Workshop on Trade Policy and Trade Indicators

Module 2.5

UNITED NATIONS

ECLAC

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Grubel-Lloyd Index (1)

- Measures the degree of trade within the same branch at the product level, i.e. the intra-industrial trade.
- Mechanically, the share of intra-industry trade rises with the level of sectoral aggregation
- It is recommended to use SITC at 3 digits for analysis of industries.

For Industries

$$GLI_{ij}^{k} = 1 - \frac{\left|X_{ij}^{k} - M_{ij}^{k}\right|}{X_{ij}^{k} + M_{ij}^{k}}$$

Grubel-Lloyd Index (2)

- The calculation can be performed for only one sector or for the country's total. At the same time, for groups of countries it must be weighted.

For Countries

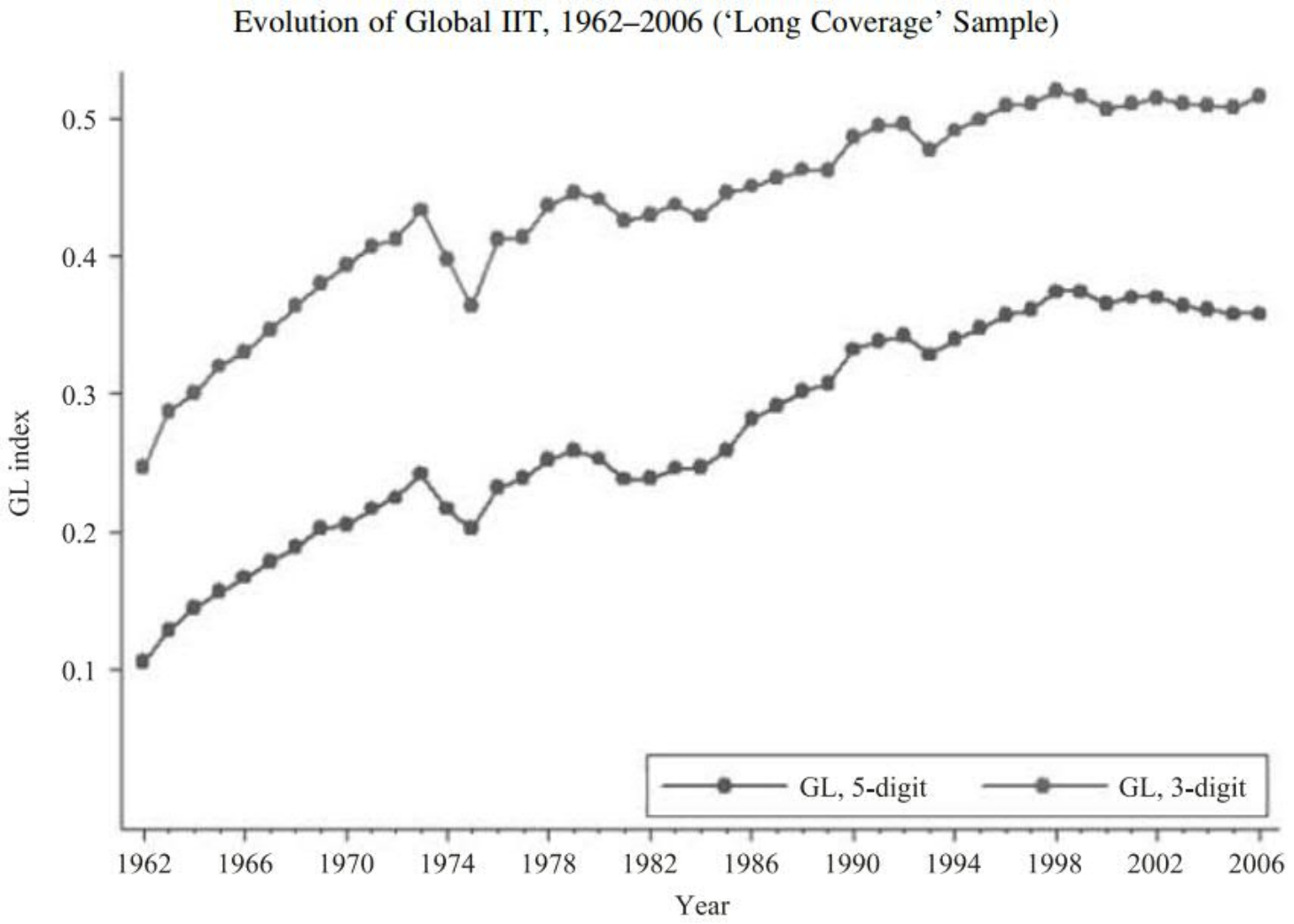
$$GLI_{ij} = \sum_{k=1}^{K} w_{ij}^{k} GLI_{ij}^{k}$$

