# 1. MOTIVATION

- **Global gross domestic product will increase over the next two decades, at least.**

- **Over the next few decades, global primary energy consumption is expected to continue changing.**

- **In addiction, energy consumption will most likely increase over the next two decades, at least, driven by emerging economies.**

- **It will lead to the design of energy policies that face the new concerns.**
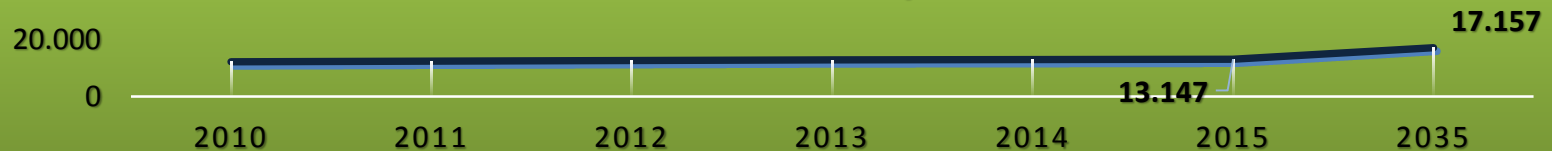
# 1. MOTIVATION

## GDP BILLIONS OF US DOLLARS (2035 PREVISION)

| | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2025 | 2035 |
|---|------|------|------|------|------|------|------|------|

200
100
0

68

128

## PRIMARY ENERGY CONSUMPTION MTOE (2035 PREVISION)

| | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2035 |
|---|------|------|------|------|------|------|------|

20.000
0

13.147

17.157

# 1. MOTIVATION

**Frequently primary energy consumption or primary energy supply are used as a energy consumption proxy.**

*Primary energy supply = Indigenous production + imports – exports - international marine bunkers - international aviation bunkers +/- stock changes*

# 1. MOTIVATION

**Research Question:**

*Do the energy supply impacts on economic growth equal than energy consumption?*

*By using a panel autoregressive distributed lag (ARDL) the augmented energy-growth nexus with globalization is explored.*

# 2. METHODOLOGY

## Data:

- Gross Domestic Product (constant 2010 US$ - World Bank);

- Primary Energy Consumption (BP 2016);

- Primary Energy Supply (IEA 2016);

**43 countries, from 1971 to 2013.**

- Total Population (World Bank);

- KOF Index of globalization (http://globalization.kof.ethz.ch/).

*The variables revealed to be I(0) and I(1).*

# 2. METHODOLOGY

## A panel ARDL approach was followed because:

- It allows to handle with $I(0)$ and $I(1)$ variables;

- Is robust to the presence of endogeneity;

- Allows to correct outliers with impulse dummies;

- When a parameter is significant it is identical for testing Granger causality.

The general UECM form is represented as follows:

$$\mathbf{DLY_{it}}$$

$$= \alpha_{1i} + \delta_{1i}\mathbf{TREND} + \sum_{j=1}^{k} \beta_{21ij}\mathbf{DLY_{it-j}} + \sum_{i=0}^{k} \beta_{22ij}\mathbf{DLX_{it-i}} + \ldots$$

