

International sourcing during Covid-19: How did Chilean firms fared?

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CEMLA Joint Research

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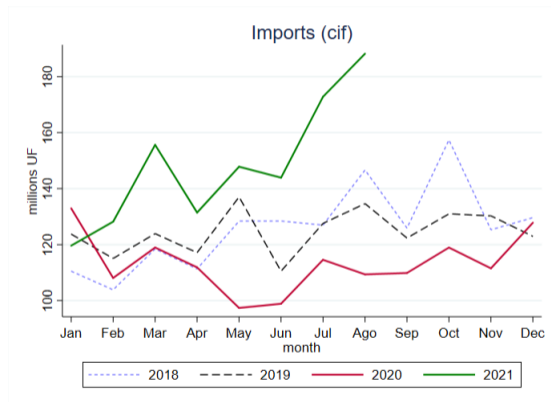
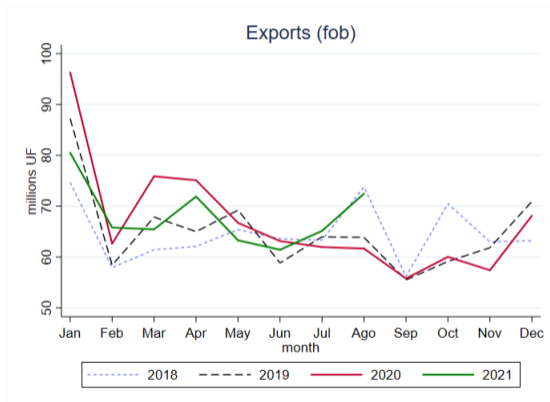
[§] The views and conclusions presented do not necessarily reflect the position of the Central Bank of Chile or its Board members.

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Motivation

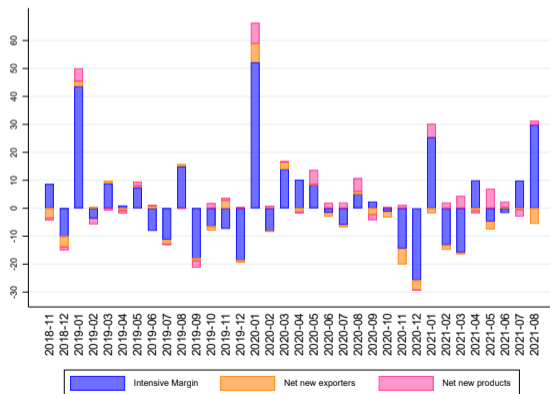
- ▶ Covid-19 unprecedented shock: demand/supply.
- ▶ How Chilean firms are responding and adapting to it? Through which margins?
 - ▶ **Domestic relationships** → Employment, domestic supplier/clients *Albagli, Fernández, Guerra-Salas and Huneus (2021)*.
 - ▶ **International links** → In this work we want to explore links with foreign suppliers/clients. Exports and import dynamics *intensive margin* and *extensive margin*.
- ▶ What can we expect in terms of prices? Increasing concerns on the impact of supply disruptions on costs. We want to examine what happens to the bundle of imported intermediate inputs at the firm level.

International Trade Developments



Export dynamics

(a) Exports growth dynamics: product margin

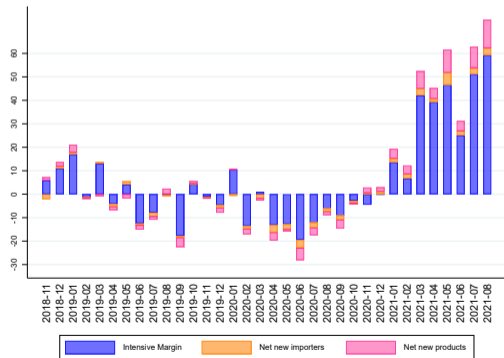


- ▶ Aggregate dynamics, decomposed into:
 1. intensive margin
 2. net extensive margins: (a) new products (b) new exporter.
- ▶ Exports fared relatively well.
- ▶ Dynamics mainly driven by the intensive margin.
- ▶ Net entry in new products/new destinations.
- ▶ Firms stopping their exporting activity.

