

Exports

Case study



SMART TIO

More Smart, more TIO

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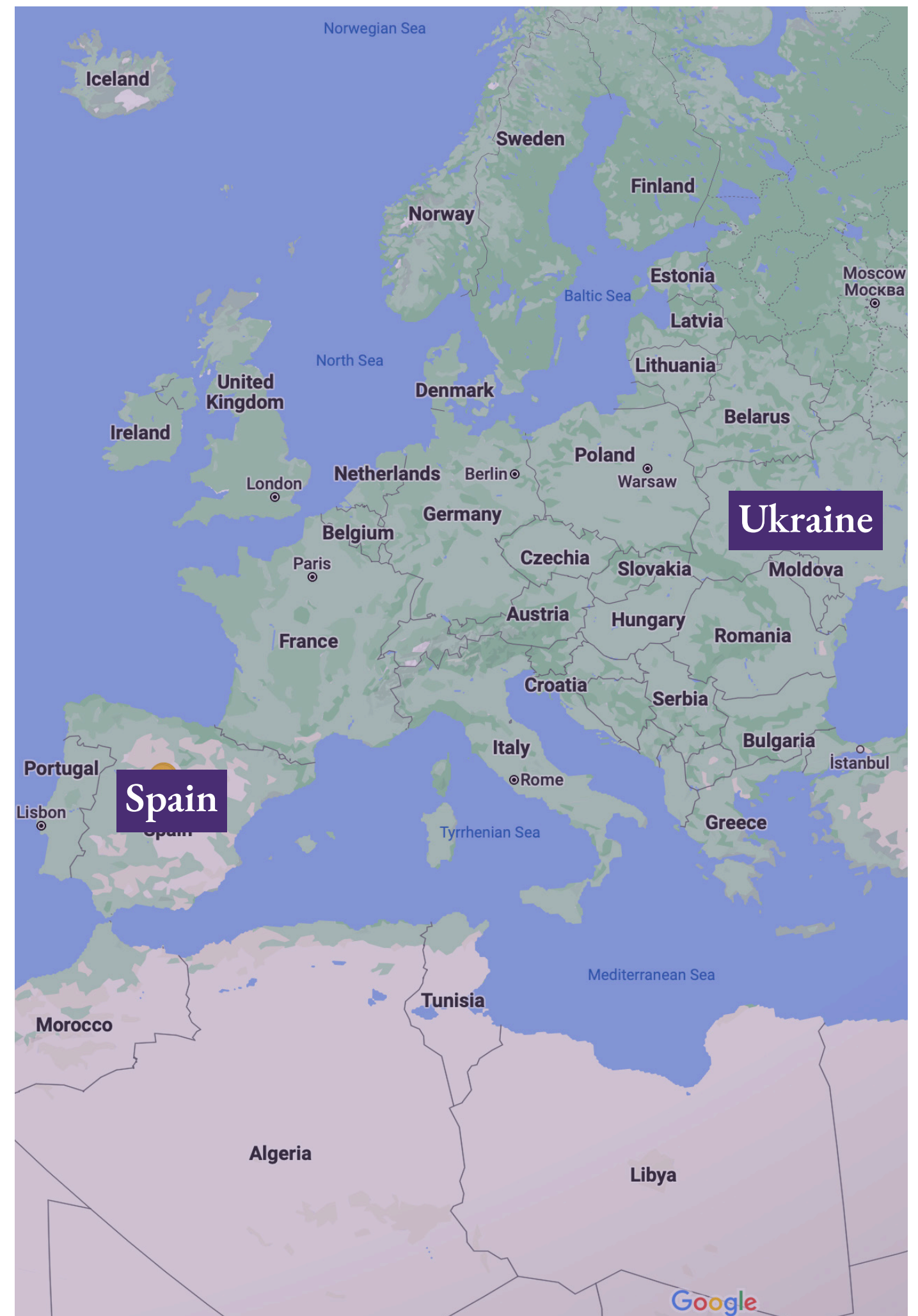
Methodology and Smart TIO information.

Problem description

The Ukraine-Russian conflict, starting in February 2021, escalated tensions between the Russian and European authorities. As the first measure, the European Commission agreed on economic sanctions on Russia, aiming to convince Russians to leave Ukraine. Meanwhile, more than 700 companies suspended operations or exports in Russia¹, showing their position against the war in order to save selling in other countries. These international companies belong to several sectors, e.g. textile sector with Inditex, Decathlon, or Adidas; food services like Burger King, etc. In the case of the European Commission, several restrictive measures were published in different packages from 23rd February 2022 to 25th February 2023, in order to limit trade with Russia². For this reason, it is key to anticipate the effects for Spain if its exports to Russia are completely suspended, in order to find policies to soften the direct and indirect effects.

