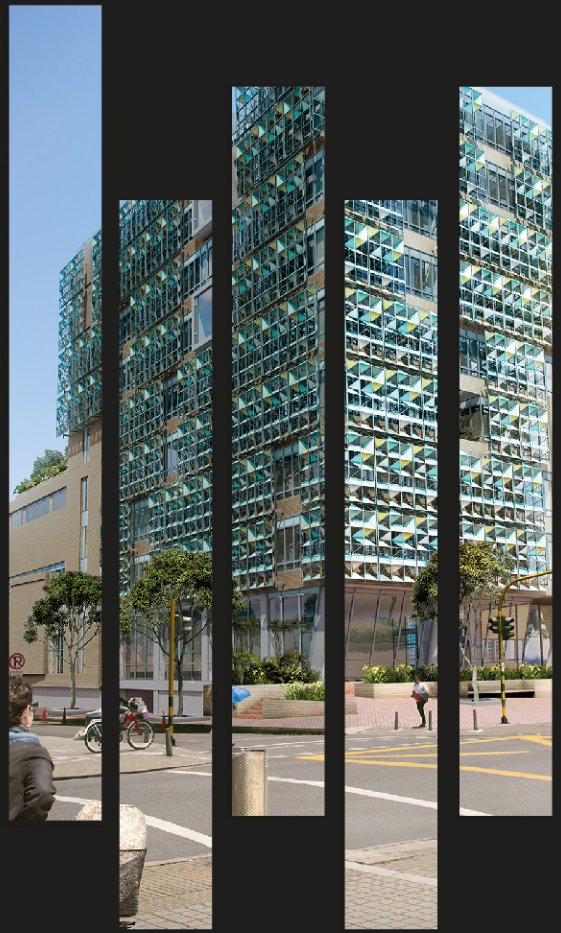

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The environmental impact of ‘services in a box’ trade:
Mode 5 trade meets Scope 3 emissions. The case of Bogotá.

VIII Encuentro de REDLAS
7 y 8 de noviembre de 2019
Universidad Ean

Enrique Gilles - Universidad Ean

Contents

- Mode 5, Scope 3, Services in a Box?
- Globalization, global value chains and the climate crisis
- To what extent do goods' exports involve emissions in services? The case of Bogota

GATS - Modes of services supply

- Mode 1: cross-border
- Mode 2: customer purchases while abroad
- Mode 3: commercial presence abroad by service firm
- Mode 4: a worker crosses temporarily a border to provide a service
- **Mode 5: services embedded in goods trade.**

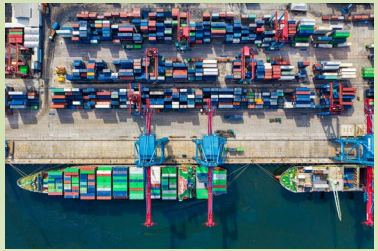
Mode 5: “Services in a Box”

R&D

Design

Business services

Transport



Services inputs (like engineering, design, banking, software and logistics) play an increasingly important role in global manufacturing as a direct contributor to the value-added incorporated in manufacturing products. (Cernat et al., 2017)

Scope 3 emissions

- GHG Protocol - the standard to calculate carbon footprints.
- It includes:
  - Scope 1 – direct emissions
  - Scope 2 – emissions embodied in energy use
  - Scope 3 – emissions embodied in purchases: Consumption-based accounting

- This research: emissions generated in the service Sector by the exports of goods, or when “mode 5 meets scope 3”.

International trade matters

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“Globalization has led to an increasing geospatial separation of production and consumption, and, as a consequence, to an unprecedented displacement of environmental and social impacts through international trade.” Wiedmann & Lenzen (2018).