Import dynamics

(a) Import growth dynamics: product margin

Distribution firms: wholesale/retail

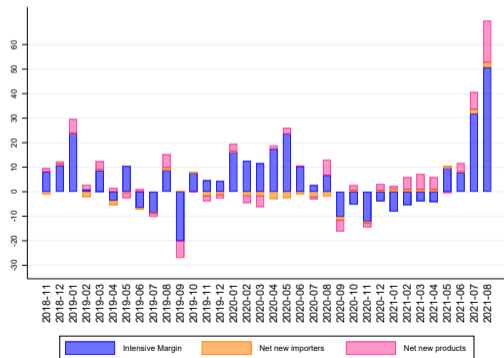


- ▶ Sharp recovery in imports by firms operating in the distribution sector.
- ▶ Those firms that were already importers in $t - 12$, increased their product portfolio.
- ▶ The net contribution of firms entering import activities is small.
- ▶ by BEC

Import dynamics

(b) Import growth dynamics: product margin

Manufacturing firms



- ▶ Dynamics mainly driven by the intensive margin.
- ▶ Negative net entry in new products and firms exiting their import status. This has implications for the recovery. Concerns as regards international production network broken links, how easy will be to re-establish them ([Huneuus \(2019\)](#)) and possibly with new prices.

▶ by BEC

Dataset

- ▶ We will use 2 sources of data (at the firm-level):
 - ▶ **VAT/Electronic firm-to-firm receipts:** Firm characteristics (size, sector,...) and relationships with domestic suppliers/clients. Data on turnover, material, wagebill,...
 - ▶ **Customs:** Information on firm-level transactions at HS-8 digit and trading partners, this allows to obtain more details on the relationships with foreign suppliers/clients, DIN DUS formulaires (V,Q,uv).
- ▶ Basic cleaning ▶ CLEANING STEPS to guarantee consistency and keep high coverage ▶ COVERAGE.
- ▶ **Time span:** 2017m1-2021m8 (56 months and will be up-dated).
- ▶ Some sectors are excluded: Mining, EGW and Public Administration.

Sources of heterogeneity:

The merged firm-level dataset will allow us to assess different sources of heterogeneity:

- ▶ The role of Covid-19 **stringency index** in trading partners.
- ▶ **Consumption goods:**
 - ▶ Indoor vs. Outdoor goods **de Lucio et al. (2021)** ▶ INDOOR-OUTDOOR
- ▶ **Intermediate goods:**
 - ▶ Input specificity **Rauch. (1999)**
 - ▶ Participation in Global Value Chains: firm that imports intermediates and exports intermediates.

Summary statistics

Table: SUMMARY STATISTICS

	Full Sample		non-Importers		Importers	
	Mean	std.dev	Mean	std.dev	Mean	std.dev
Employment	16.39	150.25	13.56	125.64	83.82	436.96
Sales (thousands)	1.89	177.52	1.15	171.87	33.97	886.87
Capital per worker (thousands)	0.30	0.84	0.29	0.82	0.42	1.03
Sales per worker (thousands)	0.18	0.29	0.17	0.27	0.40	0.49
Export (thousands)	0.14	11.79	0.05	3.05	3.66	69.93
Export share in output	0.51	0.40	0.60	0.38	0.28	0.34
Imports (thousands)	0.20	18.72	0.00	0.00	7.18	113.33
Import share in materials	0.50	0.31	.	.	0.49	0.30

Note: Based on dataset after basic cleaning. EGW, Mining and Public Administration sectors have been excluded. Monetary values are in Unidades de Fomento (UF).

