Pemex and the resource curse

Franziska Holz, Mariza Montes de Oca, Martin Kulczyk

DIW Berlin

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Overview

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 $\rightarrow$ unemployment increased 1-5% & corporate investment tumbled. Exports made the guilder stronger $\rightarrow$ 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 arangements $\rightarrow$ 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 I

- **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.

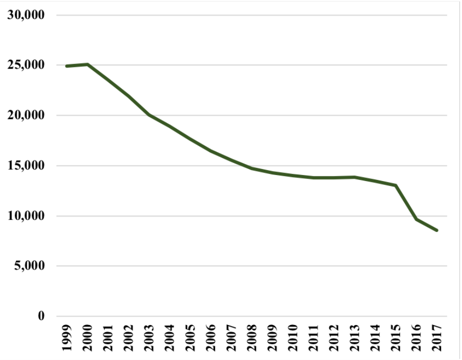
Type		Oil	Gas	Crude Oil eq.
		(MMMb)	(MMMMcf)	(MMMboe)
Resources	Total	69.2	217.9	112.8
	Conventional	37.3	76.4	52.6
	Unconventional	31.9	141.5	60.2
		(MMb)	(MMMcf)	(MMboe)
Reserves	Total	19,420	30,020	25,467
	Proved	6,464	10,022	8,484
	Probable	5,817	9,356	7,678
	Possible	7,139	10,643	9,305

Source: National Hydrocarbons Commission (2018), Reserves Report 2018

Symptoms of the curse in Mexico's oil sector II

Resource endowed (II)?: Downward trend in proved reserves more

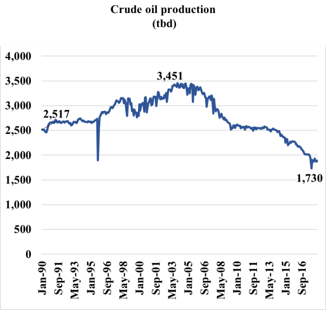
Mexican hydrocarbon reserves
(proved reserves, million barrels of oil equivalent)

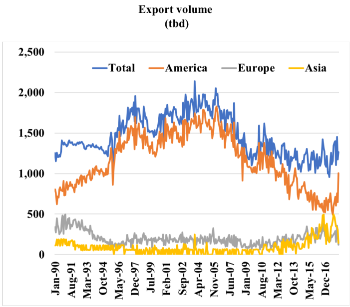


Source: own elaboration with data from the SIE (System of Energy Information).

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

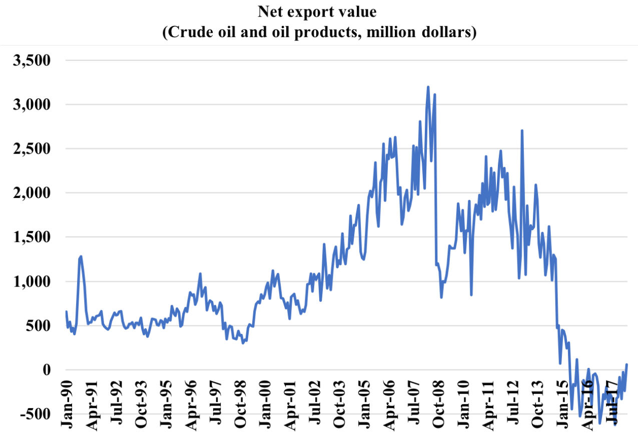




Source: own elaboration with data from the SIE (SENER).

Symptoms of the curse in Mexico's oil sector III

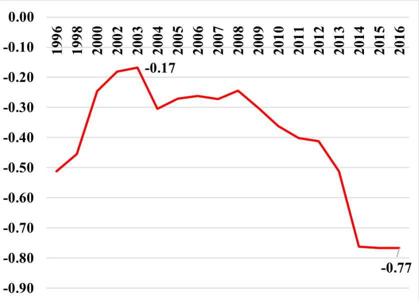
- The hydrocarbon trade balance has also deteriorated with increasingly low export prices of crude oil and higher import prices of oil products (e.g. gasoline)



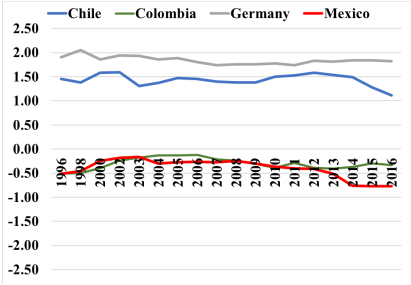
Symptoms of the curse in Mexico's oil sector IV

