

# External Shocks, Labor Market, and Informality Outcomes: An application to Colombia

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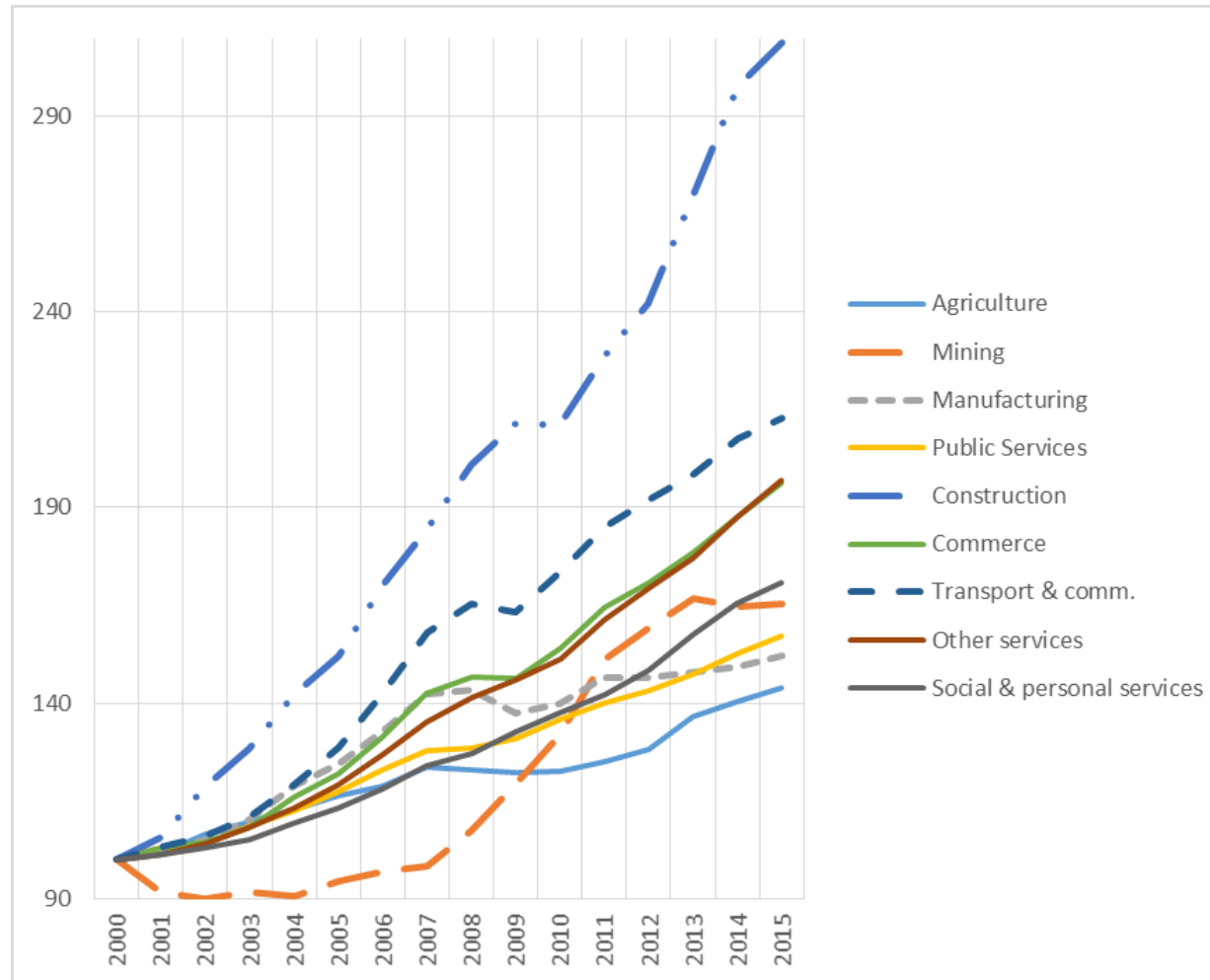
Universidad del Rosario, Colombia

