

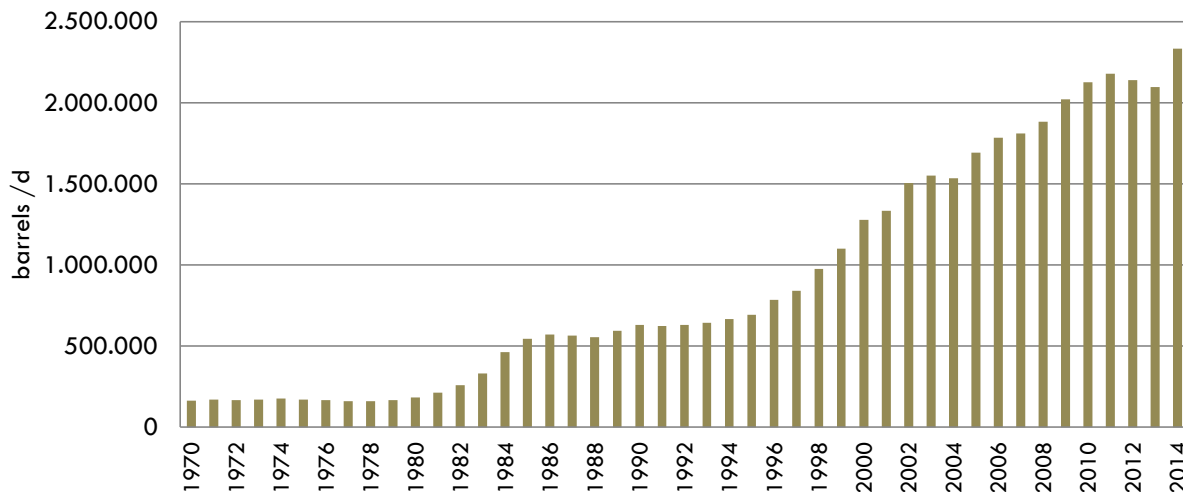
The Crisis in the Oil Industry and its Impacts on the Brazilian Macroeconomic Indicators

SUMMARY

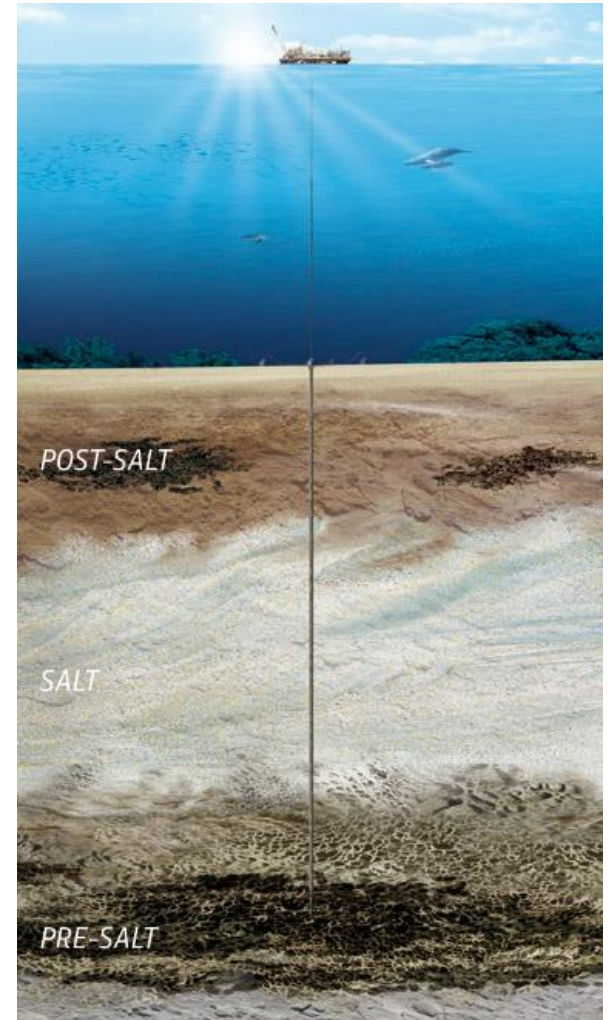
- Overview
- Oil and Gas Industry in Brazil
- Goals
- Methodology
- Results
- Conclusions

OVERVIEW

- Oil and gas exploration and production
 - ❖ 2000 : 1.5 million BOE/d
 - ❖ 2006 : beginning of exploration of pre-salt resources
 - ❖ 2010: 42,000 barrels per day (pre-salt)
 - ❖ 2014: 492,000 barrels per day (pre-salt)
 - ❖ 2015 : 2.8 million BOE/d



Source: Elaborated based on data from the MME (2015) and ANP (2015)



