THE FUTURE OF OIL IN MEXICO
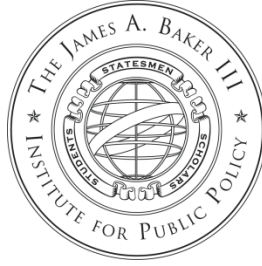
/ EL FUTURO DEL SECTOR PETROLERO EN MÉXICO

"El petróleo es nuestro": The Distribution of Oil Revenues in Mexico

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"EL PETRÓLEO ES NUESTRO": THE DISTRIBUTION OF OIL REVENUES IN MEXICO

BY

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ABOUT THE STUDY:
THE FUTURE OF OIL IN MEXICO/
EL FUTURO DEL SECTOR PETROLERO EN MÉXICO

The energy industry plays an important role in the Mexican economy, and energy trade is a major component to the U.S.-Mexico relationship. The Mexican government relies on the oil industry for 35 percent of total government revenues, including taxes and direct payments from Petróleos Mexicanos (Pemex), the state oil company. Mexico is the third-largest foreign crude oil supplier to the United States. However, with declining production and rising demand, Mexico could become a net oil importer in the coming decade. President Calderón pushed for energy sector reform in Mexico, but more reforms will be needed for Mexico to reverse its current path toward importer status. This study identifies the dynamics of the political trends in Mexico that will impact future energy policy. The aim of this study is to promote a better understanding of the challenges facing Mexico's oil sector and to enhance the debate among policymakers, the media and industry on these important issues.

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Paul Segal, D.Phil., is a lecturer in economics at the University of Sussex. He has been a research fellow at Harvard University, a consultant economist at the United Nations Development Programme and a research fellow at the Oxford Institute for Energy Studies, where he continues to serve as a visiting senior research fellow. His research follows two themes: global inequality and poverty, and the economics of resource-rich countries. The two themes overlap in his work on the distribution of resource revenues and their role in poverty reduction. Segal occasionally writes policy articles for FT.com, the website of the Financial Times, as well as the Guardian website. He completed his doctorate degree at Nuffield College, University of Oxford, in 2006.

I. Introduction

Since 1938, when Mexico became one the first countries in the world to nationalize its oil industry, the people of Mexico have known that the oil found in their territory belongs to them. Mexico's 1917 constitution declared that subsoil resources belonged to the nation, and since 1960, when a constitutional amendment banned concessions (Mommer 2002, 83), the national oil company Pemex has been the sole producer of Mexican oil. But while the principle is clear that Mexican oil should benefit Mexicans as opposed to foreigners, the question of which Mexicans—how the benefits of oil are distributed among citizens—remains unaddressed.

Oil revenues have comprised between 7 percent and 10.5 percent of Mexico's gross domestic product (GDP) in recent years.[1] The Mexican economy is therefore not as dependent on oil as the major exporters of the Middle East, where oil production is worth more than the non-oil economy, or Venezuela, where it comprises up to a third of GDP. But oil provides 30 to 40 percent of Mexican government revenues, and for this reason it is highly significant. Mexicans therefore benefit from their oil through government expenditures, and this paper analyzes the distribution of these benefits. This requires a more general analysis of the distributional impact of fiscal policy, and the paper draws on existing distributional estimates. It goes beyond them by considering counterfactuals implied by entitlements to oil revenues, and considering the implications of different trajectories for oil production in the future. It also briefly considers international examples of the distribution of hydrocarbon revenues, and the political economy of these policies.

Resource revenues are different from other government income because the resource from which they derive ostensibly belongs equally to all citizens. When government expenditures are financed by the taxation of individuals and businesses it generally implies redistribution, as the benefits of government expenditures are distributed differently from the tax burden. But by definition, resource rents are not created by anyone. Expenditure of resource rents therefore implies distribution, but not *re*distribution (Segal 2011a).

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[1] For brevity I use "oil revenues" in Mexico to refer to hydrocarbon revenues more generally, which are dominated by oil.

It also follows from this that the political economy of the distribution of resource rents is different from that of the distribution of income more generally. Oil revenues belong equally to all Mexicans, but I show that fiscal policy appears not to take this into account. I therefore consider the potential impact of alternative policies that acknowledge universal entitlements to oil revenues.

Fiscal policy in Mexico is sometimes discussed in the context of the imperative to "support the poorest," but extreme poverty is currently running at 16.5 percent of the population.[2] An alternative fiscal policy that takes account of universal entitlements to oil revenues would eliminate that poverty. But while this is an important issue, poverty reduction is not the primary concern of this paper and the aim is not to consider policies for poverty reduction more generally. Rather, the assumption is that all Mexicans already have an entitlement to their share of their country's oil revenues: it is a birthright, not a poverty-reduction strategy, or a privilege to be bestowed by a charitable society.

Section II discusses fiscal policy and its distributional impact as it currently stands. Section III considers alternative policies that directly take account of entitlements to oil revenues. In Section IV I discuss four international examples of methods for distributing hydrocarbon revenues. Section V turns to the political economy of oil distribution, and Section VI concludes.

II. Fiscal Policy

In this section I review Mexican fiscal policy, first from an aggregate perspective, considering the composition of government revenues and expenditures, and then considering its distributional impact. The Mexican government is small in terms of both expenditure and revenue, and the level of taxation of Mexican individuals and businesses is smaller than even this would suggest, since a large share of government revenues is due to oil. Standard calculations of fiscal policy show it to be mildly progressive, but when I assume equal rights to oil revenues it becomes regressive in 2008, and ambiguous in 2006. That is, when we take account of the fact that all Mexicans have a right to an equal share of oil revenues, fiscal policy does not redistribute

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[2] The extreme poverty line in 2008 was M$611 in rural areas and M$870 in urban areas.

income from the rich to the poor. On the contrary, in 2008 it redistributed income to the top 10 percent, from everyone else. At the end of this section, I consider the distributional impact of gasoline subsidies and the conditional benefit Oportunidades, a poverty reduction program, in more detail.

