
Fiscal Policy and Natural Resource Entitlements: Who Benefits from Mexican Oil?

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Abstract

This paper suggests a new approach to analysing the distribution of natural resource revenues and applies it to the case of Mexico. It defines a *natural resource entitlement* as a citizen's per capita share of their country's natural resource rents. The main finding is that, according to official estimates, Mexican fiscal policy transfers oil entitlements from the bottom 90 percent of the population to the top 10 percent of the population. This implies that, although fiscal policy is progressive relative to market income, it is regressive once oil entitlements are taken into account. I consider a fiscal reform that would ensure that every citizen received their oil entitlement, and in doing so would eliminate extreme poverty.

Contents

Acknowledgements	iii
Abstract	iv
I. Introduction	1
II. Fiscal Policy	4
Aggregate revenues and expenditure	4
The distributional impact of fiscal policy	5
An alternative estimate	10
Estimation issues.....	12
III. A Policy Proposal	13
The impact on poverty	18
Behavioural responses	19
A comparison: Bolivia's Renta Dignidad	20
IV. The Political Economy of Oil Distribution	21
V. Conclusion	22
References	24

Figures and Tables

Figure 1: Oil revenues as % of GDP and of government revenues	5
Figure 2: 2008 income shares pre-fisc, post-fisc, post-fisc plus state health and education expenditures, and with oil entitlements	8
Figure 3: Post-fisc income relative to income with oil entitlements, 2008	9
Table 1: Income shares, %, before and after fiscal policy, and with oil entitlements, 2008 (SHCP)	6
Table 2: Income shares, %, before and after fiscal policy, and with oil entitlements, 2008, Lustig et al. (2011) (LJPS)	11
Table 3: Distributional impact of fiscal policy, selected countries	17

I. Introduction

Conflict over the ownership of natural resources has always been a driver of global history. As a result of the conflict between producer countries and international companies, the principle that natural resources belong to “peoples”, or the collective of citizens of the country in which the resources are found, has become embedded in international law and human rights treaties.¹ Yet, while the international distribution of resource ownership has been resolved, in principle, if not always in practice, a second distributional issue has emerged in some resource-rich countries. If it is citizens of the resource-owning country who should benefit from the resource, the question remains: which citizens? This paper addresses that question by focusing on the case of Mexico, an oil-rich country in which national control of oil has been beyond doubt since nationalisation in 1938, but where the domestic distribution of its benefits remains problematic.

While this is the first study to explicitly investigate whether citizens are receiving their share of the benefits of resource revenues, the question has long had political salience within resource-producing countries. Citizens in these countries typically feel a sense of entitlement to their resources, and social conflict can emerge when enough people feel they are not receiving their share. Such was the case in Venezuela, where the rise of Hugo Chavez was driven by the popular perception that the elite was collaborating with foreign oil companies to keep the benefits of oil from the majority of citizens. In some cases the question of the within-country distribution of resource revenues also has a regional dimension, where the resource-producing region within a country demands a high share of the revenues, as has occurred in Nigeria and Bolivia. The sense of popular entitlement to domestic natural resources also probably explains why many hydrocarbon-rich countries subsidize fuel prices: citizens believe that since it is their oil they should get it cheap. In Mexico the direct cost of fuel subsidies reached 1.8 percent of GDP in 2008; in some oil-rich countries the cost can be much higher (Baig et al. 2007).

For citizens to benefit from their natural resources they must incur the costs of a resource industry. Resource extraction and processing is a complicated business involving large quantities of physical capital, human capital, and technology, whether employed by national

¹ Wenar (2007).

public companies, or by international private companies.² Thus from gross resource revenues the resource-owning country has to pay the risk-adjusted costs of exploration, extraction, transport and processing, covering wages and a return to capital. The revenues that remain once these payments have been made at competitive prices comprise *resource rents*, and according to the theory of natural resources it is these rents that should accrue to the owner of the resource. While in practice determining what part of gross revenues should count as rent is difficult, in principle the amount should be equal to total net government revenues due to the resource, from all forms of taxation and royalty.³

In this paper I consider a simple and intuitive interpretation of a citizens' right to their country's natural resources, denoted their *resource entitlement*: it is that every citizen has a right to their per capita share of their country's resource rents. This is justified primarily by the nature of resource rents: by definition, they are not created by anyone, and are best viewed as "manna from heaven". Those employed in the resource sector have already been paid appropriately before the rents are calculated, so they have no special claim on the remaining revenues that comprise the rents. It is also a natural interpretation of the statement in international law that resources are owned by "peoples". 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" (Wenar 2007, p. 14).⁴

In practice, resource rents (or the share actually captured by the government) are usually used to finance general government expenditure.⁵ But they differ from government income that derives from general taxation: when government expenditures are financed by the taxation of individuals and businesses it generally implies redistribution, as the benefits of government

² In the case of Mexico, a constitutional amendment banned concessions in 1960 and the national oil company Pemex is the sole producer of oil. Nonetheless, Pemex contracts private oil service companies to perform specific tasks.

³ See Segal (2011a; 2011b) for further discussion of resource rents. In practice, determining what counts as rents is complicated by the fact that the resource sector is subject to high levels of unavoidable uncertainty, and that ex ante risks can translate into high ex post profits in some cases. The first major risk is exploration: the profits due to successful projects have to be sufficient to make up for unsuccessful projects. The second major risk is price volatility, which can imply high volatility of profits.

⁴ The idea of resource entitlements also underlies a growing literature on the direct distribution of resource revenues (Palley, 2003; Sala-i-Martin and Subramanian, 2003; Birdsall and Subramanian, 2004; Sandbu, 2006; Segal, 2011a).

⁵ To the extent that these revenues are saved, which in some cases will be optimal, they are intended to finance future government expenditure.

expenditures are distributed differently from the tax burden. Since rents do not start off as the property of any individual, expenditure of resource rents implies distribution, but not *redistribution* (Segal 2011a).

I therefore propose that for resource-rich countries the baseline against which the progressiveness or regressiveness of fiscal policy should be judged is not market income, but market income plus each individual's resource entitlement. This is because a person's resource entitlement is part of their endowment, so a fiscal policy whose net effect is to provide each citizen with their entitlement should be seen as distributionally neutral. In this paper I use existing estimates of the distributional impact of fiscal policy in Mexico in order to assess fiscal policy against this baseline.