With international trade we are exchanging:

- Goods & Services
- Value added
- Jobs
- **Emissions**

Carbon footprint

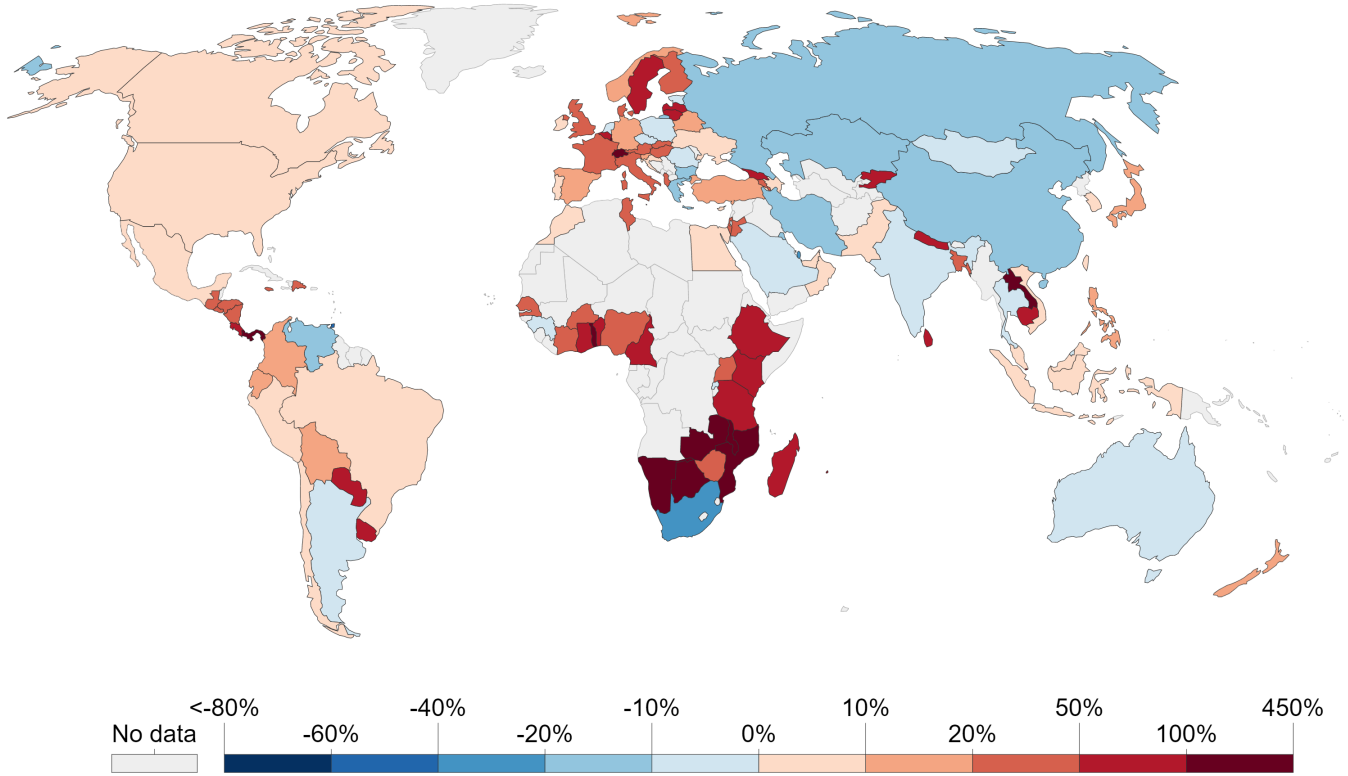
C02 emissions directly and indirectly caused by an activity (Wiedmann & Minx, 2006)

Consumption-based responsibility approach vs. the more standard production based approach.

CO_2 emissions embedded in trade, 2016

Share of carbon dioxide (CO_2) emissions embedded in trade, measured as emissions exported or imported as the percentage of domestic production emissions. Positive values (red) represent net importers of CO_2 (i.e. "20%" would mean a country imported emissions equivalent to 20% of its domestic emissions). Negative values (blue) represent net exporters of CO_2.

Our World in Data



Source: Peters et al. (2012 updated); Global Carbon Project (2018)

Cities matter

A large share of population lives in cities (60% in 2050)

Cities are dependent on other regions for food and other goods, leaving a carbon footprint throughout the world.