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 compared with a Latin American average of 13.9 percent, and an Organisation for Economic Co-operation and Development (OECD) average of 18.1 percent.[3] Along with Peru, this 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 to13 percent. It is also the lowest in the OECD by a long way, as is total government expenditure (not just current consumption), which, at 19.5 percent of GDP in 2005, was less than half the OECD average of 43 percent (OECD 2008). More recently, government revenue comprised only 21.0 percent of GDP in 2008.[4]

While 21.0 percent of GDP is already a small share for a government to collect, 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.[5] Figure 1 presents oil revenues as a share of GDP and of total government revenues.

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[3] Latin American data are from the Economic Commission for Latin America and the Caribbean (ECLAC, 2010) and only go up to 2008; OECD data downloaded from http://stats.oecd.org/index.aspx, February 13, 2011. Mexican data from Instituto Nacional de Estadistica y Geografía (INEGI).

[4] OECD data online, http://stats.oecd.org/index.aspx.

[5] 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.

Figure 1. Oil Revenues as % of GDP and of Government Revenues
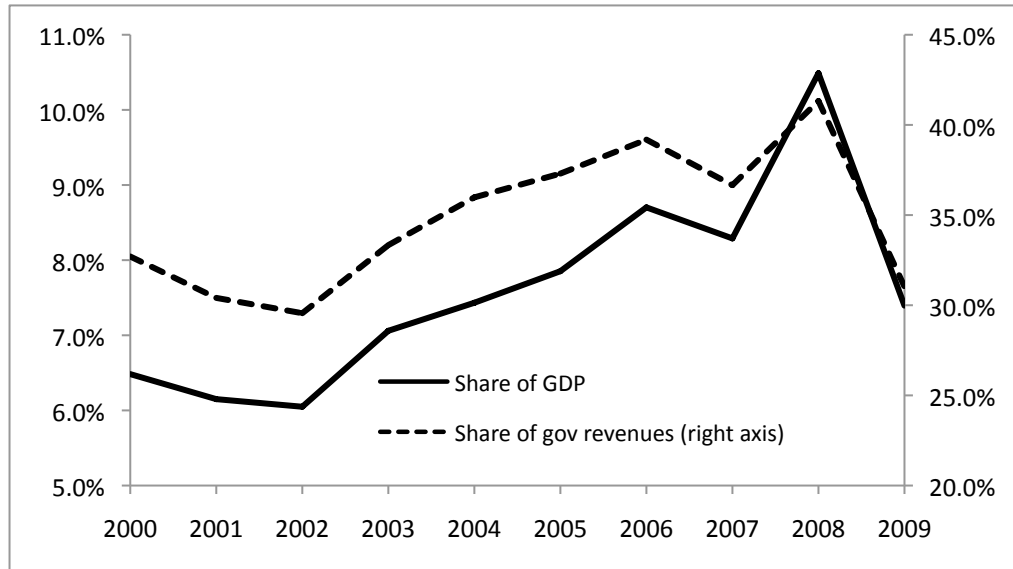
Source: Author's calculations based on data from the Secretaría de Hacienda y Crédito Público (SHCP)
Note: Excludes IEPS from 2006 to 2008, when it is negative. See footnote 5.

The Distributional Impact of Fiscal Policy

Government expenditures can be divided into four categories. The largest is government consumption expenditures, which are expenditures on goods and services that, in one way or another, are supposed to benefit the population. These include public goods with no specific beneficiary (e.g. spending on law and order), as well as subsidies and transfers in kind, such as health and education spending, which benefit specific individuals. Second are cash transfers to Mexican residents. Third are other liabilities including debt payments, and fourth is gross capital formation. According to the OECD (2008,10) these comprised, respectively, 55 percent, 24 percent, 12 percent, and 9 percent of public spending in 2005.

In discussing the distributional impact of public spending we are interested in the second category, cash transfers to Mexicans, and the subset of the first category comprised by subsidies

and transfers in kind whose individual beneficiaries are in principle identifiable.[6] Scott (2009, 2) reports that "public spending on education, health and social security, energy and agricultural subsidies, and the principal targeted instruments, totalling 25 programs or spending categories, [represent] 60% of public spending." Secretaría de Hacienda y Crédito Público (SHCP) (2010a, 30) reports that total spending on health, education, pensions and social security, direct transfers, and the domestic electrical subsidy in 2008 (but excluding other subsidies, including gasoline) was M$1,028 billion, comprising 36 percent of government revenue and 8.5 percent of GDP.[7]

The Mexican government (SHCP 2008, 2010a) estimates the distributional impact of these components of government spending, and of taxation, for both 2006 and 2008. I report the most recent results, for 2008, in detail. For 2006, Scott (2009) provides an alternative estimate of the distributional impact of government expenditures. He maintains the government's estimates of tax incidence, but treats the underlying data in a different manner so his results are somewhat different.[8]

In order to analyze the distributional impact of fiscal policy it is also necessary to distinguish between progressive and regressive fiscal policy, in both relative and absolute terms. A policy is relatively progressive if it benefits the poor more than the rich as a share of their income. A policy is absolutely progressive if it benefits the poor more than the rich in absolute terms. Thus giving $1 to someone with $10 and $2 to someone with $100 is relatively progressive (the poor person gets 10 percent of her income while the rich person gets 2 percent), but absolutely regressive.

