Pemex and the resource curse

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DIW Berlin

July 10, 2018
Overview

1. The natural resource curse
2. Symptoms in Mexico: Oil sector
3. Pemex before the reform
4. The 2013 energy reform
5. Prospects: Pemex after the election
Natural resource curse

- **Natural resource curse:** Natural resource endowed economies tend to grow less rapidly than those without [Sachs and Warner, 1995].

- **Explanations:**
  - **Dutch disease (structuralist):** Three sectors. Large gas reserves found 70s → unemployment increased 1-5% & corporate investment tumbled. Exports made the guilder stronger → less competitive exports.
  - **Rent seeking behavior:** Subject to more extreme rent-seeking behavior, politics oriented to grabbing rents [Lane and Tornell, 1996].
  - **Corruption and institutional quality:** Existing poor quality institutional arrangements → wealth-grabbing & inefficient distribution. [Sala i Martin and Subramanian, 2003].
  - **Resource drag:** Weaker growth in the resource sector.
Symptoms of the curse in Mexico’s oil sector

- **Resource endowed (I)?:**
  - Mexico has had, and still has significant reserves potential
  - However, the downward trend in total reserves as well as production partly motivated 2013 Reform
  - The RP ratio of crude oil equivalent in 2018 for 1P reserves is 9 years and 25 for 3P (CNH, 2018)
  - Pemex holds 95% of Mexico’s reserves & prospective resources

### Resources and Reserves: Hydrocarbons in Mexico.

<table>
<thead>
<tr>
<th>Type</th>
<th>Oil</th>
<th>Gas</th>
<th>Crude Oil eq.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(MMMb)</td>
<td>(MMMcf)</td>
<td>(MMboe)</td>
</tr>
<tr>
<td>Resources</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>69.2</td>
<td>217.9</td>
<td>112.8</td>
</tr>
<tr>
<td>Conventional</td>
<td>37.3</td>
<td>76.4</td>
<td>52.6</td>
</tr>
<tr>
<td>Unconventional</td>
<td>31.9</td>
<td>141.5</td>
<td>60.2</td>
</tr>
<tr>
<td>Reserves</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>19,420</td>
<td>30,020</td>
<td>25,467</td>
</tr>
<tr>
<td>Proved</td>
<td>6,464</td>
<td>10,022</td>
<td>8,484</td>
</tr>
<tr>
<td>Probable</td>
<td>5,817</td>
<td>9,356</td>
<td>7,678</td>
</tr>
<tr>
<td>Possible</td>
<td>7,139</td>
<td>10,643</td>
<td>9,305</td>
</tr>
</tbody>
</table>

Source: National Hydrocarbons Commission (2018), Reserves Report 2018
Resource endowed (II)?: Downward trend in proved reserves

Mexican hydrocarbon reserves
(proved reserves, million barrels of oil equivalent)

Source: own elaboration with data from the SIE (System of Energy Information).
Symptoms in Mexico: Oil sector

Symptoms of the curse in Mexico’s oil sector II

- **Resource endowed (II)?:**
  - In 2002 ranked as the world's fourth largest oil producer (now not even in the top ten).
  - 1990-2010: 7% of GDP, 30% of government revenue (21% in 2016)
  - Oil prod. has been declining since its peak in 2004, exports follow

![Crude oil production and Export volume charts](source: own elaboration with data from the SIE (SENER).)

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Pemex and the resource curse

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The hydrocarbon trade balance has also deteriorated with increasingly low export prices of crude oil and higher import prices of oil products (e.g. gasoline).
Corruption and institutional quality/rent seeking?:

From 2003 to 2012, more than 100 contracts (worth 8% of Pemex’s income) involved irregularities. [Guerrero, 2016]

Source: World Bank (2017), World Development Indicators
Symptoms of Dutch disease?:
- Oil export growth $\rightarrow$ overvalued currency $\rightarrow$ non-oil products less competitive (manufacturing & agriculture) [Mirovitskaya, Teichman, 1988, Esteva, 1983].
- Mexico has a relatively diversified economic structure.

