European Committee of the Regions

Commission for Economic Policy

ECON

New trade and economic relations between EU-UK: the impact on regions and cities

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QG-01-22-288-EN-N; ISBN: 978-92-895-1229-9; doi:10.2863/59463

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Table of contents

List of abbreviations

BAR: Brexit Adjustment Reserve
BREXIT: the UK's withdrawal
EU: European Union
FDI: Foreign Direct Investment
FTA: Free Trade Agreement
GDP: Gross Domestic Product
HHI: Herfindahl-Hirschman Index
LFI: Lafay Index
LRA: Local and Regional Authority
NUTS: Nomenclature of Territorial Units for Statistics
SME: Small and Medium Enterprise
TCA: EU-UK Trade Cooperation Agreement

Executive Summary

This report investigates the impact of Brexit on EU LRAs, focusing on the potential effects of the EU-UK Trade Cooperation Agreement (TCA) entered into force in 2021. It provides an extensive analysis on the new EU-UK relations, illustrating the main characteristics of the TCA and reviewing the **most recent literature** on the macroeconomic effects of Brexit on EU economies, trade, migration flows, and the new legislative competition framework.

After having identified the sectors in which the EU has a comparative advantage with respect to the UK by using disaggregated data at country level on EU-UK trade flows, the report analyses in detail the **exposure of EU regions to Brexit** considering four main sectors: vehicles, machinery, furniture and wood, and agri-food products. These are not only the EU's top sectors of specialisation in its exports towards the UK, but also those in which most of the EU manufacturing workers are employed and which significantly contribute to the EU GDP. Moreover, vehicles and agri-food products are also the sectors in which the new TCA rules (above all, those regarding origin and sanitary and phytosanitary checks) could have a higher impact on EU exporters and importers.

However, only considering the top EU sectors is also a limit, as there could be cases of regions that are highly specialised in other sectors of production exported to the UK that do not emerge from the analysis. This question is addressed in the report through **eight specific case studies**. These complement the quantitative analysis, allowing for more in-depth exploration of different dimensions other than trade flows, such as interregional cooperation initiatives, worker migration, specific sectoral needs and vulnerabilities, new business trade strategies, as well as the identification of key remediations adopted or planned to mitigate the impact of Brexit. Moreover, the eight cases highlight the opportunities inherent in the UK's withdrawal, which could benefit specific regions, sectors, or single businesses to a certain extent.

This research represents the first attempt to provide an assessment of the impact of Brexit following the TCA, both at regional and sectoral level. It has consolidated the analysis of the 2018 CoR's report '*Assessing the impact of the UK's withdrawal from the EU on regions and cities in EU27*', and expanded its approach by also considering the import side in the exposure index. This provides the opportunity not only to better capture and **control for intra-industry trade flows** across EU Member States and the UK, but also to **map the EU industrial supply-chain** and the contribution of each national and regional specialisation within European manufacturing.

The study has shown that Brexit effects are asymmetric across sectors and EU regions, impact more heavily on smaller companies, may reduce human capital mobility and cooperation between EU and UK enterprises, and negatively affect regions and communities involved in interregional projects with the UK. Additional challenges in the near future are expected for those firms, sectors and regions with significant trade relation with the UK once the rules set out in the TCA are fully applied.

More specifically:

- The TCA implies **higher costs for trade.** The rules of origin and the sanitary checks, in particular, are those with a higher impact on EU-UK trade (vehicles and agri-food products above all). The main challenges for enterprises adapting to the new regulations were the lack of time, considering the extremely short period between the TCA's publication and its entry into force, and the lack of guidance to familiarize them with the legislative framework.

- **Costs for the EU may rise in the future**. Some products are still under grace periods and costs might be even higher in the near future once these end. Moreover, the TCA does not cover the service sectors: when costs for service sectors are added to those for manufacturing, the total costs of the TCA may be more pronounced for European businesses. Other key limitations of the TCA are its precarious base and persisting elements of uncertainty which create a degree of unpredictability for enterprises and individuals who may suffer further impacts in the future.

- **Due to the TCA, EU exports to the UK have decreased**. Contrary to other destinations for EU exports, both intra-EU and extra-EU, in 2021 EU exports to the UK did not counterbalance the losses incurred in the previous year. In some sectors, EU businesses have been able to re-orientate their exports towards new markets to compensate for the decrease in trade relations with the UK.

- **Brexit has produced asymmetric effects across EU regions and sectors.** While the results from this report broadly confirm the literature forecast, with regions in northern and western Europe more exposed overall to Brexit than regions in southern or eastern Europe, when sectoral effects are considered, the picture concerning EU regional trade relations with the UK appears to be more intricate. Almost all regions in the EU are, in fact, exposed in at least one of the main EU sectors of specialisation with respect to the UK, i.e. vehicles, electrical machinery, wood products and furniture, and agri-food products. Therefore, several other regions far from northern and western Europe are also at risk. For less diversified (and often less developed) regions even a small disruption in trade with the UK can have significantly adverse effects on their production and supply chain.

- **The TCA implies higher costs for SMEs**. Brexit may in fact affect SMEs or enterprises without extra-EU trade relations more, as the costs and challenges of dealing with the TCA may be higher for them. Larger and more internationalised companies might have had the advantage of worldwide trade experience including trade outside the EU, which enabled them to prepare for Brexit and to adapt to the new rules more quickly. They might also have fewer costs to re-orientate and re-organize their business towards different markets. Brexit could also indirectly impact on those SMEs in the value chain located in regions that are less exposed to Brexit, but whose specialisation may depend on other more exposed regions.

- **Brexit has had a negative impact on EU workers and student mobility towards the UK.** The EU and the UK did not reach an agreement on human capital mobility with the TCA, which could affect several trade sectors. Preliminary data for 2021 seem to confirm a significant reduction in the number of EU-based jobseekers looking for work in the UK. The greatest impact, however, is on student mobility.

- **Interregional cooperation with the UK is more difficult.** The interruption of the Interreg Programmes can create challenges for local EU enterprises and communities. EU enterprise R&D cooperation with the UK - beyond EU programmes - may also incur increasing administrative costs and additional costs for the recognition of professional qualifications.

- **Brexit, however, may create new opportunities for some EU businesses and sectors.** Some Member States experienced an increase in exports to the UK in 2021 in specific products, improving the competitive position of their regions specialised in these. Certain regions have also increased their attractiveness, concerning foreign investors, the financial sector and logistic activities in sea ports. Moreover, the increased administrative burden induced by the TCA rules might push local enterprises to re-organize their business towards different markets.

- **LRAs have implemented different solutions to support local businesses to deal with Brexit effects.** Overall, it is agreed that the BAR could be an appropriate tool to help mitigate the impact of Brexit, but it is not expected to fully compensate all the negative effects. However, the use of the BAR is still in its initial phase, so is too early for a clear assessment of its effectiveness. Most LRAs have implemented information campaigns, initiatives to support SMEs in markets reorientation, exchange of solutions and facilitation of business networks. Interesting initiatives also include online self-diagnosis tools for enterprises to monitor Brexit effects on companies. There are also examples of funds and subsidies for local enterprises or sectors particularly affected by the Brexit. At interregional level one initiative worth citing is the Straits Committee, which includes six LRAs from France, the Netherlands, Belgium, and two from the UK, and aims to promote economic development and trade between EU regions and the UK, resolve disruptions, tackle climate change, and support young people.

Key policy recommendations include:

- the EU, Member States, LRAs and their associations should **monitor and quantify the Brexit impact**, focusing on the effects of the TCA for 2021 and the upcoming years. A proper estimate of the effects of Brexit is the first step for policy makers to better assess enterprise, sectoral, and regional needs and to design more tailored support measures.

- The asymmetric impact of Brexit and the TCA calls for the **active involvement of LRAs at national level in the use of the BAR**.

- **The BAR needs to be reinforced**. The eligibility period should be extended and additional amounts made available. Sectoral impact assessments reflecting regional needs should be produced both at EU and national level, and territorial or sectoral earmarking could be introduced to reduce discretion regarding the distribution of funds.

- Although the TCA is now in force, its full effect will probably take some time to come through. **Socio-economic and institutional stakeholders at LRA level therefore need to develop concrete regional action plans** to deal with Brexit.

- **Member States and LRAs should also consider creating regional funding support initiatives for the most affected enterprises and sectors.** Member States should also consider creating a national list of experts supporting businesses in trade internationalization strategies and providing vouchers for SMEs to activate them. The list could be also at EU level and organized on a sectoral basis.

- **A specific fund at EU level could be set-up to support bottom-up initiatives for bilateral and multilateral cooperation across EU and UK regions**. This, a sort of a BAR for interregional cooperation targeting EU regions, should aim to continue the cooperation partnerships established in the past and create opportunities for new relations.

Introduction

The last two years have been particularly challenging for EU trade. Since spring 2020, the pandemic has imposed unprecedented economic, social and financial challenges on all levels of government across the EU, with a remarkably asymmetric impact on local and regional authority (LRAs) finances (European Committee of the Regions 2021*a*). Both intra-EU and extra-EU trade have been heavily affected by strict lockdowns in numerous sectors, while restrictions on people's movement and travel have further limited inter-country and inter-regional economic activities.

Moreover, in January 2021, the UK officially left the EU single market. Despite the fact that Brexit was formally announced following the referendum in June 2016, on 30 December 2020, after a two-year transition period, the EU and the UK signed the Trade Cooperation Agreement (TCA), setting out preferential arrangements for EU-UK trade in goods and services. The TCA has imposed additional challenges for enterprises, which were especially felt in the first part of 2021. Further burdens may emerge in the near future with the end of the grace periods for certifications and full checks currently allowed on specific traded goods. The combined effects of the pandemic, persisting throughout 2021, and Brexit have caused several disruptions in trade relations between European LRAs and the UK. Furthermore, the new year has not begun under the best auspices. During the finalisation of this report in March 2022, the outbreak of the war in Ukraine and the consequent packages of restrictive measures against trade with Russia announced by the European Commission have dramatically irrupted into the EU economy. Additional and significant new elements of uncertainty for the future are therefore further worsening an already complex situation for intra- and extra-EU trade.

The impact of Brexit has been exhaustively analysed in literature[1]. Even before the signing of the TCA, numerous studies had estimated - in both a hard and soft Brexit scenario - the potential effects under several aspects, considering single or groups of EU economies[2], trade[3], specific sectors[4], workers migration[5], student

[1] For a detailed review see European Central Bank (2020) and Mathieu (2020).
[2] See, for example, OECD (2018) on the Netherlands and OECD (2019) on Denmark. CPMR (2018) instead focuses on the Brexit impact in the North Sea Region.
[3] For the latest estimates on the impact of Brexit on the UK's exports to and imports from the EU see Office for Budget Responsibility (2021) and CER (2021*a*,*b*).
[4] For instance, on agri-food sectors, see European Parliament (2017) or Cheptea, Huchet and Henry (2021).
[5] See Portes (2016 and 2020).

mobility[6], FDI[7], welfare[8], cooperation[9], and cohesion policy[10]. The overall shared conclusion was that the impact of Brexit would imply significantly heavier losses for the UK (with more pronounced effects in its weaker regions)[11] than for any other EU Member State. Recent data seem to confirm this prevision, as in October 2021, for instance, trade in the eurozone exceeded pre-covid December 2019 levels by 4%, whereas the UK stagnated at a much lower level (IFO 2022).

Concerning the impact of the TCA, the most updated analysis by Member State and sector was provided by the OECD in December 2021 (OECD 2021)[12]. Results indicate that, with the current TCA, output losses in the EU (around 0.6%) are expected to be less pronounced than those in the UK (4.4%) in the medium term, but would vary markedly across individual countries and sectors, with Ireland and motor vehicles experiencing the largest losses. Overall, countries with weaker trade links with the UK might barely be affected at all. The OECD's report also highlights that about half the economic losses come from rising technical barriers and sanitary and phytosanitary measures on goods, while the remaining half stems mainly from the higher restrictions on services. Restrictions on the free movement of people add to the economic losses and particularly affect those EU economies heavily reliant on trade in services with the UK. A further unilateral services liberalisation reform in the UK would have a small, but positive, economic spill over into the EU. Overall, the TCA ensures the integrity of the EU single market and has implied less disruptive effects on trade and investment flows, but is has several limitations, as underlined by Wachowiak and Zuleeg (2021*a,b*): higher costs for trade, minimal provisions on trade in services and capital, lack of agreement on mobility, a precarious base and several elements of persisting uncertainty. Moreover, businesses have had little time to adapt to the new rules.

The distribution of the costs and benefits of Brexit shows a high degree of asymmetry not only between the EU and the UK or within the EU, but also within EU Member States at LRA level. While many of the UK's economically weaker regions are forecast to be more exposed to Brexit, across the EU there is a strong core-periphery differentiation of the Brexit effects, with the highly urbanized regions in northern and western Europe expected to be more exposed to Brexit risks than regions in southern or eastern Europe (Chen *et al.* 2018). Other analyses suggested that smaller, more productive regions tend to lose out the most as a result of Brexit, as they might be less capable of easily shifting trade and economic activity to other countries and regions (see for instance Bertelsmann Stiftung

[6] See Amuedo-Dorantes and Romiti (2021).
[7] See Latorre, Olekseyuk, and Yonezawa (2020).
[8] See Bertelsmann Stiftung (2019).
[9] See European Committee of the Regions (2021*b*).
[10] See, for instance, CPMR-CRPM (2019) and Giordano (2021).
[11] See Billing *et al*. (2019), Thissen *et al*. (2020), and Bhattacharjee *et al*. (2020).
[12] Another very recent analysis is provided by Fusacchia, Salvitici and Winters (2022).

2019). Thissen *et al.* (2020) found that there is considerable variation in the post-Brexit implications for sector- and region-specific competitive opportunities and vulnerabilities that deviate from their respective national effects. Indeed, some specialized regions may even have competitive opportunities at the expense of nearby competing regions. In marked contrast with the UK, where existing interregional inequalities could increase due to Brexit, it is generally the weaker and more geographically peripheral regions in the southern and eastern fringes of the EU that appear to be less vulnerable. Of course, as underlined by the authors, these effects were sensitive to the nature of the final deal.

The European Committee of the Regions (CoR) has also investigated the impact of Brexit on EU regions and cities. The report published in 2018 estimated the regional exposure index covering the EU regions at two-digit sectoral level and considering trade flows (exports) with the UK in key economic sectors in the EU27, i.e. transport and vehicles, machinery, electronics, textiles and furniture, vegetables, foodstuff and wood, chemicals and plastics (European Committee of the Regions 2018). In general, the study described a varied situation across EU regions. There are no clearly identified ‘winners’ (i.e. regions with increasing socio-economic opportunities and market potentials as a consequence of Brexit, whatever the scenario), but most regions were found likely to lose their current position in some sectors in terms of trade, direct investments or migration opportunities for workers, students or researchers.

In 2021, a new CoR study highlighted that Brexit could endanger the numerous cooperation links between the UK and the EU and that the impact is likely to be highly uneven with the most severe effects expected in neighboring countries, including France, the Netherlands, and Belgium, as well as Ireland (European Committee of the Regions 2021*b*). As far as LRAs are concerned, the most important aspect of the EU-UK relations at risk includes the discontinuation of the UK’s participation in EU programmes, leading to disruptive cross-border cooperation and reducing the scope of student and professional exchanges. The CoR, in 2020, also established a contact group for relations with representatives of local UK government and devolved administrations to ensure that political dialogue with these representatives continues after the UK's withdrawal from the EU.

This new report is one of the first aimed at analysing the impact of Brexit following adoption of the TCA, both at regional and sectoral level. By using a similar, albeit reinforced, methodology, it expands and complements the analysis initiated with the 2018 CoR’s study. The report is structured as follows:

- **Chapter 1** provides an overview of the context according to literature, describing the key characteristics of the TCA (and of the Northern Ireland Protocol) and providing an overview of the overall macroeconomic impact of Brexit on GDP, trade, human capital mobility, and public procurement. The last section also discusses the Brexit Adjustment Reserve (BAR), a key EU instrument for mitigating the negative impact of Brexit on EU sectors and regions.

- **Chapter 2** investigates in detail the impact of the Brexit on trade flows between the UK and the EU from a regional perspective, presenting an analysis at NUTS2 level of the most impacted sectors and regions. Specifically, the chapter estimates the regional exposure to Brexit effects in four key sectors of the EU economy, identified as those in which the EU has a higher comparative advantage compared to the UK: vehicles, machinery, wood and furniture, and agri-food products.

- **Chapter 3** illustrates eight experiences from individual LRAs dealing with Brexit effects. Each case study analyses the main Brexit impact, identifies key challenges and opportunities, and describes the remediations adopted or planned to mitigate the negative effects on regional economies and businesses.

- **Chapter 4** summarizes the report findings and recommendations.

- **Annex I** contains, for each Member State, a country fiche illustrating the key top three sectors in which regions show a higher exposure to the Brexit.

1 The UK's withdrawal: The impact of the Trade Cooperation Agreement

This chapter describes the key characteristics of the EU-UK Trade Cooperation Agreement (TCA) and its impact on both the UK and the EU. More specifically, the first section highlights the key limitations of the TCA, which could affect EU-UK trade relations and enterprise costs. It also describes the key features of the Northern Ireland Protocol, which complements the TCA regarding specific issues related to trade between Ireland and the UK.

The following sections offer an overview of the main effects of the TCA. These should be read as potential, since the TCA only became fully operative in mid-2021 together with new waves of the pandemic. It is therefore still too premature to determine a clear and definitive picture, especially concerning the impact on individual sectors, or from an EU regional and local prospective.

Section 1.2 illustrates the overall effect on both the UK and EU economies, in terms of GDP, production change by sector, and workers and citizens' welfare. It also provides an overview of the costs of the demise of the EU Cohesion Policy in the UK, which could have an impact especially on those EU enterprises and regions involved in territorial cooperation programmes. Using the most recent estimates available in literature, section 1.3 offers an overview of the impact on trade, an issue which is analysed in detail in chapter 2. Section 1.4 is specific to human capital, and briefly discusses the latest data on EU net migration to the UK, the effects on migrant remittances and the impact on student mobility. Section 1.5 is about public procurement and the new competition framework after the TCA, while also focuses on modifications in UK laws that may impact EU companies. Finally, the last section is dedicated to the Brexit Adjustment Reserve (BAR), a key EU instrument for mitigating the negative effects of Brexit on EU sectors and regions.

1.1 The Brexit process and the Trade Cooperation Agreement

The UK joined the EU in 1973. More than four decades later, on 29 March 2017, the UK invoked Article 50 of the Lisbon Treaty and officially gave notice of its intention to withdraw from the EU.

This decision followed the result of a referendum held in June 2016, where the majority of UK citizens voted in favour of Brexit. The negotiation process lasted for two years. In this transition period, the UK was still part of the EU's economic institutions and security co-operation arrangements and the EU continued to treat the UK as a member of the single market and customs union. It also asked its trade partners to continue to treat the UK as a member state until the end of the transition period. Freedom of movement remained in place and citizens' rights continued unaffected and the UK remained subject to EU law and the rulings of the European Court of Justice.

On 31 January 2020, the Withdrawal Agreement ratified by the EU and UK parliaments allowed the UK to leave and ended the transition period. Ten months later, on 30 December 2020, the EU and the UK signed the TCA, which entered fully into force on 1 May 2021[13].

The TCA "sets out preferential arrangements in areas such as trade in goods and services, digital trade, intellectual property, public procurement, aviation and road transport, energy, fisheries, social security coordination, law enforcement and judicial cooperation in criminal matters, thematic cooperation and participation in Union programmes". In brief, it consists of a set of rules, which defines a free trade agreement, a close partnership on citizens' security, and an overarching governance framework[14].

