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Natural Resource Taxation in Mexico: Some Considerations

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Abstract

Mexico has large extractive industries and it traditionally has raised sizable fiscal revenues from the oil and gas sector. A confluence of factors—elevated commodity prices, financial challenges of the state-owned oil company Pemex, and revenue needs for financing social and public investment spending over the medium term—suggest that a review of Mexico's taxation regimes for natural resources would be opportune, against the backdrop of a comprehensive approach to tackling Mexico's challenges. This paper identifies opportunities for redesigning mining taxation to increase somewhat the revenue intake while maintaining the favorable investment profile of the sector. It also discusses recent reforms to the oil and gas fiscal regime and future reform considerations, with attention to the attractiveness of investment on commercial terms—an issue that should be placed in the context of an overall reform of Pemex's business strategy and possibly of the energy sector more generally.

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I. INTRODUCTION[1]

As countries look to finance and support their post-pandemic recoveries, it is timely to revisit the fiscal regimes applicable to the extractive industries. Indeed, well-designed and implemented fiscal regimes for petroleum and mining can, and ideally should, be part of the overall revenue mix. Soaring precious metal prices during the pandemic period raise questions around whether producers are adequately sharing in the associated resource rents. Meanwhile, price volatility in the petroleum markets, and progress in global climate change mitigation efforts, have increased the uncertainty surrounding projections of future fossil use; countries are facing important trade-offs between production and revenue objectives in a transition to a future with lower fossil fuel production and prices.

Against this backdrop, this paper analyzes the fiscal regimes applicable to mineral and petroleum extraction in Mexico. The oil and gas sector contributes 15 percent of government revenues while the mining sector contributes 0.5 percent of revenues. Reviewing and potentially reforming the taxation of natural resources enriches the discussion of the potential menu of options for collecting revenues as well as for enhancing efficiencies. Such a review is also timely given the financial challenges of the state-owned oil company, Pemex, the likelihood of continued fiscal support, and the consequences for revenue needs and spending of such support.

Mexico is considering measures to raise revenues over the medium term to finance public investment and social needs as well as to lower public debt. Noting that Mexico's non-oil revenue collections are nearly 6 percent of GDP below Latin American peers and about one half those of the OECD average, IMF staff have provided several recommendations to this end. The IMF's staff report for the 2020 Article IV consultation (IMF 2020) outlined several revenue options to raise revenues by 3-4 percent of GDP over the medium term, enhance efficiencies, and promote inclusion. These options included fundamental reforms to reduce VAT policy and compliance gaps (alongside stronger safety nets to address distributional concerns), broaden the income tax base by rationalizing inefficient and regressive income tax expenditures and widening the top personal income tax rate bracket, enhance collection of sub-national property and vehicle registration taxes, and improve the gasoline excise tax formula.

A. Mining

Despite a long history in mining and being among the top ten gold, copper, and zinc producing countries worldwide, the sector presents only a moderate source of tax revenue in Mexico. Direct taxes on production and profit from mineral extraction amount to about 0.1 percent of GDP, or 0.5 percent of total government revenue. This is partly due to Mexico's well diversified economy—the sector has a moderate economic significance, contributing just over 1 percent of GDP and exports, and approximately 400,000 direct

[1] The author would like to thank Rishi Goyal and Swarnali Hannan for their support and input in writing this paper and to Thomas Baunsgaard, Eduardo Camero, Jean-Marc Fournier, Mehdi Raissi and Jeffrey Williams, as well as FAD seminar participants for extremely helpful comments, and to Laila Azoor and Juan Pablo Cuesta for excellent production assistance. The author is also grateful for the review and comments from the Mexican authorities.

jobs—as well as a relatively low overall burden of taxation on the sector, which has evolved in a fragmented manner. The current regime implies a moderate average effective tax rate, towards the lower end of the international spectrum, and presents several design issues. While Section II of this paper provides general principles for the design of fiscal regimes for extractive industries, Section III analyzes the mining fiscal regime in Mexico. It suggests that consideration could be given to a reform that improves the design of the mining fiscal regime to provide a steady stream of revenue from the start of production and allows the government to share in the upside of more profitable projects. A move to such a balanced fiscal regime would maintain Mexico's position as an attractive investment location for mining companies while adding to revenues collected. Although more detailed analysis would be needed for a more precise design and calibration, a stylized example of a reform presented in this paper could lead to direct tax collections on mining profit and production of about 0.2 percent of GDP.

B. Petroleum

The appropriate design of Pemex's fiscal regime has long been a concern of the Mexican authorities. As a state-owned monopoly, Pemex historically has not been subject to the same market discipline as its private sector counterparts. In such an environment, policies must seek an appropriate balance between limiting the operational inefficiencies and cost overruns characteristic of many state-owned corporations, and the risk of creating unwarranted distortions through an overly burdensome tax regime and strict controls that limit the company's ability to behave as a profit-maximizing company.

Although the design of the fiscal regime in the past reflected concerns around the weak incentives for cost containment by Pemex, the government in 2019 implemented measures to loosen the petroleum fiscal regime applicable to Pemex.[2] The measures were based on the premise that the company's upstream petroleum activities are taxed too heavily, constraining its ability to invest in exploration and production, and were intended to release funds for additional investment. One measure was to loosen cost deduction caps under Pemex's 'entitlement' fiscal regime, aligning them with the cost recovery limits of production sharing contracts concluded under licensing rounds held in 2015–18 and Pemex's Ek Balam area that transitioned from the entitlement regime to a production sharing contractual scheme. A second measure was to reduce the profit-sharing rate from 65 percent in 2019 to 58 and 54 percent in 2020 and 2021, respectively. In 2021, government further reduced the DUC rate to 40 percent.[3]

These measures were accompanied by a series of controversial moves to increase the role of the state in Mexico's energy sector. New licensing rounds to solicit private investment were suspended, reversing part of the 2014 energy sector reform that had sought to open Mexico's

[2] SHCP Boletín 009-2019, 'Acciones para fortalecer la capacidad productiva de Petroleos Mexicano', Ciudad de México, 28 de enero de 2019.

[3] For 2021, the government granted a tax benefit of MXN 73,250 million by Presidential Decree, the equivalent of a profit sharing rate reduction to 40 percent. In September 2021, a permanent reduction of the statutory rate was proposed as part of the draft 2022 budget.

energy sector to private investment. Instead, the authorities looked to Pemex to undertake new upstream—exploration and production—investment.[4]

The authorities also invested heavily in downstream—refining—activities, including importantly the Dos Bocas refinery. Although originally slated for completion in mid-2022 at a cost of USD 8 billion, it has however been subject to significant cost and time over runs. This was part of a strategy to reduce Mexico's dependence on fuel imports. In May 2021, Pemex agreed to pay USD 0.6 billion to Shell to purchase the remaining 50 percent of a refinery in Deer Park, Texas, that it co-owned and operated with Shell. These investments have occurred against the backdrop of insufficient preventative maintenance spending or investment in domestic refining, which has been subject to recurrent shutdowns of operations and low capacity utilization.

Meanwhile, Pemex's financial health remains strained. With a business plan that has prioritized production and refining targets, including through the COVID-19 pandemic, Pemex has continued to run sizable after-tax deficits (or negative free cash flow). Its credit rating was downgraded to speculative grade in 2020, making it the world's largest "fallen angel". Its elevated external borrowing costs, which are notably higher than that of the Mexican government, have complicated plans to access markets for financing deficits and rolling over maturing debt.

Large recurrent operational losses and high cost of external borrowing have necessitated sizable, ongoing fiscal support. Support has been in the form of equity injections or fiscal transfers for the Dos Bocas refinery, debt repayments, and pension liabilities; and tax breaks—deductibility of the profit sharing rate in 2019 as well as lowering of the profit sharing rate from 65 percent in 2019 to 58 percent in 2020 and further to 54 percent in 2021. Fiscal support has averaged about 1 percent of GDP per year during 2019-21. Although support has been provided on an hoc basis, financing constraints have repeatedly become binding as Pemex has kept missing its financial targets, which has necessitated continued support.

Recurrent sizable fiscal support for Pemex implies lower resources for other priorities, including needed social spending. Therefore, a comprehensive approach is needed to address Pemex's financial challenges. IMF (2020) outlined several measures as part of such an approach. These include reforming Pemex's business plan to focus production only in profitable fields, sell non-core assets, curb plans to increase refining output at a loss, and postpone new refinery plans until it is profitable to do so. Partnering with private firms would supply needed capital and know-how, allowing to enhance efficiency by leveraging specialized expertise and managing investment costs. Implementing initiatives to reform corporate governance and procurement processes are also essential.

Conditional on changes to Pemex's business strategy and governance, which ensure that Pemex is put on a strong footing over the medium term, IMF (2020) argued that

[4] Other measures have been taken or pursued in the electricity sector, favoring the state-owned electricity company CFE over private generators and that further reversed the 2014 energy reform. In addition, in July 2021, the Mexican regulator granted operatorship of an offshore field (called Zama) to Pemex over a private consortium, following disagreements between the two on how to jointly operate the field.

consideration could be given to fiscal support that eases Pemex's financing needs. It is in this context that Section IV of this paper evaluates key characteristics of the pre-2019 tax regime for Pemex, and compares it to the recent reforms, as well as the production sharing regime which applies to contracts awarded in recent licensing rounds. The analysis suggests that measures that increase the cost cap and lower the profit-sharing rate will reduce the overall tax burden for Pemex and the regressivity of the regime. By increasing the return to Pemex, such a measure may release funds for further investment. However, the analysis shows that even with the increased cost cap and reduced profit-sharing rate, the regime does not contain sufficient progressive instruments to allow the government to share in the upside from new developments, a desirable characteristic of petroleum fiscal regimes. Thus, migration of entitlement assets to the newer more balanced contractual regimes would be beneficial.

A caveat: the discussion of these reforms is taking place against a backdrop of global climate change mitigation efforts. There remains significant uncertainty surrounding the future baseline growth of fossil fuel use, the extent of future global mitigation, and the impacts of mitigation on fossil fuel production and prices (IMF 2019a). The general direction is clear: overall fossil fuel production is expected to decline significantly over the medium to long term. Carbon pricing efforts are expected to lead to a growing wedge between consumer and producer prices for all fossil fuels.

Countries may be vulnerable if they are dependent on fossil fuel revenue or at risk of ending up with "stranded" fossil fuel assets that can no longer be extracted on a commercial basis. Countries with high extraction costs will likely face a greater proportional reduction in production with global climate change mitigation—as producer prices fall, production from fossil fuel assets with higher costs will be reduced or perhaps not developed at all. Differences in countries' fiscal regimes, which constitute part of the extraction cost, will also influence production decisions. While Mexico sits towards the lower end of the global oil cost curve, it too will ultimately face a trade-off between production and revenue objectives in the transition to a future with lower fossil fuel production and prices. These climate change mitigation issues—although not formalized in this paper—will need to feature adequately in any consideration of reform of petroleum fiscal regimes.