- **Corruption and institutional quality/rent seeking?**:
  - From 2003 to 2012, more than 100 contracts (worth 8% of Pemex's income) involved irregularities. [Guerrero, 2016]

Control of Corruption: Mexico (-2.5 [weak] to 2.5 [strong])



Control of Corruption: Country comparison (-2.5 [weak] to 2.5 [strong])

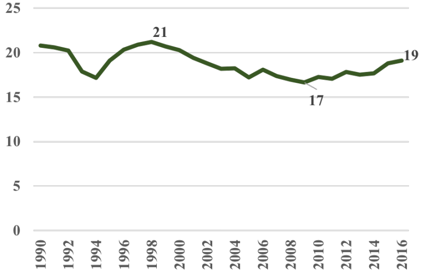


Source: World Bank (2017), World Development Indicators

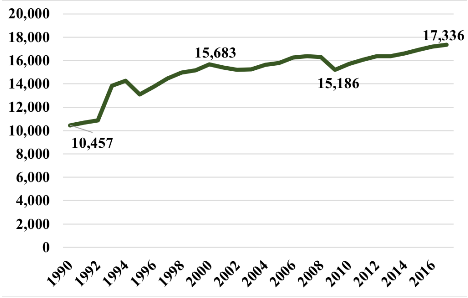
Symptoms of the curse in Mexico's oil sector V

- **Symptoms of Dutch disease?**:
  - Oil export growth → overvalued currency → non-oil products less competitive (manufacturing & agriculture) [Mirovitskaya, Teichman, 1988, Esteva, 1983].
  - Mexico has a relatively diversified economic structure more

Manufacturing Sector in Mexico (value added, % of GDP)



GDP per capita, PPP (constant 2011 international $)

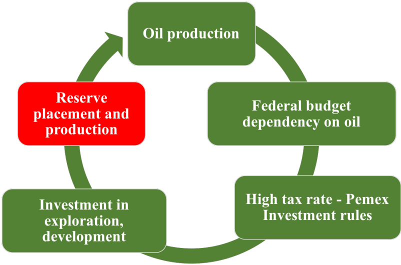


Source: World Bank, World Development Indicators

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

Fiscal dependency trap



Source: own elaboration

Symptoms of the curse in Mexico's oil sector VII

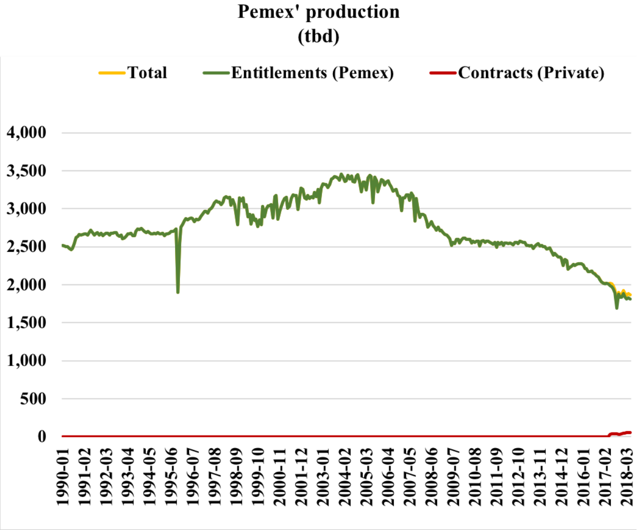
- **Sustainability in resource endowed economies**:
  - Hartwick rule: constant level of consumption can be sustained if value of investment equals value of rents at each point in time. (Hardwick, 1977)
  - Oil revenues used to escape the curse: stabilization, savings, investments.
  - Mexico 2000-2014: 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)

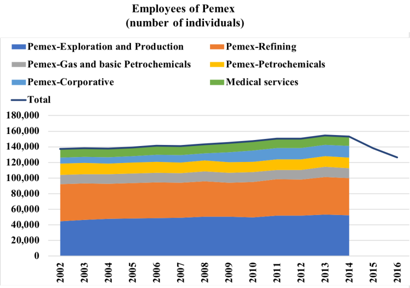
Pemex: Production



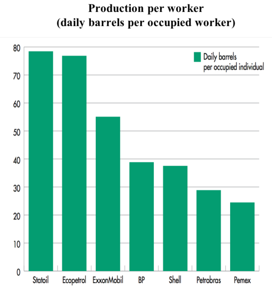
Source: CNH, 2018c. Oil and Gas Production in Mexico. National Hydrocarbons Commission .