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Imported varieties

Table: NUMBER OF PRODUCTS AND ORIGIN (DIN) BY SECTOR

	2019					
	Products			Origin		
12_sectors	Mean	Median	Max	Mean	Median	Max
Agro (n=5,579)	2.4	1.0	73	1.4	1.0	23
Manu (n=35,596)	5.8	2.0	146	2.6	1.0	43
Const (n=8,009)	3.0	1.0	93	1.5	1.0	17
Retail (n=122,194)	6.6	2.0	448	2.1	1.0	40
Transp (n=10,647)	3.2	1.0	120	1.7	1.0	20
Finan Act (n=2,878)	3.6	1.0	117	1.7	1.0	25
Hous Act (n=949)	2.6	1.0	29	1.3	1.0	7
Busi Act (n=19,443)	3.2	1.0	154	1.5	1.0	28
Pers Serv (n=11,262)	2.1	1.0	61	1.4	1.0	21
Total	5.5	2.0	448	2.0	1.0	43

Note: After basic cleaning. We exclude Mining, EGW and Public Administration.

Empirical analysis: Firm level

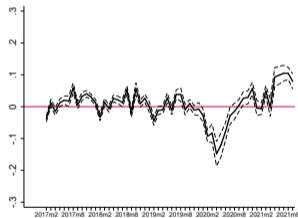
$$\ln x_{it} = \nu_i + \beta_t + \gamma_X X_{it} + \epsilon_{it} \quad (1)$$

- ▶ **Dependent variables:** x_{it} can be exported/imported volumes, quantities, or unit values of firm i , number of varieties at time t .
- ▶ **Controls:** firm size, industry (2-digit/4-digit), import/export ratio to sales, material to sales,...
- ▶ **Fixed effects:** (firm#time).
- ▶ **Standard errors cluster:** industry level.

Import dynamics: Firm-level

- ▶ Time dummies (with firm fixed effects) show a sharp drop in the average number of products imported relative to early 2017.

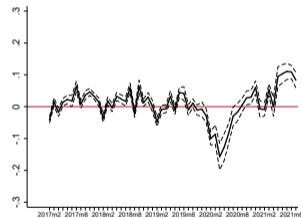
(a) Number of Products



(c) Number of Countries



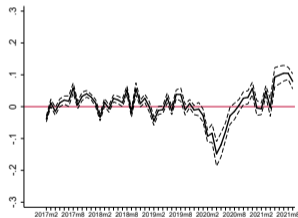
(b) Number of Varieties



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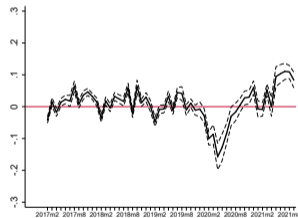
(a) Number of Products



(c) Number of Countries



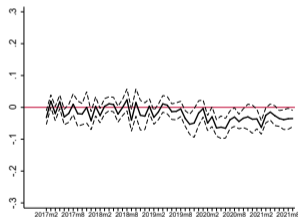
(b) Number of Varieties



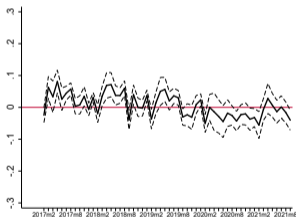
Export dynamics: Firm-level

- ▶ Time dummies show that Chilean firms slightly reduced the average (ln) number of exported products, the number of destination countries and varieties (product#destination) since the start of the covid outbreak.

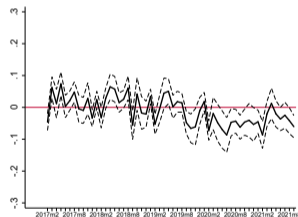
(a) Number of Products



(c) Number of Countries



(b) Number of Varieties



Unit Values: Manufacturing firms

- ▶ Unit values at the product-level:

$$UV_{ijkt} = \frac{\text{Value}_{ijkt}}{\text{Quantity}_{ijkt}} \quad (2)$$

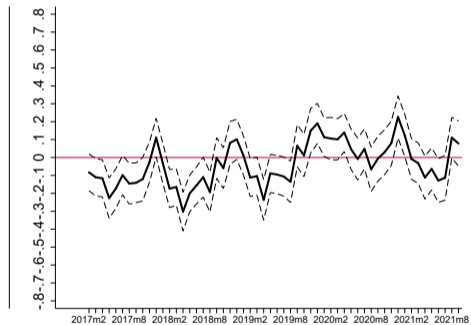
- ▶ Imported costs at the firm level. Index (weighted average) of unit values.

