European Commission

SCIENCE FOR POLICY BRIEF

The relevance of re-exports for identifying strategic dependencies

HIGHLIGHTS

- → Re-exports are foreign goods exported in the same state as previously imported, directly to somewhere else.
- → Re-exports matter when measuring foreign import concentration and production capacity substitution to identify strategic dependencies.
- → The Eurostat's new FIGARO database allows for disentagling domestic exports and re-exports.
- → Our results provide evidence that certain raw materials, photosensitive semiconductors and spacecraft might deserve special attention for future in-depth reviews of foreign strategic dependencies.

1 INTRODUCTION

In May 2021, the Commission[1] carried out a comprehensive review of the EU's strategic dependencies and capacities including a first round of in-depth reviews analysing dependencies, risks and relevant policy measures in six strategic areas (raw materials, active pharmaceutical ingredients, batteries for electromobility, renewable hydrogen, semiconductors and cloud and edge services). A second in-depth review is forthcoming and will include: (1) raw materials for the green transition (with a focus on permanent magnets and magnesium as well as construction materials); (2) photovoltaic panels and technologies; (3) chemicals; (4) cybersecurity; (5) IT software (with a focus on cloud and edge software); and (6) streaming services.

This first review used a bottom-up approach to map foreign dependencies[2] by measuring the concentration of EU imports on a limited number of foreign suppliers, the share of EU imports coming from third countries and the domestic capacity for import substitution. As a result, the Commission reported 137 products[3] where the EU could be considered highly dependent on imports from third countries.

One of the key pillars for enhancing the EU's open strategic autonomy, highlighted in the updated Industrial Strategy, is the ongoing efforts to achieve a better understanding and a more structural monitoring of the EU's strategic dependencies. Within this context, this brief draws the attention to re-exports[4] and its relevance for identifying foreign strategic dependencies in future in-depth reviews.

Generally speaking, gross exports can be broken down into domestic exports and re-exports. The former are exported goods and services domestically produced in the exporting country while the latter, takes into account only traded from one country to another.

On the one hand, with regard to concentration, various non-EU country suppliers (e.g. United States, United Kingdom, and Japan) may re-export one specific product to the EU while only one, e.g. China, might really have produced it. On the other hand, for production capacity substitution, re-exports increase the volume of gross exports overestimating the

[1] COM(2021)350 and SWD(2021)352

[2] The analysis used the BACI database, which provides disaggregated data on bilateral trade flows for more than 5000 products and 200 countries. The database is built from United Nations Statistical Division (Comtrade). Trade flows are balanced to remove trade asymmetries, i.e. different declarations of exporters and importers. Products are defined as items from the Harmonized System (HS) nomenclature, at the 6-digit level.

[3] Within the most sensitive ecosystems according to SWD(2021)352: aerospace and defence, electronics, energy intensive industries, renewable energy, health and digital.

[4] Re-exports are foreign goods exported in the same state as previously imported, directly to the rest of the world.

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domestic capacity of production and therefore, the substitution capacity[5]. In both cases, re-exports could potentially mask important foreign strategic dependencies.

Unlike the BACI database used in SWD(2021)352, the Eurostat's FIGARO[6] merchandise trade database allows for disentangling re-exports and domestic exports from the United Nations Statistical Division (UN Comtrade) database using the information provided by the EU Member States about the country of origin and country of consignment (entering the EU) in EU merchandise trade, from the Eurostat's Comext database.

By breaking down gross exports into re-exports and domestic exports the list of strategic dependent products increased to more than three hundred products. Although at aggregated level the results were similar to those of SWD(2021)352[7], we found differences at a more granular level, particularly in the number of foreign strategic dependent products. In particular, around 60% of the missing products encountered were classified as raw materials (mineral products), chemical products and textile products.[8]

Therefore, as a follow up of SWD(2021)352 and based on the second round of in-depth reviews, the Joint Research Centre (JRC) briefly describes hereafter the results obtained for three categories of products that have been identified, in one way or another, as key contributors to the EU's green transition and strategic autonomy by both the SWD(2021)352 and the forthcoming second round of in-depth reviews, i.e. raw materials for construction (aluminium, nickel and copper), photosensitive semiconductor devices (solar PV technologies) and spacecraft, including satellites and suborbital and spacecraft launch vehicles.