II. Principles for Extractive Industries' Fiscal Regime Design

A key challenge in the taxation of extractive industries (EI) is to balance securing an acceptable share of revenue for the government, with maintaining incentives for companies to invest in the sector. This must be achieved in the face of uncertain mining and petroleum production, prices, or costs across a variety of potential project outturns.

Critical to achieving this balance is the design of a stable and credible fiscal regime, with an appropriate combination of production and profit-based instruments. As noted in IMF (2012), for many resource-rich countries, combining (i) a production-based instrument, such as an ad valorem royalty; (ii) corporate income tax with rules tailored to the special characteristics of the mining and petroleum sectors; and (iii) a form of additional resource rent capture mechanism, has considerable appeal.

- A production-based instrument such as a royalty ensures some minimum revenue whenever production is positive, regardless of project profitability (a reservation price for extracting the resource). However, given their regressive nature, they should be set at a moderate level so as not to excessively distort commercial decisions—a high royalty may deter investment in less profitable projects or increase cut-off grades, reducing the economically mineable resource.
- The corporate income tax ensures that the normal return to equity is taxed at the corporate level in extractive industries as in other sectors and, moreover, that foreign tax credits will be available where investing companies' home countries tax them on worldwide income. Input taxes and capital allowances should be structured to allow relatively quick payback of initial investments, where the intrinsic project economics allow, and permit achievement of minimum required rates of return. At the same time, policy measures should be put in place to limit the extent of tax erosion.
- An additional rent capture mechanism recognizes the potential for the EIs to generate immobile (location-specific) economic rents that the government can tax without deterring investment, and allows the country to share in periods of high profitability. Progressive instruments commonly feature in modern EI fiscal regimes. In recent decades, recognizing the potential for large economic rents in the resource sectors, many mineral and petroleum-producing countries in the region and internationally have introduced a range of resource rent taxes, profit-based production sharing, and additional profits tax mechanisms. A well-calibrated framework can be applied across a wide range of circumstances and projects. Progressive profit-based instruments capture a rising share of cashflows as profitability increases, playing an important role in offsetting the impact of regressive instruments and allowing the government to maintain an appropriate government take across a variety of projects outturns.

The balance of these instruments will depend on a government's revenue objectives and risk preferences. The greater the variation of aggregate EI revenues in response to the unfolding of the many uncertainties—e.g., in prices, costs, and geology—the greater the risk that is borne by the government. Differences in the willingness of the operator and the government to bear risk can influence the structure of an efficient fiscal regime. Where, for instance, the government is better able to bear risk than operators, both can gain by putting in place a fiscal regime that puts more risk on the government but offers a higher expected overall tax rate, especially in the more profitable projects. Conversely, a government with pressing revenue needs may be willing to trade higher uncertain future revenues for certain revenues today.

III. Mexico's Mining Fiscal Regime

A. Background

Mexico has a long history in mining, now being the global leader in silver production, and among the top ten gold, copper and zinc producing countries worldwide. Amid Mexico's well-diversified economy, the sector has a moderate economic significance, contributing just over 1 percent of GDP and exports, and approximately 400,000 direct jobs.

Despite the scale and value of mining production, the sector remains only a moderate source of tax revenue. Sector-specific direct taxes on mining production and profit from its extraction amount to approximately 10 percent of the total value of mineral production (Figure 1) and just over 0.5 percent of total government revenue. This is likely to reflect the relatively low overall burden of taxation on the sector, as well as possible compliance and enforcement issues eroding the tax base.[5]

The mining fiscal regime has developed in a fragmented manner. In recent decades, many resource-rich countries have designed fiscal regimes to receive a larger share of the rents associated with resource extraction, involving the use of instruments such as state participation, income taxes, ad-valorem royalties, and other revenue instruments. In contrast, until 2014, Mexico did not have any sector-specific taxes. Charges constituted only the generally applicable corporate income tax with minimal sector specific rules, and a surface rental charge on mining companies based on the size of the mining area. Since then the regime has been gradually augmented with a minimal royalty on gold and silver extraction of 0.5 percent and an additional profits tax of 7.5 percent.

B. Mexico's Mining Fiscal Regime

Mexico's fiscal regime for mining is a royalty-tax system. The main instruments are a flat rate 0.5 percent royalty for gold and silver, the statutory 30 percent corporate income tax,[6] and a 7.5 percent additional profits tax,[7] along with surface rental payments, which are creditable against the additional profits tax. Mining companies are also required to provide a 10 percent unpaid or 'free' equity participation to workers. [8] The statutory regime applies to all investors, and no fiscal stability assurances are provided to mining investors in Mexico. Mining revenues amounted to about MXN 29 billion, or about 0.12 percent of GDP, in 2019.

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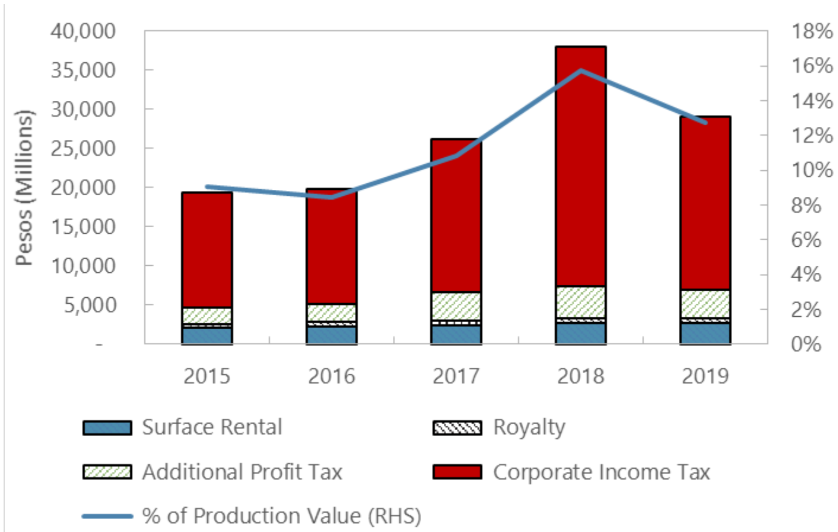
[5] Beyond the core mining fiscal regime, other tax and non-tax revenues are collected from the sector, including personal income tax, payroll taxes, import duties, from both companies engaged in mineral extraction as well as mining service providers resident in Mexico. The authorities reported total revenue contributions from the sector of MXN 51 billion in 2019, or approximately 0.2 percent of GDP.

[6] There is no ringfencing by mine or license area for the calculation of corporate income tax or the additional profit tax.

[7] The tax base of the additional profit tax approximates EBIT (earnings before interest, tax) with certain restrictions on deductions. In deducting depreciation in the calculation of net earnings instead of direct expenditure, and without applying uplift factor to negative cashflows, to reflect a return to the investor, and with restrictions on the type of investment that can be deducted, the tax base differs from resource rents. Rents—earnings in excess of normal required return—are an attractive tax base because they can be taxed without distorting a company's behavior.

[8] In practice, further analysis is warranted to understand whether the burden of this tax is offset by companies offering lower wages to workers.

Figure 1. Mexico: Mining Revenues (2015–19)



Source: SAT.

C. Economic Modeling of Mexico's Mining Fiscal Regime

To evaluate the key features of the current fiscal regime, economic modeling was undertaken using the IMF's FARI modeling framework (Box 1) and stylized gold and copper project examples. The project example is stylized for illustrative purposes, although it is intended to reflect the broad cost structure of typical mines operating in Mexico. In a baseline scenario at gold and copper prices of USD 1600 per ounce and USD 8000 per ton, the gold and copper projects are highly profitable, generating pre-tax returns of 53 and 21 percent, respectively. With more detailed information on the economics of current projects in Mexico (including for other minerals), the analysis could be refined further.

Box 1. Fiscal Analysis of Resource Industries (FARI)

FARI estimates the government's share of a resource project's total pre-tax net cash flows as well as the interactions among the different parameters constituting the fiscal regime. FARI is a discounted cash flow model set up to reflect tax accounting rules and specific tax payments to the government.

The IMF's Fiscal Affairs Department (FAD) uses several metrics for fiscal regime evaluation. From an investor's perspective, key indicators are the post-tax NPV of the project, the post-tax internal rate of return, the payback period, and the breakeven price. From a government's perspective, key indicators are the average effective tax rate (AETR), which is a measure of the "government's take", the marginal effective tax rate (METR) and the progressivity of the fiscal regime.

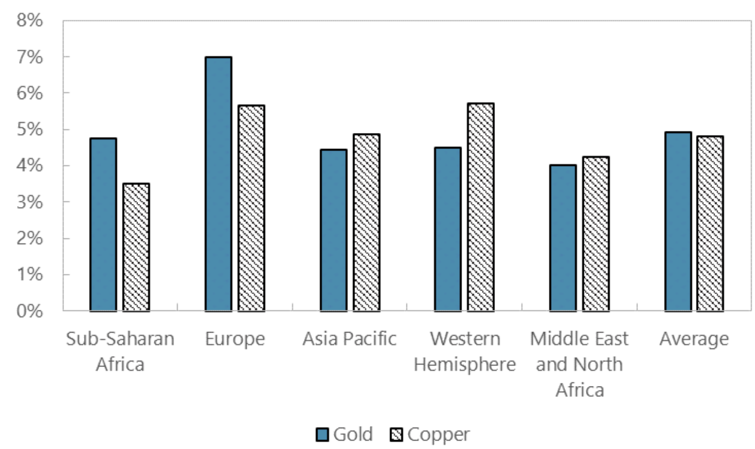
Fiscal regimes can be compared internationally and across alternative scenarios on their AETR, METR, and progressivity. However, as any model, it represents a stylized representation of reality. FARI focuses on the evaluation of the fiscal regime assuming all factors remain constant.

For more information, visit https://www.imf.org/external/np/fad/fari/

Key features of Mexico's mining tax regime were evaluated, and compared to an illustrative regime, as well as those of other mining countries. Only the principal direct taxes on production and profit were modeled. Surface rentals were not modeled owing to their relatively minor fiscal impact.[9] The regimes are analyzed on a project level. Note, thus, that the impact of the consolidated ringfencing treatment applicable to mining companies is not analyzed. As such, the benefit to the investor in being able to offset new investment costs against revenue from currently producing mines is not reflected in the results.

The illustrative regime was designed to represent a well-balanced regime situated in line with international peers. It comprises a 5 percent royalty for all mineral types, the 30 percent statutory corporate income tax, and a 15 percent resource rent tax. A royalty rate of 5 percent sits well within the regional average (Figure 2), providing a more certain revenue stream from the start of production. Its regressive impact is offset by the inclusion of a resource rent tax which takes effect once the project reaches a 12.5 percent rate of return, an approximation for the investor's cost of capital.[10] As demonstrated below, as calibrated, the regime performs well in terms of revenue generating capacity, neutrality, as well as progressivity.

Figure 2. Average Mining Royalty Rates by Region



Source: IMF Fiscal Regime Library.