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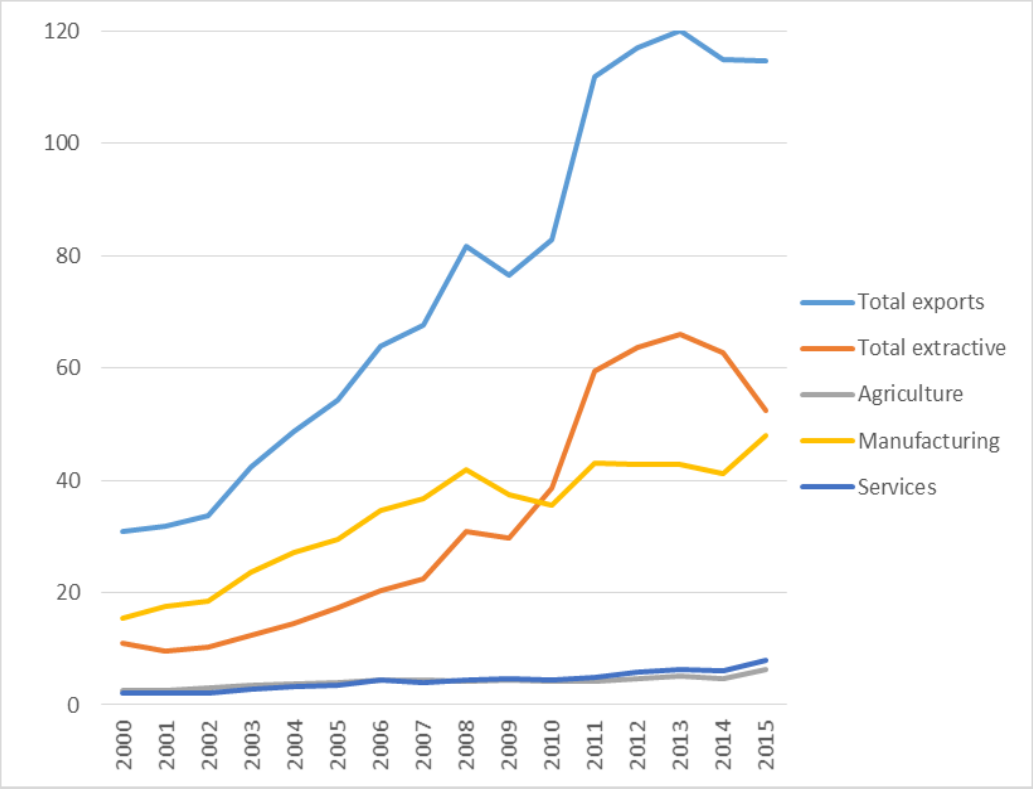
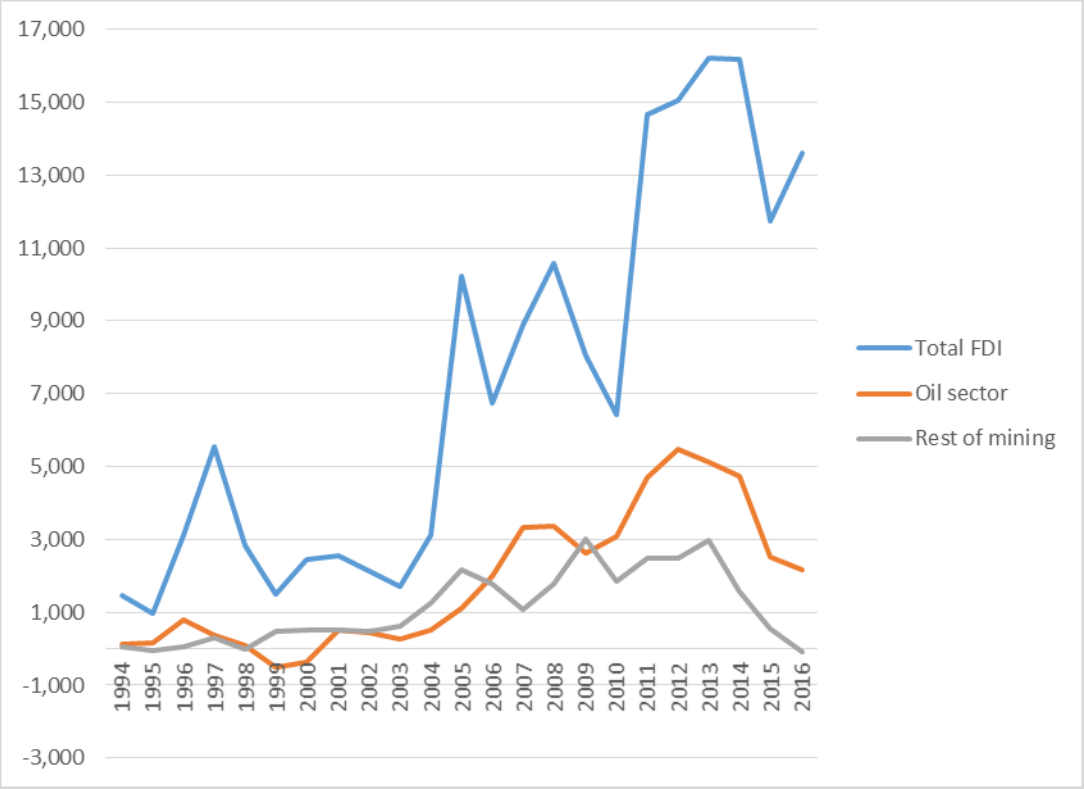
# Motivation

- Oil and mining production and export boom from the middle 2000s
- Potential Dutch Disease effects on the economy and policy response
- As policy response is implemented, international oil prices plunge
- Questions on the effect of drop in prices and policy implemented on the economy and the labor market

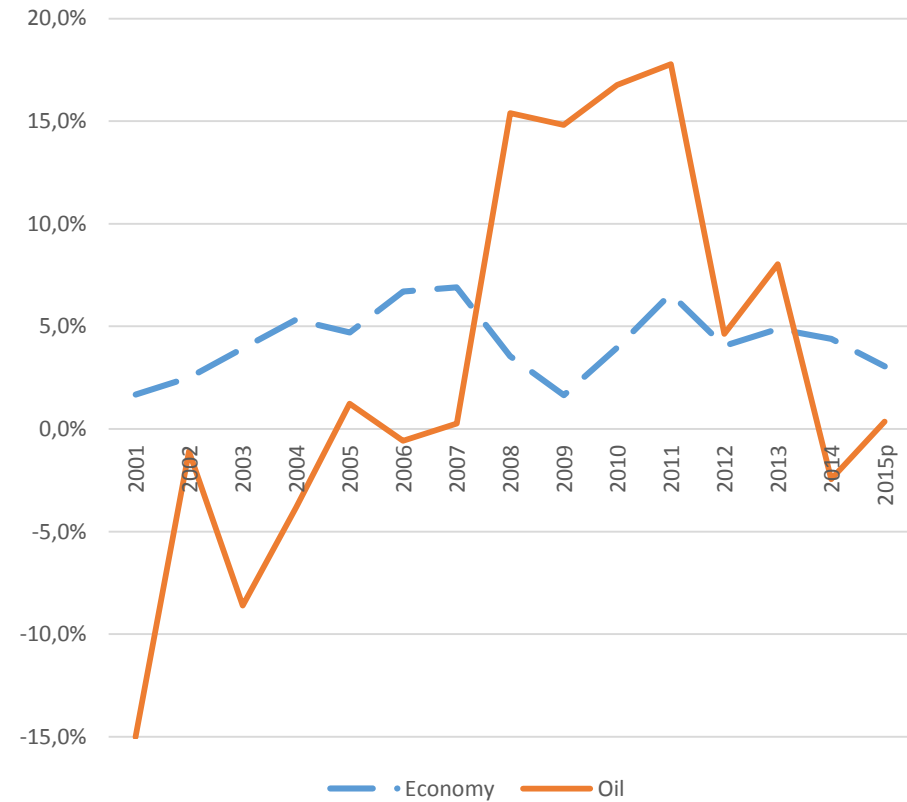
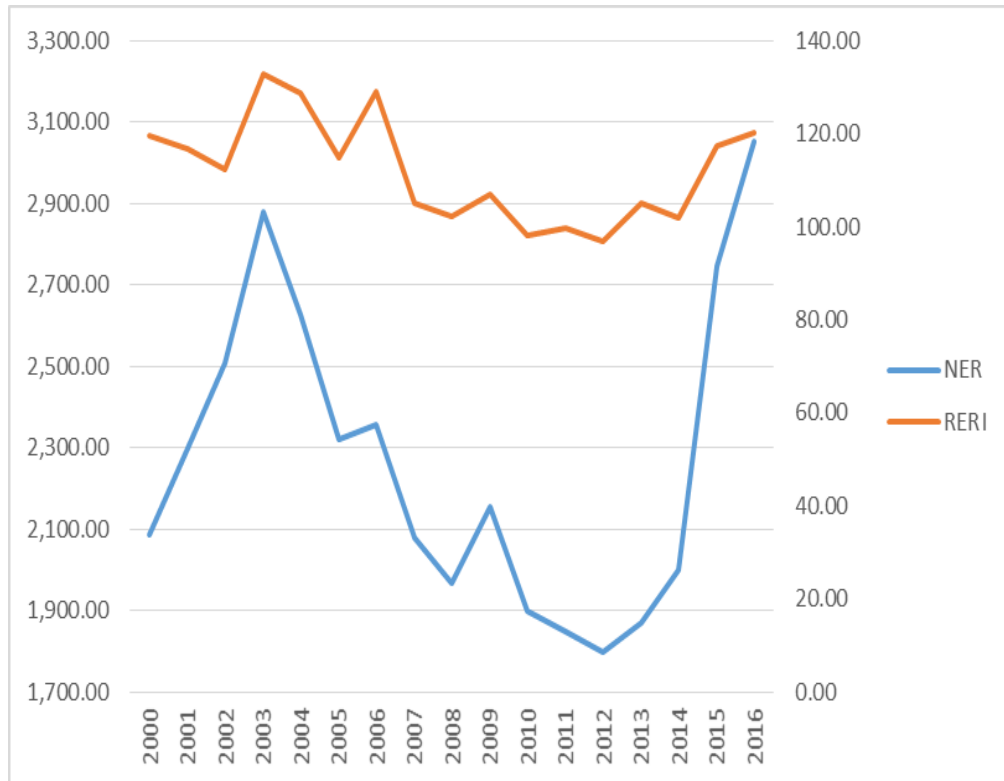
# ECONOMIC CONTEXT: Volume Index (2000=100)