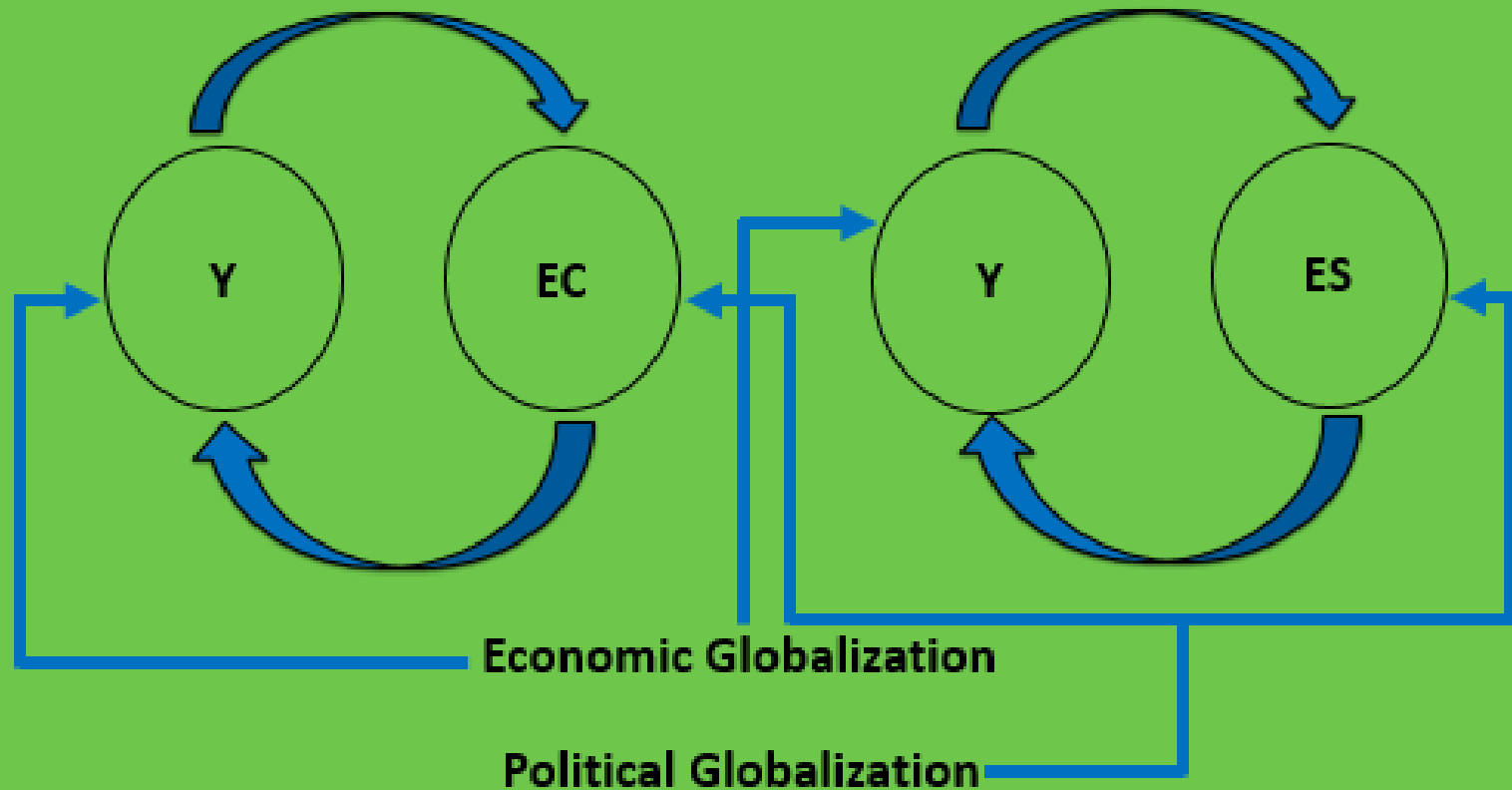$$+ \gamma_{21i}\mathbf{LY_{it-1}} + \gamma_{22i}\mathbf{LX_{it-1}} + \cdots + \varepsilon_{1it},$$

where prefix "L" denotes natural logarithm and "D" the first difference of the variable, $\alpha_{1i}$ denotes the intercept, $\delta_{1i}$, $\beta_{2kij}$, $k = 1, \ldots, m$, and $\gamma_{2im}$ the estimated parameters, and $\varepsilon_{1it}$ the error term.