[9] Surface rentals are a form of land rental payment and are commonly paid by mining companies from the start of exploration. They constitute a low burden of taxation but allow for some payment to be received before production begins. They also provide incentives for companies to relinquish land that they do not wish to explore further, which can then be licensed to other investors. In Mexico, the relatively large share of mining revenue contribution from surface rentals (Figure 1) appears to reflect the large area of land under licence, rather than the rates themselves. However, the level of payments could be reviewed to ensure they do not present an excessive burden on mining exploration and extraction.

[10] The design of a resource rent tax could also be approximated with some modifications to Mexico's existing EBIT tax, namely (i) immediate expensing of all costs rather than using a depreciation schedule; and (ii) allowing for an uplift factor on capital costs to allow for the investor to earn a certain rate of return (calibrated to reflect the industry cost of capital) before the tax sets in.

Revenue Generating Capacity

The revenue generating capacity of each fiscal regime was evaluated by estimating the Average Effective Tax Rate (AETR) or "government take". The AETR is defined as the ratio of government revenue from a profitable project to the project's pre-tax net cash flows, and is calculated both in undiscounted and discounted terms using a discount rate of 10 percent.

The Mexican regime generates an AETR that is relatively low, when compared with other major producers, suggesting room to increase the overall burden of taxation. The discounted AETR is 46 percent and 45 percent for the gold and copper projects, respectively. In the case of copper, the regime is the lowest of all comparators, reflecting the lack of any royalty instrument. For gold, while Mexico does not sit at the very bottom of the range of comparators, with a number of other established producers with AETRs in the 50–70 percent range, the analysis suggests there is room to further increase the fiscal burden.

The illustrative regime, which increases the royalty rate and the additional profit tax rate, increases the AETR to the middle of the international comparator range.

Figure 3. Average Effective Tax Rate 1/

Figure 3a. AETR—Gold

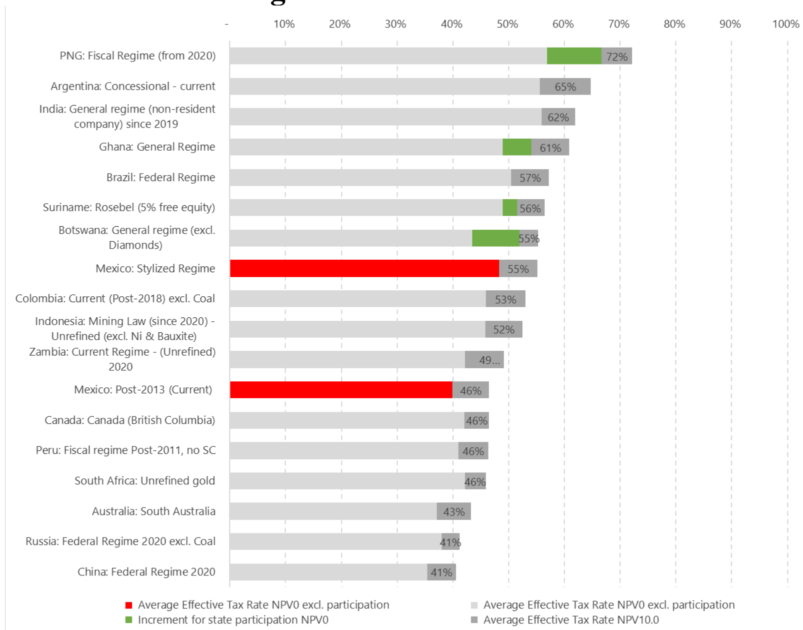
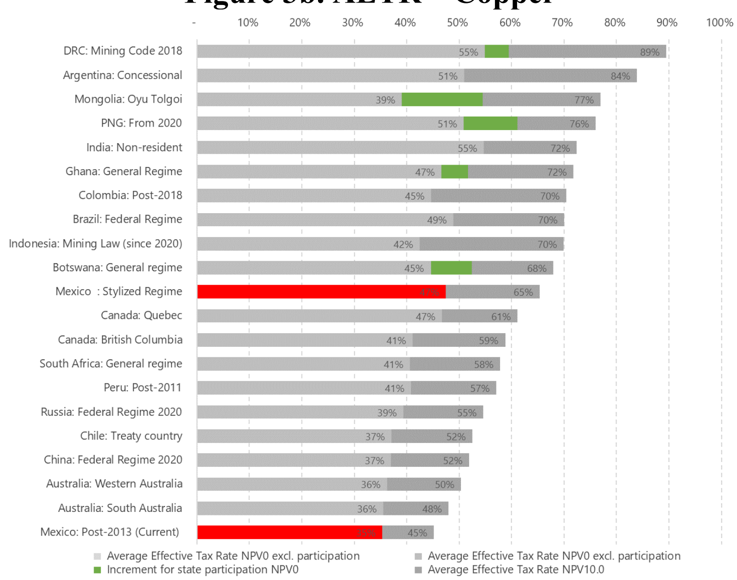


Figure 3b. AETR—Copper



1/ AETR expressed in undiscounted as well as discounted net present value (NPV) terms at 10 percent discount rate to account for time value of money, and the government's opportunity cost.

Neutrality

Neutrality is a key concept to ensure a balance between revenue-generating capacity and ensuring that marginal projects remain competitive and productive, that is, that production decisions are not distorted. It analyzes the relative burden that the different options would put

on a marginal project. A key indicator is the "breakeven price" or the minimum price required to meet the minimum after-tax rate of return required by the investor (assumed in the model to be 12.5 percent in real terms).[11]

Mexico's mining fiscal regime is competitive with a relatively low break-even price. The breakeven price is USD 1152/oz and USD 7037/ton for the gold and copper projects respectively, placing it towards the lower end of the international range, with significant room to increase the fiscal burden while still remaining competitive. This reflects the fact that Mexico has an attractive mining fiscal regime that avoids large distortions, owing in particular to the low royalty rate for gold and the absence of royalty for other minerals. It also suggests that there is room to increase the royalty rate—the calibration of royalty rates must balance the need to raise revenues, without excessively disincentivizing production from less profitable mines or deterring project development. As an example, increasing the royalty rate to 5 percent increases the breakeven price, but it still sits well within the comparator range.

Progressivity

Progressivity relates to the ability of the government to share in the upside if profitability is notably higher. Progressivity can be compared by showing the range of comparators' AETR at different levels of profitability. The upper and lower bounds are set by the highest and lowest AETR at each price level across all comparators. A country compares favorably if it avoids being at the extremes or even outside of the comparator range with a flat or upward sloping curve.

Mexico's current mining fiscal regime displays some, albeit limited, progressivity. Without a significant production-based instrument, the AETR remains relatively constant at all levels of profitability. Under the illustrative regime, in addition to the higher royalty rate, the inclusion of the higher additional profit tax rate (with a 12.5 percent rate of return threshold) help to ensure an appropriate balance of production and profit-based instruments.

[11] This rate would of course vary by country, depending on the risks to be faced in the exploration and development of potential mining projects.