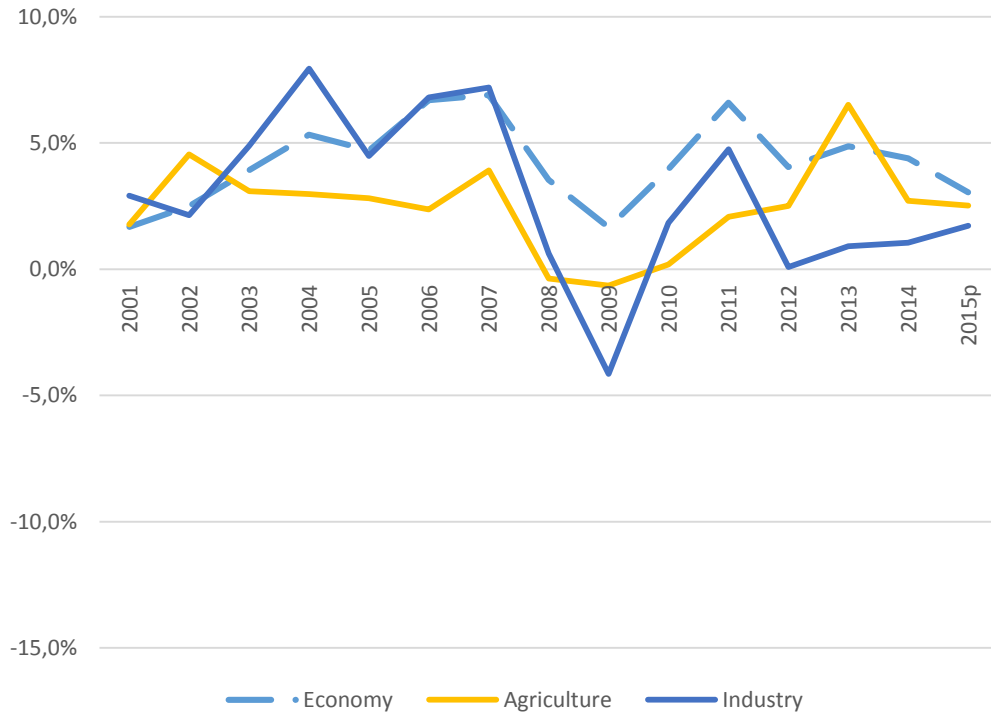
# ECONOMIC CONTEXT: FDI (US\$ million) and Exports (\$COP trillion)



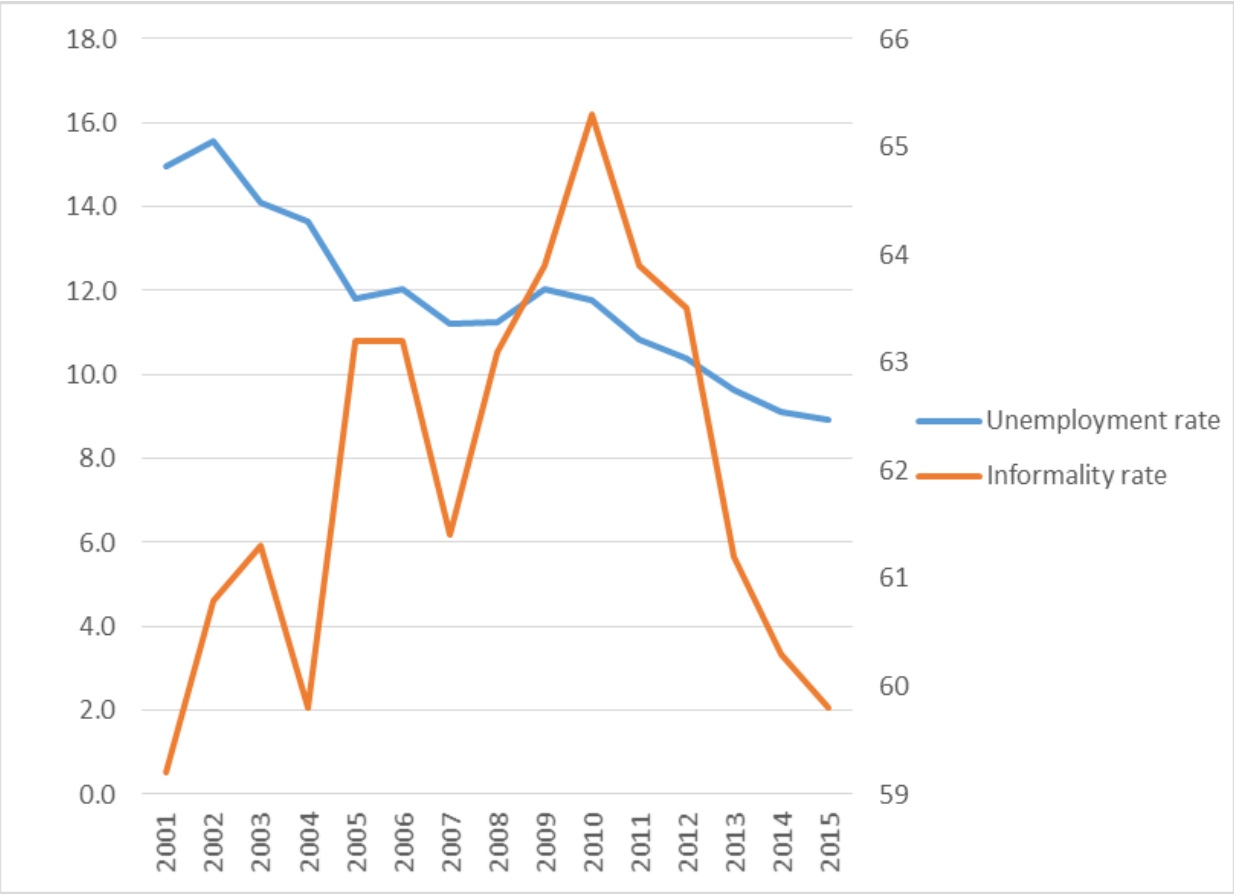
# ECONOMIC CONTEXT: NER, RERI, and Growth Rate