Economic development means more urbanization thus the role of cities on carbon footprints will increase.

¿Which will be the effects of a more urban world, together with changes on lifestlyes?

The case of Bogotá

Assessing Consumption-Based Carbon Emissions for the City of Bogotá, Colombia.

Gilles, Enrique; López, Luis-Antonio; Cadarso, María-Ángeles; Ortiz, Mateo. Joint Project by Universidad Ean & Universidad de Castilla La Mancha

Methodology: nesting Bogotá's IOT into OECD's ICIO (TiVA)

	Intermediate Consumption			Final Demand		
	BOG	R_COL	Rest of the World	BOG	R_COL	Rest of the World
Bogota	**Zd BOG**			**Yd BOG**		
Rest of Colombia		**Zd R_COL**			**Yd R_COL**	
Rest of the World			**Zd RoW**			**Yd RoW**
Value Added						
Output						

Method: Environmentally extended MRIO

$$\boldsymbol{F} = \underbrace{\hat{\mathbf{e}}(\boldsymbol{I} - \boldsymbol{A})^{-1}}_{\boldsymbol{P}} y$$

$$PBA_i = \sum_j^r F_{ij}$$

Production-based Accounting

$$F = \begin{bmatrix} F^{11} & F^{12} & F^{13} \\ F^{21} & F^{22} & F^{23} \\ F^{31} & F^{32} & F^{33} \end{bmatrix} = \begin{bmatrix} P^{11} & P^{12} & P^{13} \\ P^{21} & P^{22} & P^{23} \\ P^{31} & P^{32} & P^{33} \end{bmatrix} \begin{bmatrix} \hat{y}^{11} & \hat{y}^{12} & \hat{y}^{13} \\ \hat{y}^{21} & \hat{y}^{22} & \hat{y}^{23} \\ \hat{y}^{31} & \hat{y}^{32} & \hat{y}^{33} \end{bmatrix}$$

$$CBA_j = \sum_i^r F_{ij}$$

Consumption-Based Accounting
or
Carbon Footprint

Data sources

ALCALDÍA MAYOR DE BOGOTÁ D.C.

OECD BETTER POLICIES FOR BETTER LIVES

iea International Energy Agency Secure Sustainable Together

DANE DEPARTAMENTO ADMINISTRATIVO NACIONAL DE ESTADÍSTICA

Bogotá's IOT

48 Sectors

MRIO IOT (Inter-Country IO)

