

# Building critical minerals regional value chains

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## Green Transition in Latin America

Harnessing regional integration and industrial policy  
to build the economies of the future

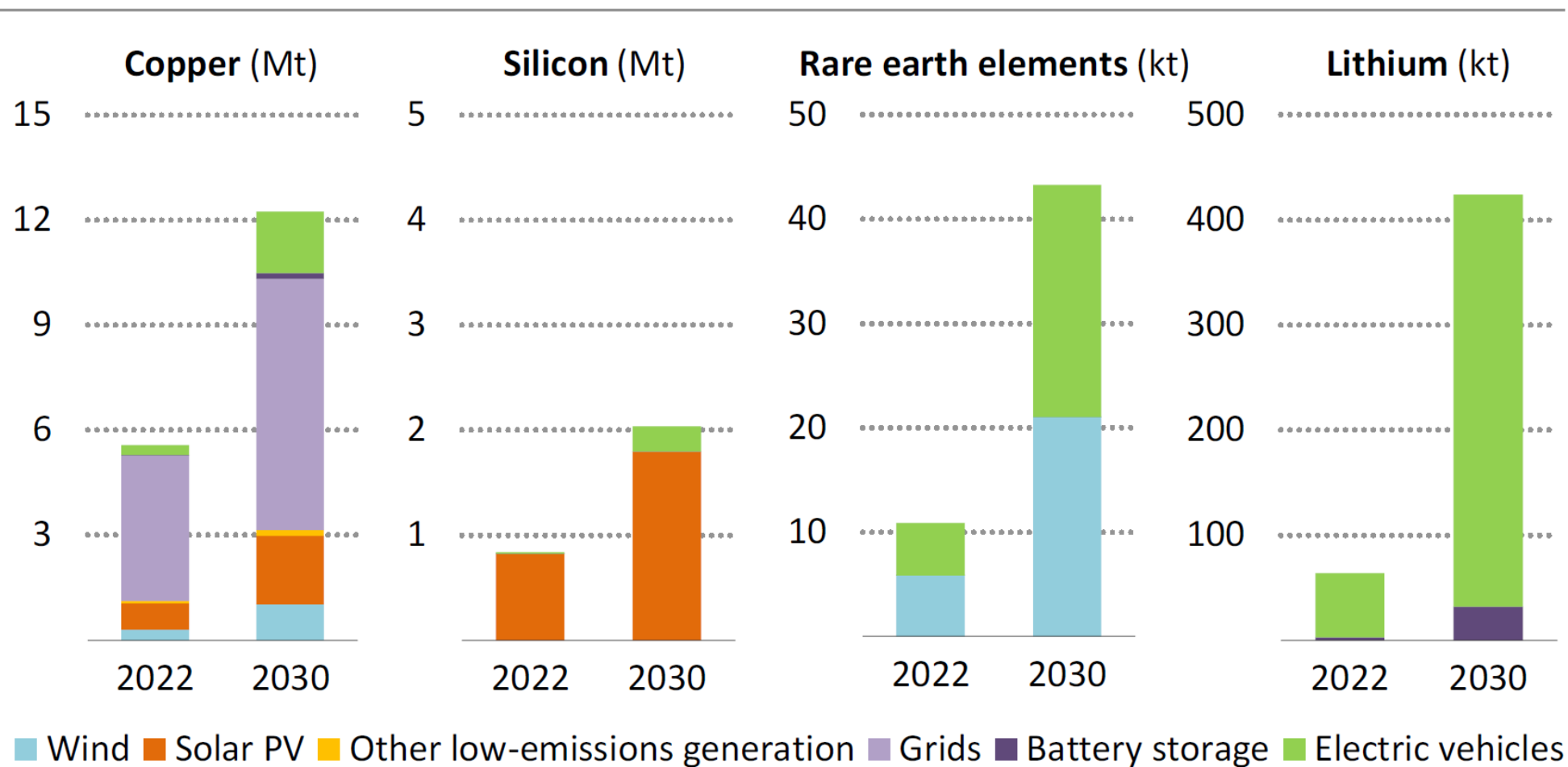
**8-9 April, BNDES, Rio de Janeiro, Brazil**

# Outline

1. Critical minerals - what they are
2. Benefitting from minerals (detailed mineral and country specific CB analyses)
3. Value Chain-oriented policies
4. Regional value chains ?