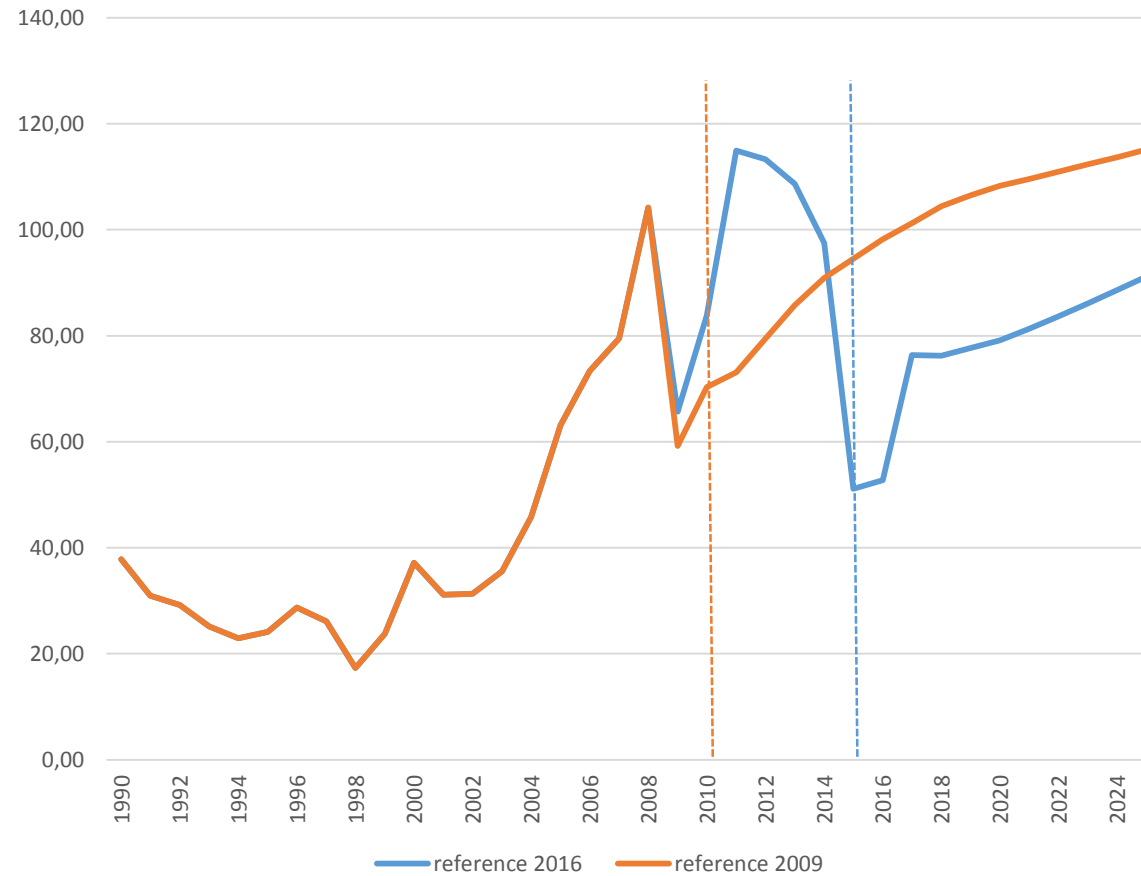
# ECONOMIC CONTEXT: Sectoral Growth Rates



# ECONOMIC CONTEXT: Unemployment (left) and Informality (right)



# ECONOMIC CONTEXT: Oil Prices (Brent, US\$/barrel)





# Research Questions

Impact of the international oil price drop on:

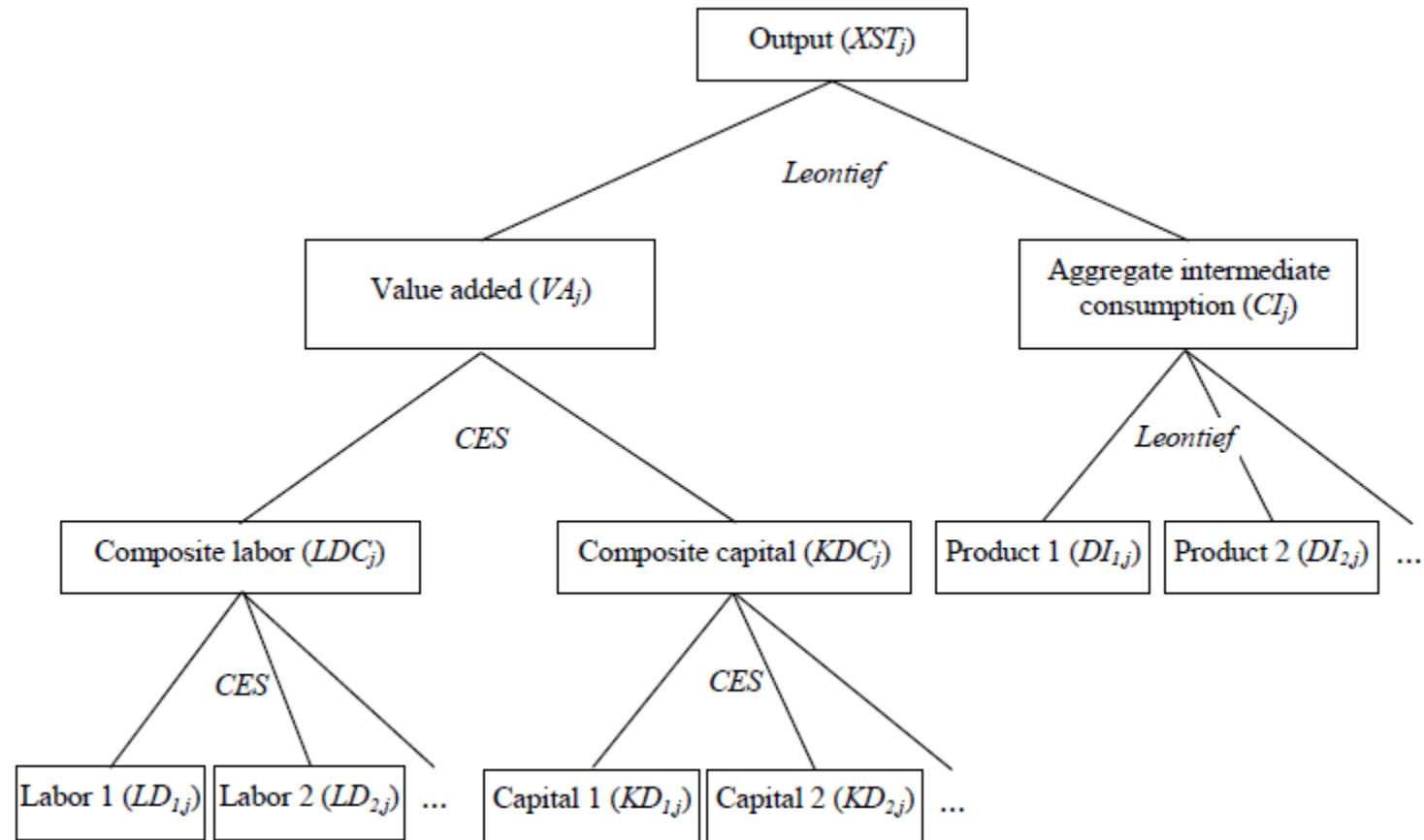
- Economic growth
- Sectoral and labor market dynamics
- Informal sector (employment) dynamics

Additional effects of policy intervention for facing Dutch Disease

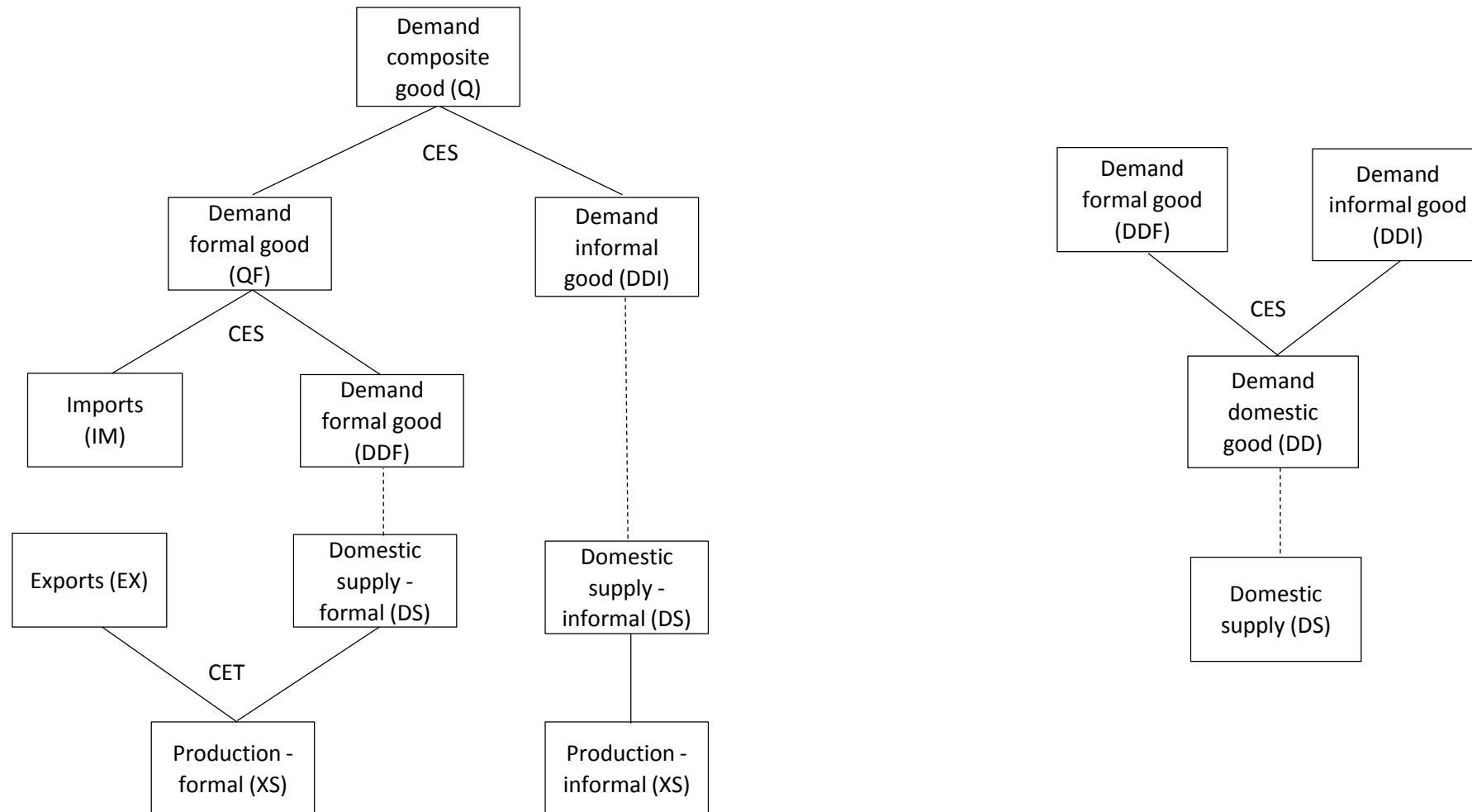
# Modeling

- Recursive dynamic CGE (based on PEP's 1-t model)
- Formal and informal activities
- Informal activities:
  - Hire only informal workers
  - Do not export (except for agriculture)
  - Do not pay taxes

# Structure of production



# Structure of consumption



# Modeling

- Segmented labor market:
  - Unemployment in the formal segment
  - Formal market clears through employment level (if there is unemployment)
  - Limited “migration” of formal unemployed workers to the informal segment
  - Full employment in informal segment
  - Informal market clears through wages