65 Regiones

36 Sectors

CO_2 emissions

Emissions intensities

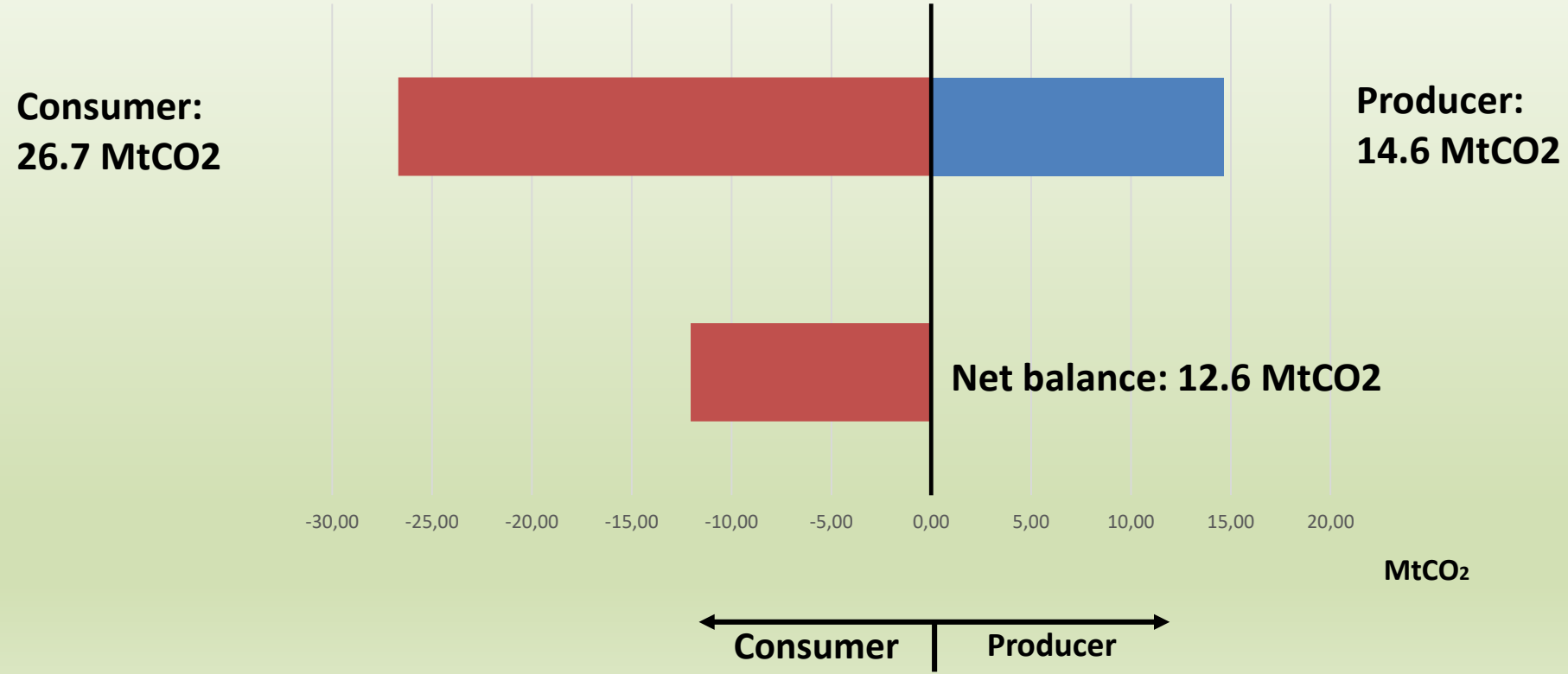
32 sectors

International trade

