

EU27 and the UK: Product Dependencies and the Implications of Brexit

Lisandra Flach (EconPol Europe, LMU Munich and ifo Institute), Feodora Teti (EconPol Europe, LMU Munich and ifo Institute), Lena Wiest (EconPol Europe, University of Tübingen and ifo Institute) and Margherita Atzei (EconPol Europe, University of St. Gallen and ifo Institute)

Key Messages

- This report provides an overview on product dependencies between the EU27 and the UK and uncovers several stylized facts.
- Only few products are imported solely from the UK, and they represent a negligible share of imports.
- In almost all the EU27 countries, less than 10% of goods with five or less suppliers come from the UK.
- Those goods are sourced otherwise mostly from other countries inside the EU27, which suggests that it might be easier to substitute these goods across countries.
- However, for German-UK trade, most of those goods are classified as intermediate goods, which implies that Brexit may cause an additional distress on supply chains.
- For the UK, most of the goods that are dependent on five or less suppliers come from countries within the EU.
- 54% of them are classified as intermediate goods, meaning that Brexit might cause a significant increase in trade costs for the UK.

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Background and Motivation

The current COVID-19 crisis has shown the importance of supply chain diversification to mitigate the negative effect of unexpected supply shocks. The decision of the United Kingdom (UK) to leave the European Union (EU) poses additional challenges to foreign trade: Irrespective of the outcome of the Brexit negotiation, trade costs between the UK and the EU will increase as a response to Brexit and cause disruptions in trade relations. Trade shocks hitting one bilateral country pair might be more severe for goods that are highly dependent on few suppliers, as they cause an increase in costs and, in the worst case, supply chain disruptions.

In this report, we take a detailed look at goods that are dependent on few suppliers. We show that (i) only few products are imported solely from the UK, and they represent a negligible share of imports (ii) with exception of Ireland, Malta and Cyprus, all other EU27 countries import less than 10% of goods with five or fewer suppliers from the UK, (iii) those goods are otherwise mostly sourced from other countries inside the EU27, which suggests that it might be easier to substitute these goods across countries, (iv) however, for German-UK trade, most of these goods are classified as intermediate goods, which implies that Brexit may cause an additional distress on supply chains, (v) for the UK, 64% of the goods that are dependent on five or fewer suppliers come from countries within the EU, (vi) nearly 54% of those goods are classified as intermediate goods, meaning that Brexit might cause a significant increase in trade costs for the UK. Given the extent of trade relations between the UK and the EU27, our results unfold the far-reaching consequences of Brexit for the UK economy and the

importance of a trade agreement that ceases trade uncertainty and minimizes the costs of Brexit.

Our analysis is based on Comext data for the year 2019. Comext is Eurostat's reference database for statistics on international trade in goods. The data provides information on bilateral trade flows for the CN classification at the 8-digit level.

With the Comext data, we investigate from how many suppliers a product is imported, whereby we define a supplier as an origin country.

Aggregate Trade Patterns between the UK and the EU27

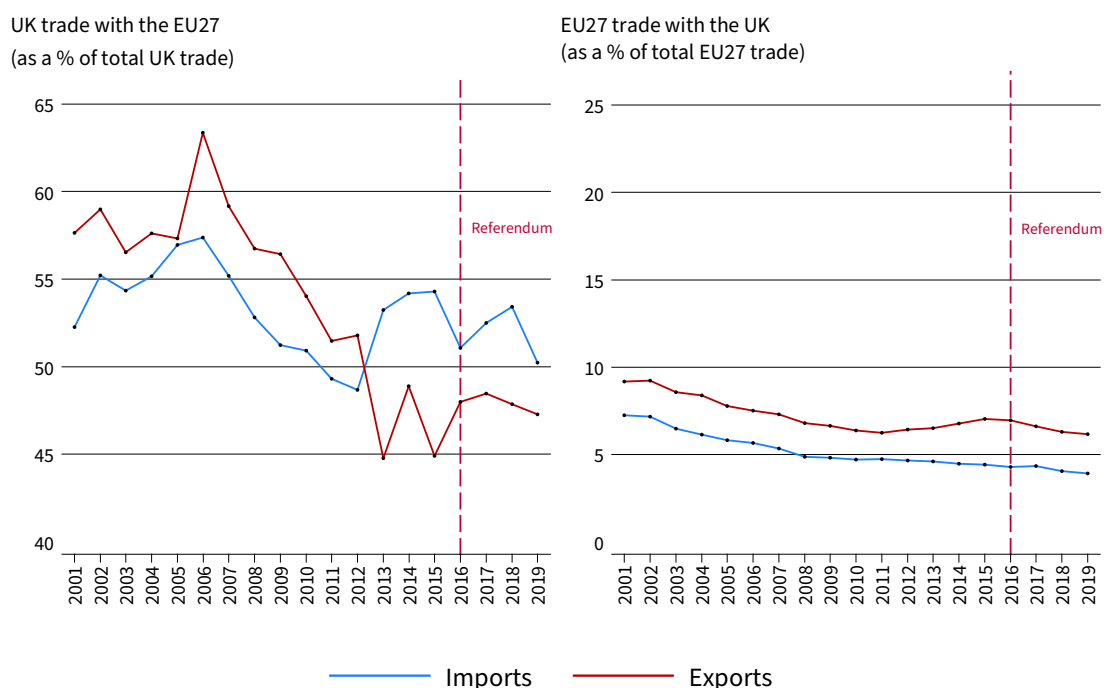
The literature has provided several estimates on the costs of Brexit for the UK, the EU27 and the global economy (Dhingra et al. 2017, Felbermayr et al. 2017, Felbermayr et al. 2018, Graziano et al. 2018, Sampson 2017, Steinberg 2019, Vandenbusche 2019). Most of the quantitative exercises show that both the UK and the EU27 lose from Brexit. However, the extent of the loss differs widely across countries and depends for instance on the intensity of trade with the UK.

In this section we focus on the trade patterns between the UK and the EU27 over time and check if any shifts have taken place since the referendum in 2016. Figure 1 shows the evolution of the trade relation between the UK and the EU27 over time. The left graph shows the share of UK-trade with the EU27 as a percentage of total UK trade flows, the right graph shows the same from the perspective of the EU27.

The figure highlights the importance of the EU27 market for UK trade: in 2019, 50% of the imports and 47% of the exports were traded with the EU27, which makes the EU27 market the UK's largest trading partner. In 2006, both, the shares of UK exports and imports to the EU27, were at the maximum level; since then both shares are on a general downward trend, the exports more than the imports. Since the referendum in 2016, the exposure to the EU27 market did not significantly change from the perspective of the UK. Hence, especially as a

supplier, the EU27 matter for the UK. For the EU27, the UK is much less important as a trading partner: in 2019, only 4% of total exports go to the UK and 6% of the total imports are from the UK, respectively. While the trade shares decrease between 2001 and 2007, they remain relatively stable thereafter. Since the referendum in 2016, we have seen a slight decrease in the trade shares with the UK.

Figure 1: Since the referendum, only slight changes in the trade relationship between the UK and the EU27 can be observed at the aggregate level



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Note: This graph shows the UK trade (imports and exports) with the EU27 as a share of total UK trade (left panel) and the same from the perspective of the EU27 (right panel) for the years 2001 to 2019.

Source: Comext, authors' illustration.

These aggregated numbers show us that the UK is much more dependent on the EU27 as a trading partner, especially on the import side, than vice versa. The trade relationship between the UK and the EU27 has become only slightly less interconnected since the referendum.