The main finding of the paper is that, on the basis of official estimates, fiscal policy is regressive according to this baseline. Even adjusting to include a more generous estimate of progressive health and education spending, the net effect of fiscal policy is to transfer a share of oil entitlements from those in the bottom 90 percent of the population to the richest 10 percent. Relative to their oil entitlements, those in the bottom 90 percent each lose on average about M\$1,400 per year (US\$134, PPP\$179). These losses fund extra income of just over M\$13,000 (US\$1,248, PPP\$1,673) per person per year for the richest 10 percent. I also perform the analysis using independent estimates of the impact of fiscal policy due to Lustig, Jaramillo, Pessino and Scott (2011), which suggest greater progressiveness.

I then consider a simple alternative fiscal policy that is constructed to be progressive relative to the baseline of oil entitlements; this is also based on the further finding that Mexican government revenue and expenditure are unusually low by international standards. I show that extreme poverty, currently running at 16.5 percent of the population, would be virtually eliminated by the policy.

Section II discusses Mexican fiscal policy and its distributional impact, comparing it with the distributional implications of oil entitlements. Section III considers an alternative form of fiscal policy that directly takes account of entitlements to oil revenues. I discuss the possible impact on both income distribution and household behaviour, and compare it with a related policy in Bolivia. Section IV turns to the political economy of oil distribution and suggests

that if citizens were to benefit more directly from their hydrocarbons then they might be more willing to give up inefficient and regressive fuel subsidies. Section V concludes.

II. Fiscal Policy

Aggregate revenues and expenditure

Relative to comparable countries, the Mexican government spends very little on its citizens. In 2008 government consumption, covering public expenditures such as health, education, defense, and other goods and services paid for on behalf of the population, accounted for just 9 percent of GDP. This was down from 11 percent in 1999, and compares with a Latin American average of 13.9 percent.⁶ Along with Peru, it was the second lowest in Latin America, higher only than Guatemala—despite Mexico’s per capita GDP (in PPP\$) being 50 percent larger than Peru’s (and more than double Guatemala’s). In both Argentina and Chile, with per capita GDP (in PPP\$) close to that of Mexico, it is 12 to 13 percent. Government revenues as a share of GDP are also extremely small by international standards, at only 22.7 percent of GDP in 2008.⁷ In Argentina and Chile the figures are respectively 33.4 percent and 27.2 percent. I return to the size of the Mexican government relative to international norms later in section III.

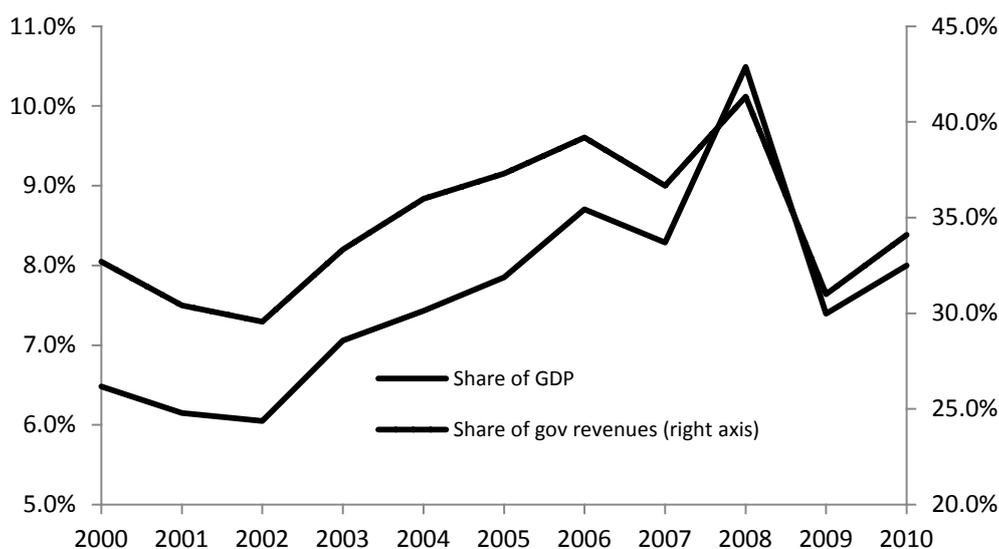
While government revenue is already low, the real impact of taxation on the pocketbooks of Mexican citizens and businesses is substantially smaller still, since typically about a third of government revenue is due to oil. In 2008, when oil prices were at their highest, oil revenues peaked at 41 percent of government income, or 10.5 percent of GDP.⁸ Figure 1 presents oil revenues as a share of GDP and of total government revenues.

⁶ Latin American data are from the Economic Commission for Latin America and the Caribbean (ECLAC, 2010) and only go up to 2008. Mexican data are from the Instituto Nacional de Estadística y Geografía (INEGI).

⁷ Government revenue data are from the IMF’s World Economic Outlook online data.

⁸ For brevity I use “oil revenues” in Mexico to refer to hydrocarbon revenues more generally, which are dominated by oil. Here I use data from the Mexican government (Secretaría de Hacienda y Crédito Público, or SHCP), which will not necessarily be comparable with the IMF data I use for international comparisons. In the government budget, the special tax on production and services (Impuesto Especial sobre Producción y Servicios, or IEPS) as applied to gasoline and diesel is counted as government income under *petroleros*. However, in 2006–2008 and 2010 it was negative, i.e. a subsidy, so the fact that it falls under *petroleros* makes income due to *petroleros* look smaller than it really is. Thus in calculating oil revenues I exclude IEPS when it is negative, on the basis that in those years it is really an expenditure.

Figure 1: Oil revenues as % of GDP and of government revenues



Source: Author's calculations based on data from the Secretaría de Hacienda y Crédito Público (SHCP)
Note: Excludes IEPS from 2006 to 2008, when it is negative. See footnote 7.

