United Nations Conference on Trade and Development

10th MULTI-YEAR EXPERT MEETING ON COMMODITIES AND DEVELOPMENT

25-26 April 2018, Geneva

Industrial Policies for Diversification and Resource-based industrialization: Case studies of Malaysia and Chile

By

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The views expressed are those of the author and do not necessarily reflect the views of UNCTAD.

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AGENDA

1. Mapping out diversification routes around commodities
2. Diversification experiences of Malaysia and Chile
3. Policy recommendations

Figure 1: Taxonomy of Diversification Paths

Role of Commodities:

Source of Capital

As products in a value chain

Source of production capabilities

Financial Diversification (abroad)

Upstream Diversification

Backward production linkages

Vertical Integration

Consumption linkages

Commodity Value Chain

Fiscal linkages

Transversal Capability Building

Knowledge, Technological and organisational skills

Forward production linkages

Goods with wide application for other sectors

Infrastructure

Downstream Diversification

Unrelated

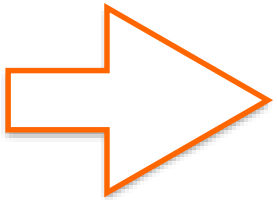
Horizontal Diversification
(Degree of Relatedness)

Examples of logistics and engineering around Malaysia and South Africa's extractives, industrial paint in Congo, Cement production in Algeria, bio-mining in Chile, etc.

Source: Author's elaboration

Some challenges for vertical integration as a diversification tool

1. **High costs of capital investments and technological barriers** to the provision of certain goods and services in some commodity sectors
2. **Internationally consolidated supply chains** to reduce costs and guarantee quality and reliability standards.
3. The most easily accessible activities to local participation usually do not imply great degrees of **capabilities and learning by doing**
4. Non-strategically designed vertical integration can further increase industrial dependence to commodity volatility instead of promoting industrial diversification.



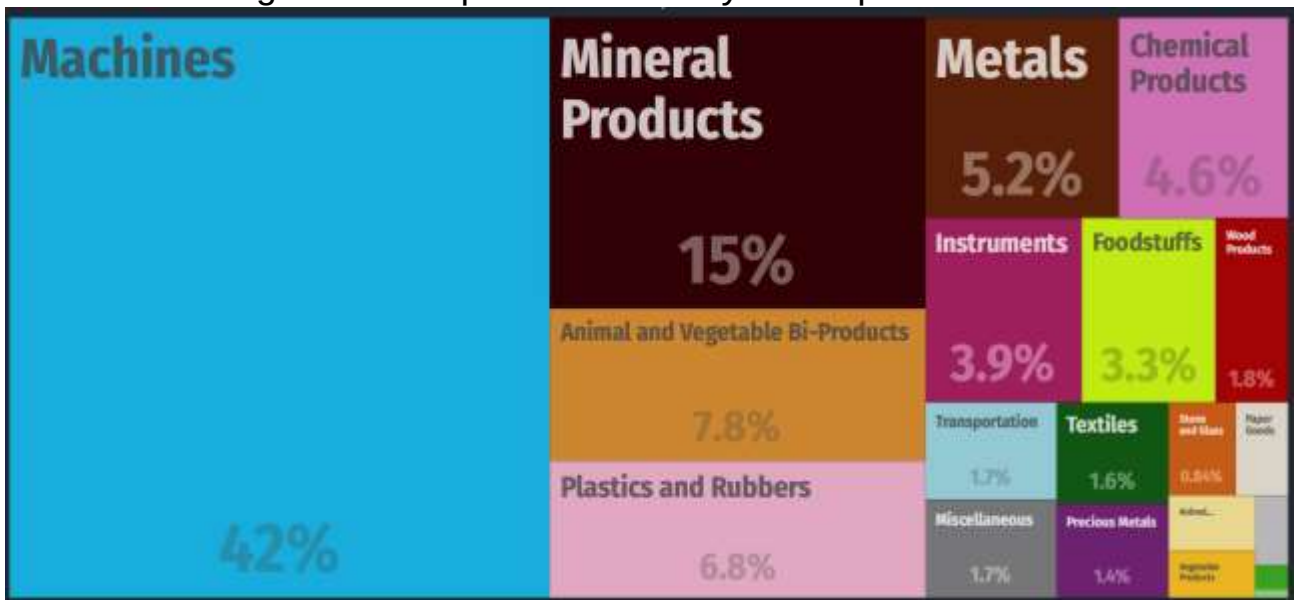
Resource abundance does not necessarily imply competitive advantage or privileged access to downstream and upstream activities