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.



Source: own elaboration with data from the SIE



Source: CIDAC (2013)

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.

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

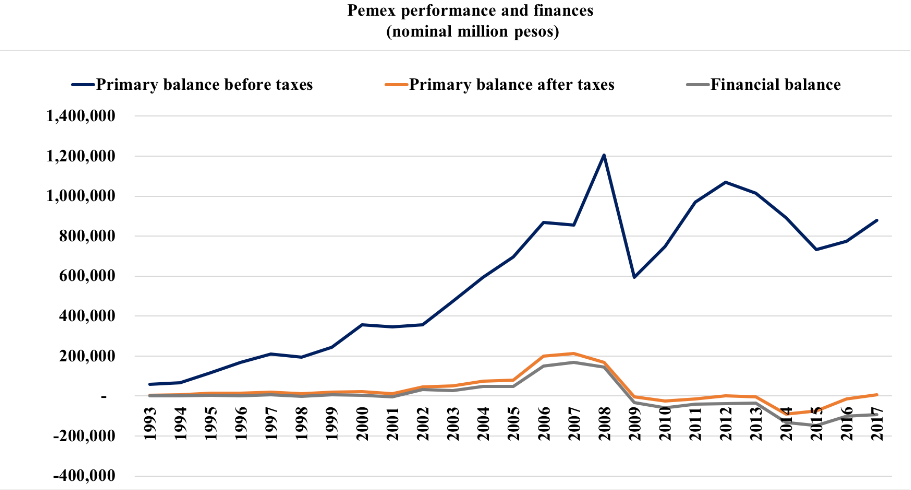
Source: Own elaboration with data from Carreon-Rodriguez & Rosellon (2012) and Moody's (2017)

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 more
- 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



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.

UPSTREAM

Open and competitive markets:

- 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**

MID & DOWNSTREAM

Open and competitive markets:

- 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		
PRODUCTION SHARING AGREEMENTS	Allow contractor keep in-kind production to cover costs and their share of operating profit. Deliver remaining production to a marketing firm hired by CNH.	**Payment:** % of production
PROFIT SHARING CONTRACTS	Require contractor to deliver all of its production to CNH's marketing firm. FMP paying it its share of profits.	**Payment:** % of profit
SERVICE CONTRACTS	Contractor sells hydrocarbons extracted to Mexican government at a price stipulated in the contract	**Payment:** fees + onerous transmission of hydrocarbons
LICENSE CONTRACTS	Have a right to minerals extracted after paying a variety of fees to Mexican government	**Payment**: cash

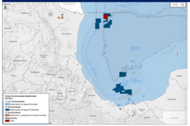
The 2013 energy reform and Pemex

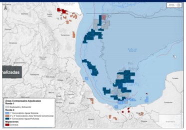
- Pemex becomes a 'State Productive Enterprise' more
- Investment: The congress determines and approves budget for Pemex, but Pemex has autonomy to distribute and invest in projects
- Tax burden: Lower tax rate for PEMEX more , but government can continue drawing on the state oil company's profits for 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.

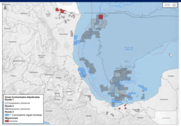
Reform implementation upstream

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

Round 0	Round 1	Round 2	Round 3	R4
Entitlements	**Contracts**			







Round 0

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

83% of 2P reserves

21% of resources

Round 1

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

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

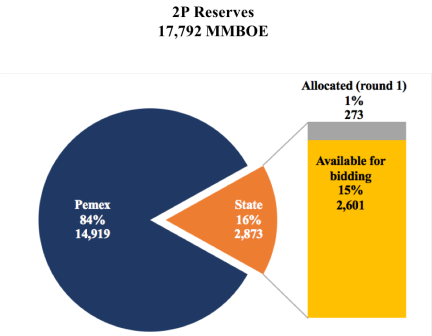
3.2 Exploration, extraction, onshore

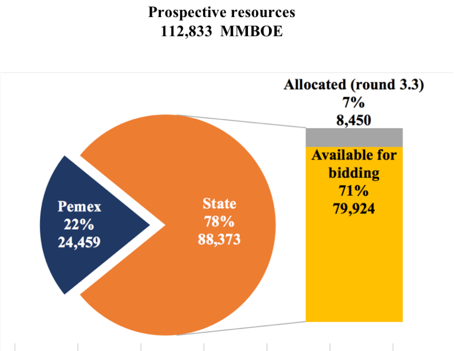
3.3 ....