**Graphs:**
- Manufacturing Sector in Mexico (value added, % of GDP)
- GDP per capita, PPP (constant 2011 international $)

Source: World Bank, World Development Indicators
**Symptoms of the curse in Mexico’s oil sector VI**

**Resource drag?:**

- Monopoly: lack of competition
- Fiscal dependency trap
  - Low investment levels within PEMEX: Capital investments needed approval from the Ministry of Finance (SHCP) and Congress.
  - Before reform, PEMEX could not issue equity capital nor borrow money by selling bonds
- High labor costs: union collective contract + approx. 100 billion pension liability + high number of employees

Source: own elaboration
Symptoms of the curse in Mexico’s oil sector VII

- **Sustainability in resource endowed economies:**
  - Hartwick rule: constant level of consumption can be sustained if value of investment equals value of rents at each point in time. (Hardwick, 1977)
  - Oil revenues used to escape the curse: stabilization, savings, investments.
  - Mexico 2000-2014: largest revenue share not directed at stabilization, savings and no conclusive evidence for investments. (Sanchez, 2016)
  - While Stabilization Fund (established in 2000) used at crucial points, the largest part of 2000–2014 oil revenues not directed toward stabilization: Only 2.6%.
  - Instead, close to half to current expenditures (ibid)
  - New Oil Fund for Stabilization and Development flawed by institutional design?
Symptoms of the curse in Mexico’s oil sector VIII

Resource drag?:

- **Progressiveness of the fiscal policy (taxes + public expenditures):**
  - In isolation Mexican tax system is moderately progressive (before vs. after tax/expenditures)
  - When compared to a baseline where each citizen is entitled to a share of oil revenues, Mexico’s fiscal policy is regressive. (Segal, 2012)
  - Net effect: a transfer of oil entitlements from the bottom 90% to the richest 10% (Segal, 2012)
Pemex' production (tbd)

Pemex before the reform

**Pemex: Labor costs and other operational inefficiencies**

- High labor costs associated with union workers pensions (50% of debt) is one of the reasons why Pemex has been running on losses.
- In 2013, Mexico employed 154,774 individuals; two times Exxon Mobil, Shell and BP, three times Petrobras, six times Statoil. (Pemex Statistical Yearbook, 2016; CIDAC, 2013)
- Labor productivity (see Figure below) is also lower in comparison to other oil companies.

![Graph showing employees and production per worker]

Source: own elaboration with data from the SIE

Source: CIDAC (2013)
Pemex before the reform

Pemex: Tax regime and financial restrictions

- Pemex tax burden has been historically high: 50-65% of income, limiting cash flow for investment
- For several years, PEMEX generated positive pre-tax profits but after-tax losses

Fiscal regime of Pemex.

<table>
<thead>
<tr>
<th>Before 2005</th>
<th>After 2005</th>
<th>After 2008</th>
<th>After 2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Taxes based on income</td>
<td>• Improved because</td>
<td>• Simplified fiscal</td>
<td>• Simplified fiscal regime</td>
</tr>
<tr>
<td>Income tax (DEP)</td>
<td>more taxes based on net earnings than gross sales</td>
<td>regime</td>
<td>• Increased cap for capital cost deductions</td>
</tr>
<tr>
<td>Special tax on extraction (DEEP)</td>
<td></td>
<td>• Mainly based on net income</td>
<td></td>
</tr>
<tr>
<td>Right on oil extraction (DAEP)</td>
<td></td>
<td>• States get a share of oil revenues</td>
<td></td>
</tr>
<tr>
<td>• Tax on oil returns (ISRP)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Sales tax (IEPS)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Hydrocarbon right (DSH)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Own elaboration with data from Carreon-Rodriguez & Rosellon (2012) and Moody’s (2017)
Capital spending and legacy of under investment

Financial restrictions of PEMEX negatively affected investment in exploration, development and technology, ultimately affecting reserve placement and production. (Carren-Rodriguez & Rosellon, 2012)