Case study 1: Malaysia
From commodity dependent to a diversified industrialised economy

Main features of Malaysia's diversification

- **Value addition in commodity sectors** (palm oil, rubber, oil and gas)
- **Horizontal diversification** towards the electronics sector
- **Key role of industrial policies** to target both horizontal diversification and vertical integration

Figure 2: Composition of Malaysian exports in 2016



Source: Atlas of Economic Complexity, 2017

Malaysia: Linkage development around Petroleum

Relevant Policies

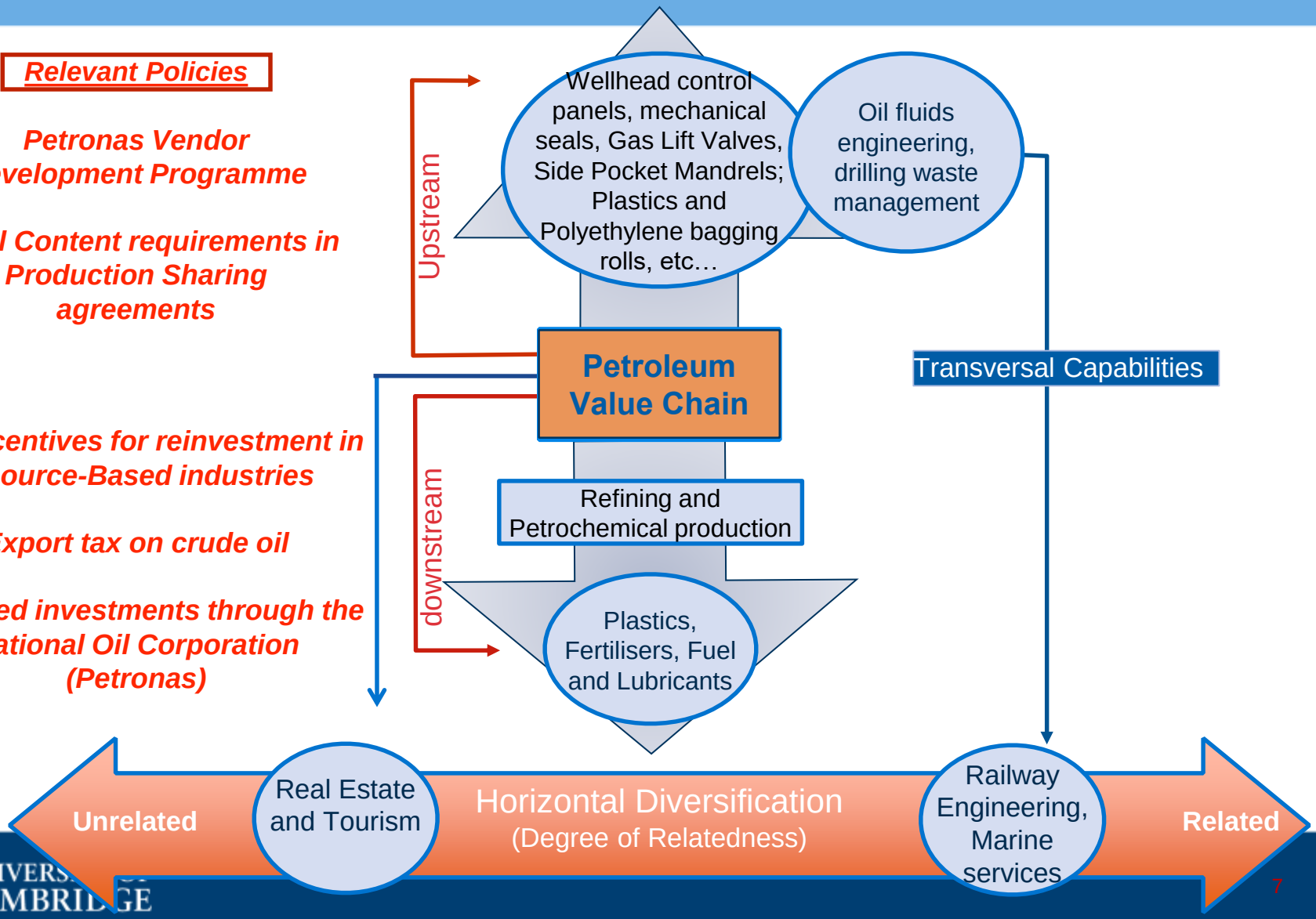
Petronas Vendor Development Programme

Local Content requirements in Production Sharing agreements

Tax Incentives for reinvestment in resource-Based industries

Export tax on crude oil

State-led investments through the National Oil Corporation (Petronas)



Malaysia: Linkage development around Palm oil & Rubber

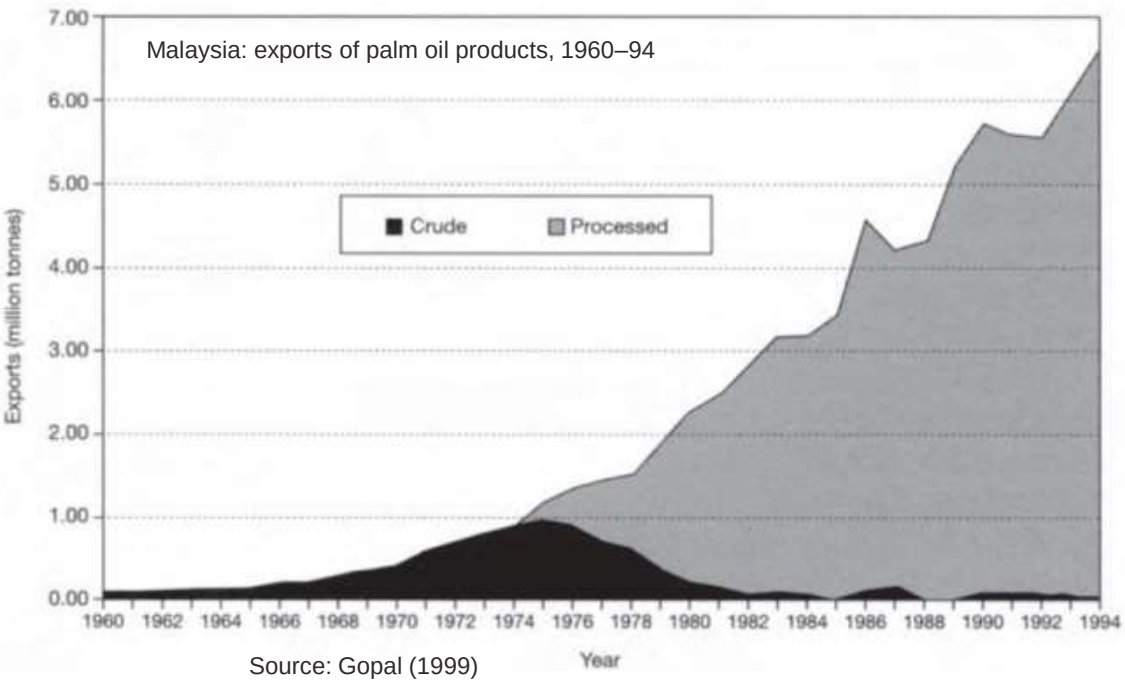
Some Relevant Policies

Incentives for reinvestment in resource-Based industries

Export Duty on crude palm oil

Palm Oil

Refined Palm Oil



Source: Gopal (1999)

Rubber

Rubber Milling / Ribbed Smoked Sheets

Latex products

Tyres

Primary processing phase (1950s and 1960s)

Phase of beneficiation and export orientation through additional policy incentives (1970s-1980s)

Third phase of value addition (1985-1990s)

Palm Oil Research Institute of Malaysia

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Malaysia's Horizontal diversification

The Electrical and Electronics (E&E) sector

- The E&E industry represents 48.7% of exports and 32.5% of employment in Malaysia
- It mostly consist of assembling => labor intensive but doesn't require much technological skills.
- Combined with the FDI-Led feature of the sector, those activities makes delocalisation easier

Role of the State and targeted policies:

