

Sectoral Purchasing Power Parities for Latin American Economies

Presentation to the Sixth World KLEMS Conference 2021
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Objective: PPPs for output and inputs for LA economies

- Construct PPPs for gross output, intermediate inputs and value added at the industry level for LA economies
- 8 LA economies: Chile, Colombia, Costa Rica, El Salvador, Guatemala, Mexico, Peru and the Dominican Republic
- 9 sectors: Agriculture; Mining; Manufacturing; Electricity, gas, and water supply; Construction; Wholesale and retail trade; Transport and storage and communication; Finance, insurance, real estate, and business services; and Community social and personal services
- Reference year: 2011

Outline

- Methodology
- Data
- Estimates
- Conclusion

Methodology

- The methodology for sectoral PPPs and industry productivity comparison are pioneered by Jorgenson et al. (1987) and Caves, Christensen and Diewert (1982).
- It has been adopted in international comparison initiative such as World KLEMS and many country level studies (Inklaar, Timmer and van Ark, 2006)

Methodology

- The methodology starts with data on SUTs and PPPs at the product level.
 - Supply tables at basic prices and use tables at purchaser price. Those tables are published in most countries following SNA standards and are fully consistent with the data requirement for PPPs estimation for productivity level comparison
 - PPPs at the product level. Those data are collected for ICP project of the World Bank and UNSD and OECD-Eurostat PPP program and are used for the comparison of GDP per capita from expenditure side.
- The PPPs at the product level are then aggregated to derive PPPs for gross output, intermediate inputs, and value added at the industry level, using information from SUTs as weights.

Aggregation method

- CCD multilateral translog index is used for such aggregation. It is transitive and base country independent.
- An average of all countries is used as benchmark for comparison with other countries
- PPP for gross output is estimated as:

$$PPP_c^o = \sum_i \hat{v}_{ic} \left(\ln p_{ic}^o - \overline{\ln p_i^o} \right)$$

- $P(ic)$: The relative price of output i in country c , expressed in domestic currency relative to the US dollars
- $P(i)$: a geometric average of price of output i over all countries included
- $v(ic)$, average share of output i between country c and the constructed benchmark economy

Aggregation method

- The same CCD multilateral index is used to construct PPP for intermediate inputs.
- PPPs for value added is derived using double deflation based on CCD index aggregation.
- PPPs at the industry level is aggregated to total economy to derive PPPs for GDP for total economy (bottom-up approach).

Data sources - SUTs

- Supply table at basic price and use tables at purchaser price for LA economies
 - OECD database on SUTs for Chile, Columbia, Mexico and Costa Rica, 72 products by 72 industries
 - SUTs from individual countries for Peru, Dominican Republic, El Salvador and Honduras. Rectangular SUTs, which are transformed to square table, using market share assumption. The table are aggregated to 72 industries and 72 products. For a few countries such as Honduras, the data are more aggregated.
- The final set of SUTs for PPPs estimation includes 9 sectors and 72 products.

Data sources – PPPs at product level

- PPPs at 155 basic headings from ICP 2011, expressed as domestic currency per US dollar
- They are mapped to 72 products to obtain PPPs for the 72 products.

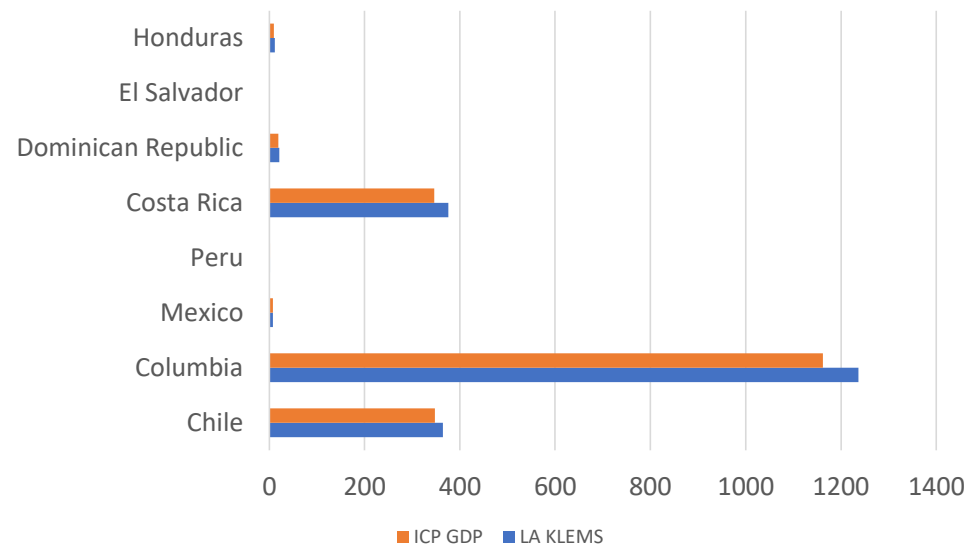
Data sources – PPPs at the product level

