

Industrial and Innovation Policies in a World of Global Value Chains

Carlo Pietrobelli

carlo.pietrobelli@uniroma3.it

pietrobelli@merit.unu.edu

https://www.merit.unu.edu/about-us/profile/?staff_id=1560

Campinas, SP, BR, 4 July 2019

<https://www.ige.unicamp.br/spec/symposium2019/>

JULY 3-4

INTERNATIONAL SYMPOSIUM

The Challenges of Technology
and Economic Catching-Up in
Emerging Economies



InSySPo

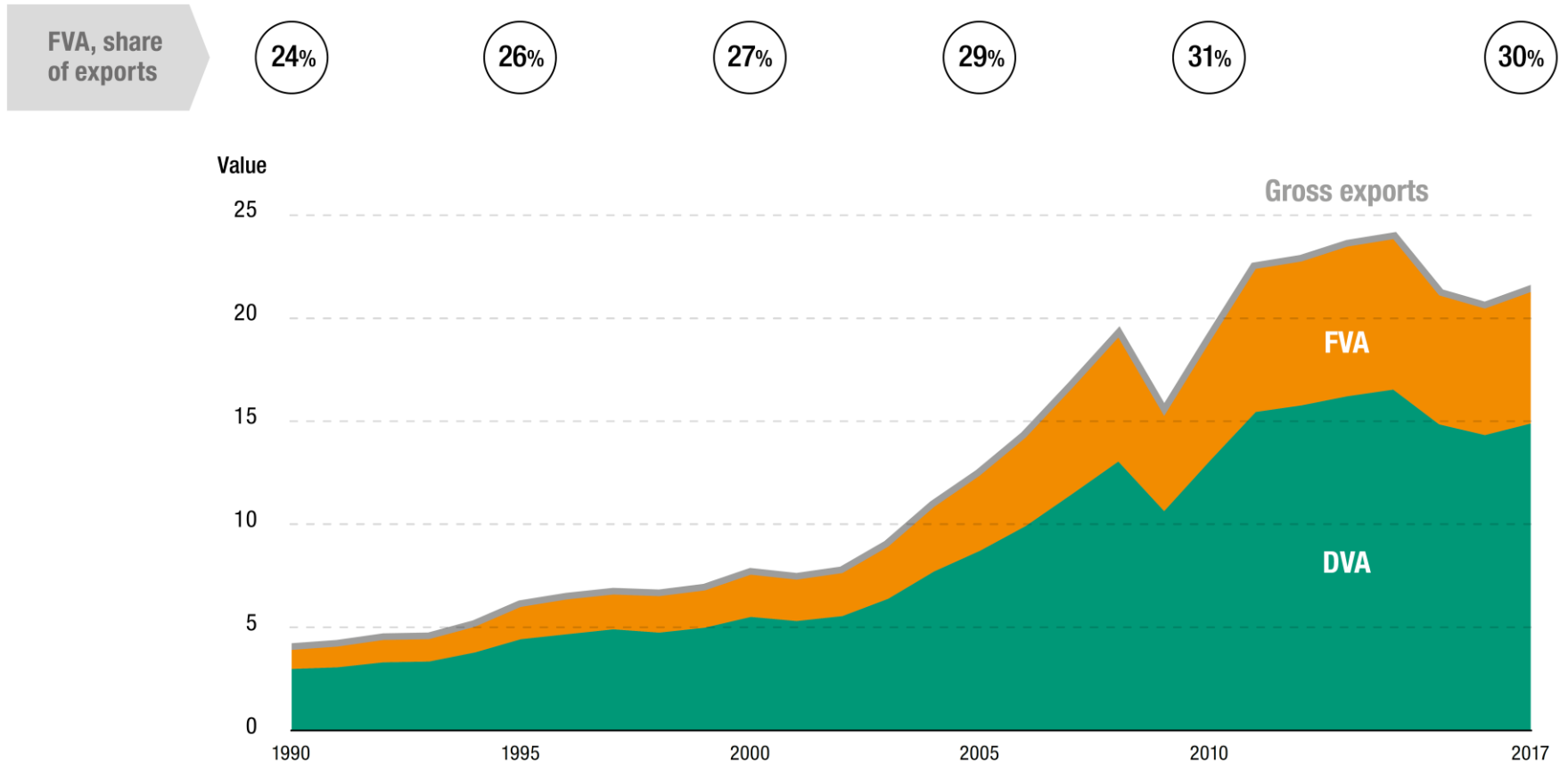
My summary remarks

- The advent of GVCs is changing the nature of development policies.
- (In this regard) Governments can do a lot, and need to learn how, to **rethink policies in light of GVCs**. E.g.:
 - ✓ **Attract “better”** FDI and lead firms, with a GVC-consistent logic.
 - ✓ **Modify trade policies:** exports depend on imports, tariffs may multiply protection.
 - ✓ Innovation policies require considering that GVCs and their governance **coevolve** with Innovation Systems