The TCA provides tariff- and quota-free access for all products, classed as originating in the EU or UK, in line with the rules of origin defined in the agreement. As such, by default, goods entering the EU from the UK are subject to tariffs unless they meet the rules of origin. For this, the TCA contains a lengthy list of rules of origin for products to which careful attention must be paid. While the TCA includes non-originary processed raw materials as 'British' products and allows businesses to self-certify the origin of goods, compliance with the rules can be complex for a number of specific sectors, where much stricter rules apply. Proving the origin of individual shipments can be particularly burdensome[15], with

[13] Trade and Cooperation Agreement between the European Union and the European Atomic Energy Community, of the one part, and the United Kingdom of Great Britain and Northern Ireland, of the other part, Official Journal of the European Union, 30.04.2021.
[14] From the EU perspective, the TCA is an association agreement under article 217 of the Treaty on the Functioning of the European Union (TFEU). The agreement has seven parts: (1) common and institutional provisions; (2) trade, transport, fisheries and other arrangements; (3) law enforcement and judicial cooperation in criminal matters; (4) thematic cooperation (health and cyber security); (5) participation in union programmes, sound financial management and financial provisions; (6) dispute settlement and horizontal provisions; and (7) final provisions. The 400 pages of the main text of the agreement are supplemented by a further 600 pages with almost 50 annexes covering specific aspects, such as rules of origin, fisheries, cars, chemicals, medicine, organic produce and wine, specific services, energy, the movement of people, short-stay business visas and the exchange of information. Additional 200 pages set out three protocols on cooperation on VAT fraud, customs and social security.
[15] For example, an electric car produced in the UK and exported to the EU would only be exempt from tariffs if 45% of its added value is European or British and its battery is wholly of EU or British origin. This means that a British electric car with a Chinese battery would be subject to tariffs.

many small and medium businesses often choosing to pay the tariffs to avoid the administrative burden of proving the origin of their products.

Moreover, agri-food trade is now subject to health certificates, which were not previously required, but are now systematically checked, alongside periodic inspections. Industrial goods, on the other hand, must bear the CE mark, guaranteeing they meet the technical requirements of the EU, meaning that the UK now needs three marks: one for Great Britain, another for products destined for Northern Ireland and a third for products destined for the EU. Certain products like chemicals or pharmaceuticals must be reregistered and face additional hurdles to approval. Similarly, VAT and special taxes accrue at the point of each import (this also applies to online shopping), rather than as part of periodic declarations of intra-community transactions.

The TCA also includes a number of measures for the trade in goods such as mutual recognition schemes for trusted traders ('authorised economic operators') to facilitate customs clearance, the use of common international references in technical specifications, as well as specific schemes for wine, organic produce, cars, chemicals and pharmaceuticals.

One particularly sensitive issue was fisheries, which threatened to derail negotiations right up to the last minute, despite the sector making up just a fraction of the economies of both parties (around 0.1% of GDP). Eventually, both parties reached an agreement, exempting UK exports[16] from tariffs (but not from health regulations) and allowing for EU vessels to maintain their access to UK waters over the next five years, while gradually phasing in a 25% reduction in catches. Concessions from the EU are focused on species that are less affected by coastal fishing in an attempt to minimise the effect on fishing communities. After 2026 negotiations on access and share of stocks will take place on an annual basis, although provisions exist for multiannual agreements.

Box 1.1: The impact of the TCA on fisheries and aquaculture in the EU

A recent study published by the European Parliament in February 2022 (Caillart and Salz 2022) estimated the impact of the TCA on EU fisheries sector. In 2019, the EU-27 fishing fleet produced about 2.6 million tonnes of fish with a total value of EUR 3.5 billion in the North Atlantic. About 50% of these catches originate from the 105 Total Allowable Catches (TACs) shared with the UK. Compared to 2019, the EU27 fishing fleet lost about 66 400 tonnes of fishing opportunities as a result of the TCA. This loss will gradually increase to 110 900 tonnes by 2025. The economic value of these losses is estimated at EUR 108.4 million and EUR 178.6 million respectively. The TCA will lead to a

[16] 80% of UK catches are exported and two-thirds of these exports are for the EU.

reduction of catches of (almost) fully utilised quota by about 24 700 tonnes in 2021 and 55 800 tonnes in 2025. The respective values are EUR 30 million and EUR 51 million. The most affected Member States are Ireland, France, the Netherlands, and Denmark.

France and the Netherlands cases are analysed in more detail by the study. In France, the main region impacted are the Hauts de France (67% of regional vessels accessed the UK waters), Normandy (26% of the regional fleet) and Britany (15% of the regional fleet). The fishing ports most dependent on catch obtained in UK waters are Boulogne s/Mer, Cherbourg, Roscoff and Saint Malo (44%, 50%, 47% and 25% of catch landed respectively). In the Netherlands the pelagic sector has lost over 20 000 tonnes in fishing opportunities, with an estimated value of EUR 9.4 million. Approximately 50% of this loss can be allocated to the reduction of pelagic TACs of herring, mackerel and blue whiting. The remaining 50% loss is a consequence of the TCA. Considering that the Dutch pelagic quota are (almost) fully utilised, the TCA has reduced the turn-over of the Dutch fleet by about EUR 5.4 million (10 190 tonnes). The pelagic fleet will lose by 2025 further some 6 800 tonnes, mainly of herring and mackerel. At 2019 prices, this loss represents about EUR 3.6 million in annual revenues. Unless the catchability would significantly deteriorate, which does not seem likely given the situation of the recent years, this will be a real loss for the pelagic fleet.

Source: based on Caillart and Salz (2022).

Despite the fact that the TCA safeguards the integrity of the EU single market, implies less disruptive effects on trade and investment flows, and represents a basis to build future EU-UK cooperation, it still has several limitations (Wachowiak and Zuleeg 2021*a*,*b*):

- **Higher costs for trade.** The avoidance of tariffs and quotas on goods benefits several sectors, but as trade terms are subject to rules of origin, the need for entry and exit customs declarations and animal and plant health checks will inevitably lead to more cumbersome and costly trade.

- **Minimal provisions on trade in services and capital.** While this is the case for most free trade agreements (FTAs), new barriers to trade in services could have a detrimental impact especially on the UK's service industry, which has recorded a yearly trade surplus with the EU since 2005. However, for sectors of strategic interest, such as financial services, the EU has an interest in encouraging the development of these services within the Single Market.

- **Lack of agreement on mobility**. Several trade sectors, especially in services, rely on the movement of people. In this regard, the UK's wish to end the freedom of movement and the lack of a mobility chapter in the TCA creates new barriers for business travel. This implies severe consequences for some UK service exports, such as the British creative industries. Any significant easement on trade in services would presuppose the free movement of people and regulatory alignment. The two red lines the UK is unwilling to cross.

- **Precarious base**. Agreed relations could end up in a no-deal-like state if either party decides to terminate them, or takes harsh, unilateral remedial measures which could result in its unravelling. The prospect of retaliatory measures, introducing tariffs, potentially terminating (parts) of the TCA, further creates a degree of unpredictability for enterprises and individuals.

- **Persisting uncertainty.** The inclusion of several grace periods, transitional periods and reviews of (parts of) the TCA Agreement, results in further precariousness. The adjustment periods on both energy and fisheries end in 2026, there is a general review of the TCA after five years, and either party can request to end the adjustment periods. In total, there are 13 ways to terminate some or all of the TCA, highlighting the dynamic and uncertain nature of the deal.

- **Lack of time for businesses to adapt to the new rules.** Considering the extremely short time span between the TCA's publication and its entry into force, businesses on both sides had little time or guidance to familiarise themselves with the new rules. This resulted in disruption and even forced some companies to suspend their activities while awaiting further clarity.

Box 1.2: Estimated costs for enterprises due to the TCA

Customs checks in particular are likely to introduce delays at the UK-EU border, adding to costs and disrupting tightly interwoven supply chains, with manufacturers thereby having to stockpile components, which in turn will add to costs. For example, as reported by Bailey (2021), Honda has estimated that every 15-minute delay at the border would add around £850 thousand (around EUR 1 billion) to their costs per year. In the pharmaceutical sector, there are products that have to be delivered within 24 hours or they become unusable. While manufacturers can find ways to mitigate these risks but such actions necessarily imply higher costs.

Costs relating to customs declarations can in fact be substantial. Large manufacturers, such as the auto-component supplier GKN, have said that this would have a significant impact on them. A customs declaration when importing into the UK costs in the region of £35 (EUR 42). To put this into context, Ford alone has stated that it will need to submit 115 000 customs declarations per year for its imported components (e.g. for making engines). The costs could also be significant for manufacturers exporting goods to the EU. The number of customs declarations that UK firms will need to fill out could cost some £15 billion (around EUR 18 billion) per year. The aerospace sector alone would accrue additional costs of around £1.5 billion (EUR 1.8 billion) per year.

Fulfilling the rules of origin requirements will further increase costs by up to £6 billion (EUR 7.2 billion) per year. These rules are critical especially to industries like automotive where an assembled car might be made up from as many as 30 000 'bits' with extended supply chains crossing borders many times. The TCA offers some flexibility on this, at least temporarily. Self-certification on rules of origin has been allowed for a twelve month 'grace period'. Nevertheless, firms will need to start work on gathering the evidence to show that their future exports qualify given that such compliance work is usually done well in advance.

Source: based on Bailey (2021).

From very early in the Withdrawal Agreement negotiations, both the UK and the EU acknowledged the unique circumstances existent in Ireland and the need to safeguard the 1998 Good Friday (Belfast) Agreement, by avoiding a hard border on the island of Ireland and protecting North-South cooperation. Thus, **the Northern Ireland Protocol** was signed in January 2020[17]. This solution avoids a hard border between Ireland and Northern Ireland, while ensuring the integrity of the EU's single market (Institute for Government 2021).

For Northern Ireland–Republic of Ireland trade, the EU's Union Customs Code (customs rules) apply and there are therefore no tariffs or restrictions. Rather than checks taking place along the Irish border, it was agreed that any inspections and document checks would take place between Northern Ireland and Great Britain. Checks on goods take place at Northern Ireland ports to make sure they comply with EU laws. Goods moving directly from Great Britain to Northern Ireland are not subject to a tariff unless the good is "at risk" of being moved into the EU afterwards. Similarly, goods from third countries entering Northern Ireland are subject to the UK tariff, unless they are at risk of being moved to the EU. For goods deemed "at risk", the EU tariff is applied. If the UK tariff is lower, and said goods are proven to have stayed in Northern Ireland, the UK can reimburse traders. Moreover, Northern Ireland is also obliged to align with specific EU rules.

[17] Agreement on the withdrawal of the United Kingdom of Great Britain and Northern Ireland from the European Union and the European Atomic Energy Community, 31 January 2020. A consolidated text was then agreed in December 2020.

In particular, it has to stick to the rules of the EU's Single Market, in areas such as the technical regulation of goods, agricultural and environmental production and regulation, state aid and other areas of north–south co-operation between Northern Ireland and the Republic of Ireland.

First estimates indicate that the Protocol has benefited Ireland's traders (and negatively impacted on Northern Ireland's traders, as detailed in the box below), while imports from Great Britain have slumped[18]. Irish firms, traditionally reliant on imports from Great Britain, switched supply chains to firms in Northern Ireland in 2021. For many enterprises, in fact, it became easier for Dublin to order goods from Belfast than London, and likewise easier for Belfast to order goods from Dublin than London. The value of Irish exports to Northern Ireland jumped 54% in 2021 to a historic high of EUR 3.7 billion, led by EUR 1.3 billion in shipments of food products and live animals.

Trade accelerated even more strongly in the other direction as Northern Ireland exports to the Ireland rose 65% to EUR 3.9 billion, of which +EUR 1 billion (or +43%) in food and animals from 2020, and a tripling of chemicals and pharmaceuticals to EUR 850 million. Moreover, Ireland's exports to Great Britain rose 17% to EUR 14.4 billion, led by chemicals and drugs (+ 40%). By contrast, the value of goods exported from Great Britain to Ireland dropped 13% last year to EUR 15.4 billion, mainly driven by substantial decrease in food, drinks, machinery and other manufactured goods, offset only partially by the surging cost of imported British fuels.

Box 1.3: Estimated costs due to the Northern Ireland Protocol

2021 was a very difficult year for all traders in Northern Ireland, due to lack of time, detail, knowledge and experience which exacerbated companies' adjustment, particularly being in the middle of a pandemic. This resulted in costs and supply chain disruption which harmed performance throughout 2021. Overall, estimates reveal that costs due to the Protocol amount to around £850 million (around EUR 1 billion, i.e. 6% of total trade between Northern Ireland and the UK), including the £250 million a year which the UK government is spending to assist businesses with the impact of the Protocol[19]. Moreover, in the medium term the protocol is forecast to leave Northern Ireland's economy 2.6% smaller compared to a scenario in which the UK had stayed in the EU (Duparc-Portier and Figus 2021). This would amount to £1 billion of foregone output. These impacts could potentially be halved by firms in Northern Ireland sourcing a lot more goods from the EU rather than Great Britain.

[18] Politico, *All-Ireland trade booming in post-Brexit economy*
[19] Esmond Birnie, *The Irish Sea border is costing Northern Ireland £850m a year*, on-line article 12 August 2021.

For Northern Ireland traders, much of 2021 was taken up with trying to understand the new processes, and educating Great Britain and EU suppliers and customers whilst continuing to run their operations. According to surveys by Manufacturing NI (UK in a Changing Europe 2022) 24% of enterprises continue to struggle with the new requirements in the Irish Sea, but this number is significantly down from 41.3% when surveyed in July. Moreover, more than half the firms were affected by the lack of preparedness and willingness of Great Britain suppliers to the Northern Ireland market. Whilst there was an increase in firms reporting business as usual (up to 29% from 23%), 20% report that their Great Britain suppliers are still unwilling to engage with the new formalities in the Irish Sea. While significantly down on July figures (70.2%), this highlights the continuing impact of the lack of preparedness at both a government and business level for the changes introduced in January 2021.

There has been a significant increase in firms reporting sales to Great Britain at expected levels and a significant rise (from 6.4% to 20.4%) in those reporting increased business as a result of the Protocol. Moreover, around half the businesses reported sales to the EU as expected. There was a significant increase in manufacturers reporting business as usual with two thirds reporting that relationships with EU suppliers have settled (up from 45% in April). However, whilst there was a continuation of the decline in firms reporting a marginal negative impact, there was a rise from 2.8% to 9.3% of those reporting a significant drop. The cause is unclear.

Moreover, around 25% of manufacturers see the Protocol as providing them an opportunity now and in the future. However, around 20% would prefer the Protocol to be replaced (with what has not been suggested). It appears that most of these businesses trade exclusively in Northern Ireland or process goods and return them to Great Britain and thus face disruption and costs and without having a recognisably significant EU supply chain.
Overall, it seems that the confusion around the status of Northern Ireland goods and unfettered access in early 2021 has reduced, and that Great Britain customers are increasingly looking to Northern Ireland to supply them as supply chains in GB become strained under the new Brexit import requirements.

1.2 The overall impact on the UK and EU economies

Although it is still too early to clearly assess the overall impact of Brexit, also due to the difficulty in disentangling it from the consequences of covid19, there is general consensus in the literature that **overall costs are estimated to be significantly greater for the UK than for the EU as a whole.** However, the signing of the TCA has undoubtedly led to a better situation for both parties than that forecast in the case of a no agreement.

Even before the UK completed its split from the EU at the end of 2020, Brexit had reduced the size of the UK economy by about 1.5%, according to estimates from the UK Office for Budget Responsibility (2020). In line with its pre-Brexit forecast, since the TCA came into force, the decline in trade volumes could cause a 4% reduction in the size of Britain's economy over the long-run. Forecasts suggest that in a no-deal scenario the UK GDP would be up to 2% lower[20].

A clearer picture of the potential effects of the TCA is provided by a study published in December 2021 by the OECD, based on the methodology developed in OECD (2020). By quantifying the trade impact, in the UK and in EU countries, following the UK's exit from the Single Market, the analysis simulates the medium-term effects on UK and EU GDP considering three scenarios:

- the EU and the UK agree on a full free trade agreement (FTA), with no changes regarding the free movement of people;
- an FTA combined with services regulations and ending of the free movement of people for EU nationals into the UK (i.e. as the TCA);
- the previous scenario combined with some service regulatory liberalisation in the UK.

The findings suggest that a full FTA could lead to a fall of about 6.3% in UK exports and 8.1% in UK imports in the medium term, compared to staying in the Single Market. The overall output loss would amount to 3.7%, less than that in a no-deal situation, but still significant especially as the scenarios in the OECD study omit the productivity channel which could magnify the impact. Ending the free-movement of people for EU nationals is expected to bring additional costs to the services economy, with output losses reaching 4.4%. By contrast, service liberalisation would help to mitigate the trade losses from leaving the Single Market, on the trade side, but only to a limited extent, causing a GPD loss of 3.3%.

Table 1.1: Brexit impact on UK and EU GDP, difference to baseline (%)

	FTA	+ end of free movement of people	+ further services liberalisation
UK	-3.7	-4.4	-3.3
EU	-0.4	-0.6	-0.5

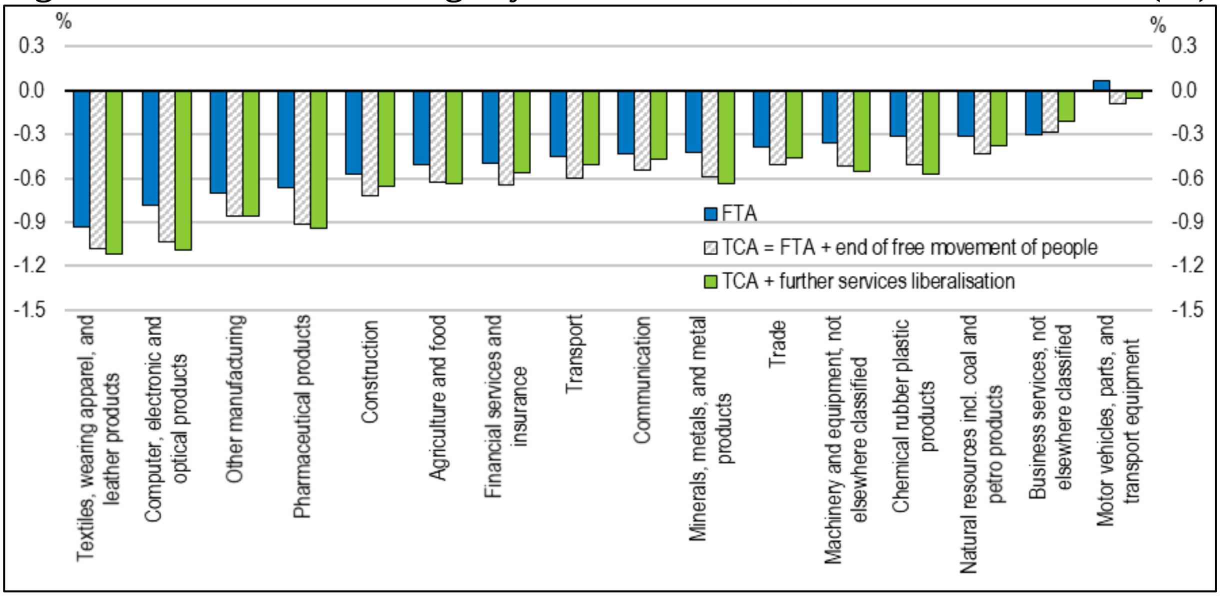
Source: reproduced from OECD (2021).