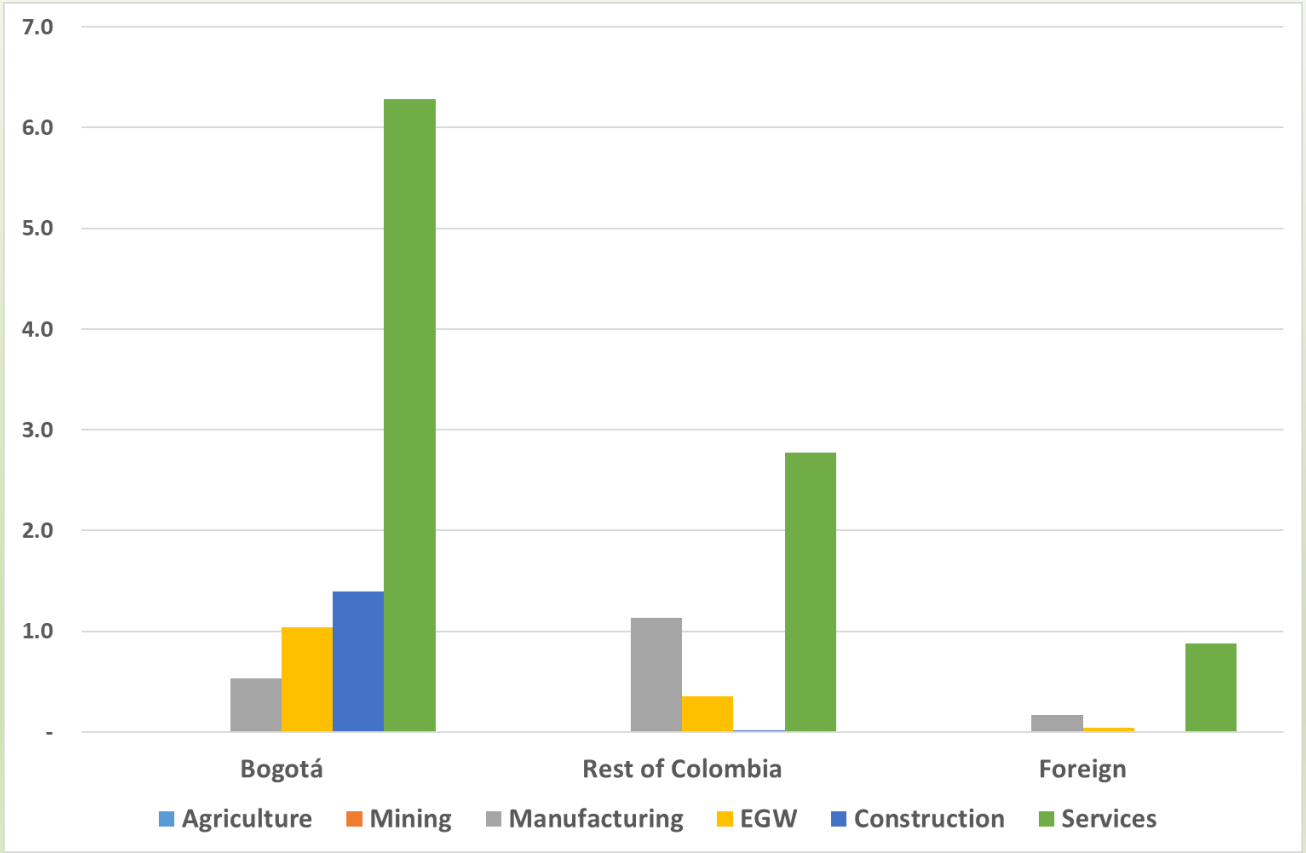

Results

Bogotá:

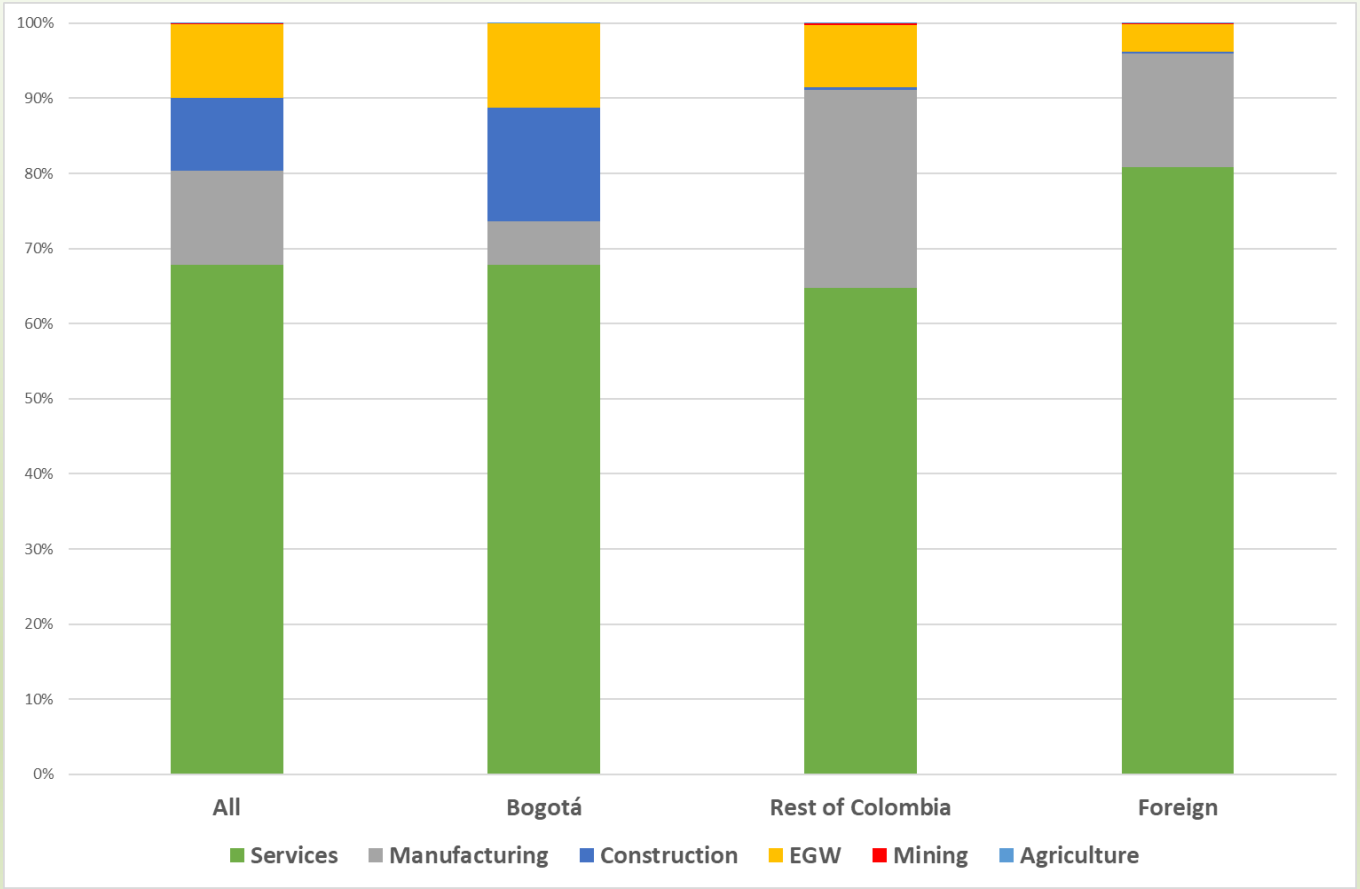
Emissions according to Consumption and Production approaches