Besides the fact that aggregate figures mask heterogeneity across sectors and countries, there could be many other reasons for this lack of responsiveness: First, the high degree of political uncertainty about the Brexit and whether the UK will indeed leave the EU might prevent firms to update their beliefs. In this case, we would only see a change in trading patterns once there is more clarity about the outcome of the negotiation process. Alternatively, the constant patterns could indicate sticky buyer-seller relationships. In this case, firms will not substitute with partners from other markets but instead internalize the increase in trade costs due to Brexit by either absorbing them or by passing on the costs, i.e. increasing prices. For products that can be substituted rather easily with alternative source-/destination-countries we would not yet expect to see a change because for now the higher trade costs have not yet materialized, i.e. tariffs and non-tariff barriers are still zero. Once the UK has left the EU, we should observe a fast adjustment and firms may decide to switch to alternative trading partners. Hence, when firms can substitute easily with other trading partners, the disruptions in trade relations due to Brexit will be much less pronounced than when they are highly dependent.¹

In the remainder of this report, we focus on imports and take a detailed look at goods that are dependent on few suppliers, i.e. those goods for which we expect Brexit to increase costs the most and, in the worst case, disrupt supply chains.

Data

To analyse the dependencies of buyer-seller relationships one would ideally need firm-level data. These data are unfortunately not available. Instead, we base our analysis on Comext data for the year 2019. Comext is Eurostat's reference database for statistics on international trade in goods. The data provides information on bilateral trade flows using the CN classification at the 8-digit level.² With the Comext data, we investigate how many suppliers a product is imported from, defining a supplier as an origin country. Other studies have evaluated product dependencies at the 6-digit level (e.g. Aichele et al., 2020). We conduct the analysis at the more disaggregated 8-digit classification, which provides a more precise

¹ Due to the lack of data for domestic production at the 8-digit product level, we cannot account for domestic substitution.

² See details at <https://ec.europa.eu/eurostat/web/international-trade-in-goods/data/focus-on-comext>.

description of bilateral trade flows at the product level.³ In the absence of firm-level data for the EU27 countries and the UK, which would allow us to uncover the exact supply dependencies between firms across countries, the results from this report at the aggregate level can be interpreted as a lower bound of import dependencies from international suppliers.

A second restriction we face in the analysis is the absence of recent data on input-output linkages across countries. To overcome this constraint, we use data from the UN Trade Statistics to investigate the share of products that are classified as intermediate goods. The Intermediate Goods in Trade Statistics classifies goods in four categories: consumption goods, intermediate goods, capital goods, and goods that cannot be classified. We use this classification as a proxy for intermediate goods trade.

Given recent discussions on supply chain resilience, we focus our analysis on trade in goods. Further research could extend the analysis for trade in services.⁴

Dependencies in Imports for the UK and the EU27

Trade shocks that hit one bilateral country pair might be more severe for goods that are highly dependent on few suppliers, as it is more difficult to substitute these goods and therefore alleviate the increase in costs. To evaluate how much the EU27 and the UK are at risk of being highly dependent on few suppliers, we determine the number of suppliers for each product that a country imports, i.e. the number of distinct origin countries. Then, we calculate and compare the share of products that are supplied by many countries and the share supplied by few origin countries. Figure 2 shows the results of this analysis.

Most countries are highly diversified with respect to the number of suppliers. On average the countries in our sample source goods from 15.9 suppliers (median: 11 suppliers). However,

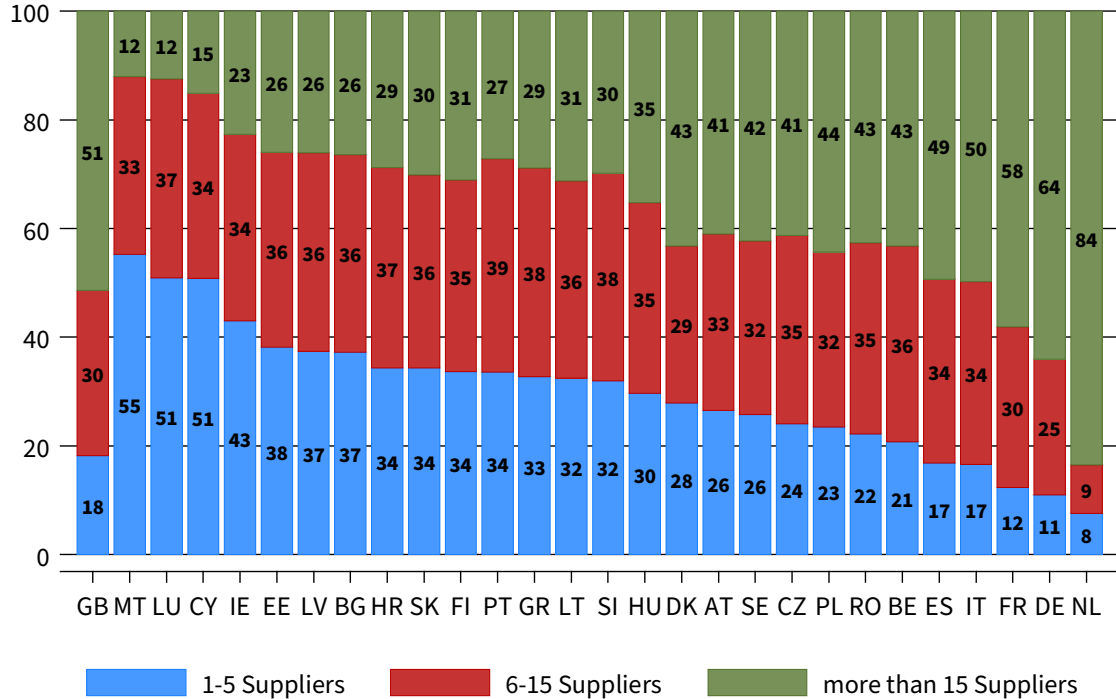
³ As a mechanical outcome, product dependencies from suppliers are higher at the 8-digit classification in comparison to 6-digit classification, as products are characterized at a more detailed level. For example, a 6-digit product refers to pineapple (080430) whereas an 8-digit product refers to dried pineapple (08043010).

⁴ Braml et al. (2020) show that global trade in services has quadrupled since 2000, whereas trade in goods tripled in the same period, which indicates the increasing importance of trade in services for the global economy.

looking at the different importers we observe a large degree of heterogeneity. Small and remote countries are highly dependent on few suppliers. For Malta, Luxemburg and Cyprus, more than half of all products are supplied by at most five countries. In contrast, large countries in the centre of Europe, have a highly diversified portfolio of suppliers. For France and Germany, the shares of products that are imported by one to five suppliers equal only 12% and 11%, respectively; for Belgium, Spain and Italy the shares are slightly higher, but still relatively low (17% and 21%, respectively). The UK also belongs to this group with less than one fifth of all products being imported by fewer than five suppliers. For the remaining countries, which are mostly medium sized countries, the share of products with one to five suppliers ranges between 22% and 43%. For this group geography matters, too: countries that are relatively more remote – Ireland, Estonia and Bulgaria – diversify less than countries that are closer to central Europe such as Austria, Poland and the Czech Republic.

For the Netherlands, the extremely high share of products with more than 15 suppliers seems a bit puzzling, especially with respect to the economic size of the country. Much of Europe's sea-trade is passing through Rotterdam, which is the most important ports in Central Europe. This is commonly referred to as the Rotterdam-Effect. Hence, the Dutch trade statistics contain a significant amount of transit trade, potentially inflating the number of suppliers: much of the imports to the Netherlands are in fact not due to Dutch demand instead the final destination is somewhere else in Europe. Hence, the number of suppliers will be overestimated for the Netherlands, while the reported numbers for the remaining countries are a lower bound.

Figure 2: While small and remote countries are highly dependent on few suppliers, most countries have a highly diversified sourcing portfolio



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Note: This graph shows the share of products by the number of suppliers (exporting countries) for the EU27 and the UK (year: 2019, in %). The countries on the x-axis are arranged in descending order with respect to the share of products with high dependencies, i.e. one to five suppliers. Country codes are explained in Table 1.

