ERCST

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Reporting on Response Measures under Biennial Update Reporting – Case Study on Chile

ERCST Methodology Development

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Background on response measures

- In UNFCCC negotiations the issue of trans-border impacts of climate change mitigation measures is known as response measures.
  - The Kyoto Protocol in Article 2.3 states that Annex I parties *"shall strive to implement policies and measures (...) in such a way as to minimize (...) effects on international trade, and social, environmental and economic impacts on other Parties, especially developing country Parties."*

Background on response measures

- Understanding these concerns is fundamental when assessing the sustainability of the transition to a low GHG global economy, as stakeholders with concerns that are not taken into account can potentially play a strong role in slowing down the transition.

- Yet, while there has been considerable debate on how to achieve this, currently there is a lack of empirical studies to provide substance to the UNFCCC discussions on response measures and a lack of methodologies to report on the impact of response measures.

Background on response measures

- Biennial update reporting (BUR) allows for reporting on economic and social consequences of response measures by non-Annex I Parties
  - Decision 2/CP.17 Annex III contains the guidelines on RM reporting for BUR
- Parties are encouraged to provide detailed information on the assessment of economic and social impacts of response measures
  - Annex III.D.90 of Modalities, procedures and guidelines for the transparency framework

Project objectives

1. To design and create a methodology on response measures (RM) under Biennial Update Reporting.

2. To test this methodology through a case study on a country which has the available data, looking to see if the methodology works with the available data.

Suggested tabular format for reporting on response measures in BUR (UNFCCC secretariat)

Reporting information on any economic and social consequences of response measures

Response measures action	**Social and economic consequences from the response measures action**	**Challenges and barriers to address the consequences**	**Support needed to address the consequences**
1. In this column, non-Annex I Parties could provide a description of specific action(s) of response measures	*2. In this column, Parties could report on the consequences of the specific action identified in column 1, including any information regarding how the consequence has been linked to the action.* *-Disaggregate the information in terms of intensity and magnitude in:* *Low;* *Medium or moderate; and* *High* *(to create specific criteria for disaggregation)*	*3. In this column, Parties could report on challenges and barriers in address/coping with the consequences identified in column 2.* *Parties may also provide further elaboration under the section on reporting finance, technology and capacity-building needs and support received*	*4. In this column, Parties could report on the support needed for economic diversification.* *Parties may also provide further elaboration under the section on reporting finance, technology and capacity-building needs and support received*
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Overview: ERCST RM methodology

Step 1: Country description

Step 2: Identify the top 15 sectors in terms of value added.

Step 3: Collect data on characteristics of top 15 sectors.

Step 4: Building on Steps 2 and 3, identify vulnerable sectors, using <u>two methods</u>:

- » **Method 1:** Threshold method.
- » **Method 2:** Weighted scores method.

Identifying the vulnerable sectors

Overview: ERCST RM methodology

Step 5: Stakeholder input to identify anything which was missed in Step 4.

Step 6: Identify the response measures that might impact sectors from Step 4. (Country-level discretion whether to include positive as well as negative impacts.)

Step 7: Once completed further employing stakeholder input, to identify RM identified in Step 6.

Step 8: Assess the impacts of response measures on identified sectors.

Step 9: Look at possible domestic and international tools and support which may be needed to address the impacts.

Step 1: Country description

- Step 1 focuses especially on the past and current economic, social and environmental evolution of the country, including its geography, history, and political system

- It will center on the recent evolutions in the country's economic, social and environmental sectors.

Step 2: Identifying the vulnerable sectors

- Step 2 identifies the main sectors of the economy - which will subsequently be assessed for vulnerability to Response Measures (Steps 3 & 4).

- Using the activity classification system appropriate to the country (ISIC Rev 4, in the case of Chile), at a high level of disaggregation (4-digit level, in the case of ISIC), list the top 15 sectors in the economy ranked by **total value added**.

Step 3: Sector characteristics through key variables.

Describe the sectors' key characteristics. For each sector identified in Step 2, collect the data on the following key variables. These will be used in Step 4 to identify vulnerable sectors.

- Sectoral employment at fulltime equivalency (FTE), or labour input value.
- Sectoral emissions per value added (Tonnes C02e/million of USD).
- Exports (USD), (based on concordance between ISIC classification and HS codes at 6-digit level) as share of national exports.
- Exports (USD), as share of world exports).
- Top 5 Export Destinations (+% of total exports of product).
- Domestic production.