# Modeling

- Other characteristics:
  - Account for rents from natural resources (oil and mining)
  - Dividend payments endogenous (rate as function of international prices)
  - Oil and mining production partly depends on sectorial FDI
  - Implementation of an stabilization and saving fund (FAE)

# Data

Sector	Type	Sectoral Share in:					Capital-Labor ratio
		Value Added	Total Employment	Unskilled Labor	Skilled Labor	Capital	
Agriculture	Formal	1.7	2.3	4.4	1.4	1.0	0.4
	Informal	5.4	8.2	22.9	2.0	2.0	0.2
Oil	Formal	8.1	1.1	0.3	1.5	16.7	12.0
Mining	Formal	2.2	0.9	1.0	0.8	3.9	3.6
	Informal	0.6	0.7	1.9	0.1	0.5	0.6
Industry	Formal	8.5	7.4	3.4	9.0	10.0	1.1
	Informal	2.2	3.0	4.7	2.3	1.2	0.3
Refinery	Formal	2.9	0.2	0.1	0.3	6.2	23.3
Tradable services	Formal	17.9	14.5	4.9	18.6	22.0	1.2
	Informal	8.4	12.2	15.7	10.8	3.5	0.2
Non-tradable services	Formal	22.1	21.3	11.6	25.3	23.3	0.9
	Informal	13.5	18.3	28.1	14.2	7.5	0.3
Pub. Admin.	Formal	6.5	9.9	1.0	13.6	2.3	0.2

# Data

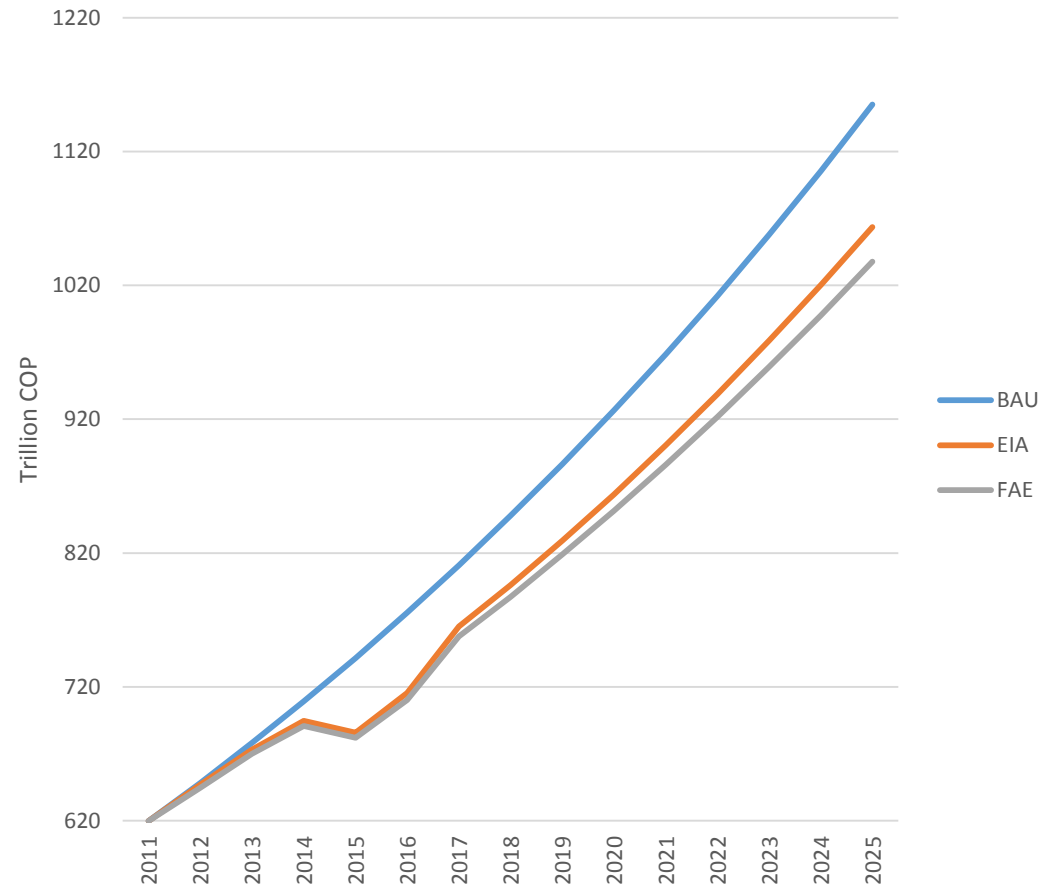
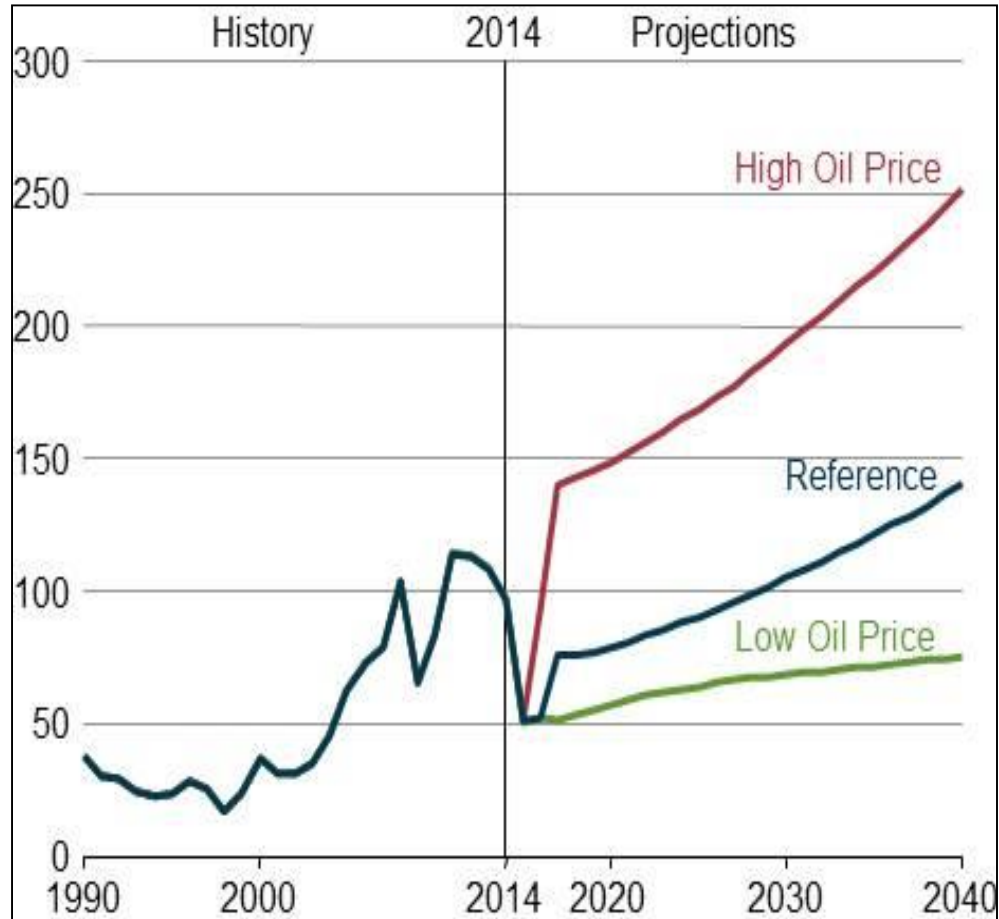
Products	Share in total:		Export Coefficient	Import Penetration
	Exports	Imports		
Agriculture	3.7	4.2	0.08	0.09
Oil	39.1	0.0	0.72	0.00
Mining	14.1	0.3	0.68	0.04
Industry	29.3	79.0	0.15	0.34
Refinery	9.3	7.4	0.35	0.31
Tradable services	4.5	9.1	0.02	0.04