3.4 ....

Reform implementation upstream

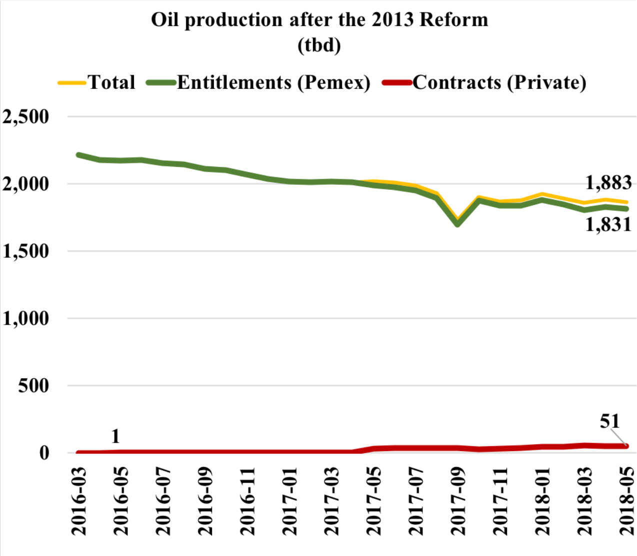
16% of 2P reserves and 78% of resources available for bidding.





Source: own elaboration with data from the CRE, CNH and the Ministry of Energy

Pemex: Production



Source: CNH, 2018c. Oil and Gas Production in Mexico. National Hydrocarbons Commission .

Pemex and Petrobras: A comparison

	Brazil (Petrobras)	Mexico (Pemex)
Government take/incomes	Government take represents between 25% and 50% of revenues, albeit with a clear declining trend in recent years.	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.
Total investment/incomes	Investment represents a high percentage of revenue, consistently over 50% with peaks of 80%. This trend continues throughout the period, although with variations.	Investment represents a very low percentage of revenue, remaining under 20% during the period, albeit with a slight increase in recent years.
Evolution of proven reserves (2002–2014)	193% increase in proven reserves of gas 165% increase in proven reserves of oil	41% drop in the proven reserves of oil and gas

Source: Ramírez-Cendrero & Paz (2017)

The first challenges of the reform implementation: upstream auctions

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

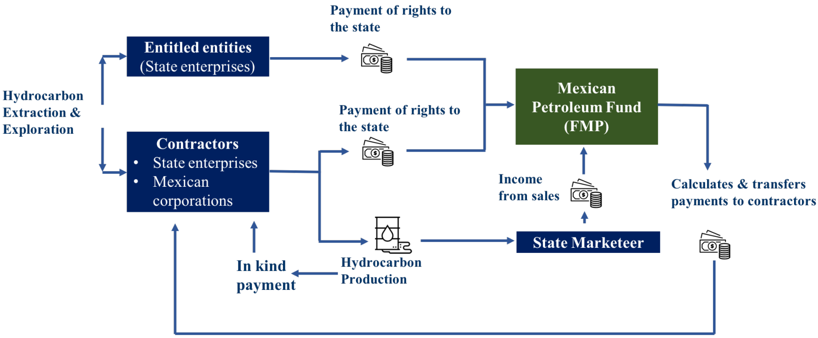
The Mexican Petroleum Fund (FMP)

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

- Input (income) to the FMP:

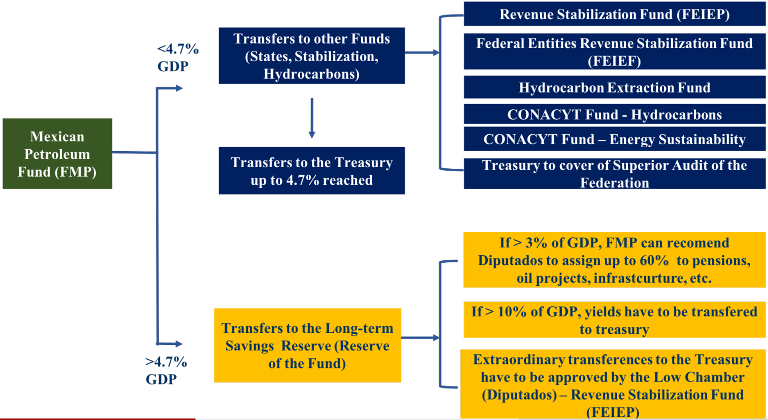


Source: based on FMP (2015)

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):



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

In 2017, the Long Term Savings Reserve received resources for the first time, after three years of operation