Outline

1. GVCs are widespread and relevant
2. “Modern” industrial and innovation policies are increasingly accepted
3. A typology of **GVC-oriented policies**
4. Three examples: trade, investment attraction, and innovation policies (GVCs and innovation systems *coevolve*)

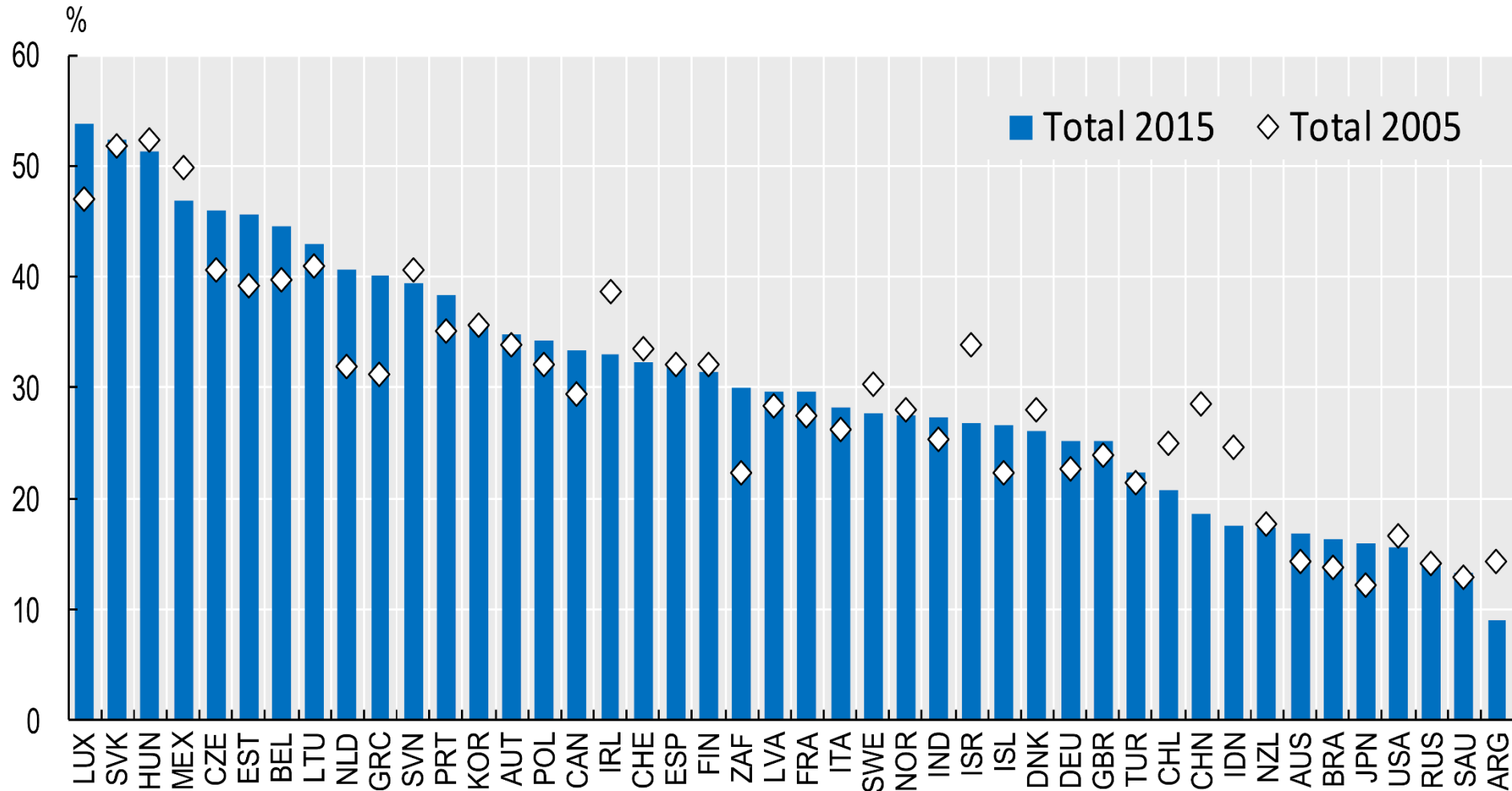
Figure I.14. Global trade: long-term trends in value added terms, 1990–2017 (Trillions of dollars and per cent)



Source: UNCTAD; based on data from the UNCTAD-EORA GVC database.