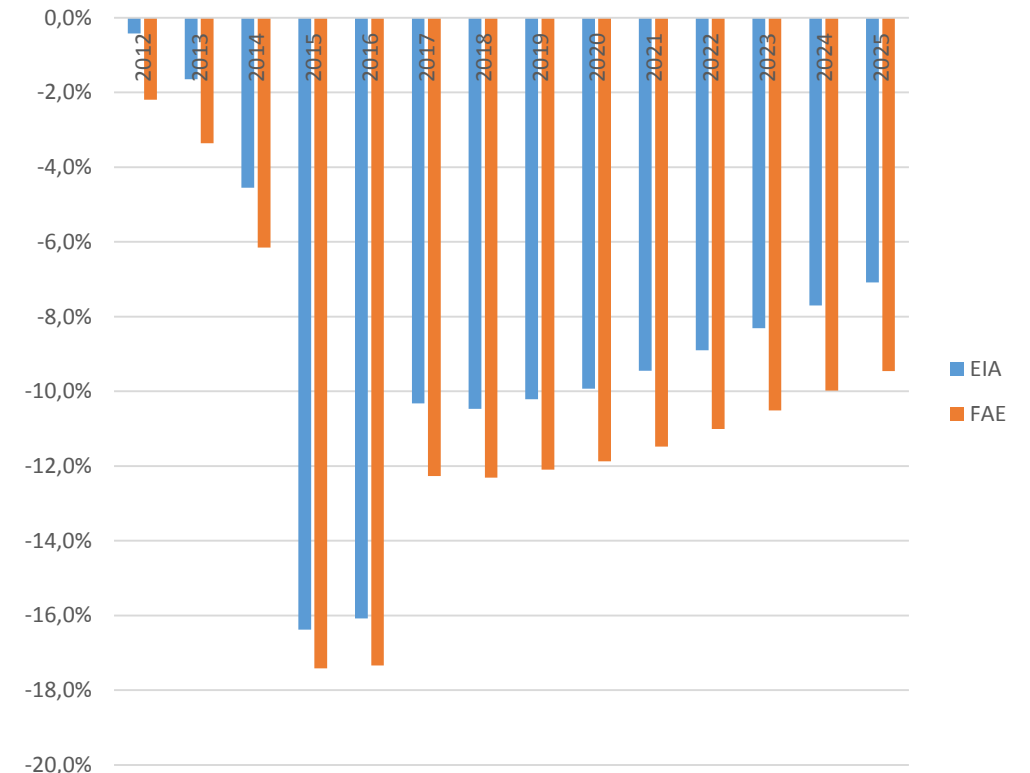
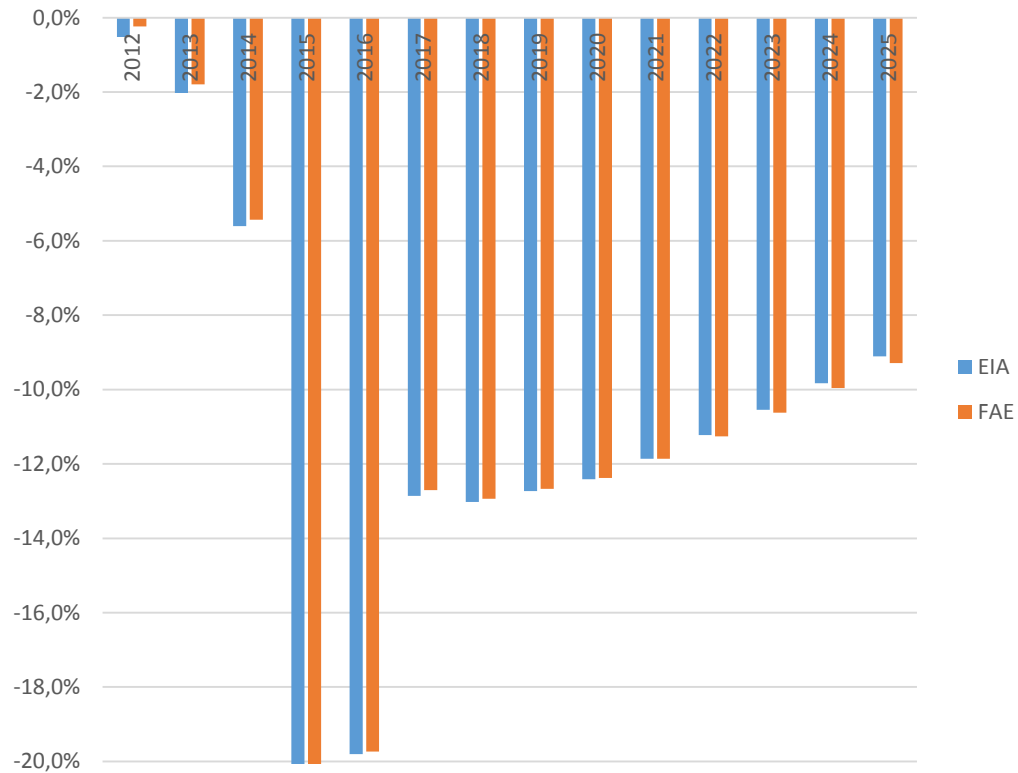
# Simulations

