Prebisch-Singer effect for global value chains: fragmentation of production, price dynamics and international inequalities

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Prices I

Price setting

- A reflection of bargaining power of a company:

  Standard approach: $P = (1 + m)ulc$
  IO-augmented approach: $P = (1 + m')(ulc + uci)$
  VA approach: $P(VA) = 1 - uci = ulc + ucc$

- BP vis a vis its customers, competitors, other members of supply chain, other supply chains etc.
- Role of input specificity, technological capabilities, market structures, GVC governance, international dynamics.

Prices as incomes: development prospects

- In a closed economy: measures of distribution between classes and sectors
- In GVCs: strong macroeconomic consequences
- Means to: consume, accumulate capital and knowledge

Prices II

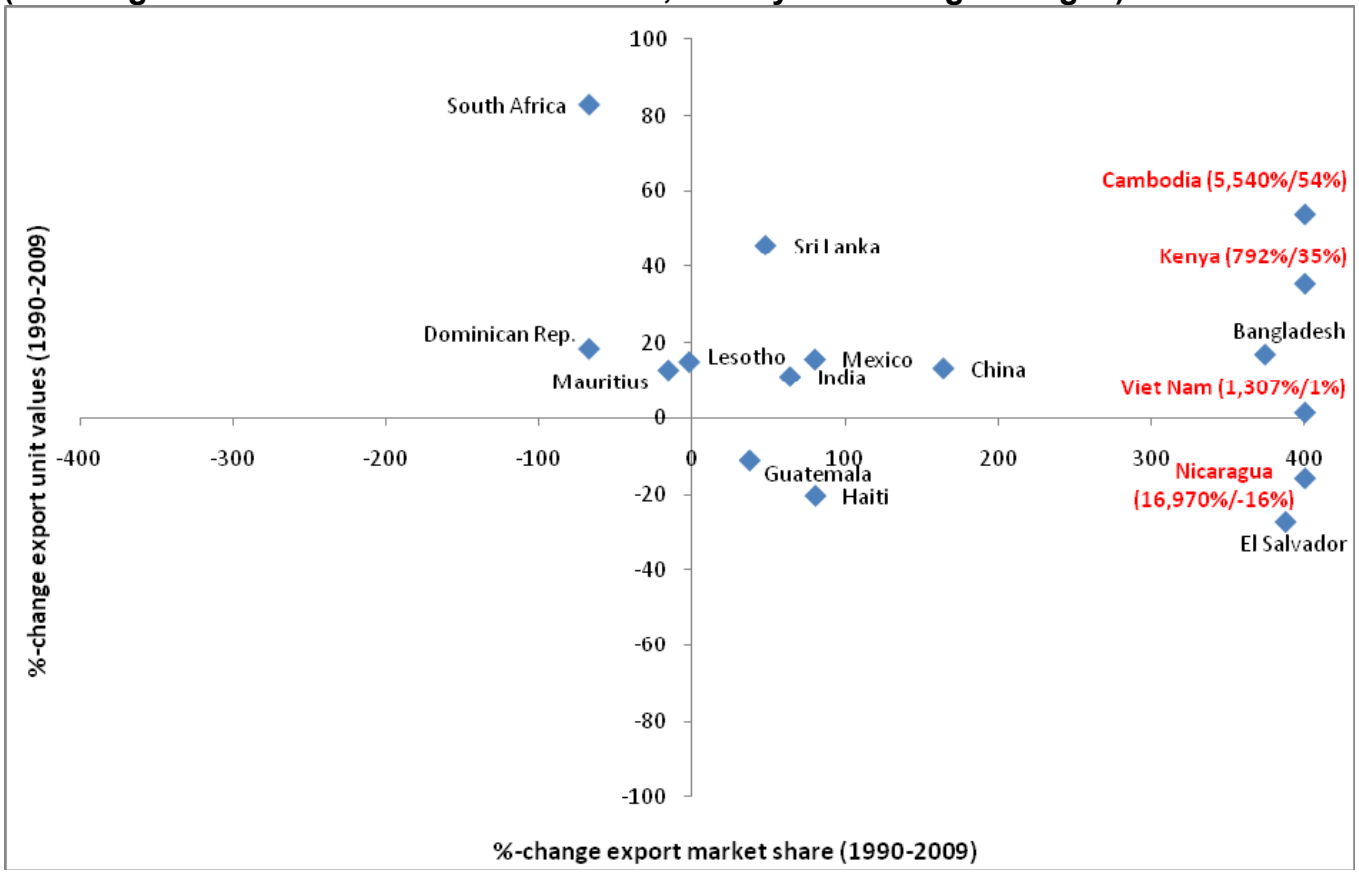
Prices and international competitiveness