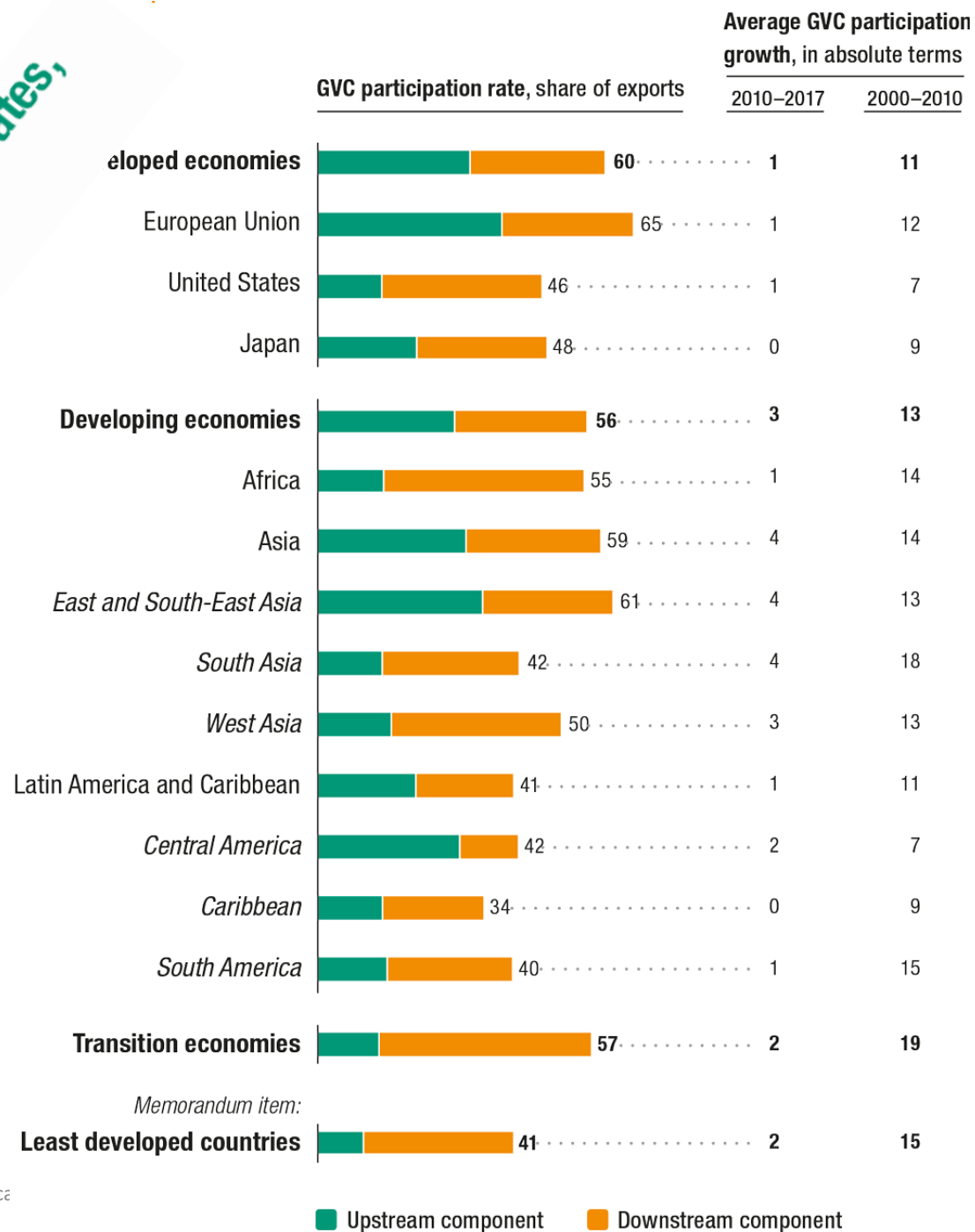
GVCs are a reality

Figure 2. Foreign Value Added of Manufactured Exports, 2005 and 2015



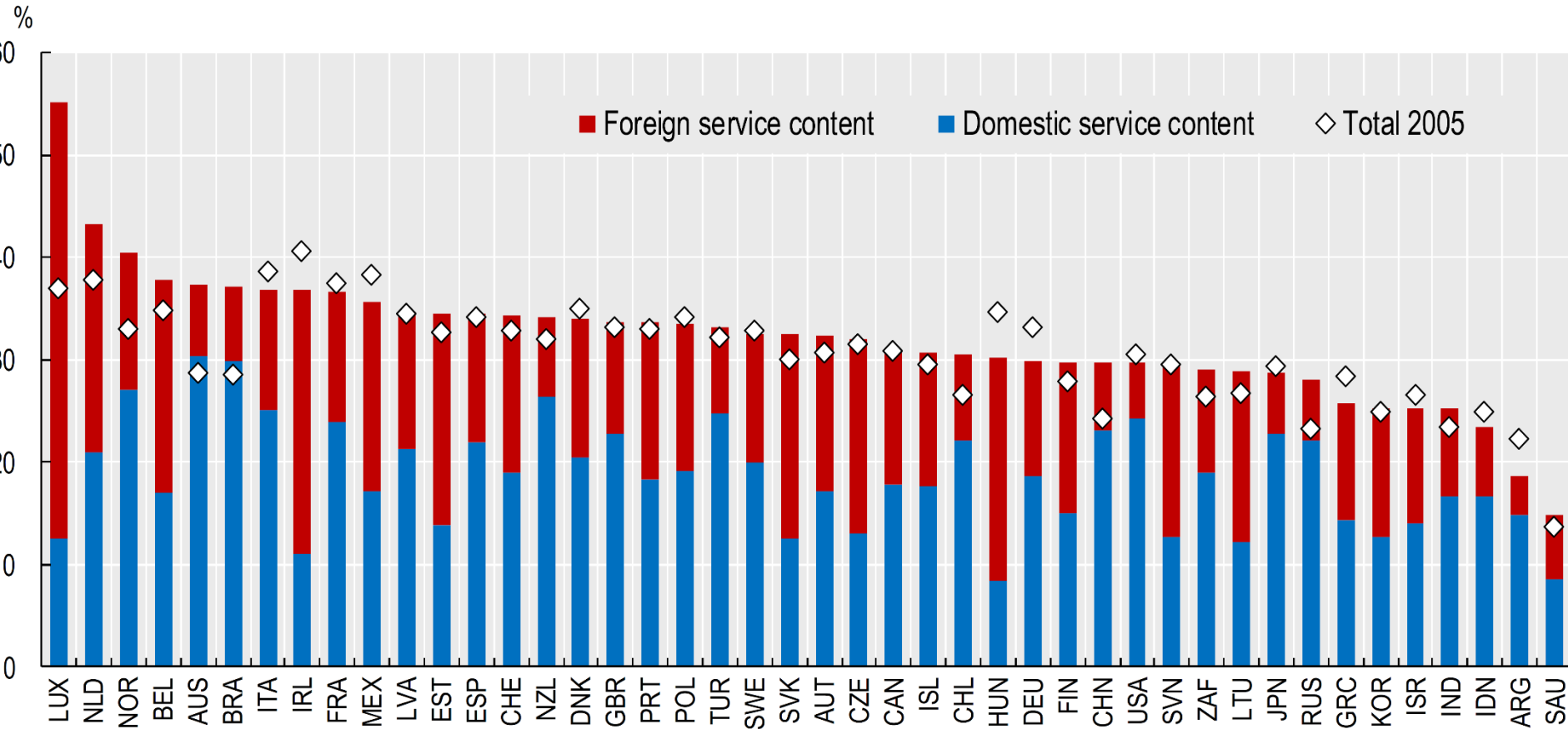
Source: OECD, 2018.

GVC participation rate, by region, 2017 and growth rates, 2010–2017 and 2000–2010 (Per cent)



Services are also organized along GVCs

Figure 3. Services value-added embodied in manufacturing exports, 2015



Source: OECD, 2018.

Why so much interest in GVCs?

Why does it matter for development?

1. Access to demanding and sophisticated markets
2. Access to knowledge, technology, organization,
3. Opportunities for learning and innovation



**GVCs are not only a trade
phenomenon**

“Modern” Innovation and Industrial policies are beginning to be accepted

1. **Pragmatism**, empirically based. Conclusions are dependent on the context, **no best practice to emulate** (Pritchett).
2. Sharp **analytic approach to justify, define and implement policies** is required.
3. **A learning process**. Uncertainties and imperfect information urge policymakers to set up a process to **discover** the policies needed (Hausmann, Rodrik). Learning based on tentative, experimental, policy design and implementation (Sabel and Zeitlin, 2012).
4. Discovery requires **smart collaborations** between the government and the private sector. Complementary pieces of knowledge (Fernandez-Arias et al., 2018).
5. The **institutions** condition success and failure. Institutional capabilities to explore, design, implement, monitor, and evaluate policies.
6. **Innovation** is an essential component of industrial policy.
7. **Outward orientation** is central.

Huge diversity of Innovation and industrial policies

- Industrial and innovation policy include things that are very different in nature.
- We need a **typology**, where we emphasize two dimensions:
 1. **Scope of the interventions** (horizontal or vertical).
 2. **Type of interventions**: public goods / public inputs, or market interventions (subsidies, tax exemptions, protection).

These two dimensions define a useful **2x2 matrix**, because every quadrant raises different public policy considerations.



Horizontal

Vertical

Public
Inputs



Market
Interventions



	H	V
PI		
MI		

Why does it matter?

The **public policy considerations differ in each quadrant:**

- ✓ The pros and cons differ
- ✓ The risk of rent seeking and “capture” by individuals or groups differ
- ✓ The difficulty of designing and implementing policies can also differ
- ✓ The institutional capabilities and requirements differ

A Typology of Industrial and Innovation Policies - examples

	Horizontal	Vertical
Public Inputs	Funding of basic Research	Sectoral Public Technology centers
Market interventions	Matching grant for innovation	Tax rebates for innovation in biotechnology sector