2 RAW MATERIALS FOR CONSTRUCTION

Regarding raw materials for construction, the EU has faced shortages and price's increases for raw materials for construction during 2021, mainly because of the increase in global demand due to the economic recovery, EU's foreign dependencies and supply chain constraints such as increased transportation costs and bottlenecks.

In particular, within the raw materials for construction, the focus will be on aluminium ores and concentrates (HS260600), copper ores and concentrates (HS260300) and nickel ore and concetrate[9] (HS260400). Their relevance is also reinforced at the EU Industrial Forum, where they have been suggested to be added to the list of strategic dependent products. Moreover, these materials are also relevant for strategic end-uses (combinined with other materials) according to the EU's list of critical raw materials[10].

2.1 Aluminium ores and concentrates

Based on our own estimates of the concentration of EU imports of aluminium ores from a limited number of foreign suppliers but with gross exports, Figure 1 shows a low level of concentration in line with the results of the SWD(2021)352 ("BACI approach"). This suggests that although Guinea represents almost half of the total value of EU imports (49%), the risk of concentration (CDI_1<0.4) dependence is moderate, because it can be covered through Australia (22%) and other third countries (28%) such as India, Ghana, Brazil, among others.

Hovewer, with additional information on re-exports, the EU imports of alumimium ores and concentrates amounted to 561 million euros, of which 406 corresponded to re-exports and only 155 million euros to products imported directly from the producer country. Accordingly, nearly half of the Guinea's gross exports to the EU were re-exports from other parts of the world (137) while this was barely 10% of the rest of the world's gross exports of aluminium to the EU (16). Eventually, all Australian gross exports to the EU were re-exports with an estimated trade margin of 6 million euros and null domestic production. As a result, 90% of the EU imports of aluminium ores and concentrates come from Guinean mines (Figure 1). Thus, re-exports matter and aluminium ores and concentartes should be included in the list of foreign dependent products.

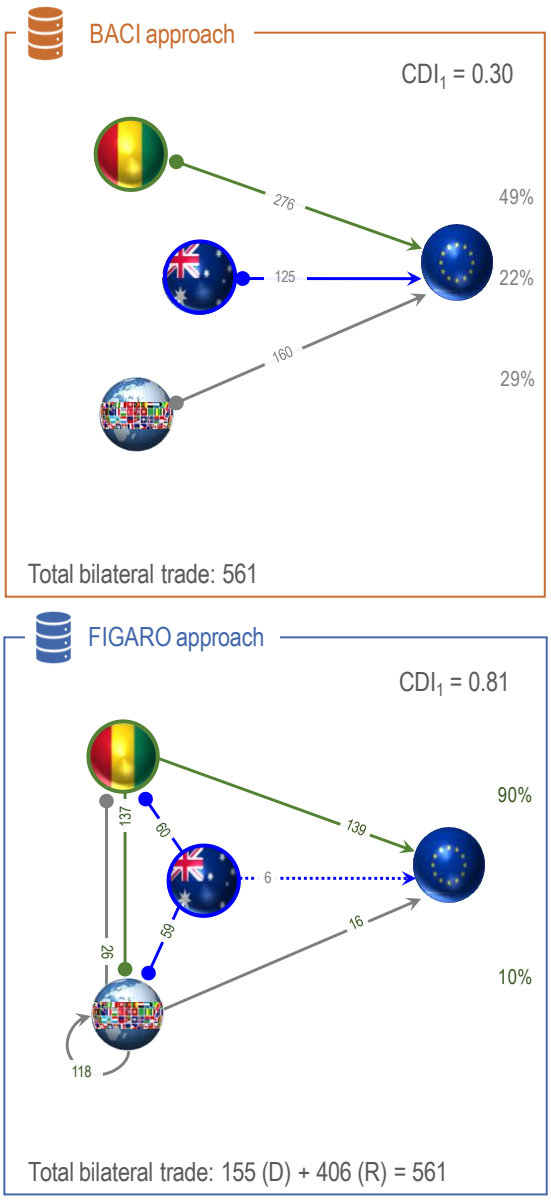
Moreover, this analysis is confirmed knowing that Guinea's main aluminium producers are CBG (Compagnie des Bauxites de Guinée) and GAC (Guinea Alumina Corporation), whose owners arefrom United Kingdom (Alcoa) and Australia (Rio Tinto); and Emirates (EGA) and Rusal (Russia), respectively.