$$GLI_{ij} = 1 - \frac{\sum \left| X_{ij}^{k} - M_{ij}^{k} \right|}{\sum \left(X_{ij}^{k} + M_{ij}^{k} \right)}$$

Grubel-Lloyd Index (3)

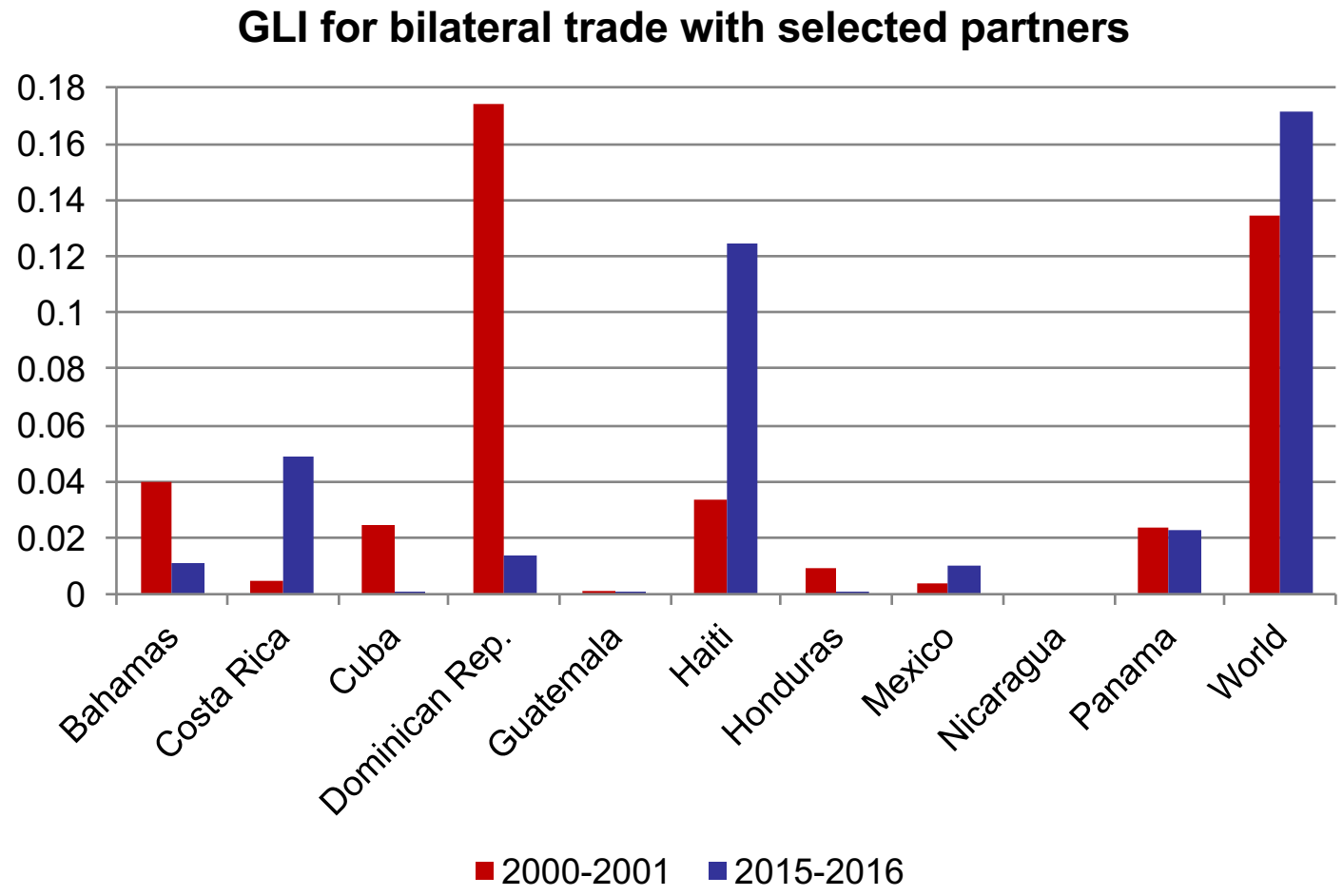
- The index gives results between 0 and 1 whereby three levels are defined:
  - greater than 0.33 (indications for intra-industrial trade),
  - greater than 0.10 but smaller than 0.33 (potential intra-industry trade),
  - and smaller than 0.10 (inter-industrial relations).

