cash transfers. Why would citizens be willing to pay more in taxes than they received in oil revenue transfers? The "twist" is that the government agrees, if the project is not successful, to subject itself to an audit. If the audit confirms that the government did in fact cheat, then some of the tax revenue is returned to the citizens. Knowing this, citizens are willing to pay more in taxes than they received in transfers to finance the public project. Since many oil governments today have expenditure plans that exceed their revenues (especially in light of low oil prices), an oil revenue transfer and tax scheme, coupled with an audit as described here, may be part of the solution.

6. Conclusion

The literature on the resource curse, despite its many sides, converges around the observation that the "curse" is closely linked with how resource-rich governments have used their oil revenues. In this paper, we showed that there is considerable evidence, across countries and over time, that oil-rich countries have worse public-spending outcomes than their non-oil counterparts. In the low-population/high-oil-rents countries of the GCC, the inefficiency is in the manner with which oil revenues are transferred to citizens. In higher-population countries, there are huge inefficiencies and leakages in the way that oil revenues are used to provide public goods.

The standard view is that poor public-spending outcomes are associated with weak institutions governing public expenditures. But in the case of oil-rich economies, these weak institutions may themselves be the result of the countries' dependence on resource revenues. For unlike tax revenues, resource revenues accrue directly to the government, without citizens' knowing the extent of the revenues, much less being able to hold government accountable for their use. Empirical evidence on the relationship among tax revenues, accountability and public-expenditure outcomes corroborates this reasoning.

To resolve this problem of poor public-spending outcomes in oil-rich states, we propose that the oil revenues be distributed directly to citizens, with the citizens' paying taxes to finance public goods. In this way, citizens will both know the extent of oil revenues, and have an incentive to scrutinize how government spends their tax money. We showed using a game-theoretic model that such a scheme could lead to enhanced public expenditure outcomes. Finally, we considered various problems with this proposal, and concluded that it is not only feasible and desirable, but there may be reasons why resource-rich governments will find it in their interest to adopt it. Given that low oil prices are likely to persist for some time, governments are correctly focusing on the efficiency of public expenditures. Transferring oil revenues to citizens and taxing them for public goods may be an idea whose time has come.

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