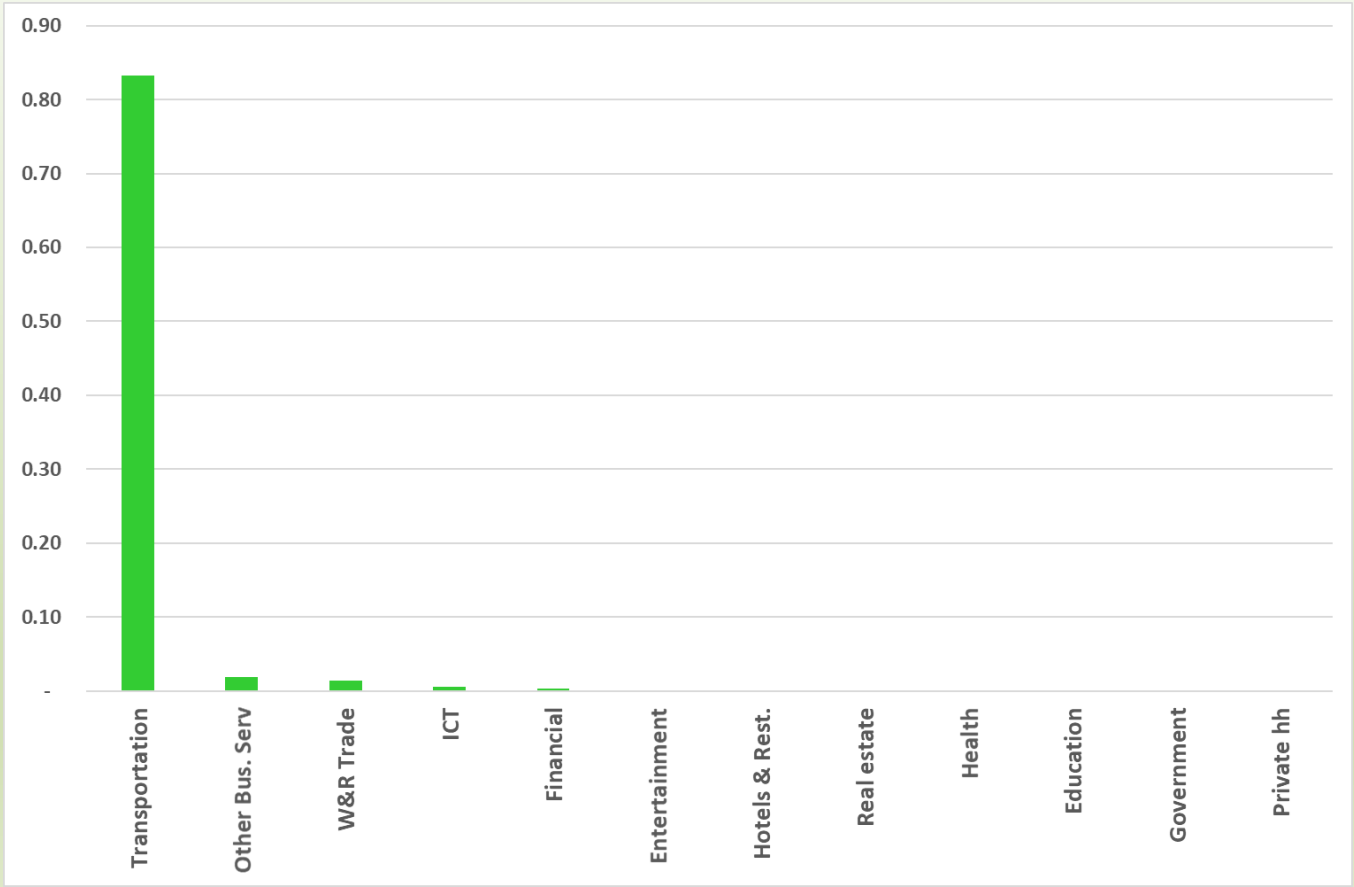
Emissions in Bogotá sectors by origin of final demand (levels)