[20] See Harari (2020) for a complete review.

In terms of sectors, higher output losses are envisioned in motor vehicles (-9.6%), textiles (-6.4%), computer and electronics (-5%), machinery and equipment (-3.9%), and chemical and plastic products (3.8%). Output losses in the services sectors would range from 2 to 7%, with losses above 3% reported in key sectors, such as finances, business services, communications and construction. The North East and North Midland of England and Wales, highly specialised in manufacturing exports could be particularly affected by the expected fall in manufacturing trade in the move to an FTA. London and South England are the regions most exposed to a disruption in trade in services as they have large employment shares in service sector industries, such as financial intermediation.

For the EU economy, a full FTA in place would cause a decline in GDP of 0.4% in the medium-term, in line with other Brexit studies. Ending the free movement of people is expected to deepen output loss by 0.2% (i.e. the TCA could reduce EU GDP by 0.6%). A multilateral services liberalisation by the UK could slightly mitigate the negative effects of restricting bilateral services trade between the two parts. The extent to which individual EU Member States may be impacted could vary markedly, ranging from -0.1% in Romania to -2.2% in Ireland. Not surprisingly, EU member states with strong UK trade relations (Ireland, Luxembourg, Denmark, Belgium, Sweden), particularly in economically important sectors, could experience larger declines in both output and trade.

Figure 1.1: Production change by sector in the EU, difference to baseline (%)



Source: reproduced from OECD (2021), p.22.

Production in the EU could decline marginally in almost all sectors. The decrease stems from reduced demand for EU exports in the UK market. With overall output declining in the UK in the various scenarios, there is less demand for goods and services both imported and domestic. Moreover, the increase in the cost of imported intermediate inputs from the UK into the EU27 could increase the price of intermediate goods and services used in production. The most affected sectors could likely be textile (-0.9% in the FTA scenario), computers (-0.7%) and pharmaceuticals (-0.6%). The services sector could also experience decreases in production ranging from 0.3% (business services) to 1% (public services) in the medium term under the FTA scenario.

The analysis conducted by De Lyon and Dhingra (2021) underlined the fact that as most of the UK trade is for products used as inputs in production, with the increased costs due to Brexit, the costs of inputs have increased, resulting in firms becoming less cost-efficient. According to the study, around 33% of firms reported that Brexit affected their costs or prices according to the analysis. Literature also shows that workers in those industries more exposed to the increasing costs of intermediate inputs, also experienced a fall in wages and a reduction in training following the sterling depreciation after the Brexit referendum (Costa, Dhingra and Machin, 2019). The impact of Brexit could therefore also have significant **effects on workers and citizens' welfare, especially in the UK**. In a study by Bertelsmann Stiftung (2019), the aggregate yearly welfare losses for the UK would amount from EUR 32 billion (soft Brexit) to EUR 57 billion (hard Brexit), which translates into an average loss of between EUR 500 and EUR 873 per capita. As for EU countries, the relative welfare losses are stronger the nearer a country is to the UK. Ireland, for instance, is projected to lose about EUR 720 of income (per capita) yearly in a hard Brexit and about EUR 400 in a soft Brexit scenario. In absolute aggregate terms, welfare losses are also severe elsewhere, especially in Germany (EUR 10 billion annually, with Oberbayern, Dusseldorf, Cologne, Holstein and Bremen most affected) and France (about EUR 8 billion, with the northern regions particularly hard hit), with the per capita losses for both countries being in the range of EUR 115-120 per year.

Box 1.4: The potential impact on employment in Ireland, Germany and the Netherlands

According to the analysis by IGEES published in October 2021 (IGEES 2021) on employment in **Ireland**, the sectors most severely affected by Brexit following the TCA are agriculture (all sub-sectors and 106 800 people employed), financial services (91% of employment, or 104 900 peoples), and industry (23% of employment, or 64 900 people). The sectors most moderately affected include 100% of employment in administrative services, ICT, and professional services, 85% in transport and 20% in industry. At 21%, severely affected sectors had the highest share of employed individuals who had, at most, a lower secondary education.

Moreover, severely affected sectors range from 9% in Dublin to 17% in the Border, and other regions with relatively high shares include the South-East and Midlands (15% each). Moderately affected sectors range from 16% in the Border to 31% in Dublin; other regions with relatively high shares included the South-West and Mid-East (21% each).

In **Germany** around 188 000 employees in the manufacturing sector can be directly attributed to exports to the UK (IFW 2021). The largest proportion is in the large, industrially rich German states, including 48.000 employees in Bavaria alone. The relative weight of this employment is much higher in smaller states such as the Saarland or Bremen, where the corresponding share of industrial employment is at 5.4% and 4.7% respectively, against the national average of just under 3 percent. In addition, there are employees in supplier industries who are also indirectly dependent on exports to the UK. At the sector level, the automotive industry (Bavaria and Baden-Württemberg) and mechanical engineering (North Rhine-Westphalia) account for almost 50% of industrial employment dependent on exports to the UK. In the Saarland 12% of automotive employees work for exports to the UK.

In **the Netherlands**. because of Brexit, the decreasing trade with the UK, could lead to a reduction in GDP level in 2030 from 0.9% to 1.5% lower (EIR 8 - 13.3 billion of income loss). Specifically, agricultural sector in the provinces of Zeeland and Flevoland may be negatively affected by the increase of trade costs. Moreover, the loss of operating space in the North Sea will also negatively affect the Dutch vessels involved in fisheries, with a potential loss of EUR 25 million in 2025 compared to 2019. However, the costs due to the Brexit are being partially compensated by the increased attractiveness of the Dutch capital market and financial sector for companies relocating operations due to Brexit (Fransman and Bakker 2021). Since the referendum in 2016, 218 companies have opted for the Netherlands, of which 78 again made the (partial) move in 2020[21]. For example, Snag Tights, Candy Hero and the Commonwealth Bank of Australia chose the Netherlands because of Brexit. These 218 companies together are expected to generate 6 000 jobs and EUR 544 in investments in the first three years after arrival.

[21] Invest in Holland, *Coronavirus and Brexit impact the arrival of foreign companies to the Netherlands in 2020*, on-line article 18 February 2021.

There is also evidence that Brexit has increased UK regional disparities (see for instance Billing *et al.* 2019, Thissen *et al.* 2020, and Bhattacharjee *et al.* 2020), with the poorest regions in the UK losing the EU cohesion resources. One additional negative effect of Brexit is in fact the demise of the EU Cohesion Policy in the UK, which undoubtedly contributed positively to more UK disadvantaged territories and drove local economic development trajectories (see Giordano 2020 for a complete review). **The TCA gives the UK access to five EU funding programmes**: Horizon Europe, the Euratom nuclear research programme, the ITER project, the earth monitoring project Copernicus, and the EU satellite surveillance and tracking services. The UK government will continue to make a financial contribution to the EU budget in exchange for ongoing involvement in these programmes. In addition, the TCA specifies that the conditions agreed upon for these five programmes do not apply to any of the European Territorial Cooperation programmes, i.e. those programmes that are part of the European cohesion and structural policy, namely Interreg, URBACT and ESPON. The UK will however stay in the current Interreg programmes (with 258 ongoing projects) until the end of the whole programming period. Lastly, the UK has chosen not to be part of the Erasmus+ programme supporting education, training, youth and sport in Europe (see section on human capital for detail).

In the period 2021-2027, the UK will participate in the Peace Plus Programme, with a financial commitment of about EUR 1.14 billion, to which the UK will provide around EUR 850 million. The Programme will support social, economic, and regional stability in Northern Ireland and the border counties of Ireland (Counties Cavan, Donegal, Leitrim, Louth, Monaghan and Sligo). It will also introduce funds for small grants, to ensure easier access for community groups and smaller organisations.

Box 1.5: The cost of leaving the EU Cohesion Policy for the UK

An analysis conducted by the Conference of Peripheral Maritime Regions at the beginning of 2019 (CPMR-CRPM 2019), which underlines that many areas in the UK are falling behind the EU average and regional inequalities in the UK remain strikingly high[22], estimated that had the UK remained in the EU, it would be entitled to about EUR 13 billion in regional development funding (under the EU Cohesion Policy) for the 2021-2027 period. This would represent a 22% increase compared to the current period covering 2014 to 2020.

The worsening level of regional disparities in the UK in recent years also plays a large part in explaining the significant differences in aid intensity (e.g funds per capita) from the Cohesion Policy from one area to another. Cornwall and

[22] Based on Eurostat data, the difference between Inner London, the richest NUTS II region in the UK with a regional GDP average of 614% of the EU average, and West Wales and the Valleys, the UK's poorest region with a regional GDP of 68% of the EU average, is particularly striking and a unique case in Europe.

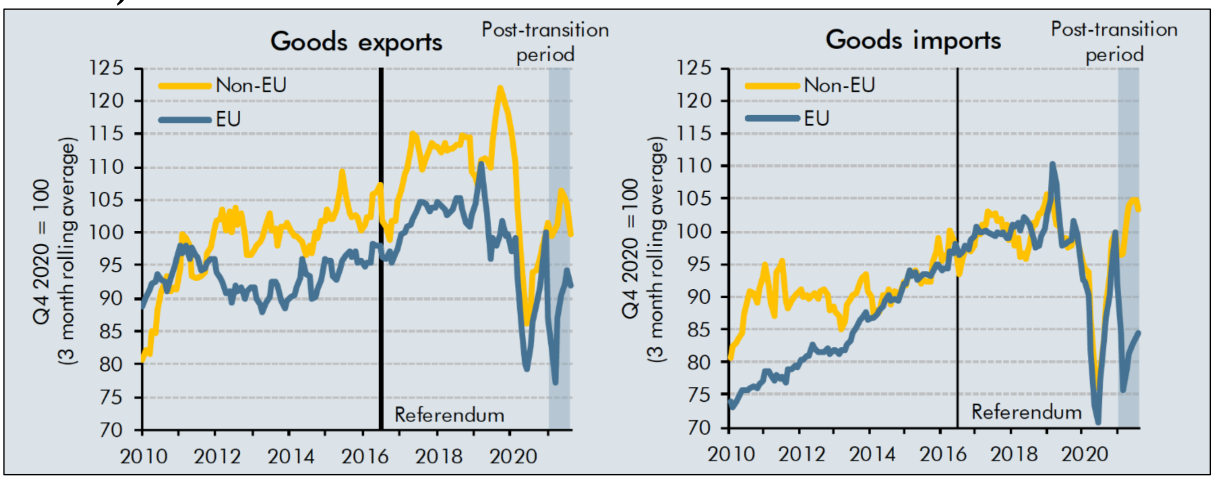
the Isles of Scilly, and West Wales and the Valleys – the two regions in the UK currently classed as 'less developed regions' – would still stand to receive a significant share of the UK allocation of Cohesion Policy. Three additional areas (South Yorkshire, Tees Valley & Durham, and Lincolnshire) would become less developed regions for the post-2020 period. All five of these regions would stand to receive EU support in excess of EUR 500 per capita for the seven-year period.

1.3 The impact on trade: the latest estimates

The principal impact of Brexit will be felt through international trade. For this reason, the next chapter of this report is entirely dedicated to the analysis of the changing trade flows between EU Member States and the UK and the potential exposure of EU regions to the effects of Brexit. Here in this section, the latest estimates on the TCA effects on EU-UK trade are briefly illustrated.

The data provided by the UK Treasury (Office for Budget Responsibility 2021) indicates that UK-EU goods trade volumes fell sharply after the TCA came into effect and remain below their pre-Brexit (and pre-pandemic) levels in 2019. UK goods exports to the EU and imports from the EU fell by 45% and 30% respectively in January 2021, greater than their fall early in the pandemic. Moreover, while goods trade with the rest of the world experienced similarly sharp falls at the start of the pandemic, in August it had recovered to 7% below the average 2019 levels whereas total goods trade with the EU remained down 15%. Moreover, the outlook shows that UK trade was lowered even before trading conditions with the EU changed, potentially due to anticipatory effects and the uncertainty created by the UK referendum.

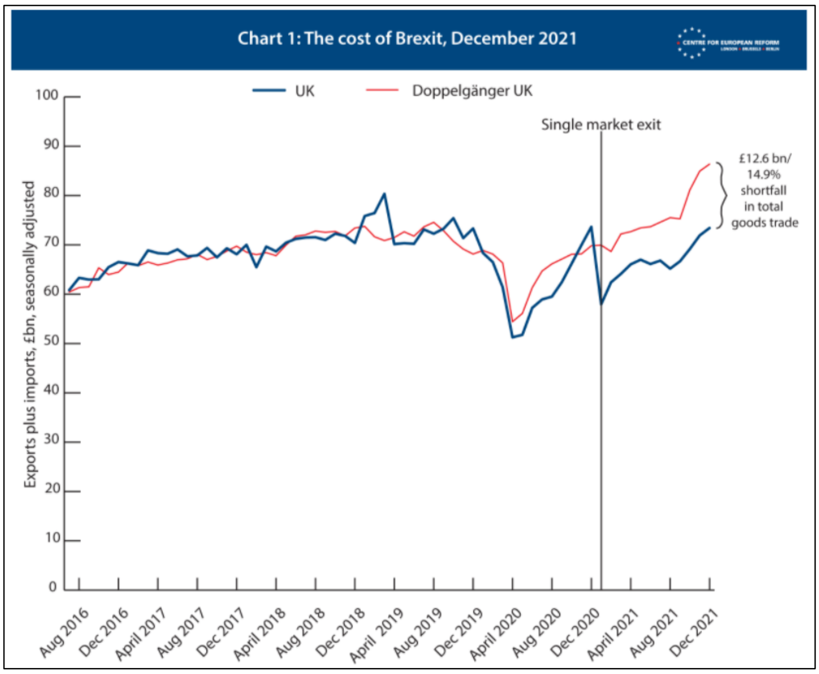
Figure 1.2: EU and non-EU goods trade (exports from and imports to the UK)



Source: Reproduced from Office for Budget Responsibility (2021), p.58.

One of the most up to date attempts to quantify the cost of Brexit is provided by the monthly bulletins published since January 2021 by the Centre for European Reform. The last report in December 2021 (CER 2021*b*) estimated that UK goods trade was 14.9%, or £12.9 billion (around EUR 15.4 billion) lower than it would have been if the UK had stayed in the EU's single market and customs union. The CER's model compares the UK with a 'doppelgänger UK', a group of countries whose trade and other economic data closely matched that of the UK, between the referendum and the end of the transition period[23]. For many months, the model has found that UK goods trade is between 11% and 16% lower as a result of Brexit.

Figure 1.3: The cost of Brexit, December 2021

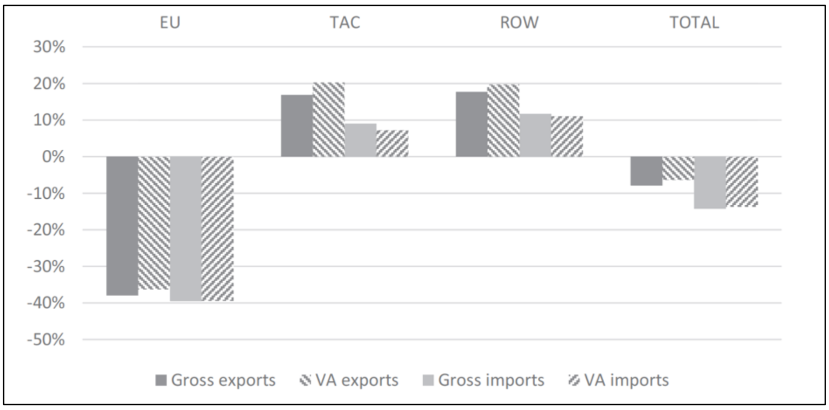


Source: reproduced from CER (2021b).

[23] The doppelgänger is a subset of countries selected from a larger group of 22 advanced economies by an algorithm. The algorithm finds the countries that, when combined, create a doppelgänger UK that has the smallest possible deviation from the real UK data until December 2019, before the pandemic struck. The data includes goods trade, GDP growth, population, inflation, industrial production as a share of output, as well as some other measures. See CER (2021*a*) for detail.

A very recent paper by Fusacchia, Salvitici and Winters (2022) has analysed the percentage changes in UK trade in terms of both gross value and domestic value added (incomes created in the exporter) due to the TCA. UK exports to the EU have declined by over 35% and imports from the EU by almost 40%, while exports to elsewhere have increased by at least 16% and imports by around 10%[24]. Overall, the extra-EU trade flows do not fully compensate for the EU ones, so total UK exports have fallen by 7.9% and imports by 14.2%. All sectors have registered declines in exports of value added to the EU of at least 30% and increases to other markets. The biggest proportionate losses in exports to the EU are predicted to be in food, mostly affected by higher non-tariff measures, and in textiles and motor vehicles, which face relatively large increases in non-tariff measures and the cost of rules of origin. The smallest proportionate fall is in services.

Figure 1.4: Change in UK bilateral imports and exports due to the TCA



Source: reproduced from Fusacchia, Salvitici and Winters (2022), p.40.
Note: TAC= Trade Agreement—Continuity countries; ROW=rest of the world.

Moreover, the study has estimated that the new border costs have reduced allocative efficiency both in the UK and the EU, even if the negative impact is proportionately much larger for the UK than the EU[25]. Concerning terms of trade (i.e. the measure between a country's export prices and its import prices) the related loss relative to 2019 base line values is about $ 31 billion (around EUR 27.4 billion) for the UK, while for the EU it is about $ 5 billion (EUR 4.4 billion). The EU figure is smaller because the shock is proportionately smaller for European enterprises and, therefore, they have less pressure than do UK firms to reduce their prices in order to try to mitigate the losses of exports. Such changes in the terms of trade are straight transfers of welfare from the UK and the EU to other countries. Together, the efficiency and terms of trade losses reduce the amount available for consumption/investment/government by about 2.4% and 0.7% of total UK and EU base-line private consumption respectively. The most affected country in the EU is France, followed by Germany.

[24] For the calculations, authors aggregates the 141 countries into ten regions: the UK; France; Germany; Italy; the remaining members of the EU; the 70 countries (excluding Japan) with which the EU has signed Free Trade Agreements (i.e. the TAC countries); China; Japan; the United States; and the rest of the world (ROW).
[25] UK–EU trade accounts for a larger proportion of UK aggregate production and consumption than of EU aggregate production and consumption, making adjustment in the UK harder and more costly.