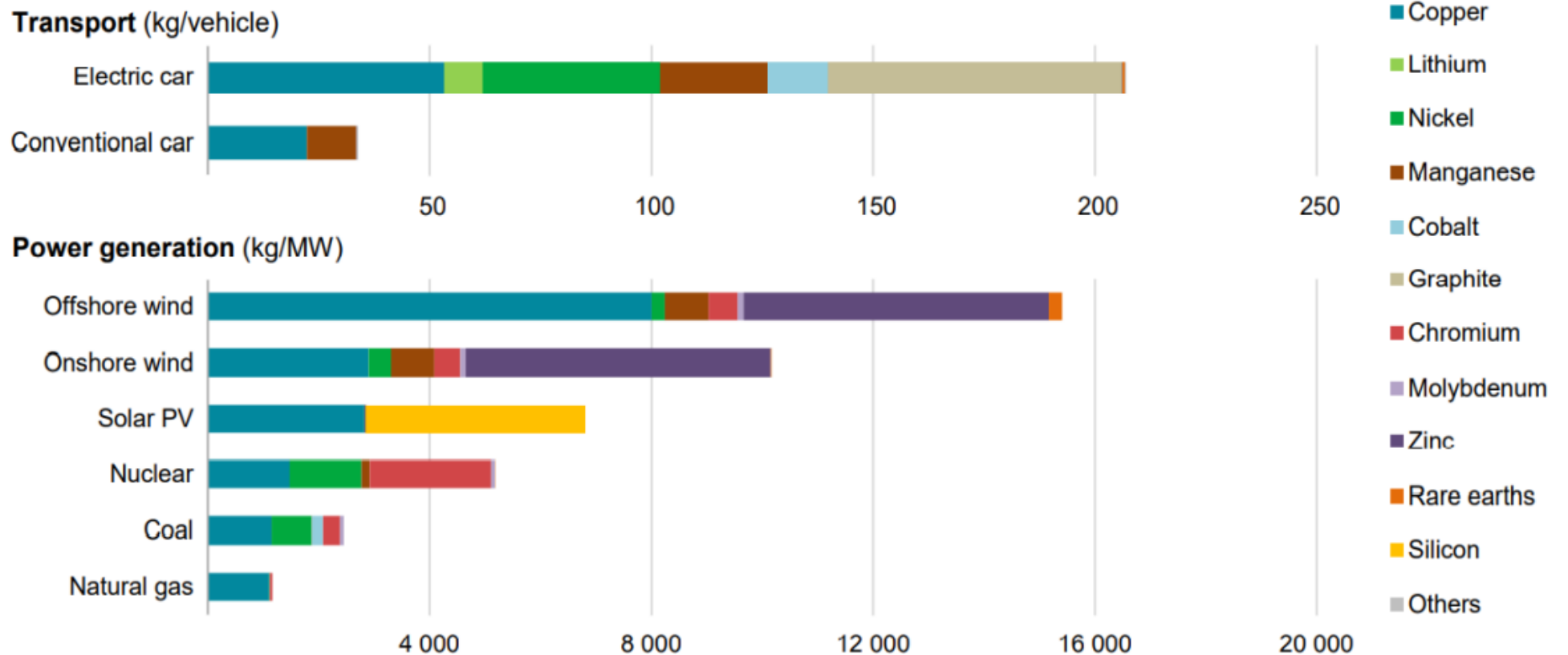
# Electrification increases demand for key critical minerals by 2 to 7 times by 2030

**Figure 1.27** ▶ Demand for critical minerals for selected clean electricity supply and electrification technologies in the APS, 2022 and 2030



# An Opportunity exists, but How?

Minerals Use Intensity increases with new (digital) technologies



Source: IEA (2021)

Maximizing value-added from natural resources is a **tailored mineral-country specific challenge**

- ✓ **Deepening**
- ✓ **Moving downward or upward** along the mining value chain

# How to take advantage of the demand for natural resources and minerals

1. Use capital and labor to diversify and **add value downstream**
2. Deepen your specialization **in the extraction stage**
3. Strengthen your presence in **services** related to the sector. (tailor-made and location-specific, exploiting vertical disintegration of mining companies, using scientific advances in ICT, biotechnology, new materials, strengthening local suppliers' capabilities)
  - A careful assessment of **costs and benefits** by **each sector** and **country**