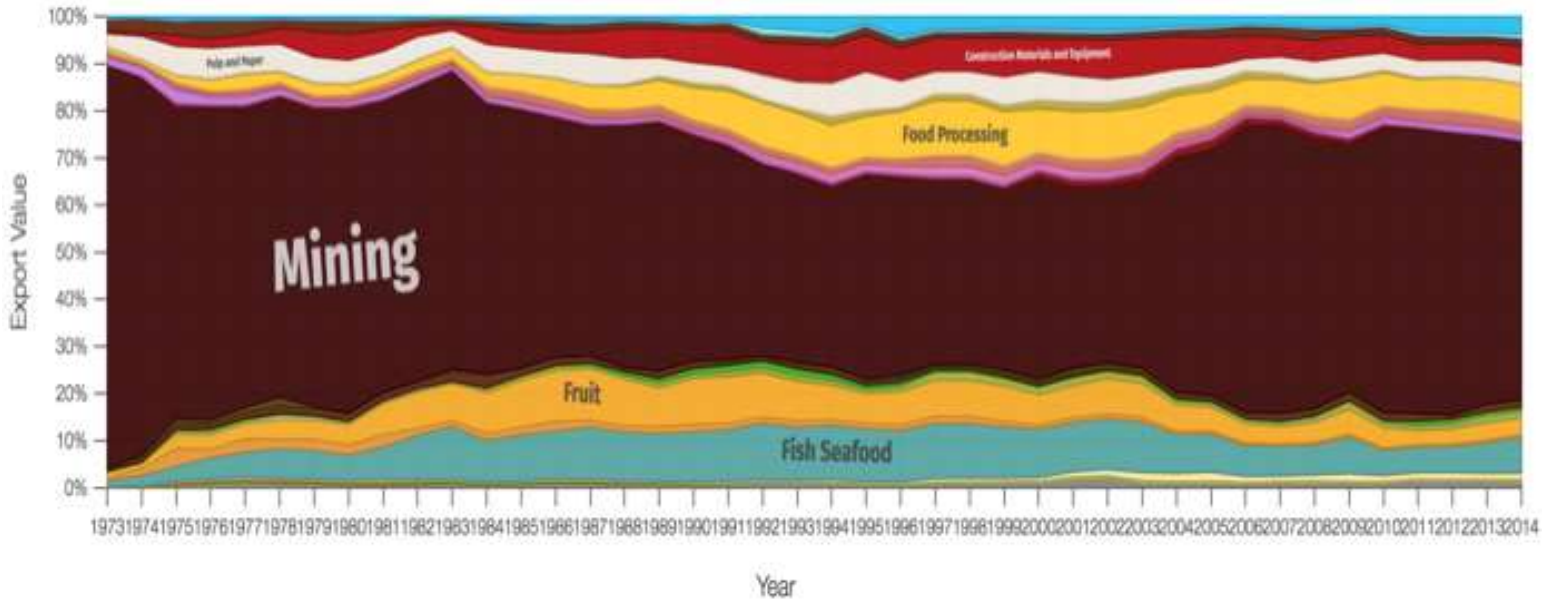
- Tax incentives for pioneering investments in the sectors by companies such as Intel
- Promotion of investments in high-tech activities by MIDA and State development corporations (such as the Penang Development Corporation)
- Human Capital Accumulation: Creation of the Penang Skill Development Centre to increase the supply of skilled workers

Case study 2: Chile, the world's largest copper producer

Key points on Chile's diversification

- **From copper dependence to a relatively diversified commodity-based economy**
- **A success story of fiscal stabilisation of copper revenues**
- **Yet, limited production linkages and value addition around copper**
- **Succe**ssful Diversification towards new sectors, as a result of targeted policies, not just market forces alone.

Figure 3: Products exported by Chile as a share of total export value between 1973 and 2014



Source: Observatory of Economic Complexity (2018)

Forward Linkages around copper

Processing and Value addition of copper has been rather limited:

- Refined copper < 50% of exported copper
- Copper-based products such as copper cables <1% of exports of the mining sector.

Chile's Altonorte copper smelter

Mainstream explanation for low value addition:

- High cost of value addition because of strong currency (peso), relatively high wages and high energy prices

Parallel explanations:

- Time/Dynamic inconsistency coupled and short term profit maximisation of extractive firms.
- Dependence on China as raw copper importer, which has interests in refining and adding value to copper domestically.