Step 4: Using the two methods below, determine which are the vulnerable sectors

- Step 2 identified the most significant sectors for the country, describing some of their relevant characteristics.
- Step 4 acts as a filter to identify the sectors which are:
  - vulnerable to response measures, and
  - significant to the national economy.

  These are the sectors which will be focused on in the study.
- There are two possible methods to do so:
  - Method 1: Threshold method
  - Method 2: Weighted scores method

Step 4: Method 1: Thresholds

- This method involves testing whether a sector passes each of the three listed threshold conditions.
  - If it does pass the three thresholds, the sector will be considered vulnerable to RMs.
- The thresholds are to be considered to be in series giving them equal weight.
- The first two determine vulnerability, and the third determines significance.
- This method therefore incorporates a process of elimination from the very first threshold, allowing for more efficient gathering and analysing data

Step 4: Method 1: Thresholds

- The three sectoral thresholds are:
  1. Trade intensity
     - First we look at trade exposure of the sectors by calculating the level of trade intensity:

$$Trade\ intensity = \frac{\text{exports}}{\text{domestic production}}$$

     - The higher the trade intensity, the higher the relevance and vulnerability of the sector for our analysis
       - Higher than 19%: high trade intensity
       - Between 10 and 19%: medium trade intensity
       - Lower than 10%: low trade intensity: sector does not pass the threshold

Step 4: Method 1: Thresholds

- The three sectoral thresholds are (continued):
  2. Energy cost per unit of value added
     - Proxy for GHG intensity of the sector.
     - The suggested threshold will be 5 %.

  3. Value added as a percentage of GDP
     - Importance of the sector in the economy of the country.
     - If greater than 1%: sector passes third threshold

- Thresholds might need to be adjusted depending on the country being assessed
  - For example, due to differences in structure of economies between developed and developing countries.

Step 4: Method 2: Weighted scores

- The second method, the **weighted scoring method** provides a systematic process for selecting the vulnerable sectors based on the same three criteria seen above:
  - trade intensity (calculated through trade intensity: exports/domestic production),
  - energy costs per unit of value added, or GHG intensity (grams of $C0_2e$/value added), depending on the available data, and
  - national sectoral significance, which will be calculated by looking at the value added relative to GDP.
- Whereas in Method 1 these values were categorised as thresholds, in this Method the values are used in a weighted average formula.

Step 4: Method 2: Weighted scores

- Each criterion is assigned a weight based on its level of importance to calculating the sector's vulnerability to RM.
  - Trade intensity and energy costs per unit of value added are each assigned a weight of 40%.
  - National sectoral significance through value added relative to GDP is assigned a weight of 20%.
- For a sector to be classified as vulnerable to RMs, it must achieve a certain cut-off score (***TBD***) in this weighted assessment.
- Possible to define a minimum score range to determine whether a sector should be perceived as relevant or not.

Step 4: Method 2: Weighted scores

Tabular overview of the weighted scoring method

Trade intensity (trade intensity: exports/domestic production). Scored zero to 100, derived by multiplying number by 4, cap at 100.	**40%**
Energy costs per unit of value added, or GHG intensity (grams of $C0_2e$/value added), depending on data availability. The figures will be normalized to a score between zero and 100.	40%
National sectoral significance: value added relative to GDP. Scored zero to 100, derived by multiplying number by 50, cap at 100.	20%

Step 4: Method 2: Weighted scores

- Method 2 provides a clear overview for each sector.
  - Method 1 does not provide this general overview, as the criteria are incorporated as automatic elimination thresholds
- Method 2 allows for incorporation of weight differentiation for the criteria.
  - Method 1: all thresholds are equally important
- Research and administrative burden for Method 2 will be higher due to the lack of elimination process.
- Method 2 cut-off score may have to be adjusted once seeing the results (for example, 0 sectors pass)
  - Allows for an added level flexibility beyond Method 1

Step 5: Stakeholder input to identify anything which Step 4 missed.

- Stakeholder consultations will supplement the above methods.
- Consultations will be designed to capture sectors of concern that the methodologies may have missed.
- Where missing sectors of concern are identified, the team will review the methodology for revisions that might help avoid such misses in future.