Figure 1.5: Welfare changes ($ billion, relative to 2019 base-line values, 2014 prices) and as percentage of private consumption

	Allocative efficiency, $ billion	Terms of trade, $ billion	Total $ billion	Total as % of Consumption
UK	–18.1	–31.2	–49.3	–2.40
Germany	–2.5	–0.7	–3.2	–0.15
Italy	–0.6	–0.3	–0.9	–0.07
France	–1.7	–1.4	–3.1	–0.19
Rest of EU	–7.4	–2.5	–9.9	–0.25
TAC	0.8	7.0	7.8	0.15
Japan	0.0	1.6	1.6	0.06
US	0.6	8.1	8.6	0.07
China	2.5	6.0	8.5	0.18
ROW	2.5	12.6	15.1	0.12

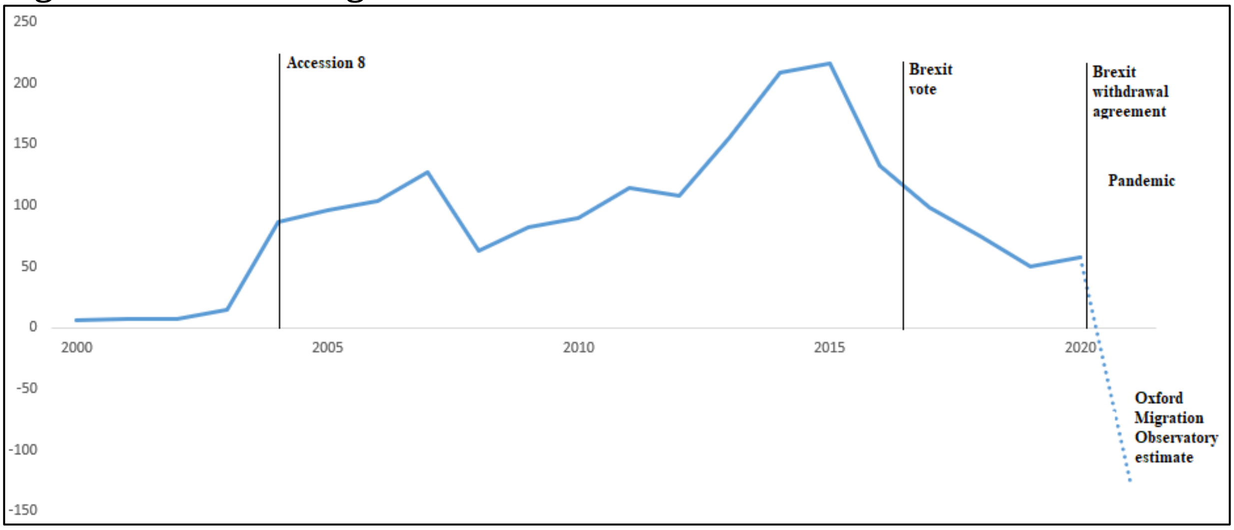
Source: reproduced from Fusacchia, Salvitici and Winters (2022), p.46.

1.4 The impact on human capital

Migration and the freedom of movement were central issues in the UK's referendum on EU membership. The TCA has ended the free movement of people between the EU and the UK. However, in contrast to UK-EU trade, which, prior to the pandemic, remained generally stable after the referendum, the UK-EU migration flows started to decrease following the referendum announcement. For instance, international student applications from EU countries stagnated already in 2016 in contrast to applications from non-EU countries, which rose by 14% (Amuedo-Dorantes and Romiti 2021).

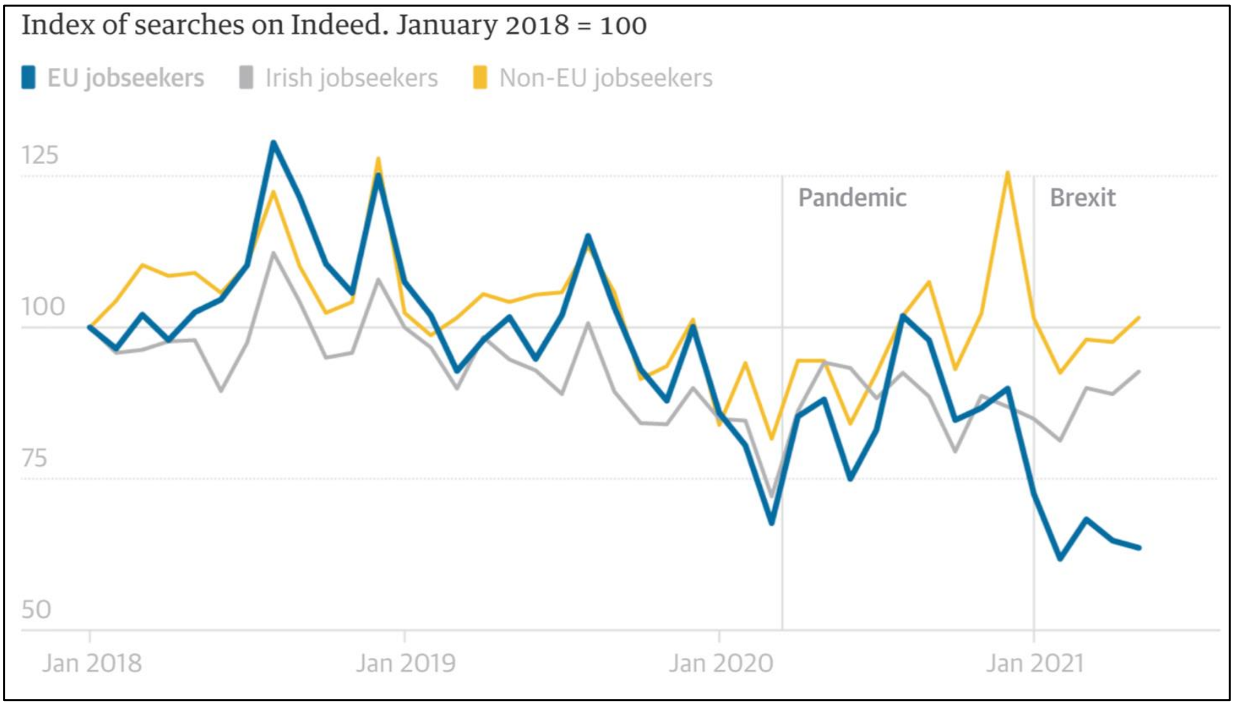
Since the accession to the EU of the ex-Eastern bloc in 2004, often referred as the Accession 8, intra-EU labour mobility has changed radically wherever very large structural differences in wage levels emerged (Portes, 2016). The impact of the membership of the new states increased migration, mainly driven by economic reasons, toward the major economies in the EU, in particular the UK and Ireland. For instance, around 2 million Poles have migrated since 2004 with approximately 700 000 or 35% coming to the UK (Filimonau and Mika, 2019). After Brexit, thousands of workers returned to their countries of origin or moved toward other EU countries. In 2020, EU net migration was negative, with an estimated 94.000 more EU nationals leaving the UK than arriving. EU immigration dropped considerably in 2020 compared with previous years, while the numbers of EU people emigrating held steady. This reduction in immigration is most likely to have been caused by a combination of the impact of both the coronavirus pandemic and Brexit (UK Office for National Statistics, 2021). Most recent figures also highlight that searches by EU-based jobseekers for work in the UK were down by 36% in May 2021 from average levels in 2019[26]. Low-paid jobs in hospitality, the care sector and warehouses recorded the biggest declines at 41%. The sharp decline in interest among EU jobseekers was not replicated in other countries.

Figure 1.6: EU net migration to the UK



Source: reproduced from Oxford Migration Observatory.

Figure 1.7: Searches by EU-based jobseekers for UK jobs since January 2018



Source: reproduced The Guardian, Number of EU citizens seeking work in UK falls 36% since Brexit, study shows, on-line article 17 June 2021..

[26] Based on figures from the jobs website Indeed. See The Guardian, *Number of EU citizens seeking work in UK falls 36% since Brexit, study shows*, on-line article 17 June 2021.

These changes could have a significant economic impact on the UK, where, over the past two decades, migration from the EU has boosted growth, mitigated skill and labour shortages, and benefited public finances. It has also led to rapid population growth in some areas of the country. For the EU countries that have contributed to migration to the UK, there will be both advantages and disadvantages. In the medium to long term, a decrease in the emigration of relatively young and skilled EU workers to the UK, coupled with the return of some of those currently residing in the UK to the EU, may be an economic benefit (Portes 2020). This is particularly true for countries facing severe demographic challenges, like Latvia and Lithuania.

However, while the return of young, educated people could boost the economy of the EU countries, reversing, for instance, the effects of aging and brain drain, there could be possible negative effects regarding the employability of low-skilled returning migrants. Moreover, the economy of the country of origin could lose the remittances that migrant workers send to their home countries, especially in low-income Member States. Countries such as Germany may also be impacted. Over the last decades, the UK and Germany were the primary recipients of EU labour migrants. With Brexit, Germany could be the new destination for EU worker migrants, and it could also benefit from the return of skilled Germans from Britain.

Box 1.6: Impact of returning migrants, the example of Poles

Poles represented the second most common overseas-born population in the UK, with an estimated 682 000 people and the first non-British population with an estimated 696 000 people in 2021. In Poland, returning migrants could face difficulties associated with socioeconomic re-integration. As Polish people in the UK are mostly employed in the hospitality sector and the tourism industry, the low-skills nature of the hospitality labour market could render this process particularly difficult (Filimonau and Mika, 2019).

There could be multiple effects from returning migrants[27]. First, it may increase unemployment in Poland, as returning migrants face difficulties in finding new job opportunities. Moreover, it could decrease the contribution of remittances to the national economy, which corresponds to around EUR 250 million per year from Polish migrants residing in the UK. These represent one fourth of total remittances which contribute to 1% of Poland’s GDP. Finally, the Polish diaspora residing outside the country generates a significant demand for Polish goods, principally agricultural products. In the scenario where large group of Poles leave the UK, this may reduce the demand for Polish exports, again negatively impacting on Poland’s economy.

[27] European Leadership Network, on-line article, *Brexit and its impact on British-Polish relations*, 29 June 2017.

Another effect of Brexit is the end of student and academic mobility between the UK and EU. In 2019, 18% of all academic staff in the UK and more than 26% of the academic staff employed purely for research were EU-citizens" (Zotti, 2021). The analysis conducted by Amuedo-Dorantes and Romiti (2021) found that Brexit has significantly lowered applications originating from EU country members. When compared to international student applications originating from elsewhere in the world, the growth rate of EU applications dropped by 14% following the referendum. More specifically, Brexit appears to have had a larger impact on EU applications in STEM subjects[28] (-17%) compared to non-STEM (-13%). The disparate impact on this group of international students could have significant implications, given the positive externalities of STEM labour on local earnings and productivity, as well as the importance of international talent for innovation and growth. Brexit might be negatively impacting the selectivity of EU students applying to UK universities. Moreover, while UK universities are expected to lose tuition fees[29], higher education institutions in other EU countries could become more attractive. The top alternative destinations for EU students who decide that the UK is too expensive as a result of the Brexit changes are the Netherlands (49%), Germany (36%), France (19%), Ireland (16%), and Sweden (14%)[30].

Moreover, even though EU and UK universities share a long history of cooperation, the UK has also opted out of the new Erasmus+ programme 2021-27 as an associated third country. The UK government decided to implement the Turing Scheme, which will provide funding to students based in the UK, independently from their citizenship to cover the costs of study mobility and work placements/internships. This programme will mirror Erasmus+ principles, allowing any student enrolled at EU universities to participate. However, the Turing Scheme will not be based on reciprocity, and it will not cover the costs of students studying at UK universities (Cherry, 2021). On the other hand, the Irish government announced that students in Northern Ireland can still participate in Erasmus+ via a workaround solution. The Scottish government has expressed its desire to continue to participate, but it is hampered by its lack of legal ability to conclude international agreements in its own right (Cardwell, 2021).

[28] These include medicine, subjects allied to medicine, biological sciences, veterinary science, physical sciences, mathematical science, computer science, engineering and technology, and architecture, building and planning.

[29] The new rules may result in UK universities losing £62.5 million (EUR 74.7 million) per year in tuition fees, as a result of losing more than half (57%) of their first-year EU students (Department for Education, 2021).

[30] ICEF Monitor, *New analysis projects Brexit's impact on EU enrolment in British higher education*, on-line article, 3 March 2021.

1.5 The impact on public procurement and competition framework

Before Brexit, the UK was part of the EU Public Procurement (PP) law[31]. While substantive obligations ensured the functioning of the internal market for public contracts, the EU legislative framework also created a mechanism for gathering and sharing of information such as the Single Market Scoreboard or e-Certis. Today, the new rules on PP between the EU and the UK are set out in Title VI of the TCA to guarantee each party's suppliers access to increased opportunities to participate in PP and to enhance the transparency of the procedures.

The TCA mostly refers to the Agreement on Government Procurement (GPA) of the World Trade Organisation (WTO), which guarantees a high level of continuity in the EU-UK relationship as both parties are GPA members (the UK since 1 January 2021). The TCA indeed creates GPA+ market access, as detailed in Section B of Annex PPROC-1, including a range of services but with the explicit exclusion of healthcare. The high level of mutual access to PP markets can only be subjected to future modifications, but not to reductions, while the newly created Trade Specialised Committee (TSC) on PP will deal with any disputes regarding market access. The Committee addresses the matters of Title VI of the TCA, and is the primary forum to exchange information, discuss best practices and share implementation experience. It is also responsible for monitoring the implementation of Title VI and discussing technical issues (Fella, 2021).

The UK Government has attempted to keep the regulatory status quo on PP as unchanged as possible (Sánchez-Graells 2021). However, they have introduced secondary rules to replace EU-wide platforms, and to reallocate powers and functions previously assigned to the European Commission. The Public Procurement (EU Exit) Regulations 2020 included the creation of a UK e-notification service (Find a Tender[32]) to replace the current EU-wide publication of procurement notices through the Official Journal of the EU (TED), and the reallocation of the powers and functions of the European Commission to the Minister for the Cabinet Office. The key operational change is the decoupling of the UK from e-Certis and the associated system of European Single Procurement Document (ESPD). The effect could be to raise the administrative costs of EU companies seeking to tender for contracts in the UK and UK companies wanting to tender for contracts in the rest of the EU.

[31] Directive 2014/24/EU on public procurement, and Directive 2014/25/EU on procurement by entities operating in the water, energy, transport and postal services sectors.
[32] https://www.find-tender.service.gov.uk/Search

Moreover, the value thresholds determining coverage have generally been revised with effect from 1 January 2022 (Sánchez-Graells 2022). The new thresholds are slightly higher than those derived from the previous transposition of the EU rules[33] but the revision of the thresholds has made them inclusive of VAT, moving away from the 'net of VAT' approach under EU law. This, in effect, lowers the thresholds for public contracts subject to VAT and will, thus, have the effect of expanding coverage. However, unlike the GPA—which does not apply to contracts below certain value thresholds—the TCA provides that, when procuring a contract below the relevant financial threshold, the procuring party must treat EU or UK suppliers no less favourably than suppliers from its own country (unless covered by specific GPA exceptions such as security).

However, overall, other (major) changes remain a relatively distant prospect on the UK procurement regulation horizon. The next steps in the process of review of the procurement rulebook leading to expected new legislation will 'not be earlier than 2023'. The Green Paper published in December 2020[34] signalled its intention to simplify the existing regulatory framework into a single set of rules for all public contract awards. In doing so, the UK proposes, for example, to reduce the procurement procedures available to buyers from seven to three[35]. Other proposals included in the Green Paper are:

- basing the evaluation of bids on the Most Advantageous Tender (MAT) rather than the most economically advantageous to encourage contracting authorities to take a broader view, including social value as part of the quality assessment;
- expanding the grounds on which bidders may be excluded for poor past performance;
- establishing "crisis" as a new ground for using the limited tendering procedure.

There are also plans to reform the legal review system as well as to tackle claims over minor issues that delay contract awards, such as a new fast track system and capping the level of damages available to successful bid protest complainants to a maximum amount equal to legal fees plus 1.5 times their bid costs.

[33] However, it should be noted that EU thresholds were also revised upwards with effect from 1 January 2022 by Commission Delegated Regulation (EU) 2021/1952 of 10 November 2021 [2021] OJ L398/23.

[34] Cabinet Office (2020), *Transforming public procurement*, December 2020.

[35] A new competitive, flexible procedure that gives buyers maximum freedom to negotiate and innovate to get the best from the private, charity, and social enterprise sectors; the (existing) open procedure that buyers can use for simpler, "off the shelf" competitions (expanding its availability to suitable defence and security procurements for which this procedure is currently not available); a "limited tendering procedure", which will be effectively equivalent to the existing "negotiated procedure without prior publication".

UK competition policy has largely remained unchanged since 31 December 2020 except in the highly contentious area of state aid rules (Stehpan 2021). The TCA contains an obligation to maintain a competition law regime in relation to anti-competitive agreements, abuse of dominance and anti-competitive mergers. The key difference is that the work of the Competition and Markets Authority (CMA)[36] includes all anticompetitive enforcement action and merger regulation work that has both a UK and a EU dimension. As a result, businesses operating in both the EU and the UK have to comply with two regulatory regimes, where previously cases were dealt with either by the European Commission or the CMA, but never both. The TCA also contains detailed provisions on state aid that require the UK to adopt a domestic subsidy control regime and a relevant authority for overseeing the regime.

The system of digital and data regulation in the UK remained largely unchanged on 1 January 2021 (Fletcher 2021). The two primary pieces of EU legislation, the e-Commerce Directive and the GDPR regulation have not been modified in the UK. EEA (European Economic Area) firms that provide online services in the UK, are exempted from some aspects of domestic UK law, so long as they follow the relevant rules in the EEA country in which they are established. However, from 1 January 2021, such firms are fully bound by UK legislation, while UK firms will no longer benefit from this exemption when providing services into the EU. For financial services, this has the additional implication that EU-based providers active in the UK will need to be directly authorised in the UK rather than relying on home state authorisation. To ease the transition, the Financial Conduct Authority (FCA) has adopted a Temporary Permissions Regime, which will enable firms to remain active in the UK while they negotiate authorisation. UK-based providers active in the EU will likewise need to seek direct authorisation in an EU Member State.

1.6 Mitigation measures: the Brexit Adjustment Reserve

To counter unforeseen and adverse consequences of Brexit in Member States, the European Council agreed in July 2020 to create a Brexit Adjustment Reserve (BAR), formally adopted in October 2021 with Regulation 2021/1755[37].

The BAR has a budget of nearly EUR 5.4 billion (in current prices) outside the ceilings of the EU's multiannual financial framework to support public expenditure incurred by Member States from 1 January 2020 to 31 December

[36] The CMA is the competition regulator in UK, a non-ministerial government department responsible for strengthening business competition and preventing and reducing anti-competitive activities.
[37] Regulation (EU) 2021/1755 of the European Parliament and of the Council of 6 October 2021 establishing the Brexit Adjustment Reserve.

2023 for eligible measures, including support for affected sectors, training, and new border facilities. Funding is available for all Member States, distributed in several allocation tranches, with 80% of the resources to be allocated in the form of pre-financing, to be disbursed in 2021, 2022 and 2023, and the remainder to be made available in 2025, where applicable. The first pre application requires simple notification which must contain the body management in charge of the BAR, the account number for money transfer and the control system that is intended to be put in charge. Moreover, in September 2024, Member States must present their justification, the rational and the impact of the BAR. If they do not justify the expenditure, they have to give the money back.