Figure 4. Breakeven Prices

Figure 4a. Breakeven Price—Gold

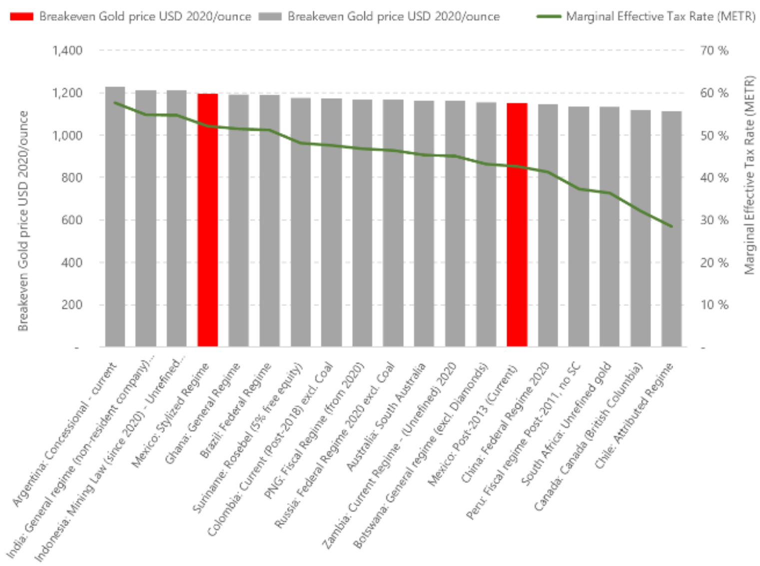


Figure 4b. Breakeven Price—Copper

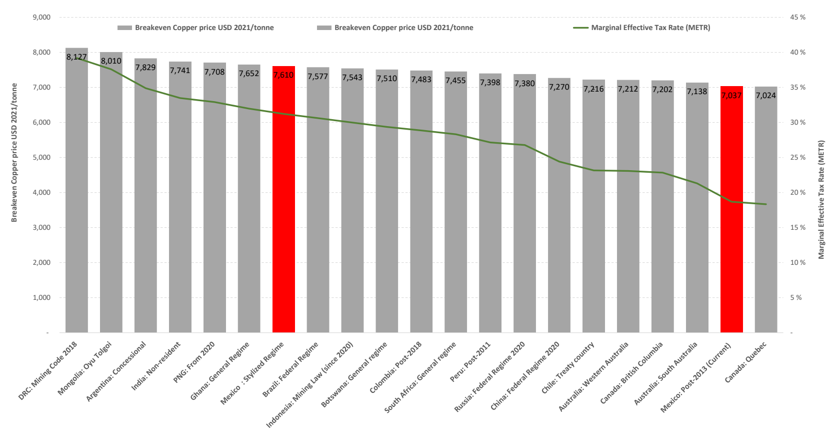


Figure 5. Progressivity

Figure 5a. Progressivity—Gold

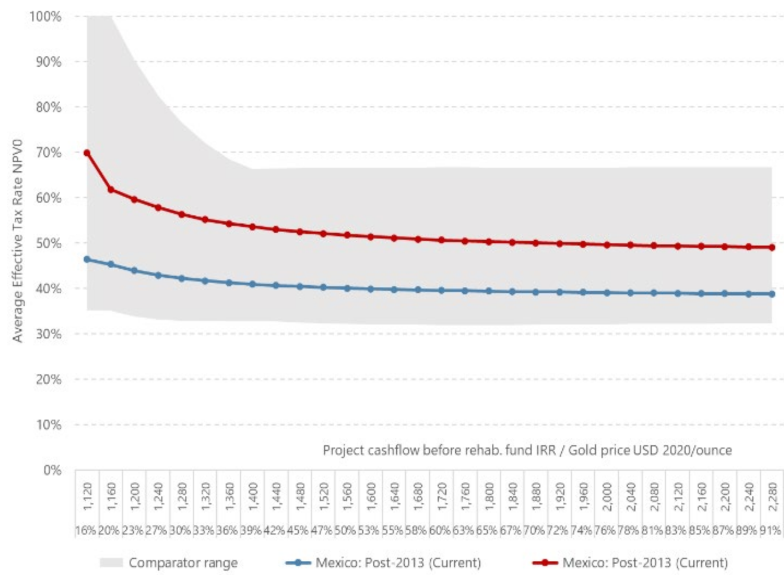
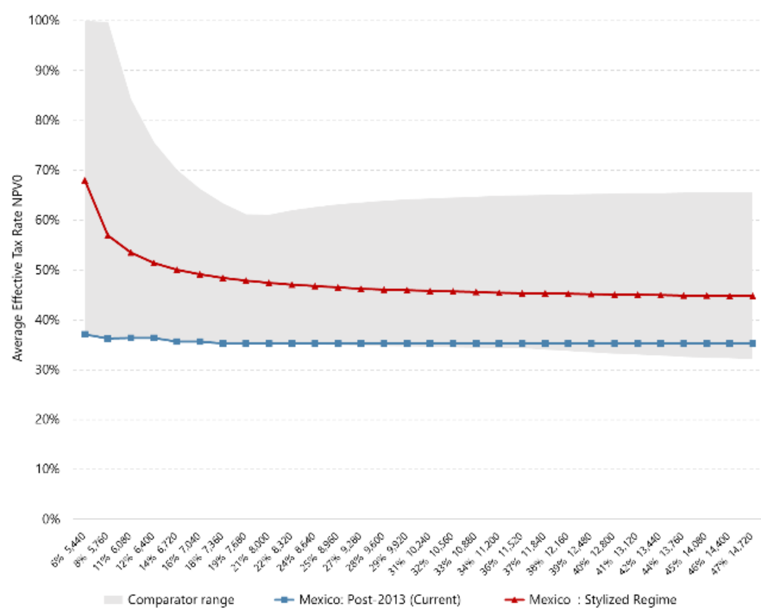


Figure 5b. Progressivity—Copper



D. Summary Findings for the Mining Regime

The analysis suggests that there is room to increase the overall tax burden on mining through a redesign of the system. There is a need to maintain an appropriate balance between production and profit-based instruments, so as not to excessively distort production decisions and to allow the government to share in the upside of mining projects. As reflected by the illustrative regime, to increase the government's take while minimizing the effect on

competitiveness, a moderate increase in the royalty rate, combined with refinement of the additional rent tax to better tax resource rents, could be considered.

The resulting increase in revenues would be proportional to the current tax base. An increase in AETR from approximately 40 to 55–60 percent would imply a 40–50 percent increase in government revenues. From the level of approximately MXN 30 billion in 2019, this would imply an increase in revenue to MXN 45 billion (0.2 percent of GDP). While not large, it nonetheless brings Mexico closer to peers and improves the design of the mining fiscal regime to allow the government to share in the upside of mining projects.

IV. Pemex's Taxation Regime[12]

A. Background

The petroleum sector in Mexico has a long history of public ownership, with only recent private sector participation. The oil industry was nationalized in 1938 and the state-owned oil company Pemex was founded, with exclusive rights over exploration, extraction, refining, and commercialization of oil in Mexico. This arrangement lasted until 2013–14, when a wide-reaching Mexican energy reform opened the petroleum sector to private companies, allowing the state to enter into a range of risk-sharing contracts with the private sector.[13]

As oil production has declined, Pemex has faced growing difficulties. Mexico has experienced falling crude oil and natural gas production, with crude oil production declining on a sustained basis from its peak in 2004 of 3.4 million barrels per day to 1.6 million barrels per day in 2020, less than half of its 2004 peak. Pemex has had a difficult time fully replacing petroleum reserves. The decline in production and reserve levels is mainly a consequence of the depletion of Mexico's principal oil field (Cantarell), Pemex's lack of the financing and technical capacity required to explore for and develop the majority of its potential resources located in offshore Gulf of Mexico, and the restrictions on private sector participation.

B. Mexico's Petroleum Fiscal Regime

Analysis of Pemex's regime has been the subject of earlier IMF Fiscal Affairs Department (FAD) Technical Assistance reports, most recently in 2012, the findings of which are summarized in Box 2.

[12] This section draws upon analysis presented in IMF (2019b).

[13] Under the 'Round Zero' process of the reform in 2014, the Ministry of Energy (SENER) granted Pemex rights over 83 percent of proven and probable reserves and 21 percent of Mexico's prospective reserves—preserving a dominant role for Pemex.

Box 2. Summary of Findings from 2012 Report

The report assessed the fiscal regime in place at the time, which comprised three main instruments: (i) the Stabilization Fund Duty (DSHFE), a 10 percent royalty applicable when oil prices exceeded \$31 per barrel; (ii) the Extraordinary Export Duty, a 13.1 percent royalty, creditable against the DSHFE, applied to the difference between the actual and the budget oil price; and (iii) the ordinary duty, a 71.5 percent income tax, subject to a cost cap of \$6.50/bbl. It also analyzed a special regime applicable to activities in Chicontepec and in deep water fields.

Assuming an oil price at prevailing 2012 levels of \$115 per barrel, and industry benchmark costs of \$7.5 per barrel, the report's analysis concluded that the 2012 fiscal regime generated average effective tax rates (AETR) in the range 70–80 percent, comparable with other countries in the region (and presenting an improvement over the pre-2005 regime which implied a much higher AETR). The AETR was notably higher when assumed costs are in line with Pemex's costs of \$17/barrel.

However, the report also acknowledged the regressivity of the regime in terms of both cost and (in the case of the ordinary regime) price, driven largely by the limits on deductibility of costs, which were set at low levels, and in absolute terms, not indexed by inflation. It also presented sensitivity analysis which illustrated that over a \$50–80 price range, the ordinary regime generated AETR of over 100 percent, rendering representative projects unviable at both industry benchmark and Pemex cost levels.

It concluded that in the long run, the cost cap should be eliminated, and the fiscal regime aligned with normal IOC taxation. In preparation for this transition, emphasis was placed on narrowing the gap between Pemex and industry benchmark costs and on strengthening audit controls and independent oversight. It also suggested that interim adjustments to the cap could be considered to reduce its distortionary effects.

Source: Cheasty et al., 2012, 'Mexico: Is Pemex Taxed Too Much?', IMF Technical Assistance Report.

Exploration and extraction activities in Mexico are carried out through 'entitlements' held by Pemex or 'contracts' with private companies. While much of Pemex's activities are carried out under entitlements, Pemex has the option to migrate any existing entitlement to the contractual regime. Incentives to move to the new regime include less onerous and more progressive fiscal terms. There is also the possibility to 'farm out' or partner with private sector partners (where Pemex's joint venture partners are determined through a public tender process). There were four farmouts in 2017-18, and none since then. The contract type and the technical terms are determined by SENER and the fiscal terms are established by the SHCP.

Entitlements

An entitlement is a contract through which the Ministry of Energy (SENER) can grant Pemex (or another state productive enterprise) the right to explore and produce hydrocarbons. The entitlement holder can then conclude service contracts with private companies for exploration and extraction activities. There are currently 428 entitlement agreements in place between SENER and Pemex.

The entitlements granted to Pemex are subject to a specific fiscal regime, composed of production and area-based instruments, along with the corporate income tax. This regime is comprised of the following principal components, also detailed in Table 1.

- Profit Sharing Fee of 65 percent of production value (which was reduced to 58 percent in 2020 and 40 percent in 2021) less cost deductions, which are subject to an annual cost cap.

- Hydrocarbons Extraction Fee, essentially a price linked ad-valorem royalty

- Corporate Income Tax at 30 percent of taxable income.

The entitlement regime also includes two annual fixed surface area fees, the Hydrocarbon Exploration Fee, and the Tax on Hydrocarbon Exploration and Extraction Activity. The profit-sharing fee and both the hydrocarbons fees are deductible expenses for the calculation of corporate income tax.

Table 1. Mexico: Entitlement Fiscal Regime (2019)

Fiscal Term	
Production Sharing Fee (percent of value of hydrocarbons)	65%
Rate	
Cost Depreciation	100% expensing of exploration Costs, 4 year straight-line depreciation of development costs
Cap on Cost Deductions (percent of value of hydrocarbons)	
Onshore Oil	minimum of 12.5 percent or $8.3/barrel
Offshore Oil Shallow	minimum of 12.5 percent or $6.1/barrel
Offshore Oil Deep	60%
Natural Gas	80%
Chicontepec	60%
Hydrocarbon Extraction Fee (percent of value of hydrocarbons)	When oil price is less than $48 per barrel, 7.5%. When oil price greater than or equal to $48 per barrel, 12.5% + (Petroleum price *1 .5)%
Corporate Income Tax	
Rate	30 percent
Depreciation	100 percent immediate expensing of exploration costs, 4 year straight-line depreciation of development Costs

Source: Hydrocarbons Revenue Law.

Cap on Cost Deductions

The cost caps associated with the profit-sharing fee reflect an effort to try and contain costs. Prior to the 2014 reform, cost caps were calculated annually in absolute monetary terms, from agreed annual portfolio–wide expenditures by Pemex divided by the number of barrels expected to be produced in the year. The reforms saw the introduction of caps expressed as a percentage of revenue in the Hydrocarbons Revenue Law, ranging from 12.5 percent to 80 percent depending on the location of the activity (onshore or offshore) and the type of hydrocarbon being extracted (oil or gas). In 2016, a minimum level for cost deductions was introduced for onshore and shallow water projects, at USD 8.3 and USD 6.1 per barrel respectively, providing some additional relief at lower price levels. The relatively low level of the cost caps appear to be driven by both the low operating costs associated with the Cantarell field, as well as the government's experience of cost inflation issues in Pemex.

An important determinant of the fiscal regime's impact on marginal or less profitable projects is the minimum government share of project revenues, or the 'effective royalty rate'. Under the entitlement regime, this minimum share results from the Hydrocarbon Extraction Fee and the effect of the cost cap limit combined with the profit-sharing fee. The cap on cost deductions, just like a royalty, secures up-front revenues to the government as soon as production starts by ensuring that there is always a minimum quantity of production revenue subject to the profit-sharing fee. The combination of these instruments provides a floor for the government share of project revenues, regardless of project profitability, offering host countries a form of revenue protection by ensuring that the government collects revenue as long as there is production. However, a high minimum government share of project revenues will increase the risk perceived by an investor: the recovery or payback period will be longer due to the lower amount of petroleum available for cost recovery, with an increased risk that not all costs will be recovered over the project life.

Table 2. Mexico: Minimum Government Revenue
(Percent of Project Revenues)

	Onshore	Offshore Shallow Water	Offshore Deepwater	Natural Gas	Chicontepec Paleochannel	2019-21 Measures
Minimum Royalty (percent of Production Revenue)	7.5	7.5	7.5	7.5	7.5	7.5
Cost Cap (percent of Production Revenue)	12.5	12.5	60	80	60	60
Profit Sharing Fee (percent of Production Revenue-Costs)	65	65	65	65	65	40
Effective Royalty Rate (percent)	**60.1**	**60.1**	**31.6**	**19.5**	**31.6**	**22.3**

Source: Hydrocarbons Revenue Law and Staff Estimates.