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[6] The sources used below 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 so implicitly, the assumption is that they are distributionally neutral in relative terms, i.e. that benefits are proportional to income.

[7] I have attempted to reconcile these percentages both with each other and with the ECLAC and OECD data reported above, but they appear to be based on different estimates and are not reconcilable.

[8] Both Scott (2009) and SHCP (2008, 2010a) base their estimates on the national household survey ENIGH, and both value the benefit of receiving transfers in kind at the cost of provision. The main methodological difference is that Scott uniformly scales all incomes in the survey so that, in aggregate, they equal the national accounts estimate of personal income, whereas SHCP scales each individual source of income to its national accounts estimate (salaries, fees, honorarios, entrepreneurial activities, and interest payments).

Table 1 presents 2008 SHCP estimates of decile shares[9] 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, as discussed above), which I also refer to as post-fisc income. 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 coefficient, measuring inequality, barely declines, dropping by 0.6 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, the Gini coefficient declines by 5.0.

For 2006, SHCP's (2008) estimates and Scott's (2009) estimates both imply that fiscal policy is progressive relative to market incomes. In SHCP data, fiscal policy reduces the Gini by 4.0, while Scott finds a larger reduction of 6.4. [10]

The last two columns of Table 1 consider 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. I refer to this right 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. In 2006 the figures were 8.7 percent of GDP, or M$8,616 (US$791 or PPP$1,164) per person per year.

Post-fisc household income (including income in kind) accounts for about 75 percent of GDP,[11] so in 2008 these oil revenues amount to 14 percent of post-fisc household income (10.5 percent/75 percent). Each decile is therefore entitled to the equivalent of 1.4 percent of total

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[9] Unless otherwise specified, the distribution is of individuals ordered by per capita household income, including income in kind when the distribution of government expenditure is considered.

[10] Scott (2009) estimates his own Gini coefficients for the distributions he presents. For SHCP data, and other distributions that I calculate below using Scott's data, I estimate the Gini from decile shares using the software Povcal. I base these estimates on decile shares because I was unable to get the underlying microdata from either Scott or SHCP. Povcal was written by Shaohua Chen, Gaurav Datt, and Martin Ravallion. It can be downloaded from http://go.worldbank.org/YMRH2NT5V0.

[11] Household final consumption expenditure is about 65 percent of GDP (World Bank World Development Indicators online) while we saw above that relevant government expenditure comprised about 8.5 percent of GDP.

household income as their share of oil revenues. 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. I also subtract the benefit due to oil subsidies, discussed below (and as estimated by SHCP), since the cost of these subsidies is already counted in oil revenues and, hence, in oil entitlements.

Using this calculation of "with-oil" income, if the post-fisc income of a decile is at least as large as estimated with-oil income, then fiscal policy is giving them the full value of their oil entitlements. That is, the benefits they receive from government expenditures, net of the tax they pay, are at least as large as their oil entitlements. If post-fisc income is lower than with-oil income, then it means that they are not receiving the full value of their oil entitlements.

Figure 2 illustrates the three levels of income: market or pre-fisc income; post-fisc income; and with-oil income. The fact that post-fisc income shares are higher than pre-fisc income shares for lower deciles, and vice versa for higher deciles, indicates that fiscal policy is progressive relative to market income. However, as indicated in the last two columns of Table 1 and in Figure 2, post-fisc income is lower than income with oil 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. The net effect of fiscal policy is therefore to transfer oil entitlements to the richest 10 percent of the population, from the rest of the population.

Those in the bottom 90 percent of the population lose on average a total of M$1,749 per year (US$167, PPP$224). These losses fund extra income of just over M$16,000 (US$1500, PPP$2000) per person per year for the richest 10 percent.

The extent to which post-fisc income differs from income with oil entitlements is recorded in the last column of Table 1 and illustrated in Figure 3. While all below the top 10 percent receive less than their share of oil revenues, in proportional terms people in the bottom half of the distribution lose more—between 3.6 percent and 4.7 percent of their incomes—than deciles six

to nine. The result of these effective transfers is to increase the incomes of the richest decile by 4.6 percent. The Gini coefficient also reflects these results, with inequality of post-fisc income being lower than market or pre-fisc income, but higher than income with oil entitlements.

Far from redistributing income from the rich to the poor, in 2008 the fiscal system failed to give the majority even their share of the nation's oil revenues, with their benefits from their oil being redistributed to the richest 10 percent of the population.

Table 1. Income Shares, %, Before and After Fiscal Policy, and With Oil Entitlements, 2008 (SHCP)

Deciles by Population	Pre-fisc Income (Market)	Net of Taxes Only	Post-fisc Income (Net of Taxes and Spending)	With Oil Entitlements	Post-fisc Relative to With Oil
1	1.7%	1.8%	2.6%	2.7%	-3.8%
2	2.8%	2.9%	3.5%	3.7%	-3.9%
3	3.4%	3.5%	4.0%	4.2%	-4.5%
4	4.2%	4.3%	4.7%	5.0%	-4.7%
5	5.3%	5.4%	5.7%	5.9%	-3.6%
6	5.9%	6.0%	6.3%	6.5%	-2.8%
7	7.7%	7.7%	7.8%	8.0%	-2.6%
8	9.7%	9.6%	9.6%	9.8%	-2.1%
9	13.2%	12.9%	12.5%	12.9%	-2.8%
10	46.1%	46.1%	43.1%	41.2%	4.6%
Total	100%	100%	100%	100%	
Gini (Povcal)	54.0	53.4	48.9	47.1	
Gini Change		- 0.6	- 5.1	- 6.9	

Source: SHCP (2010a) Table 29, p. 47; final two columns and Gini are author's calculations.
Note: For calculation of share of non-oil income see text. Gini coefficient is author's estimation using Povcal software, based on decile shares (see footnote 10).