Grubel-Lloyd Index (4)



Source: Brülhart (2009)

Grubel-Lloyd Index (5)



Source: Authors based on data from COMTRADE.

Note: Each bar represents an average of the annual index. Sectorial data: SITC Rev2 3 digits

Trade Overlap Index

- Measures the level of specialization within a sector relative to the trade between distinct sectors, thereby showing the degree of liberalization and integration of the economy in the international market.
- Its value lies between 0 (inter-) and 1 (intra-industrial trade).

$$TO = 2 * \frac{\sum_{k=1}^{n} \min\left(X^k, M^k\right)}{\sum_{k=1}^{n} \left(X^k + M^k\right)}$$

Herfindahl-Hirschman Index (HHI)

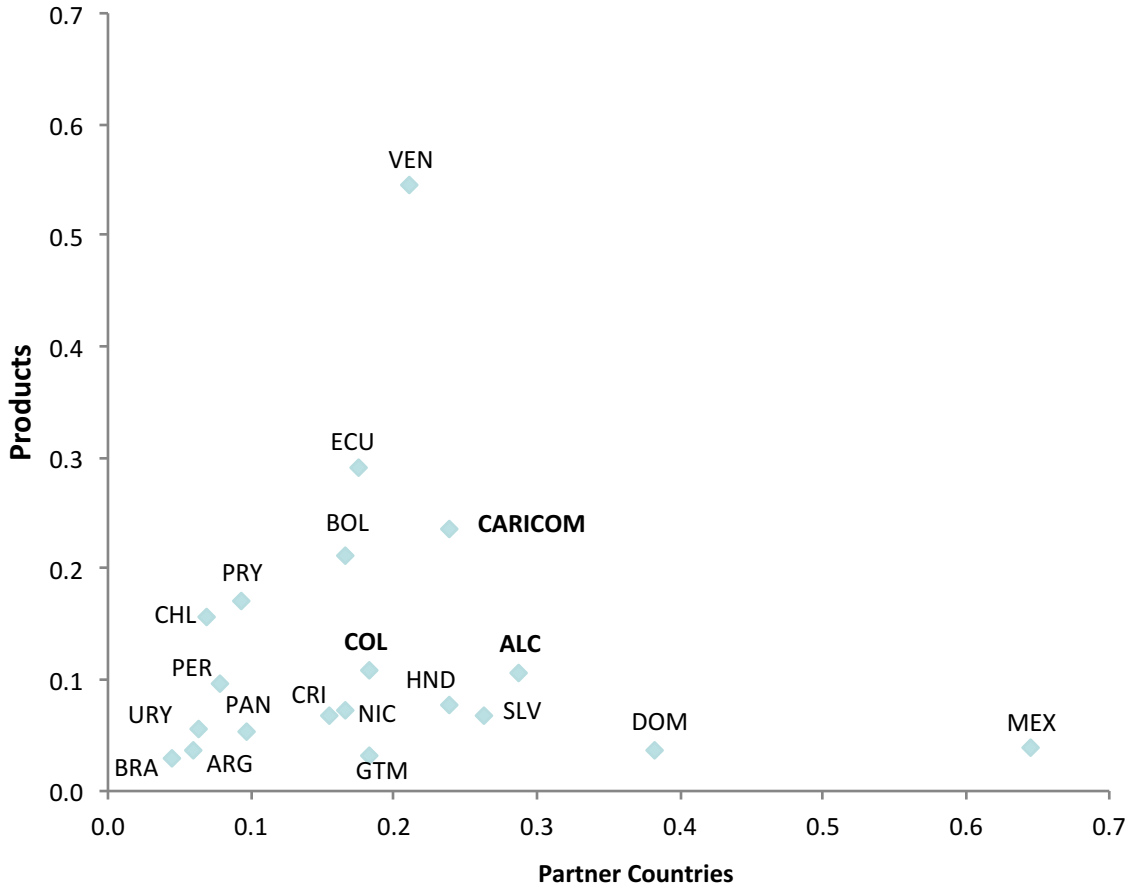
- Measures the degree of diversification/ concentration by weighting each product or trade partner according to its relevance in total trade.
- The normalized index varies between 0 and 1.
- Values greater than 0.18 : “concentrated” trade
- Value between 0.10 and 0.18: “moderately concentrated” trade
- Value between 0 and 0.10 : “diversified” trade

$$HHI = \frac{\left(\sum_{j=1}^{n} p_i^2 - \frac{1}{n}\right)}{1 - \frac{1}{n}}$$

$$p_k = \frac{x_k}{\sum_{k=1}^{n} x_k}$$

Analysis of the Herfindahl-Hirschmann Index (1)