Step 6: Identify the response measures

Four-part procedure:

1. For the vulnerable sectors identified in Step 4, identify top 3 importers (top export destinations)
2. For the vulnerable sectors, identify the types of response measures likely to impact (country-level discretion whether to include positive as well as negative impacts)
3. Search in identified trading partners for identified types of response measures
4. Search international initiatives for identified types of response measures

Step 6: Identify the response measures
Part 2: Search for vulnerable sectors in third column

Response measures	Impacts in country undertaking the response measure	Possible impacts in other countries	Questions on possible impacts on Chile?
Carbon taxes	• decreased demand for carbon-emitting goods; increased demand for low-carbon emitting goods	• Negative effects: fossil fuel producers. • Positive effects: low-carbon goods (e.g., renewable energy/EV components)	• Effects on low-carbon goods exports?
Subsidies			
for low-carbon transport	• decreased demand for goods associated with internal combustion engines.	• Negative effects: producers of fossil fuels, lead. • Positive effects: producers of EVs, cobalt, lithium, vanadium.	• Ex: Effect on Chile as a lithium exporter: continue to export raw materials like lithium? Is Chile looking to become a downstream manufacturer of batteries?
for low-carbon energy production	• decreased demand for thermal fuels	• Negative effects: coal, natural gas, oil producers. • Positive effects: low-carbon energy technology (e.g., PV solar cells)	
removal of, for fossil fuel production	• decreased production of fossil fuels	• Positive effects: fossil fuel producers. • Negative effects: fossil fuel consumers.	
removal of, for fossil fuel consumption	• decreased consumption of fossil fuels	• Negative effects: fossil fuel producers. • Positive effects: fossil fuel consumers.	

for energy efficiency in buildings	• decreased energy consumption	• Effects depend on fuel source used in implementing country buildings. If fossil fuels used:
		  • negative effects on producers;
		  • positive effects on consumers.	

Green procurement			
of energy	• decreased demand for thermal fuels	• Negative effects: coal, natural gas producers. • Positive effects: coal and natural gas consumers.	
of automobiles	• decreased demand for goods associated with internal combustion engines.	• Negative effects: fossil fuel producers. • Positive effects: cobalt, lithium, vanadium producers, EV producers.	• Same question on lithium export + manufacture of batteries?

Step 6: Identify the response measures
Part 2: Search for vulnerable sectors in third column

Response measures	Impacts in country undertaking the response measure	Possible impacts in other countries	Questions on possible Impacts on Chile?
Cap and trade schemes	• decreased demand for carbon-emitting goods; increased demand for low-carbon emitting goods	• Negative effects: fossil fuel producers. • Positive effects: renewable energy/EV components producers; fossil fuel consumers.	
Liberalization of trade in environmental goods	• boost in consumption of green goods	• Positive effects: producers of covered environmental goods	
Border carbon adjustment	• decreased demand for high-carbon goods	• Depends on carbon intensity, and regime details, but likely: • Negative effects: aluminium, steel, cement, plastics, pulp & paper. • Positive effects for low-carbon producers.	• For example: Energy efficiency of copper + wood pulp production in comparison with that of other global players?
Standards and labelling requirements			
for agricultural goods, involving GHG emissions	• depends on details of the scheme, but likely loss of market share for non-certified air-frieghted goods, inter alia	• Depends on details of the scheme, but possible: • Negative effects: perishable fruits such as berries, high-value horticulture	• What sorts of environmental standards and labelling present market access barriers for Chilean agricultural exports?
mandatory efficiency performance standards for consumer goods, industrial equipment	• restricts the market to high-efficiency products; reduces demand for fuel	• Negative effects: fossil fuel producers; producers of low-efficiency consumer goods and industrial equipment. • Positive effects: fossil fuel consumers; producers of high-efficiency goods/equipment	
International aviation levies	• reduction in air travel consumed	• Negative effects: flight-based tourism sectors (e.g., hotels, restaurants)	• For example: In the agricultural sector, what goods tend to be air freighted? Possible changes and/or trends? • Possible effects on tourism?
International maritime levies	• increase in shipping costs	• Negative effects: increased costs of imports and exports using maritime transport	• Which agricultural goods are shipped? Possible changes/trends?