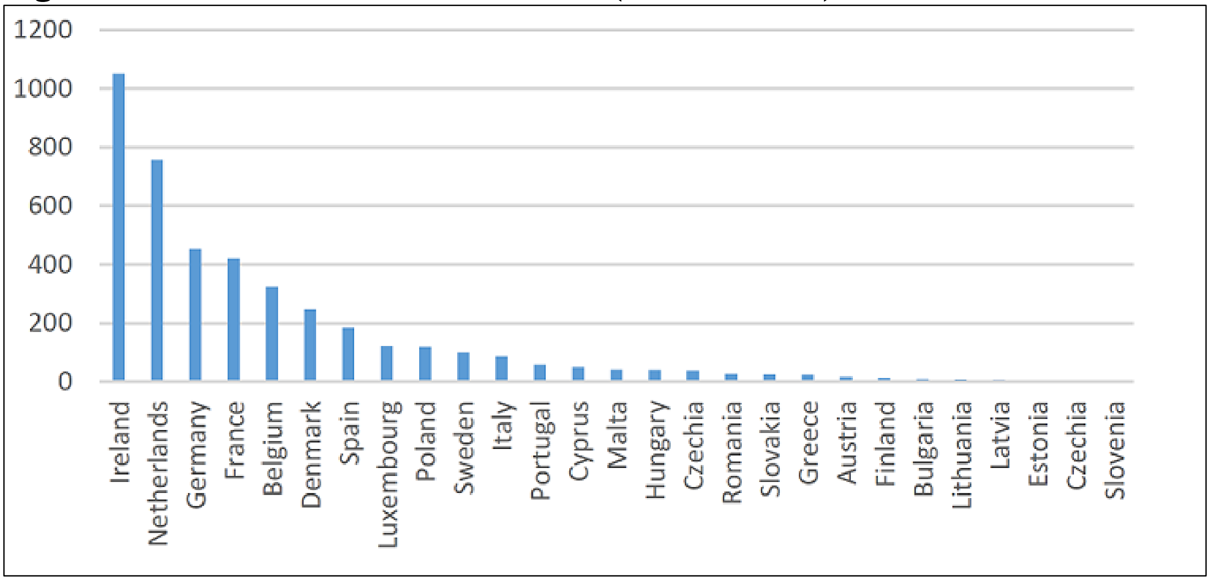
Each country's allocation is calculated based on the importance of its trade with the UK and, where applicable, on the importance of fisheries in the UK's exclusive economic zone (EEZ) and the size of the population of maritime border regions with the UK. Each Member State's share of the pre-financing amount available is calculated as the sum of a factor linked to the fish caught in the waters that belong to the UK EEZ (used to allocate EUR 600 million) and a factor linked to trade with the UK (EUR 3.4 billion).

In January 2021, the European Commission published a detailed breakdown by Member State of the pre-financing allocation under the BAR (European Commission, 2021), then approved in October[38]. Ireland, with more than EUR 1 billion, is the largest beneficiary in absolute terms, followed by the Netherlands, France, Germany, and Belgium. Eleven Member States can receive an allocation for fish caught in the UK EEZ: Belgium, Denmark, Germany, Ireland, Spain, France, Lithuania, the Netherlands, Poland, Portugal and Sweden. Denmark will receive the largest amount, with EUR 147.5 million, followed by the Netherlands (EUR 157 million), France (EUR 132 million) and Ireland (EUR 111 million), with these four Member States alone accounting for over 80% of the budget available. In December 2021, the European Commission approved the first two pre-financing applications for Ireland (EUR 920.4 million) and Italy (EUR 116 million). New approvals of more than EUR 2 billion were announced in March 2022 to a group of 12 Member States[39], making available a total of EUR 819.2 million by the end of March 2022 and the rest by April 2023.

[38] Commission Implementing Decision (EU) 2021/1803 of 8 October 2021 setting out the provisional amounts allocated to each Member State from the resources of the Brexit Adjustment Reserve and the minimum amount of support to local and regional coastal communities.

[39] Belgium, Estonia, Spain, France, Croatia, Latvia, Malta, the Netherlands, Austria, Portugal, Romania and Sweden.

Figure 1.8: Allocation under the BAR (EUR million)



Source: reproduced from European Parliament (2021a).

The CoR has welcomed the BAR, even if it has stressed the urgency for LRAs to be more involved in designing and managing the process (European Committee of the Regions 2021*c*). The BAR needs to be more regionally targeted to be truly effective, as also underlined by the CPMR (see CPMR-CRPM 2021). Its regional redesigning is essential not only to mitigate Brexit damages, but also to support conversion and shape new opportunities. The BAR regulation foresees the involvement of LRAs when relevant, but without a clear mandate or specific provisions. Currently, the degree of involvement of LRAs in the strategic use of the BAR seems to be quite limited. There are also some concerns about the amount available, which is considered insufficient for the needs of EU territories.

Overall, the BAR is considered a targeted and a short-term instrument. It is time limited and does not allocate a high level of funding. Fishery was included as this sector is place based and it can hardly move its business. It was a political message, where a small sector was considered highly important for the Commission and the regions. However, the minimum funds allocated to this sector are not particularly high, even if Member States can decide to increase them depending on their objective and goals. Member States have in fact the maximum freedom to decide in which area and sectors the money will be allocated. The beneficiaries can be anyone, specific enterprises, NGOs, individuals. However, one risk that Member States could face is having difficulties in justifying the expenditure, as beneficiaries must demonstrate that they were impacted by Brexit. For example, enterprises that have re-allocated their businesses toward other markets must demonstrate the incurred costs for adjusting their business. Another key issue relates to the fact that Member States are currently involved in the setting-up the new programming period strategic documentation, including the National Recovery and Resilience Plans (NRRPs). The BAR, therefore, is not their priority and it could be perceived as an additional element of complexity and bureaucracy, causing delays in the use of the reserve. Moreover, there is a risk of overlap between EU funds and the BAR and that the BAR is used for scopes not strictly related to the Brexit effects.

Box 1.7: Support for Hungarian SMEs through the BAR

The BAR allocates to Hungary around EUR 60 million, of which EUR 9 million has been dedicated by the Government to support SMEs. In January 2022, the Hungarian Government has published the first call for proposals under the BAR to provide support to Hungarian companies - including large enterprises - to offset the negative economic effects of the Brexit[40]. The condition for obtaining grant is that companies must demonstrate the incurred or expected negative impact due to the Brexit. Losses solely due to the increased administrative burden are not eligible for funding.

Specifically, the Tender defines the following activities as eligible: acquisition of new technological equipment; improvement of energy efficiency in the working environment; software development; marketing activities to countries outside the EU; and cyber security and data protection. Projects financed by the BAR must be completed in 24 months. The amount of aid that can be awarded may not exceed the amount of future losses incurred and likely to be incurred between 1 February 2020 and 31 December 2023 (minimum EUR 8.4 thousand, maximum EUR 5.6 billion). In addition to the amount of damage identified, a lump sum of 2% has been set up to compensate for the increased administrative burden due to Brexit.

[40] Magyar vállalkozások pályázati támogatása az Európai Bizottság Brexit kárenyhítő forrásának (Brexit Adjustment Reserve – Brexit Alkalmazkodási Tartalék - BAR) keretéből.

2 Impact on trade: regions and sectors

This chapter analyses in detail the impact of Brexit on trade flows between the UK and the EU from a regional perspective. In particular, it investigates the impact of the TCA and whether this has produced asymmetric effects across EU regions and sectors. The key aim of the analysis is to identify regional exposure to Brexit effects.

Following and expanding on the methodology developed in the CoR report of 2018, the chapter presents an overview at EU level in section 2.2, identifying the main sectors where the EU economy had a comparative advantage with respect to the UK and investigating whether this changed in 2021 with respect to the pre-Brexit situation. The sections following present an analysis of the most impacted sectors and regions at NUTS2 level.

2.1 Methodological approach

The analysis carried out in this chapter seeks to identify the most heavily impacted European sectors and regions through the use of three indexes.

The first is the Lafay Index (LFI), used to capture **the exposure (to Brexit) of sectors at a national level**. The LFI is an index of specialisation or revealed comparative advantages, which also takes into account the import flows between countries (Lafay 1992). It is normally used to analyse the trade specialisation of a country compared to the rest of the world[41]. In this study, however, the LFI index is used to assess the trade specialisation of each EU Member State compared to the UK. So, instead of using trade flows of a country with the rest of the world, those with the UK are considered. The index is as follows:

$$LFI_{j} = 100\left(\frac{x_j - m_j}{x_j + m_j} - \frac{\sum_{j=1}^{N}(x_j - m_j)}{\sum_{j=1}^{N}(x_j + m_j)}\right)\frac{x_j + m_j}{\sum_{j=1}^{N}(x_j + m_j)}$$

Where x_j is the country exports of product *j* towards the UK, *m* is the country imports from the UK and *N* is the number of sectors. The LFI captures the difference between each item's normalised trade balance and the overall normalised trade balance multiplied by the share of each traded product over total trade. A positive value of the LFI implies a comparative advantage of a country in a specific sector compared to the UK, while a negative value of the LFI implies a higher reliance on imports from the UK in these specific sectors or that the

[41] See for instance Zaghini (2003), Alessandrini, Fattouh and Scaramozzino (2007), and Matkovski *et al.* (2021).

sectoral trade balance is lower than the overall country trade balance. By construction, the sum of LFI across *j* is equal to zero.

Box 2.1: Key advantages of the LFI

The advantages of using this index are numerous:

• By also taking imports into account, the LFI allows one to control for intra-industry trade and re-export flows, and therefore it is more accurate than the traditional well-known Balassa index (Revealed Comparative Advantages index, based only on exports). As Brexit and the TCA could also have an impact on trade flows from the UK to the EU, it is fundamental to also consider the import side to better assess the UK-EU trade links and understand the supply chains. In order to correctly assess the intra-industry trade, it is necessary to utilise sufficiently disaggregated data, therefore the analysis has been conducted at a 2-digit level of the Harmonised System (HS nomenclature)[42], which includes 97 sectors.

• It also controls for distortions induced by macroeconomic fluctuations, which can affect the magnitude of trade flows especially in the short run. As the analysis is concentrated on monthly data for 2020 and 2021, this characteristic of the index is particularly appropriate for the study scope.

• The LFI takes into account the above effects by considering the difference between each item's normalised trade balance and the overall normalised trade balance. As it is applied in consideration to trade flows with the UK, it gives either the measure of the trade specialisation of a EU27 country with respect to the UK (for positive values of the difference) or, for negative values, the trade specialisation of the UK with respect to that country. As the LFI weights each product's contribution according to the respective importance in trade, the index also captures the importance of that sector to the overall trade between a country and the UK.

The second index assesses **the exposure of the EU regions to Brexit** using the top sectors according to the EU LFI. Similarly to the approach adopted in the 2018 CoR study, regional data regarding the level of employment in these sectors are then used. These have been downloaded from Eurostat which provides data up to 2019 at NUTS2 level disaggregated according to the European NACE sectoral classifications5. To conduct the analysis a correspondence table between the HS and NACE has been designed, based on a desk analysis of the two classifications

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[42] The Harmonized Commodity Description and Coding System generally referred to as "Harmonized System" or simply "HS" is a multipurpose international product nomenclature developed by the World Customs Organization (WCO). For more information: http://www.wcoomd.org/en/topics/nomenclature/overview/what-is-the-harmonized-system.aspx

and current literature on the theme. Each region is classified as ‘at risk’ (i.e. more exposed) if its share of employment in the selected sectors is higher than the national average, i.e. a value of the index >1 implies a heavier reliance on the sector in the region with respect to the national level. Section 2.3 of this chapter analyses in detail the most exposed regions according to the top sectors of specialisation of the EU. Moreover, more regional detailed data by Member State are shown in Annex I, where each regional exposure is compared to the national ranking identified by the LFI.

Finally, the last index captures the **degree of sectoral regional differentiation.** This is the Herfindahl Hirschman Index (HHI), calculated at NUTS2 level using data from Eurostat, constructed as follows:

$$HHI = \sum_{i=1}^{N} s_i^2$$

Where s_i is the share of employees in sector *i* out of the total manufacturing labour force of the region, and N is the number of sectors. The index ranges from 1/N to one, where N is the number of sectors in the region. Higher values in the HHI imply more specialisation (i.e. less differentiation) in the region. To have a clearer picture, the regional HHI is compared to the national HHI, in order to classify regions according to them being less differentiated (i.e. higher values in the HHI) or less specialised (i.e. lower values in the HHI) economies with respect to the national average. The HHI, used in combination with the regional exposure index, offers a more complete picture of the regional risk associated with the UK’s withdrawal. For instance, a region exposed in three sectors with a high HHI (i.e. higher than national average) is more at risk than a region exposed in three sectors with a lower HHI, since its economy is less differentiated and most of its workforce is employed in those most exposed sectors.

Box 2.2: Key limitations of the methodology

The methodological approach used in this study is based on the fact that there are no official data on regional EU trade flows. Some issues may therefore affect comparability between Member States and across regions and sectors, which should be considered when interpreting the analysis results:

• Brexit occurred during the covid19 pandemic, which caused a massive shock to UK, EU and global trade volumes in both 2020 and 2021, making it difficult to disentangle the separate effects of the UK’s withdrawal from those of the pandemic.

• The terms of the TCA are yet to be implemented in full, and trade barriers could rise further as more of the deal comes into force. The full effect of Brexit and higher trade barriers will probably take several years to come through, with businesses needing considerable time to adjust. The analysis proposed in this study therefore focuses on the short-term effects, and the real regional exposure should be assessed more accurately in the upcoming years, when the impact of the pandemic, hopefully, disappears.

• Trade data tend to be relatively volatile and are revised frequently, rendering any initial conclusions subject to change as the data are revised. For instance, as the UK became an extra-EU country in January 2021, the way in which Eurostat considers it changed. This has various implications for the collection of data (for instance, concerning re-exports).

• Trade flows are also subject to monetary variables (such as price fluctuations or exchange rate dynamics), which have not been considered in the current analysis. These could over-estimate or under-estimate the potential impact on trade flows across Member States.

• Finally, regional specialisation does not automatically imply that a region is open to international trade, and more specifically, to trade with the UK. The aim of the analysis is to offer an overview on which sectors and regions could, potentially, be more exposed to Brexit effects, as a basis for future research and assessment. It is also true, however, that supply chains, especially for some sectors such as vehicles, are extremely complex and articulated across European manufacturing. A non-exporter region could in fact produce semi-manufactured products used by another exporter region, resulting in both direct and indirect effects which are very challenging to depict. The 'macro' analysis in this report therefore needs to be complemented by a 'micro' analysis, which is provided through the eight case studies described in chapter 3 in order to offer a more complete picture.

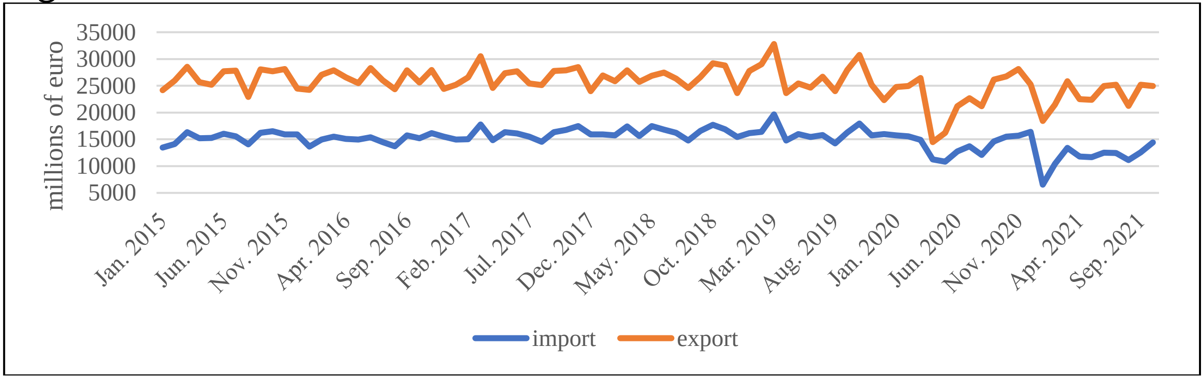
• The data on trade flows used in this report only consider the manufacturing sector. Flows concerning services, for which data collection is more challenging, have not been considered, thus potentially underestimating the effects of Brexit on the EU regional economy.

2.2 The trade specialisation of the EU *vs* the UK

From 2015 (i.e. before the Brexit referendum) and up to the end of 2019, EU trade with the UK was rather constant, with cyclical fluctuations between EUR 25 billion and EUR 30 billion in EU exports and between EUR 15 billion and EUR 17 billion in EU imports (figure 2.1). The situation changed significantly at the beginning of 2020 with the first wave of the pandemic and between the end of

2020 and beginning of 2021 with the third wave. In both cases, trade with the UK experienced a sharp drop.

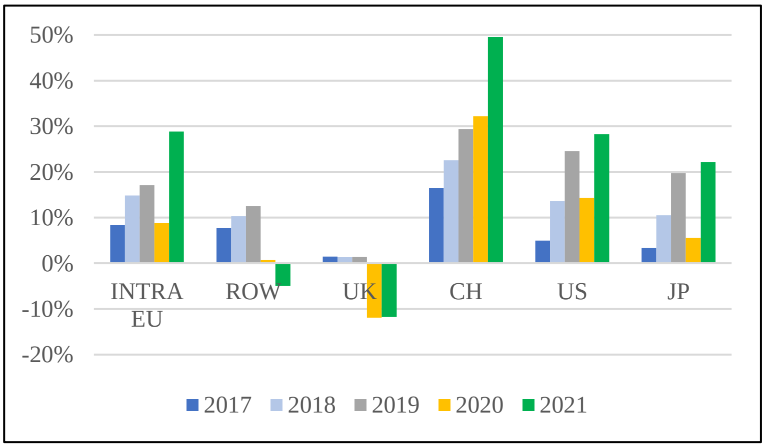
Figure 2.1: EU trade with the UK since 2015



Source: own elaboration based on Eurostat.

In 2021, in particular, imports from the UK fell to their lowest value since 2015, at EUR 6.5 billion in January (nearly -EUR 10 billion with respect to December 2020), while the drop in exports from EUR 28.1 billion in December 2020 to EUR 18.5 billion in January 2021 was less accentuated compared to the first wave of the pandemic. However, the third wave began in autumn 2020, and in those months trade between the EU and the UK increased significantly. It seems therefore that the TCA has played a more significant role, especially in imports, while the effects of the pandemic appear to be less significant.

Figure 2.2: EU total exports change compared to 2016, main destinations

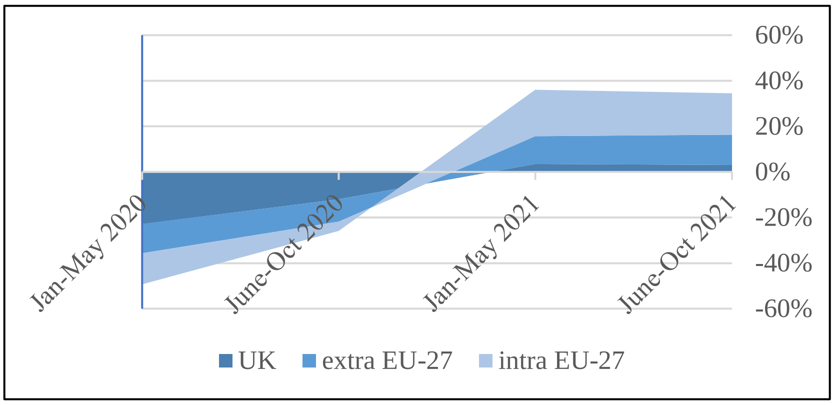


Source: own elaboration based on Eurostat
Note: ROW=rest of the world; US=United States; CH=China; JP=Japan. 2021 is up to October

Looking at yearly changes compared to 2016 (the year of the Brexit referendum), EU exports to the UK are considerably different from those to the other main EU-27 trade partners (figure 2.2). The level of exports to the UK in the pre-pandemic years, up to 2019, experienced only a slight increase (1%), while intra-EU trade grew between 8% and 17% during the same period. The UK was also significantly affected in the years of the pandemic, with a decrease in export of 12% both in 2020 and 2021. On the other hand, in the two years of the pandemic, intra-EU trade increased by 9% in 2020 and 29% in 2021. It is thus worth noting that exports towards the main trade partners were not affected by the impact of the pandemic.