- Terms of trade, divergence and Core/Periphery divisions (since Prebisch 1950 and Singer 1950)
- *Upgrading debate* - moving to 'higher-value-added activities' as a development mechanism (Gereffi 2005; Razmi & Blecker 2008; Milberg & Winkler 2014)
- **Export unit values and their dynamics** (Aiginger 1997; Kaplinsky & Readman 2005; Evgeniev & Gereffi 2008; Li & Song 2011):

country is said to experience economic upgrading in a given sector when the following two necessary conditions are fulfilled:
1) An increase (or at least no decrease) in the world export market share (i.e. its exports are internationally competitive);
2) An increase in the export unit value, implying the production of higher-value products in the sector concerned.
(Bernhardt & Milberg 2011, p. 11)

Prices III

Figure 8: Economic upgrading and downgrading in the apparel sector, 1990-2009 (% change in market share and unit values, three-year moving averages)



Note: The two axes have different scales; for Lesotho and South Africa, the time span covered is 2000-2009.
Source: Authors' own illustration based on data from UN Comtrade database.

Figure: Measures of economic upgrading

Source: Bernhardt & Milberg 2011, p. 22.

Fragmentation of production I

GVC income as total value added, generated in a country (all sectors), embodied in manufacturing final goods (of the same or any other country).

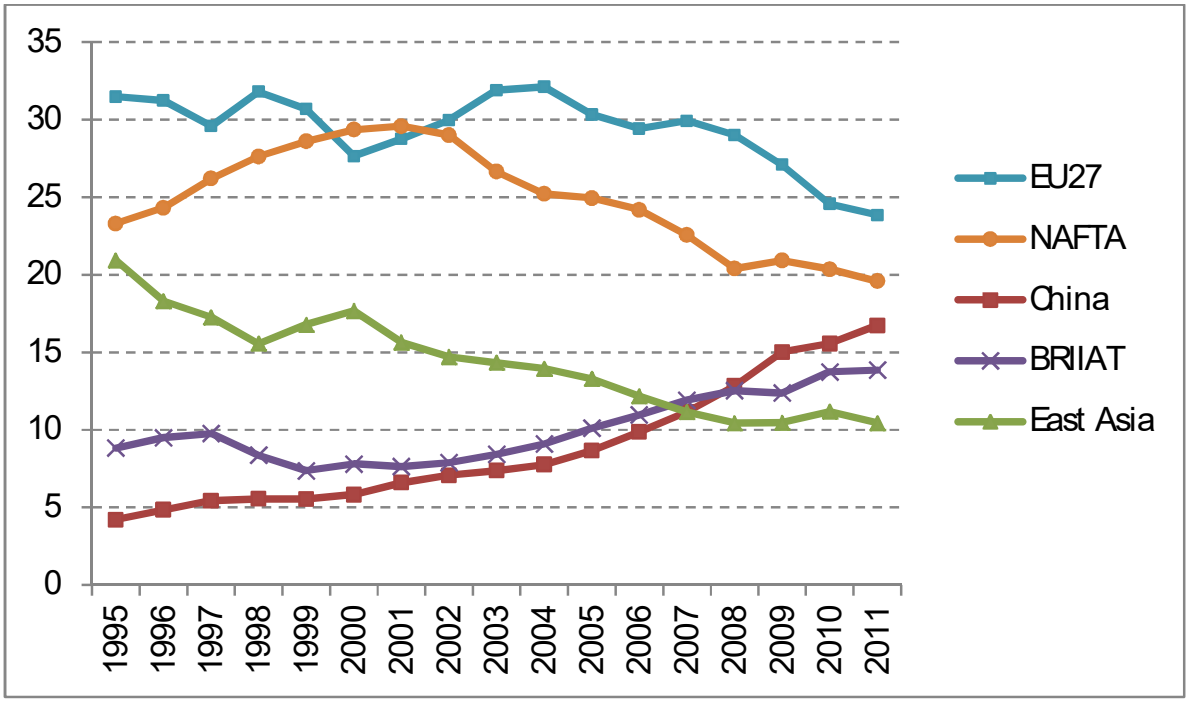


Figure: Regional shares in world GVC income for all manufactures

Source: Timmer et al. 2012, p. 41.