Step 6: Identify the response measures

Parts 3 & 4: Where to look for response measures

Looking at domestic measures from international trading partners, as well as international measures at the end from ICAO and IMO:

- EEA database: climate change mitigation P&Ms in Europe
- OECD database of environmental measures
- Party NDCs
- WTO environmental database
- IEA Building Energy Efficiency Policy Database
- ICAP carbon market database
- FAOLex database of food and agriculture laws and regs
- Global Climate Legislation Database
- IEA/IRENA Joint Policies and Measures Database
- ITC Sustainability Map, Standards Map
- UNFCCC compilation report on response measures
- ICAO and IMO climate actions

Step 7: Once completed further employing stakeholder input, to assess RMs identified in Step 6.

- Stakeholder consultations assess:
  - whether any relevant RMs have been missed, or
  - whether too many RMs have been listed as relevant for the list of sectors.
- The research team will contact key sectoral stakeholders (business, government and unions) to identify policies and impacts and verify our findings.
- To be carried out through workshops where the methodology and the main findings are presented, followed by requests for input and feedback, as well as inviting stakeholders to identify other policies (out-of-jurisdiction and international) and other negative impacts on their sector.

Step 8: Assess impacts of response measures

- Assessing the impacts of the identified response measures.
  - Finding quantitative data where available and developing any additional data where feasible.
  - Quantitative data would be sourced from policies, impact assessments and other available studies related to any environmental, economic and social impacts, looking at:
    - Type of impact (positive or negative, economic, social or environmental)
    - Size of impact
    - Timeline of impact
    - Possible contributing factors that might compound the problem.
- Each of the impacts identified above needs an in-depth discussion.
- A central issue is the quantification of impacts
  - Dependent on available information and methodologies!

Step 8: Assess impacts of response measures

Quantitative and Qualitative Assessment

- The nature, and extent of vulnerability will be analysed through quantitative and qualitative assessment, looking at economic, social and environmental factors.
- Depending on the data and resources available, quantitative analysis could be carried out through ex post empirical work by concentrating on the data series of the economic activity of the sector before, and after the operationalization of the RM.
- Qualitative overview will concentrate on a basic description of vulnerability, and the causal chain, including positive or negative, and intended or unintended impacts. Challenges/barriers to addressing vulnerability will also be looked at.

Impacts on Government Revenue

- The impacts will also be assessed by looking at royalties, corporate income taxes, and concession fees.
- This method will only be relevant for extractive sectors and other primary sectors, such as mining, oil and gas, and possibly forestry and fisheries.

Step 9: Look at possible tools and support which may be needed to address the impacts.

- Domestic measures:
  - cost alleviation domestic safety nets, worker training/retraining and adjustment programmes and economic diversification efforts.
  - Support and capacity-building, which are central issues for various mitigation tools.
- Possible international cooperative approaches.
  - International approaches could play a large role in light of their characteristics and ability to assist countries in tackling negative impacts from outside of their own jurisdiction.
- These tools and approaches may operate at a regional or global level.
  - Examples of such tools and approaches are the Technology Mechanism, the Green Climate Fund, the Adaptation Committee, the Capacity Building Framework and the REDD+ Framework.

Overview of the data found, and missing data

- Need data to complete **Step 2**: Identify the top 15 sectors in terms of value added.

- The International Standard Industrial Classification of All Economic Activities (**ISIC**) = clasificación industrial internacional uniforme (**CIIU**) is the classification used by Chile.

Level of aggregation needed, shown through sector breakdown using ISIC Rev 3.1 (CIIU Rev 3.1)

Example of where we have what we need at the right level of aggregation: 4 digit ISIC level

Manufacturing

Section D, Manufacturing	Division 26, Manufacture of other non-metallic mineral products	269 Manufacture of non-metallic mineral products n.e.c.	2691-2699 (esp. 2694 Manufacture of cement, lime and plaster, 2695 Manufacture of articles of concrete, cement and plaster)

Agriculture

Section A, Agriculture, forestry and fishing	Division 01, Agriculture, hunting and related service activities	011 Growing of crops; market gardening; horticulture	0112 Growing of vegetables, horticultural specialties and nursery products

Example of what we *have* at a higher level of aggregation for agriculture, 2 digit ISIC level.