- PEMEX annual budget (and financing program) part of Mexico’s government budget
- Budget approval needed from SHCP and Congress
- Project approval before 2008 after 2008 reform
- Reform of 2008: permitted performance based service contracts (contractors paid for services and do not get rights to sell or buy oil produced).
Pemex’s performance

Pemex performance and finances
(nominal million pesos)

Source: own elaboration with data from Pemex’ balance sheets
The 2013 energy reform

**Objective:** opening the upstream O&G industry to competition and private investment.

- Exploration and production rights without private ownership of reserves
- Pemex joint ventures (farmouts)
- Conversion of existing E&P service contracts to production sharing agreements
- New upstream contracting model

- Fuel price ‘liberalization’
- Fuel market liberalization: imports and retail

New legal framework and Institutional arrangement

- Constitutional changes
- 22 laws, 25 regulations
- 4 new institutions
  - ASEA
  - FMP
  - CENAGAS
  - CENACE
- 2 strengthened regulators
  - CNH
  - CRE
- State productive enterprises
- Contractors
The 2013 energy reform

Upstream contracting model

**ASIGNATIONS/ENTITLEMENTS**

Allow contractor to keep in-kind production to cover costs and their share of operating profit. Deliver remaining production to a marketing firm hired by CNH.

**PRODUCTION SHARING AGREEMENTS**

Require contractor to deliver all of its production to CNH’s marketing firm. FMP paying it its share of profits.

**PROFIT SHARING CONTRACTS**

Contractor sells hydrocarbons extracted to Mexican government at a price stipulated in the contract

**SERVICE CONTRACTS**

Have a right to minerals extracted after paying a variety of fees to Mexican government

**LICENSE CONTRACTS**

Payment: % of production

Payment: % of profit

Payment: fees + onerous transmission of hydrocarbons

Payment: cash
The 2013 energy reform and Pemex

- Pemex becomes a 'State Productive Enterprise'

- Investment: The congress determines and approves budget for Pemex, but Pemex has autonomy to distribute and invest in projects

- Tax burden: Lower tax rate for PEMEX, but government can continue drawing on the state oil company’s profits for national purposes despite PEMEX official status as autonomous firm
  - Constraining PEMEX long term investment plans

- Pemex CEO says it must move to IPO (like Saudia Arabia’s Aramco), but it will take years: Protect Pemex against politicians bad decisions by having a new equity investor.
Reform implementation upstream

Five year bidding program (open bidding process, more) for a portfolio of exploration and development blocks offshore and onshore

Round 0
Entitlements

PEMEX keep productive O&G fields and exploration areas with undertaken activities and investment.

83% of 2P reserves
21% of resources

Round 1
Contracts

1.1 Exploration shallow
2/14 contracts
1.2 Extraction shallow
3/5 contracts
1.3 Extraction onshore
25/25 contracts
1.4 Exploration deep-w
8/10 contracts

Round 2
Contracts

2.1 Exploration, shallow
10 contracts
2.2 Exploration, extraction onshore, 10 contracts
2.3 Exploration, extraction onshore, 14 contracts
2.4 Exploration, extraction deep waters, 19 contracts

Round 3

3.1 Exploration, extraction shallow
3.2 Exploration, extraction, onshore
3.3 ....
3.4 ....

R4

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16% of 2P reserves and 78% of resources available for bidding.

Source: own elaboration with data from the CRE, CNH and the Ministry of Energy
Oil production after the 2013 Reform (tbd)

- Total
- Entitlements (Pemex)
- Contracts (Private)