Note: This calculation assumes that the Hydrocarbons Extraction Fee or royalty is deductible from the base of the profit sharing fee. The formula for the effective royalty rate is therefore 'Royalty Rate+(1-Royalty Rate) *(1-Cost Cap Rate)*Profit Sharing Fee'. Note also that at current price levels of approximately $67/barrel, the royalty rate would be higher than the minimum rate, at around 10 percent ((0.125*60)+1.5). On July 23, 2021, the Mexican basket price was $67.88 per barrel.

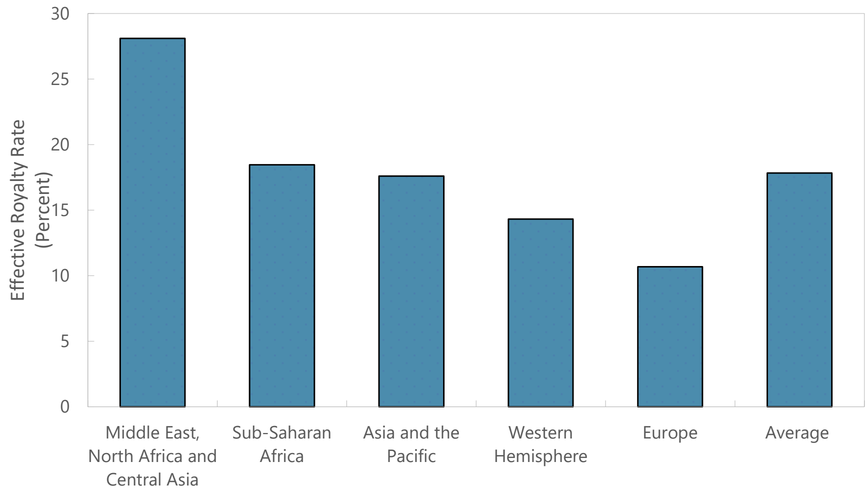
In the case of the onshore and offshore shallow water regimes, given the cost cap floors of $8.3 and $6.1 per barrel, for oil prices below $66.4 and $48.8/barrel respectively, the effective royalty rate would be lower than shown in the table, as the cost deductions would be higher than 12.5 percent of the oil price.

For onshore and shallow water offshore oil operations, the profit-sharing fee and associated cost cap have a highly regressive impact. Since Mexico is predominantly an oil producer, these terms are highly relevant to Pemex's current and future operations. The combined impact of the royalty and profit-sharing fee has the effect of a royalty of 60.1 percent (Table 2). Royalty instruments are regressive in their fiscal impact, falling most heavily on less profitable projects. Thus, while the regime might appear to generate a high level of government revenue at lower levels of profitability, it raises the risk of discouraging investment altogether. In the context of a state-owned sector, however, this regressive burden of taxation may have simply represented a transfer of revenue from Pemex to the state. But it is worth noting that, for private operators or from a purely profit-maximizing or commercial perspective, this regime may be too regressive to allow for investment to be undertaken on commercial terms.

Internationally, effective royalty rates or minimum government share of revenue levels vary significantly from country to country. However, Mexico's effective royalty rate for oil under

the entitlement regime is far above international norms. The average effective royalty rate in a sample of 63 countries surveyed is approximately 18 percent (Figure 6).

Figure 6. Average Effective Royalty Rates by Region—Oil



Source: IMF Fiscal Regime Library.

Increasing the cost cap and lowering the profit-sharing rate have the effect of reducing the regressive impact for onshore and shallow water offshore oil projects. Indeed, low cost caps combined with high profit shares increase the risk perceived by an investor as the recovery period will take longer. Therefore, increasing the cost cap and lowering the profit-sharing rate, and thereby reducing the minimum government share of revenue to 22.3 percent, may help to facilitate investment on commercial terms. As part of a comprehensive reform of Pemex's strategy, including modernizing its business plan as outlined earlier and thereby enabling decision-making on a commercial basis, such measures could incentivize investment by Pemex. They would similarly do so for private operators in a context where the playing field between Pemex and the private sector is levelled, as was envisaged under the 2014 reform.

Ringfencing

Fiscal payments made by Pemex under the entitlement regime are ringfenced by 'region'. Under the Hydrocarbons Revenue Law, payments under the entitlement regime as well as for income tax are ringfenced according to five 'regional' classifications: onshore, shallow water and deep-water areas, extraction of non-associated natural gas, as well as extraction in the Chicontepec Paleochannel, where exploration for unconventional hydrocarbons has taken place. This 'regional ringfence' also applies for income tax.

Ringfencing at a regional level rather than a licence or asset level may reduce the impact of the cost caps in encouraging cost efficiency, and will defer government revenue. Without reasonably tight ring-fencing at a licence or contract level, Pemex can deduct exploration or development costs for each new project against the income of producing projects (if they are not also constrained by the cost cap). New investments will therefore result in an immediate

reduction of taxable income on existing operations, and government revenue due from profit-based instruments such as the corporate income tax, or the profit sharing fee from producing areas will likely be delayed.

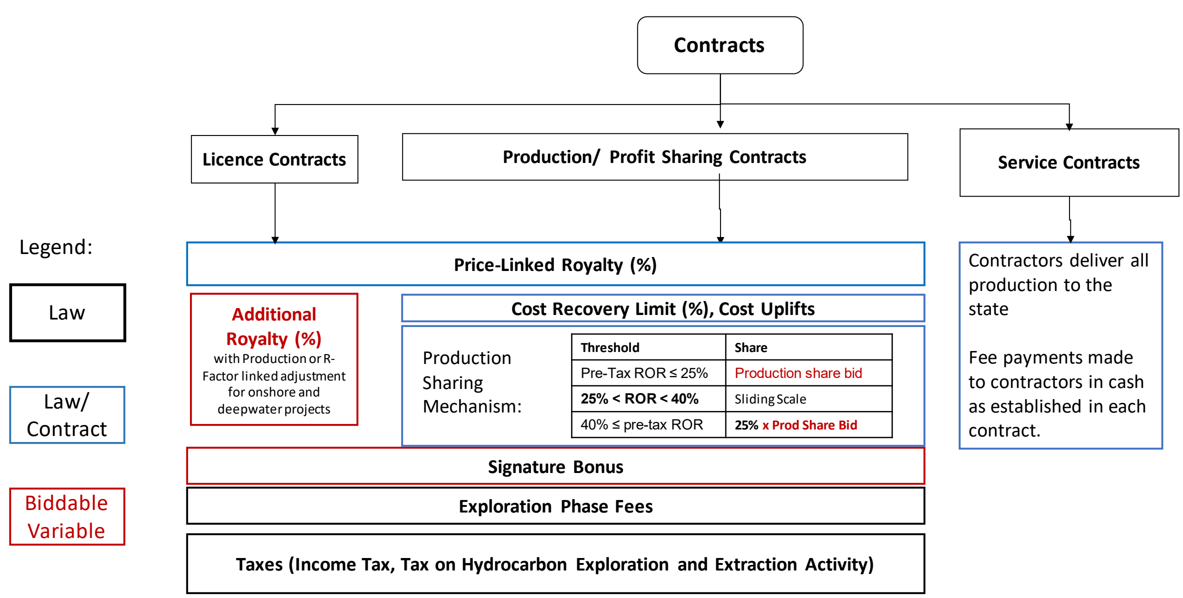
Contractual Regimes

Following the 2014 reform, the legal framework provided different contract types (license contracts, production-sharing contracts, profit-sharing contracts and service contracts), each implying different fiscal regimes. For each contract type, some of the terms were determined under the Hydrocarbons Revenue Law and specified in further detail in model contracts issued for each licensing round, and others were specified as biddable variables to be determined during the tendering process. Contract regimes appear to have a more balanced structure than the entitlement regime, comprising both production and profit-based instruments. The structure of each contract type is detailed in Figure 7.

The principal sources of variation in terms across contract areas are the choice of contract and the bid variable. The government has the flexibility to choose the fiscal system for each area tendered and the associated fiscal biddable variables.[14] A natural consequence of this design is that each contract awarded is subject to a slightly different fiscal regime.

From 2015 to 2018, license contracts were awarded for onshore and deep-water areas, and production sharing contracts were concluded for shallow water areas. However, following the reprioritization of energy policy toward Pemex since late 2018, there have been no further license contracts or production sharing contracts.

Figure 7. Mexico: Structure of Contractual Regimes



Source: IMF Mexico Fiscal Transparency Evaluation 2018.

[14] The transparency aspects of this issue were discussed in IMF (2018).

The 2019 measures sought to align the Pemex cost caps with the cost recovery limits of production sharing contracts (PSCs) that were concluded immediately prior. Given the focus on alignment with cost recovery limits of PSCs, licence contracts are not analyzed further in this note. The cost recovery limit under these production sharing contracts was set at 60 percent for oil contracts and 80 percent for gas, which align with the natural gas and deep-water oil cost caps for entitlements (Table 3). The cost recovery under the 2017 Ek-Balam contract,[15] which was specifically referenced in the SHCP circular, was also set at 60 percent. Therefore, it appears that the onshore and shallow water offshore entitlement regimes and associated cost caps were the primary focus of the measures.

The measures enacted in 2019 to lower the profit-sharing rate aligned it more closely with the minimum profit share levels under recent PSCs. Analysis of the results of bidding rounds 1, 2 and 3 suggests that the average first tier (government) profit share bid was 54 percent for shallow water oil PSCs— this aligns with the profit-sharing rate that was proposed for 2021 before it was reduced further to 40 percent in 2021. The average rate of 54 percent for the minimum government profit share will be used in the fiscal modeling analysis of the PSC regime below. However, the bids appear to have varied widely and further analysis of specific terms under signed contracts should be the subject of future analysis.[16]

Table 3. Mexico: Fiscal Terms—Production Sharing Contracts

Fiscal Term		
Cost Recovery Limit	60 percent (oil), 80 percent (gas)	
Cost Uplift	25 percent (on both exploration and development)[1]	
Production Sharing Mechanism	**Threshold**	**Government Production Share**
	Pre-Tax ROR ≤ 25 percent	(1-Contractor Production Share (Bid)
	25 percent < pre-tax ROR < 40 percent	Sliding scale
	40 percent ≤ pre-tax ROR	(1-25 percent × Contractor Production Share (Bid))
Hydrocarbon Extraction Fee (percent of value of hydrocarbons)	When oil price is less than $48 per barrel, 7.5 percent. When oil price greater than or equal to $48 per barrel, (12.5 percent*Petroleum price) + 1.5 percent	
Corporate Income Tax		
Rate	30 percent	
Depreciation	100 percent immediate expensing of exploration Costs, 4-year straight-line depreciation of development Costs	

Source: Staff calculations.