Source: Comext, authors' illustration.

Where do the EU27 and the UK Source Products with at most five Suppliers from?

So far, we have shown that the EU27 and the UK have – Malta, Luxembourg and Cyprus being the exceptions—a highly diversified portfolio of suppliers. In the remainder of the analysis, we will focus on goods that are imported from five or fewer suppliers, since substitution of those goods might be harder to achieve in case of supply-side shocks. We call these goods “highly dependent”.

Table 1: Almost all the EU27 countries are highly dependent on intra-EU suppliers, the UK also has the highest exposure towards the EU27

Importing Country (Country-Code)	UK	EU	EFTA	USA	China	RoW
Ireland (IE)	30%	38%	1%	11%	7%	13%
Malta (MT)	15%	60%	2%	5%	6%	13%
Cyprus (CY)	10%	68%	1%	3%	7%	12%
Spain (ES)	7%	72%	1%	4%	4%	11%
Greece (GR)	6%	76%	1%	2%	4%	11%
France (FR)	6%	74%	2%	4%	3%	10%
Portugal (PT)	6%	80%	1%	2%	3%	8%
Denmark (DK)	6%	61%	9%	5%	5%	14%
Italy (IT)	6%	76%	2%	4%	4%	9%
Czechia (CZ)	5%	80%	1%	2%	2%	9%
Sweden (SE)	5%	60%	10%	6%	5%	13%
Germany (DE)	5%	67%	5%	5%	4%	13%
Finland (FI)	5%	74%	3%	5%	4%	9%
Belgium (BE)	5%	73%	2%	4%	5%	11%
Poland (PL)	4%	73%	2%	3%	5%	13%
Lithuania (LT)	4%	82%	2%	2%	2%	8%
Latvia (LV)	4%	81%	1%	1%	2%	10%
The Netherlands (NL)	4%	47%	3%	9%	11%	26%
Austria (AT)	3%	79%	5%	3%	3%	8%
Romania (RO)	3%	89%	1%	1%	2%	5%
Croatia (HR)	3%	83%	1%	1%	3%	9%
Slovenia (SI)	3%	84%	1%	2%	3%	7%
Estonia (EE)	3%	81%	1%	2%	3%	9%
Hungary (HU)	3%	78%	1%	3%	5%	10%
Bulgaria (BG)	3%	73%	1%	2%	5%	17%
Luxembourg (LU)	2%	92%	1%	2%	1%	2%
Slovakia (SK)	2%	88%	1%	1%	2%	5%
The United Kingdom (GB)	n.a.	64%	3%	8%	6%	19%

Note: This table shows the source countries for products with at most five suppliers for the EU27 and the UK (year: 2019, in %). We analyse products from the UK, the EU27, EFTA (Iceland, Liechtenstein, Norway, and Switzerland), the U.S., China, and the rest of the world (RoW). The countries are ordered by descending order with respect to the share of products coming from the UK.

Source: Comext, authors' illustration.

Table 1 shows from which country groups the EU27 and the UK import these highly dependent goods. We distinguish between the UK, the remaining EU-countries, the EFTA countries (Iceland, Liechtenstein, Norway, and Switzerland), the U.S., China; aggregating all remaining origin-countries in the last column (rest of the world, RoW). The table reports the share of highly dependent goods imported from the respective country or country group.

Across all European countries, only a few products are highly dependent on imports from the UK. For goods with five or fewer suppliers, the share of products imported from the UK is well below 10% for all countries except the three economies of Ireland (30.2%), Malta (15%) and Cyprus (10%). For both the EU27 and the UK most of the goods with five or fewer suppliers are sourced from EU-countries. Hence, for firms in the EU27 countries, the increase in trade costs due to Brexit will have a much lower impact in comparison to the effect expected for firms in the UK: UK importers might experience difficulties switching towards a cheaper supplier, as 64% of the highly dependent goods are sourced from the EU27.

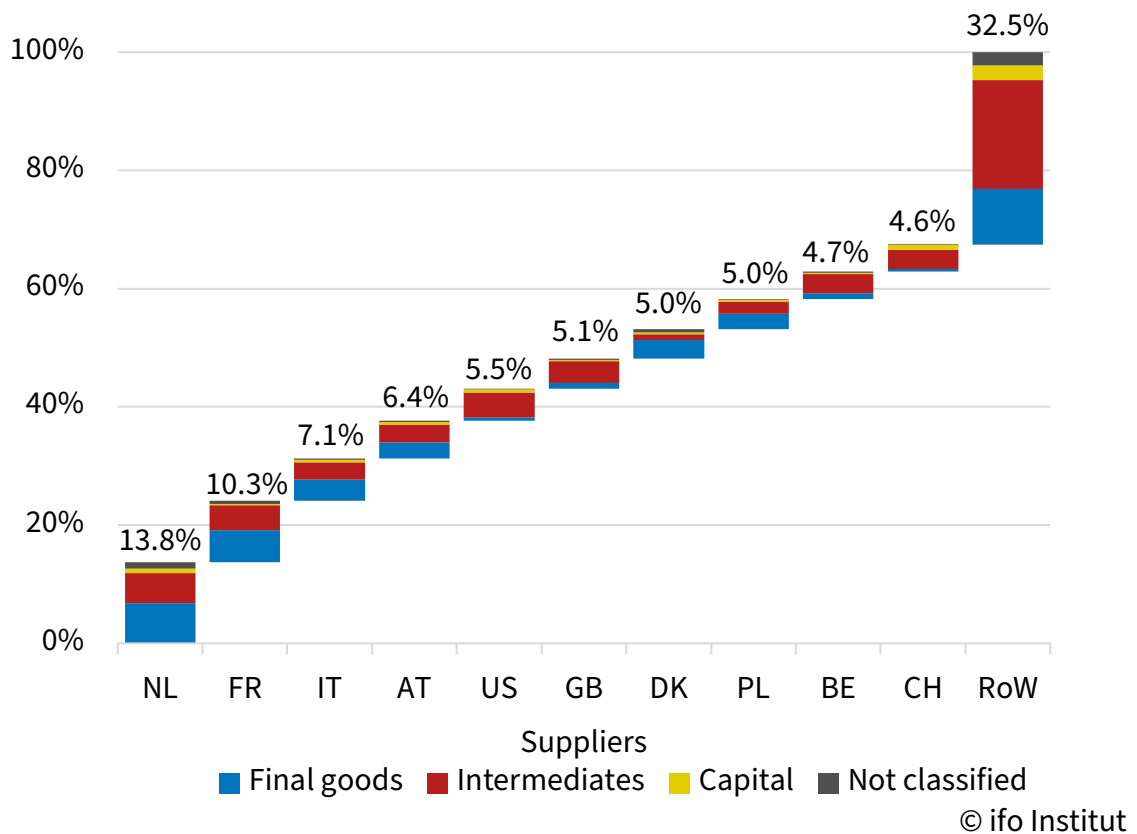
Going even Deeper: How do the Bilateral Trade Relations for Highly Dependent Products look like?

Next, we investigate the imports of Germany, the UK and Ireland in more detail. We are particularly interested in highly dependent goods, i.e. goods that are imported from five or fewer suppliers.

Figure 3 shows the sourcing countries of goods with five or fewer suppliers for Germany. Due to the Rotterdam-Effect, the Netherlands accounts for the highest share. Within the group of goods which are imported from five or fewer suppliers, UK imports represent solely 5.1% of the product-supplier combinations. Moreover, from those goods imported from at most five suppliers, 67% come from other EU countries (c.f. Table 1), mostly from France, the Netherlands, Italy and Austria – seven out of ten suppliers of dependent products are countries within the EU. This result indicates low product dependencies from UK imports in comparison to other EU member states. Moreover, it suggests that imports of highly dependent products from the UK might be more easily substituted by other European suppliers with small increase in transaction and trade costs.