$$UV_{it} = \sum_{j=1}^J M_{ijk,t} M_{i,t} \frac{\text{Value}_{ijkt}}{\text{Quantity}_{ijkt}} \quad (3)$$

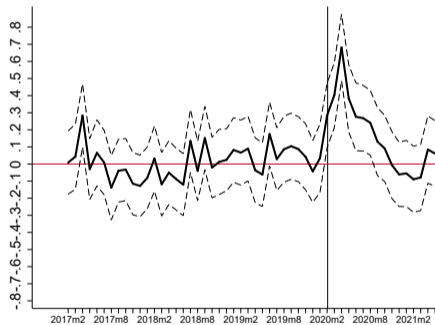
- ▶ Proxy for prices and proxy for foreign marginal costs at firm level. Some technical difficulties to construct a meaningful foreign cost index.

Unit Values: Manufacturing firms

(a) Exporter firms



(a) Importers



Empirical analysis: Firm-Product-Country level

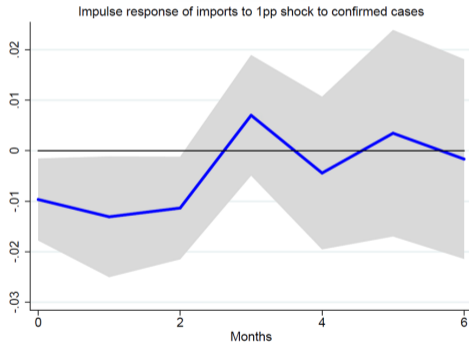
$$\ln \Delta x_{ijkt,t-h} = \nu + \alpha \mathbf{containment}_{jt} + \beta \Delta \mathbf{cases}_{jt,t-h} + \gamma_{jk} + \gamma_{jt} + \epsilon_{ijkt} \quad (4)$$

- ▶ **Dependent variable:** x_{ijkt} exported/imported volumes, quantities, or unit values of firm i , to destination j of product k at time t .
- ▶ $h=12$ for annual variation.
- ▶ **Variable of interest:** Health situation/containment measures in/taken by trading partners ▶ Oxford
- ▶ **Controls:** firm size, industry, epidemiological situation in Chile.
- ▶ **Fixed effects:** (firm \times product \times time), (firm \times country \times time).
- ▶ Similar approach to [Cerdeiro and Komaromi \(2020\)](#) \rightarrow daily, country, product and to [Meier and Pinto \(2021\)](#) analyze the exposure to China.

The role of trading partners...

Intermediates inputs: VOLUMES

Partner Confirmed cases

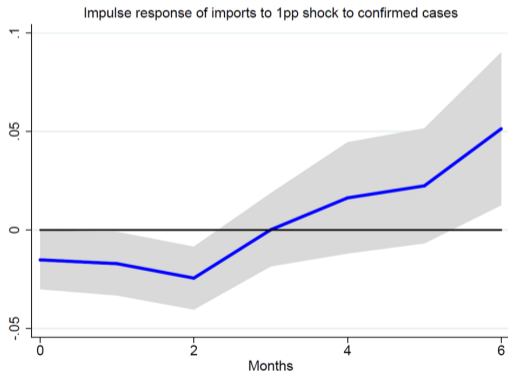


- ▶ The FE triplet compares the evolution of imports comparing the imports of a similar firm, same product in a given period: origin with worsened health situation vs. unchanged.
- ▶ Imports decline by 1pp.
- ▶ Short-lived impact 1 quarter (3 months).
- ▶ A role for the elasticity of substitution?
Input specificity?