[15] https://www.gob.mx/cms/uploads/attachment/file/283510/Contrato_.pdf

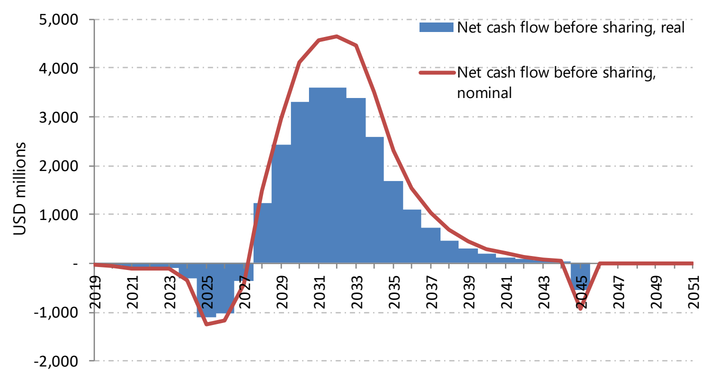
[16] It is also understood that the Ek-Balam contract has a much higher minimum government share of 70.5 percent. Further analysis would consider the mechanics of this PSC and the basis on which these terms were determined during the migration process.

C. Economic Modeling of Mexico's Petroleum Fiscal Regime

Economic modeling was undertaken using FAD's FARI modeling framework and a stylized offshore oil field example. The project example is stylized for illustrative purposes, although it is intended to reflect the broad cost structure of prospects that might be anticipated in the shallow water offshore Mexican waters.[17] However, there is likely to be significant variation in the cost structures and project economics of Pemex's current and future projects in Mexico, and as such the analysis which follows considers a number of possible variations in price and cost which might alter the ultimate project economics. With more detailed information on the economics of current and future Pemex projects (including for natural gas), the analysis could be refined further.[18]

Figure 8. Mexico: Economics of Project Example Evaluated

	MMBbl	Years
Total production	500	18
Project costs	**$MM**	**$/Bbl**
Exploration costs	400	0.80
Development costs excluding drilling	2,208	4.42
Drilling costs	1,977	3.96
Operating costs	3,998	8.00
Decommissioning costs	558	1.12
Total costs	9,141	18.3
Oil Price	$60/Bbl	
Pre-tax IRR	35.0 percent	



Note: All figures are in 2019 constant dollars.

A key variable underpinning the project economics is the oil price. The analysis uses a constant oil price of USD 60 per barrel. With these assumptions, the project yields a relatively high pre-tax IRR of 35 percent (Figure 8), i.e., a profitable project on a pre-tax basis.

The analysis is based on the perspective that investment decisions are being made on a commercial basis. The current fiscal regime applied to Pemex's shallow water offshore oil operations is compared with the 2019 and 2021 measures and the average terms of production sharing contracts.[19] Only the principal terms of the regimes, as detailed above in Tables 1 and 2 are modeled. Smaller surface area fixed fees are not modeled – these would constitute a fixed fee and have a relatively small regressive impact.

The regime is analyzed on a project level, and thus the impact of the consolidated ringfencing treatment applicable to Pemex is not analyzed. As such the benefit to Pemex in being able to

[17] See Pemex Investor Presentation, available at http://www.pemex.com/en/investors/investor-tools/Presentaciones%20Archivos/Investor%20presentation_20181106.pdf

[18] For example, recently Pemex announced that its operating costs fell to an average of USD 11.15 per barrel (a reduction of 20 percent between 2019 and 2020.

[19] The PSC regime is assumed to have a minimum government profit petroleum share of 55 percent.

offset new investment costs against revenue from currently producing fields is not reflected in the results. Further work could consider the impact of the consolidated tax treatment at the 'regional' level, and the beneficial impact of moving to ringfencing at an asset level, even under the current Pemex regime.

Revenue Generating Capacity

The revenue generating capacity of each fiscal regime was evaluated by estimating the Average Effective Tax Rate (AETR) or "government take". The AETR is defined as the ratio of government revenue from a profitable project to the project's pre-tax net cash flows and is calculated both in undiscounted and discounted terms using a discount rate of 10 percent. Figure 9 shows the AETR of the regimes, while Table 4 shows the key results.

At the assumed price and cost levels, the entitlement regime renders the project unviable. Under the entitlement regime with the 12.5 percent cost cap, the project is clearly unviable with an AETR of well over 100 percent, and a 6.8 percent investor IRR. It should be noted that this may be partially ameliorated by the regional ringfencing treatment which would allow these costs to be recoverable from other projects, unless they are also constrained by the cost cap.

Figure 9. Mexico: Average Effective Tax Rate—AETR for Selected Regimes

Discount Rate 10.0 Percent

Note: Project Description: Size: 500 MMBbl; Costs: $18.3/Bbl (real); Oil price: $60.7/Bbl (real); IRR pre tax: 35 percent. AETR is expressed in undiscounted as well as discounted net present value (NPV) terms at 10 percent discount rate to account for time value of money, and the government's opportunity cost.

Table 4. Mexico: Key Results

Project Fiscal Results *(% or US$ mm real 2019 terms)*	Entitlement Regime	Entitlement Regime - 2019 Reforms	Production Sharing Regime
Pre-Tax project IRR	35.0%	35.0%	35.0%
Post-tax IRR on total funds	6.8%	20.9%	18.5%
Post-tax IRR on equity	9.0%	32.1%	29.6%
Pre-tax NCF undiscounted	20,844	20,844	20,844
Post-tax investor NCF undiscounted	1,944	7,478	5,839
Government Revenue undiscounted	18,779	13,245	14,884
AETR undiscounted	90.1%	63.5%	71.4%
Pre-tax NCF (10% discount)	5,267	5,267	5,267
Post-tax investor NCF (10% discount)	-350	1,449	1,024
Government revenue (10% discount)	5,510	3,711	4,136
AETR (10% discount)	104.6%	70.5%	78.5%

Source: Staff calculations.

The analysis of the entitlement regime would therefore support the notion that the tax burden is constraining Pemex's ability to invest. For projects comparable to the example analyzed, operating on commercial terms—be it private sector companies or otherwise—implies that it is unlikely to be profitable to explore and develop petroleum resources under these fiscal terms. The fiscal regime may thus be restricting the possible returns to investment and the availability of capital.

Increasing the cost cap and reducing the profit-sharing rate does significantly improve the viability of the project. With the increased cost cap and reduced profit-sharing rate (at 40 percent), the discounted AETR falls significantly to 70.5 percent, with an investor IRR of 20.5 percent.

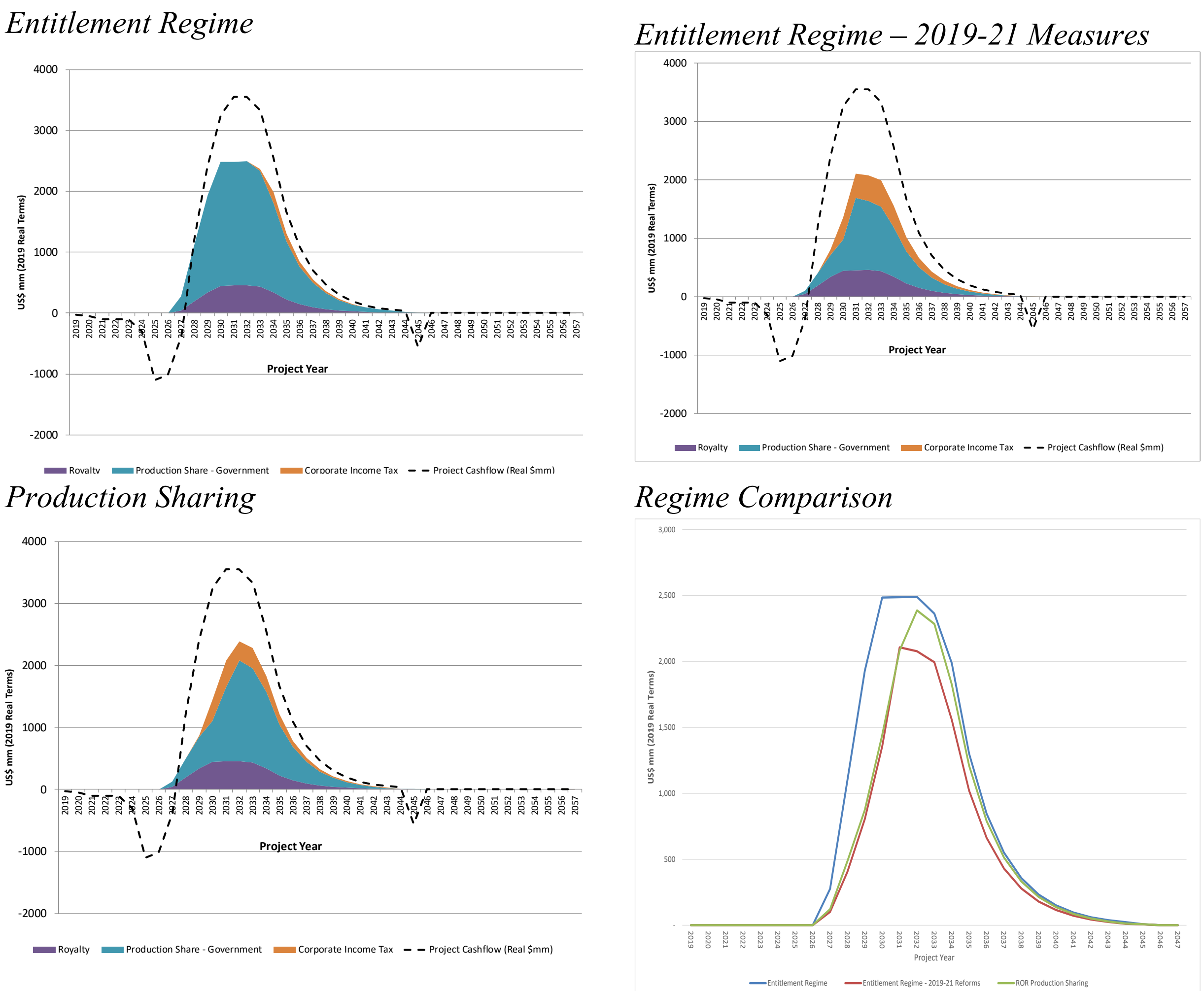
The project is also viable under the PSC regime. The PSC regime generates an AETR of 78.5 percent, with a post-tax IRR of 18.5 percent. The higher AETR relative to the reformed entitlement regime is primarily a reflection of the higher minimum profit sharing rate (assumed at 54 percent) under the modeled PSC regime.

Profile of Government Revenues

Looking at the profile of government revenues, under the entitlement regime, government takes significant revenues from the commencement of production. Figure 10 displays the profile and composition of revenues collected by the government from royalty, profit sharing fee or production sharing and corporate income tax. The profile of government revenue mainly reflects the production profile of the project evaluated. While under all three options the government starts receiving revenue from day one of production (due to the royalty and minimum production share/profit sharing fee), the government take from early cashflows is especially high in the case with the 12.5 percent cost caps. Raising the cost cap to 60 percent and lowering the profit sharing rate to 40 percent provides relief to the investor in the early

years of the project while it is recovering its investment. This effect is also seen in the case of the production sharing system, where the uplifts on exploration and development costs provide further relief to the investor during the investment recovery period.