- ICP collects PPPs for products used for final expenditures. PPPs are not available for the products that are mainly used for intermediate inputs such as crude oil and mining products. Exchange rates or GDP PPPs are used as proxy.
- PPPs from ICP are based on market price. For productivity comparison, gross output is valued at basic price and intermediate inputs are valued at purchaser price.
- To estimate PPPs for gross output, PPPs from ICP for purchaser price (market price) are converted to basic prices by peeling off transport and trade margins and net product taxes, which are available from SUTs.

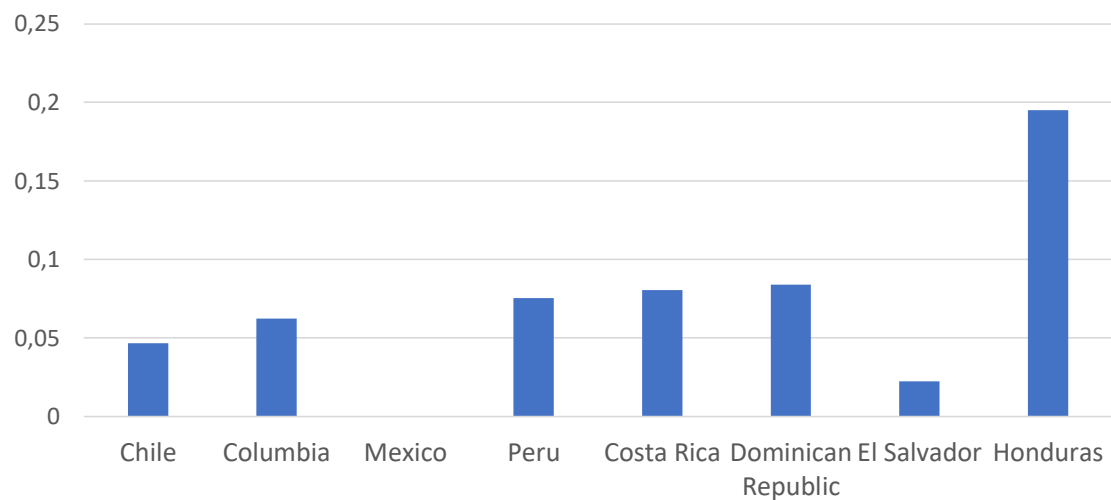
LA KLEMS Sectoral PPP data bases

- PPPs for gross output, 9 sectors and total economy, 2011
- PPPs for intermediate inputs, 9 sectors and total economy, 2011
- PPPs for value added, 9 sectors and total economy, 2011