The distributional impact of fiscal policy

Who benefits from government expenditures? The Mexican government (also referred to below by the relevant department *SHCP*⁹) produces estimates of the distributional impact of fiscal policy, broken down by how much tax each household pays and how much it receives from the government in the form of cash and services.¹⁰ In their data total federal spending on behalf of households in 2008, including the cost of gasoline subsidies, was M\$1,245 billion or 10.3 percent of GDP.¹¹

Columns 2–4 of table 1 reproduce these official estimates, reporting decile shares of income before any taxes or transfers, labelled market or pre-fisc income, income net of taxes, and income net of both taxes and transfers (cash and in kind), which I also refer to as post-fisc income. Below I discuss unpublished estimates of expenditures by Lustig, Jaramillo, Pessino and Scott (2011) (henceforth LJPS), who find that the government under-reports total expenditures by omitting state-level spending on education worth M\$213 million. I therefore

⁹ *Secretaría de Hacienda y Crédito Público.*

¹⁰ Estimates use the household income and expenditure survey ENIGH. They ignore benefits to households due to infrastructure and other capital spending, law and order, and other non-individual expenditures. There is no obvious way to apportion these benefits across households. Ignoring them, as most analysts do, is equivalent to assuming that they are distributionally neutral in relative terms, i.e. that benefits are proportional to post-fisc income excluding these expenditures.

¹¹ Total federal spending on behalf of households was M\$1,028 billion (SHCP 2010, p. 30), comprising 36 percent of government revenue and 8.5 percent of GDP, rising to M\$1,245 billion or 10.3 percent of GDP with gasoline subsidies.

construct additional estimates that include this extra expenditure, assuming that it is distributed in the same manner as other health and education expenditures. This raises total estimated expenditures to M\$1,458 billion or 12.0% of GDP. The result is reported in column 5 of Table 1, headed ‘Post-fisc with extra social spending’.

Table 1: Income shares, %, before and after fiscal policy, and with oil entitlements, 2008 (SHCP)

	SHCP estimates			Author’s estimates			
1	2	3	4	5	6	7	8
Deciles by households	Pre-fisc income (market)	Net of taxes only	Post-fisc income (net of taxes and spending)	Post-fisc with extra social spending	With oil entitlements	Post-fisc relative to with-oil	Post-fisc relative to with-oil, higher social spending
1	1.7%	1.8%	2.6%	2.9%	3.0%	-12.7%	-2.7%
2	2.8%	2.9%	3.5%	3.8%	3.9%	-9.9%	-3.9%
3	3.4%	3.5%	4.0%	4.2%	4.4%	-8.1%	-3.7%
4	4.2%	4.3%	4.7%	4.9%	5.1%	-7.3%	-4.6%
5	5.3%	5.4%	5.7%	5.8%	6.0%	-5.2%	-3.5%
6	5.9%	6.0%	6.3%	6.4%	6.5%	-3.0%	-1.8%
7	7.7%	7.7%	7.8%	7.9%	8.0%	-2.0%	-1.8%
8	9.7%	9.6%	9.6%	9.6%	9.7%	-1.1%	-1.5%
9	13.2%	12.9%	12.5%	12.4%	12.6%	-1.0%	-2.1%
10	46.1%	46.1%	43.1%	42.2%	40.7%	6.0%	3.8%
Total	100%	100%	100%	100%	100%		
Gini of individuals (Povcal)	59.9	59.4	55.0	53.5	52.1		
Gini change relative to pre-fisc		-0.5	-4.9	-6.4	-7.8		

Source: Columns 2 – 4: SHCP (2010) Table 29, p. 47; columns 5 – 8: author’s calculations.

Note: Gini coefficient is author’s estimation using Povcal software, based on decile shares (see footnote 11).

The official estimates imply that the tax system is approximately distributionally neutral: it barely increases the income shares of each of the bottom six deciles at the expense of the eighth and ninth deciles, but leaves the top decile share untouched. The Gini index, measuring inequality, barely declines, dropping by 0.5 percentage points. Net of both taxes and spending, however, the fiscal system as a whole is clearly progressive in relative terms, raising the income shares of the bottom seven deciles at the expense of the top two, with the largest gains at the bottom of the distribution. Correspondingly, fiscal policy reduces the Gini index by 4.9 points.¹² When I impute the effect of the additional spending on health and education noted by LJPS, in column 5, the total effect of government expenditure is still more progressive, further raising the bottom seven decile shares and lowering the top two decile shares.

Columns 6–8 present my calculations regarding the role of oil in the distribution of income. I start from the assumption that all Mexicans have a right to an equal share of oil revenues received by the state, a right I refer to as *oil entitlements*. This means that, in 2008, 10.5 percent of GDP belonged in equal share to all Mexicans. This amounted to M\$11,925 (US\$1,055 or PPP\$1,529) per person per year. I now ask the question: if every citizen enjoyed net benefits from government taxation and expenditures equal to the value of his or her personal entitlement to oil revenues, what would their incomes be? To answer this I add per capita oil revenues to market or pre-fisc income, and report the implied decile shares in column 6.¹³

How do actual post-fisc incomes compare with incomes with oil entitlements? That is, to what extent does fiscal policy implicitly fulfil each citizen's right to their share of oil revenues? If the post-fisc income of a decile is at least as large as that estimated with-oil income, then fiscal policy is giving them the full value of their oil entitlements. In other words, the benefits they receive from government expenditures, net of the tax they pay, are at

¹²I was unable to get finer-grained data than the decile shares, so I estimate the Gini from decile shares using the software Povcal.. Povcal was written by Shaohua Chen, Gaurav Datt, and Martin Ravallion. It can be downloaded from <http://go.worldbank.org/YMRH2NT5V0>.

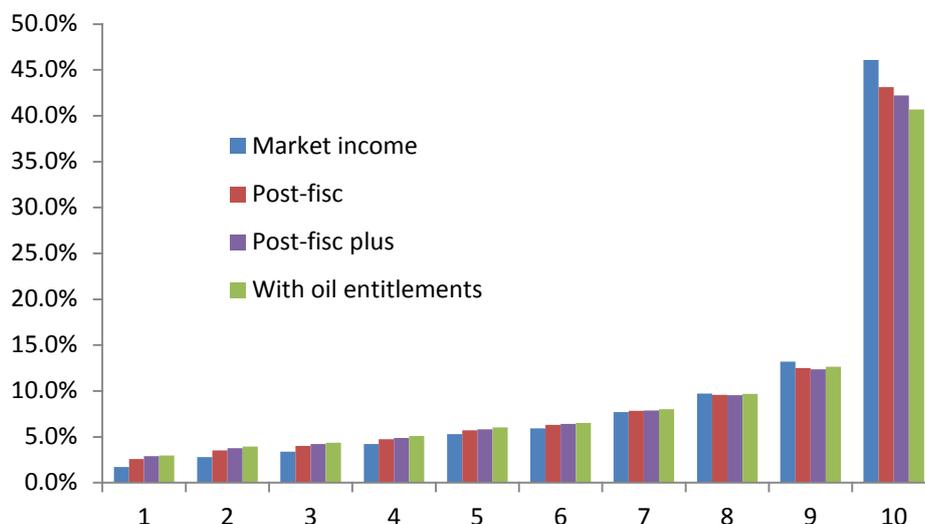
¹³ I also subtract the benefit due to oil subsidies as estimated by SHCP, since the cost of these subsidies is already counted in oil revenues and, hence, in oil entitlements. Post-fisc household income (including income in kind) accounted for 73.3 percent of GDP in 2008 (the figure used by John Scott in LJPS), so oil revenues amounted to 14.2 percent of post-fisc household income (10.5 percent/73.3 percent). Each decile is therefore entitled to the equivalent of 1.42 percent of total household income as their share of oil revenues.

least as large as their oil entitlements. If post-fisc income is lower than with-oil income, it means that they are not receiving the full value of their oil entitlements.