However, it is important to note that, among the goods with five or fewer suppliers sourced from the UK, 72% are classified as intermediate goods. Given the importance of intermediate goods trade to the manufacturing industry in Germany, the increase in costs due to Brexit might impose additional constraints for well-functioning supply chains.

Figure 3: Germany imports highly dependent products mainly from the EU27



Note: This graph shows German imports for products with five or fewer suppliers (year: 2019, in %). The sourcing countries on the x-axis are arranged in descending order of importance as a sourcing country of products with high dependencies, i.e. one to five suppliers. We distinguish imports in four categories: consumption goods, intermediate goods, capital goods, and goods that cannot be classified. Country codes are explained in Table 1.

Source: Comext and UN Trade Statistics, authors' illustration.

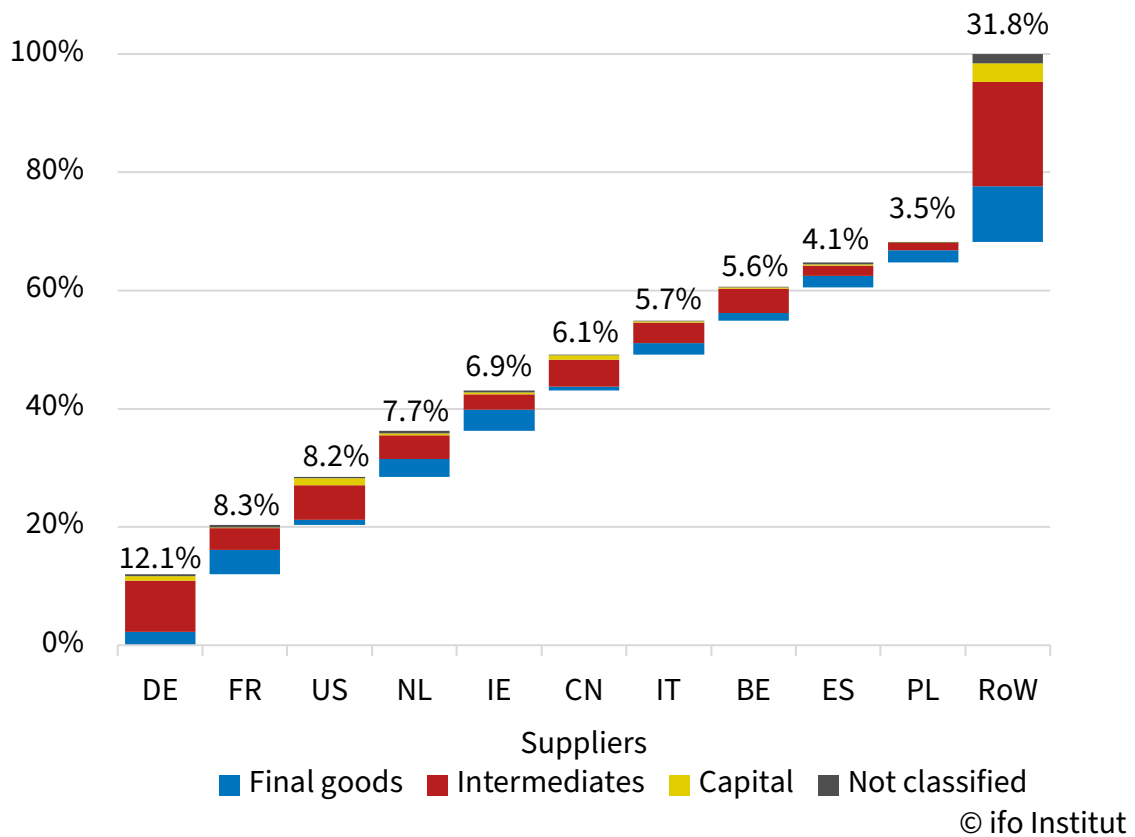
We also investigate complete dependencies from the UK (c.f. figure A1 in the Appendix). Only nine products are exclusively sourced from the UK and they represent less than 0.001% of the value of total German imports in Euros. The nine goods with complete dependency from the

UK are organic chemicals, animal or vegetable fats and oils as well as one photographic good and one good in nuclear machinery. All nine products are classified as intermediate goods.

Overall, UK imports rely heavily on trade with the EU27 as shown in Figure 1. For goods imported from five or fewer suppliers, nearly 64% of the product-country pairs correspond to countries in the EU27 (c.f. Table 1). In Figure 4, we disentangle the dependencies even further and distinguish imports by country of origin. Imports from Germany represent the largest bulk (12.1%). Moreover, a large portion of those goods are classified as intermediate goods. Hence, the uncertainty and increase in trade costs due to Brexit might cause severe disruptions in trade relations and increase in trade costs.

Complete dependency from one sourcing country further increases the risk of negative shocks for the UK. For instance, the UK imports 53 goods solely from Germany, of which roughly 77% are intermediate goods (c.f. A2 in the Appendix). These 53 products stem from various sectors, the main share of goods belonging to the organic chemicals sector.

Figure 4: The UK also imports highly dependent products mainly from the EU27

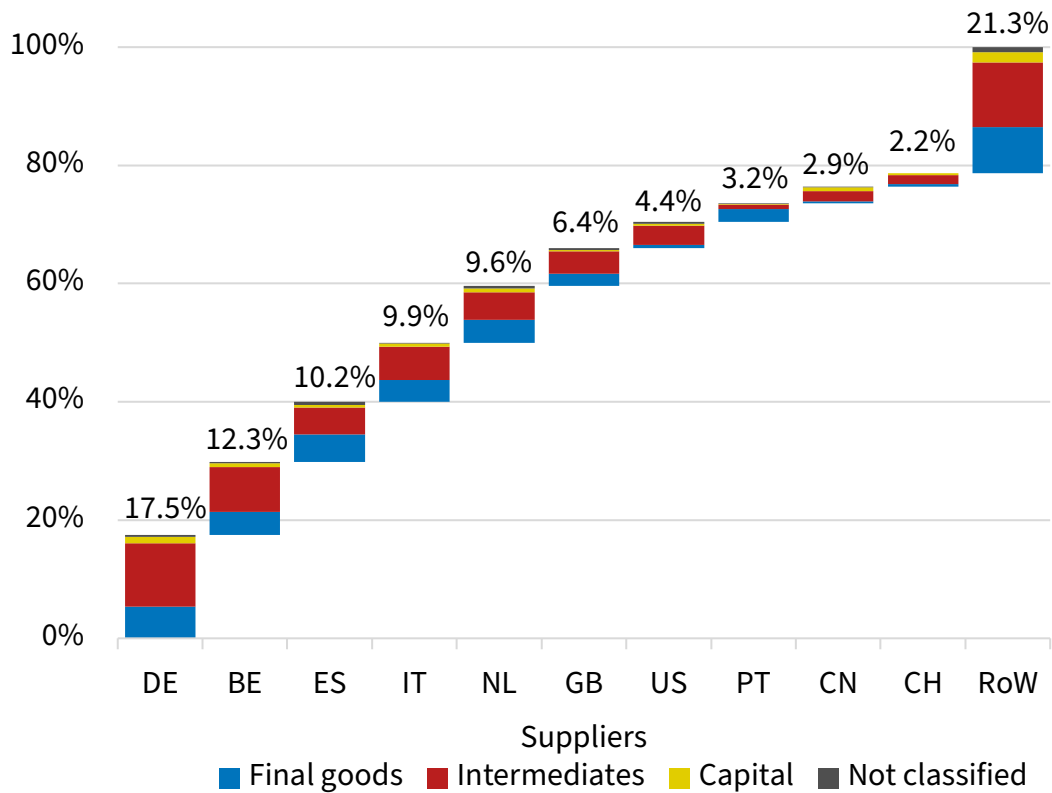


Note: This graph shows UK imports for products with five or fewer suppliers (year: 2019, in %). The sourcing countries on the x-axis are arranged in descending order of importance as a sourcing country of products with high dependencies, i.e. one to five suppliers. We distinguish imports in four categories: consumption goods, intermediate goods, capital goods, and goods that cannot be classified. Country codes are explained in Table 1.