FMP Transfers to Funds, Treasury and Long-term Savings (million pesos)

	2015	2016	2017
Total transfers to Treasury and Funds	398,805	307,920	442,875
Percentage of GDP	0.0%	1.6%	2.2%
Oil Revenue Excedent (Bruto)	0	0	55,972
Oil Revenue Excedent (Neto)	0	0	17,906
Percentage of GDP			0.09%

Source: own elaboration with data from FMP (2015-2017)

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 camppaign declarations
- Allienate extreme left coalition members

Benefits:
- May benefit of increased production & succes

Compatible with AMLO social spending agenda

Pausing

Pausing new bids

Slowing down

Slowing down new bids

Cancelling reform

Cancelling? Declarations: respect contracts

Feasible: executive + congress

Costs (political/electoral):
- Economic uncertainty
- Fund Pemex w: state budget, debt, sell-off assets

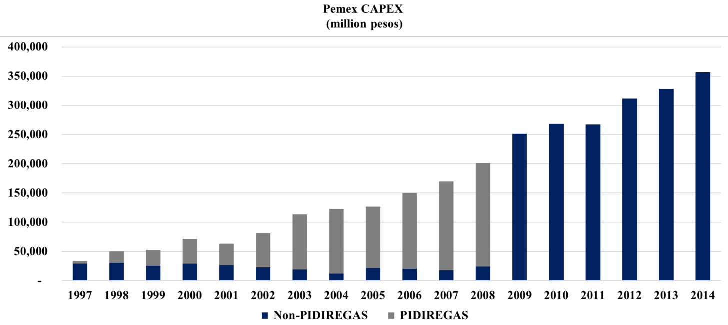
Benefits (political):
- In line w/ early campagin declaration
- Coalition members

Not compatible with social spending agenda

Focus on other aspects? Labor, pensions, corruption?

Thank you for your time!

Pemex Capex



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

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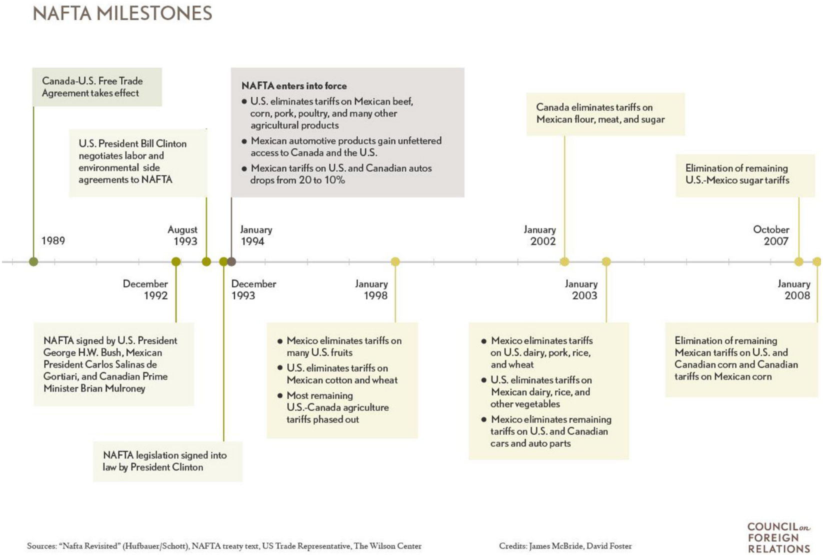
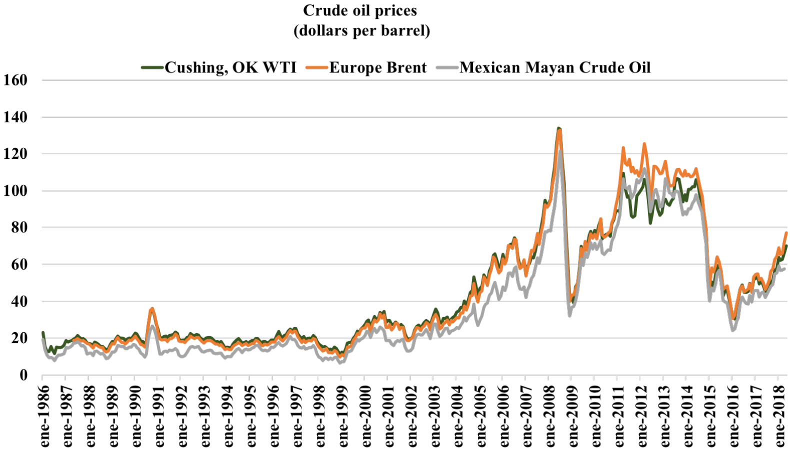
NAFTA timeline