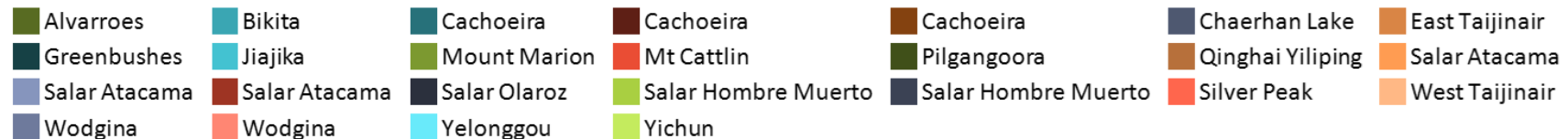
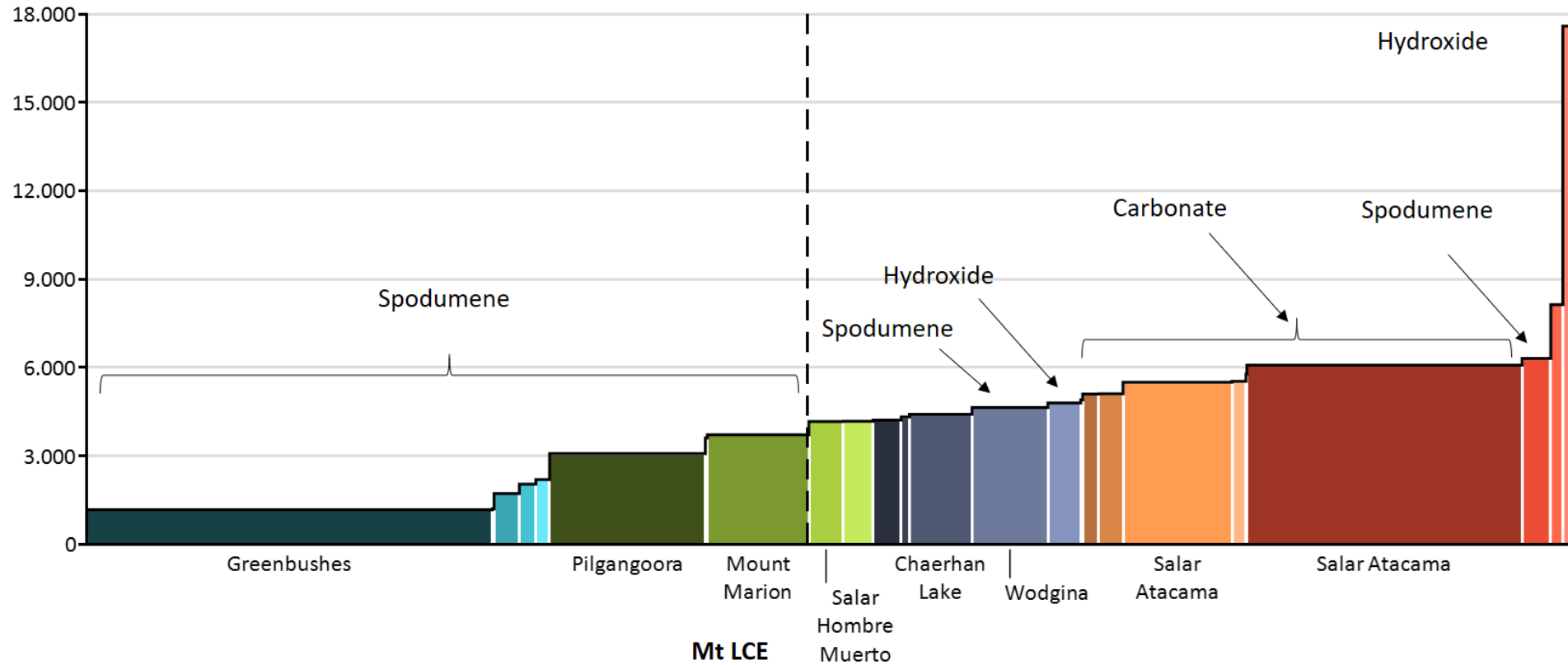
- Pietrobelli et al., 2024 ICC Special Issue, <https://academic.oup.com/icc/advance-article/doi/10.1093/icc/dtad079/7471252>
- LSE BLOG <https://blogs.lse.ac.uk/gild/2019/05/10/mining-global-value-chains-new-opportunities-and-old-obstacles-for-developing-countries/>
- World Bank WDR 2020 p.73 <https://www.worldbank.org/en/publication/wdr2020>

- An example of a careful assessment of **costs and benefits** by **each sector** and **country**
- **Lithium for Chile**