Source: Comext and UN Trade Statistics, authors' illustration.

For most of the countries in the EU27 the figure is similar to the one shown for Germany. France, for example, shows a similar pattern. For goods imported from five or fewer suppliers, the top ten suppliers are mostly countries within the EU27 as well as the U.S., China and Switzerland. The shares for the remaining EU-countries can be found in A3 in the Appendix.

Figure 5: France shows a similar dependency pattern with a high share of highly dependent imports coming from the EU27



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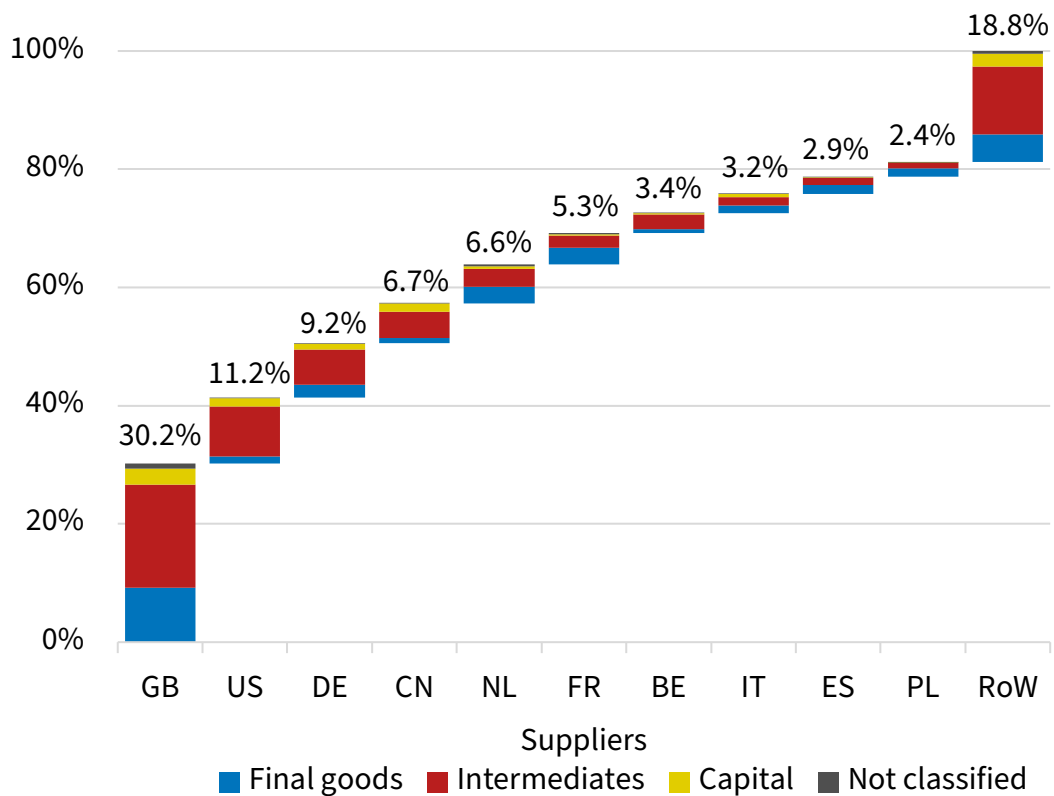
Note: This graph shows French imports for products with five or fewer suppliers (year: 2019, in %). The sourcing countries on the x-axis are arranged in descending order of importance as a sourcing country of products with high dependencies, i.e. one to five suppliers. We distinguish imports in four categories: consumption goods, intermediate goods, capital goods, and goods that cannot be classified. Country codes are explained in Table 1.

Source: Comext and UN Trade Statistics, authors' illustration.

As shown in Table 1, Ireland is the country that stands out with respect to the dependency on the UK as a supplier. 30% of goods with at most five suppliers are imported from the UK. There are at least two reasons for this observation: First, given its geographic location and the historical ties, the UK is a natural trading partner for Ireland. Second, Ireland and the UK are relatively remote compared to the rest of the EU, resulting in high interconnectedness and dependence. Due to the size of the economies, the UK is much more important for Ireland as a supplier than the other way around; the UK imports 6.9% of all goods with at most five suppliers from Ireland (c.f. Figure 4). However, a comparison between this number and the

share of UK imports from Austria, which in terms of GDP is comparable to Ireland, shows that for the UK the dependence on Ireland is rather high. Figure 6 shows the suppliers for Ireland in more detail. 18% of Ireland’s highly dependent goods come from the U.S. and China, while Germany, the Netherlands and France are the most important European partners.

Figure 6: In contrast to other EU27 countries, Ireland imports a high share of highly dependent products from the UK



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Note: This graph shows Ireland’s imports for products with five or fewer suppliers (year: 2019, in %). The sourcing countries on the x-axis are arranged in descending order of importance as a sourcing country of products with high dependencies, i.e. one to five suppliers. We distinguish imports in four categories: consumption goods, intermediate goods, capital goods, and goods that cannot be classified. Country codes are explained in Table 1.

Source: Comext and UN Trade Statistics, authors’ illustration.

Conclusion

The EU27 market is the UK's largest trading partner: In 2019, 50% of the UK's imports and 47% of the exports were traded with the EU27. For goods that are dependent on few suppliers, the relation with the EU27 countries is even tighter: For the UK, 64% of the goods that are dependent on 5 or fewer suppliers come from countries within the EU.

The decision of the UK to leave the EU imposes a key challenge for trade relations and, depending on the outcome of the ongoing Brexit negotiations, will cause severe increases in bilateral trade costs. The experience from former crises has shown that disruptions caused by negative shocks are more severe in case of highly dependent goods, which are sourced from few suppliers. This report provides an overview on product dependencies between EU27 and the UK and uncovers several stylized facts. We show that, whereas for most of the EU27 countries less than 10% of the highly dependent goods are sourced from the UK, the majority of UK's imports of highly dependent goods are sourced from countries in the EU27. However, for both, the UK and the EU27, Brexit imposes challenges for supply chains, as in both cases most of these goods are classified as intermediate goods, which are used as input for final production in the destination country. For those goods, uncertainty and rising costs due to Brexit may cause an additional distress on supply chains.

Despite heterogeneity across the EU27 countries, we show that, except for Ireland, the pattern of dependencies is similar across the EU27 members. Our results emphasize the need for reaching a trade agreement between the EU27 and the UK that minimizes the costs of Brexit and reduces the uncertainty in international relations.