Fragmentation of production II

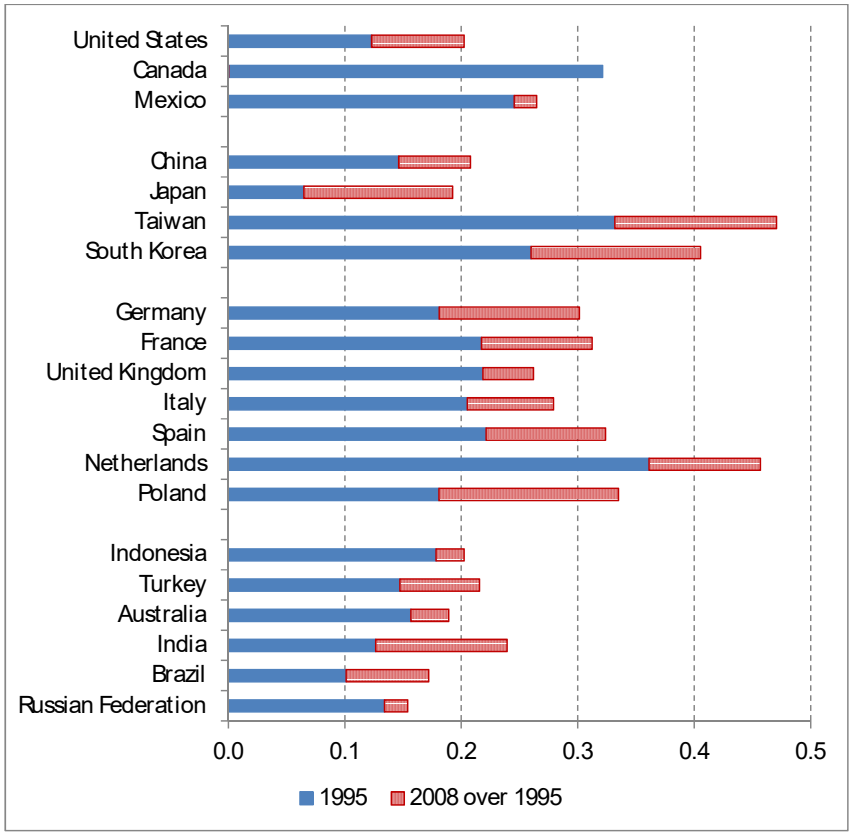


Figure: Share of foreign value added in production of final manufacturing products

Source: Timmer et al. 2012, p. 57.

Premise I
Substantial differences in production prices, levels and dynamics

Possible consequences

- Biased assessment of real shares of countries in global manufacturing production (levels and tendencies)
- Real vs nominal discrepancies - reflection of changing positions in GVC, of capabilities to capture the gains in GVCs
- Diverse factors/mechanisms leading to real/nominal value added growth
- Diverse economic consequences of price/quantity growth of nominal value added

Research questions

1. How to measure price indices of sectoral value added, for a broad sample of countries?
2. To what extent do countries capture the gains in GVCs by: producing more (**quantity effect**) vs being able to increase their unit prices (**price effect**)?
3. How changes in relative prices within GVCs change the view of offshoring processes?

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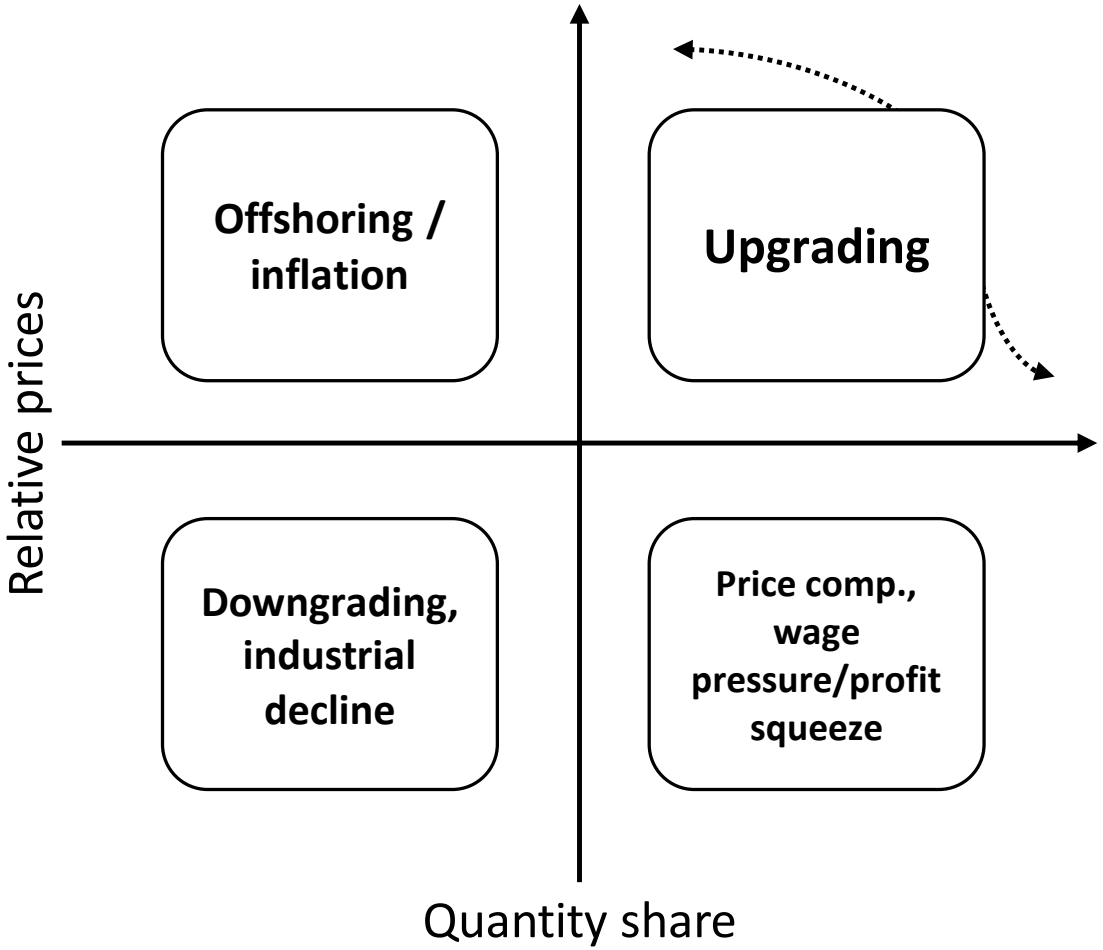
Modes of competitiveness