A more detailed overview of the trade dynamics in 2020 and 2021 is offered by figure 2.3, which compares semester changes with respect to the same period in the previous year. The figure highlights that, while intra-EU exports and exports towards extra-EU countries recovered completely in 2021 from the significant drop experienced in 2020, exports to the UK in 2021 did not counterbalance the loss occurred in the previous year. This may suggest that the TCA has impacted on EU-UK trade, and that, at the same time, EU enterprises, overall, have been able to re-orientate their exports towards new markets to compensate for the decrease in trade relations with the UK.

Figure 2.3: EU exports change in 2020 vs 2019 and in 2021 vs 2020



Source: own elaboration based on Eurostat

Looking at the top specialisations in the EU economy with respect to the UK in 2021 according to the LFI (table 2.1), these are concentrated around three main manufacturing sectors: vehicles and parts thereof; electrical machinery and equipment; furniture and articles of wood (two separate sectors according to the HS nomenclature, but strictly related in the supply chain). The remaining top ten sectors are agri-food related products, such as fruits, vegetables, and meat. In the bottom sectors, i.e. where the weighted EU trade balance is more driven by imports from the UK, there are products related to raw materials (iron, steel, and petroleum), chemicals, and aircraft and parts thereof. Moreover, the EU is a net importer of products related to fisheries. Overall, compared to the situation in 2016, the composition of EU trade specialization has experienced only marginal changes, both in the top and bottom sectors. This suggests that, despite the drop in trade flows with the UK experienced in 2020 and 2021, the EU economy has maintained its comparative advantages in the key sectors with respect to the UK.

Table 2.1:Ten top and bottom EU sectors *vs* the UK according to LFI

HS code	Sectors	LFI 2021	LFI rank in 2016
Top sectors			
87	Vehicles and parts thereof	2.11	1
85	Electrical machinery and equipment	1.59	6
44	Wood and articles of wood	0.83	3
94	Furniture	0.49	2
07	Edible vegetables	0.37	5
16	Preparations of meat and fish	0.34	10
20	Preparations of vegetables and fruits	0.34	8
08	Edible fruits and nuts	0.32	9
02	Meat	0.30	4
06	Plants and flowers	0.29	11
Bottom sectors			
28	Inorganic chemical products	-0.24	83
49	Books and newspapers	-0.26	85
32	Paints and colouring matters	-0.26	91
99	Other manufacturing products	-0.30	93
03	Fish and crustaceans	-0.37	90
72	Iron and steel	-0.45	88
38	Other chemical products	-0.49	95
88	Aircraft, spacecraft and parts thereof	-0.93	89
71	Precious metals	-1.23	26
27	Petroleum oils and gas, coal	-4.32	97

Source: own elaboration based on Eurostat.

The following tables show the LFI calculated for each Member State and ranked according to the top 30 and bottom 30 sectors in the EU LFI rank. The tables provide an overview of which Member States contribute to the EU trade specialisation and, broadly, of the supply chain interlinks across EU economies. At the same time, the tables illustrate in which sectors Member States might potentially be more exposed to the effects of Brexit, thereby providing the basis for the analysis of the regional exposure index conducted in section 2.3. In detail:

- In the **vehicles** sectors, the top specialised countries compared to the UK are Germany, France and Spain, where the main European car factories are located. However, a consistent contribution to the sector also comes from Austria and Portugal, and from eastern countries such as the Czech Republic and Slovakia which are specialised in parts and semi-manufacturing items for vehicle production.

- In **electrical machinery and equipment**, most of the EU Member States show a high degree of specialisation. The sector is significantly important for Denmark, Slovenia, Slovakia, Hungary, Croatia, Poland and the Netherlands. However, France, Spain, and Italy, at the top of EU manufacturer economies, show negative LFI values.

- **Wood and articles of wood** is a sector where the Baltic countries, Latvia in particular, as well as Finland and Sweden show the highest degree of specialisation. These countries are also highly specialised in **furniture**, a sector including Italy and Denmark together with most of the eastern European countries, Slovenia, Poland and Romania in particular.

- In relation to **agri-food sectors**, these are remarkably important for Spain (especially for edible fruit and vegetables), Denmark, Ireland and Poland (meat related products), and Greece, Cyprus and Ireland (dairy products).

Looking at the bottom EU sectors, most of the Member States display negative LFI values and are net importers in the majority of sectors. It should be noted, however, that some Member States show high specialisation in some sectors where the EU, overall, is de-specialised compared to the UK. For instance, higher LFI values are recorded by Belgium, Greece, Croatia and Malta in pharmaceutical products, or by Ireland in organic chemicals[43]. Only Estonia, Finland and Ireland are nett exporters of fuel related products to the UK.

[43] Trade dynamics in these sectors, however, have been significantly affected by the pandemic.

Table 2.2: The LFI index by Member State according to the top EU LFI rank in 2021 (first 30 sectors)

SECTOR	European Union	Belgium	Bulgaria	Czechia	Denmark	Germany	Estonia	Ireland	Spain	France	Croatia	Italy	Cyprus	Latvia	Lithuania	Luxembourg	Hungary	Malta	Netherlands	Austria	Poland	Portugal	Romania	Slovenia	Slovakia	Finland	Sweden	Greece
VEHICLES	2,11	-1,53	-6,20	7,64	-2,05	5,86	-2,88	-1,73	5,23	2,56	0,52	-1,74	-13,41	-2,43	-2,60	1,68	-2,03	-2,01	0,01	3,52	-1,41	3,61	-3,50	1,84	9,20	-1,95	-3,45	-7,22
ELECTRICAL MACHINERY AND EQUIP.	1,59	0,30	0,77	0,84	9,21	1,15	-1,12	0,26	-0,19	-0,09	4,88	-0,10	-1,70	-0,76	-1,02	1,50	5,72	1,35	3,98	1,84	2,42	1,44	2,38	7,11	4,75	-0,55	-0,04	2,99
WOOD AND ARTICLES OF WOOD	0,83	0,27	0,45	0,12	0,43	0,35	6,66	1,08	0,43	0,15	1,10	0,17	-0,04	15,36	2,48	1,39	0,19	0,01	0,09	1,33	1,08	0,88	0,74	0,55	0,16	7,78	6,23	0,01
FURNITURE	0,49	-0,02	1,17	0,16	1,13	0,35	4,58	-0,37	0,22	-0,08	1,51	1,58	-0,27	0,12	5,47	-0,72	0,23	0,14	0,12	-0,77	1,93	0,69	2,43	4,20	0,10	0,05	0,28	-0,11
EDIBLE VEGETABLES	0,37	0,25	0,15	-0,01	-0,04	0,01	0,06	0,27	2,27	0,18	0,05	0,07	1,50	0,00	0,05	0,00	0,25	-0,03	0,98	-0,02	0,36	0,18	0,01	0,00	0,00	0,00	-0,01	0,12
PREPARATIONS OF MEAT	0,34	0,38	0,66	-0,01	1,17	0,24	0,00	1,28	0,22	0,15	1,06	0,14	-0,37	0,03	0,75	0,00	0,40	-0,17	0,18	0,07	1,09	0,17	0,66	0,23	0,01	0,00	0,02	0,34
PREPARATIONS OF VEGET. AND FRUIT	0,34	1,11	0,22	-0,02	0,03	0,07	-0,17	-0,14	0,73	0,18	0,04	0,68	-0,35	0,01	0,05	0,00	0,18	-0,39	0,57	0,10	0,22	0,65	0,18	0,00	-0,01	-0,02	-0,01	3,28
EDIBLE FRUIT AND NUTS	0,32	0,15	0,12	-0,01	0,00	0,05	0,00	0,00	2,59	0,29	0,62	0,30	0,52	0,00	0,01	0,03	-0,03	-0,01	0,31	0,03	0,16	0,23	0,10	0,02	0,00	-0,02	0,00	1,73
MEAT AND EDIBLE MEAT OFFAL	0,30	0,26	0,03	-0,02	2,16	0,14	-0,03	2,45	0,31	-1,33	0,03	0,13	-0,08	-0,04	-0,01	0,00	0,37	-0,05	1,08	0,03	1,07	0,05	0,31	0,06	0,00	0,00	-0,01	0,07
LIVE TREES AND OTHER PLANTS	0,29	0,06	0,12	0,00	0,05	0,01	0,00	0,01	0,03	0,03	0,00	0,11	0,00	0,00	0,01	0,01	0,01	0,01	1,98	0,00	0,01	0,01	0,00	0,01	0,00	0,00	0,00	0,00
PAPER AND PAPERBOARD	0,28	0,39	-0,10	-0,09	-0,02	0,35	0,42	-0,86	0,29	0,15	0,40	0,35	-0,26	-0,14	-0,11	-1,31	-0,18	-4,21	0,13	0,53	0,12	0,76	-0,02	1,06	-0,01	8,10	2,62	-0,05
PREPARATIONS OF CEREALS	0,26	0,80	0,95	0,00	-0,02	0,19	-0,56	0,35	0,26	0,49	0,48	0,78	-1,68	-0,07	1,03	0,07	0,17	-0,88	0,12	0,34	0,50	0,28	0,24	-0,07	0,00	-0,40	-0,32	0,41
DAIRY PRODUCTS	0,17	0,22	0,59	-0,06	0,62	0,15	0,01	1,11	0,09	0,39	-0,27	0,31	28,13	0,01	-0,06	0,09	0,07	-0,27	-0,04	0,08	0,16	0,01	0,29	0,00	0,17	0,01	0,01	3,94
COCOA AND COCOA PREPARATIONS	0,17	0,47	0,67	0,03	-0,03	0,24	-0,03	0,02	0,07	0,12	-0,18	0,24	-0,55	0,01	0,60	0,00	0,09	-0,40	0,15	0,18	0,53	-0,01	0,08	-0,02	0,17	-0,04	0,02	-0,04
FOOTWEAR	0,17	0,02	-0,16	0,10	0,03	0,25	-0,11	-0,20	0,22	0,19	-0,02	0,44	-0,30	-0,11	-0,07	2,07	-0,02	-0,22	0,15	0,02	0,08	0,94	0,13	-0,05	0,00	-0,02	0,09	0,00
ARTICLES OF APPAREL AND CLOTHING	0,14	0,15	1,13	-0,09	0,22	0,11	-0,12	-0,59	0,11	0,35	0,06	0,72	-0,39	-0,17	0,20	0,04	-0,02	-0,63	0,13	-0,04	0,07	1,88	0,35	-0,03	0,02	-0,10	0,07	0,78
MACHINERY APPLIANCES	0,14	-0,73	-4,26	-1,74	2,28	0,91	-5,90	0,34	-3,61	-1,49	1,24	1,53	-2,10	-2,08	-4,90	-17,22	-2,46	-2,05	1,68	-0,64	0,37	-1,65	2,83	-1,72	-9,99	-4,12	-2,37	-3,39
BEVERAGES, SPIRITS AND VINEGAR	0,12	0,87	-4,68	-0,27	-0,75	-0,13	-2,51	-0,49	0,00	1,93	-1,86	1,04	-2,36	-1,05	-0,22	-0,07	-0,24	0,57	0,26	-0,21	-1,03	-0,14	-1,80	-0,59	-0,29	-0,91	-0,06	-2,75
CERAMIC PRODUCTS	0,11	0,19	1,18	0,01	-0,10	0,03	-0,02	-0,05	0,54	0,04	0,21	0,27	-0,05	-0,05	0,06	-0,12	0,17	-0,04	-0,04	0,09	0,12	0,66	-0,05	-0,04	-0,04	-0,04	-0,03	-0,15
MISCELLANEOUS MANUFACTURING	0,11	0,41	-0,28	0,36	0,04	0,06	-0,03	-0,10	0,01	0,10	0,13	0,05	-0,09	-0,02	0,01	0,00	0,19	-0,08	0,12	0,00	0,04	0,03	-0,02	0,07	0,26	-0,06	0,49	-0,04
CLOTHING ACCESSORIES, NOT KNITTED	0,10	0,08	1,51	-0,14	0,20	0,05	-0,13	-0,79	0,33	0,27	-0,23	0,62	-0,50	-0,14	0,17	0,05	-0,02	-0,21	0,17	-0,06	0,10	0,49	2,21	-0,05	-0,01	-0,06	0,07	-0,12
TOYS, GAMES AND SPORTS REQUISITES	0,09	0,23	0,06	1,04	0,14	0,07	-0,04	-0,08	0,09	-0,18	0,28	0,12	-0,18	-0,10	0,02	0,03	0,05	-0,22	0,10	0,14	0,19	-0,07	0,03	-0,04	0,08	-0,14	-0,04	0,24
ARTICLES OF LEATHER	0,08	0,01	-0,04	-0,04	-0,01	0,02	-0,20	-0,05	0,03	0,44	-0,08	0,29	-0,37	-0,06	0,05	-0,06	0,03	-0,09	0,06	-0,03	0,02	-0,04	0,10	-0,03	0,00	-0,04	-0,01	-0,04
CARPETS	0,08	0,54	-0,03	-0,07	0,21	0,01	0,00	-0,03	0,01	-0,02	-0,03	0,01	-0,03	0,00	-0,01	0,00	-0,04	-0,02	0,22	0,01	-0,05	0,09	-0,02	-0,01	-0,03	-0,03	0,03	0,00

MISCELLANEOUS ART. OF BASE METAL	0,07	-0,02	0,20	0,23	0,06	0,14	-0,20	-0,03	0,11	-0,09	-0,05	0,15	-0,09	-0,13	-0,14	0,06	-0,01	-0,08	-0,06	0,68	0,19	0,07	0,13	1,68	-0,25	0,01	0,00	0,11
RUBBER AND ARTICLES THEREOF	0,07	-0,47	1,08	0,27	-0,17	0,16	-0,49	0,00	0,24	0,12	-0,01	-0,03	-0,08	-0,14	-0,19	0,81	0,51	-0,06	0,05	-0,11	0,03	0,30	0,84	0,75	-0,47	-0,25	-0,09	-0,23
ARTICLES OF STONE, PLASTER, CEMENT	0,07	0,10	0,01	0,01	-0,61	-0,01	-0,13	0,30	0,44	0,07	-0,01	0,02	-0,15	-0,01	-0,08	0,38	0,15	-0,07	0,06	0,10	-0,07	0,25	-0,09	0,15	-0,03	-0,13	-0,07	-0,07
ORES, SLAG AND ASH	0,06	-0,04	n/a	0,00	0,00	-0,01	n/a	0,00	-0,04	0,01	0,00	-0,01	0,00	n/a	0,00	0,00	0,00	0,00	0,02	0,00	-0,12	0,00	0,00	0,00	0,00	0,48	2,15	0,36
SUGARS AND SUGAR CONFECTIONERY	0,06	0,21	0,12	0,19	-0,15	0,05	-0,02	-0,11	0,12	0,19	0,01	0,02	-0,12	0,00	0,11	0,00	0,04	-0,14	0,09	0,00	0,01	0,07	-0,03	-0,11	0,05	-0,02	-0,04	0,01
SHIPS, BOATS AND FLOATING STRUCT.	0,06	0,02	-0,01	0,00	-0,06	0,24	-0,47	-0,04	-0,07	-0,06	-2,55	0,24	0,68	0,06	0,05	0,00	-0,01	-0,13	0,11	-0,01	-0,36	-0,31	0,00	-0,46	0,00	0,10	-0,34	-0,52

Source: own elaboration based on Eurostat.

Table 2.3: The LFI index by Member State according to the bottom EU LFI rank in 2021 (last 30 sectors)

