
This presentation analyzes Colombian industrial structure behavior and its regions between 1974 and 2005 to determine if the liberal reform at the end of the 20th century caused the industrial stagnation and its lack of diversification.
I am going to talk about:

- Introduction
  - Colombian economic
  - Economic and industrial growth
  - Productive transformation

- Liberal reform

- Econometric model using STATA
What was my goal:

• I wanted to know what happened with colombian industrial growth after Liberal Reform (1990 - 2005)

• Why does the industrial growth rate decrease after Liberal Reform?

• What is the Liberal Reform? It is a set of policy to reform the economy and democracy of the developing countries. For example, to open the markets (capital market, product market, financial market)

• In Latin American countries, Liberal Reform is named like Neo-liberal Model or Washington Consensus.
Where is Colombia?

Colombia is a country placed on the north of South America.
## Introduction

### Colombian Economic Indicators 2014

<table>
<thead>
<tr>
<th>Indicators</th>
<th>Value</th>
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</thead>
<tbody>
<tr>
<td>Population</td>
<td>47,661,787</td>
</tr>
<tr>
<td>Gross Domestic Product (GDP)(current US$)</td>
<td>377,739,622,866</td>
</tr>
<tr>
<td>GDP per capita (current US$)</td>
<td>7,720</td>
</tr>
<tr>
<td>Average annual growth rate GDP per capita, 1960 - 2014 (constant 2005 US$)</td>
<td>2.16%</td>
</tr>
<tr>
<td>Colombia GDP pc. with percent USA GDP pc</td>
<td>14%</td>
</tr>
<tr>
<td>GINI Coefficient</td>
<td>0.538</td>
</tr>
</tbody>
</table>

Source: World Bank and DANE
What happened?

- In 1950 our economic was very similar to the economic of Japan or South Korea.

- What happened in last 40 years?
Colombian Economic structure, 1965 - 2005

The Colombian industry lost weight in the economic in last 40 years. Why?

Colombian economy is specialized in service sector

Source: DANE

Why? Because the industrial growth was lower than other sectors

Source: DANE

Source: DANE

Before Liberal Reform
- Average annual growth rate 1974 - 1990: 4.4%

After Liberal Reform
- Average annual growth rate 1991 - 2005: 2.2%
- Average annual growth rate 1974 - 2005: 3.4%

Source: DANE

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</tr>
</thead>
<tbody>
<tr>
<td>Antioquia</td>
<td>5.60%</td>
<td>2.54%</td>
<td>5.58%</td>
<td>5.08%</td>
<td>-0.20%</td>
<td>0.23%</td>
<td>4.69%</td>
<td>1.32%</td>
</tr>
<tr>
<td>Atlántico</td>
<td>4.25%</td>
<td>2.19%</td>
<td>6.30%</td>
<td>4.59%</td>
<td>-2.98%</td>
<td>-0.32%</td>
<td>4.91%</td>
<td>0.47%</td>
</tr>
<tr>
<td>Bogotá</td>
<td>2.69%</td>
<td>4.56%</td>
<td>6.17%</td>
<td>4.90%</td>
<td>-0.11%</td>
<td>-2.24%</td>
<td>6.00%</td>
<td>1.05%</td>
</tr>
<tr>
<td>Bolívar</td>
<td>10.21%</td>
<td>3.59%</td>
<td>6.02%</td>
<td>6.84%</td>
<td>4.25%</td>
<td>8.30%</td>
<td>9.28%</td>
<td>7.03%</td>
</tr>
<tr>
<td>Cundinamarca</td>
<td>5.06%</td>
<td>5.10%</td>
<td>7.73%</td>
<td>6.19%</td>
<td>3.82%</td>
<td>2.68%</td>
<td>6.18%</td>
<td>4.14%</td>
</tr>
<tr>
<td>Valle del Cauca</td>
<td>3.56%</td>
<td>3.85%</td>
<td>6.86%</td>
<td>5.00%</td>
<td>0.26%</td>
<td>-1.60%</td>
<td>2.22%</td>
<td>0.36%</td>
</tr>
<tr>
<td>Promedio 6 dptos</td>
<td>4.09%</td>
<td>3.47%</td>
<td>6.16%</td>
<td>4.94%</td>
<td>0.10%</td>
<td>-0.24%</td>
<td>5.10%</td>
<td>1.52%</td>
</tr>
</tbody>
</table>

Source: DANE
State of the art

• There are many studies about industrial growth in Colombia, but none use econometric model to explain the decrease of growth rate in the industry after the Liberal Reform.