¹ Data from a project by the Kyiv School of Economics (KSE Institute).

² Restrictions on trade and investment consists of Council Decisions (CFSP) 2022/266 and Council Regulation (EU) 2022/263.

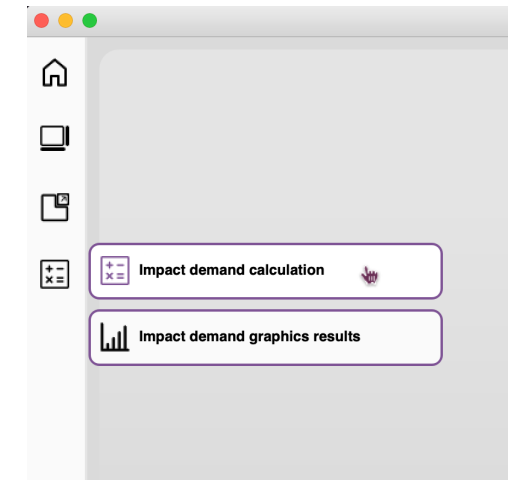


Although direct Spanish exports show a decrease due to the complete closure of trade between Europe and Russia, identified with the data from the Spanish Trade Ministry, it is also important to understand the magnitude of the indirect impact, which can be calculated with Smart TIO³. These effects correspond to the production and job losses for the suppliers of the companies which can not keep exporting to Russia

³ Please, check the [methodological appendix](#) if you wish to know more about the methodology that Smart TIO uses for doing its calculations.

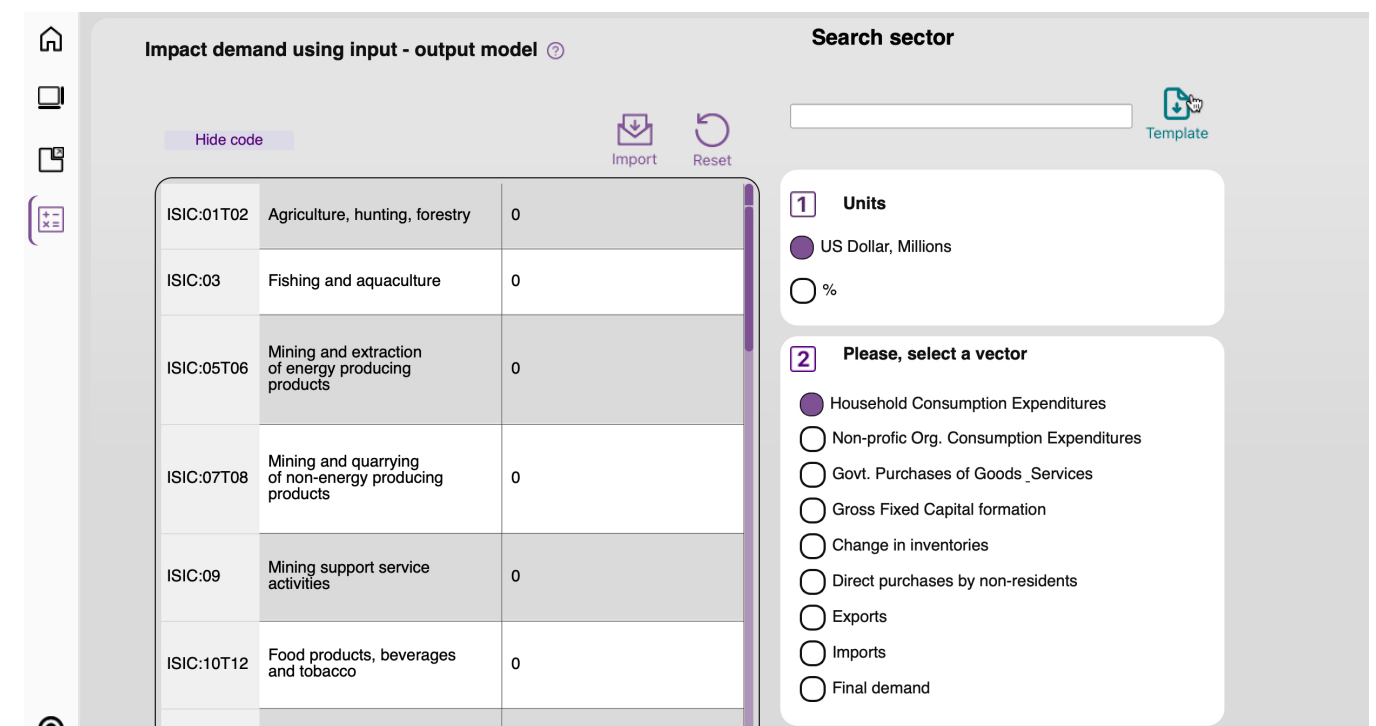
To calculate these 2 effects, direct and indirect, in Smart TIO, we need:

1 Going to “Impact demand calculations”



2

Several sectors may be affected by the closure of the Russian market and we need to identify the weight of the loss for each of the sectors to understand the share that should be reduced in the Smart TIO application. The sectors must correspond with the aggregation list that Smart TIO uses⁴, so it can be helpful to download the sector template in CSV format to fill when, as in this case, we have several sectors affected.



⁴ Smart TIO Sectoral classification follows the International Standard Industrial Classification of All Economic Activities (ISIC), Rev. 4, if you need to identify the sector where a product belong to, please, check the statistical paper from United Nations, part 3 (page 63): [United Nations: Department of Economic and Social Affairs: Statistics Division. \(2008\). International standard industrial classification of all economic activities \(ISIC\), Rev. 4. United Nations Publications.](#)

3

The Database [Datacomex](#), from the Spanish Ministry of Industry, Commerce and Tourism, provides information on the total exports and the exports sent to Russia in 2021 by sector. Based on this information, we will calculate the share of exports from each Smart TIO sector in 2021, as we can see in the following table.

ISIC:01T02	0.23
ISIC:03	
ISIC:05T06	
ISIC:07T08	4.58
ISIC:09	
ISIC:10T12	0.51
ISIC:13T15	2.08
ISIC:16	0.33
ISIC:17T18	0.59
ISIC:19	0.02
ISIC:20	1.00
ISIC:21	0.34
ISIC:22	1.28
ISIC:23	1.12
ISIC:24	0.12
ISIC:25	0.40
ISIC:26	0.44
ISIC:27	0.51
ISIC:28	1.34
ISIC:29	0.55
ISIC:30	0.58
ISIC:31T33	0.70
ISIC:35	0.00

ISIC:36T39	0.05
ISIC:41T43	
ISIC:45T47	
ISIC:49	
ISIC:50	
ISIC:51	
ISIC:52	
ISIC:53	
ISIC:55T56	
ISIC:58T60	0.13
ISIC:61	
ISIC:62T63	
ISIC:64T66	
ISIC:68	
ISIC:69T75	
ISIC:77T82	
ISIC:84	
ISIC:85	
ISIC:86T88	
ISIC:90T93	0.39
ISIC:94T96	
ISIC:97T98	

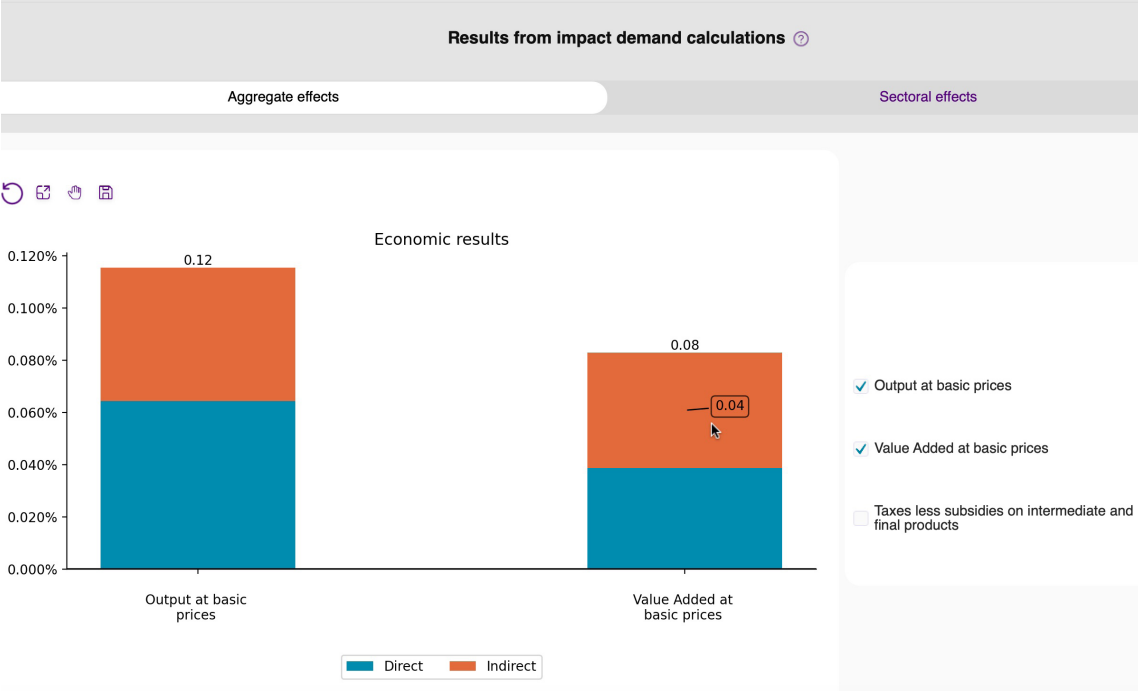
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Based on this data, we import the CSV file with the data in Smart TIO and we calculate the direct and indirect impacts.