SECTOR	European Union	Belgium	Bulgaria	Czechia	Denmark	Germany	Estonia	Ireland	Spain	France	Croatia	Italy	Cyprus	Latvia	Lithuania	Luxembourg	Hungary	Malta	Netherlands	Austria	Poland	Portugal	Romania	Slovenia	Slovakia	Finland	Sweden	Greece
EXPLOSIVES; PYROTECHNIC PROD.	-0,01	0,00	-0,01	0,01	0,00	-0,01	0,01	0,01	0,00	-0,03	0,05	-0,02	-0,03	0,00	0,00	0,00	0,00	0,00	0,00	-0,01	-0,01	-0,08	0,00	0,00	0,00	-0,03	0,01	-0,03
KNITTED OR CROCHETED FABRICS	-0,01	0,02	-0,25	-0,02	-0,01	0,00	-0,05	-0,01	0,00	-0,01	-0,02	0,01	-0,01	-0,02	-0,08	0,00	0,00	0,41	0,00	-0,05	-0,17	-0,02	-0,25	-0,01	0,00	-0,02	-0,01	-0,01
PULP OF WOOD	-0,01	-0,02	n/a	0,00	0,00	-0,05	0,02	0,02	0,06	-0,06	0,00	0,00	0,00	-0,01	0,00	0,00	-0,01	0,00	-0,18	-0,04	0,00	0,03	n/a	-0,10	0,00	0,70	0,79	0,00
PRODUCTS OF ANIMAL ORIGIN, N.E.S.	-0,01	0,04	-0,02	0,01	-0,15	0,00	0,03	0,04	-0,01	-0,06	0,00	-0,02	-0,02	0,00	-0,01	0,00	0,00	0,00	-0,03	0,00	-0,05	-0,01	0,00	0,01	0,02	-0,02	0,00	0,01
PREPARED FEATHERS	-0,01	0,00	-0,02	0,00	0,00	0,00	0,00	-0,14	0,00	0,00	0,00	0,00	-0,01	0,00	0,00	-0,01	0,00	-0,02	0,01	0,00	0,00	-0,01	0,00	-0,02	-0,01	-0,01	0,00	0,00
SALT; SULPHUR; EARTHS AND STONE	-0,03	-0,01	-0,60	-0,03	-0,14	-0,03	-0,09	0,31	0,21	0,02	0,48	-0,09	0,39	-0,02	-0,06	0,00	-0,05	-0,05	-0,07	0,00	-0,11	-0,26	-0,12	-0,05	-0,01	-0,61	-0,34	1,06
RAW HIDES AND SKINS	-0,03	-0,05	-0,08	-0,16	0,01	0,00	-0,01	0,01	0,00	-0,02	-0,01	-0,15	0,00	-0,02	-0,03	-0,01	-0,02	0,00	0,00	-0,02	-0,06	-0,14	-0,66	-0,23	0,02	0,00	0,00	0,00
IMPREGNATED, COATED, TEXTILE	-0,03	0,01	-0,56	-0,15	-0,06	-0,01	-0,08	-0,02	-0,01	-0,02	0,15	-0,03	-0,03	-0,04	-0,14	0,35	-0,01	-0,17	-0,02	0,02	-0,31	-0,01	-0,80	-0,13	0,00	-0,06	-0,03	-0,03
SOAP, ORGANIC SURFACE-ACTIVE	-0,04	0,20	-0,37	-0,57	-0,12	0,02	-0,16	-0,44	-0,01	0,14	-0,73	0,14	-0,40	-0,61	-0,02	0,01	-0,08	-0,63	0,03	-0,08	0,09	-0,38	-0,38	-0,19	-0,17	-0,68	-0,38	-1,08
OTHER BASE METALS; CERMETS	-0,04	-0,01	-0,01	-0,31	0,00	-0,04	0,01	0,00	-0,02	-0,06	-0,01	-0,06	0,00	0,00	-0,01	0,00	-0,01	0,00	0,02	0,06	-0,02	-0,03	-0,02	0,03	-0,02	-0,19	-0,17	-0,04
WOOL, FINE ANIMAL HAIR	-0,04	-0,02	-0,22	-0,03	-0,56	-0,01	-0,06	-0,01	-0,02	-0,03	-0,17	-0,17	0,00	-0,02	-0,47	0,00	0,01	0,00	-0,01	-0,01	-0,05	-0,09	-0,08	0,01	-0,01	-0,45	-0,01	-0,01
PHARMACEUTICAL PRODUCTS	-0,04	3,35	0,82	-0,39	-0,53	-0,11	-0,08	0,46	-0,70	-0,62	4,81	-0,33	0,37	-0,35	0,04	0,19	1,41	5,83	0,18	-1,11	-0,33	-0,01	-0,52	-17,8	-0,19	-0,82	1,09	4,10
COPPER AND ARTICLES THEREOF	-0,05	0,37	1,39	-0,13	-0,20	-0,20	-0,04	0,07	-0,36	0,00	-1,31	-0,18	-0,10	-0,01	-0,13	0,20	0,33	-0,26	0,07	-0,03	-0,15	-0,07	-0,15	0,00	0,00	0,35	-0,41	-0,26
ORGANIC CHEMICALS	-0,06	-0,97	-0,06	-0,06	-0,20	0,00	0,01	6,48	-1,68	0,08	-0,09	-0,07	-0,26	0,04	-0,03	-0,04	-1,02	-0,10	-0,93	0,04	-0,25	0,01	-0,03	-0,01	-0,23	0,46	-0,20	-0,73
MAN-MADE FILAMENTS	-0,06	0,04	-0,02	-0,02	-0,01	-0,01	-0,06	-0,01	0,02	-0,02	-0,03	0,02	-0,01	-0,01	-0,06	-0,08	0,13	-0,02	-0,32	-0,03	-0,16	-0,07	-2,11	0,21	0,02	-0,02	-0,02	0,05
LEAD AND ARTICLES THEREOF	-0,09	0,01	-0,07	0,00	0,00	-0,06	0,00	-0,01	-0,08	-0,18	0,00	-0,20	n/a	0,00	0,00	n/a	-0,01	0,00	-0,03	-0,02	-0,14	-0,66	0,00	-0,33	-0,04	-0,12	-0,34	-0,72
ESSENTIAL OILS AND RESINOIDS	-0,10	-0,48	1,57	-0,92	-0,39	-0,13	-0,35	0,88	0,15	0,55	-1,30	0,23	-0,73	-0,23	-0,23	0,02	-0,64	-0,52	-0,27	-0,10	-0,20	-0,17	-1,03	-0,40	0,19	-0,39	-0,38	-0,04
NICKEL AND ARTICLES THEREOF	-0,11	-0,32	-0,08	-0,41	-0,02	-0,08	0,00	-0,07	-0,04	-0,07	-0,59	-0,13	0,00	0,00	0,00	0,00	-0,06	0,04	-0,01	0,17	-0,02	-0,04	-0,36	-0,02	-0,01	0,36	-0,63	-0,01
WORKS OF ART, AND ANTIQUES	-0,12	-0,18	0,01	-0,03	-0,08	-0,07	0,00	0,11	-0,06	-0,28	0,00	-0,32	-0,35	0,00	-0,01	-0,42	-0,20	-0,31	-0,02	-0,50	-0,03	-0,37	n/a	-0,02	-0,01	0,01	-0,02	-0,03
PLASTICS AND ARTICLES THEREOF	-0,14	0,10	0,33	-1,83	-1,23	0,50	-1,33	-0,43	-0,20	0,10	-0,64	-0,01	-1,29	-0,89	-1,26	-3,30	-1,14	-2,11	-0,05	0,70	-1,08	0,15	-1,11	0,89	-0,89	-0,68	-1,14	0,22
INORGANIC CHEMICALS	-0,24	0,10	-0,21	-0,01	-0,08	0,12	-0,02	0,02	-1,21	-0,07	-0,04	-0,40	-0,03	-0,05	0,00	0,07	0,08	-0,04	-0,76	0,06	-1,01	-0,19	-0,04	0,03	-0,05	-0,36	-0,45	-0,05
PRINTED BOOKS, NEWSPAPERS	-0,26	-0,18	-0,03	-0,25	-0,43	-0,09	-0,22	-0,86	-0,14	-0,24	-0,20	-0,09	-0,17	-0,04	0,01	-0,14	-0,18	5,30	-0,27	-0,04	0,05	-0,29	-0,01	0,48	0,00	-0,46	-0,38	-0,83
TANNING OR DYEING EXTRACTS	-0,26	-0,41	-0,56	-0,27	-0,43	0,14	-0,47	-0,25	-0,21	-0,60	-0,85	-0,15	-0,49	-0,11	-0,21	1,59	-0,23	-0,65	-0,43	-0,57	-0,42	-0,15	-0,38	0,04	-0,27	-0,51	-0,15	-1,01

Other products	-0,30	0,21	-0,55	0,00	-4,71	-0,56	-0,05	-0,79	0,10	-0,16	0,00	-0,04	-0,57	0,00	-0,06	-0,12	0,13	0,16	0,04	-0,04	-0,09	0,00	-0,02	-0,01	-0,03	-0,46	-0,02	-0,53
FISH AND CRUSTACEANS	-0,37	0,03	-0,01	-0,01	-0,41	0,01	-0,05	-0,04	-0,13	-2,55	-0,02	-0,03	-0,33	-0,51	-0,02	0,00	0,01	-0,04	-0,14	0,00	0,01	-0,14	0,01	0,00	0,00	0,00	-0,01	0,15
IRON AND STEEL	-0,45	-0,03	0,06	-0,19	-0,27	0,11	-0,06	-0,46	-1,68	0,18	-0,45	-0,75	-0,04	-0,18	-0,87	5,33	-0,23	0,23	-0,88	0,42	-0,31	-2,39	-0,13	-0,27	-0,23	0,68	-3,16	-0,75
MISCELLANEOUS CHEMICAL PROD.	-0,49	-0,48	-0,64	-1,03	-0,61	-1,09	-1,09	0,43	-0,42	0,44	-0,70	-0,22	-0,55	-1,08	1,77	-0,10	-2,29	-0,39	-0,45	-0,21	-0,57	-0,66	-0,83	-0,51	-0,18	-1,24	-0,36	-0,84
AIRCRAFT, SPACECRAFT, AND PARTS	-0,93	0,42	-1,34	-0,05	-0,11	-2,98	0,02	0,21	-0,69	-1,63	-8,95	-0,97	0,00	-1,86	-0,18	-0,73	0,30	5,99	0,12	-0,41	0,15	0,51	-0,30	-0,39	0,01	-0,06	-0,19	-0,57
NATURAL OR CULTURED PEARLS	-1,23	-0,60	-0,17	-0,61	-0,06	-4,26	-1,89	0,01	-2,57	0,03	-0,03	-1,98	2,42	-0,04	-0,68	-0,25	-0,02	-0,01	0,08	-6,38	-1,49	-0,32	n/a	-0,02	-0,01	-0,42	3,22	-0,08
MINERAL FUELS, MINERAL OILS	-4,32	-6,63	-0,17	0,52	-3,46	-2,57	11,5	-6,70	-1,82	-0,23	-0,18	-3,00	-0,09	0,22	-0,61	0,03	-0,08	-1,60	-11,4	-0,94	-1,13	-6,14	0,23	-0,07	-0,02	2,26	-0,08	2,71

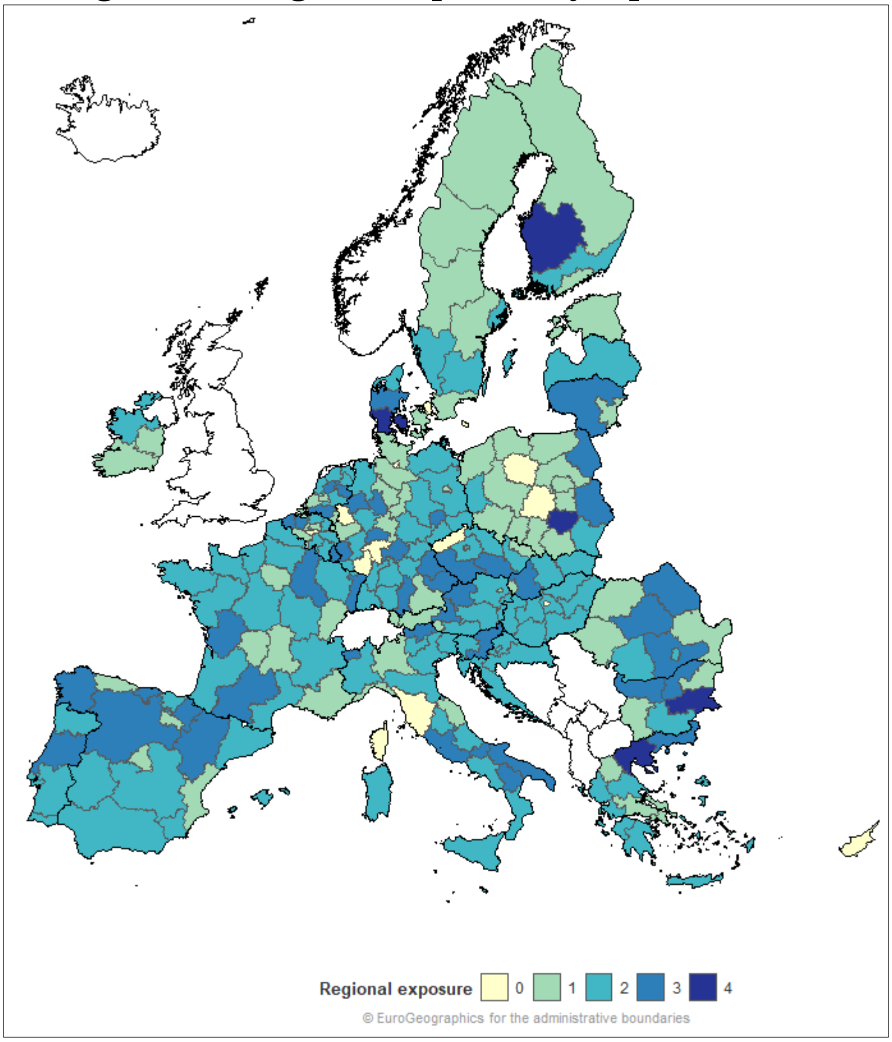
Source: own elaboration based on Eurostat.

2.2 Regional exposure by top EU sectors

As illustrated in the methodological approach described at the beginning of this chapter, the most heavily impacted regions, in terms of trade flows with the UK, are identified by considering the most impacted sectors at EU level and their relative weight at NUTS2 level within each Member State. The regional exposure index has thus been determined by assessing the share of people employed in each sector in relation to the national average. The analysis uses Eurostat data from 2019 – the last available year - for all EU Member States.

The map displayed in figure 2.4 shows the regional exposure index at NUTS2 level considering the top sectors of specialisation in the EU economy. As underlined in section 2.1, these are vehicles, electrical machinery, wood products and furniture, and agri-food products. Almost all regions are exposed in at least one of the main EU sectors considered. A more regional in-depth analysis of these sectors is provided in the following sub-sections.

Figure 2.4: Regional exposure by top EU sectors



Source: own elaboration based on Eurostat data.

Box 2.3: Notes on methodology

In interpreting the results displayed in this section both at sectoral and regional level, the following issues should be taken into account:

• As a measure of the exposure, the analysis considers only regions which display a higher employment share (i.e. >1) with respect to the national average. This, of course, does not automatically imply that regions with a lower employment share are exempted from potential Brexit effects.

• To have a clearer overview of the machinery sector, in which several EU national and regional economies are highly specialised, the analysis at regional level also considers machinery appliances (HS84), other than electrical machinery and equipment (HS85) which is the second EU sector according to the LFI[44]. Moreover, wood products and furniture are considered as one sector, given the interlinked nature of their supply chain[45].

• The analysis on agri-food products is split into two. Edible vegetables (HS07) and edible fruits and nuts (HS08), which are activities related to agriculture, so employment in agriculture is therefore considered[46]. Preparations of meat (HS16) and preparations of fruit and vegetables (HS20) are instead manufacturing-related activities, so employment in agri-food is considered[47].

• There are few available data and information at regional level that clearly capture the Brexit effects at sectoral level (for instance, regional exports to the UK). So, to complete and interpret the results, secondary resources, such as on-line articles and academic research, or reports conducted before the TCA, have been also consulted. It should also be remembered that there is no uniform classification of sectors across the EU (for instance, sometimes vehicle components are considered as part of the machinery and equipment sector or, similarly, beverages are included in the agri-food sector) and this may affect comparability across Member States and regions.

[44] The corresponding sectors at NACE level used for the employment share are C27- Manufacture of electrical equipment, and C28- Manufacture of machinery and equipment not elsewhere classified.
[45] The corresponding sectors at NACE level used for the employment share are C16- Manufacture of wood and of products of wood and cork, except furniture, and C31- Manufacture of machinery and equipment not elsewhere classified.
[46] The corresponding sector at NACE level used for the employment share is whole sector A-Agriculture, forestry and fishing, as Eurostat does not provide further disaggregation.
[47] The corresponding sector at NACE level used for the employment share is C10- Manufacture of food products.

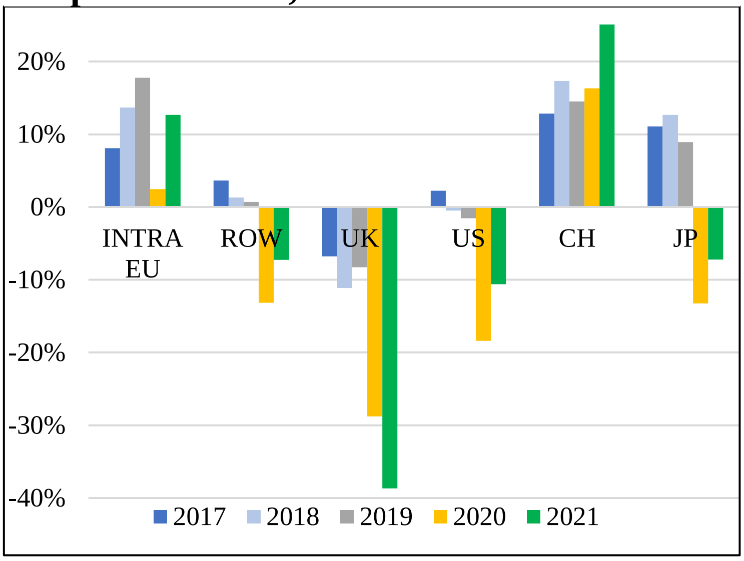
2.2.1 Vehicles

The automotive industry is crucial for Europe's economy, contributing to 7.2% of the EU's GDP with 309 assembly and production plants across the EU. The EU is among the world's biggest producers of motor vehicles and the sector represents the largest private investment in research and development (R&D). The sector provides direct and indirect jobs to 13.8 million Europeans, representing 6.1% of total EU employment. 3.5 million people work directly in the manufacturing of motor vehicles, representing 11.4 % of EU employment in manufacturing[48].

Automotive has been a global industry for over 100 years, but, since the 90s', the emergence of regional production systems has resulted in EU regional integration, creating new opportunities, especially for eastern Member States, to move up in the value chain, and leading to changes in the relationship between EU manufacturers, assemblers and suppliers (European Parliament 2021*b*). This was clearly observed in Slovakia (15.7% of direct automotive employment in total manufacturing in 2018), Romania (15.7%), Czech Republic (13.7%), and Hungary (12.8%)[49].

The sector has one of the most integrated supply chains between the UK and the EU, consisting of a large number of highly specialized production steps, multiple exports and reimports. According to ACEA data[50], 2.2 million motor vehicles were exported in 2019 from the EU27 to the UK for a value of EUR 41 billion (of which nearly EUR 22 billion from Germany), corresponding to 81% of total UK vehicle imports and 30% of total EU27 vehicle exports. However, EU exports to the UK - compared to other destinations - recorded a decrease across all five years following the Brexit referendum, with record lows of -29% in 2020 and -39% in 2021 compared to 2016 (see figure 2.5).

Figure 2.5: EU vehicles exports change compared to 2016, main destinations



[48] ACEA, *EU-UK automobile trade: facts and figures – March 2020.*
[49] Based on ACEA data. See https://www.acea.auto/figure/share-of-direct-automotive-employment-in-the-eu-by-country/
[50] ACEA, *EU-UK automobile trade: facts and figures – March 2020.*

The decrease in 2020 and 2021, the years of the pandemic, was the largest compared to other extra-EU trade partners. On the contrary, the overall intra-EU trade experienced an increase across all five years, with a peak recorded in 2019 (+19%). In the two years of the pandemic, intra-EU trade increased by 2% in 2020 and 13% in 2021. It is worth noting that vehicle exports towards China were not affected by the impact of the pandemic, while exports to the USA and Japan did decrease, but less than those towards the UK.

The TCA seems, therefore, to have played a role in EU-UK vehicle trade dynamics in 2021. Despite the fact that the agreement has prevented an estimated potential five-years loss of EUR 110 billion for the EU in the case of a no-deal[51], the rules of origin, in particular, could have a substantial impact on the automotive industry[52], as it is a complex sector with many vehicles containing over 30 000 parts (component, sub-assembly or assembly). Historically, origin has been less important to EU and UK manufacturers as once the part was imported into the EU it could move around freely. Since the inception of the TCA, the rules of origin mean that parts imported to the EU or UK now cross a border, resulting in potential tariffs if the criteria for origin are not met[53]. The EU did, however, granted a 12-month grace period to identify origin, allowing parts to be moved around without the relevant origin documentation until the end of 2021.

Given the importance of the automotive sector for EU employment and export, Brexit and the TCA could have an impact on several Member States and regions. According to the analysis of the LFI index previously presented, for eight Member States the automotive industry is among the top three sectors in terms of comparative advantage with respect to the UK. These are Austria, the Czech Republic, France, Germany, Portugal, Slovakia, Spain, and Slovenia. From the analysis of the employment share in the automotive sector (figure 2.6) there are also several other regions exposed in terms of employment in Italy, Denmark, Romania, Bulgaria and Croatia. Moreover, these regions could be affected by possible disruptions in EU automotive sector value chains due to Brexit.

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[51] ACEA, *Only weeks left to save EU and UK auto sectors from €110 billion 'no deal' Brexit disaster*, on-line article 14 September 2020.

[52] Grant Thornton, *Rules of origin: the automotive trade after Brexit*, on-line article 8 March 2021.

[53] A good example is the crankshaft used in the BMW Mini, which crosses the channel three times in a 2 000-mile journey before the finished car rolls off the production line.

In **Germany**, the leading EU producer and main exporter to the UK, around 60 000 people are employed in the sector for the UK export market (Deloitte 2017). In 2019, Germany accounted for half the value of the automotive sector exports to the UK. The regions where employment in automotive is most concentrated are Oberbayern, Bremen and, in particular, Stuttgart. All these regions have a higher HHI. Almost 45% of Stuttgart's total manufacturing revenues, in fact, come from the automotive sector and the three largest players in its automotive cluster are Daimler, Porsche and Bosch. The Stuttgart region is also heavily export oriented as exports accounted for 67% of the turnover of manufacturing businesses located in the region in 2018 (AmCham EU 2021). This reflects the export focus of the automotive sector (together with the machinery and equipment sectors), and is the highest of all the regions in Germany. The region has also attracted considerable R&D investments in the automotive sector thanks to highly innovative small and medium-sized suppliers, research centres and close cooperation with academia. This is also why a significant part of its employment is in the machinery sector.