# Costs and Benefits in the Lithium GVC

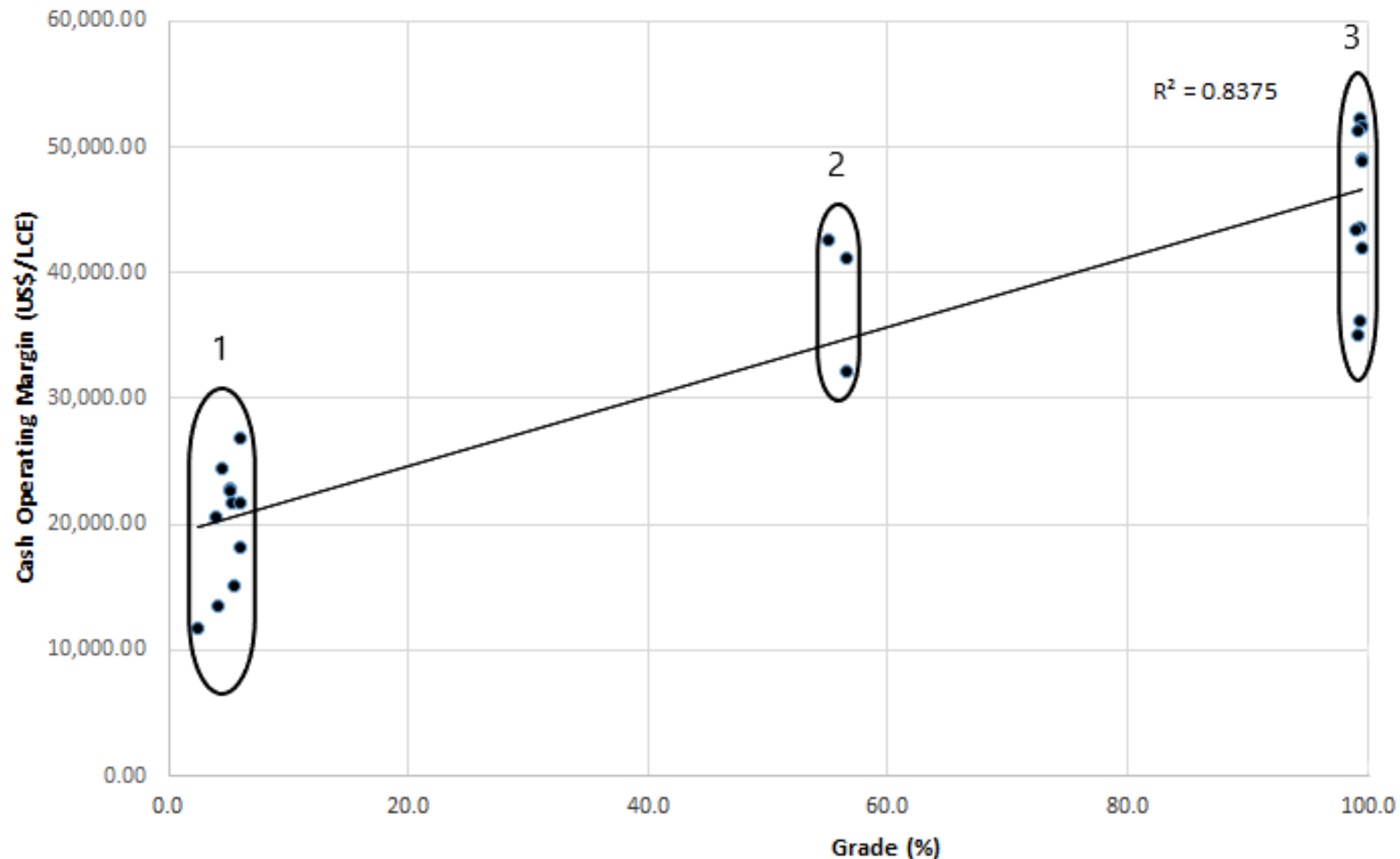
- **Significant leap** from Spodumene to Carbonate (from brines) – but spodumene also needs to be processed to obtain Ca, increasing costs