Figure 2. Income Shares Pre-Fisc, Post-Fisc, and With Oil Entitlements, 2008
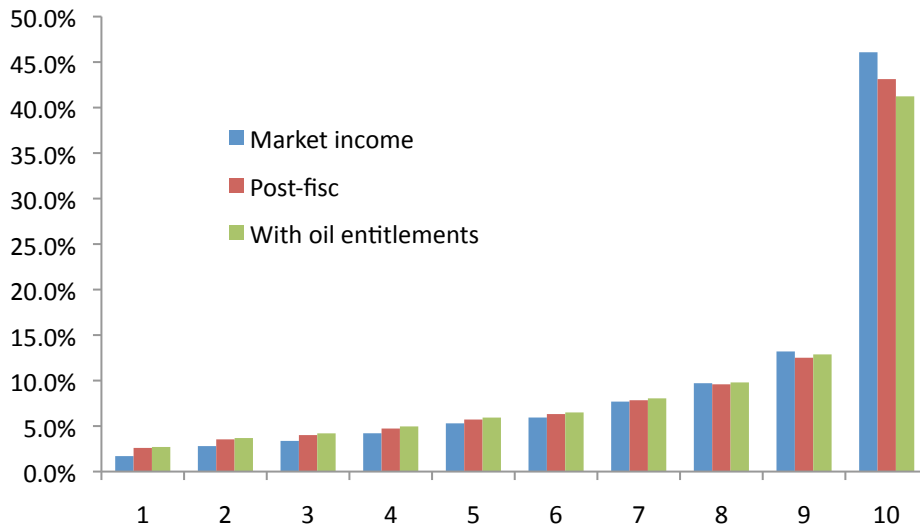
Source: Author's calculations using SHCP (2010a)

Figure 3. Post-Fisc Income Relative to Income With Oil Entitlements, 2008
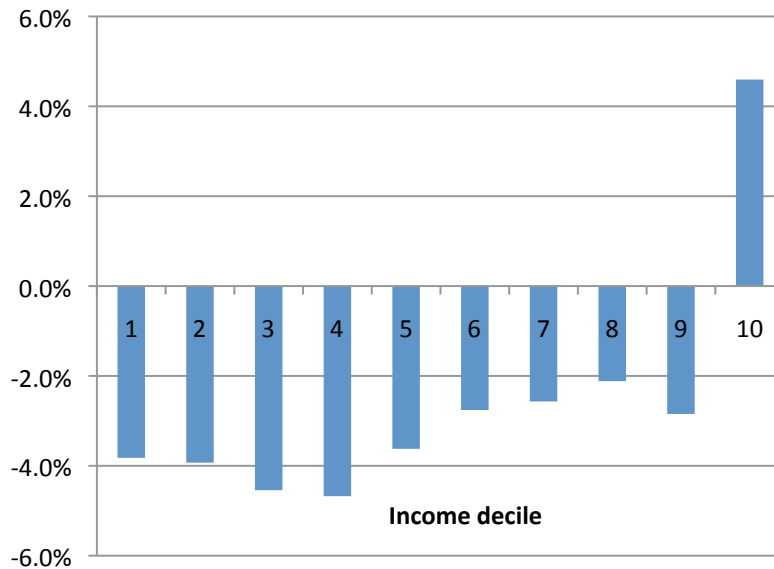
Source: Table 1

Note: Bars show the percentage change in 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.

The effect of acknowledging oil entitlements on the progressivity 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 benchmark oil prices averaging US$97 per barrel, much higher than the US$65 of 2006. The average for 2010 was about halfway between the two, at US$80; at the time of writing in February 2011, oil has once again surpassed US$100. The effect of oil entitlements in 2006 is therefore less dramatic, and calculations based on the different estimates of the impact of fiscal policy produced by SHCP (2008) and Scott (2009) both show a smaller impact, but conflict in terms of their progressivity. It is therefore not clear whether fiscal policy was neutral, slightly progressive, or slightly regressive with respect to oil entitlements in 2006.[12] I consider scenarios for future Mexican oil production, the other main determinant of revenues, below.

Gasoline Subsidies

One component of fiscal policy that became particularly important in 2008 was subsidies to gasoline and diesel, whose prices in Mexico are regulated by the state in order to smooth out the instability of international oil prices. The mechanism for regulating the price is the Special Tax on Production and Services (IEPS), which was indeed a tax up to 2005. From 2006 to 2008, however, as international oil prices rose, the price-smoothing mechanism turned into a subsidy, costing 0.4 percent of GDP in both of 2006 and 2007 and rising to 1.8 percent of GDP in 2008. The subsequent decline in the oil price led to the disappearance of the subsidy and in 2009 IEPS was revenue-neutral for the government, but price rises since then led to IEPS once again being a subsidy in 2010.

Fuel subsidies are a common and very popular policy in hydrocarbon-rich countries, where the population typically feels a sense of entitlement to hydrocarbons.[13] But they are highly inefficient and, in most cases, regressive. Their inefficiency is easy to see if one considers the simple experiment of exchanging $1 of fuel subsidy for a cash benefit of $1. With the cash benefit the recipient can choose to spend the $1 on fuel, in which case she is in the same position as with the subsidy. But she can also choose to spend some share of the $1 on something else. The fuel

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[12] The calculations are available from the author.
[13] See Segal (2011b) for discussion.

subsidy implies forced expenditure on fuel as opposed to on other goods and services that might be preferred.