Source: adapted from Crespi et al., 2014

A Typology of GVC-oriented Policies - examples

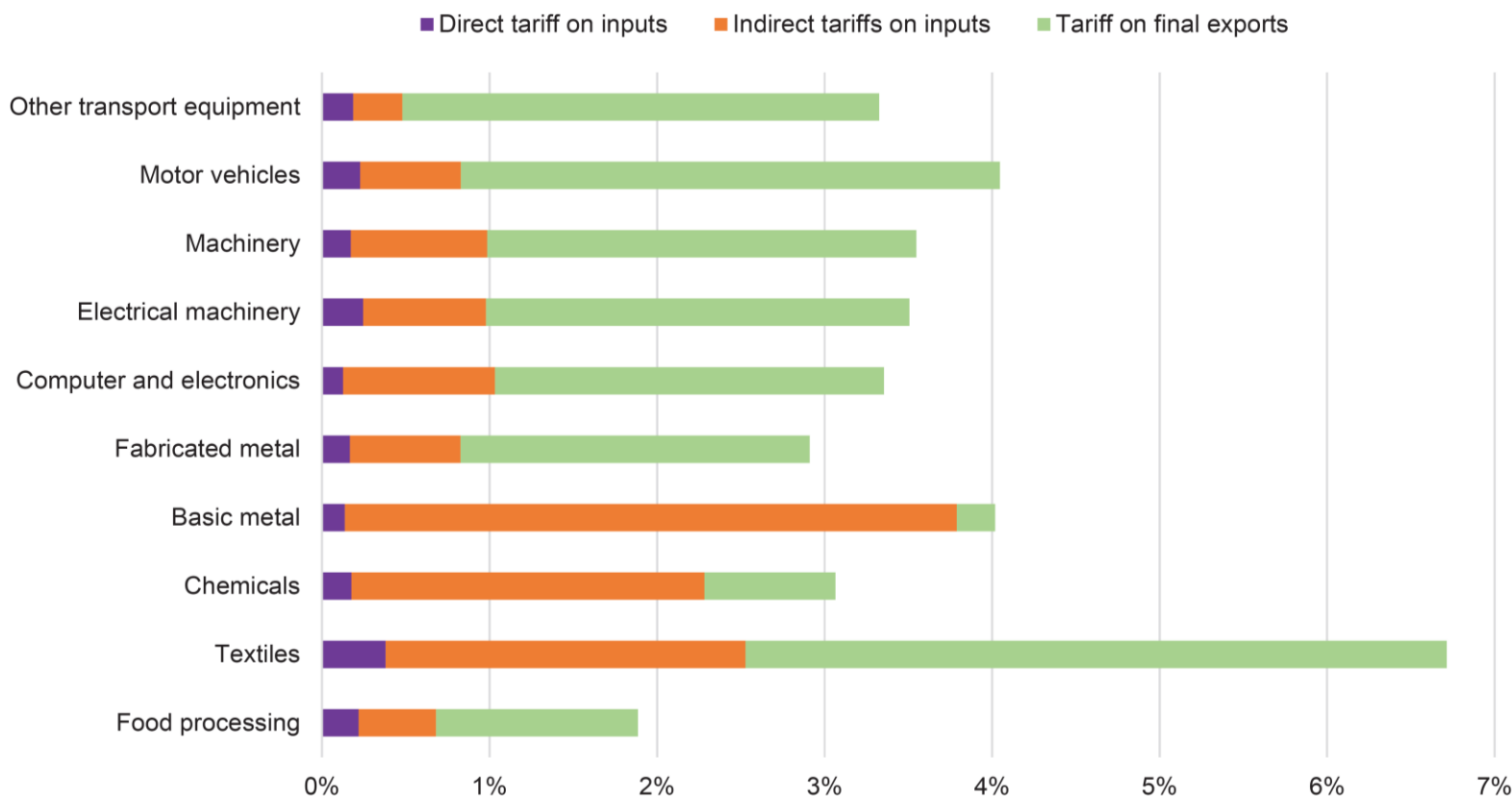
	Horizontal	Vertical
Public Inputs	<ul style="list-style-type: none"> • Monitor opportunities for selective attraction • Streamline procedures for FDI and lead-firm (e.g. One-stop shops). 	<ul style="list-style-type: none"> • FDI and lead-firm attraction: <ul style="list-style-type: none"> ✓ Skills training center ✓ Quality, Standards, Certification Organizations
Market Interventions	<ul style="list-style-type: none"> • R&D&i subsidies for local providers' capabilities • Matching grants for collaborative R&D • "<u>Force</u>" externalities via training commitments and suppliers' development 	<ul style="list-style-type: none"> • Temporary tax exemptions to new local providers • Selective R&D&i subsidies/grants

Three Examples of GVC-oriented Policies: How do policies change

1. Trade policy
2. Investment attraction
3. Innovation policy

1. Trade policies change

Average ad valorem Tariffs along the GVC, Selected Industries, 2015



Source: TIVA database 2018 and TRAINS. Based on applied and preferential tariffs.