US\$/Mt LCE



# Cash Operating Margin versus Lithium Grade

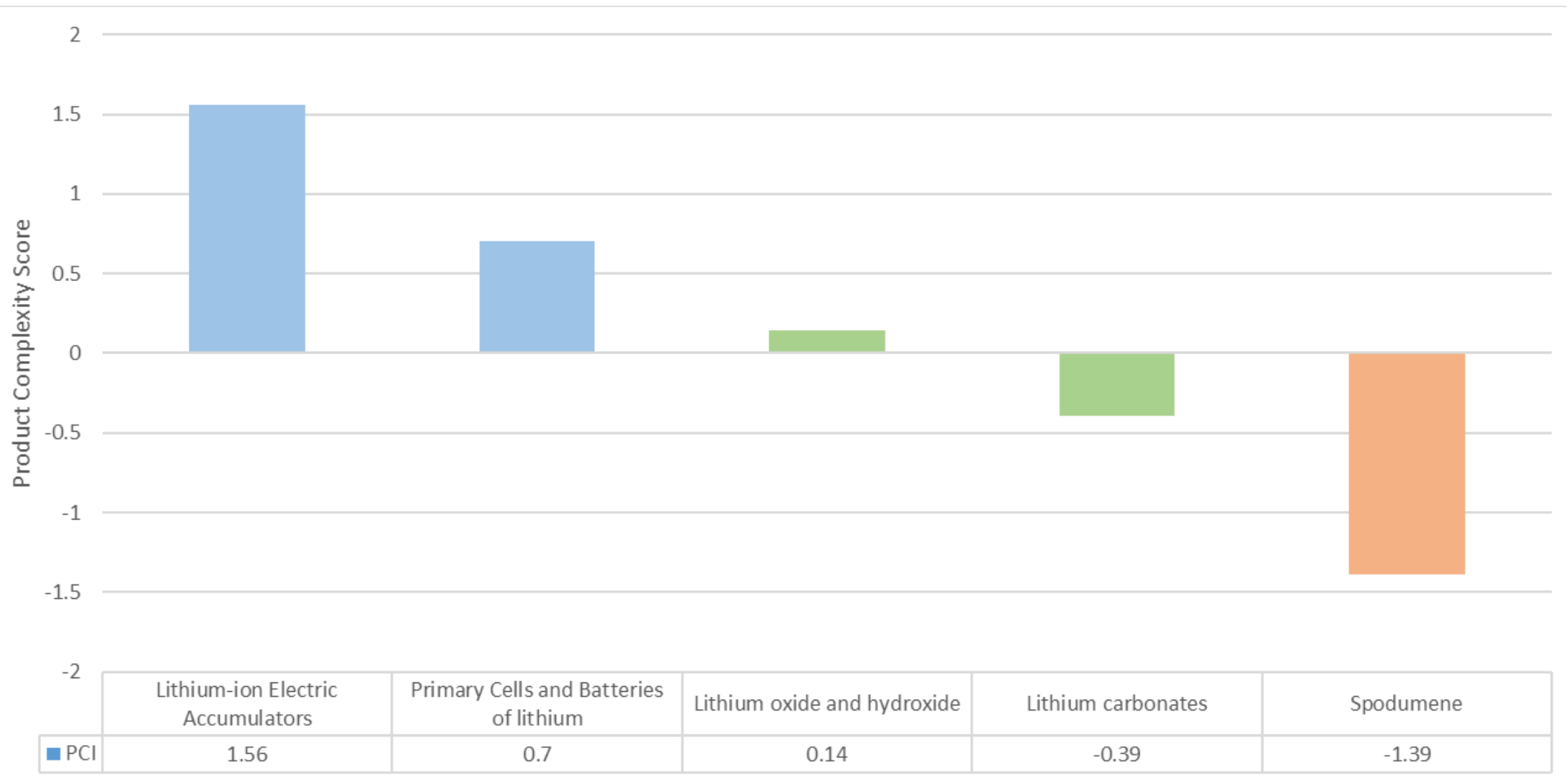
- Spodumene (with 2.5% to 6% of Li<sub>2</sub>O); Lithium hydroxide (with 55% to 56.5% LiOH); and Lithium carbonate (with 99% to 99.5% Li<sub>2</sub>CO<sub>3</sub>)
- Positive and high correlation (0.91) between the level of processing of lithium products and the cash operating margin.





# Possible Spillovers from Lithium Operations

## Product Complexity Scores for Lithium-Based Products



# The institutional framework in which minerals are produced and traded influences costs and benefits

## Demand for "green" productions is growing

- International trade regulations and agreements can modify the countries' competitiveness in different stages of the value chain.
- With a **carbon tax** on minerals and metals, e.g. Carbon Border Adjustment Mechanism of the EU (Bellora & Fontagné, 2023), Australian lithium concentrate produces 8 to 60 times more CO<sub>2</sub> emissions than LiCa from brines.
- Similarly, Chilean copper cathodes would gain competitiveness vs. Chinese cathodes because of the lower CO<sub>2</sub> emissions in the production and transport stages

# GVC-oriented policies – from an extended literature survey

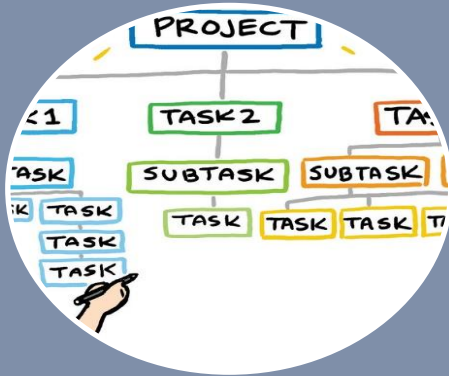
GVC <b>participation</b> policies	Enter and enhance local participation in GVCs
GVC <b>value capture</b> policies	Strengthen value creation and capture in GVCs
GVC <b>inclusiveness</b> policies	Improve social and environmental conditions in GVCs
GVC <b>resilience</b> policies	Strengthen local economic resilience

**Carlo Pietrobelli, Roberta Rabelotti & Ari Van Assche**  
**Making sense of global value chain-oriented policies: The trifecta of tasks, linkages and firms**

<https://link.springer.com/article/10.1057/s42214-021-00117-6>



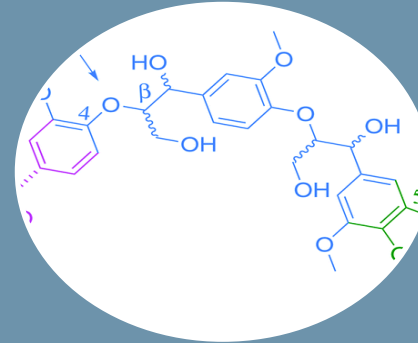
# The trifecta of GVC-oriented policies



## Tasks

Companies and governments should **target specific tasks** in the value chain, and **not**, as in the past, **entire sectors**

Policymakers take a more **granular view** of the type of activities they target to promote economic development.