Emissions in Bogotá sectors by origin of final demand, (in %)



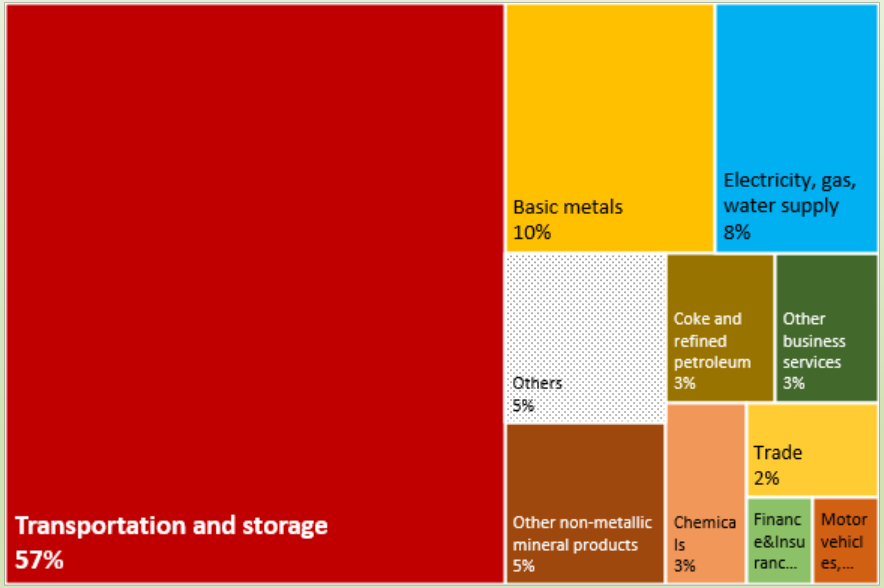
Inside Services: Emissions generated by foreign demand



Emissions embedded in Bogota's exports, by industries

Embedded in exports to the Rest of Colombia

29% of Bogota PBA



Embedded in exports to the Rest of the World

5% of Bogota PBA

Sum up

- Globalization makes production and consumption places increasingly independent
- Urbanization process worldwide will not stop soon: expect more and bigger cities
- The majority of the carbon footprint of Bogota’s exports is in the Services
- Services are relatively clean, except for one big polluter: Transportation. Efforts have to be made in this sector in order to provide a cleaner environment.

Muchas gracias

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