Fuel subsidies are also regressive because richer people tend to spend a higher share of their incomes on fuel—largely because richer people are more likely to own cars (Coady et al. 2006). Mexico in 2006 was no exception, as shown in Table 2: in 2006, more than 70 percent of the benefits of fuel subsidies went to the top 30 percent of the population.[14] Surprisingly, in 2008, when fuel subsidies grew massively, their impact was much less regressive. They were still absolutely regressive in that the rich gained more from them than did the poor, with the richest 10 percent gaining over 10 times more than the poorest 10 percent. But in relative terms, the picture is much less clear. Relative to income, the gain of the top 10 percent was smaller than the gain of the bottom 10 percent. But the gain of the eighth and ninth deciles was relatively high as a share of their incomes. Nonetheless, the subsidies remained more regressive than government expenditure on average, as seen above.

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[14] Though they are regressive, their absolute size was small, at 0.4 percent of GDP, so eliminating them would have very little impact on overall inequality.

Table 2. Benefit Incidence of Subsidies on Gasoline and Diesel Due To IEPS: Share of Total Benefit Received by Each Decile

Decile	2006	2008
1	0.8%	2.1%
2	1.7%	3.8%
3	2.8%	5.0%
4	3.7%	6.8%
5	4.5%	8.5%
6	6.7%	9.2%
7	8.4%	11.3%
8	12.4%	12.2%
9	18.8%	16.1%
10	40.2%	24.9%
Total	100%	100%

Source: For 2006, SHCP (2008, Table 18, p. 28). For 2008, SHCP (2010a, Table 13, p. 21).

Oportunidades

The best-known poverty-reduction program in Mexico, and the most progressive component of government expenditure, is Oportunidades. Table 3 shows the share of the spending on Oportunidades received by each decile of the population. It is clearly progressive both in absolute and relative terms: the poorest decile (10 percent) of the population receive 33.3 percent of the total benefits while the top decile receive only 1.7 percent.

However, while important for some households, at M$42.2 billion in 2008 this program amounted to only 0.35 percent of GDP. This implies that 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, the goal of Oportunidades is not simply to be progressive, but is to specifically target poverty. Errors of inclusion—receipt of the benefit by the non-poor—are not negligible, with 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.

Table 3. Benefit Incidence of Oportunidades by Decile, 2008

Decile	Share of Total benefit received by decile	Average yearly payment per capita, M$
1	33.3	1,266
2	18.5	703
3	12.7	483
4	9.4	357
5	6.4	243
6	7.3	278
7	4.8	182
8	3.3	125
9	2.7	103
10	1.7	65
Total /average	100	381

Source: SHCP (2010a, 40) and author's calculations

III. Alternative Distribution Policies

We have seen that the Mexican government manages an unusually small share of GDP, almost the lowest in Latin America and by far the lowest in the OECD. Across countries, this share has a strong positive correlation with the level of per capita GDP, and 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. I repeated their calculation using data for 169 countries and find that it is 11.2 percent of GDP below the value predicted on the basis of per capita GDP.[15]

Moreover, we saw that fiscal policy is progressive compared to market incomes, but fails to provide most Mexicans with benefits on par with the value of their per capita share of oil revenues. So how might fiscal policy be changed in order to recognize every citizen's right to his or her share of oil revenues? Above I defined oil entitlements as the right of citizens to their per capita share of oil revenues. Here I consider a fiscal policy that recognizes this right by giving each citizen benefits equal to the value of this share, over and above current fiscal policy as described above.

This requires that the portion of government revenue due to oil be set aside so that it can be distributed equally according to oil entitlements. But in order to finance current expenditures (excluding subsidies, whose effects I subtract), other taxes must be raised to balance the fiscal budget. The net effect is that both taxation and government spending rise by the full value of oil revenues. Over the past five years, government revenue averaged 18.5 percent of GDP and government oil revenues comprised 8.6 percent of GDP. The policy would therefore have implied that government revenue would have averaged 27.1 percent of GDP.

How plausible is it that tax revenue and total government income rise by 8.6 percent of GDP? There is no doubt that it would be politically challenging. Given the scale of the reform required, it should probably not be considered as an immediate goal, but should be thought of in the context of the long-run reform of Mexican fiscal policy.

While it is a substantial increase, however, government revenue would remain well below the level predicted on the basis of per capita GDP. Mexico would remain tied as the sixth lowest in the OECD, and also well below Argentina (33.4 percent) and Brazil (36.6 percent).[16]

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[15] Data are from IMF World Economic Outlook (WEO) online data. I deleted outliers that had general government revenue as percentage of GDP (G) below 10 percent (two countries) or above 60 percent (six countries), and regressed G on log per capita GDP in PPP$ (lnY) for 2008. The result was G = -8.7172 + lnY*4.4643, significant at the 1 percent level with an R^2 of 0.30. In IMF data the 2008 value for G is 22.9 percent and the predicted value is 34.1 percent. Note that this estimate of G is different from estimates due to the Mexican government or ECLAC, used above.

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 this five-year average of oil revenues. That is, I use the 2008 fiscal policy and add oil entitlements worth 8.6 percent of GDP: starting with the post-fisc distribution in 2008, I then distribute that 8.6 percent of GDP equally to all citizens, paying for it by assuming that taxation is raised by 8.6 percent of GDP. This implies that each year, each citizen would gain M$9780 (PPP$1251, US$879) and then pay back an additional 8.6 percent of their income.[17]

One way to achieve this reform would be to simply 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 (Segal 2011a). Fiscal policy can then be considered to be additional to this, taxing citizens on the basis of their total income net of the cash payment, and providing benefits.