• I estimated a panel data econometric model to explain this situation.

\[
\text{Ln}\text{Va}_{ti} = \alpha + \text{Ln}\beta M_{ti} + \text{Ln}\beta X_{ti} + \partial_0 \text{Liberal} + \partial_0 AM_{ti} + a_1 + u
\]
The model

• I used the growth rate of industrial value added like dependent variable, and the growth rate of industry exports and imports like independent variables.

• I used a dummy of structural change to model the liberal reform effects

\[ \ln V_{at_i} = \alpha + \ln \beta M_{ti} + \ln \beta X_{ti} + \partial_0 \text{Liberal} + \partial_0 AM_{ti} + a_1 + u \]
The model

\[ \ln Va_{ti} = \alpha + \ln \beta M_{ti} + \ln \beta X_{ti} + \partial_0 \text{Liberal} + \partial_0 AM_{ti} + a_1 + u \]

- \( Va \): Value added
- \( M \): Imports
- \( X \): Exports
- \( \text{Liberal} \): Dummy of structural change to model the Liberal Reform Effects (Economic policy) = Apertura.
- \( AM \): Is a combination between Liberal and Imports variables
- \( i \): Industrial sectors
The model using Stata

Group variable: ciiurev2

Number of groups = 26

R-sq: within = 0.3157
between = 0.3987
overall = 0.2937

Obs per group: min = 31
avg = 31.0
max = 31

F (5, 775) = 71.52
Prob > F = 0.0000

corr(u_i, Xb) = 0.3220

| v_agregado         | Coef.  | Std. Err. | t     | P>|t|   | [95% Conf. Interval] |
|--------------------|--------|-----------|-------|-------|----------------------|
| exp_fob_dol        | 0.0401549 | 0.0164902 | 2.44  | 0.015 | 0.0077841, 0.0725256  |
| import_cif~1apertura | 0.0709439 | 0.0175765 | 4.04  | 0.000 | 0.0364406, 0.1054471 |
| ap_exp_fob         | -1.772652 | 0.3413612 | -5.19 | 0.000 | -2.442754, -1.102549 |
| ap_imp_cif         | 0.143164 | 0.0203813 | 7.02  | 0.000 | 0.1031548, 0.1831732 |
|                    | -0.0366925 | 0.0166474 | -2.20 | 0.028 | -0.0693719, -0.0040132 |
|                    | 18.2184   | 0.3601066 | 50.59 | 0.000 | 17.5115, 18.9253      |

| sigma_u | .89664234 |
| sigma_e | .33217938 |
| rho     | .87931548 |

(fraction of variance due to u_i)

F test that all u_i=0:  F(25, 775) = 184.79  Prob > F = 0.0000
The model using Stata

Random-effects GLS regression
Group variable: ciuurev2

|                     | Coef.  | Std. Err. | z     | P>|z|     | [95% Conf. Interval] |
|---------------------|--------|-----------|-------|---------|----------------------|
| v_agregado          |        |           |       |         |                      |
| exp_fob_dol         | .0425141| .0164658 | 2.58  | 0.010   | .0102416 -.0747865  |
| import_cif~l        | .0763502| .0173771 | 4.39  | 0.000   | .0422917 .1104087   |
| apertura            | -1.819885| .3419311 | -5.32 | 0.000   | -2.490058 -1.149712 |
| ap_exp_fob          | .1445436| .0204366 | 7.07  | 0.000   | .1044885 .1845986  |
| ap_imp_cif          | -.0362303| .0166752 | -2.17 | 0.030   | -.0689131 -.0035475|
| _cons               | 18.08508| .3909497 | 46.26 | 0.000   | 17.31883 18.85132  |

Number of obs = 806
Number of groups = 26

R-sq: within = 0.3156
between = 0.3966
overall = 0.3001

Obs per group: min = 31
avg = 31.0
max = 31

Random effects u_i ~ Gaussian
corr(u_i, X) = 0 (assumed)

Wald chi2(5) = 363.39
Prob > chi2 = 0.0000

sigma_u = .81119464
sigma_e = .33217938
rho = .85639507 (fraction of variance due to u_i)
Conclusion

• The Liberal Reform in Colombia affects the industrial growth due to the increase of the imports, and to the appreciation of the Colombian currency (exchange rate).

Thank you