Other raw materials showed the same problem. In this regard, South-African trade flows of nickel are mainly re-exports being the United States the relevant producer. This also applies to magnesium, where 93% of the EU imports depend on China's production if we consider re-exports. For copper, if re-exports are taken into account, the EU import concentration becomes higher, with ca. 80% of the foreign EU imports

[5] Re-exports do not affect the share of EU imports coming from third countries (e.g. China) since it is not relevant whether they arrive to the EU as (e.g. Chinese) domestic export or as (e.g. Chinese) re-export.
[6] For more details about the methodology see *European Commission (2019)* (2019). We used 2018 as a reference year in this brief.
[7] Main foreign strategic product groups: raw or processed materials, chemicals, health ecosystem, transport equipment, electrical equipment and Information and Communication Technology (ICT) products.
[8] However, textiles are not considered as a sensitive ecosystem.
[9] In particular, copper is used (with beryllium) in electronic and electrical connectors, battery, undersea fibre optic cables, and chips; in automotive electronics (life safety applications); in weather forecasting satellites; in air traffic control radars; in undersea earthquake tsunami detection monitors; etc. Besides, combined with niodium, copper is used for the production of certain types of steel in the automotive industry and fabricated metal products; platinum and palladium are by-products obtained in copper and nickel mining (e.g. Finland) for the production of automotive catalysts for emissions control; cobalt is mined as a by-product of nickel and copper mining in Finland. On a global scale cobalt is primarily used in manufacturing of battery chemicals (Ni-Cd, Nimetal hydride and Li-ion rechargeable batteries used in portable electronic devices, energy storage systems and electric vehicles).
[10] Study on the EU's list of Critical Raw Materials, Factsheets 2020; for more information: *https://rmis.jrc.ec.europa.eu* and European Commission (2017).

depending on Chile and Peru, and with large parts of their production re-exported via Australia and Indonesia.

Figure 1 – EU trade network of aluminium ores and concentrates

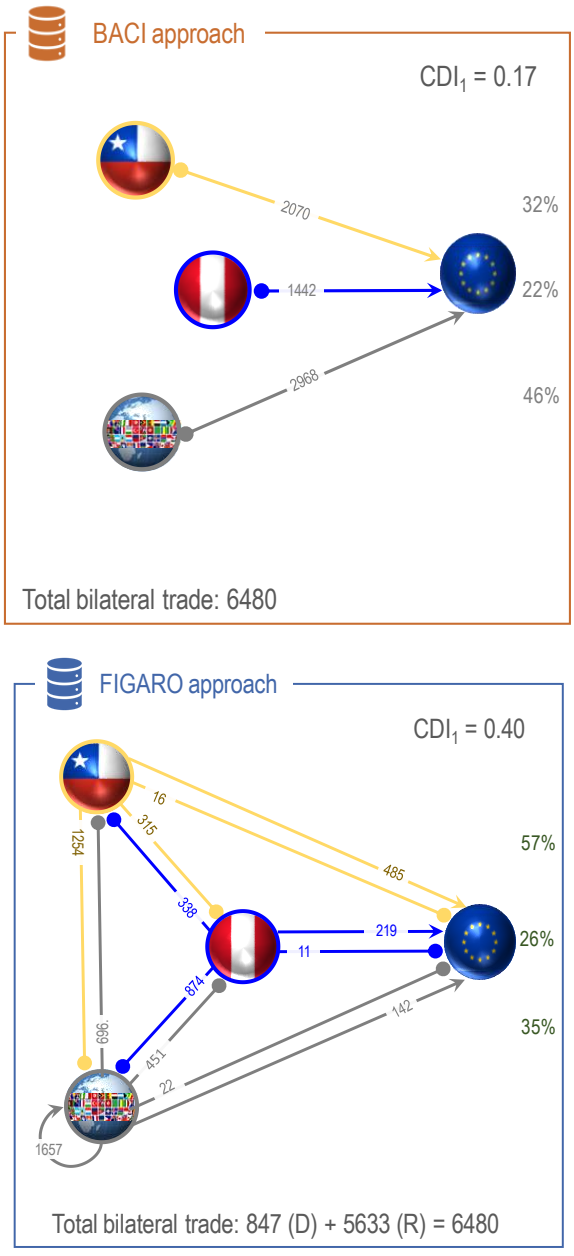


Source: Own calculations from the FIGARO database.