## Linkages

the economic performance of companies and the social conditions offered to their workers are strongly influenced by the linkages

Policy makers regulate and strengthen these linkages to promote economic and social improvements, while ensuring a country's economic resilience



## Enterprises

Necessary to **understand the (microeconomic) logic of lead companies and suppliers**

Policymakers collaborate with GVC lead firms and suppliers to improve relationships, ensure fair treatment of workers, adopt sustainable business practices and build resilience



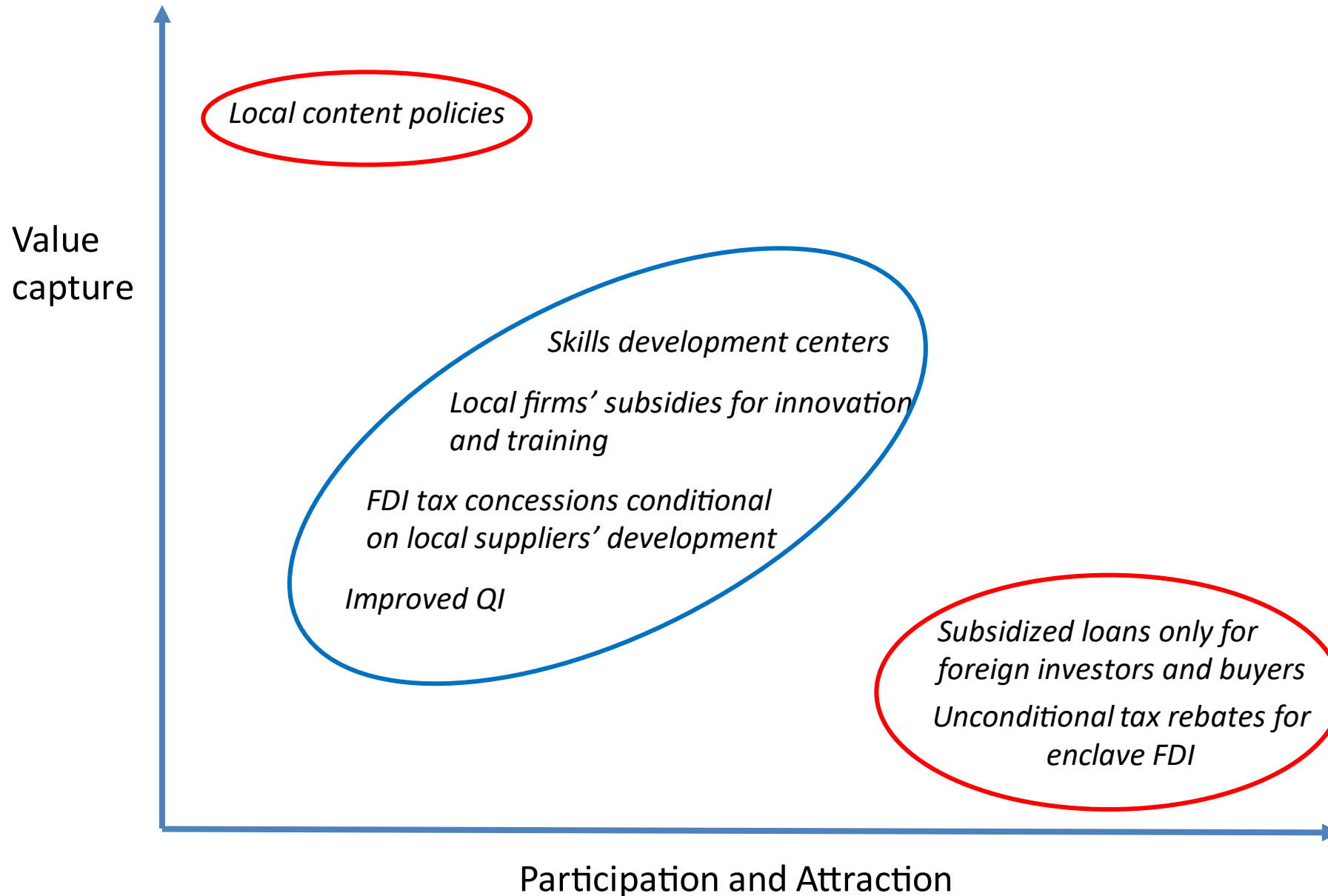
# Economic rationale of GVC-oriented policies