In the estimates of income distribution above I followed SHCP (2008, 2010a) and Scott (2009) in treating the value of in kind benefits in the same manner as cash income. In terms of distributional impact we can therefore abstract from the question of how much of this spending is cash (as in the resource dividend) and how much is in kind via public services: net total income in the estimates will be the same in either case.

The effect on national accounts, however, will be different depending on what share of the oil transfers is benefits in kind, which count as government expenditure, and what share is cash transfers, which count as household income. If all were spent on in kind transfers then government expenditure in 2008 would rise from 9.0 percent to 17.6 percent of GDP. It would

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[16] IMF WEO online data.

[17] Applying the same 8.6 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.

remain below Cuba, Brazil's 18.8 percent, and Colombia's 18.1 percent,[18] and well below the OECD median of 19.5 percent.

If only half of the 8.6 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. If all of the 8.6 percent were given as cash to households, then government expenditure would not rise at all.

An estimate of the distributional impact of such an oil transfer is presented in Table 4, where I also reproduce pre-fisc and post-fisc SHCP (2010a) estimates from Table 1. The last column presents income deciles and inequality for the policy just calculated. Compared with current post-fisc income, income shares rise for all of deciles one to seven, while deciles nine and 10 see their shares fall. Inequality as measured by the Gini correspondingly falls an additional five Gini points lower than post-fisc income to 43.9.

This is a substantial progressive redistribution, but Table 5 indicates that it would not be unusual by international standards. The current distributional impact of fiscal policy in Mexico is moderate relative to other Latin American countries at 5.1 percentage points, less progressive than Colombia's 5.4, Costa Rica's 6.8, or Panama's 8.0. With the alternative policy of oil entitlements, the distributional impact in Mexico rises to a total of 10.1 percentage points. It remains well below the European average of 12.5, in between the levels of the low-redistribution and high-inequality southern European countries of Italy, Portugal, and Spain, which span 9.1 to 10.8.

The moderate nature of the policy is also indicated by the fact that the resulting Gini of 43.9 would still represent the highest level of inequality in the OECD.[19]

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[18] ECLAC data online; the largest is Cuba at 30.8 percent.

[19] OECD data online. The next highest is Turkey with 43. Our estimated 43.9 is net of in kind transfers, which are relatively progressive, so the Gini for disposable income—used by the OECD and many other data sources—would be higher still, implying a larger gap with Turkey than this suggests.

Table 4. Income Shares (%) With Oil Revenue Distribution Policy, 2008

Deciles of Population	Pre-fisc Income	Post-fisc Income	With Oil Revenue Distribution Policy
1	1.7%	2.6%	3.3%
2	2.8%	3.5%	4.2%
3	3.4%	4.0%	4.6%
4	4.2%	4.7%	5.3%
5	5.3%	5.7%	6.2%
6	5.9%	6.3%	6.7%
7	7.7%	7.8%	8.1%
8	9.7%	9.6%	9.6%
9	13.2%	12.5%	12.3%
10	46.1%	43.1%	39.7%
Total	1.00	1.00	1.00
Gini	54.00	48.87	43.9
Gini change		-5.1	-10.1

Source: SHCP (2008) and author's calculations

Note: For calculation of share of non-oil income, see text. Gini coefficient is own estimation using Povcal software, based on decile shares.

Table 5. Distributional Impact of Fiscal Policy, Selected Countries

	Pre-fisc Gini Minus Post-fisc Gini
Mexico	5.1
Mexico with oil entitlements	10.1
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: Table 4 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 the most recent data, for 2008, 16.5 percent of the population were living below the extreme poverty line (linea de bienestar mínimo).[20] The monthly extreme poverty line was M$611 in rural areas and M$870 in urban areas[21] 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

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[20] See The National Council for the Evaluation of Social Development Policy (CONEVAL) website at http://medusa.coneval.gob.mx/cmsconeval/rw/resource/coneval/med_pobreza/6123.xls?download=true.
[21] See CONEVAL website,
http://medusa.coneval.gob.mx/cmsconeval/rw/resource/Bienestar_feb2010.xls?view=true.

has to recoup, as described above. In this case, extreme poverty is eliminated.[22] The calculation is made more complicated to the extent that the oil transfer is given as benefits in kind, but it seems reasonable to assume that the increase in well-being of poor households would be comparable.

IV. International Experience and Political Economy

I now briefly review relevant experiences of four other hydrocarbon producers in distributing their resource revenues: Bolivia, Iran, Norway, and the U.S. state of Alaska.[23]

Bolivia: Bonosol and 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 from the Bono Solidario, or Bonosol, created in the mid-1990s. Bonosol was a pension of 1,800 Bolivianos (currently about US$260) a year, granted to all Bolivians who had already reached age 21 by the end of 1995 the right to the benefit beginning at age 65. It was not conceptualized as a universal pension based on the inherent merits of such a benefit, but rather as time-limited compensation for the privatization (referred to as "capitalization") of major national companies (Whitehead 1997). Its payment was sporadic over ensuing years.

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

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[22] The oil benefit is worth M$815 per month, less 8.6 percent tax, coming to M$745. In addition, we must subtract the 8.6 percent from existing incomes. For someone below the poverty line, this additional tax is 8.6 percent of a maximum of M$870, which is M$75. The net benefit from the policy is, then, at least M$745 – M$75 = M$670, rising to M$745 as pre-policy income falls to zero. For someone to remain in poverty after the policy would imply that their pre-policy income was below M$219 or PPP$28 per month; according to the World Bank's Povcalnet website (accessed February 17, 2011), less than 0.2 percent of the population was below this poverty line in 2006 (the latest year for which they have data).