## Pemex and Petrobras: A comparison

<table>
<thead>
<tr>
<th></th>
<th>Brazil (Petrobras)</th>
<th>Mexico (Pemex)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Government take/incomes</strong></td>
<td>Government take represents between 25% and 50% of revenues, albeit with a clear declining trend in recent years.</td>
<td>Government take is the majority share of the incomes, between 50% and 65%. Stable trend throughout the period but with uncertainty due to deterioration in the performance of the company from 2014.</td>
</tr>
<tr>
<td><strong>Total investment/incomes</strong></td>
<td>Investment represents a high percentage of revenue, consistently over 50% with peaks of 80%. This trend continues throughout the period, although with variations.</td>
<td>Investment represents a very low percentage of revenue, remaining under 20% during the period, albeit with a slight increase in recent years.</td>
</tr>
<tr>
<td><strong>Evolution of proven reserves (2002–2014)</strong></td>
<td>193% increase in proven reserves of gas 165% increase in proven reserves of oil</td>
<td>41% drop in the proven reserves of oil and gas</td>
</tr>
</tbody>
</table>

Source: Ramírez-Cenderro & Paz (2017)
The first challenges of the reform implementation: upstream auctions

- Collapse in oil prices since mid-2014 → energy companies postponing upstream oil investments

- Lessons: better understand the prospectivity of the blocks offered, understand effects of allowing Pemex bidding and having it withdraw in the last minute, impact of guidelines and contractual clauses, better understanding of appetite for exploratory risk at different oil price conditions (Lajous, 2015)
The fund receives, and manages (transfers & invests) all non-tax revenue from new contracts and assignments. It transfers payments to contractors (under profit sharing contracts).

Functions:
- Administer the state income from oil rents
- Constitute and administer a Reserve for long term savings
- Administer financial and calculation aspects of contraprestaciones/compensations

Institutional arrangement:
- Trustee: Central Bank, highly trusted institution
- Trustor: Ministry of Finance
- Committee: three State representatives & four independent (nominated by Executive, approved by 2/3 Congress)
The 2013 energy reform

The Mexican Petroleum Fund (FMP): Flawed by institutional design?

- Input (income) to the FMP:

```
Entitled entities (State enterprises) → Payment of rights to the state → Mexican Petroleum Fund (FMP)

Contractors
- State enterprises
- Mexican corporations

Hydrocarbon Extraction & Exploration

Hydrocarbon Production

In kind payment

Payment of rights to the state

State Marketeer

Income from sales

Calculates & transfers payments to contractors

Source: based on FMP (2015)
```
The Mexican Petroleum Fund (FMP): Flawed by institutional design?

However, the Reserve of the Fund may be limited according to the Law of the FMP: Not following the Hartwick rule

Output (transfers & savings) of the FMP (Articles 8 and 16 LFMP):
In 2017, the Long Term Savings Reserve received resources for the first time, after three years of operation.

<table>
<thead>
<tr>
<th>FMP Transfers to Funds, Treasury and Long-term Savings (million pesos)</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total transfers to Treasury and Funds</td>
<td>398,805</td>
<td>307,920</td>
<td>442,875</td>
</tr>
<tr>
<td>Percentage of GDP</td>
<td>0.0%</td>
<td>1.6%</td>
<td>2.2%</td>
</tr>
<tr>
<td>Oil Revenue Excedent (Bruto)</td>
<td>0</td>
<td>0</td>
<td>55,972</td>
</tr>
<tr>
<td>Oil Revenue Excedent (Neto)</td>
<td>0</td>
<td>0</td>
<td>17,906</td>
</tr>
<tr>
<td>Percentage of GDP</td>
<td>0.09%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Prospects after the election: AMLO

Campaign proposals:

- Building refineries
- Freezing gasoline prices
- Reviewing contracts of the 2013 reform, before -any- cancellation of the reform
- Fight corruption
- Impulse renewables, CELs market
- Carbon market that impulses local development and reduces poverty

Qualified by the team:

- Gasoline prices will continue to increase with inflation, likely to use current softening policy (no change?)
- Romo (chief of staff): Oil reform is set to stay
Prospects after the election

- Continuing with revisions
  - Respect contracts, review of conditions
  - Costs (political/electoral):
    - Contradicting early campaign declarations
    - Alienate extreme left coalition members
  - Benefits:
    - May benefit of increased production & success
  - Compatible with AMLO social spending agenda
  - Focus on other aspects?
    - Labor, pensions, corruption?