OVERVIEW

○ Changes on the favorable context in the Brazilian Oil industry

❖ 2014

- 2nd half of 2014 - Oil prices dropped in the international market
- Petrobras was severely affected by the government's fuel price policy
- Petrobras faces financial difficulties after the Car Wash Operation

OVERVIEW

- Changes in the medium and long-term planning of Petrobras

- Decrease in Petrobras investment

- 2013 – 2017 Business & Management Plan: US\$ 236.7 billion

- 2015 – 2019 Business & Management Plan: US\$ 98.4 billion

- Investment in Exploration and Production (E&P)

- 2013 – 2017 Business & Management Plan: US\$ 147.5 billion

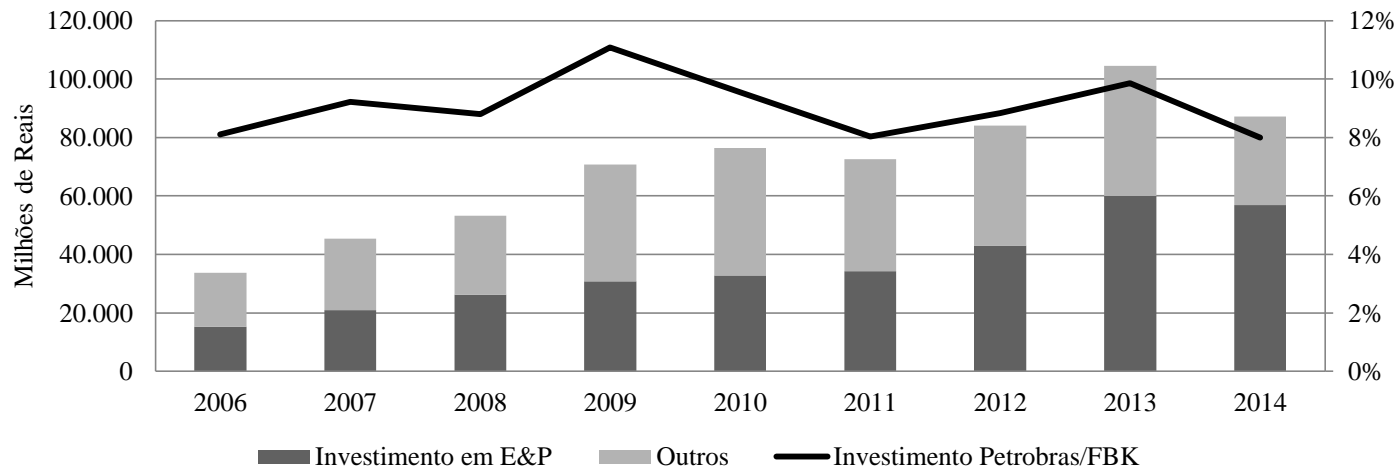
- 2015 – 2019 Business & Management Plan: US\$ 80.0 billion

OIL AND GAS INDUSTRY IN BRAZIL

○ High level of participation in gross fixed capital formation (GFCF)