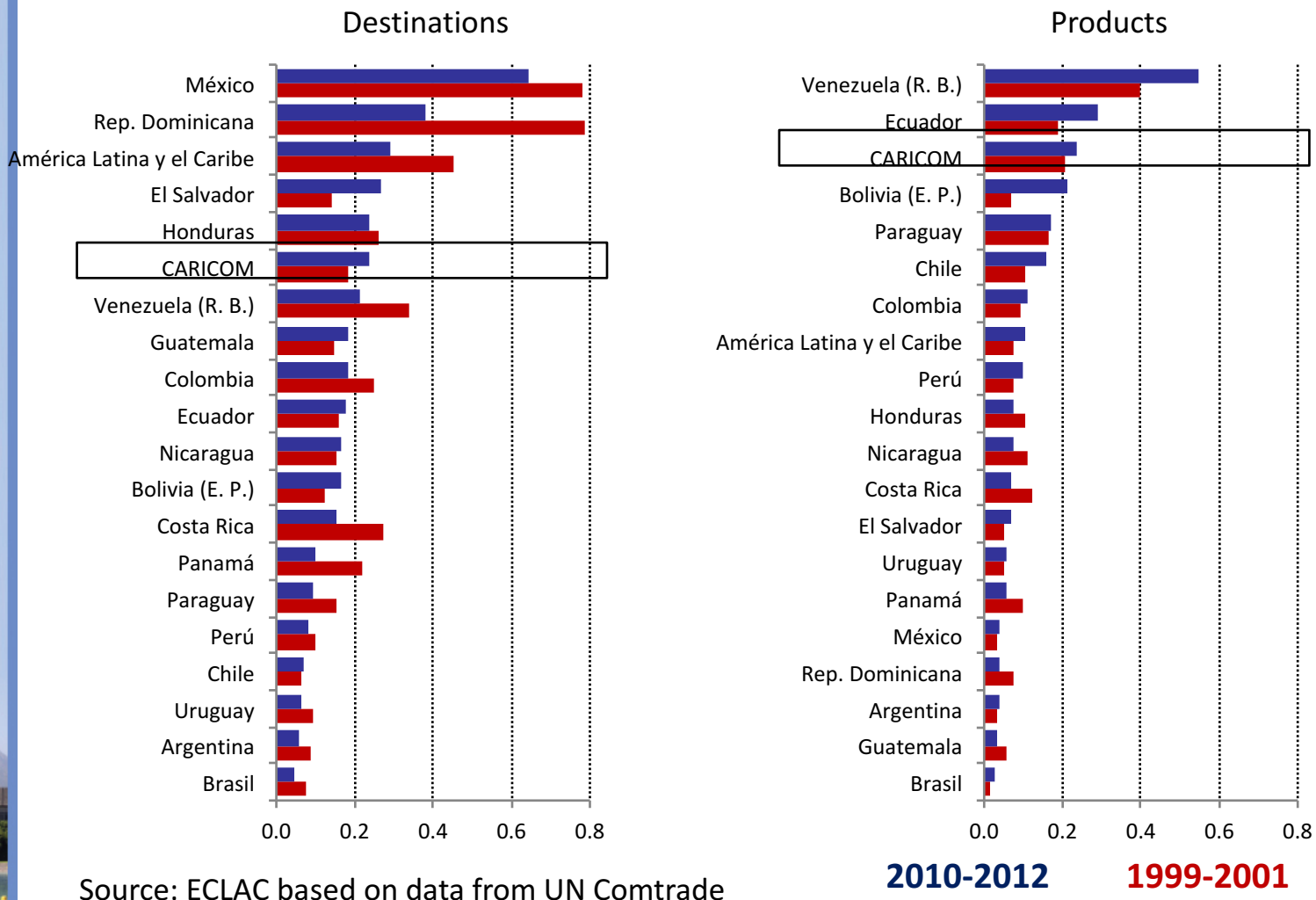
Latin America and the Caribbean: HHI combined for Destinations and Products, 2010-2012



Source: ECLAC based on data from UN Comtrade

Analysis of the Herfindahl-Hirschmann Index (2)

Latin America: Development of the HHI, 1999-2001 and 2010-2012



Source: ECLAC based on data from UN Comtrade

Theil Index

- Diversification measure: alternative to the HHI

$$TI = \frac{1}{n}\sum_{k=1}^{n}\frac{x_k}{\mu}\ln\left(\frac{x_k}{\mu}\right) \qquad \mu = \frac{\sum_{k=1}^{n} x_k}{n}$$

- It can be decomposed in two parts: the degree of diversification between a group and the other within each group (e.g. at different digits from a classification)

$$TI = T_b + T_w$$

Theil Index

- Between-group component:

$$T_b = \sum_{j=0}^{G} \frac{n_j}{n} \frac{\mu_j}{\mu} \ln\left(\frac{\mu_j}{\mu}\right)$$

- Within-group component:

$$T_w = \sum_{j=1}^{G} \frac{n_j}{n} \frac{\mu_j}{\mu} T_j$$

$$T_w = \sum_{j=1}^{G} \frac{n_j}{n} \frac{\mu_j}{\mu} \left[\frac{1}{n_j} \sum_{k \in j} \frac{x_k}{\mu_j} \ln\left(\frac{x_k}{\mu_j}\right) \right]$$

- Cadot, Carrere & Strauss-Kahn (2013)

Intra-Regional Trade Index (IRT)

- Perhaps the best known and simplest indicator to measure the importance of intraregional trade flows.
- It relates the total mutual trade between members of a customs union or trade agreement to the trade of the group of countries with the entire world.
- It directly shows which share of the grouping's total trade takes place between the members.