Backward linkages in the copper sector I

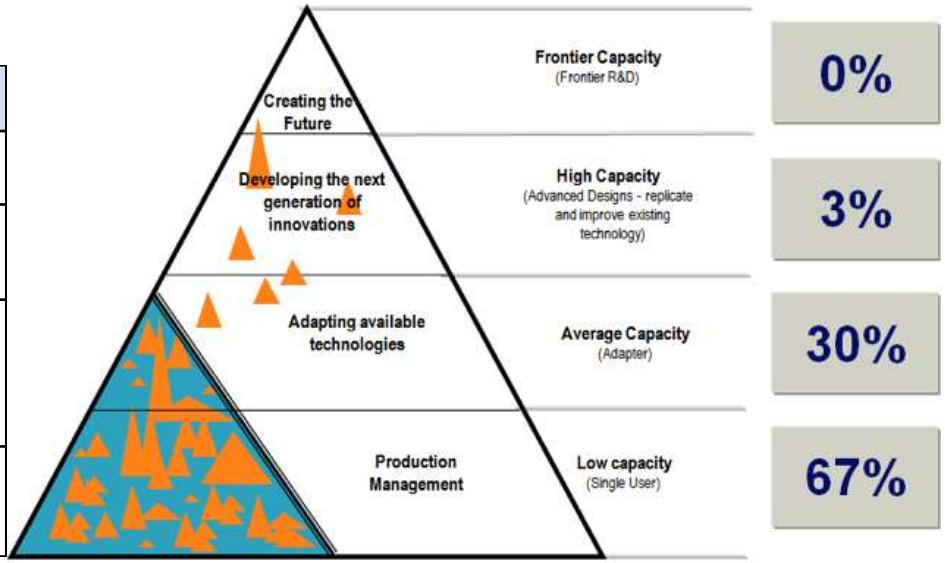
- **The number of Chilean mining suppliers has been increasing** from 3.443 firms in 2007 to 5.998 firms in 2012 (FCh, 2012; 2014)
- **Limited technological and innovative capabilities,** as well as **low export orientation**
- Firms within the Australian METS sector export 20x more than their Chilean counterparts, despite Chile being one of the world top mineral producers.

Figure N°5. Indicators comparing Mining suppliers in Chile and Australia in 2012

	AUS	CHI
Total sales (in USD million)	90.000	20.000
Total exports (in USD million)	15.000	500
Exports as share of total exports of the mining sector	13.3%	1.7%
Number of suppliers in the mining sector	1.500	6.000

Sources: Austmine (2013); Fundación Chile (2014; 2015); Bravo Ortega, Munoz, (2015); Meller y Gana (2015); Meller and Parodi (2017).