The role of trading partners...

Consumer goods: VOLUMES

Partner Confirmed cases

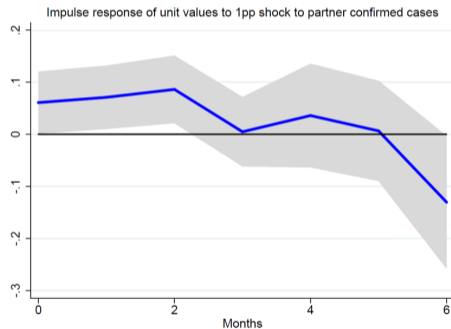


- ▶ No significant impact on consumer goods.
- ▶ Composition effects not capturing well the epidemiological situation? [▶ ICIO](#)

The role of trading partners...

Intermediates inputs: UNIT VALUES

Partner Confirmed cases



- ▶ Increase in average unit values.
- ▶ Short-lived impact.

Main takeaways






- ▶ **ongoing work!** as the impact of supply disruptions is an ongoing event.
- ▶ We are characterizing the behaviour of firms at very dis-aggregated level during the Covid-19 → evidence of heterogeneous behavior among firms, according to the type of imported good.
- ▶ Up to know, we have analyzed the behavior of **direct international links**...
- ▶ ... but we are missing the indirect exporting/importing, we could exploit the information on B2B transactions (“FE”) (see [Marcel and Vivanco \(2021\)](#) and [Albagli, Fernández, Guerra-Salas y Huneus \(2021\)](#)).
- ▶ We are specially interested in firm-level imported input costs and the role of supply disruptions. We aim to evaluate how costs are passed-through to client prices along the production chain.
- ▶ **To do list:** (1) explore asymmetries → what to expect during recoveries?, (2) a good approach to explore the impact of climate change related events?, (3) ...

Thanks!

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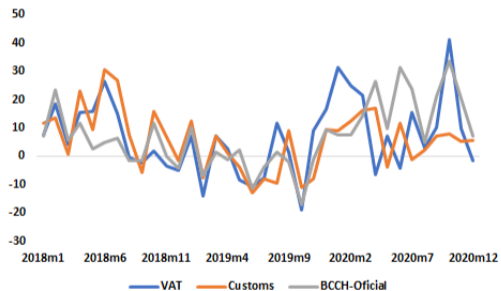
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References

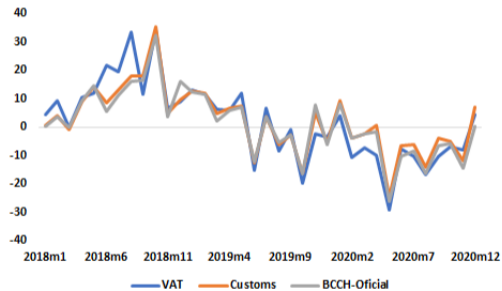
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CRC TR 224 Discussion Paper Series.

- ▶ We take away firms with negative values in sales or wage bill.
- ▶ We take away firms with just one employee .
- ▶ We take away firms with highly volatile capital stock growth or value added. Winsorized at the 90th percentile.
- ▶ We take away firms with implausible sales to labor and sales to capital.
- ▶ Compute lpr and trim the distribution 1th and 99th percentile.
- ▶ We exclude sectors that might not be representative such as: mining, utilities: Electricity, Gas and Water and Public Administration.