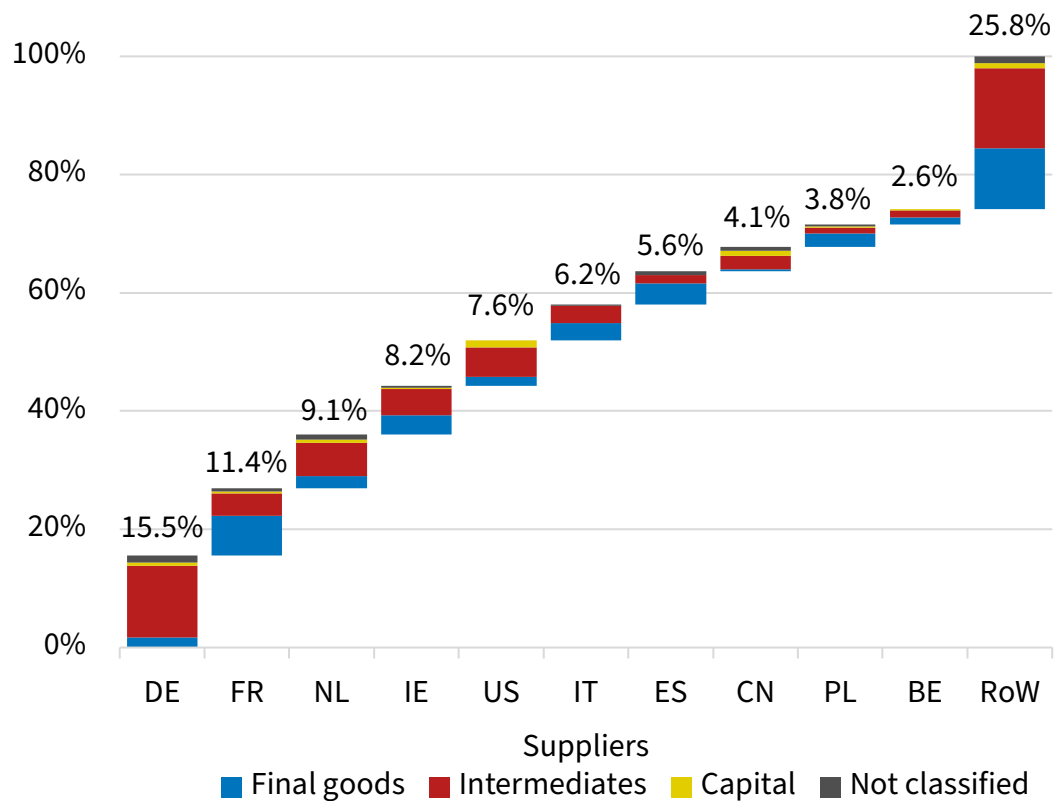
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Appendix

Figure A1: The UK imports a high share of intermediate goods in completely dependent products; most of them are imported from the EU27

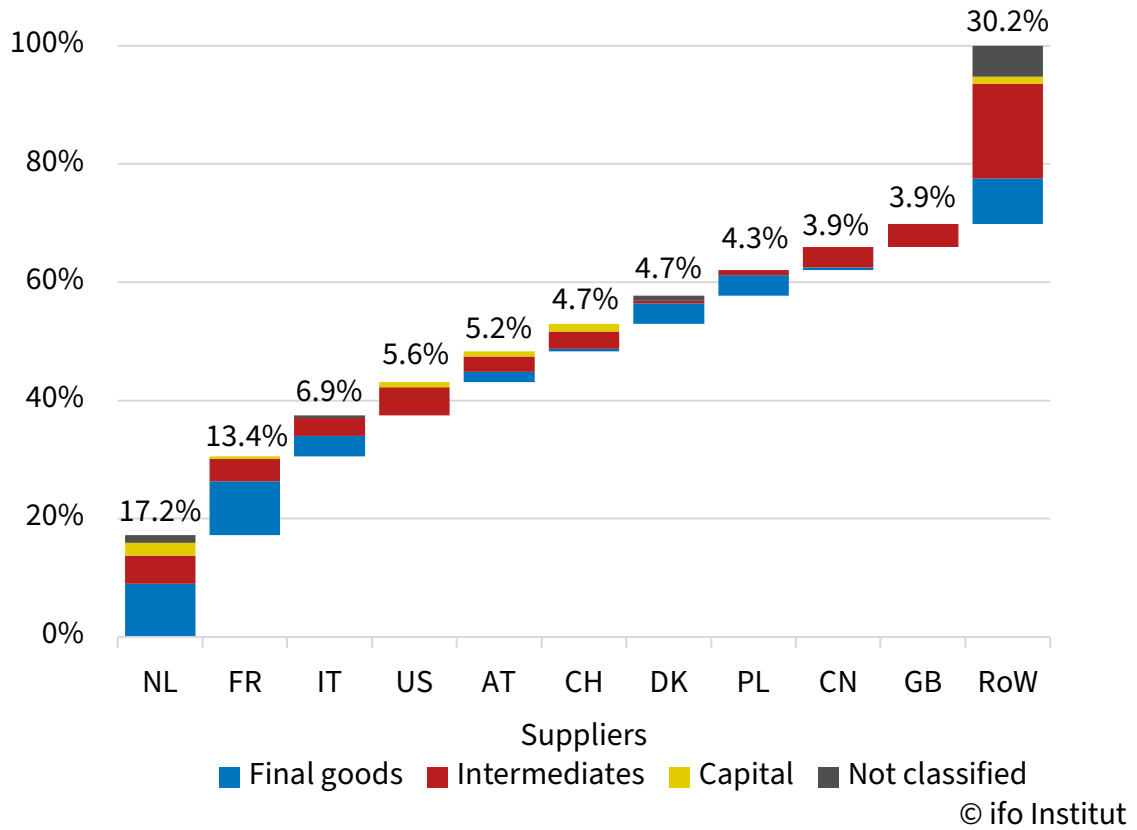


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Note: This graph shows UK imports for products with one supplier (year: 2019, in %). The sourcing countries on the x-axis are arranged in descending order of importance as a sourcing country of products with complete dependency. We distinguish imports in four categories: consumption goods, intermediate goods, capital goods, and goods that cannot be classified. Country codes are explained in Table 1.

Source: Comext and UN Trade Statistics, authors' illustration.

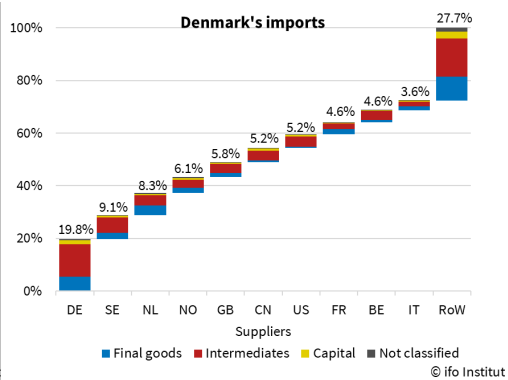
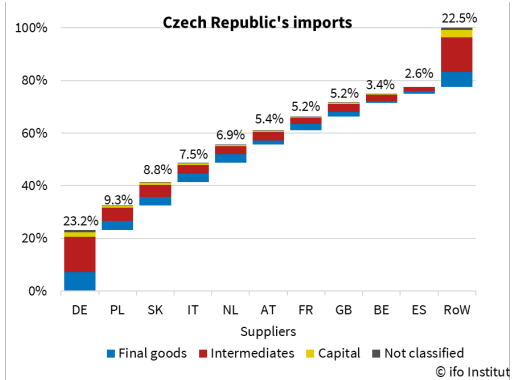
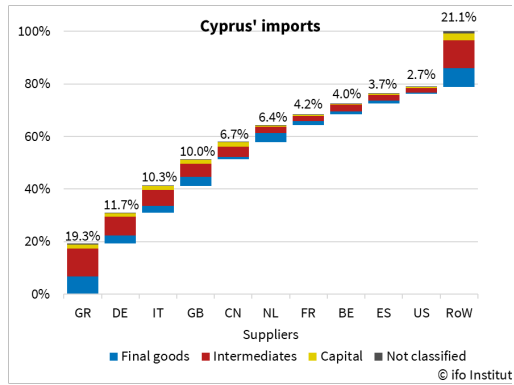
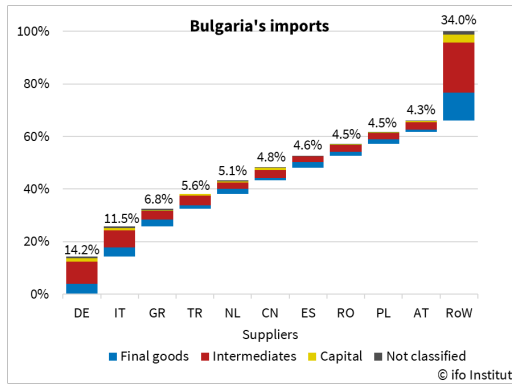
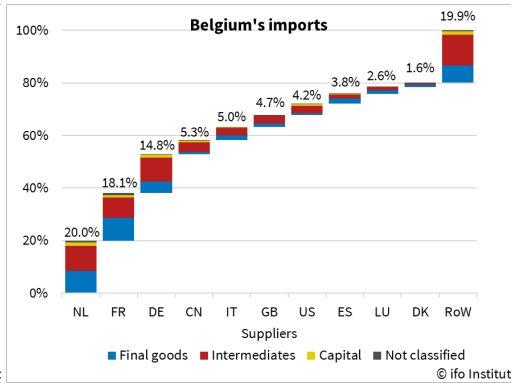
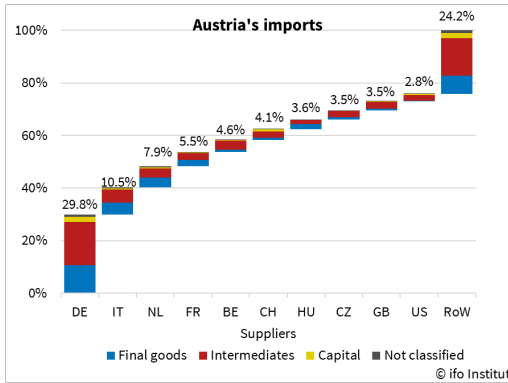
Figure A2: Germany imports a small share of completely dependent products from the UK