[23] This section draws on Segal (2011b).

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."[24]

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$860[25]) 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 (Müller 2009, 168).

Renta Dignidad cost 1.4 percent of GDP in 2008 and 1.5 percent in 2009 (IMF 2010, 6). Poverty was reported to have been reduced by 4.8 percentage points in 2008, but systematic analyses of the impact of the policy on poverty and inequality do not yet seem to be available.

Iran: Subsidies and Direct Distribution

Iran is a major producer of oil, with oil revenues providing about 70 percent of fiscal revenues and 18–22 percent of GDP from 2006 to 2009 (IMF 2010, 20). Fuel and other goods have been heavily subsidized for many years, with the price of a liter of gasoline having been only about 10 U.S. cents. However, in January 2010, the Iranian Parliament passed a bill to phase out these and other subsidies over five years, planning to partly replace them with universal cash transfers to the population (Tabatabai 2010). On December 20, 2010, the subsidies were cut, with petrol prices nearly quadrupling to 38 U.S. cents per liter.[26] Households have been given a one-off cash payment of about US$80 each to compensate and have been promised double that amount in 2011.[27]

Under the government's long-term proposal, transfers will total US$50 billion annually, or around US$700 per person per year. One motivation given for the proposed cash transfer is to

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[24] Or, in the original Spanish: "Es el resultado concreto de la nacionalización de nuestros recursos naturales. Recursos que ahora llegan directamente a las manos de la gente que más lo necesita. Es una medida sostenible en el tiempo que no representa privatizar las empresas públicas ni perder para siempre nuestra riqueza y patrimonio."

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

[26] William Yong, "Gas Prices Soar in Iran as Subsidy is Reduced," *New York Times*, December 19, 2010.

[27] Najmeh Bozorgmehr, "Iran moves to cut food and fuel subsidies," *Financial Times*, December 19, 2010.

make it politically easier to withdraw the subsidies; it is "justified and perceived as a means of compensating the population for the removal of subsidies to which they have become accustomed. Many view cheap oil as a benefit to which they are entitled as a major oil producing nation, and the metamorphosis from price subsidies to cash transfers is seen as merely a change of form in that entitlement." (Tabatabai 2010, 7). Whether the one-off cash payment will evolve into the planned long-run system of transfers remains to be seen.

Norway: The Government Pension Fund–Global

Norway's approach to the management of hydrocarbon revenues is deliberately conservative, with revenues being saved in the Government Pension Fund–Global explicitly to fund future pension commitments. Limited current expenditures are allowed and are regulated by a "fiscal rule" that states that only "the expected return on the fund can be used. The expected real rate of return on the fund is estimated at 4 percent. This means that the fiscal budget can be settled with a deficit corresponding to this rate of return."[28] Current expenditures of oil revenues therefore finance the general government budget, like in the case of Mexico.

There are two senses in which this arrangement is particularly conservative. First, the fiscal rule implies spending the real return to the oil wealth that has already been extracted, not the real return to total estimated oil wealth—so it does not take account of the revenues that are expected to flow in the future. This is why it is referred to as a "bird in hand" rule. Second, the basis of the rule is that Norwegians want oil-financed pensions to rise in real terms with wages. This implies that future expenditures of oil wealth are expected to be higher in real terms than current expenditures of oil wealth. Since economic growth should lead to Norwegians being richer in the future than they are now, this puts a surprisingly high weight on future consumption relative to current consumption. In this sense, Norway is therefore not a good model for low- or middle-income countries whose populations have pressing needs in the present (Segal 2011b).

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

Alaska: The Permanent Fund Dividend

The U.S. state of Alaska has a state-owned fund, called the Alaska Permanent Fund, which by law receives at least 25 percent of oil royalties received by the state government. Each year, a dividend from this fund is given to all those who have resided in the state for at least one calendar year. The dividend is calculated as 52.5 percent of the fund's nominal income (not including the share of oil royalties that has been added to the fund) averaged over five years, divided by the number of eligible recipients.[29] In most years it has lain between US$800 and US$2,000. Partly due to this policy, in 2007 Alaska had the joint second-lowest poverty rate of all the states of the United States, despite having only the 19th-highest per capita personal income (Segal 2011a).

V. Oil Sector Reform and 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 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 ended in failure, the policy withdrawn in the face of widespread protests (Mapstone and Schipani 2011).

In Mexico there remains a perception among some 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." Perhaps even more oddly, it insisted that, by keeping

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[29] See Alaska Permanent Fund Corporation, http://www.apfc.org/home/Content/aboutFund/aboutPermFund.cfm and http://www.apfc.org/home/Content/dividend/dividend.cfm.

the price of gasoline and diesel below that in the United States, it "maintained, in this respect, a competitive position for the national productive apparatus."

These claims are entirely false, as discussed above, but they sound plausible. 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. As discussed above, this appears to be the strategy that Iran is adopting. 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—reducing the sense that higher prices have made them poorer.

A similar argument may be made for the removal of exemptions on value added tax in Mexico that are regressive but popular. A universal oil entitlement could be presented as the quid pro quo of a package of unpopular but sensible, and progressive, fiscal reforms.

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.