Example of what we *need* at a lower level of aggregation, 4 digit ISIC level

Step 2: Value added: Manufacturing data

- For example in the manufacturing sector, **data is available at the 4 digit level following ISIC Rev 4 (CIIU 4)** shown below through the last two digits of the 4 digit level.

CIIU Rev. 4	Valor Bruto de Producción (miles de pesos)	Consumo Intermedio (miles de pesos)	Valor Agregado (miles de pesos)
10 - Elaboración de productos alimenticios	13,957,843,029	10,145,006,229	3,812,836,804
11 - Elaboración de bebidas	3,301,633,417	2,591,583,652	710,049,762
13 - Fabricación de productos textiles	215,434,899	130,029,971	85,404,926
14 - Fabricación de prendas de vestir	236,340,201	152,743,209	83,596,992
15 - Fabricación de productos de cuero y productos conexos	198,389,999	97,864,282	100,525,717
16 - Producción de madera y fabricación de productos de madera y corcho*	2,253,612,627	1,637,559,263	616,053,354
17 - Fabricación de papel y de productos de papel	2,999,502,671	2,140,634,865	858,867,817
18 - Impresión y reproducción de grabaciones	356,859,777	221,325,508	135,534,269
20 - Fabricación de sustancias y productos químicos	6,239,948,459	4,181,555,925	2,058,392,499
21 - Fabricación de productos farmacéuticos, sustancias químicas medicinales y productos botánicos de uso farmacéutico	720,767,618	449,093,809	271,673,809
22 - Fabricación de productos de caucho y de plástico	1,809,620,939	1,305,679,985	503,940,955
23 - Fabricación de otros productos minerales no metálicos	1,500,566,164	1,005,438,851	495,127,316
24 - Fabricación de metales comunes	952,641,059	772,030,579	180,610,471
25 - Fabricación de productos elaborados de metal, excepto maquinaria y equipo	1,529,652,700	1,065,861,785	463,790,930
26 - Fabricación de productos de informática, de electrónica y de óptica	36,387,992	21,476,129	14,911,863
27 - Fabricación de equipo eléctrico	556,053,136	395,161,478	160,891,658
28 - Fabricación de maquinaria y equipo n.c.p.	821,225,701	569,028,302	252,197,399
29 - Fabricación de vehículos automotores, remolques y semirremolques	63,414,476	51,476,233	11,938,243
30 - Fabricación de otro equipo de transporte	52,630,781	25,188,059	27,442,721
31 - Fabricación de muebles	288,188,388	174,624,157	113,564,231
32 - Otras industrias manufactureras	68,315,858	40,717,801	27,598,057
33 - Reparación e instalación de maquinaria y equipo	781,196,331	417,806,509	363,389,818
C** - Industrias manufactureras	1,172,285,140	905,833,517	266,451,620

Step 2 data gaps for value added: What we have and what we need

Sector	What we have	What we need
Agriculture	2 digit level	4 digit level
Manufacturing	4 digit level ✓	
Mining	2 digit level	4 digit level
Tourism	4 digit level ✓	

Data we have and data we need for Step 3: Sector characteristics through key variables.

Key Variables	What we have	What we need
Sectoral employment at fulltime equivalency (FTE), or labour input value	1 digit ISIC level	4 digit ISIC level
Sectoral emissions per value added (Tonnes C02e/million of USD).	Various ISIC digit levels from 1 to 4 digit levels	4 digit ISIC level for each sector
Exports (USD), (based on concordance between ISIC classification and HS codes at 6-digit level) as share of national exports.	4 digit ISIC level	
Exports (USD), as share of world exports).	4 digit ISIC level	
Top 5 Export Destinations (+% of total exports of product).	4 digit ISIC level	
Domestic production.	Various ISIC digit levels from 1 to 4 digit levels.	4 digit ISIC level for each sector

Step 3: Key variable: *Sectoral employment at fulltime equivalency (FTE), or labour input value*

- Currently we have the data at 1 digit ISIC level (ISIC Section) however, **we need data at the 4 digit ISIC level in order to input the data in Methods 1 and 2**.