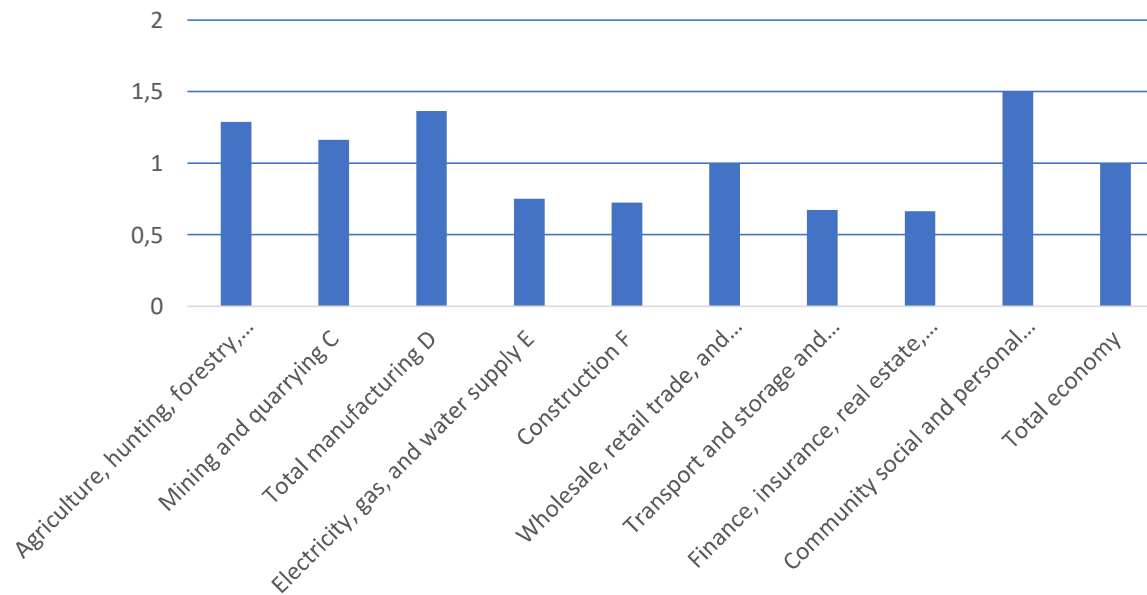
PPPs for GDP in total economy, LA KLEMS vs ICP, 2011 (National currency per US dollars)



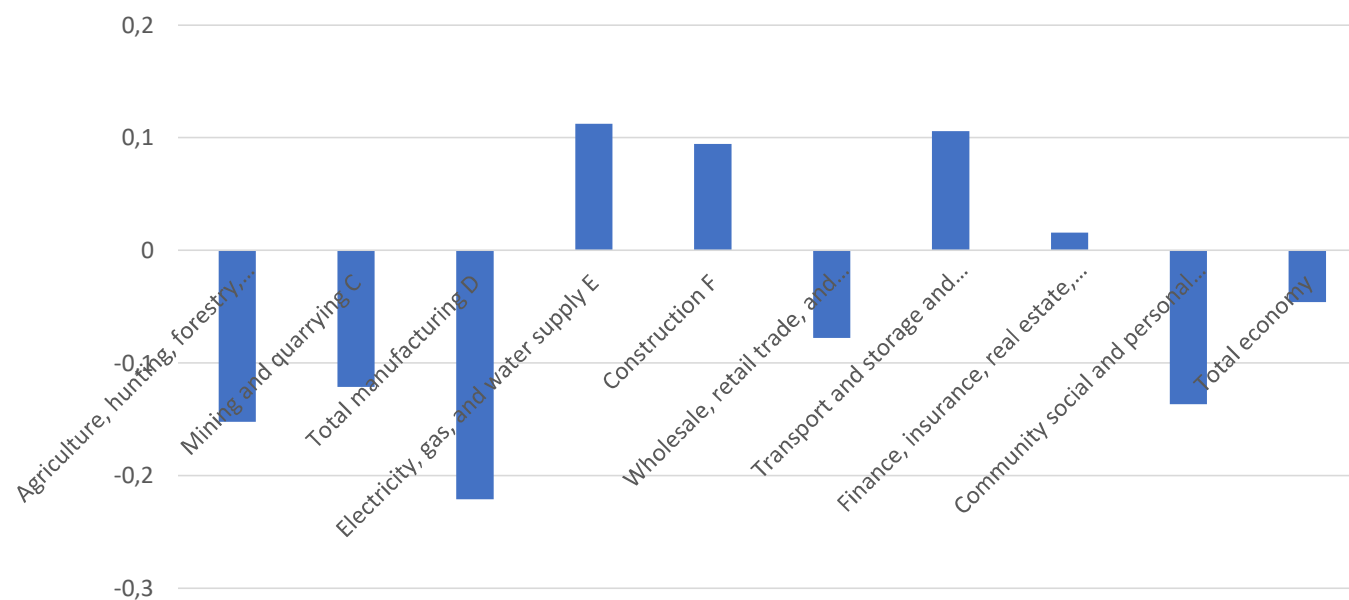
Log differences of PPPs for GDP in total economy, LA KLEMS over ICP, 2011