In both the standard estimates (column 4), and my estimates that impute extra health and education spending (column 5), post-fisc income is lower than income with oil entitlements (column 6) for all deciles except the richest. That is, for all but the top 10 percent of the population, fiscal policy provides less than the value of their oil entitlements, with the richest 10 percent receiving more. Hence the net effect of fiscal policy according to these estimates is to transfer oil entitlements to the richest 10 percent of the population, from the rest of the population.

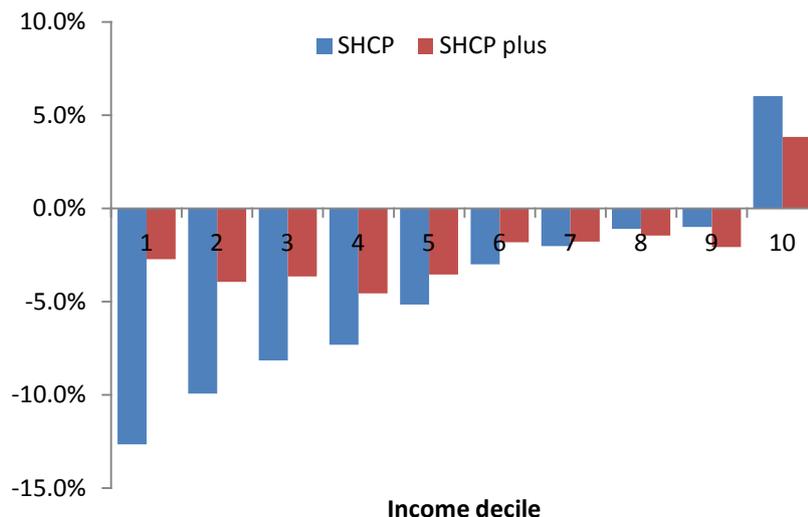
Figure 2 illustrates the different income concepts as presented in Table 1 while Figure 3 illustrates the last two columns, demonstrating actual post-fisc income relative to what income would be with oil entitlements. As just discussed, the incomes of the bottom nine deciles are reduced by fiscal policy relative to oil entitlements, with the benefits going to the top decile. Using the estimates that include the higher progressive health and education spending, individuals in the bottom 90 percent of the population each lose on average about M\$1,400 per year (US\$134, PPP\$179) relative to their oil entitlements. These losses fund extra income of just over M\$13,000 (US\$1,248, PPP\$1,673) per person per year for the richest 10 percent.

Figure 2: 2008 income shares pre-fisc, post-fisc, post-fisc plus state health and education expenditures, and with oil entitlements



Source: Author's calculations using SHCP (2010)

Figure 3: Post-fisc income relative to income with oil entitlements, 2008



Source: Table 1

Note: Bars show the percentage change going from income with oil entitlements to actual post-fisc income. A negative implies that actual post-fisc income is lower than income would be with oil entitlements. SHCP plus represents estimates using SHCP data with the addition of the higher progressive health and education expenditure estimated by LJPS.

The effect of oil entitlements on the implied progressiveness of fiscal policy clearly depends on the value of oil revenues, since the larger are these revenues, the larger are the oil entitlements. Oil revenues were historically high in 2008 with the predominant Mexican oil grade, Maya, averaging US\$84.7 over the year.¹⁴ However, though the price was lower in 2009, it has since risen even higher, averaging \$99.0 in 2011. Looking ahead, futures contracts on Maya are not publicly available but from 2012 onwards futures in the benchmark WTI grade are currently trading higher than the 2011 average.¹⁵ If the price of Maya follows the same relative pattern, its expected future price remains above its 2008 average. There is therefore little reason to believe that changes in oil prices will lead to reduced oil revenues to Mexico in the future.

There is, on the other hand, serious concern regarding production volumes in the future. A full discussion of this issue is beyond the scope of the present paper, but Segal (2011c) discusses the issue and notes that if Mexico were to raise its oil discovery rate to that in the

¹⁴ Data downloaded from US Energy Information Administration website, accessed 4 April 2012: <http://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=PET&s=IMX2810008&f=M>.

¹⁵ Average WTI price from US Energy Information Administration website; futures prices go up to December 2015 and are from CME Group, <http://www.cmegroup.com/trading/energy/crude-oil/light-sweet-crude.html>, checked 5 April 2012.

US, whose fields are much more mature, then it could expect production to remain approximately constant over the next 10 years.

An alternative estimate

Lustig, Jaramillo, Pessino and Scott (2011) (LJPS) provide an alternative estimate of the distributional impact of government expenditures. They assume SHCP's estimates of tax incidence, but produce their own estimates of the incidence of government spending. Importantly, they include spending by state governments, which brings their total estimated expenditures to M\$1,552 billion or 12.8 percent of GDP.¹⁶ As mentioned above, state expenditures on education and health spending are estimated at M\$213 billion, accounting for most of the difference with SHCP. Table 2 gives market incomes and post-fisc incomes as estimated by LJPS. According to these estimates the fiscal system is more progressive than in official SHCP estimates, lowering the estimated Gini by 8.1 points.¹⁷

In contrast to the estimates produced by the Mexican government, the estimates of LJPS imply that fiscal policy is progressive even relative to my estimates of income with oil entitlements: incomes post fiscal policy are higher for the bottom 8 decile shares than they would be with oil entitlements, while the top two are lower. This difference is driven primarily by the higher social expenditure estimate in LJPS; further differences in estimation are discussed in the next section.