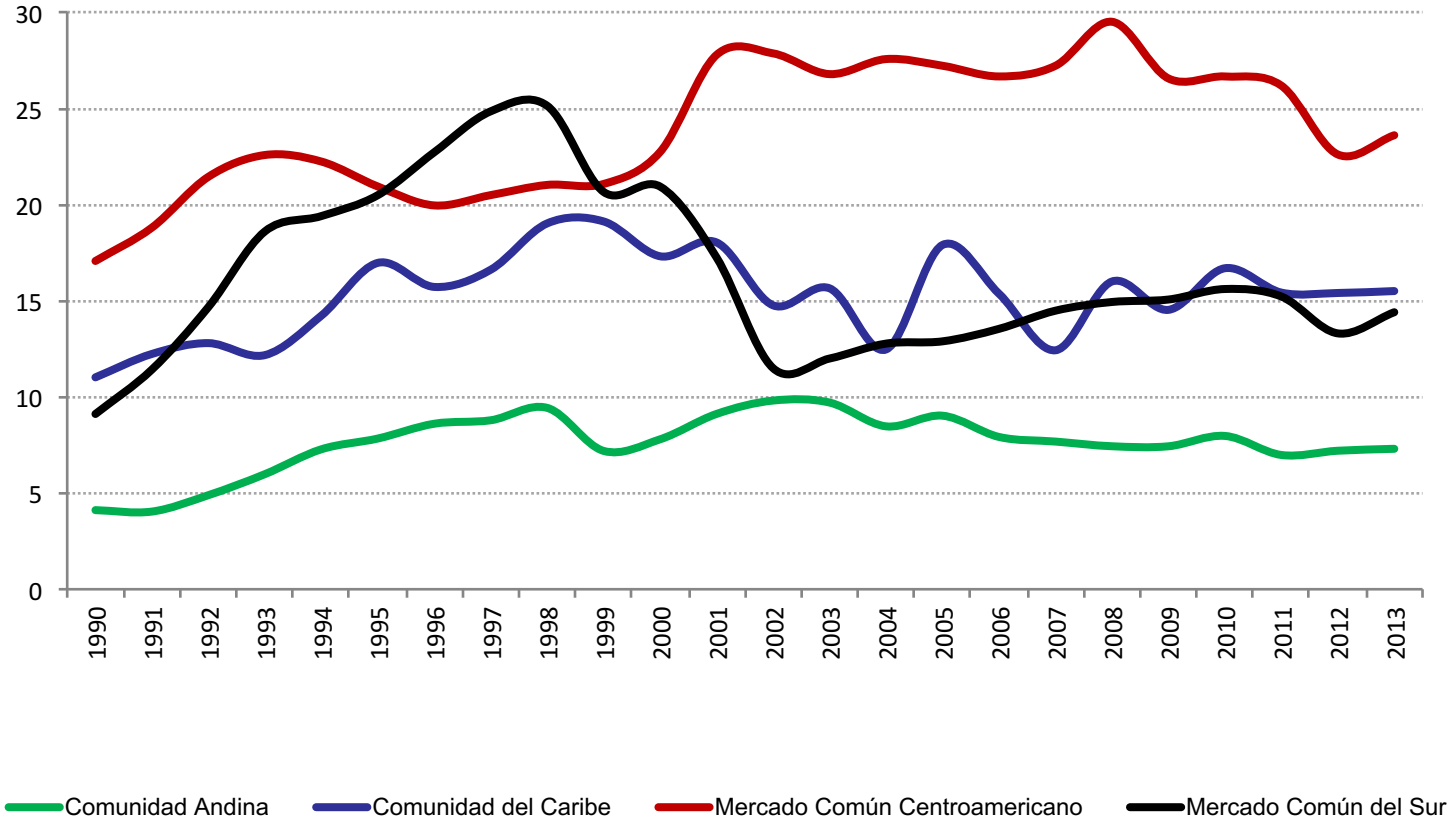
$$IRT - \text{exports} = \sum_{i=1}^{n} x_{ij} \,/\, \sum_{i=1}^{n} X_i^{Total}$$