<p><b>Participation policies</b></p>	<p><b><i>Horizontal policies to reduce market distortions</i></b></p> <ul style="list-style-type: none"> <li>• <b>Market supporting policies</b></li> <li>• <b>Connection policies</b></li> </ul> <p>Minimalist State interventions, market facilitating policies</p>
<p><b>Value capture policies</b></p>	<p><b><i>Vertical policies</i></b> justified by:</p> <ul style="list-style-type: none"> <li>• Power asymmetries between lead firms and their suppliers;</li> <li>• Costs, risks, and uncertainty;</li> <li>• Need of coordination of the different actors investing along the GVC</li> </ul>
<p><b>Inclusiveness policies</b></p>	<p><b>Lead firms can be powerful actors to promote social and environmental upgrading; yet how to induce them:</b></p> <ul style="list-style-type: none"> <li>○ Need motivation – inducement – dialogue;</li> <li>○ Country-level and also <b>supranational</b> policies may be required</li> </ul>
<p><b>Resilience policies</b></p>	<ul style="list-style-type: none"> <li>• Fear that, with deep functional specialization and off-shoring, governments could not guarantee <b>society's well-being in case of unexpected shocks</b> (e.g. provision of vaccines and masks).</li> <li>• Belief that sometimes in specific sectors <b>regulations</b> and <b>direct interventions</b> may improve resilience (normative objective).</li> </ul>

## Policy tools – traditional but with a new approach

<p><b>Participation policies</b></p>	<ul style="list-style-type: none"> <li>• Remove obstacles to trade</li> <li>• Creation of favorable business environment</li> <li>• Competition enhancing policies</li> <li>• Transport and digital infrastructure improvements</li> <li>• <i>General</i> education and training</li> </ul>
<p><b>Value capture Policies</b></p>	<ul style="list-style-type: none"> <li>• Strengthen local innovation and entrepreneurship systems</li> <li>• Improve specific infrastructures (logistics, digital, productive)</li> <li>• Develop <i>specific</i> skills</li> <li>• Favor <i>linkages</i> among universities, training centers, and GVC firms</li> <li>• Provision of business services on norms, metrology, quality, laboratory, certifications</li> </ul>
<p><b>Inclusiveness policies</b></p>	<ul style="list-style-type: none"> <li>• Reform labor, social and environmental norms and regulations, and their applications; - both at national and supranational levels</li> <li>• Responsible procurement policies;</li> <li>• Promotion of private social and sustainability norms</li> <li>• Favor participation of local communities in GVC governance;</li> </ul>
<p><b>Resilience policies</b></p>	<ul style="list-style-type: none"> <li>• Resilience tests of supply chains</li> <li>• Diversification of GVCs</li> <li>• Public procurement for resilience;</li> <li>• Reshoring policies;</li> <li>• International cooperation to share essential goods, set up joint procurement policies/strategies; limit export restraints</li> </ul>

## DIAG. 2. GVC-oriented policies: Complements or Substitutes? Possible trade-offs



**Table 1. Examples of GVC-oriented Policy Tools**

	<b>Horizontal</b>	<b>Vertical</b>
<b>Public Inputs</b>	<ul style="list-style-type: none"> <li>▪ Monitor opportunities for investment and lead firms attraction</li> <li>▪ <b>Streamline</b> procedures for FDI and lead-firm (e.g. One-stop shops)</li> </ul>	<ul style="list-style-type: none"> <li>▪ FDI and selective lead-firm attraction</li> <li>▪ FDI in S&amp;T to increase location attractiveness for international research centers (via IP laws and enforcement, or tax concessions - a market intervention).</li> <li>▪ Skills training centers</li> <li>▪ <b>Quality, Standards, Certification Infrastructures (QI)</b></li> <li>▪ Policies to reinforce <b>linkages and spillovers</b> between GVC participants and local knowledge base (e.g. cluster policies, policies for technology transfer etc.) – may also operate through market interventions;</li> </ul>
<b>Market interventions</b>	<ul style="list-style-type: none"> <li>▪ <b>Generic R&amp;D&amp;i</b> subsidies for local providers' capabilities</li> <li>▪ Matching grants for <b>R&amp;D conditional on collaboration</b> (Force externalities via training commitments and suppliers' development)</li> <li>▪ Encourage international mobility of talent</li> </ul>	<ul style="list-style-type: none"> <li>▪ Selective temporary tax exemptions to new local providers</li> <li>▪ <b>Local content policies</b> (forcing lead firms to buy locally)</li> <li>▪ <b>Selective R&amp;D&amp;I</b> subsidies/grants</li> <li>▪ Promotion of innovative entrepreneurship, e.g. ease access to capital</li> </ul>

Source: adapted from Pietrobelli (2022).