¹⁶ Note that these expenditures are not a subset of government consumption expenditure because some components, such as pensions and social security, are cash transfers and thus count as household expenditure in national accounts. For this reason these numbers are consistent with the earlier observation that government consumption expenditure comprises only 9 percent of GDP.

¹⁷ They are not strictly comparable, however, because for LJPS the unit of observation is the individual, while SHCP presents deciles of households. Since households with lower per capita incomes tend to be larger, there are more individuals in the bottom decile of households than the bottom decile of population, partly explaining why the pre-fisc incomes of the lower deciles are higher in SHCP estimates than in LJPS.

Table 2: Income shares, %, before and after fiscal policy, and with oil entitlements, 2008, Lustig et al. (2011) (LJPS)

1	LJPS estimates		Author's estimates	
	2	3	4	5
Deciles by individuals	Pre-fisc income (market)	Post-fisc income (net of taxes and spending)	With oil entitlements	Post-fisc relative to with oil
1	1.1%	2.4%	2.2%	7.6%
2	2.3%	3.4%	3.3%	4.3%
3	3.3%	4.3%	4.1%	4.3%
4	4.3%	5.1%	5.0%	2.6%
5	5.4%	6.1%	6.0%	1.8%
6	6.7%	7.3%	7.2%	1.9%
7	8.6%	8.9%	8.8%	1.0%
8	11.1%	11.1%	11.0%	0.5%
9	16.0%	15.1%	15.3%	-1.1%
10	41.3%	36.3%	37.1%	-2.1%
Total	100%	100%	100%	
Gini (Povcal)	53.0	44.9	46.1	
Gini change		-8.1	-6.9	

Source: Columns 2 and 3: Lustig et al. (2011); columns 4 and 5: author's calculations.

Note: Gini coefficient is author's estimation using Povcal software, based on decile shares (see footnote 11).

Estimation issues

We have seen that the major difference between SHCP and LJPS is the higher estimated expenditure in the latter. My estimates in Table 1 of SHCP with higher social spending close most of this gap. Another important difference arises in the approach to aggregate income. LJPS uniformly scale upwards total household income as reported in surveys in order to make it consistent with the national accounts estimate of aggregate household income. In contrast, SHCP scale each source of income to its national accounts estimate, dividing incomes into salaries, fees and honorariums, entrepreneurial activities, and interest payments.¹⁸ This method has the advantage of taking into account the fact that capital income tends to be underestimated by a lot more than wage income. The constant-scaling assumption in LJPS implicitly distributes the under-reported capital income proportionally across the distribution, whereas the piece-wise scaling of SHCP more realistically attributes it to those who report some capital income, who tend to be richer.

Both LJPS and SHCP (2010) base their estimates on the national household survey ENIGH, and both value the benefit of receiving transfers in kind at the cost of provision as budgeted by the government. This is a strong assumption with two major potential problems. First, the fact that the government budget allocates a certain amount of money to a public service does not imply that this amount of money will in fact get spent on services that reach citizens. Corruption and inefficiency can lead to “leakage” of funds *en route* where some share of the money allocated disappears before being spent on the benefit or service intended.¹⁹ International studies of such leakage have found that in the most severe cases the majority of funds may be lost en route, with the budgeted services simply not being provided.²⁰

Leakage will imply an upward bias in estimates of the benefits due to public services. This effect could be substantial. For instance, leakage of only 6% would bring the LJPS estimate of total expenditure down to the level of SHCP with the added state-level social spending, which is sufficient to make the difference between fiscal policy being progressive or regressive relative to oil entitlements.

¹⁸ This technique is generally attributed to Oscar Altimir.

¹⁹ This is a different sense of “leakage” from “errors of inclusion”, where targeted benefits or services are received by those outside the target group.

²⁰ See Gauthier (2006) for an in-depth discussion of leakage in the provision of public services, with a focus on African countries.

The second doubt over equating the cost of a service to its value to a household is due to the fact that even if there is no leakage, benefits that cost X may be worth more or less than X to the user. Methods exist to estimate their monetary value to households, but they are controversial and difficult to implement, and are not available in the Mexican data.²¹

III. A Policy Proposal

How might fiscal policy be changed in order to recognize oil entitlements? In the calculations above, the baseline against which I tested current fiscal policy was one in which each citizen receives precisely their per capita share of oil revenues from the government, and no more. But if we assume that citizens have a right to these revenues then a policy that does just this is not *redistributive*: each citizen ends up with their market income plus their oil entitlement, which I considered part of their endowment. There are two reasons to consider going beyond this benchmark. First, as we saw above, the Mexican government manages an unusually small share of GDP, so there is scope for higher government revenues and expenditures. Second, fiscal policy is generally expected to be progressive, and the Mexican government explicitly states as a policy objective “supporting those who have least” (SHCP 2010b, 3). Hence additional progressive redistribution would be consistent with stated government objectives.

I therefore propose a policy in which each citizen is simply given benefits equal to the value of their share of oil revenues, *over and above current fiscal policy*. That is, citizens first receive their oil entitlement (in cash or in kind), and then existing patterns of taxation and expenditure act on this post-oil-entitlement income distribution. Since oil revenues would no longer fund the general budget, it would require raising taxation by the amount of oil revenues. But I will show that this would bring government revenues (and perhaps expenditures – see below) closer to international norms.

The purpose is not to provide a full estimation of the effect of such a policy, which would require strong behavioural assumptions. Nonetheless, we can make some observations on its expected distributional impact. I start with a more formal analysis of the expected size of government revenues and expenditures and then turn to the distributional question.

²¹ McKay (2002) and Davoodi et al. (2003) discuss this and other relevant issues.

The literature on the relative size of government across countries and over time has analysed and tested a range of explanatory variables. Scott and Vargas (2010) find that government revenue in Mexico is 10.8 percent of GDP below where one would expect on the basis of its per capita GDP. Other cross-country studies have in addition used trade openness, population, and demographic variables (Rodrik, 1996; Alesina and Wacziarg, 1998; Shelton, 2007). In line with this literature I regressed total government revenue and total government expenditure as shares of GDP on log per capita GDP at constant 2005 PPP\$, trade as a share of GDP, total population, and the share of the population aged 65 or over.²² All variables were significant for government revenue; all but trade were significant for government expenditure.²³

For our purposes the important point is that values predicted for Mexico are much higher than the actual values. Taking the averages over 2000–2009, actual government expenditure according to the IMF was 22.8 percent of GDP, while the predicted value was 8.3 percentage points higher at 31.1 percent. Actual government revenue was 20.4 percent of GDP, while the predicted value was 10.1 percentage points higher at 30.5 percent. In 2008, the year under analysis in this paper, expenditure and revenue were respectively 7.6 and 8.4 percentage points below their predicted values. This implies that there is substantial scope for the government to both raise more tax revenue, and spend more money on its citizens.