- Pausing
  - Pausing new bids

- Slowing down
  - Slowing down new bids

- Canceling reform
  - Canceling?
    - Declarations: respect contracts
  - Feasible: executive + congress
  - Costs (political/electoral):
    - Economic uncertainty
    - Fund Pemex w/ state budget, debt, sell-off assets
  - Benefits (political):
    - In line w/ early campaign declaration
    - Coalition members
  - Not compatible with social spending agenda
Thank you for your time!
Pemex Capex

Pemex CAPEX
(million pesos)

Notes: PIDIREGAS are long-term productive infrastructure projects. Non-Pidiregas: budgetary investments. Includes upstream maintenance expenditures.

Source: own elaboration with data from Pemex Statistical Yearbooks
NAFTA timeline

NAFTA milestones:

- Canada-U.S. Free Trade Agreement takes effect
- NAFTA enters into force
  - U.S. eliminates tariffs on Mexican beef, corn, pork, poultry, and many other agricultural products
  - Mexican automotive products gain unfettered access to Canada and the U.S.
  - Mexican tariffs on U.S. and Canadian autos drops from 20 to 10%
- Canada eliminates tariffs on Mexican flour, meat, and sugar
- Elimination of remaining U.S.-Mexico sugar tariffs
- NAFTA signed by U.S. President George H.W. Bush, Mexican President Carlos Salinas de Gortari, and Canadian Prime Minister Brian Mulroney
- NAFTA legislation signed into law by President Clinton
- Mexico eliminates tariffs on many U.S. fruits
- U.S. eliminates tariffs on Mexican cotton and wheat
- Most remaining U.S.-Canada agriculture tariffs phased out
- Mexico eliminates tariffs on U.S. dairy, pork, rice, and wheat
- U.S. eliminates tariffs on Mexican dairy, rice, and other vegetables
- Mexico eliminates remaining tariffs on U.S. and Canadian cars and auto parts
- Elimination of remaining Mexican tariffs on U.S. and Canadian corn and Canadian tariffs on Mexican corn

Sources: “Nafta Revisited” (Hufbauer/Schott), NAFTA treaty text, US Trade Representative, The Wilson Center

Credits: James McBride, David Foster
Development of crude oil prices

Crude oil prices (dollars per barrel)

- Cushing, OK WTI
- Europe Brent
- Mexican Mayan Crude Oil

Source: own elaboration with data from the EIA
Main characteristics of a State Productive Enterprise

1. Corporate regime: Compensation, Recruitment, Budget, Debt, Accountability

2. Governing Law
   - Commercial Law vs. Administrative Law

3. Performance evaluation
   - Economic objectives

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Fiscal Regime for Assignments/Pemex

Duties and Royalties

- Hydrocarbon Extraction Duty (Royalty): % of the value of extracted hydrocarbons (% based on the hydrocarbon price levels)
- Hydrocarbon Exploration Duty: Fixed amount per km² (amount increases with time)
- Profit Sharing Duty: Value of extracted Hydrocarbons - Allowable Deductions x Rate

Taxes

- Hydrocarbon Exploration and Extraction Activity Tax: Fixed amount for exploration per km² + fixed amount for extraction per km²
- Income Tax (ISR): Allowable deductions:
  - 100% of investments in: exploration, EOR\(^1\) and capitalizable maintenance.
  - 25% of investments in: extraction and development.
  - 10% of investments in: storage and transport infrastructure.

Source: Pemex (2014)
Five year bidding program 2015-2019
Mexico in ranking: reserves and production

Source: Pemex Statistical Yearbook 2017
Mexico Macro developments

Mexico GDP per capita

Mexico gross domestic savings (% of GDP)

Mexico debt (% of GDP)

Mexico CPI (2010=100)
Natural resource curse in fossil-fuel abundant economies & climate policy

- **Research question:** How to advance mitigation policies in fossil fuel rich developing countries?

- **Focus:** Latin America e.g. Colombia (coal), Argentina and Bolivia (gas)

- **Motivation:** Paris Agreement vs. Institutional challenges & political economy