## Value Chain Councils?

- A mechanism of **collaboration between government and business and analysts to identify reform packages to add value in a GVC context** (Findlay and Hoekman (2021))
- Similar to the experience of *Mesas Ejecutivas*?
- Policies need to be designed with an **economy-wide vision**, acknowledging the influence of a variety of policy areas, but also **accepting the specificity** of each supply chain.
- Focus on **coordination** across many government agencies and with industry.
- Better with an **epistemic community**, sharing standards and understanding, mutual trust and converging interests.
- A **multilateral policy dimension** beyond what individual governments can do. Coordination across countries matters, with value chains sometimes facing **obstacles across countries**
- A “whole of the supply chain” approach in trade and investment negotiations

▷ Regional value chains?

## Summing up

- ▷ Rethinking needed to consider GVCs in trade and development policies (The *trifecta*)
- ▷ Entering GVCs but also capturing value (innovation and upgrading)
- ▷ HOW



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**Thank you!**

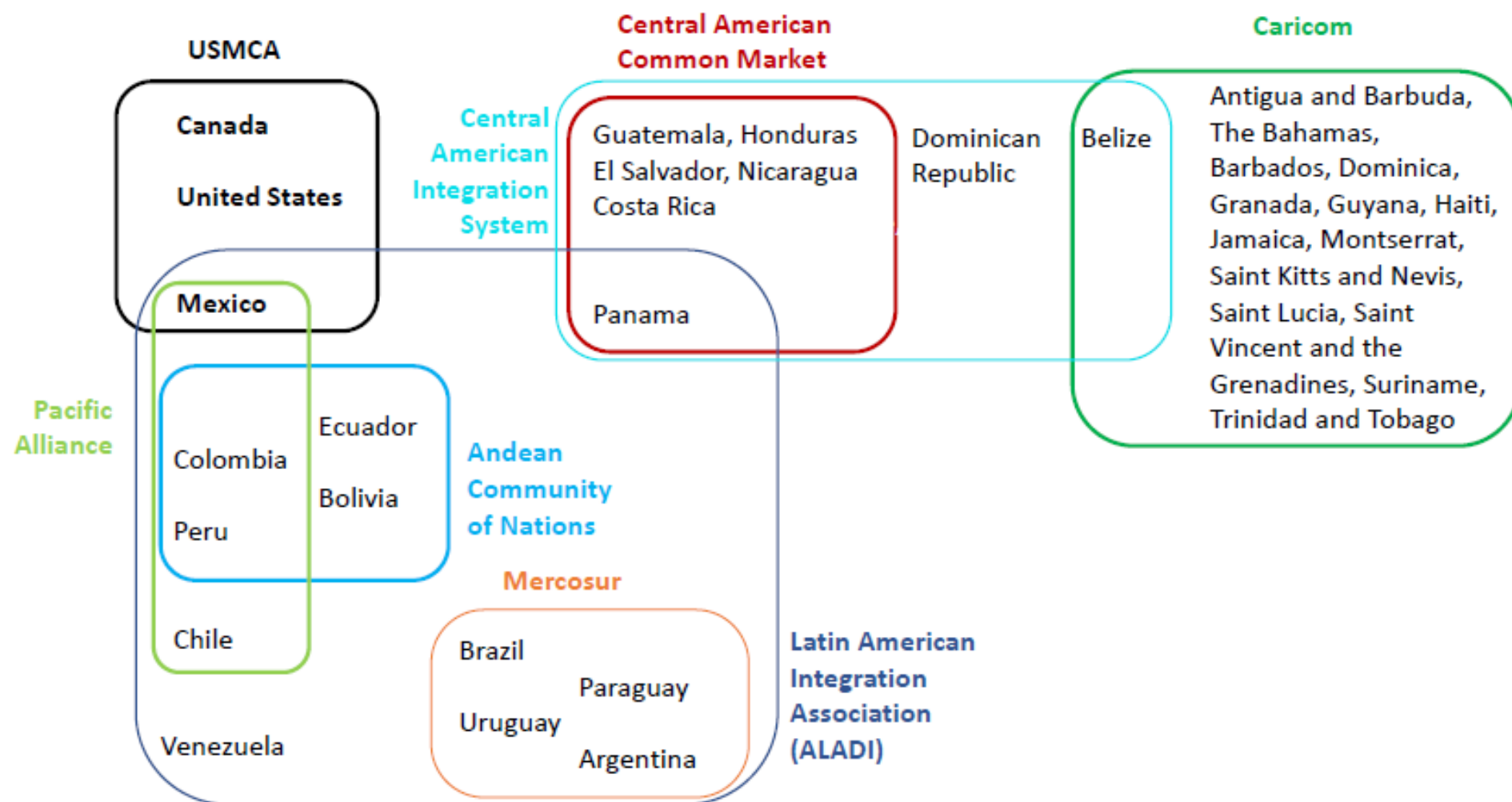
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Figure 5.8. LAC subregional integration mechanisms



Note: The USMCA entered into force in July 2020 and substituted the North America Free Trade Agreement (NAFTA).

Source: Authors' elaboration based on (CAF, 2021<sub>[2021]</sub>).