How to calculate indexes of production prices? I

Basis: WIOT - input-output tables, for 40 countries and 35 industries, with *intersectoral flows of gross output*, 1995-2011 (Timmer et al. 2015).

Aim: International value added flows in *constant, domestic production prices*.

1. WIOD Socio-Economic Accounts: price indices of VA and GO, 1995-2009
   - Different sources and techniques of estimation of indices (bottom-up / top-down)
   - In some cases only approximate data
   - No data for RoW

How to calculate indexes of production prices? II

2. WIOT in Previous Year Prices, 1995-2009:
   - Estimates coherently by GGDC, based on product data (unit export values)
   - Need to construct chained price indices (missing data, when no flows in some years)
   - VA as a residual (some negative results)
   - Problems with prices of inventories
3. Construction of counterfactual price indices, e.g. wage- or profit-based
4. *Additionally:* comparison of production price levels (e.g. GGDC Productivity Level Database).

Adopted empirical procedure

1. Analysis based on SEA, with WIOT PYP for robustness

2. Estimation of 1995-2007 matrices of nominal VA flows, based on WIOT, focus on manufacturing final goods:

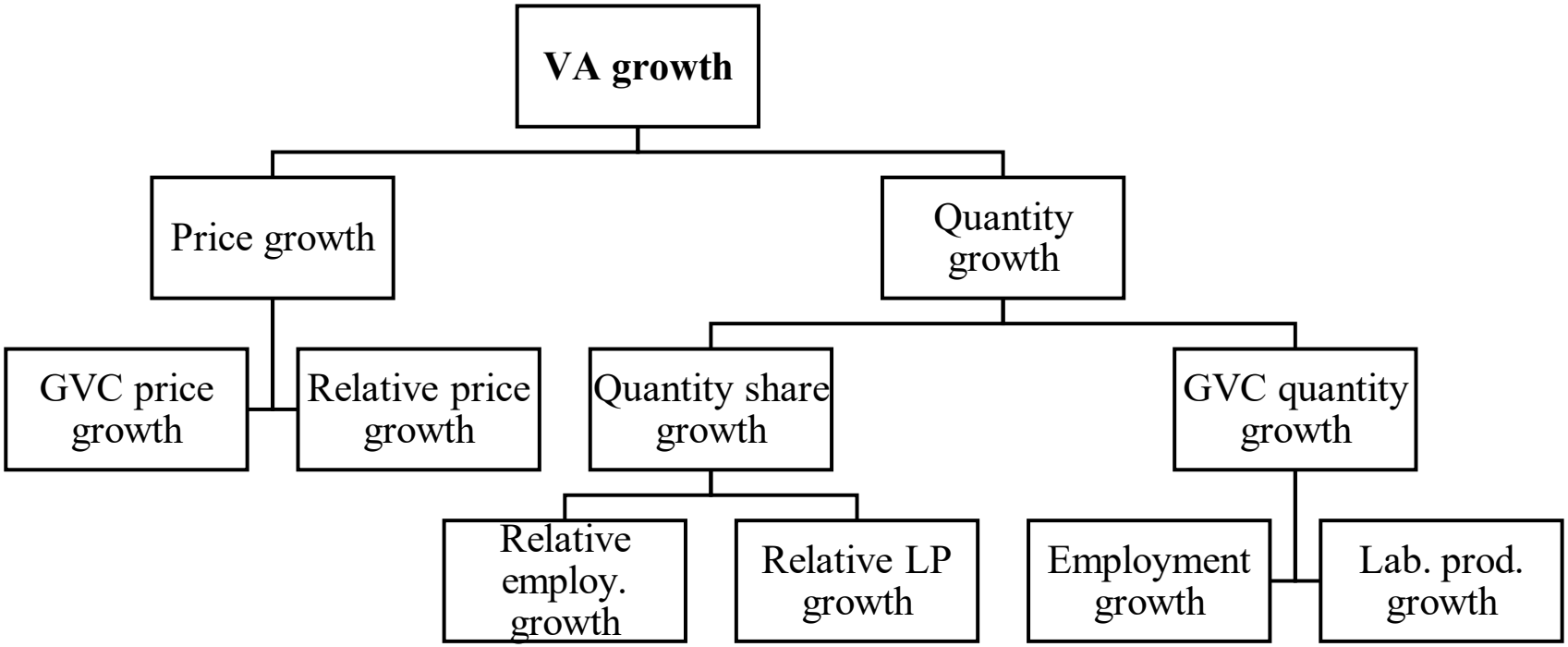
$$V = P(I - A)^{-1}F. \tag{1}$$

3. VA deflation based on value added price indices and provided annual exchange rates (WIOD SEA)

4. Calculation of price indices for whole economy (based on initial, final and mixed structures of production):

$$\begin{cases} I^P_{L,i} & = \sum_{j=1}^{35} (u_{i,j,1995} \cdot VA\_P_{i,j,2007}) \\ I^P_{P,i} & = 1/\sum_{j=1}^{35} \frac{u_{i,j,2007}}{VA\_P_{i,j,2007}} \\ I^P_{F,i} & = \sqrt{I^P_{L,i} \cdot I^P_{P,i}} \end{cases} \tag{2}$$

Decomposition of Value Added Growth



Additional dimensions: own/foreign GVCs, structural change.