- Average ad valorem tariffs are higher if one considers **direct and indirect tariffs on inputs, in addition to tariffs on final exports.**
- **Protection is higher for an economy requiring a large share of intermediate imports**

1. Trade policies change

- Goods cross borders many times, first as inputs and then as final products
- Barriers at the border become costlier and have a **cumulative impact along the value chain** (OECD, 2018).
- Production activities which are linked to the GVC, are affected by tariffs faced in the destination market and across different countries
- Who is effectively paying the cost of protection?
- Antimiani et al., 2018 show that the total impact of tariffs can have a significant cumulative impact because of trade in intermediates. The **“beggar thyself”** content of protectionism.

2. FDI and GVC attraction policies

The missing link in the value chain: sterilization of medical devices in Costa Rica

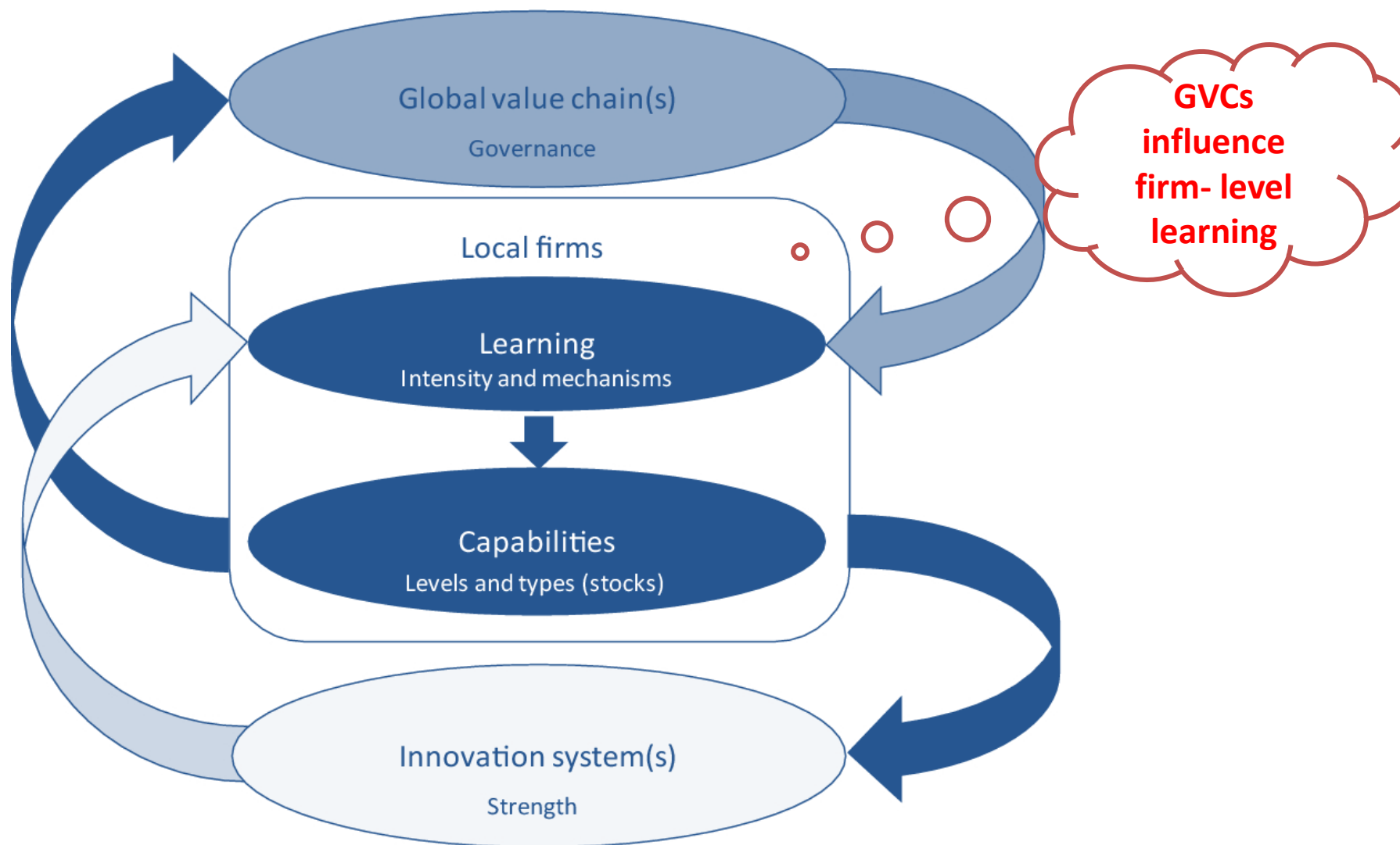


2. Investment and GVC attraction policies

- The **medical devices** sector targeted by CINDE, Costa Rica, for many years. The sector expanded since Baxter's arrival in 1987, to reach US\$1.5 billion exports in 2014.
- However, **only low-complexity disposable medical devices were exported**, and not, for example, heart valves or other cardiovascular devices. The latter needed a process of **sterilization**, not available locally.
- Why did not any activity of sterilization develop in the country? A **“chicken-and-egg” problem**. The **market did not solve the problem by itself.....**
- Selective attraction of foreign sterilization companies: in 2009 BeamOne, Sterigenics in 2011. Other cardiovascular devices producers followed (Boston Scientific, Abbot Vascular, St. Jude Medical).
- In 2013 Costa Rica exported US\$300 m. in therapeutics and US\$500 m. in surgical and medical devices. Disposables fell from 90 to 50%.
- **CINDE targeted sterilization because it realized that a segment of the value chain was missing**, and that the market would have not solved the problem.