2.2 Copper ores and concentrates

Following the same approach used for the case of the raw material presented above, if we consider gross exports, the foreign dependencies by measuring the concentration of EU imports of copper ores and concentrates does not seem to be concentrated in a significant number of foreign suppliers. Indeed, Chile represents one third of the total value of EU imports (32%), being the risk of concentration (CDI_1<0.4) dependence moderate. Peru (22%) and other third countries (46%) such as Indonesia, Canada, Australia, among others (see upper diagram on Figure 2) could supply the EU market otherwise.

Figure 2 – EU trade network of copper ores and concentrates



Source: Own calculations from the FIGARO database.

However, with additional information on re-exports, we can see that EU imports of copper ores and concentrates amounted to 6,480 million euros, out of which 5,633 million euros corresponded to re-exports. As a result, the EU is highly concentrated on Chilean's production of copper ores (57%), followed by Peru (26%) and other third countries with smaller shares (see bottom diagram in Figure 2).

As a result, 83% of the EU's imports of copper ores and concentrates come from Chilean (57%) and Peruvian (26%) mines. Therefore, copper ores and concentrates merit special attention for the reasons mentioned above.

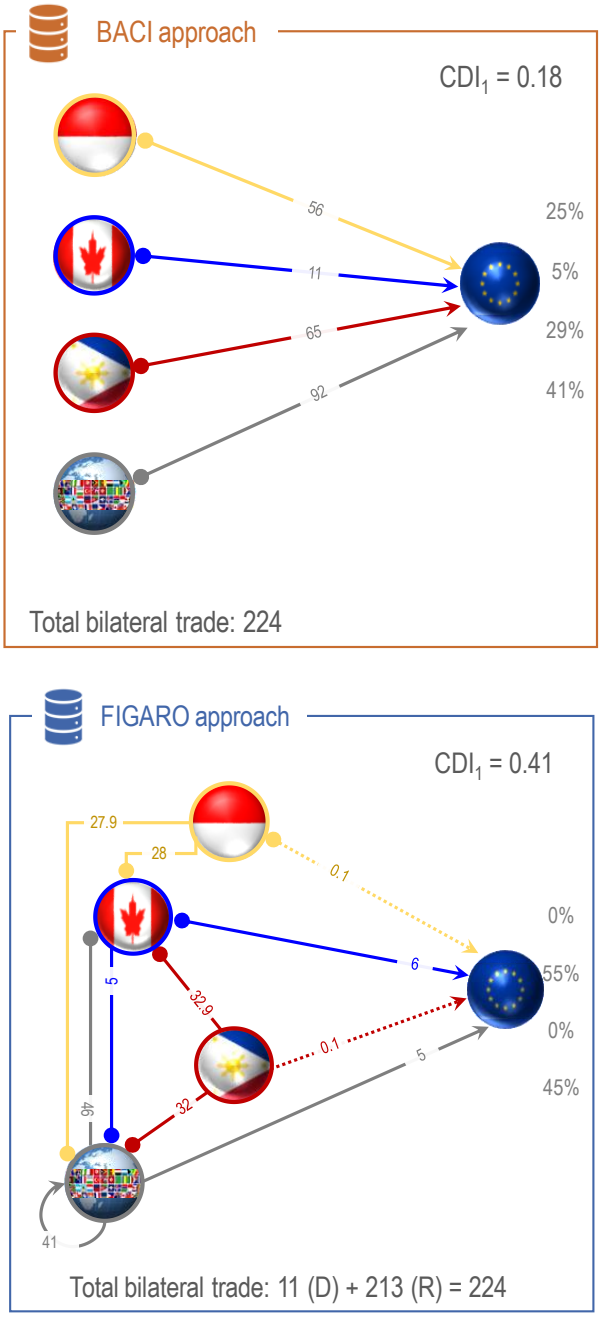
Besides, almost two thirds of Chile's gross exports to the EU were re-exports from other parts of the world. Likewise, 85%

of Peruvian gross exports were re-exports, mainly from Chile (338 million euros).