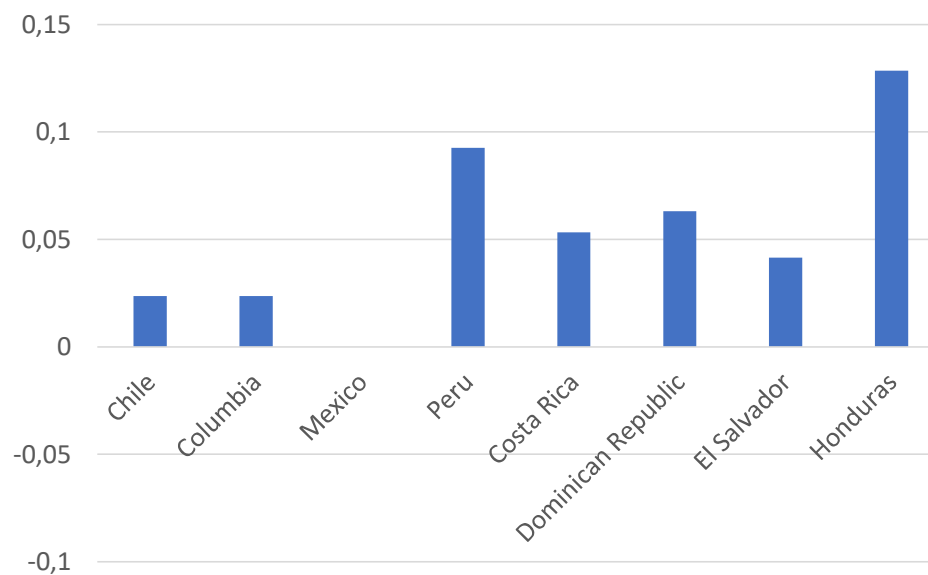
PPPs for Value Added by sector, total economy = 1, median over LA economies



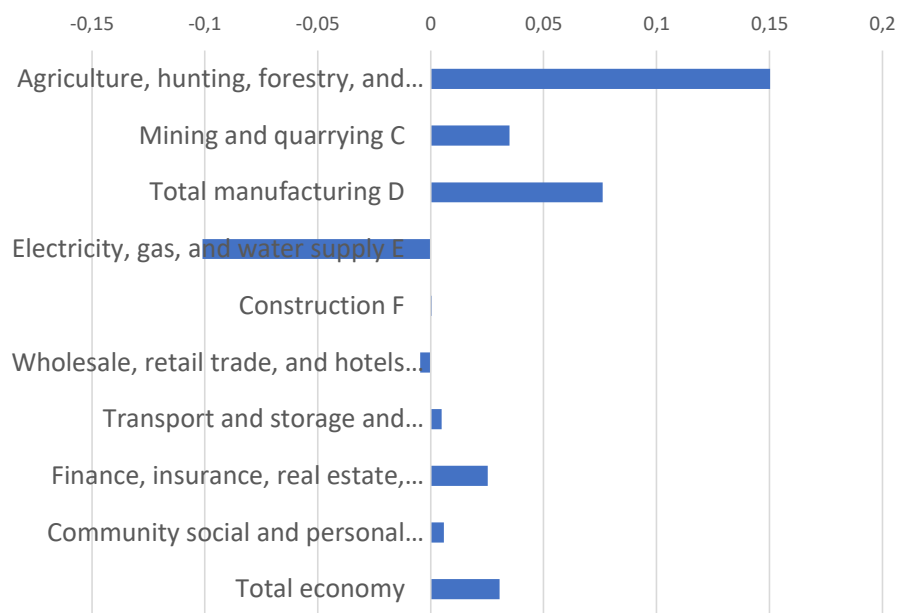
Log differences in PPPs for value added and gross output by sector



Log differences in PPPs for GDP in total economy, with and without adjustment for taxes and margins