Figure 10. Mexico: Government Revenue Profile and Composition



Source: Staff calculations.

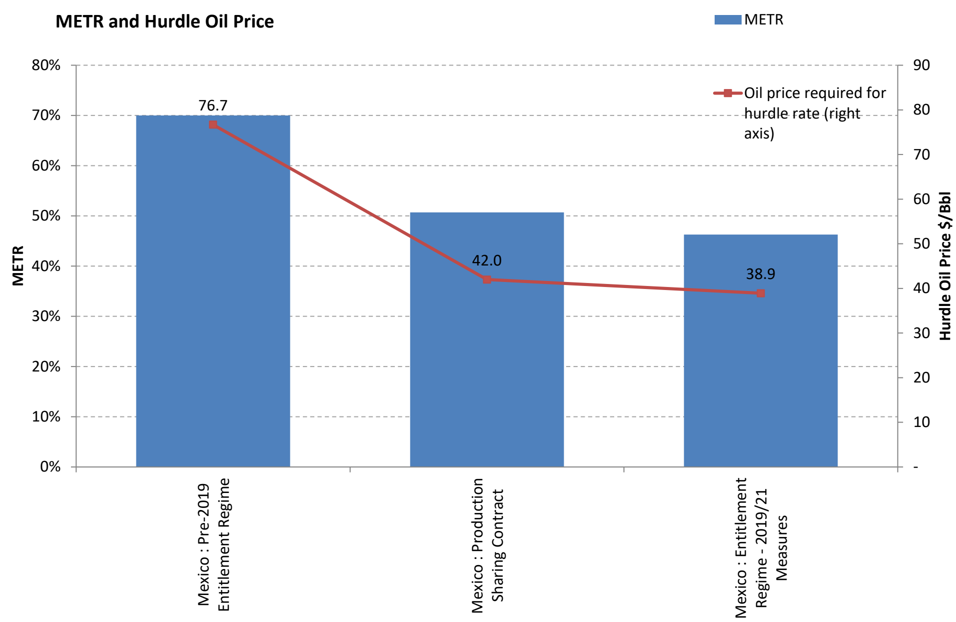
Neutrality

The analysis also compared the relative burden that the different options would put on a marginal project. A key indicator is the "breakeven price" or the minimum price required to meet the minimum after-tax rate of return required by the investor (assumed in the model to be 12.5 percent in real terms).[20] As expected, for the entitlement regime, driven by its highly regressive nature, the breakeven price is well above current price levels at USD 76.7/barrel (Figure 11). In contrast, by reducing the regressive fiscal burden, the entitlement regime with

[20] This rate would of course vary by country, depending on the risks to be faced in the exploration and development of potential projects in Mexico.

increased cost cap and lower profit-sharing rate, and the production sharing regime display breakeven prices more in line with current market trends and expectations.

Figure 11. Mexico: Breakeven Price



Source: Staff calculations.

Progressivity

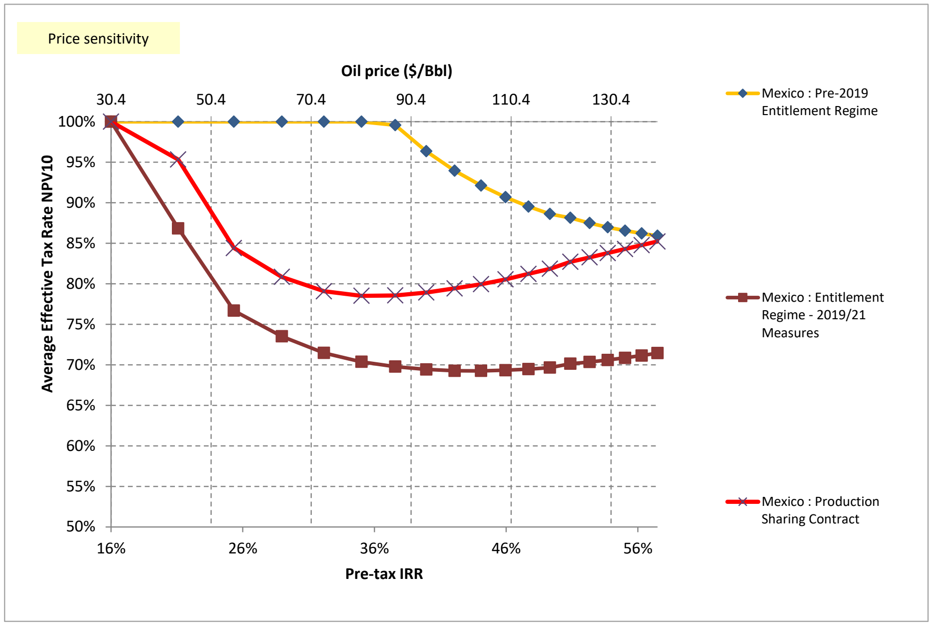
The analysis then considered how the AETR varies over a range of project outcomes. Progressive instruments in the fiscal regime would yield a higher share for the government as the profitability of the project increases, offsetting the impact of the regressive instruments. Figure 12 below illustrates the AETR over a range of project pre-tax IRRs. The variation in project pre-tax IRR was obtained by varying oil prices and the unit costs of the projects, respectively.

While increasing the cost cap and reducing the profit-sharing rate reduces the regressivity of the entitlement regime, without a substantive progressive component, the AETR falls as profitability increases. In contrast, under the PSC regime, while the AETR initially falls as profitability increases due to the dominance of its regressive components, this effect is counteracted by the progressive components once profitability increases enough to trigger the higher tiers of the production sharing mechanism.

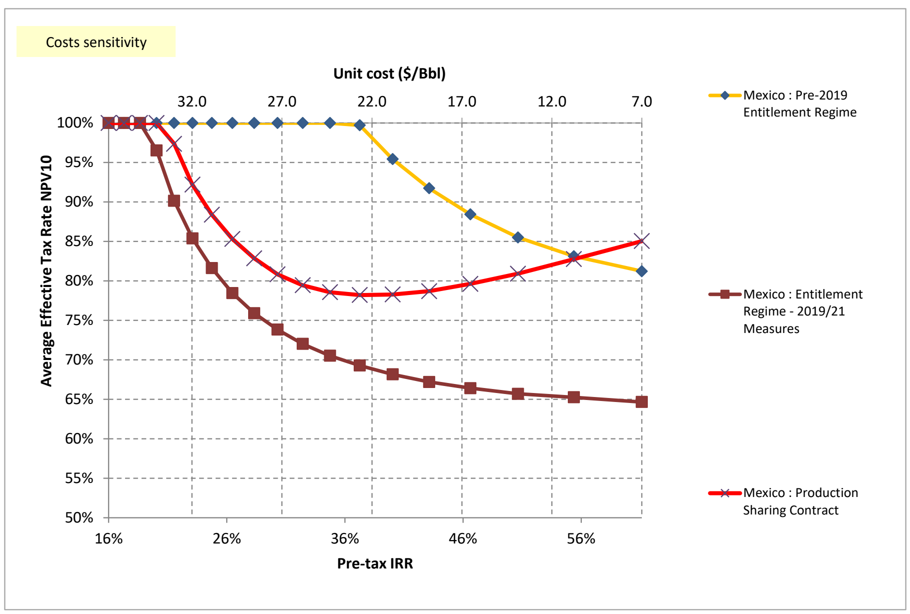
The results imply that a wider range of projects could be developed commercially under the reformed entitlement regime and the PSC regime. Although it appears that government take from an individual project would be lower under the PSC and the reformed entitlement regime at lower levels of project profitability, it is important to recall that such projects, if based purely on commercial viability, would not be developed at all under the current entitlement regime, and so no government revenue would be available.

Figure 12. Mexico: Progressivity

Price Sensitivity



Cost Sensitivity



Source: Staff calculations.

International Comparison

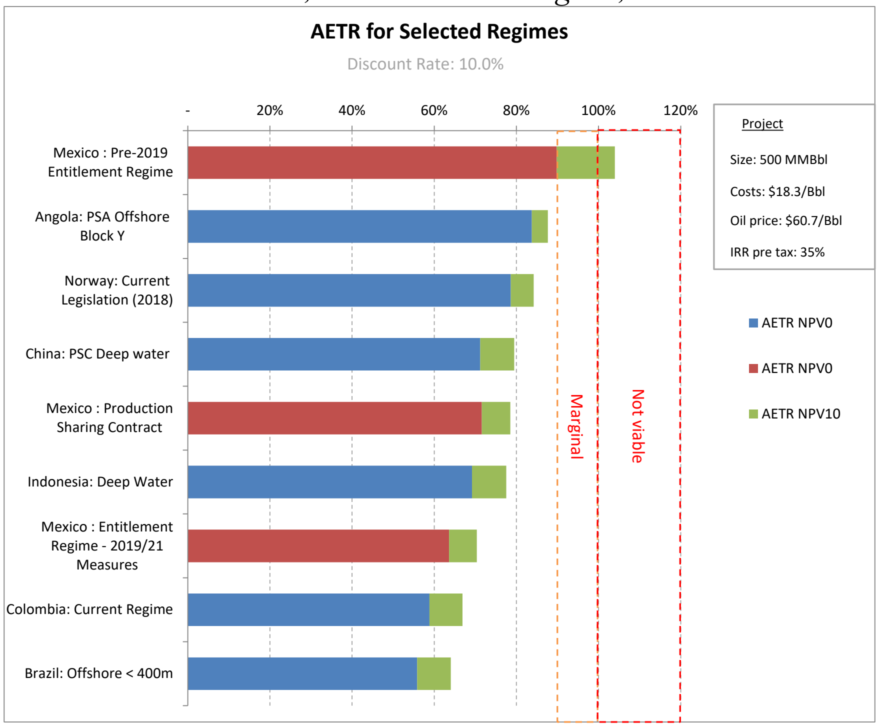
The Mexican regimes were compared with fiscal regimes applicable in other petroleum producing countries from the region and globally (Figures 13 and 14). Some of the comparators included in the sample are terms in established producers (Angola, Norway, Indonesia), while others are producers in the region (Colombia, Brazil). Under their fiscal

regimes, these comparator countries use a range of production sharing and additional profits tax mechanisms to capture resource rents.