(a) Exports (year-on-year growth)

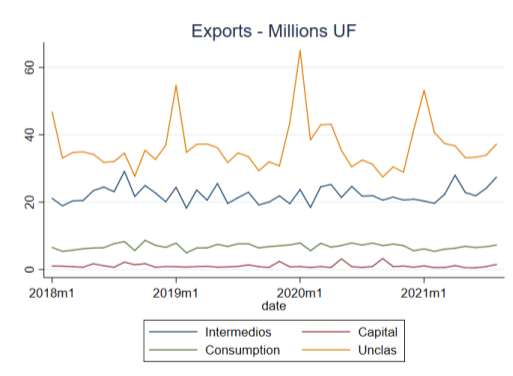


(b) Imports (year-on-year growth)

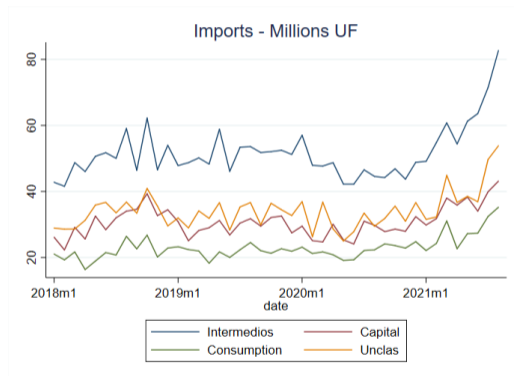


By type of good: Broad Economic Categories (BEC) ▶ DATASET

(a) Exports



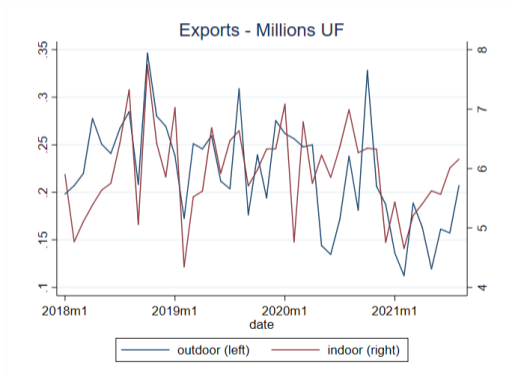
(a) Imports



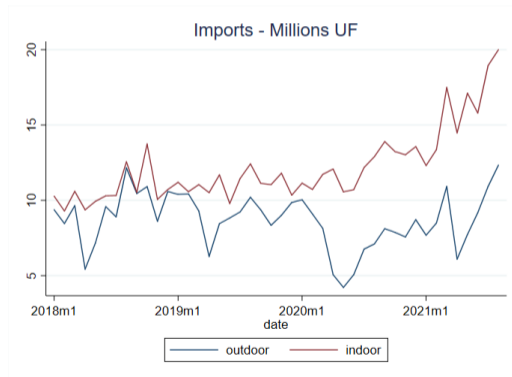
Consumption goods: Outdoor vs. indoor ▶ DATASET

▶ Based on [de Lucio et al. \(2021\)](#) classification.

(a) Exports



(a) Imports



Health situation: Stringency measures and confirmed cases

▶ BACK

(a)



(b)

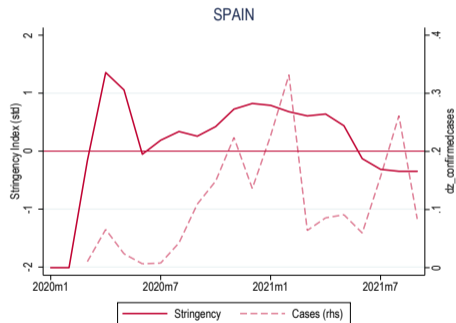
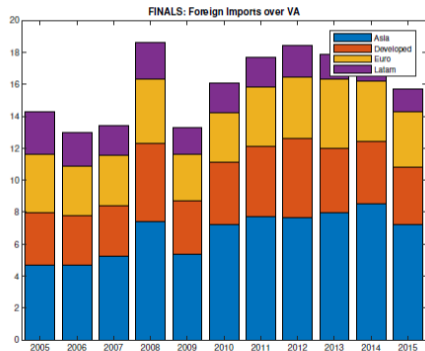


Figure 1: IMPORTACIONES

(a) Importaciones Finales (en % del PIB)



(b) Importaciones Intermedias (en % del PIB)