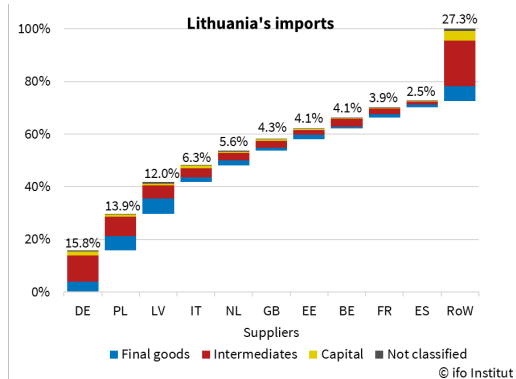
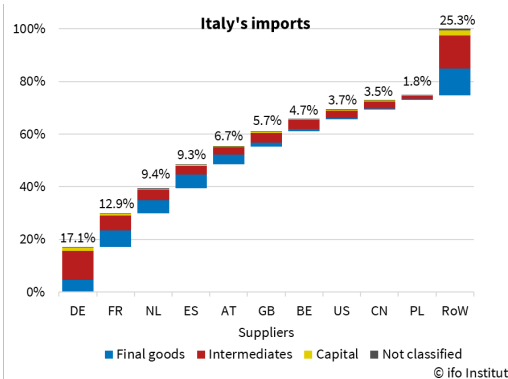
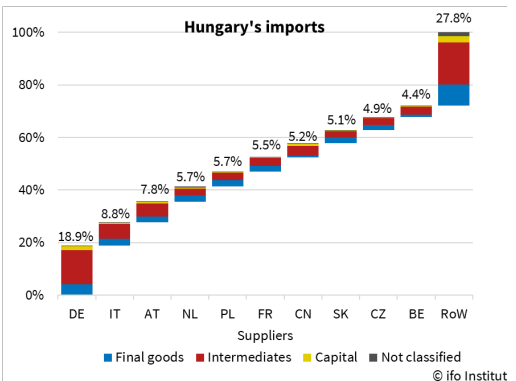
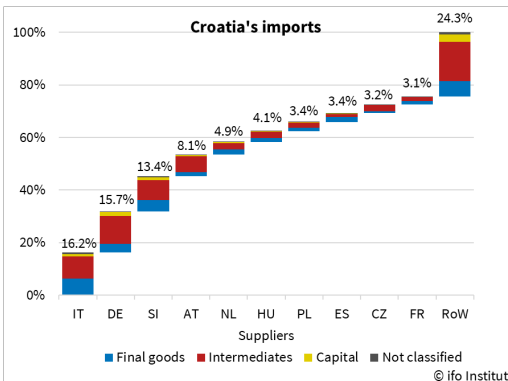
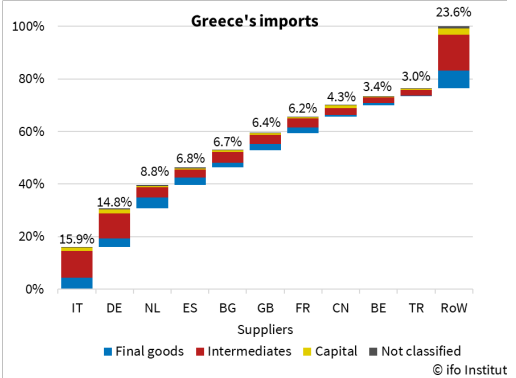
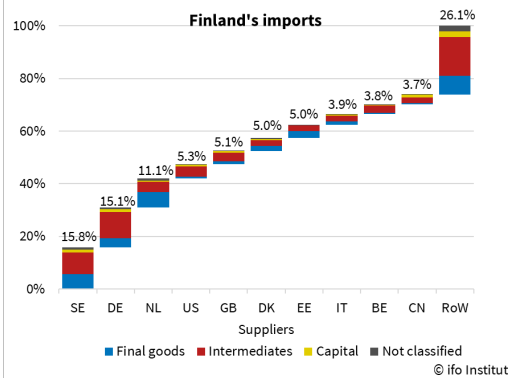
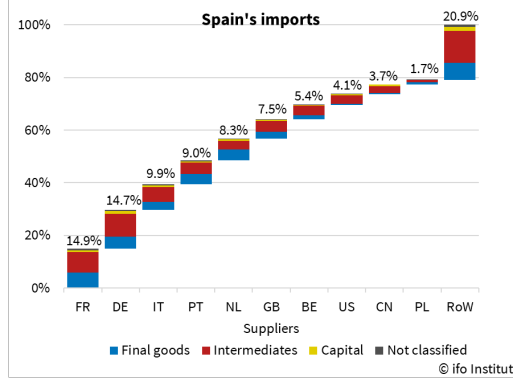
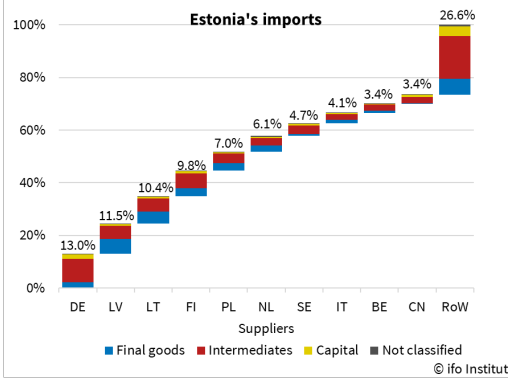