- BAU: growth at the (assumed) steady state growth rate  
+ trade liberalization
- EIA: oil prices behaving as forecasted in 2014
- FAE: oil prices as forecasted plus savings and stabilization fund
- Closure:
  - Nominal Exchange rate is the numeraire
  - Real current government expenditure exogenous
  - Oil and mining FDI exogenous (and constant)
  - Investment is savings driven

# Results: GDP

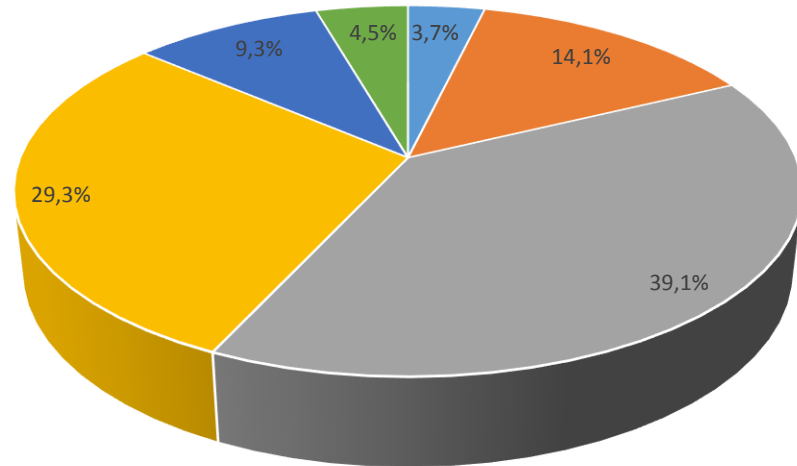


# Results: Percentage Changes in Export (left) and Import (right) Values



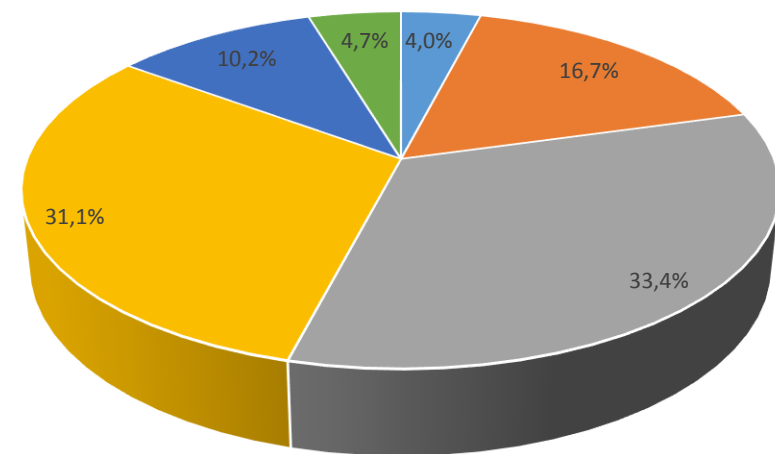
# Results: Export Shares

2011



■ Agriculture ■ Minerals ■ Oil ■ Industry ■ Refinery ■ Tradable servs.

FAE 2025



■ Agriculture ■ Minerals ■ Oil ■ Industry ■ Refinery ■ Tradable servs.

# Results: Average Growth Rates and Percentage Diff in Levels

Formal Activities	Growth Rates			Output Levels	
	BAU	EIA	FAE	EIA	FAE
Agriculture	4,6%	2,8%	2,2%	-21,3%	-28,0%
Mining	4,6%	5,4%	5,7%	11,6%	16,5%
Oil	4,6%	4,4%	4,4%	-2,8%	-3,0%
Industry	4,6%	3,9%	3,6%	-9,2%	-12,3%
Refinery	4,6%	4,5%	4,3%	-0,7%	-3,8%
Tradable servs.	4,5%	3,5%	3,1%	-12,9%	-17,2%
Non-tradable servs.	4,5%	3,4%	3,0%	-13,5%	-18,0%
Public adm.	4,6%	4,6%	4,6%	0,4%	0,5%

# Results: Average Growth Rates and Percentage Diff in Levels

Informal activities	Growth rates			Output levels	
	BAU	EIA	FAE	EIA	FAE
Agriculture	4,6%	4,5%	4,5%	-0,3%	-0,5%
Mining	4,7%	2,6%	1,7%	-24,7%	-33,2%
Industry	4,2%	3,7%	3,6%	-6,7%	-8,2%
Tradable servs.	4,7%	4,9%	5,0%	2,6%	3,8%
Non-tradable servs.	4,5%	4,4%	4,3%	-1,7%	-2,7%



## Results: Average Growth Rates for Informal Employment

Informal activities	Unskilled labor			Skilled labor		
	BAU	EIA	FAE	BAU	EIA	FAE
Agriculture	1,3%	1,4%	1,4%	1,3%	1,3%	1,3%
Mining	1,4%	-1,1%	-2,1%	1,4%	-1,2%	-2,2%
Industry	0,9%	0,5%	0,5%	0,9%	0,4%	0,4%
Tradable servs.	1,5%	1,9%	2,0%	1,4%	1,8%	1,9%
Non-tradable servs.	1,3%	1,4%	1,4%	1,3%	1,3%	1,3%



## Results: Annual Growth Rates by Employment Type

Employment type	BAU	EIA	FAE
Unskilled informal	1.30%	1.39%	1.43%
Skilled informal	1.30%	1.41%	1.44%
Unskilled formal	1.30%	0.39%	0.05%
Skilled formal	1.30%	0.62%	0.38%
Unskilled (total)	1.30%	1.14%	1.08%
Skilled (total)	1.30%	0.86%	0.71%
Informal	1.30%	1.40%	1.44%
Formal	1.30%	0.59%	0.34%

## Results: Unemployment Rates

Labor type	Scenario		
	BAU	EIA	FAE
Unskilled labor	13.1%	15.0%	15.7%
Skilled labor	8.9%	14.1%	16.0%
Total	10.2%	14.4%	15.9%

## Conclusions

- The drop in oil prices induces an external balance shock
- The economy grows, in average, 0.6 percentage points below the baseline rate (this means a 2025 GDP level 10.2% below the baseline)
- Relative price changes favor production of informal activities substituting for the composite formal production-imports

## Conclusions

- In a context of lower growth this implies:
  - Less dynamic labor demand in general
  - More dynamic labor demand by informal activities
  - Higher unemployment rate in the formal sector
  - Higher “migration” of formal workers to the informal sector
- Operation of the FAE further lowers growth and enhances the “informalization” of the labor market