Country annual growth rates, 1995-2007

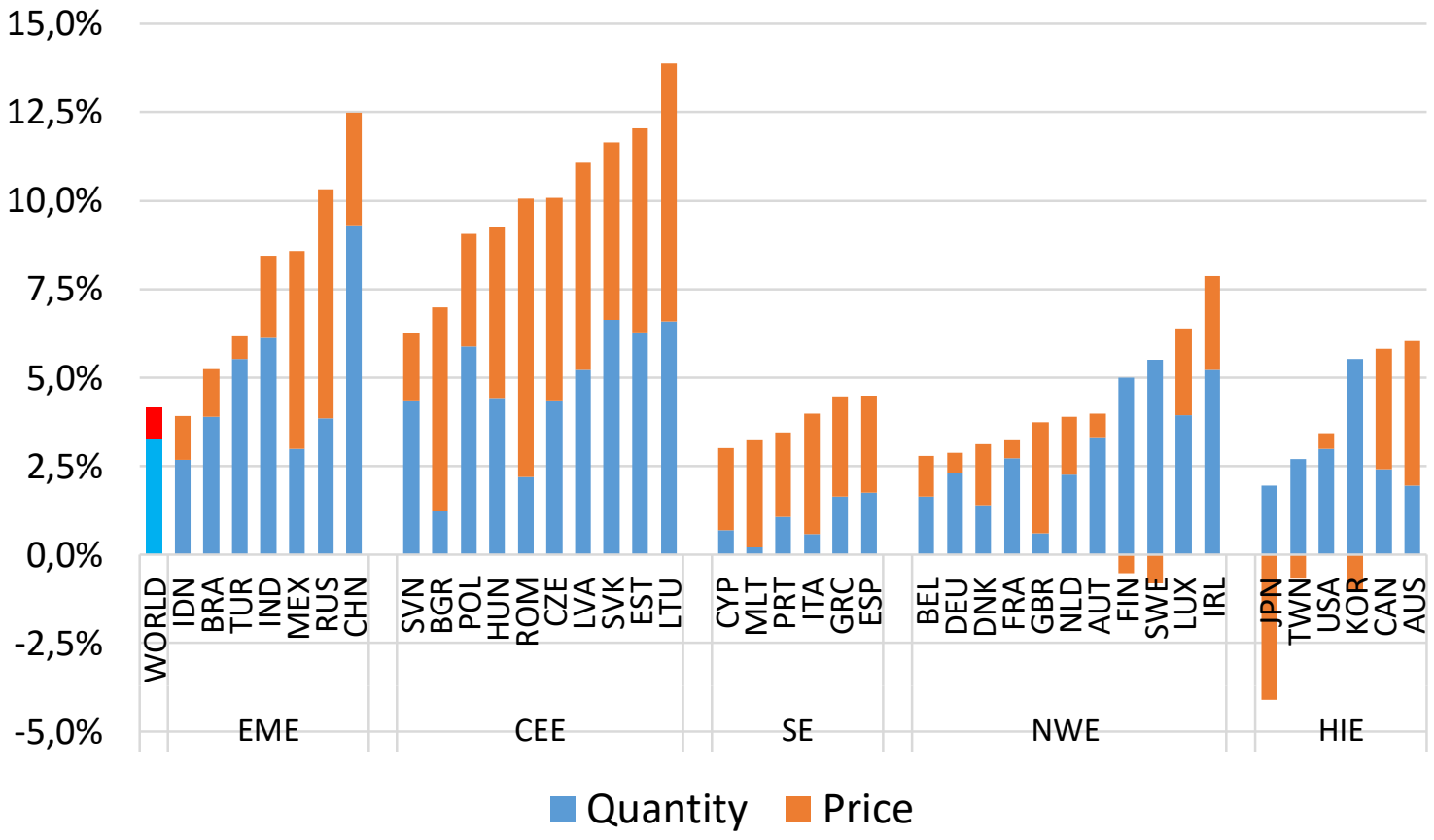


Figure: Decomposition of VA in GVC growth, av. annual growth rates, Fisher-based

Robustness checks

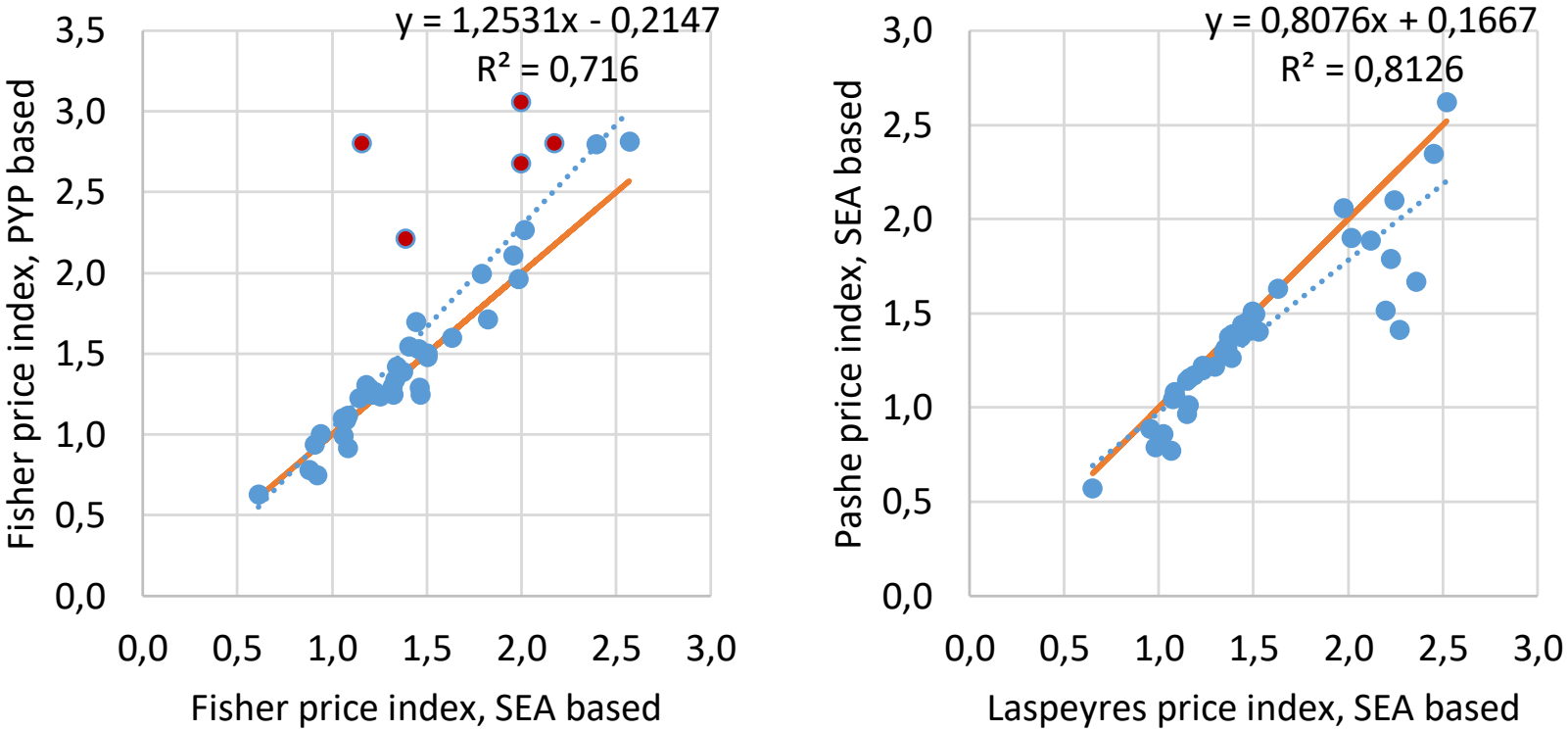


Figure: Comparison of different variants

Modes of competitiveness in GVC

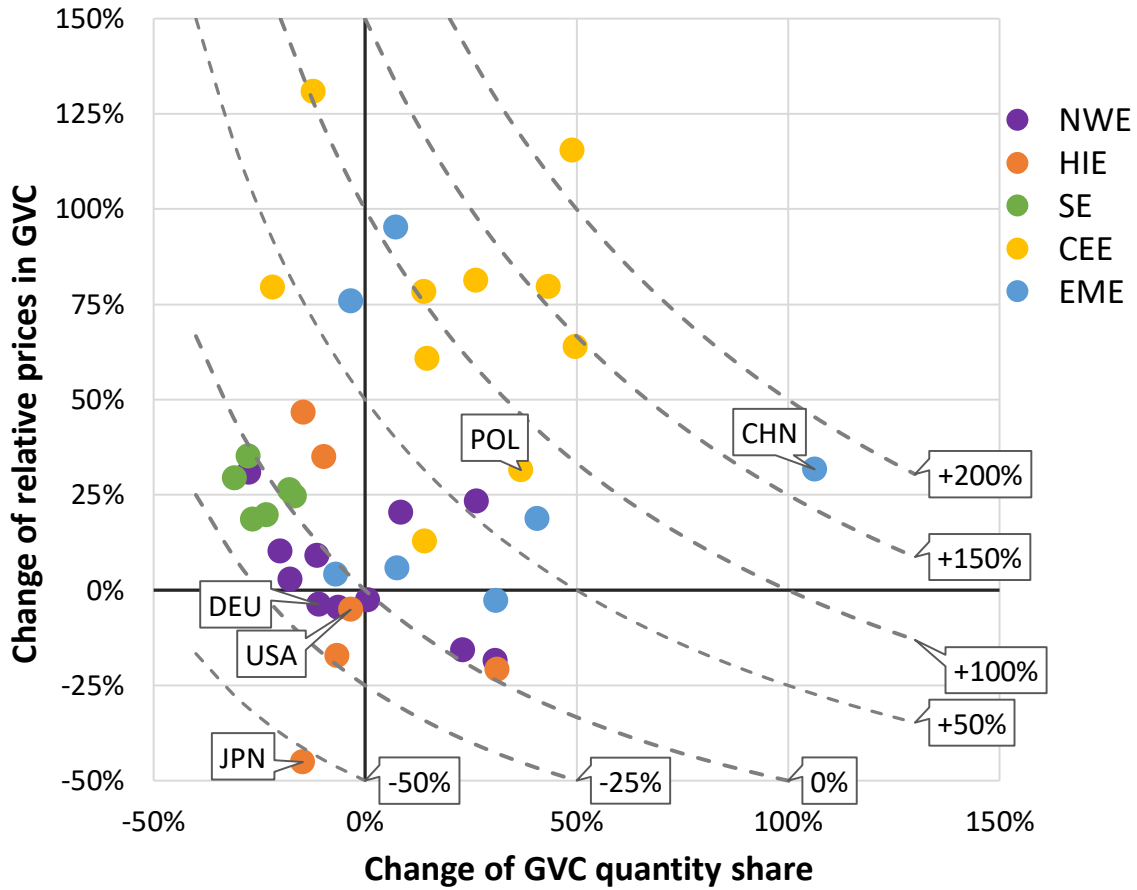


Figure: Change of country shares in Global GVC income - decomposition

Distribution of Global GVC income

	Nominal GVC income 1995 (1)	*Nominal GVC income 2007 (2)*	*GVC income 2007, in 1995 prices (3)*	*Value share change (2)/(1)-1.0*	*Quantity share change (3)/(1)-1.0*	*Relative price change*
Emerging Economies-7	15,2%	28,0%	21,3%	+84,1%	+41,3%	+30,3%
Central-East. Europe-10	1,5%	2,9%	1,9%	+90,2%	+19,3%	+59,4%
Southern Europe-6	7,9%	7,9%	5,9%	-0,6%	-24,0%	+30,8%
North-West. Europe-11	26,0%	23,7%	23,1%	-8,8%	-10,6%	+2,1%
High-Income Economies-6	49,3%	37,5%	47,8%	-24,0%	-6,2%	-19,0%

Figure: Distribution of Global GVC income

Note: RoW excluded (which accounts for 11-13% of nominal GVC income).