A full projection of future oil revenues is beyond the scope of this paper, but I make a simple preliminary estimate on the basis of the relationship between oil prices, oil production, and government revenues from 2000 to 2010.[30] I apply this relationship to estimates of two different

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[30] The log of government revenues from 2000 to 2010 was regressed on log oil price and log oil production. The result is: revenue = 3.09 + 0.722price (0.054) + 0.645production (0.028) where standard errors are in brackets. Price was significant at the 1 percent level and production at the 5 percent level; the adjusted R^2 is 0.95. Using this regression for projections assumes (1) that the discount on Mexican oil stays constant at its average over the period, and (2) that government revenue stays constant as a share of gross Pemex revenues at its average over the period. The first assumption will not hold if the composition of Mexican oil changes substantially; the second will not hold if the share of gross revenues used for investment changes substantially.

scenarios for Mexican oil production in the future,[31] on the basis of the oil price in the futures market. At the time of writing (February 20, 2011) futures oil prices up to December 2015 are almost exactly equal to the average oil price for 2008, both being just under US$100, so I use this price for the projections.[32]

In Table 6, I report projected output and revenues under two scenarios for production. Under the first scenario, labelled "U.S. replacement rate," reserve replacement proceeds at the average rate in the United States, which implies almost constant production. Under the second, labelled "Replacement rate in Mexico over last five years," reserve replacement proceeds at the average of the last five years in Mexico, which is lower, leading to declining production. Under the more optimistic projections, per capita revenues will decline very modestly to about US$800 per person per year in 2020, lower than the US$1,055 in 2008 but marginally higher than the US$791 in 2006. Based on the actual rate of reserve replacement over the last five years, however, revenues are projected to decline to only US$546 per person per year in 2020, dropping by nearly half compared with 2008 and nearly a third compared with 2006.

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[31] Output projections are due to Ron Soligo, professor of economics at Rice University and a Rice scholar at the James A. Baker III Institute for Public Policy. Following the IMF World Economic Outlook, I assume population growth of 1 percent.

[32] I use a price of US$99. If the oil price remains at this level in nominal terms then projected revenues will be nominal, so their real value will be lower than in Table 6. It is not implausible, however, that oil prices will rise with inflation, and if that occurs then the projections can be interpreted in real terms.

Table 6. Projected Oil Production and Revenues

	U.S. Replacement Rate			Replacement Rate in Mexico Over Last Five Years		
Year	Production (b/d, m)	Total Revenues, US$m	Per Capita Revenues, US$	Production (b/d, m)	Total Revenues, US$m	Per Capita Revenues, US$
2011	2,578	96,138	876	2,462	93,320	851
2012	2,579	96,157	868	2,344	90,415	816
2013	2,581	96,195	860	2,224	87,398	781
2014	2,582	96,214	851	2,103	84,302	746
2015	2,582	96,233	843	1,982	81,142	711
2016	2,583	96,252	835	1,863	77,956	676
2017	2,584	96,271	827	1,746	74,762	642
2018	2,585	96,290	819	1,632	71,580	609
2019	2,585	96,309	811	1,524	68,480	576
2020	2,586	96,328	803	1,421	65,464	546

Source: Oil production projections due to Ron Soligo;
Revenue projections are author's calculations (described in the text).

Motivating support for oil sector reform was one justification behind the plan to sell Pemex bonds to Mexican citizens. Legal challenges to the policy have not been resolved and no bonds have yet been offered. But it is also difficult to see such a policy having a major impact on popular perceptions of oil policy, given that only a very small minority of Mexicans would be in a position to participate in such bond purchases. Moreover, this policy would have none of the distributional benefits of the oil transfers discussed above.

It is the universality of oil entitlements, directly tying the benefits received by each citizen to her or his share of oil revenues, that would seem politically salient. Only universal policies can correspond to the universal ownership of oil revenues. Scott (2009) argues that part of the inadequacy of Mexico's current system of social security is its link with formal employment. Such a link may be appropriate in highly industrialized countries, and they work well in much of Europe. But since so many Mexicans are in the informal sector, much of social security bypasses them altogether. In an economy like Mexico's, a universal system of benefits—whether a resource dividend that provides cash, or a universal system of social spending as advocated by Scott (2009)—is the surest way to reach all citizens.

VI. Conclusion

Mexican oil belongs to all Mexicans, and they receive the benefits of their oil via government budgets through goods and services provided by the government, 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 the benefits received by the majority of Mexicans—all but the richest 10 percent—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.

This analysis implies that the net effect of the fiscal system is to redistribute these oil entitlements from the least rich 90 percent of Mexicans to the richest 10 percent. Instead of the nearly M$12,000 they should have each received in 2008, those in the bottom 90 percent of the population received on average only M$10,250, losing M$1,749 per year (US$167, PPP$224). The beneficiaries were the richest 10 percent of Mexicans who received more than double their share of oil revenues, gaining an extra M$16,000 (US$1500, PPP$2000) per person per year over and above their M$12,000 entitlement.

At the same time, the Mexican government has a very small role in the economy compared with other countries in Latin America and in the OECD. In the context of these two facts about Mexican fiscal policy, this paper estimated the impact of a policy that distributes the benefits of oil revenues equally to all Mexicans as a universal benefit, over and above current fiscal policy. Oil revenues could be distributed in cash as a resource dividend, following the example of the Alaska permanent fund dividend, or could pay for universal entitlements to government services and social security.

Such policies would require a rise in general taxation to compensate the government for lost oil revenues. However, because of the low starting level of taxation, government revenues would remain relatively low by international standards. The distributive impact would be substantial, with inequality as measured by the Gini coefficient declining by 19 percent. 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, extreme poverty, standing at 16.5 percent of the population in 2008, would be eliminated.

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