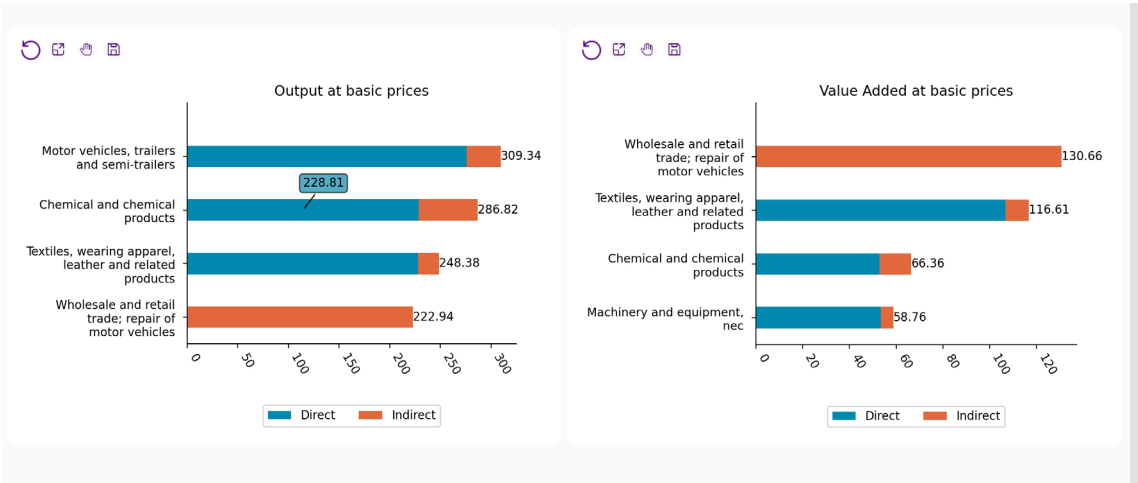
ISIC Code	Sector	Value
ISIC:01T02	Agriculture, hunting, forestry	0.232196
ISIC:03	Fishing and aquaculture	0.0
ISIC:05T06	Mining and extraction of energy producing products	0.0
ISIC:07T08	Mining and quarrying of non-energy producing products	4.579214
ISIC:09	Mining support service activities	0.0
ISIC:10T12	Food products, beverages and tobacco	0.514509
ISIC:13T15	Textiles, wearing apparel, leather and related products	2.080382
ISIC:16	Wood and products	

ISIC Code	Sector	Value
C:01T02	Agriculture, hunting, forestry	0.232196
C:03	Fishing and aquaculture	0.0
C:05T06	Mining and extraction of energy producing products	0.0
C:07T08	Mining and quarrying of non-energy producing products	4.579214
C:09	Mining support service activities	0.0
C:10T12	Food products, beverages and tobacco	0.514509