Development of crude oil prices



Source: own elaboration with data from the EIA

Back to slide of reform challenges

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

2015	2016	2017	2018	2019 onward
70.00%	68.75%	67.50%	66.25%	65.00%

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)

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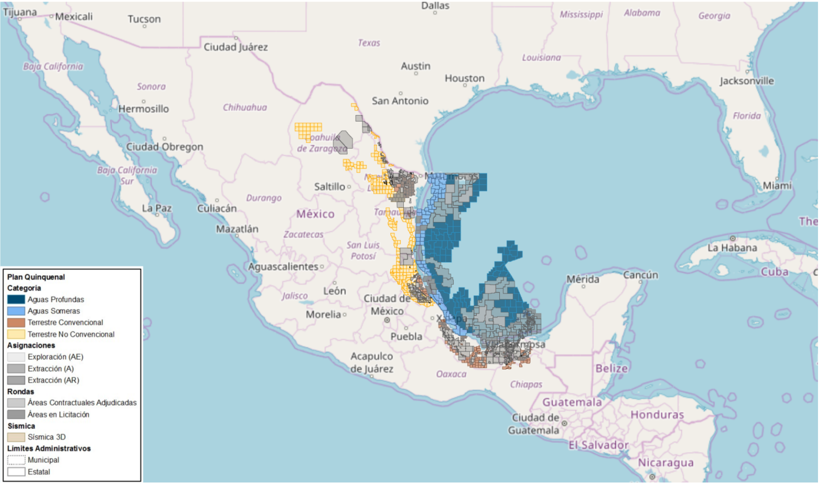
Five year bidding program 2015-2019



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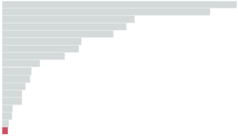
Mexico in ranking: reserves and production

10.1 Proved oil reserves 2017, selected countries [a]

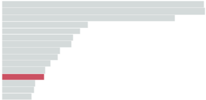
Rank	Country	million barrels
1	Venezuela	300,878
2	Saudi Arabia	266,455
3	Canada	169,709
4	Iran	158,400
5	Iraq	142,503
6	Kuwait	101,500
7	United Arab Emirates	97,800
8	Russia	80,000
9	Libya	48,363
10	Nigeria	37,062
11	United States	35,272
12	Kazakhstan	30,000
13	China	25,620
14	Qatar	25,244
15	Brazil	13,000
16	Algeria	12,200
17	Angola	8,273
18	**Mexico**	**7,037**
	World total	1,645,862



a. As of January 1.
Source: Oil and Gas Journal and CNH.

10.3 Oil production 2016, selected countries

Rank	Country	thousand barrels per day
1	Russia	10,366
2	Saudi Arabia	10,421
3	United States	8,879
4	Iraq	4,400
5	China	4,015
6	Canada	3,641
7	Iran	3,551
8	United Arab Emirates	2,987
9	Kuwait	2,848
10	Brazil	2,504
11	Venezuela	2,213
12	**Mexico**	**2,154**
13	Angola	1,713
14	Norway	1,630
15	Nigeria	1,531
	World total	77,844



Source: Oil and Gas Journal and CNH.

Source: Pemex Statistical Yearbook 2017

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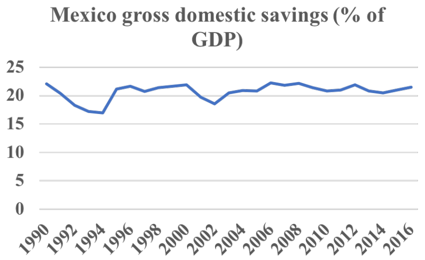
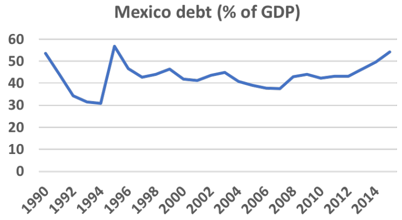
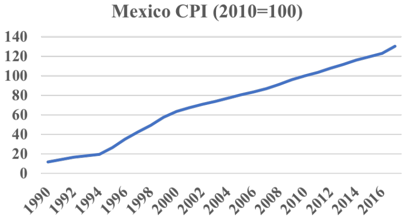
Mexico Macro developments







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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