Figure N°4. Innovative capabilities of mining suppliers in Chile



Source: InnovaChile, 2009

Chile: Backward linkages in the copper sector II

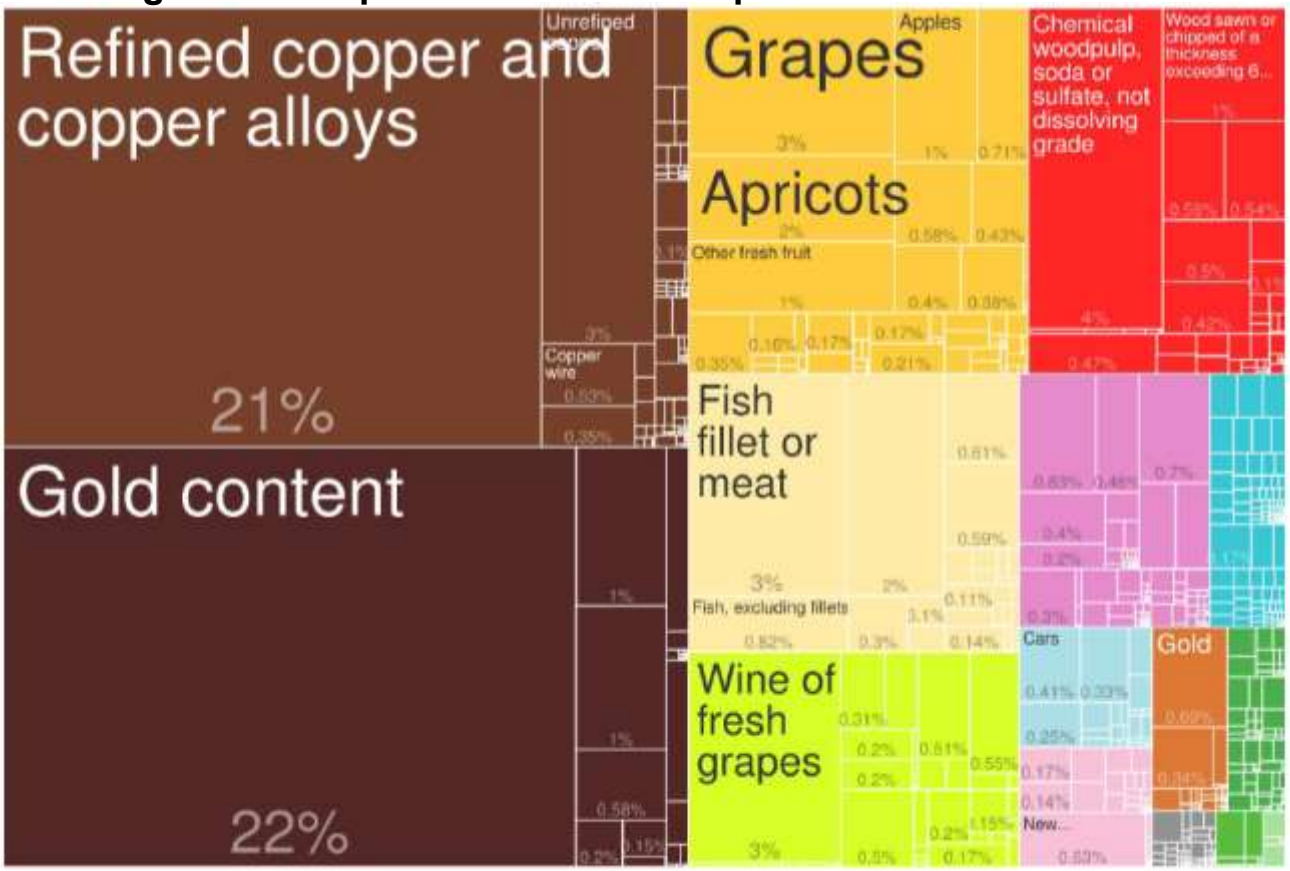
Fieldwork interviews suggest several obstacles and market failures:

1. **Difficulty of scaling up** for suppliers because the large scale of operations means there is very little timeframe for learning by doing.
2. **Unstable and heterogeneous intra-industry linkages and managerial risk aversion attitude towards** collaboration with local firms
3. **Labour mismatch** between human capital available and the skills needed for innovation and backward linkage development.
4. Very **high domestic sales** sometimes disincentivizing export orientation.

Lack of strategic state interventions in the copper sector contribute to explain the persistence of ***high barriers for copper-based industrialisation.*** Market forces alone have not enabled 'one thing to lead to another…'