2.3 Nickel ores and concentrates

A first look at the concentration risk for nickel ores and concentrates seems to indicate that the sources of this raw material are highly diversified if measured by gross exports.

Figure 3 – EU trade network of nickel ores and concentrates

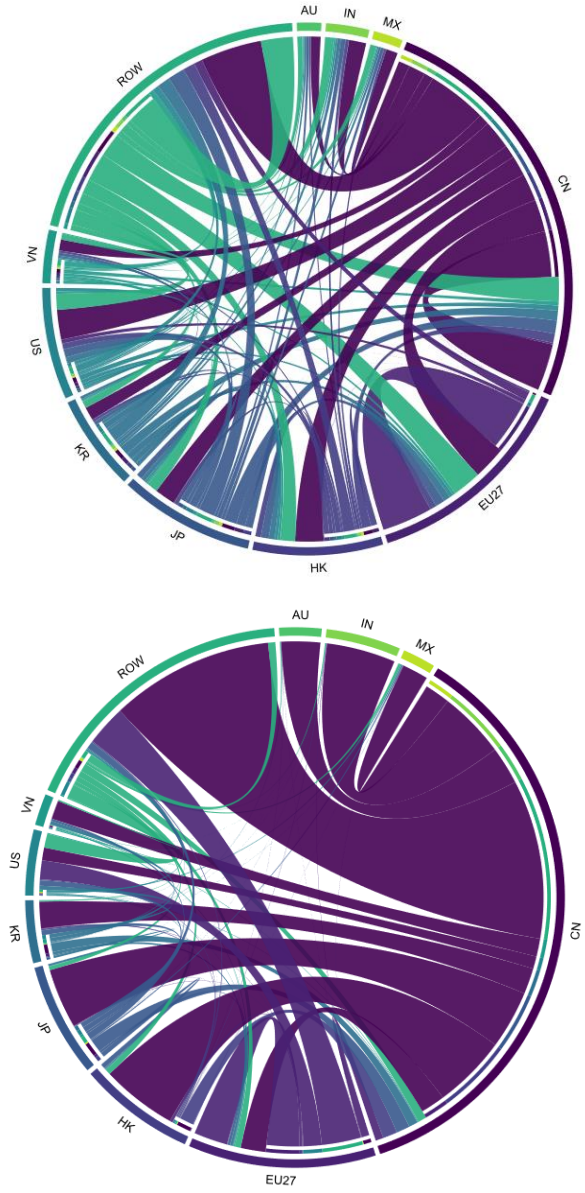


Source: Own calculations from the FIGARO database.

As shown in Figure 3, although countries like Indonesia and Philippines account for half of the non-EU imports of nickel ores and concentrates (54%), the concentration risk (CDI_1<0.4) dependence still looks moderate, since apparently third countries such as Canada, Zimbabwe or Australia, among others, can satisfy the EU demand (41%).

However, with additional information on re-exports, Canada stood out as the country exporting most to the EU (55%), leaving countries like Indonesia or the Philippines just as re-exporters. Therefore, the nickel ores and concentrates revealed as high foreign dependent products (CDI_1>0.4) worthwhile exploring in future in-depth analyses.