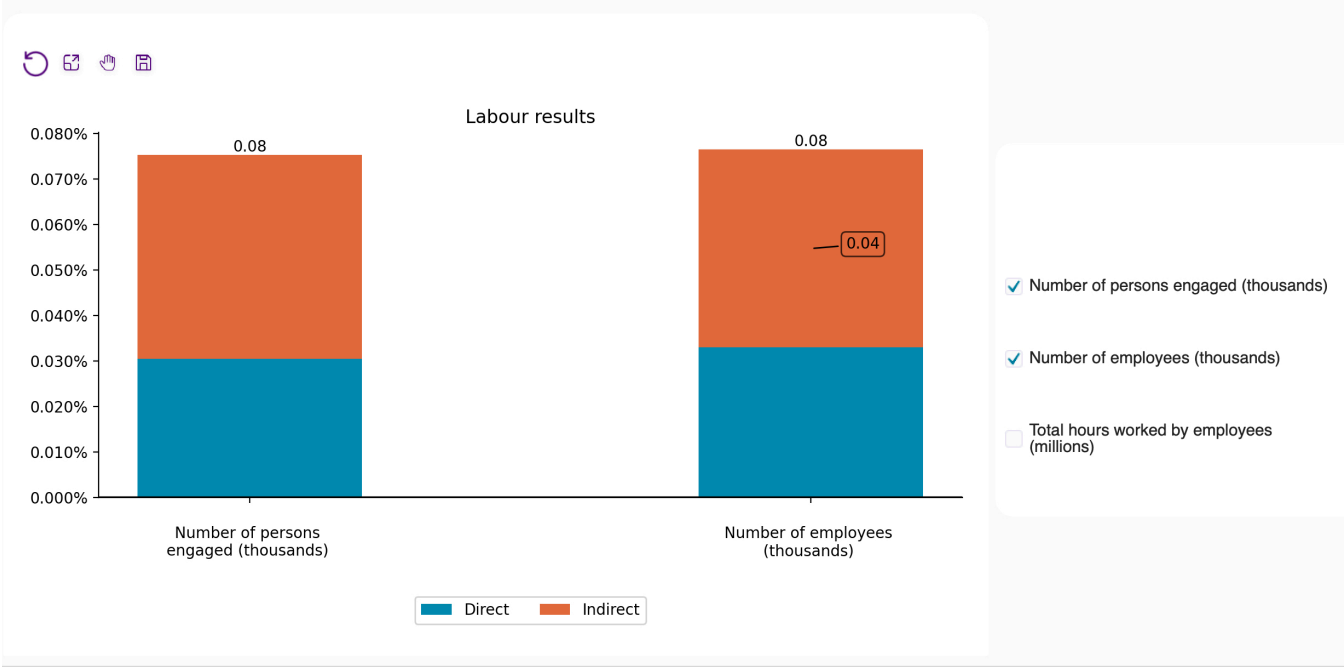
Direct and indirect economic effects of the stoppage of export to Russia in the Spanish economy are shown in the figure below. Although aggregated effects on the Spanish economy seem small (0.12% on output and 0.08% on value-added), we should take into consideration that we measure only what would happen if the exports from Russian, i.e. from only 1 country, are completely stopped during 1 year, and we are not taking into account imports from Russian that will have much more important effects. But, it is essential to split the effects from imports and exports since policy implications on alternative markets can be different. Therefore, in this document we analyse the export effects.



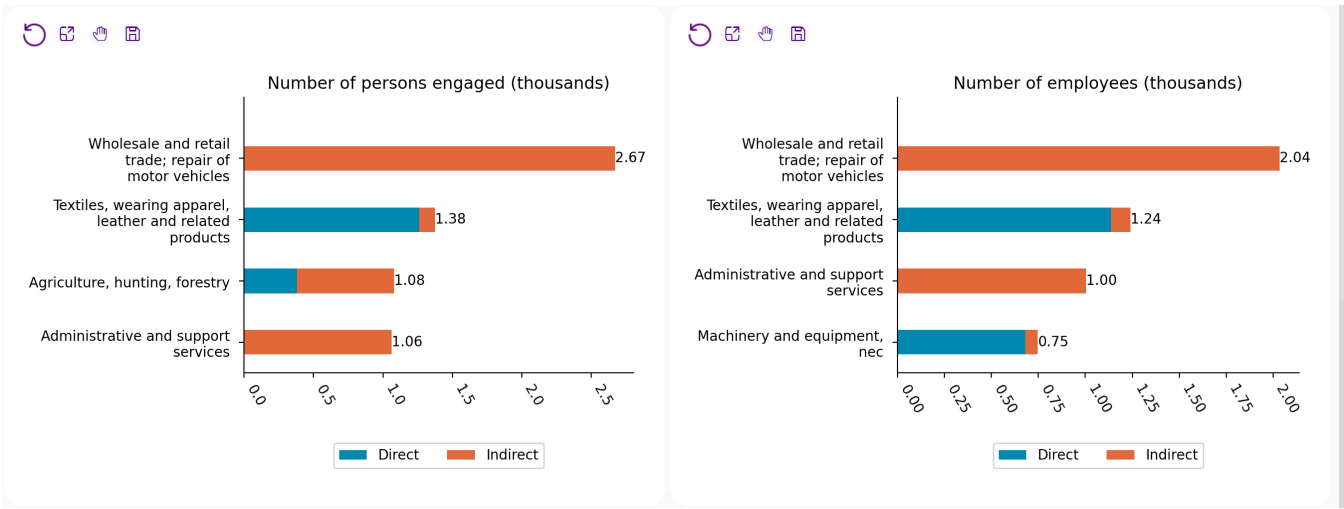
However, the effects on particular sectors can be high and we need to identify them. Effects on production are particularly high on Motor vehicles, chemical products, Textile and wholesale and retail trade. Note that the Wholesale and retail trade sectors do not do direct exports to Russia and they are particularly affected due to the indirect effects. This is particularly important if we measured in terms of the value-added.