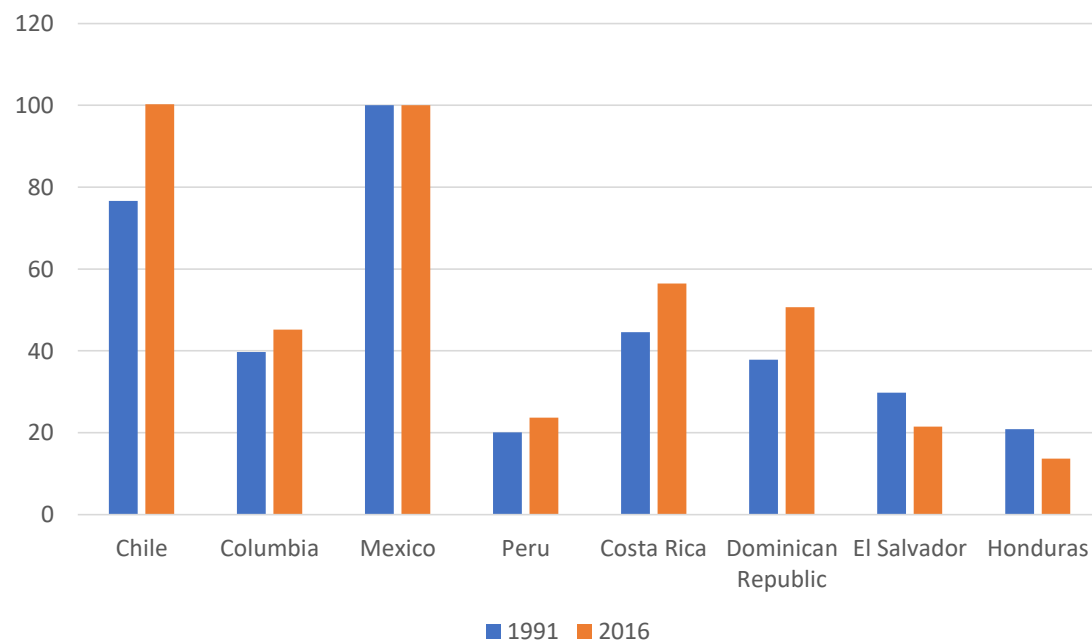


Log differences in PPPs for output, with and without adjustments for tax and margins

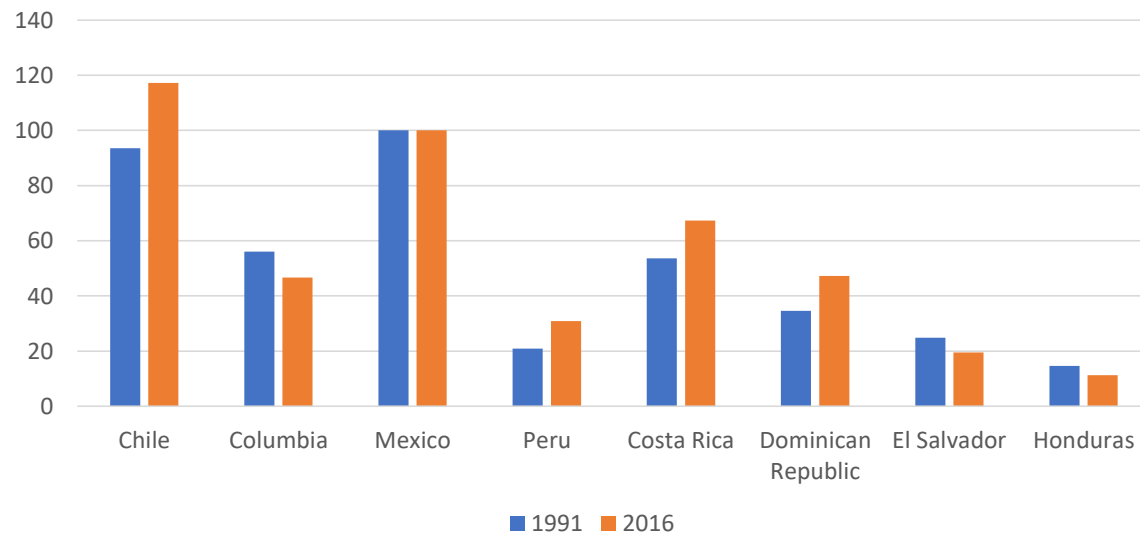




Relative labour productivity levels, total economy, Mexico = 100



Relative labour productivity levels, Manufacturing, Mexico = 100



Conclusions

- Main data used for constructing sectoral PPP are available for a large number of economies: SUTs and PPPs at product level
- Those data improved significantly over time as the demand for such data increased for our understanding of global production and international competitiveness
- The main challenges remains:
 - PPPs from ICP are available for final demand products, but not available for intermediate inputs. The challenge have be addressed with success (Inklaar, Timmer and van Ark, 2006)
 - SUT tables are too aggregated for some economies