Figure 4 – The global flow chord-diagram of photosensitive semiconductor devices



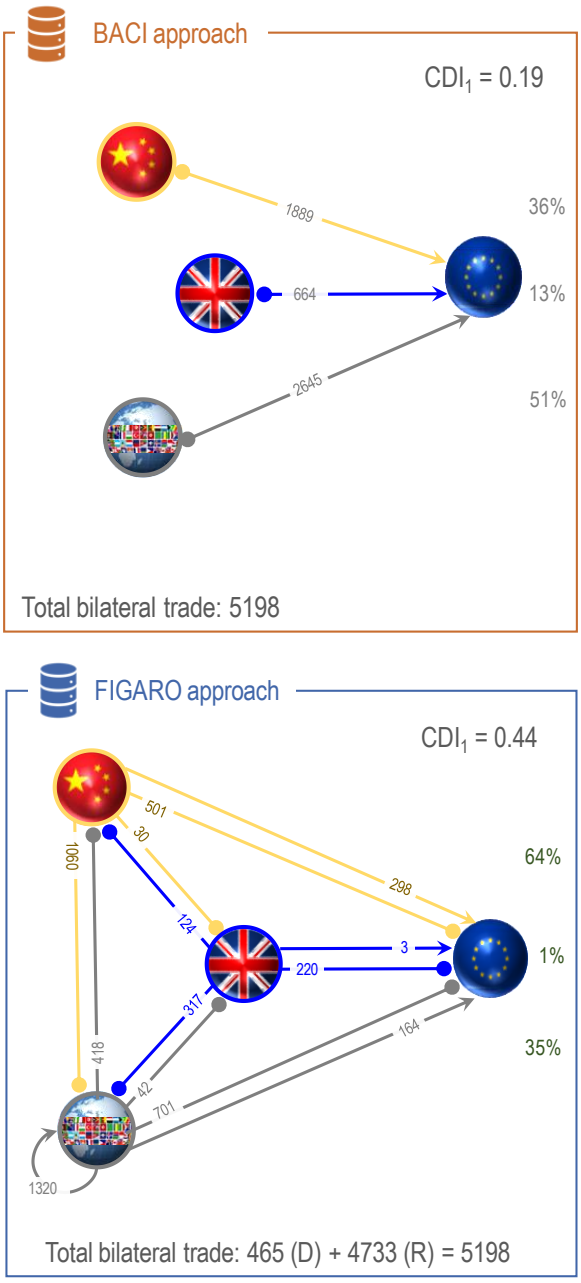
Source: Own calculations from the FIGARO database.

3 SOLAR PV TECHNOLOGIES

Turning on solar PV technologies, as pointed out in the second round of in-depth reviews of EU dependencies, they have become the world's fastest-growing energy technology, having a fundamental role in providing decarbonised electricity. In particular, we also focus on photosensitive

semiconductor devices (HS854140)[11], which includes photovoltaic cells (solar photovoltaics), considered critical for the EU space and defence systems as well, for example, as satellite power supply.

Figure 5 – EU trade network of photosensitive semiconductor



Source: Own calculations from the FIGARO database.

According to the total bilateral trade based on the FIGARO database, half of the EU imports for photosensitive semiconductor devices come from less than five non-EU countries in 2018, with China accounting for 23% of the EU's foreign imports followed by United Kingdom (8%), Japan (7%), Malaysia (6%) and Hong Kong (5%).

In fact, around 79% of the total (intra and extra) EU import comes from non-EU countries although apparently (see Figure 4 – top). It does not seem to be a high risk given the low concentration of suppliers evidenced in the commercial flows of this type of products.

However, the picture is different when we turn to trade flows adjusted for re-exports (Figure 4 – bottom). In this case, China becomes the main global supplier. While the EU appeared to have a high degree of trade diversification, this was not really the case, mostly for Japan and Korea, where less than 10% of their gross exports to the EU were really produced there.

As seen before, gross exports tend to show an apparent low concentration of foreign suppliers of photosensitive semiconductor devices to the EU. Indeed, as shown in Figure 5 ("BACI approach") the moderate risk of concentration with China (36%) could be reasonably covered by the trade flows that the EU maintains with the United Kingdom (13%), Japan (10%) or Korea (10%).

However, 91% of the EU imports of these products are re-exported by third countries, leaving an underlying distribution of producing suppliers very much concentrated on a few countries, i.e. China (64%) followed by Malaysia (11%), Korea (8%) and Japan (6%) as direct suppliers. This makes evident the relevance of re-exports in the identification of foreign strategic dependencies.

4 SPACECRAFT, INCLUDING SATELLITES

Our last case covers spacecraft, including satellites, and suborbital and spacecraft launch vehicles (HS880260) given their strategic relevance shown as key enablers of the EU strategic autonomy and as key products dependent on solar PV technologies as stated in the second in-depth reviews.

Indeed,EU flagship programmes such as Galileo may integrate non-EU technologies and this may pose a potential dependency issues[12].