Cross-section dependence was detected. For this reason the **Driscoll and Kraay** estimator was used.
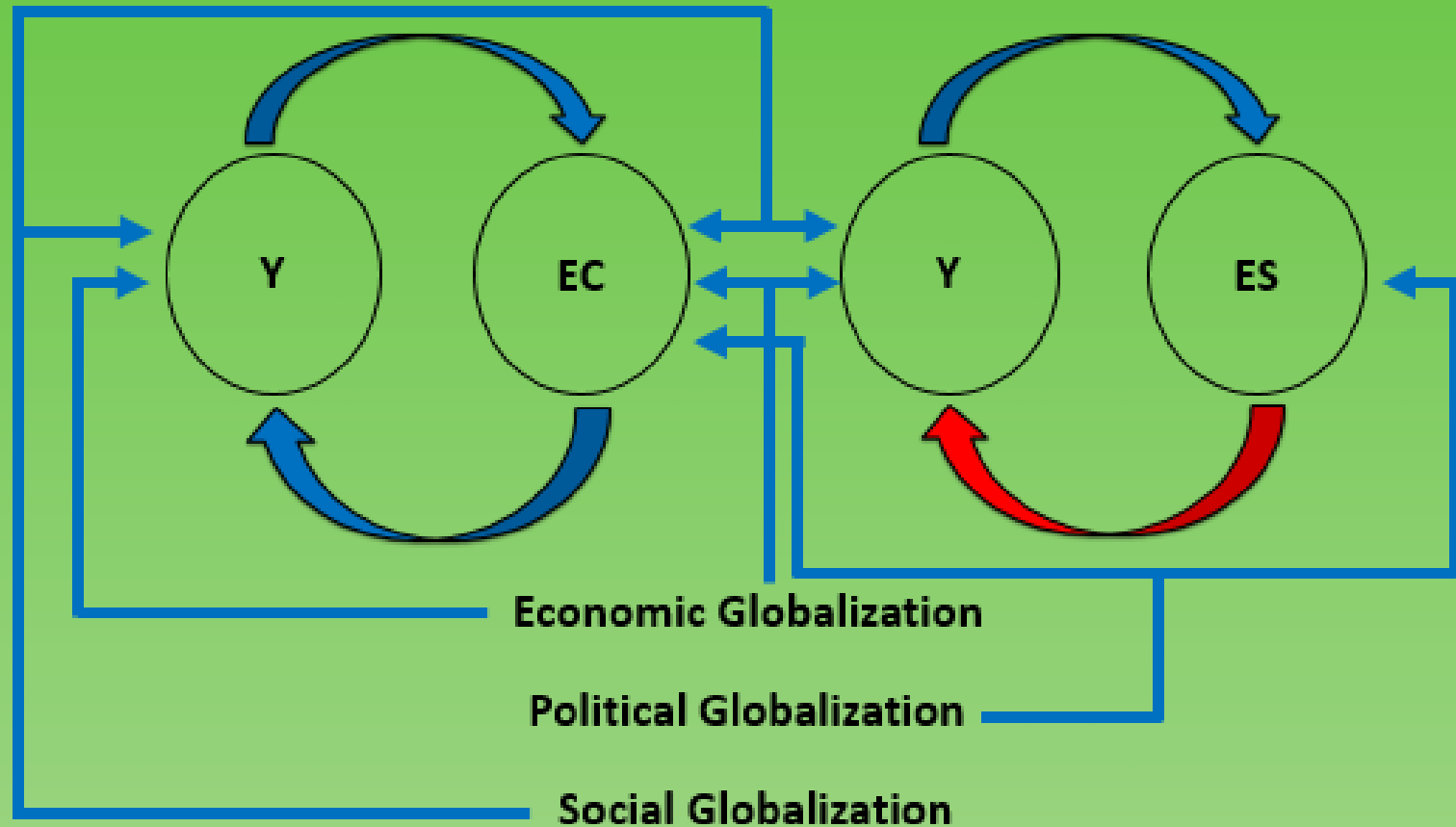
# 3. RESULTS



Short-run:

Y — Economic Growth; EC — Energy Consumption; ES — Energy Supply; ➡ Denotes Causality; ➡ Denotes No Causality.

**Long-run:**



Y – Economic Growth; EC – Energy Consumption; ES – Energy Supply;
→ Denotes Causality; → Denotes No Causality.

# 4. CONCLUSIONS

| Energy consumption-Economic growth: | Energy supply-Economic growth: | Long-run globalization energy consumption : | Long-run globalization on energy supply: |
|---|---|---|---|
| Long-run Feedback Hypothsis | Long-run Growth Hypothesis | The three dimensions causes energy consumption | Political globalization drives energy supply |

# 4. CONCLUSIONS

Energy consumption impacts were expected to be close to energy supply.

The promotion of foreign trades, direct investment, international tourism, among others will most likely cause economic growth and energy consumption.

Increase energy efficiency as a global goal could prevent the possibility of inefficient energy consumption caused by economic growth and globalization

When more data is available it will be possible to go further on this research, namely by making the sample closest to a globe measure.