3. Innovation policies also need to consider the emergence of GVCs

The coevolution of GVCs and the Innovation System and Capabilities' Development



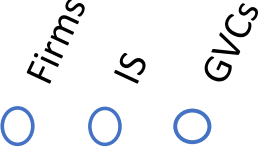
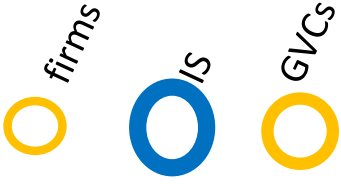


GVCs and Learning Mechanisms

Governance Type	Learning mechanisms within GVC
Market	<ul style="list-style-type: none">▪ Knowledge spillovers▪ Imitation
Modular	<ul style="list-style-type: none">▪ Learning through pressure to accomplish international standards.▪ Transfer of knowledge embodied in standards, codes, technical definitions
Relational	Mutual learning from face-to-face interactions
Captive	Learning via deliberate knowledge transfer from lead firms confined to a narrow range of tasks – e.g. simple assembly.
Hierarchy	<ul style="list-style-type: none">▪ Imitation▪ Turnover of skilled managers and workers▪ Training by foreign leader/owner▪ Knowledge spillovers

Illustrative trajectories of GVC-IS Coevolution

(Lema, Rabelotti, Pietrobelli, 2018)

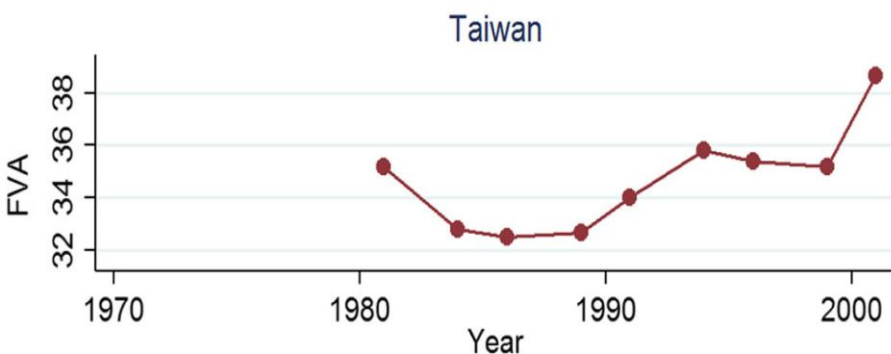
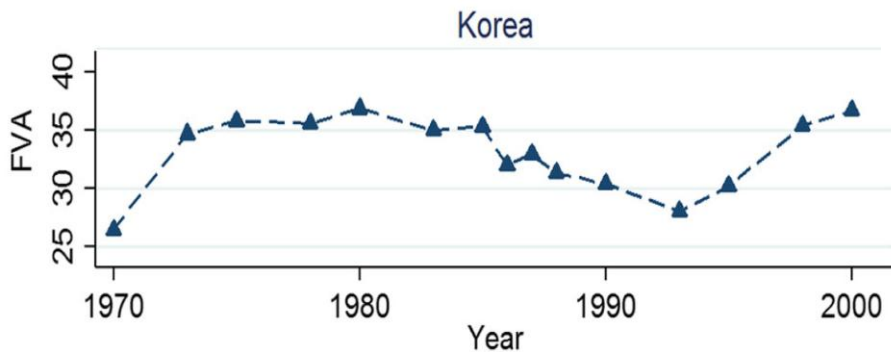
	<p>Gradual Electronics, auto, space in India and China, salmon in Chile</p>	<ul style="list-style-type: none"> ▪ Firm capabilities gradually & cumulatively strengthened ▪ IS sufficiently strong and strengthened by GVC ▪ GVC strengthened with more rewarding and learning-intensive roles
	<p>In-Out-In South Korea and Brazil examples</p>	<ul style="list-style-type: none"> ▪ Firm capabilities strengthened in jumps; GVC & IS as alternate sources of knowledge and capabilities ▪ IS sufficiently strong to support GVC development ▪ GVC fail to provide learning opportunities; ▪ interrupted value chain development; sequencing of local and global value chains
	<p>Aborted Aquaculture chains in Bangladesh</p>	<ul style="list-style-type: none"> ▪ Firm capabilities unchanged/developed marginally ▪ IS fragmented and unable to support GVC; ▪ limited absorptive capacity ▪ GVC participation stagnant; limited learning
	<p>Retrograding Cassava in Thai, timber in Gabon</p>	<ul style="list-style-type: none"> ▪ Firms' capabilities weakened. ▪ Very weak IS unable to support GVC development ▪ Negative influence of lead firms ▪ Influence of China's entry, product downgrading