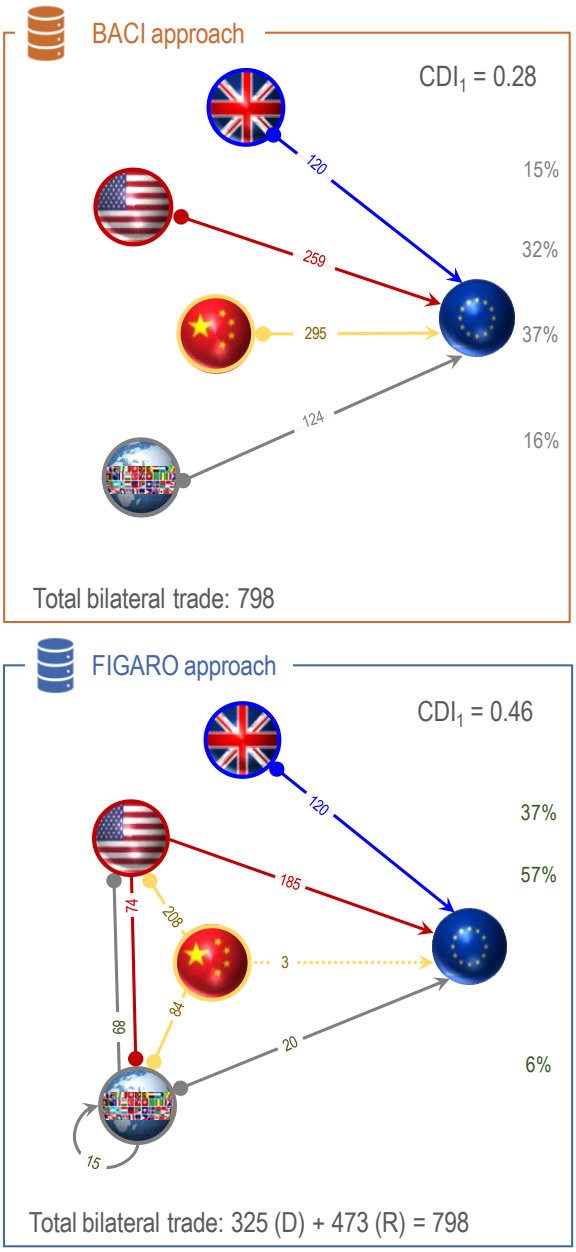
According to the total bilateral trade based on the FIGARO database, two thirds of the EU imports of these products come from United States and China in 2018, followed by United Kingdom (15%). However, the concentration is not considered high enough (CDI_1<0.4) to signal these products as strategic and dependent, although more than 80% of the EU imports come from only those three non-EU countries.

Figure 6 shows instead that China's gross exports to the EU are really only re-exports from United States and other regions in the world (with also an implicit trade margin service exported to the EU). A deeper examination reveals the fact that 94% of the EU foreign imports depends on United States and United Kingdom as producers.

[11] The same product selected in the second round of in-depth reviews of dependencies (2022).

[12] For more detailes see the EP Space and Defence in-depth analysis (2020): https://www.europarl.europa.eu/RegData/etudes/IDAN/2020/653620/EXPO_IDA(2020)653620_EN.pdf

Figure 6 – EU trade network of spacecraft, incl. satellites



Source: Own calculations from the FIGARO database.

5 CONCLUSIONS

Following the SWD(2021)352 and the forthcoming second round of in-depth reviews, the EU is dependent on goods and services when it relies on a limited number of foreign suppliers combined with limited domestic capacity of substitution. The Commission mapped strategic dependencies using a bottom-up approach and a balanced view of merchandise trade based on UN Comtrade (BACI).

This brief is a follow up of this analysis and shows the relevance of re-exports in identifying foreign strategic dependences. This is possible provided that the Eurostat's FIGARO[13] balanced view of merchandise trade allows for breaking down gross exports of UN Comtrade into domestic exports and re-exports by combining it with the Eurostat's international merchandise trade statistics (Comext).

This brief also provides illustrative examples of the first results obtained with the FIGARO database on certain raw materials for construction (aluminium, copper and nickel), photosensitive semiconductors devices and spacecraft, including satellites, and suborbital and spacecraft launch vehicles.

The results seem to provide evidence that certain raw materials (mineral products such as aluminium, copper and nickel) and chemical products, among others, might deserve special attention in future studies. Indeed, re-exports matter when measuring foreign import concentration and production capacity substitution in these products.

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[13] Within the EU Industrial Forum, stakeholders also claimed for a more robust list across time by including some regularly updates, which is in line with the the JRC work ahead to use the time series of the Eurostat's FIGARO merchandise trade database.

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