The proposed policy requires that taxes must be raised by the value of oil revenues, since that quantity is now being set aside to pay oil entitlements. In 2008, both total government revenue and government oil revenue were unusually high. So here I consider the distributive impact of an increase in taxation and expenditure based on a five-year average of oil revenues.²⁴ Over the five years 2005-09, government oil revenues averaged 8.5 percent of

²² All independent variables were from World Development Indicators; total government revenue and total government expenditure were from the IMF's World Economic Outlook database. The dataset covered 183 countries from 1980 to 2009.

²³ (1) $\text{Govrev} = -8.287196 + 3.68\text{lngdppc}^{**} + 0.937\text{trade}^* - 8.02\text{e-}09\text{pop}^{**} + 0.764\text{over65}^{**}$
 $R^2: 0.4364 \quad (0.205) \quad (0.392) \quad (1.23\text{e-}09) \quad (0.0534)$

(2) $\text{Govexp} = 7.828225 + 1.91\text{lngdppc}^{**} - 0.089\text{trade} - 7.98\text{e-}09\text{pop}^{**} + 1.055\text{over65}^{**}$
 $R^2: 0.3869 \quad (0.193) \quad (0.378) \quad (1.21\text{e-}09) \quad (0.0496)$

Standard errors in parentheses. * significant at 5% **significant at 1%

²⁴ As discussed in Segal 2011a, smoothing payments over such a period may even be good policy to reduce income volatility.

GDP. I therefore use the 2008 fiscal policy and add oil entitlements worth 8.5 percent of GDP: starting with the post-fisc distribution in 2008, I then assume that a further 8.5 percent of GDP is raised in taxation, with that amount being distributed equally to all citizens. This implies that each year, each citizen would gain M\$9,780 (PPP\$1,251, US\$879) and then pay back an additional 8.5 percent of their income.²⁵

How plausible is it that tax revenue and total government income rise by 8.5 percent of GDP? There is no doubt that it would be politically challenging. The two largest political parties, the PAN and the PRI, have proposed fiscal reforms, but neither controls the congress and agreement on the nature of the reform required has so far eluded them.²⁶ Given the scale of the reform proposed here, it should not be considered as an immediate goal, but can be thought of in the context of the long-run reform of Mexican fiscal policy.

However, while the policy implies a substantial increase in government revenue, it would remain below the level predicted by the regression reported above. Under the policy government revenue would have averaged 30.1 percent of GDP, lower than the 30.9 percent predicted by the regression reported above. It would also remain well below the levels in Argentina (32.1 percent) and Brazil (35.9 percent).

With an additional M\$9,780 of increased tax revenue to spend on citizens each year, how should the government spend it? One way to achieve this reform would be simply to increase progressive public expenditures. Scott (2010) argues for a greatly expanded system of social spending, including a universal social security system, improved targeting of poverty-reduction schemes, and improved health and education spending, funded by a rise in general taxation. A second distributive policy, and in conceptual terms the simplest, is direct distribution, or a *resource dividend*, under which each citizen receives his or her share of oil revenues as a cash payment (Palley, 2003; Sala-i-Martin and Subramanian, 2003; Birdsall and Subramanian, 2004; Sandbu, 2006; Segal, 2011a). Fiscal policy can then be considered to be additional to this lump-sum endowment, taxing citizens on the basis of their total income net of the cash payment, and providing benefits.

²⁵ Applying the same 8.5 percent tax to everyone implies that the tax is distributionally neutral in relative terms. As we saw above, this is approximately true of existing Mexican taxes.

²⁶ Thomson (2011). A reform passed in 2007 was intended to raise tax revenues by between 2 and 3 percent of GDP over the following five years, but by 2010 non-oil revenues had risen by only 1.1 percent of GDP, from 14.3 percent to 15.4 percent.

Following the method of SHCP and LJPS, who treat the value of in-kind benefits in the same manner as cash income, the form of the expenditure makes no difference to the estimated distributional impact. The effect on national accounts, however, will be different as benefits in kind count as government expenditure while cash transfers count as household income. If all the extra spending were dedicated to in-kind transfers then government consumption expenditure in 2008 would rise from 9.0 percent to 17.5 percent of GDP. It would remain below Brazil's 18.8 percent, and Colombia's 18.1 percent.²⁷ If only half of the 8.5 percent were spent on in kind transfers and the other half given in cash to households, then government expenditure would rise from 9.0 percent to 13.3 percent. This would be closer to Argentina's 12.5 percent and Chile's 12.2 percent. Clearly if all of the 8.5 percent were given as cash to households then government consumption expenditure would not rise at all.

I calculate a simple first-order estimate of the impact of this oil transfer on inequality by adding the oil entitlement to everyone's income and then subtracting the proportional income tax, estimating the implied Gini using Povcal.²⁸ It is first-order because it assumes no behavioural response by individuals, which would change the implied distributional impact. It is therefore intended to be indicative of the order of magnitude, rather than definitive. I discuss behavioural responses below.

Table 3 reports the results along with estimates for a range of Latin American and European countries from an international study by the IMF (Cubero and Hollar, 2010). Such international comparisons should be treated with caution because the underlying data and methods used in different countries may not be strictly comparable. We have already seen that the two different sets of estimates for Mexico give rather different results. However, given the evidence available, relative to other Latin American countries the distributional impact of existing fiscal policy in Mexico appears moderate in SHCP estimates, reducing the Gini by 4.9 points, and relatively progressive in LJPS estimates at 8.1 points. With the alternative policy of additional oil entitlements, the distributional impact in Mexico rises to a total of 10.2 percentage points and 13.1 respectively. The estimate based on SHCP data therefore remains well below the European average of 12.5, while the estimate due to LJPS data slightly exceeds it. The lower estimate puts the net impact between the levels of the low-

²⁷ ECLAC data online; the largest is Cuba at 30.8 percent.

²⁸ See footnote 11.

redistribution and high-inequality southern European countries of Italy, Portugal, and Spain, which span 9.1 to 10.8.