Social impact can be measured in terms of people at risk of losing their job, i.e. workers or employees that may lose their jobs. Using Smart TIO, we also get the direct and indirect effects of export to Russian disruptions on employment. Relatively to all Spanish jobs, the effects arrive at 0.08% in terms of total persons engaged and the 0.08% in terms of employees, being the indirect effects half of the total effects.

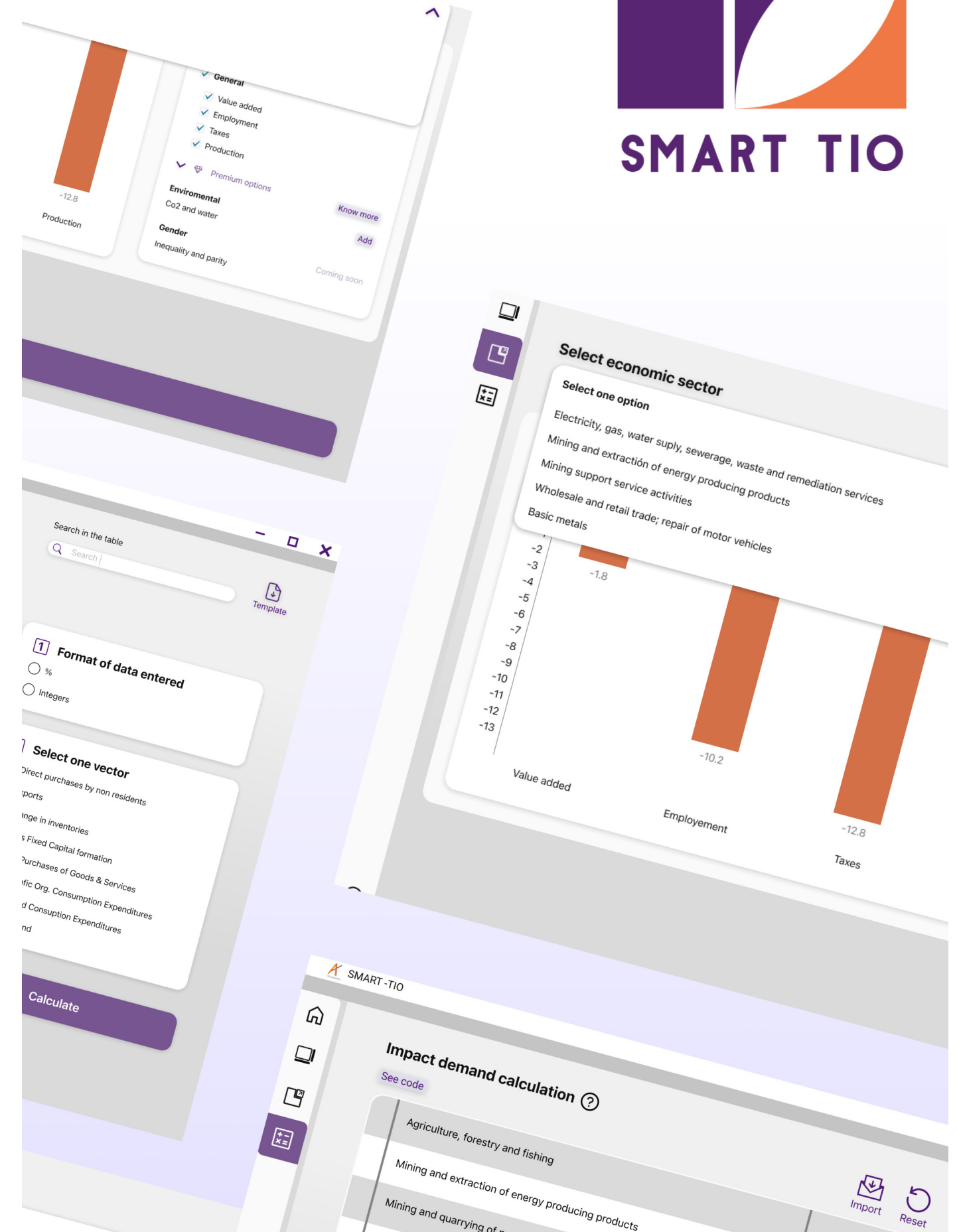


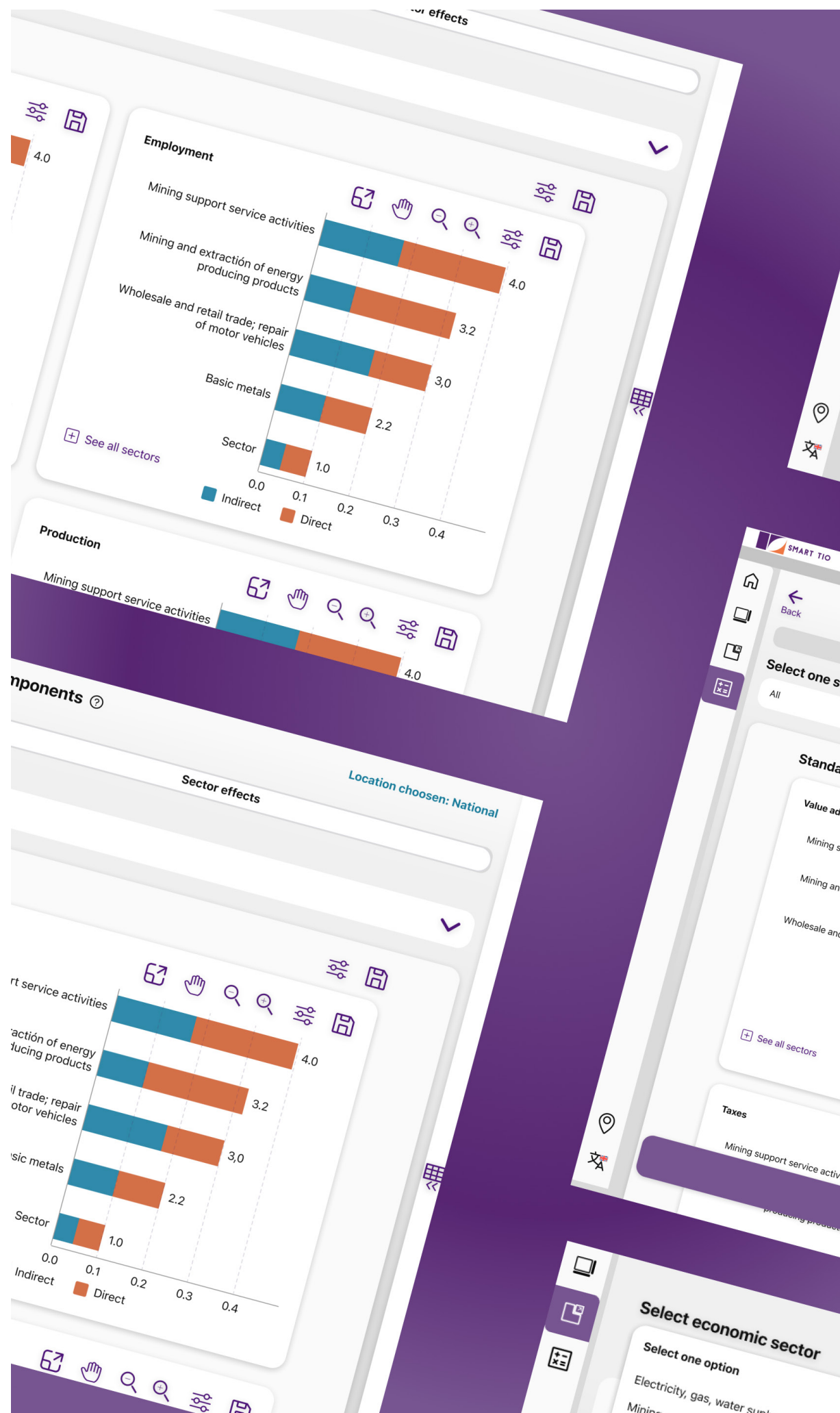
Taking into account that sectors have a different intensities in labour, social effects can be quite different from the effects on production. Actually, in this case, the effects on employment hit quite strongly in the sector of Wholesale and Retail trade and much less the chemical or mother vehicle sector.