$$IRT - \text{imports} = \sum_{i=1}^{n} m_{ij} \,/\, \sum_{i=1}^{n} M_i^{Total}$$

$$IRT - \text{trade} = \sum_{i=1}^{n} (x_{ij} + m_{ij}) \,/\, \sum_{i=1}^{n} \left(X_i^{Total} + M_i^{Total} \right)$$

Analysis of Intra-Regional Trade

Integration Schemes: Development of Intra-Regional Trade (exports), 1990 - 2013



Source: ECLAC based on data from the integration schemes

Trade Intensity Index

- This index corrects the bias of the IRT index by weighting by the group's corresponding share of world trade. The equations of the IRT index are modified in the following way:

$$\text{Export Intensity} = \frac{\sum_{i=1}^{n} x_{ij} \Big/ \sum_{i=1}^{n} X_i^{Total}}{\sum_{i=1}^{n} X_i^{Total} / X^{World}}$$

$$\text{Import Intensity} = \frac{\left(\sum_{i=1}^{n} m_{ij} \Big/ \sum_{i=1}^{n} M_i^{Total} \right)}{\sum_{i=1}^{n} M_i^{Total} / M^{World}}$$

$$\text{Trade Intensity} = \frac{\sum_{i=1}^{n} (x_{ij} + m_{ij}) \Big/ \sum_{i=1}^{n} \left(X_i^{Total} + M_i^{Total} \right)}{\sum_{i=1}^{n} \left(X_i^{Total} + M_i^{Total} \right) \Big/ \left(X_i^{World} + M_i^{World} \right)}$$

Analysis of Intra-Regional Trade, corrected

Integration Schemes: Development of the Trade Intensity Index (exports), 1990 - 2012

	1990	1995	2000	2005	2012
Andean Community	11.5	23.1	19.4	18.6	12.4
Caribbean Community	82.4	177.7	153.9	142.0	131.4
Central American Common Market	149.6	146.6	127.5	197.0	183. 4
Southern Common Market	6.8	15.0	16.0	8.3	8.5

Source: ECLAC based on data from the integration schemes and WTO.