❖ 2013

- Total Petrobras investment : 10% of GFCF
- Investments in E & P - 6% of GFCF



OIL AND GAS INDUSTRY IN BRAZIL

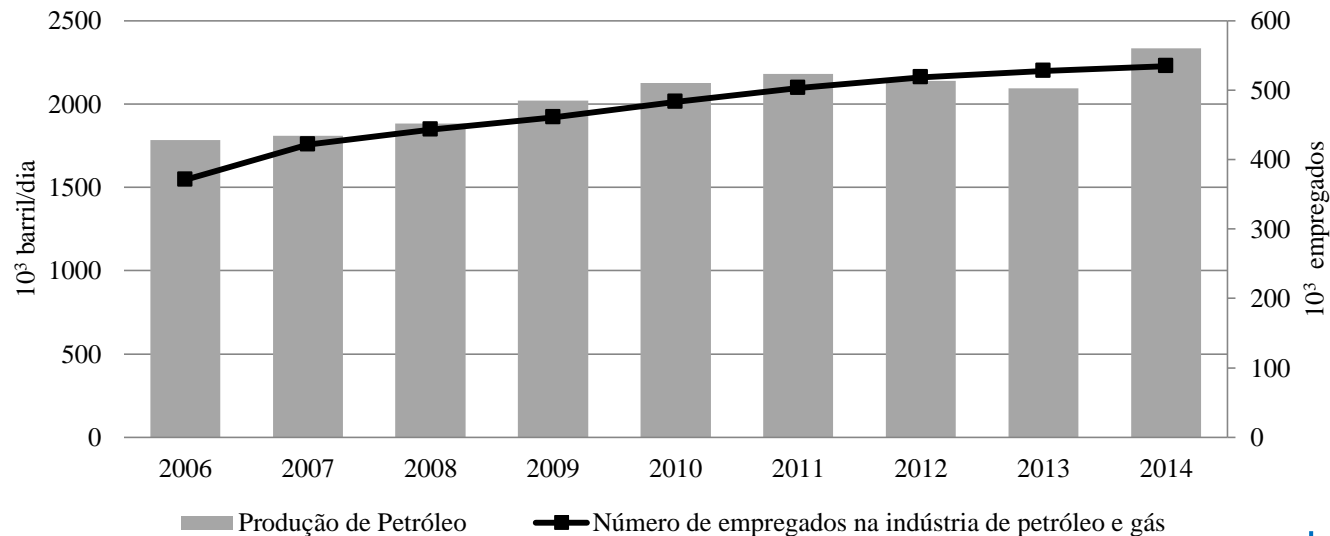
○ Employment

❖ 2007

- Oil and gas production rise
- Direct increase in the employment sector

❖ 2006 - 370,000 employees

❖ 2014 – 534,000 employees



GOALS

○ Questions:

- What will be the impact of reduction in investment on:
 - the employment level ?
 - the national income?

Calculate the impact of reduction of investment in the oil industry on income and on employment in Brazil

METHODOLOGY

- Input-Output Model (IO)

- ❖ **Hypotheses:**

- Constant returns to scale;
- Supply is perfectly elastic;
- Time invariant coefficients

$$X_i = \sum z_{ij} + D_i$$

$$D_i = C_i + I_i + G_i + E_i$$

$$z_{ij} = a_{ij} \cdot X_j$$

$$X = (I - A)^{-1}D$$

METHODOLOGY

- Input-Output Model

- ❖ **Impact Analysis**

- Generation of employment and income

- Direct effect: $\Delta W_i = \lambda_i \cdot \Delta X_i$

Sector employment coefficient: $\lambda_i^L = \left(\frac{L_i}{X_i} \right)$

National income coefficient : $\lambda_i^{VA} = \left(\frac{VA_i}{x_i} \right)$

- Indirect effect: $\Delta L^{dir+ind} = \lambda(I - A)^{-1} \cdot \Delta D$

$$\Delta L^{ind} = \Delta L^{dir+ind} - \Delta L^{dir}$$

METHODOLOGY

- Input-Output Model

- ❖ **Update of the Input and Output Matrix**

- R.A.S. Method

$$A_{2009} = R \cdot A_{2005} \cdot S$$

$$A_{2013} = R \cdot A_{2009} \cdot S$$

METHODOLOGY

Table 1. Breakdown of investment in the Input and Output Matrix sectors

Code	Sector	Investment vector	Imports (%)	Taxes (%)	
				Domestic	Imported
03	Oil and Gas	0.17	0.5	0.05	0.05
04	Non-metallic mineral	0.01	0	0.26	0.00
05	Steel mill	0.06	0.1	0.27	0.52
06	Non-ferrous metallurgy	0.00	0	0.27	0.56
07	Other metallurgical	0.02	0.2	0.30	0.56
08	Machines and equipment	0.14	0.5	0.23	0.42
10	Electrical material	0.06	0.3	0.24	0.38
11	Electronic equipment	0.04	0.6	0.36	0.61
13	Other vehicles components	0.27	0.8	0.00	0.00
17	Chemical elements	0.00	0	0.24	0.43
19	Other chemicals	0.01	0	0.24	0.43
21	Plastic products	0.00	0	0.27	0.50
22	Textile industry	0.00	0	0.27	0.50
34	Construction	0.06	0	0.03	0.03
35	Trade	0.00	0	0.03	0.03
36	Transport	0.00	0	0.04	0.04
38	Financial Institutions	0.01	0	0.01	0.01
40	Business services	0.15	0.175	0.03	0.03

Source: Modified from Kupffer (2000)

RESULTS

○ Input-Output Model : Employment

❖ In relation to investment announced in BMP 2013 – 2017 approximately:

- 104,386 direct jobs won't be generated in the Oil and Gas sector
- 83,834 indirect jobs won't be generated

In total 188,220 jobs won't be generated in Brazil

RESULTS

- Input-Output Model: Added value

- ❖ The reduction in investment in the oil and natural gas exploration activity will generate **US\$ 3,309.53 million** less (direct and indirect impact) in the added value, compared to the investment that would be made by Petrobras in the BMP 2013 – 2017.

CONCLUSIONS

❖ The difference between results for investment simulations from both models BMP 2013 – 2017 and BMP 2015-2019 are significant.

The decrease in investment :

- Will generate a reduction of 36% in jobs, which is equivalent to 188,220 jobs
- The economy will lose U\$ 3,309.43 million.

THANKS

niagararodrigues@gmail.com