Relative prices in GVC and offshoring

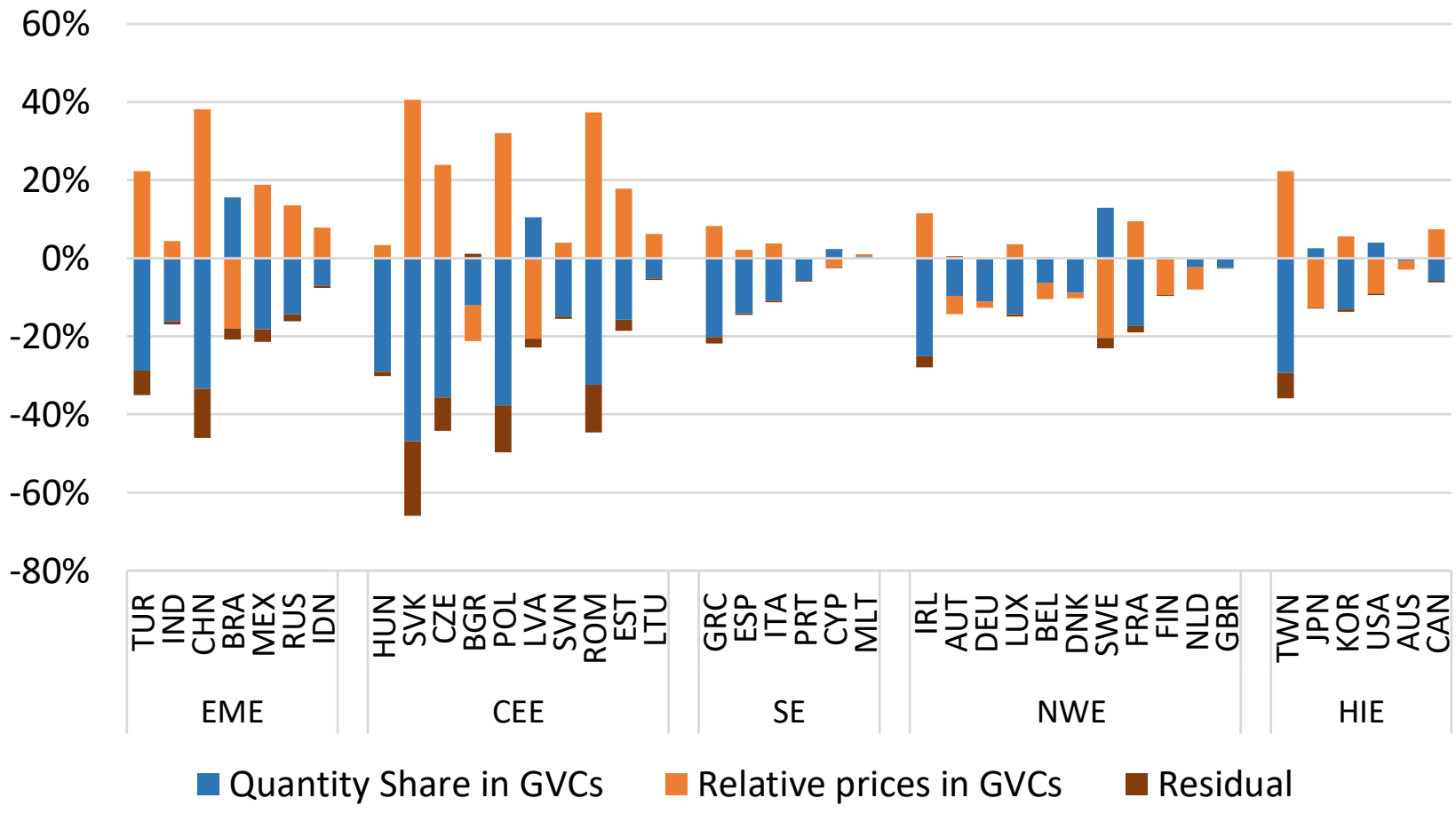


Figure: Change in Domestic VA in manufacturing final goods (% increase on initial level, 1995-2007

Conclusions

- Diverse patterns of nominal GVC income growth across countries and of building the competitiveness across countries;
- Emerging economies and CEE experienced both quantity and relative prices growth (UPGRADING); stable share of Southern Europe (INFLATION and LOSS of COMP.); North-Western Europe able to increase relative prices vis a vis other HIE (mainly US and Japan): OFFSHORING/DECLINE;
- Nominal fragmentation of GVCs driven mainly by actual offshoring, with some important exceptions of countries with declining relative prices of production (incl. Brazil, Japan, USA);
- Need for more systematic robustness verification, including balancing tests and counterfactual price sets;
- Further research avenues, incl: structural change and employment, determinants of price changes, explicit inclusion in macro-modelling.

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