Trade Potential Index

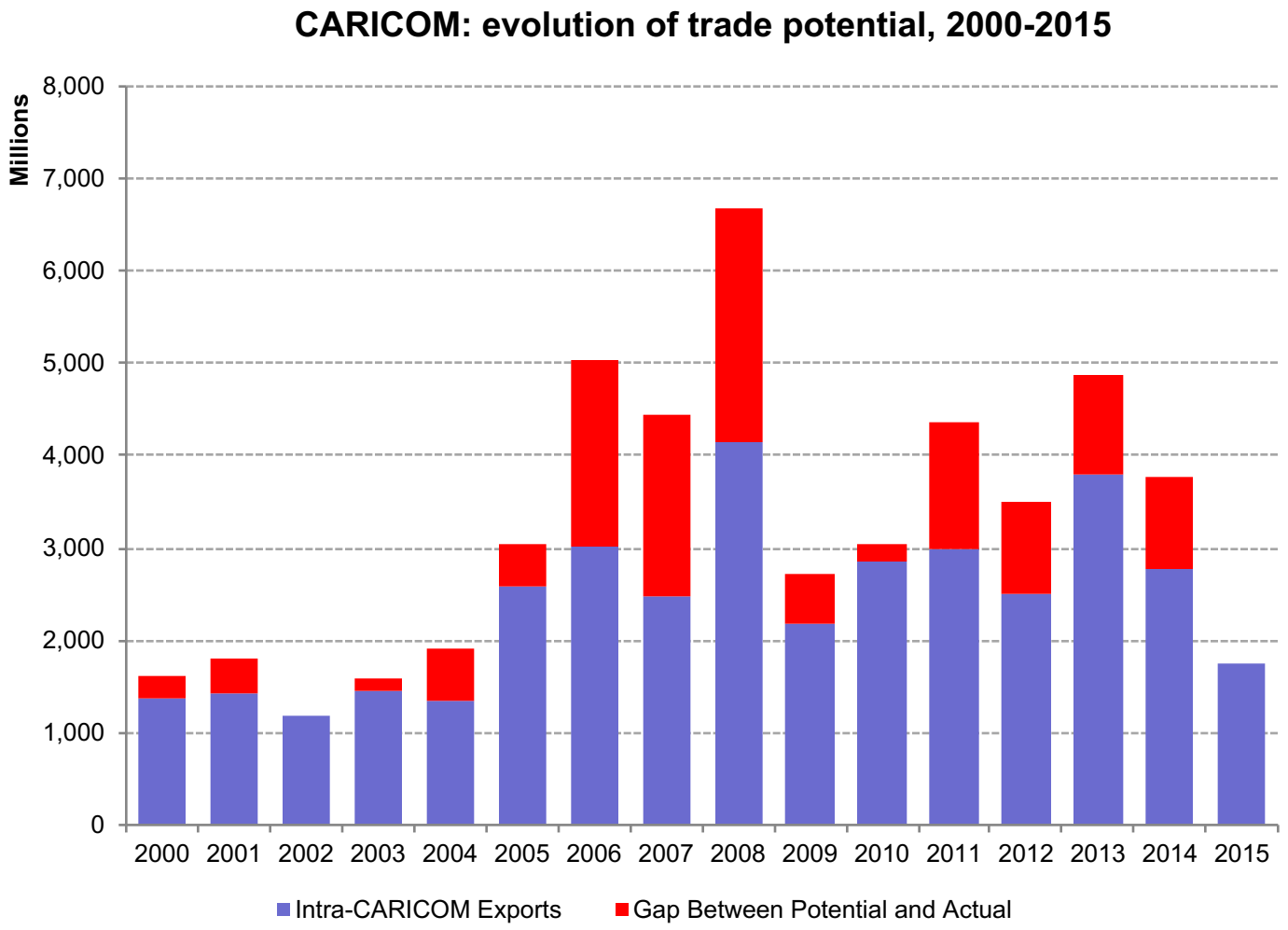
- The indicator calculates the maximum trade flow that the members of an integration scheme could realize.
- From a political point of view, it is more or less a measure for the benefits from intra-regional preferences that the countries grant themselves mutually in the considered regional grouping.

$$TII_t = \frac{\sum_{i=1}^{n} X_{ijt} \Big/ \sum_{i=1}^{n} XT_{it}}{\sum_{i=1}^{n} XT_{it} \Big/ XW_t}$$

$$\overline{TII} = Max_{t=1}^{t=n}\left(TII_t\right)$$

$$PIRT_t = \frac{\overline{TII}}{TII_t} * \sum_{i=1}^{n} X_{ijt}$$

Analysis of Trade Potential



Source: ECLAC, based on data from the Comtrade database

Exercises

- How has the concentration of Jamaica's exports to the United States changed between 2000 and 2015?
  - Calculate the HHI for 2000, 2005, 2010 and 2015 using export data.
- In 2010, which sectors in Jamaica's exports to the Dominican Republic showed the highest levels of intra-industry trade?
- What was the country-level GLI between Jamaica and the Dominican Republic in 2010?

References

- Brülhart, M. (2009). An Account of Global Intra-industry Trade, 1962–2006. *The World Economy*, *32*(3), 401-459.
- Cadot, O., Carrere, C., & Strauss-Kahn, V. (2013). Trade diversification, income, and growth: what do we know?. *Journal of Economic Surveys*, *27*(4), 790-812.

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