While the redistributive impact of the alternative policy is relatively large when calculated on the basis of LJPS data, it should be noted that the Gini remains high by international standards: from the pre-fisc Gini of 53.0 (Table 2) it falls to 39.9 net of transfers in kind. Inequality of disposable income would be higher still, depending on the extent to which oil entitlements are given in cash as opposed to in kind.

Table 3: Distributional impact of fiscal policy, selected countries

	Pre-fisc Gini minus post-fisc Gini
Mexico current	4.9 (SHCP) or 8.1 (LJPS)
Mexico with oil entitlements	10.2 (SHCP) or 13.1 (LJPS)
Bolivia	4.3
Colombia	5.4
Costa Rica (2000)	6.8
El Salvador (2000)	1.6
Guatemala (2004)	3.7
Honduras (2004)	2.7
Nicaragua (1998)	3.1
Panama (2003)	8.0
Peru	3.1
EU-15 (2001)	12.5
Denmark (2001)	18.1
Ireland (2001)	17.4
Italy (2001)	9.1
Portugal (2001)	10.2
Spain (2001)	10.8
Sweden (2001)	14.5

Source: Author's calculations for Mexico; Cubero and Hollar (2010) otherwise.

The impact on poverty

What would be the impact of the above distribution of oil revenues on poverty? In 2008, 16.5 percent of the population were living below the extreme poverty line (*línea de bienestar mínimo*).²⁹ The monthly extreme poverty line was M\$611 in rural areas and M\$870 in urban areas³⁰ while the value of the oil benefit above was M\$9780 per year, or M\$815 per month. If we assume that the oil transfer is in cash, as a resource dividend, then we can add this to household incomes and then subtract the appropriate amount of tax that the government has to recoup, as described above. In this case, extreme poverty is virtually eliminated.³¹ This is so regardless of any plausible behavioural responses to the policy (discussed below).

The calculation is made more complicated to the extent that the oil transfer is given as transfers in kind. In this case we can make no unambiguous statements about income poverty. If all the oil entitlement is given as transfers in kind then income poverty will be affected only indirectly, and perhaps not at all. However, Mexico has also implemented a multi-dimensional poverty measure that includes six different indicators of “social rights,” including level of education and access to health services, in addition to income (CONEVAL 2010). In 2008 10.5 percent of the population suffered from both extreme income poverty and lacked at least three of the six non-income dimensions. Such a poverty measure embodies judgements regarding the trade-offs between income and other dimensions of household well-being and would allow the government to estimate the most effective composition of expenditure from the point of view of multi-dimensional poverty reduction.

Mexico already has a well-known poverty-reduction program, named *Oportunidades*.³² However, while important for some households, at M\$42.2 billion in 2008 this program amounted to only 0.35 percent of GDP. Individuals in the bottom decile received on average about M\$1,266 per year (US\$114 or PPP\$162), and those in the second decile about half that. Moreover, errors of inclusion – receipt of the benefit by the non-poor – are substantial, with

²⁹ The National Council for the Evaluation of Social Development Policy (CONEVAL) website, file download from http://medusa.coneval.gob.mx/cmsconeval/rw/resource/coneval/med_pobreza/6123.xls?download=true.

³⁰ CONEVAL website, file download from http://medusa.coneval.gob.mx/cmsconeval/rw/resource/Bienestar_feb2010.xls?view=true.

³¹ The oil benefit is worth M\$815 per month, less 8.5 percent tax, coming to M\$745. This immediately eliminates rural poverty. For urban poverty, the additional M\$125 must be made up. Given the additional 8.5% tax, this requires a pre-benefit income of M\$137, or PPP\$17.5. Virtually no Mexican household falls below that level of per capita income.

³² The calculations that follow are based on data from SHCP (2010).

the top half of the distribution receiving 20 percent of the total value of the policy. But more importantly, errors of exclusion – failing to reach the intended beneficiaries – are severe: Soares et al. (2007) find that *Oportunidades* reaches only 30 percent of the poor. Such a low rate is not unusual for targeted poverty reduction programs: the same study also found that Brazil’s conditional and targeted transfer, *Bolsa Familia*, reaches only 41 percent of the poor.

Behavioural responses

Substantial changes in fiscal policy would be expected to lead to changes in people’s behaviour. The direction of any change is, however, theoretically ambiguous. Static economic theory predicts that raising incomes through a lump-sum benefit will reduce work effort (the income effect implies that agents “purchase” more leisure), while higher marginal tax rates may reduce or increase work effort (depending on whether one of the income or substitution effects dominates). There are also dynamic effects. For instance, if poor households are credit constrained and therefore cannot make high-return investments (including in schooling, or human capital), then cash transfers can loosen this constraint and increase their productivity over time. Such a rise in productivity is important in its own right, and in addition may increase work effort if it implies higher wages. Moreover, in this case the benefit may increase growth by raising investment. On the other hand, redistribution away from richer households may reduce their savings rate and could thereby reduce investment.³³

Abramovsky et al. (2011) model the effect of tax changes in Mexico by accounting for the static effects on behaviour. They do not, however, address the dynamic effects mentioned. Moreover, even the static effects of a policy reform as large as that suggested here are unlikely to be captured by such a model, which assumes small changes. Instead we can turn to empirical evidence. A World Bank report on conditional cash transfers (Fiszbein et al. 2009, pp. 117–120) reviews the literature on this question. Studies of *Oportunidades* find no negative effect on work supply. Similar findings have been made in Cambodia and Ecuador. One study, however, did find a negative impact on adult male labour supply in Nicaragua, in response to a relatively generous transfer payment. In Bolivia, on the other hand, in households of recipients of the generous and unconditional pension *Bonosol*, consumption was found to increase by twice the amount of the benefit, suggesting that it enabled them to

³³ Barrientos (2011) discusses these mechanisms in detail.

increase production.³⁴ *Bonosol* and its more recent incarnation, *Renta Dignidad*, are further discussed below.

While these studies are informative, the benefit proposed for Mexico is larger than most of the benefits they analyse (Bolivia's *Renta Dignidad*, on which more below, is an exception). This might imply a larger behavioural impact – though we cannot know in which direction. Moreover, the reform suggested here leaves many possibilities open: the tax increase could be implemented in a variety of ways, and the benefit paid in cash or in kind. These details would, to a large extent, determine the behavioural responses. If the government were to proceed with the policy, a cost-benefit analysis of these options would be required.