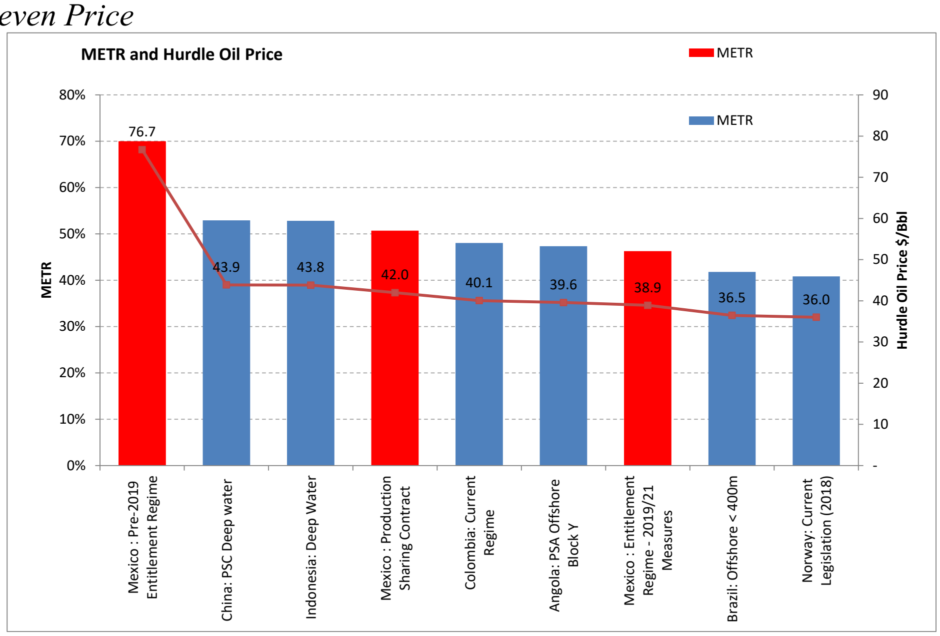
The pre-2019 entitlement regime places a significantly higher burden on projects than the other countries in the sample. In contrast, the PSC and the reformed entitlement regime places Mexico better in line with the sample in terms of neutrality, while still maintaining a comparable government share of revenue. In terms of progressivity, the PSC regime places Mexico in line with other regime with production sharing linked to profitability indicators such as the Angolan rate of return linked production sharing system, or those with additional profit tax mechanisms such as the Norwegian Special Petroleum Tax.

Figure 13. Government Tax and Breakeven Price—International Comparison

Government Revenue and AETR; AETR Selected Regime; Discount Rate 10 Percent



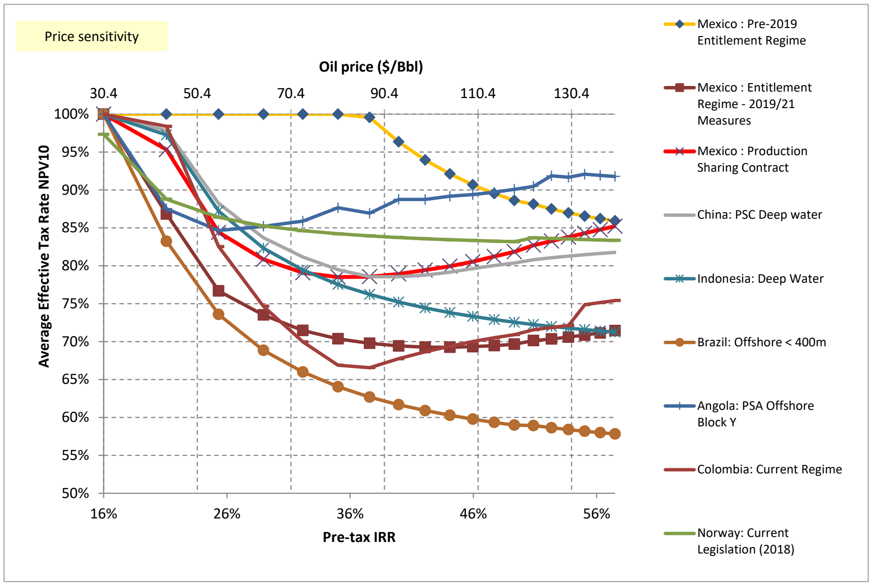
Breakeven Price



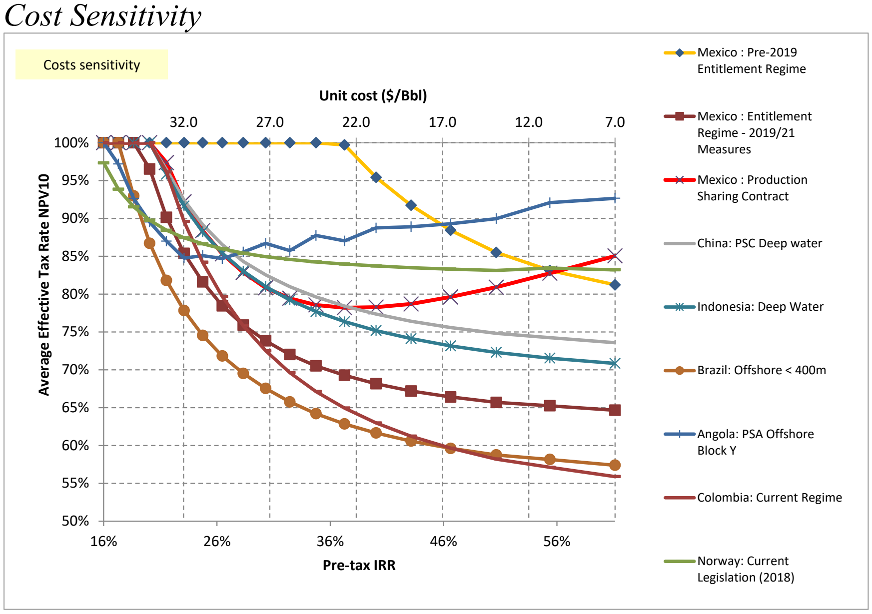
Source: Staff calculations.

Figure 14. Progressivity—International Comparison

Price Sensitivity



Cost Sensitivity



Source: Staff calculations.

It remains challenging to assess the macro-level revenue implications of these efforts without detailed asset-level information for each entitlement. Given the number and range of different assets held by Pemex, it would be necessary to understand the size, stage of development, and financial position of each asset —the increase in the cost cap will provide more relief for those fields which are still recovering large capital investment costs, than those which have already recovered capital investment costs and now are only incurring operating costs. Similarly, the distribution of assets within and across the regional ringfencing of entitlements—the basis on which the cost deduction and profit sharing calculations are made—will determine the broader revenue impact and effectiveness of the

recent measures. The government estimates that the combined effect of the 2019 and 2021 measures will reduce government revenue from the Pemex fiscal regime by MXN 78 billion in 2021, and MXN 83 billion in 2022 (around 1.5 percent of government budgetary revenues).

Further consideration should be given to ringfencing Pemex's operations at an asset level to encourage greater cost efficiency in the development and operation of project. The current regional ringfencing, which allows cost from less efficient projects to be offset against income from producing fields, may not be providing sufficient incentives for cost containment.

D. Implications of Climate Change Mitigation Efforts

As noted in the introduction, these discussions are taking place against a backdrop of global climate change mitigation efforts. While significant uncertainty surrounds the future baseline growth of fossil fuel use and the impacts of mitigation on fossil fuel production and prices, coal and oil production are expected to fall the most over the medium to long run, with the share of natural gas in fossil fuel consumption likely increasing given its somewhat lower carbon emissions.

Since the fiscal regime forms part of the cost of extraction, differences in countries' fiscal regimes will also influence production decisions. Countries face a trade-off between production and revenue objectives in the transition to a future with lower fossil fuel production and prices – a choice between reducing the government take to compete for a declining pool of investment or to maximize revenue from remaining production from assets that have already been developed. While Mexico sits towards the lower end of the global oil cost curve, it too will ultimately face a trade-off between production and revenue objectives in the transition to a future with lower fossil fuel production and prices.

If the priority is to attract new investment, a fiscal regime that adapts more flexibly to a range of profitability outcomes (that is, more emphasis on profit-based fiscal instruments) would adjust better to declining economic rents. On the other hand, if the priority is to maximize revenue from existing assets, a greater reliance on production-based taxes (such as a royalty or minimum petroleum share) would provide more certainty about revenue during the transition period.

E. Summary Findings for the Petroleum Regime

The analysis presented in this section suggests that, in the context of a comprehensive reform of Pemex's business strategy, measures to increase the cost cap and lower the profit-sharing rate reduce the regressivity of the petroleum fiscal regime and, by increasing the return to Pemex, should improve its ability to undertake new onshore and shallow water oil projects on a commercial basis and increase its available cashflow for additional investment.

However, the analysis shows that even with the increased cost cap and reduced profit-sharing rate, the regime does not contain sufficient progressive instruments to allow the government to share in the upside from new developments, a desirable characteristic of petroleum fiscal regimes.

With any increase in cost caps, other mechanisms should be put in place to mitigate the risk of cost inflation. These would include: (i) careful screening by CNH of Pemex's projects, budgets and work plans; (ii) regular high-quality cost and fiscal audits (which should be required by CNH and SAT, the Tax Administration Service); and (iii) competitive, transparent procurement procedures for subcontractor services. In addition, ringfencing Pemex's operations at an asset level when calculating fiscal payments is likely to encourage greater cost efficiency in the development and operation of its projects. The provision of tax relief such as the 2019-21 measures should also ideally be contingent upon strategic and governance reform within Pemex. Ultimately, through the migration process, private sector participation through farmouts can provide a mechanism for cost oversight and incentivize cost containment.

V. Conclusions

Amid several factors—elevated commodity prices, Mexico's large extractive industries, the financial challenges of Pemex that will lower the net fiscal revenues from Pemex and that could imply continued weak investment by Pemex, and the imperative for greater government revenues to finance needed social spending and quality public investment over the medium term—this paper has put forward considerations for the review and potential reform of the fiscal regimes for mining and petroleum. To be clear, such a review and reform ought to be considered in the context of a comprehensive approach to Mexico's challenges. This includes, in particular, a change in Pemex's business strategy to focus production only in profitable fields, sell non-core assets, make decisions on refining and investment on commercial terms, partner with private firms that can bring specialized expertise and financing, and undertake governance and procurement reforms. More broadly revisiting the role of private investment in the energy sector is advisable, not least to limit the burden of adjustment falling squarely on the fiscal accounts.

As regards the mining fiscal regime, the analysis suggests that there is room to increase the overall tax burden through a redesign of the system while minimizing the effect on competitiveness—for instance, through a moderate increase in the royalty rate, combined with refinement of the additional rent tax to better tax resource rents. Such a redesign could seek to achieve an appropriate balance between production and profit-based instruments, so as not to excessively distort production decisions and to allow the government to share in the upside of mining projects. While the revenue increase would be relatively small—nearly doubling from 0.1 percent of GDP to 0.2 percent of GDP in the illustrative scenario presented—it would bring Mexico closer to peers and allow the government to share in the upside of mining projects, a germane issue in the context of elevated metals prices.

As regards the petroleum fiscal regime, incentives to invest under the pre-2019 regime are low when viewed from a commercial lens. In the context of a comprehensive reform of Pemex's business strategy, the 2019–21 measures to increase the cost cap and lower the profit-sharing rate reduce the regressivity of the regime, raising the attractiveness and the possibility of additional investment. Consideration should be given to enhancing the use of progressive instruments—associated with more-profit-based instruments than to production-based taxes—to allow the government to share in the upside from new developments. Broader consideration should also be given of climate change mitigation aspects that has taken on greater significance, and in this regard use of more flexible profit-based instruments could also be appropriate.

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