Although the results of this case study are based on quite strong assumptions, i.e. exports to Russia completely stopped for 1 year and Spain will be not able to find an alternative market for their products, the results can be quite useful for taken measures, identifying the sectors that may be the most affected to search for alternative solutions and compensatory measures meanwhile alternative markets are not feasible. In the case of exports, the solutions can be difficult to find since the closure or reduction of the trade between Europe and Russia can lead to an increase in the international competitiveness of these products. It is also important to take into account that, as we have seen, the indirect effects are different in production and in job losses, so it is key to distinguish if the policy is targeting industry or workers if the alternative markets are not enough for the Spanish production in the short-run.





ABOUT SMART TIO

Smart TIO is a **software created to facilitate economic decisions** by helping to perform impact calculations in a simple, fast, precise and, ultimately, efficient way. Smart TIO saves time by calculating simulations based on input-output models adjusted to your own economy. Smart-tio allow to simulate the introduction of a policy, or the impact of global trends (covid-19, war etc.). You can type data easily to do the simulations or use your on csv or xlsx file by using the import feature. It includes results on economic, labour and environmental variables ensuring more sustainable decisions. Results are shown using figures to visualize the results easily and fast. You can download the figures as well as a pdf report to have a better understanding of the main results.

Types of events and economic shocks:

- New policy introduction:
 - sectoral subsidies, tax simulations, employment measures, environmental policy.
- Size and importance of a sector in the economy (direct and indirect):
 - Health, design etc.
- Impact of global trends:
 - Environmental crisis, social inclusiveness, COVID

Impact calculations

Smart-TIO impacts are calculated based on input-ouput model developed by Leontief. The input-output table (IOT) shows the productive intersectoral relations of an economy in a particular moment in time, usually a year. These intersectoral in the economy can be express based on the Leontief model which shows the interdependeces among sectors to satisfy the final demand of an economy. Thus, we will get a system of equations that can be expressed using matrices:

$$x = [I - A]^{-1}f$$

Where the production of a country or region (x), can be calculated based on the final demand (f) and the intermediate inputs requirement from other sectors (A). Thus, a technical coefficient (aij) from the matrix A, shows what the sector i needs to produce a unit of product of sector j.

When we calculate the demand effect, by changing f.

Updating results

For updating results to the current year we use Path-RAS. Path Ras is an algorithm that allows us to provide updated impact evaluation analysis even if there is a scarcity of information. It has been published in Revista Portuguesa de Estudos Regionales.

[López, X. P., Incera, A. C., & Fernández, M. F. \(2013\). Advances in updating input-output tables: Its relevance for the analysis of regional economies. Revista Portuguesa de Estudos Regionais, \(33\), 3-12.](#)

Regionalization

For regionalizing the national input-output tables and being able to get the regional results based on regional tables we are based on the 2D-LQ algorithm.

[Pereira-López, X., Carrascal-Incera, A., & Fernández-Fernández, M. \(2020\). A bidimensional reformulation of location quotients for generating input-output tables. Spatial Economic Analysis, 15\(4\), 476-493.](#)

Sectoral disaggregation

Sectoral dissagregation is done with a AYeconomics and USC algorithm that balances input-output tables using iterative proportional fitting techniques can be prevented due to conflicting information. Our algorithm ensures economically meaningful solutions, avoiding unsought sign flips and respects all macro-economic aggregates to get accurate results. It has been accepted for publication in Economic System Research

[de la Torre Cuevas, F., López, X. P., & López, E. \(2023\). A new alternative for matrix balancing under conflicting information. Economic System Research , DOI: 10.1080/09535314.2023.2170217](#)

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