EMPLOYMENT BY TYPE OF ECONOMIC ACTIVITY[1]
EFM2019
(in thousands of persons)

Type of Economic Activity										
Agriculture, livestock, forestry and fishing (ISIC Section A)	Mining and quarrying (ISIC Section B)	Manufacturing (ISIC Section C)	Electricity, gas, steam and air conditioning supply (ISIC Section D)	Water supply; sewerage, waste management and remediation activities (ISIC Section E)	Construction (ISIC Section F)	Wholesale and retail trade (ISIC Section G)	Transportation and storage (ISIC Section H)	Accommodation and food service activities (ISIC Section I)	Information and communication (ISIC Section J)	Financial and insurance activities (ISIC Section K)
828.77	**222.20**	**883.56**	**48.90**	**39.79**	**715.09**	**1,539.61**	**556.60**	**369.95**	**143.70**	**169.99**

Source: Encuesta Nacional de Empleo, INE.

1 Según Clasificación Industrial Internacional Uniforme CIIU4.CL 2012 (Revisión 4 adaptación chilena), a partir de Clasificador de Actividades Económicas Nacional para Encuestas Sociodemográficas, CAENES.

Step 3: Key variable: *Sectoral emissions per value added (tonnes C02e/millions USD)*

- Currently we have data on energy use using national energy balance categories, or GHG emissions using IPCC categories.
- However, these do not correspond to the ISIC categories of economic activity.
- This table shows the varying degrees of data we have from the national energy balance, and through correspondence with ISIC, demonstrate how key data is still missing, where even at the 1 digit ISIC level in the third column for "transportation and storage" for example there is "no coverage" and therefore no data at all.

What we have			What we need	
Category in National Energy Balance	ISIC Rev 4 level found		ISIC Rev 4 Category at 1 digit ISIC level	Data found in National Energy Balance
Copper mining	4 digit ISIC level: Section B, Group 072, Class 0891		Agriculture, livestock, forestry and fishing	covers sugar and fishing
Salt peter mining	4 digit ISIC level: Section B Group 081, 0891		Mining and quarrying	covers copper, salt peter and iron
Iron mining	3 digit ISIC level: Section B, Group 071		Manufacturing	petrochemicals, iron & steel, cement and other manufacturing
Pulp and paper	2 digit ISIC level: Section C, Division 17		Electricity, gas, steam and air conditioning	covers electricity & gas
Iron & steel manufacturi	3 digit ISIC level: Section C, Group 241		Water supply; sewerage, waste management and remediation activities	no coverage
Petrochemicals	2 digit ISIC level: Section C, Division 20		Construction	construction
Cement	4 digit ISIC level: Section C, Group 239, Class 1072		Wholesale and retail trade	no coverage
Sugar	4 digit ISIC level: Section C, Group 107, Class 1072		Transportation and storage	no coverage
Fishing	2 digit ISIC level: Section A, Division 3		Accommodation and food service activities	no coverage
Agribusiness	2 digit ISIC level: Section A Divisions 1 and 2		Information and communication	no coverage
Construction	1 digit ISIC level: Section F		Financial and insuance activities	no coverage

Step 3: Key variable data: *Exports (USD)*

- **We have the data for exports at the 4 digit ISIC level**, (based on concordance between ISIC classification and HS codes at 6-digit level) **which is exactly what we need, and we do not need anymore data.**
- With this high level of data we will be able to input the data in our methods in order to calculate which sectors will be vulnerable to RMs.
- The data with the HS codes at the 6 digit level is shown below:

Exportaciones chilenas 2009-2018
cifras en US$ millones
Fuente: Subdepartamento de Información Comercial, DIRECON-ProChile, con cifras del Banco Central de Chile

HS6	Product	2018
Total	Total export	75,481.9
260300	Copper ores and concentrates	18,681.1
740311	Copper, refined, in the form of cathodes and sections of cathodes	15,507.2
740200	Copper, unrefined; copper anodes for electrolytic refining	2,159.9
470321	Semi-bleached or bleached coniferous chemical wood pulp, soda or sulphate (excluding dissc	1,614.0
220421	Wine of fresh grapes, incl. fortified wines, and grape must whose fermentation has been arrest	1,598.7
470329	Semi-bleached or bleached non-coniferous chemical wood pulp, soda or sulphate (excluding c	1,579.6
080610	Fresh grapes	1,233.0
030441	Fresh or chilled fillets of Pacific salmon "Oncorhynchus nerka, Oncorhynchus gorbuscha, On	1,231.1
261310	Roasted molybdenum ores and concentrates	1,114.0
080929	Fresh cherries (excluding sour cherries)	1,079.0

Step 3: Key variable data: *Exports (USD)*

- Any response measures impacting the importation of major Chilean export products will have a significant impact on the Chilean economy.