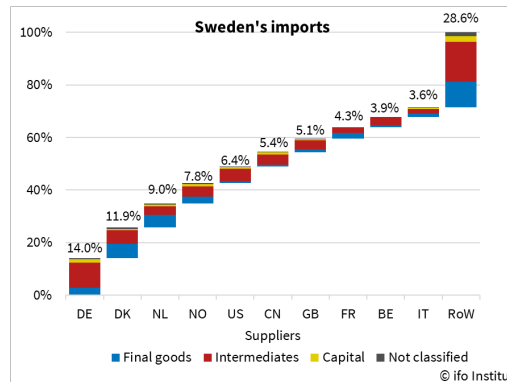
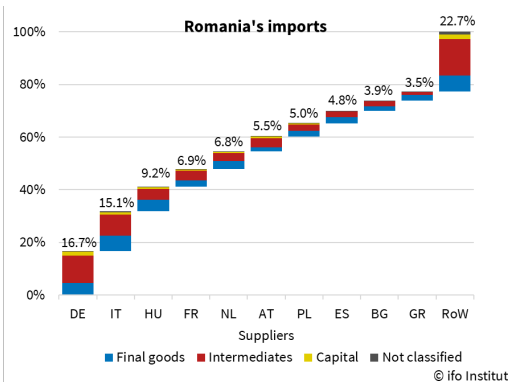
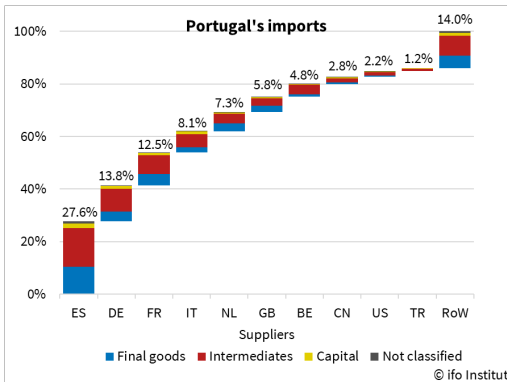
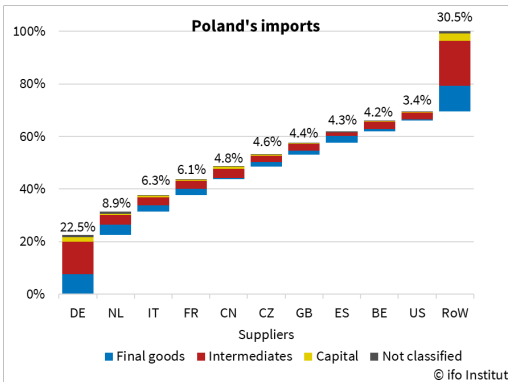
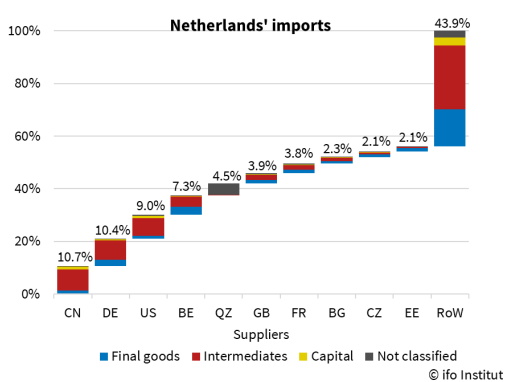
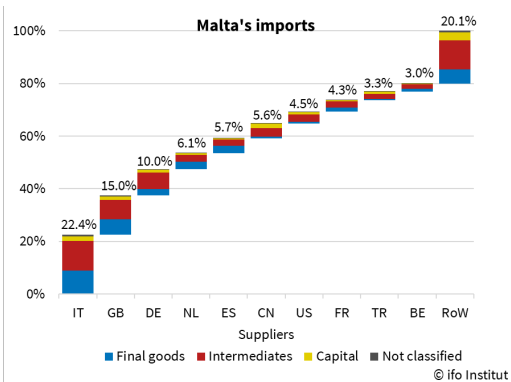
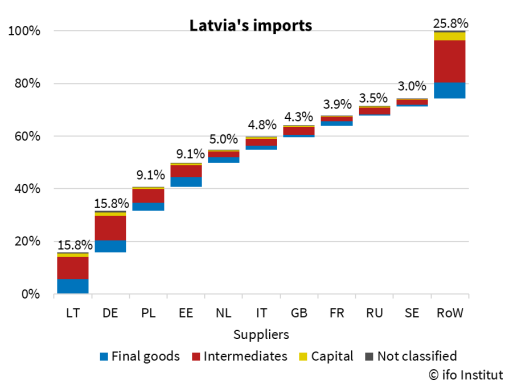
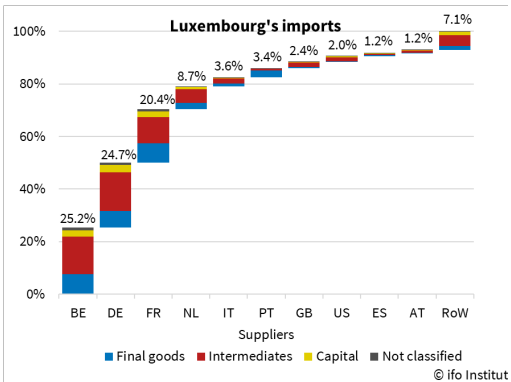
Note: This graph shows German imports for products with one supplier (year: 2019, in %). The sourcing countries on the x-axis are arranged in descending order of importance as a sourcing country of products with complete dependency. We distinguish imports in four categories: consumption goods, intermediate goods, capital goods, and goods that cannot be classified. Country codes are explained in Table 1.

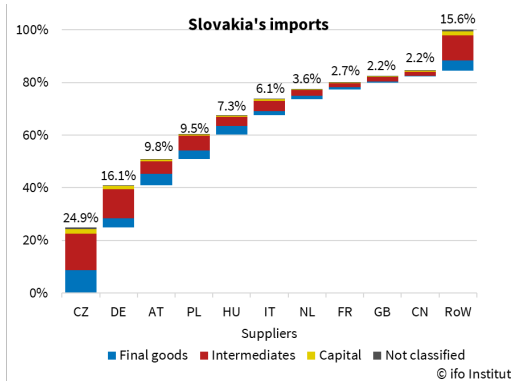
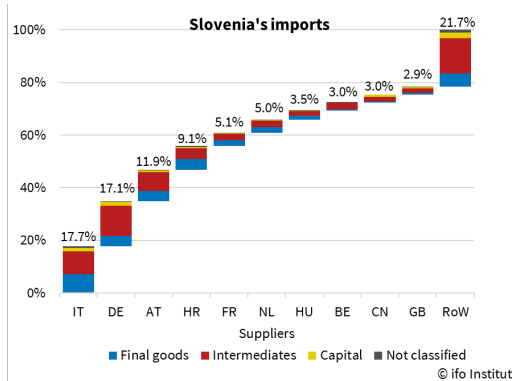
Source: Comext and UN Trade Statistics, authors' illustration.

A3: Import dependencies for other EU countries









Note: These graphs show imports for products with five or fewer suppliers for the other EU countries (year: 2019, in %). The sourcing countries on the x-axis are arranged in descending order of importance as a sourcing country of products with high dependencies, i.e. one to five suppliers. We distinguish imports in four categories: consumption goods, intermediate goods, capital goods, and goods that cannot be classified. Country codes are explained in Table 1.

Source: Comext and UN Trade Statistics, authors' illustration.

EconPol Europe

EconPol Europe – the European network for economic and fiscal policy research – is a network of 14 policy-oriented university and non-university research institutes across 12 countries, who contribute scientific expertise to the discussion of the future design of the European Union. The network's joint interdisciplinary research covers sustainable growth and best practice, reform of EU policies and the EU budget, capital markets and the regulation of the financial sector, and governance and macroeconomic policy in the European Monetary Union.

The network was founded in spring 2017 by the ifo Institute, along with eight renowned European research institutes. A further five associate partners were added to the network in January 2019.

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Our joint interdisciplinary research covers:

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- Reform of EU policies and the EU budget
- Capital markets and the regulation of the financial sector
- Governance and macroeconomic policy in the European Monetary Union

We will also transfer our research results to the relevant target groups in government, business and research, as well as to the general public.