A comparison: Bolivia's Renta Dignidad

We saw that in international terms the policy of oil entitlements would not be radical in its distributive impact. In its magnitude it is also not radical in comparison with Bolivia's universal pension *Renta Dignidad*. Bolivia, whose primary export is gas, has experimented with policies of direct distribution of part of the value of hydrocarbon revenues. The current *Renta Dignidad* scheme, begun in 2008, developed out of the *Bono Solidario*, or *Bonosol*, created in the mid-1990s. *Renta* is a universal pension that is explicitly linked to hydrocarbons. It is financed by a fixed share (30 percent) of the *Impuesto Directo a los Hidrocarburos* (IDH), or Direct Hydrocarbon Tax. It is described by the Bolivian Ministry of Autonomy (2008) 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."³⁵

Renta Dignidad is paid to all Bolivians over the age of 60, and is 25 percent higher at Bs2,400 (about US\$340 or PPP\$860³⁶) for those with no other form of pension. While *Bonosol* had to be collected from branch offices, which entailed significant collection costs for many poor people living far from urban areas, *Renta Dignidad* is distributed in addition by fixed and mobile military units and is therefore more accessible to rural populations

³⁴ Martinez (2007), cited in Barrientos (2011).

³⁵ Translated from the Spanish.

³⁶ Using the IMF's World Economic Outlook estimated PPP exchange rate for 2010 of Bs2.8/PPP\$.

(Müller 2009, 168). 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.

The payment of approximately US\$340 is equal to about 18 percent of per capita GDP. In this sense it is about double the value of the oil entitlement suggested for Mexico, relative to average incomes. This again suggests that the present proposal for Mexico is not as radical as it may sound. However, because only a minority receive it, *Renta Dignidad* cost 1.4 percent of GDP in 2008 and 1.5 percent in 2009 (IMF 2010, 6), which is much less than the costs of a universal payment such as I consider.

IV. The Political Economy of Oil Distribution

Citizens of hydrocarbon-rich countries often feel a sense of entitlement to their hydrocarbons. This is quite appropriate since the hydrocarbons do indeed belong to them. Unfortunately, as in Mexico, this is often expressed through support for fuel subsidies, despite their being both inefficient and, usually, regressive. The withdrawal of such subsidies has often met with violent popular resistance, sometimes including riots (Bacon and Kojima 2006). In Bolivia, for instance, Requena et al. (2004, vi) write that “the elimination of hydrocarbons subsidies is one of the policies that has met with the fiercest opposition from society and is therefore avoided by the government, in view of the repercussions this may have on the population and productive sectors.” A recent attempt by the government of Evo Morales to reduce subsidies in Bolivia ended in failure, the policy being withdrawn in the face of widespread protests (Mapstone and Schipani 2011).

In Mexico there remains a perception that subsidies are an appropriate form of social assistance. For instance, a government newsletter at the beginning of 2010 (SHCP 2010b, 3-4) justified the fuel subsidies of 2008 as “supporting those who have least, because it is they who suffer most from the effects of the international recessions,” and described the subsidies as “part of a packet of countercyclical policies proposed by the Federal Executive to support the family economy against the global crisis.” However, this is misconceived: fuel subsidies

are usually regressive, and SHCP (2010) confirms that this is the case in Mexico.³⁷ Nonetheless they resonate with the public.

One potential way to overcome popular resistance to subsidy reduction is to make an explicit connection between giving up subsidies and receiving, instead, a direct payment of some share of oil revenues.³⁸ A rise in oil prices necessarily makes an oil-exporting country richer, but when the only direct sign that citizens can see is a corresponding rise in fuel prices, with no obvious translation into benefits for them, then the call for subsidies is understandable. A policy that implies a direct connection between benefits received and the oil price would directly compensate citizens for rises in fuel prices – indeed, more than compensate most people – reducing the sense that higher prices have made them poorer.

A second consideration in the political economy of direct distribution that is of particular relevance to Mexico concerns reform of the oil industry. Citizens who have a direct and visible stake in their oil industry may be more inclined to support reform that will increase production and thereby increase the direct benefits they receive from oil revenues.³⁹

V. Conclusion

Mexican oil belongs to all Mexicans, and they receive the benefits of their oil via government expenditures on goods and services, cash benefits, and subsidies. The Mexican fiscal system is moderately progressive when taken in isolation, as it reduces the inequality due to market income. But in this paper I have proposed an alternative baseline for determining the progressiveness of fiscal policy, based on attributing to each citizen his or her share of the nation's oil revenues, or *oil entitlement*. The main finding of the paper is that government estimates of the effect of fiscal policy, even when adjusted with a higher estimate of the progressiveness of social spending, imply that the benefits received by the majority of Mexicans are worth less than the entitlement that they have to their oil revenues, which in 2008 were worth M\$11,925 (US\$1,055 or PPP\$1,529) per person per year. Relative to their oil entitlements, those in the bottom 90 percent each lose on average about M\$1,400 per year

³⁷ In 2006 they are regressive in relative terms (SHCP 2008), while in 2008 they are regressive only in absolute terms (SHCP 2010).

³⁸ Iran appears to have adopted this strategy. See Segal (2011b) for discussion.

³⁹ For discussion see Segal (2011c).

(US\$134, PPP\$179) while those in the richest 10 percent each gain an extra income of just over M\$13,000 (US\$1,248, PPP\$1,673).

This regressiveness does not hold when I run the calculation using distributional estimates produced by Lustig et al. (2011). Both sets of estimates, however, assume that expenditures as budgeted by the central government translate directly into the value of services provided to citizens, with no allowance for expenditure “leakage” through inefficiency or corruption. Since spending is the progressive component of fiscal policy, this suggests an upward bias in overall estimated progressiveness: if there is leakage, fiscal policy will be more regressive than estimated.

At the same time, the Mexican government has a very small fiscal role in the economy by international standards. On this basis, I considered an alternative fiscal policy that distributes the benefits of oil revenues equally to all Mexicans as a universal benefit, over and above current fiscal policy, and paid for out of increased taxation. Because of the low starting level of taxation, government revenues would remain below the level expected of a country with Mexico’s characteristics. The distributive impact would be substantial, but again would not be unusually high by international standards. While the policy simply recognizes each citizen’s entitlement to a share in the country’s oil revenues and is not explicitly a poverty reduction strategy, it would nonetheless have the effect of virtually eliminating extreme poverty, which in 2008 stood at 16.5 percent of the population.

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