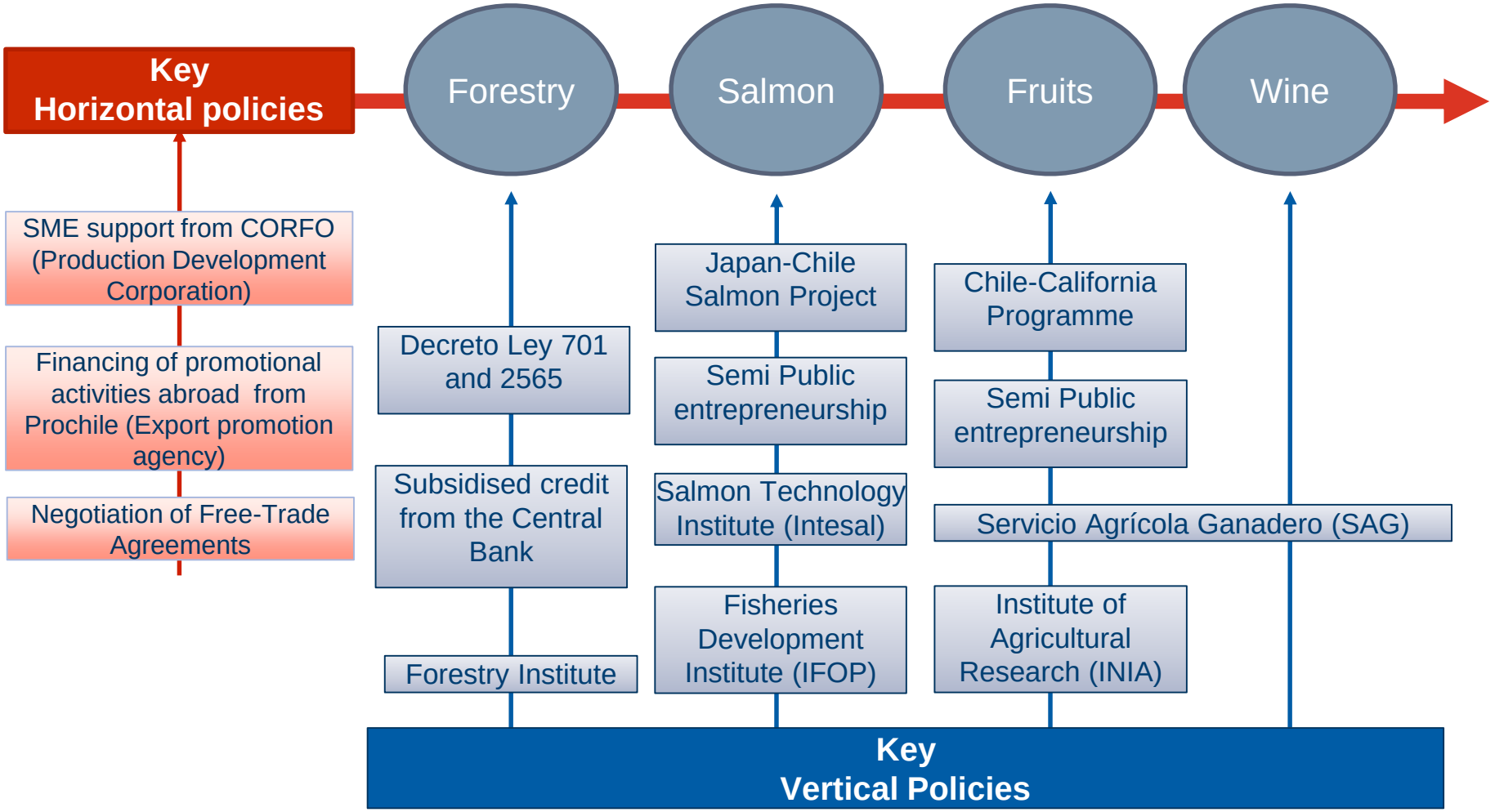
Chile's horizontal diversification

Figure 6: Composition of Chile's export basket in 2015



Source: Atlas of Economic Complexity, 2017

Mapping key state interventions behind Chile's successful non-mining sectors



Some conclusions on Industrial policies for Vertical Integration

At the State level

- **Targeted skills development programme**
- **Strategic, progressive and selective protection**
- **Incentives for export orientation**

At the firm level

- **Stable intra-industry linkages**
- **Stable industry-university linkages**
- Supplier Development Programmes

Cooperation at the regional level

- **Maximise economies of Scales and enhance productivity**
- Leverage on skills complementarities
- **Avoid a Fallacy of Composition**
- Reduce switching costs for MNCs operating in the region

Some of the key industrial policies for horizontal diversification

"Creativity always comes as a surprise to us; therefore we can never count on it and we dare not believe in it until it has happened. In other words, we would not consciously engage upon tasks whose success clearly requires that creativity be forthcoming".

Albert Hirschman,

The Principle of the Hiding Hand

Targeted skills development programme

Aligned with a country's industrial objectives to provide new skills required to shape the dynamic innovation-driven processes

Requires a collaborative framework between different types of economic and institutional actors

R&D Institutes

to accumulate sectoral knowledge and expertise and avoid collective action problems

Alleviation of first-mover disadvantage

by allowing **diffusion of technology and knowledge as public goods** to promote entrepreneurship in new sectors with high potential.

Mission-driven public entrepreneurship towards productive transformation

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