- Impacts would mimic the fluctuation of global copper prices and the corresponding downturn effect this had on Chile's revenue in the past due to the central role copper exports play in its economy.
  - Chile's top export product in 2018 was *copper ores and concentrates (HS6: 260300)*. Export for this product more than doubled since 2009.

Step 3: Key variable data: *Top 5 export destinations*

- **We have the data for this key variable and do not need anymore data.**
- The variable looks at the top five countries who are purchasing the most amount of exports from Chile, **plus the percentage of the total exports of the product.**
- Below are the top 5 export destinations for Chile's top 23 export products (at HS 6-digit level) which we have compiled:

Country	Aggregated Values for Export Destinations 2018 (USD)
China	$23,651,434,177
USA	$6,252,035,686
Japan	$5,644,799,695
Rep. Of Korea	$3,507,501,134
Brazil	$1,781,717,646

Step 3: *Top 5 export destinations:* Example

- **We have the data for this variable and do not need anymore data.**
- The data was collected for each top export product
  - 5 export partners for each product were found and listed.
- Ex: In 2018, China was the main export partner for *copper ores and concentrates*, importing more than double than Japan, the second largest trade partner for this product.
- Following the methodology, we would begin to look at RMs in these trading partners that could have an effect on copper exports from Chile.

2018 Top 5 Export Partners: Value (USD)* for *copper ores and concentrates (HS6: 260300)*	
China	$9,961,854,660
Japan	$3,844,588,755
Rep. Of Korea	$1,260,795,613
India	$950,433,773
Spain	$885,972,263

Step 3: Key variable: *Exports (as share of world exports)*

Chile's top export in 2018, *Copper Ores and Concentrates*:

HS6	Product	Chile Exports (2018)	World Exports (2018)	Exports in % (as share of World Exports) 2018
260300	Copper ores and concentrates	$18,681,072,604	$32,511,614,563	57.5%

Step 3: Key variable: *Domestic production*

- For calculating trade intensity, we need value for both domestic production and exports
  - We have domestic vs exported figures for tourism.
  - For mining, we have domestic vs exported figures for mining of copper (4 digit ISIC level: 0729), extraction of crude petroleum or natural gas (2 digit ISIC level: 06), mining of metal ores (2 digit ISIC level: 07) and other mining and quarrying (2 digit ISIC level: 08).
  - For manufacturing, we have data on gross value of production in ISIC classifications, and we have data on exports in HS codes.
    - A concordance exercise will allow us to compare one to the other
    - though all concordance exercises are imperfect
  - For agriculture, we do not have data on production for domestic markets.

Overview/Conclusions

- Once all of the data is collected at the right level we will be able to use it to calculate sector vulnerability through Method 1 and Method 2
  - Including assessing which method might be preferable for future use
- Overall, this case study will also aid in giving stakeholders visibility on what might happen and clarity for policymakers on what actions and tools might be required, aiding in understanding and addressing the implications of climate change mitigation policies.
- Any unforeseen, and unintended adverse impacts of climate change mitigation policies need to be addressed earlier rather than later, in order to ensure that the tools and measures for their mitigation have been identified and prepared, ultimately enhancing efficient policy-making and decreasing overall cost.

Alternative methodologies

What options for going forward, given data constraints?
How to identify sectors vulnerable to response measures?

A. **Fill the data gaps**, and proceed with the methodology as planned.

B. **Hybrid approach**: where necessary, identify sectors of interest only at *1 digit ISIC level* (e.g., agriculture), and use stakeholder input in those sectors to highlight vulnerable subsectors at the *4 digit ISIC level,* a more granular level.

C. **Qualitative, iterative approach**:
   - Identify the key sectors of the Chilean economy at a broad level
   - Identify the types of response measures likely to impact those sectors
   - Identify specific existing or planned response measures in countries of interest, or at the international level
   - Assess the characteristics of the sectors in Chile that might be impacted by those measures (e.g., agricultural exports with high carbon footprint)
   - Identify the sectors matching those characteristics
   - Reality proof with stakeholders

Sources

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