IN-OUT-IN (Lee, Szapiro and

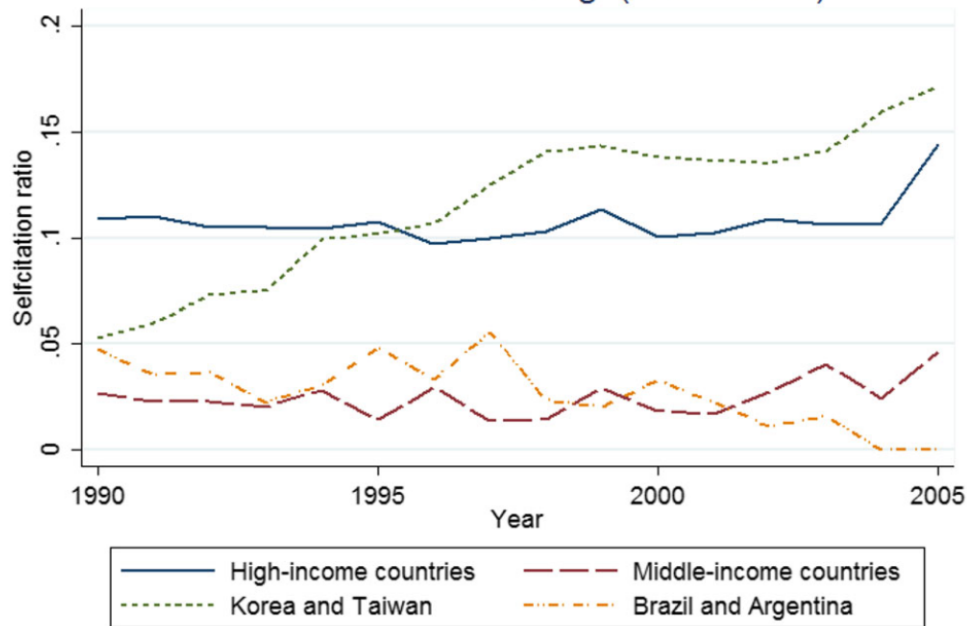
Mao, 2018 EJDR)

Trends in FVA – Foreign Value Added: Inter- and Intra-sectoral upgrading, with **fall in FVA** and simultaneous increase in local VA. This did not happen in LA.

Trend of FVA in Korea and Taiwan



Localization of Knowledge(Self-citation)



This coincided with the degree of localization of knowledge, measured by **patents self-citation**, i.e the **development of a NIS**



Special Issue
Journal of International Business Policy

Global Value Chain-Oriented Policies
co-edited by Carlo Pietrobelli, Roberta Rabelotti & Ari
Van Assche

<http://resource-cms.springernature.com/springer-cms/rest/v1/content/16526132/data/v1>

Submission deadline
September 1, 2019

Thank you

carlo.pietrobelli@uniroma3.it

IN-OUT-IN (Lee, Szapiro and Mao, 2018 EJDR)

Perils and potential of GVCs

- The *in-out-in Trajectory* may unfold if IS is relatively well developed,
- It is necessary due to the risk of losing ground to cheaper locations.

They suggest that:

- a. in the **Preliminary Development** stage GVC participation is necessary to acquire foreign knowledge and production skills, OEM
- b. In **Intermediate stage** separation and independence from existing foreign-dominated GVCs is required for functional upgrading. ODM and OBM. This requires building capabilities in design, R&D, marketing, and an IS.
- c. In the **Maturity stage** latecomer firms and economies build their own GVCs, after facing rising domestic wages

New technologies - **short cycle technologies** - which rely less on existing knowledge stocks, offer **better opportunities for latecomers**.

IN-OUT-IN Case-studies (Lee, Szapiro and Mao, 2018 EJDR)

South Korea (Lee and Mathews, 2012, Lee, 2013). *From OEM to ODM to OBM: Aurora World, Shimro Musical Instruments, HJC Helmets, Hyundai Motors.*

- Clear strategic and risky decision is required. E.g. Hyundai's choice to break up with Ford, and then with Mitsubishi, after they refused to teach about engine technologies.

Brazil, footwear in Rio Grande do Sul (Vargas and Alievi, 2003, Humphrey and Schmitz, 2002, Navas-Aleman, 2011)

1970s-mid-80s growth through GVC integration, then decline in mid-2000s, with China entering the market.

- One group remained with low price products, passive learning, low interactions with other actors: only product upgrading
- Another group (*Arezzo, Alpargatas, Grendene*) targeted high-end markets, developed local learning mechanisms, R&D, professional designers, patents, created their own GVCs.

Policies changed but firm-level strategies proved essential.