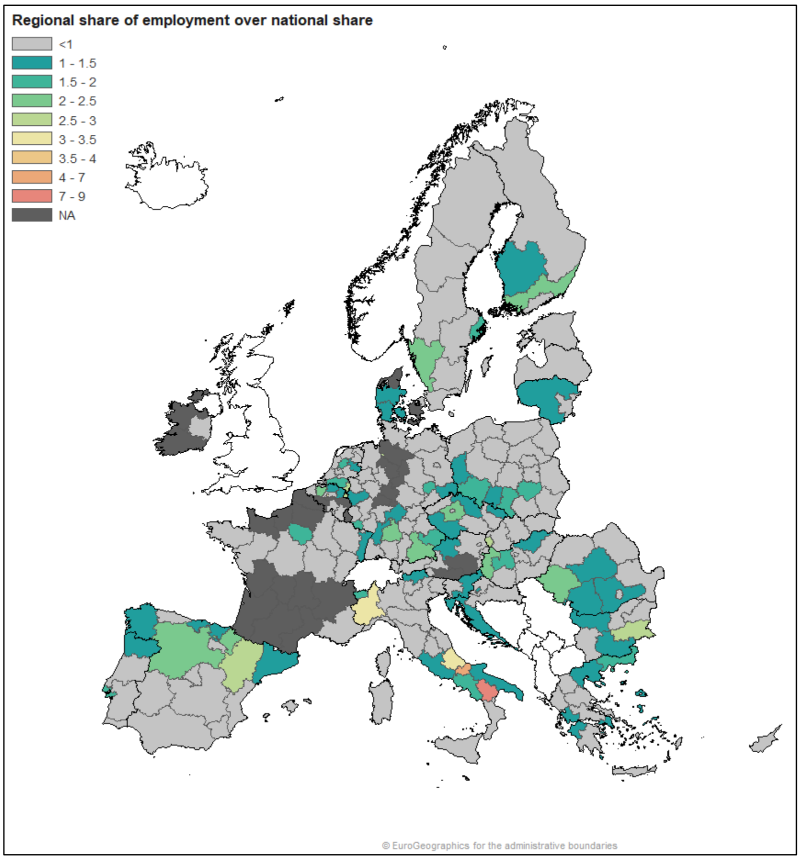
Alongside Germany, **Spain** is one of the major automotive sector exporters to the UK, with the UK receiving 12% of the Spanish auto production. Spain also has several regions that rely on employment in the automotive sector. Among these, one of the most exposed regions is Castilla y Leon, as it is also less diversified in terms of its production sectors (i.e. high HHI). The region is the base for four different automotive manufacturing plants of three major companies (Renault, Fiat, Nissan). Around 45% of the regional exports are related to the automotive sector and the UK is among its top trade partners with 12% of regional exports.

Italy is one of the most important vehicle producers in the EU, with the FIAT factory headquartered in Piemonte. However, one of the most exposed regions is Basilicata, which has one of the most important automotive districts in Melfi. The region also has the highest HHI in Italy, therefore further exposing the regional economy to the potential effects of Brexit.

The UK is one of **Sweden**'s most important trading partners. In 2019, the total value of Swedish exports to the UK was approximately EUR 15 billion, making the UK Sweden's fourth largest export market, directly or indirectly supporting 77 400 jobs in Sweden (Business Sweden 2020). The UK is also home to some 1

200 Swedish or Swede-related companies employing 100 000 Britons. Vehicles is the main sector of exports to the UK (around EUR 1.3 billion in 2019). The Västra Götaland region is potentially highly exposed to Brexit effects (see also the case study in chapter 3) and it has a high HHI. Here the Volvo Group has its headquarters in Gothenburg. About 70 000 people in Sweden work in industries directly affected by exports to the UK and it is in the automotive and mechanical industries that the biggest decrease in exports has occurred[54].

Figure 2.6: Regional exposure for the vehicles sector



Source: own elaboration based on Eurostat. Data are not available for regions in dark grey.

The Slovakian automotive sector has grown considerably since 2005 and now accounts for around 50% of the country's total industrial production, as well as 13% of its GDP. It is also the first sector for exports to the UK. More than 350 suppliers operate in Slovakia mostly concentrated in the regions of Western Slovakia (Slovak Investment and Trade Development Agency 2021). In particular, the region of Bratislavský Kraj has more than twice the number of employees in the automotive sector than the national average, exposing the region to the possible negative consequences of Brexit. It has also a high HHI. Volkswagen Slovakia is the largest investor in the country, making their Bratislava Plant one of the most important, while Jaguar Land Rover has recently invested in Slovakia to relocate part of its production[55].

Poland is another eastern economy, alongside Slovakia, to have benefitted from the EU automotive market and its integrated value chain. In particular, Silesia, including Dolnoslaskie (PL51) and Slaskie (PL22), the most industrialised region

[54] BQ Redovisning, *Brexit and how it affects Swedish entrepreneurs*, on-line article 24 April 2021.
[55] Imprese del Sud, *Le conseguenze della Brexit nel settore automotive*, on-line article 09 February 2021.

in Poland, is attracting investments for the construction of new automotive manufacturing. The region already produces around 69% of all the cars produced in Poland, mostly for international markets. Vehicles was the third sector in terms of Polish exports to the UK in 2020, dropping to EUR 1.2 billion from a value of EUR 1.74 billion in 2019.

In **Romania**, one of the most exposed regions is Vest, which has the highest HHI. As highlighted by the CoR report in 2018, the region relies significantly on mining activities with one of the world's largest industrial complexes for steel production, tightly interconnected with the automotive sector through the presence of the world's largest steelmaker, ArcelorMittal located in Galati (Western Moldavia). Overall, the Romanian automotive industry was valued at EUR 30 billion contributing to 14% of GDP and 26% of exports[56]. It also hosts Renault Dacia and Ford, and benefits from foreign investments from companies like Daimler and Bosch. The industry is concentrated in cities such as Pitesti (South Muntenia), Craiova (Oltenia) and Brasov (Centru), located in regions that are highly exposed to Brexit, as shown in the map. Romania has attracted not only car manufacturers, but also suppliers such as Bosch, Continental, Daimler, Federal Mogul Autoparts, Marquardt. Moreover, Romania is a major importer of second-hand cars, which creates opportunities for aftermarket sales and services. Overall, in 2020, exports of vehicles to the UK amounted to just EUR 301 million (third sector in terms of exports), after having peaked at nearly EUR 730 million in 2018.

The Yugoiztochen region in **Bulgaria** is one of the country's leading innovators[57], but it also has a high HHI. The region, also known as "the Energy Heart" of Bulgaria with its coal mine and three large coal power plants, also presents a high concentration of medium-high and medium-low tech production sites for automobiles in Burgas and Yambol, machinery and equipment in Sliven and Yambol and transport equipment in Burgas. Moreover, in the district of Silven, many companies operate in mechatronics and clean technologies (production of prototypes with electrical and hybrid propulsion, and innovative technology for accelerated battery charging with electricity). However, Bulgarian exports of vehicles represents a marginal share of exports to the UK, despite the significant growth in recent years (EUR 14.5 million in 2020 from EUR 4.5 million in 2016).

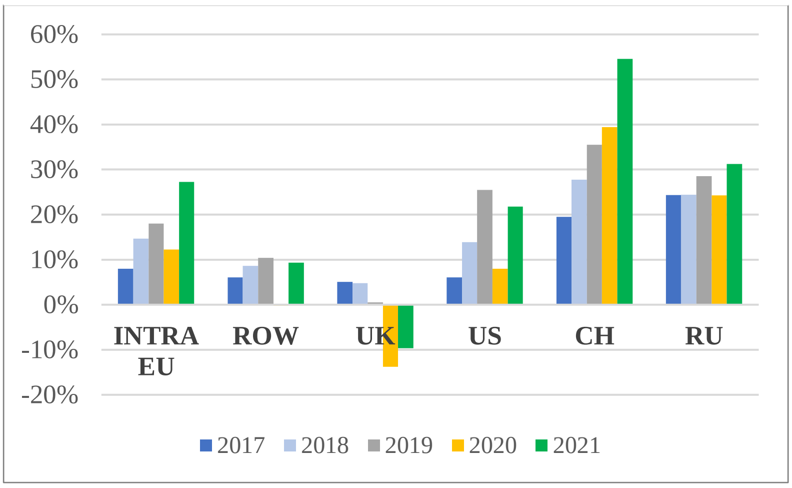
[56] SMMT, *The automotive industry in Romania*, on-line article 2 August 2021.
[57] See Balkan-Mediterranean Innoplatform (2017).

2.2.2 Machinery

The machinery sector is a key part of the engineering industry and one of the driving industrial pillars of the EU economy. The production of machinery and equipment manufacturing was in fact the main business activity with 80 000 enterprises and 3 million people employed across the EU in 2018 (European Commission 2021*c*). The total annual turnover in the sector amounted to approximately EUR 700 billion, with Germany, Italy, France and the Netherlands among the top EU producers.

Machinery accounted for 20% of EU exports to the UK in 2019. The comparative advantage of EU Member States with respect to the UK varies depending on the sector (see table 2.2). In electrical machinery and equipment (HS85), the second top EU sector according to the LFI, Denmark, Slovenia, Croatia, Hungary, Slovakia, and the Netherlands exhibit the highest LFI values. In machinery appliances (HS84), the highest LFI values are seen in Romania, Denmark, the Netherlands, Italy and Croatia. Exports towards the UK for the whole machinery sector (HS84+HS85) experienced a slight growth in 2017 and 2018 (with respect to 2016), remained almost unchanged in 2019, and then decreased significantly in 2020 (-14%) and in 2021 (-10%). On the contrary, EU machinery exports towards other EU destinations and outside the EU (China and Russia in particular) experienced remarkable growth across all five years compared to 2016.

Figure 2.7: EU machinery exports change compared to 2016, main destinations



In **Italy**, the northern regions are notable manufacturing areas highly specialised in the machinery sector. Italy exported machinery for EUR 81.8 billion in 2019, ranking it second in the EU, with a share of 14.8% behind Germany (35.1%). The 'triangle of machinery', composed by Lombardy, Veneto and Emilia Romagna, concentrates more than two thirds of Italian exports for a total of EUR 55.6 billion and is the second most important export area in the EU after the Netherlands[58].

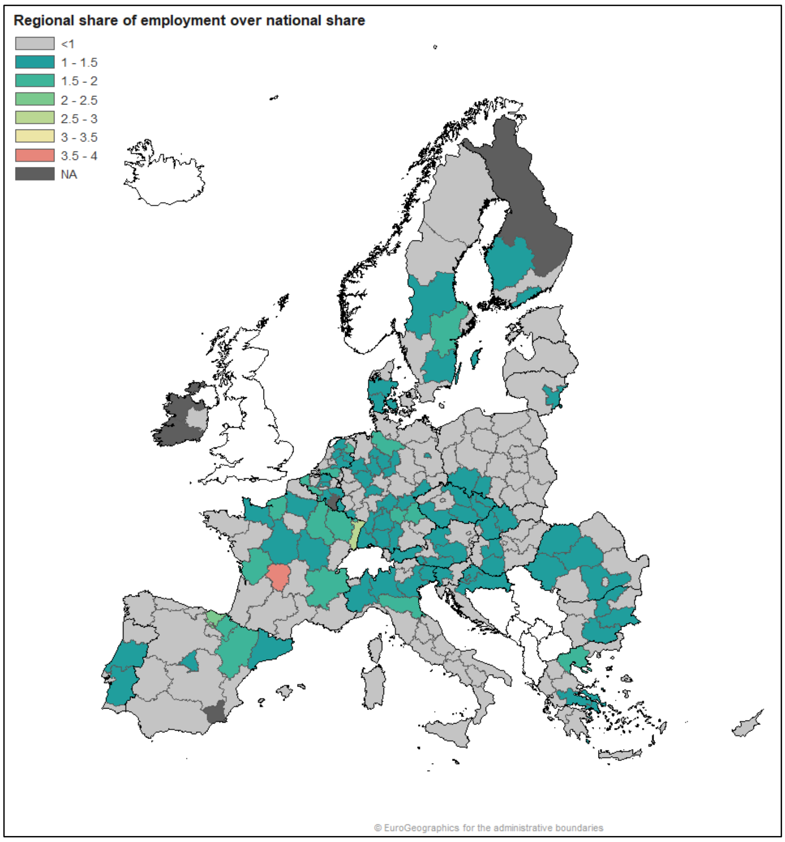
[58] The leading regions for the sector in Italy are Lombardy with exports for EUR 24.2 billion (29.5%), Emilia-Romagna with EUR 18.6 billion (22.6%) and Veneto with EUR 12.8 billion (15.6%). See Confartigianato, *Il*

Emilia-Romagna seems to be particularly exposed to Brexit The UK represents around 9% of Emilia-Romagna's total exports towards European countries, and machinery is the first sector with 37.5% of total exports going towards the UK[59].

Machinery is **Germany**'s largest sector, boasting almost 6 500 companies along the value chain and employing more than 1 million people (GTAI Germany Trade & Invest 2019). It is the most important sector for exports towards the UK after vehicles. However, in 2020, exports experienced a significant decrease. The regions most exposed to Brexit are located in the western part of the country, with the highest levels in Lüneburg in Lower Saxony and Middle Franconia in Bavaria.

Denmark has higher production shares in machinery and equipment than the rest of the EU (10% *vs* 5.5%). Central and Southern Denmark seem to be more exposed to Brexit in this sector, which stands out as it accounts for 19% of total Danish exports to the UK, i.e. 8% points above any other sub-sector. According to the OECD (2019), the machinery sector was predicted to be the most affected (-17% in export and -1.4% in production) after agri-food by Brexit.

Figure 2.8: Regional exposure for the machinery sector



Source: own elaboration based on Eurostat. Data are not available for regions in dark grey.

In **France,** Limousin in Nouvelle-Aquitaine hosts some of the world's leading companies in small electrical equipment[60] and exhibits a high exposure (other than a high HHI). However, most of the exposed areas are in the north-eastern

'triangolo dei macchinari' di Lombardia, Emilia-Romagna e Veneto al 2° posto in Ue. I dati del rapporto Meccanica 2020, on-line article 30 October 2021.

[59] Ferente, *Flussi commerciali verso il Regno Unito e scenari per l'export*, presentation 25 October 2019.

[60] For instance, Legrand company, whose head office is in Limoges.

part of France. For instance, Alsace is highly specialized in machinery with the presence of several leading producers[61] and the Rhine river port Strasbourg, which ensures fast trade connections towards central Europe and the main ports in the North Sea. Machinery is the second sector in terms of French exports to the UK after vehicles (EUR 2.60 billion in 2020, from EUR 3.18 in 2019).

Several areas in **Belgium** are exposed to Brexit in the machinery sector. Machinery exports to the UK accounted for around EUR 1 billion in 2020 (fourth sector in total exports), down from EUR 1.2 billion in 2019. In Flanders, which accounts for 83.2% of Belgium's total exports in volume (see case study chapter 3), the technological industry is driven by big (international) companies and strong innovators that are also specialized in machinery[62]. The Hainaut Province in Wallonia displays a high degree of exposure. In the analysis by Vandenbussche (2019*b*) on the potential impact of Brexit on Belgian sectors and regions, West Flanders was projected to be the province with the highest job losses (from -0.29% to -1.28%), while Hainaut was second (after Brabant-Wallon) out of the five in Wallonia (from -0.21% to -0.86%).

Similarly to Belgium, most of the territory in **the Netherlands** seems to be exposed to Brexit in the machinery sector. North Brabant (South Netherlands) and Drenthe (North Netherlands) show higher degrees of exposure. Drenthe has also a high HHI. The first is highly specialized in the electronics industry and in electrical machinery, with several spin-offs from multinationals around Eindhoven[63]. The report by Thissen *et al.* (2019) underlined that, despite the fact that larger economic regions (South Holland, North Holland and North Brabant) could be affected less severely than smaller ones (see case study on Zeeland in chapter 3), individual sectors in a certain region maybe either heavily or hardly dependent on the UK, in terms of both their sales market and their production structure, and therefore more or less exposed to Brexit. For North Brabant, the authors found that the manufacture of machinery and equipment, together with that of motor vehicles, trailers and semi-trailers, put it more at risk of significant negative changes in its competitive position towards the UK. The report did not find a high degree of exposure in these sectors for Drenthe, although the province has a cluster of medical technology companies, green chemistry and bio-based economy as well as several related companies operating in the machinery sector.

Machinery is another sector which has experienced a significant change, in terms of modernization and integration within the EU value chain, in the eastern

[61] For instance, Liebherr and Bubendorff.
[62] Invest in Flanders, *Machinery and robotics in Flanders*
[63] There are several companies from Philips, located in Eindhoven, such as Signify (formerly Philips Lighting), NXP (producer of semiconductors), and the world's largest supplier of photolithography systems, ASML.

Member States. In the **Czech Republic**, machinery and transport equipment was by and large the most important sector for exports to the UK, contributing to the EUR 3.9 billion sectoral surplus in 2018, the largest surplus of all the trade categories (Czech National Bank 2019)[64]. Eastern areas of the country such as Central-Moravia, for which the machinery industry is the most important industrial sector for the regional economy or Moravia-Silesia, where several companies operate in the coal-steel-machinery value chain seem to be particularly exposed to Brexit. Both regions have a higher HHI than national average.

Similarly, the western and central areas in **Slovakia** are also exposed. Machinery, especially electrical, is the second most exported sector from Slovakia to the UK after vehicles. The sector represents one of the key pillars of the national economy, and is strictly interlinked to the automotive industry (see previous section), which is mostly concentrated in the western regions (Slovak Investment and Trade Development Agency, 2021).

The western areas of **Romania**, are highly specialized in manufacturing, including machinery (first sector for exports to the UK), with mechanical and electrical equipment being by far the largest goods export category for the Nord-Vest region, accounting for 33.9% of the total value of regional exports (AmCham EU 2021). It was highlighted that the impact of foreign trade with the UK on Romania's economic growth would probably be negative after Brexit, but marginally so, given that the Romanian exports to Great Britain account for only 4% of the total added value (see Banica and Basile 2017).

Machinery is also the first sector for export to the UK for **Bulgaria**, with most of the 1 000 companies operating in this industry located in Sofia, Plovdiv in Yuzhen Tsentralen and Stara Zagora in Yugoiztochen (SeeNews 2019). As for Romania, the UK market represents a small share of the total Bulgarian exports.

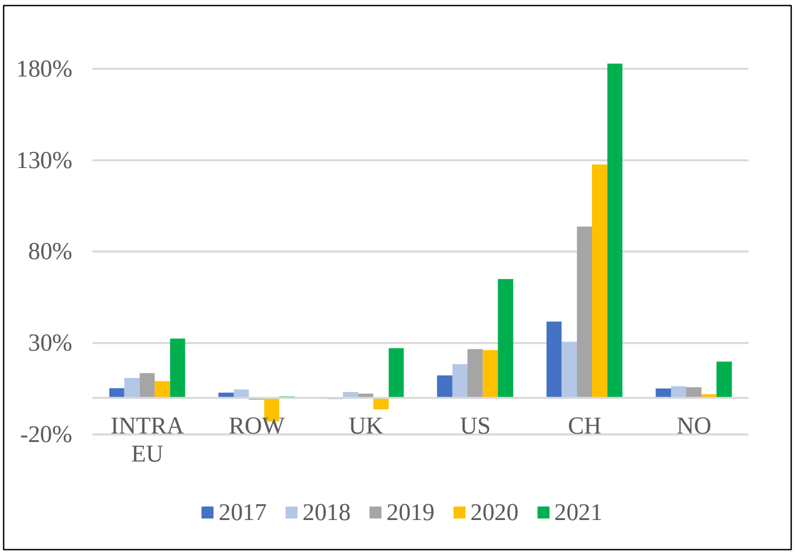
2.2.3 Wood and furniture

The EU's wood-based industries cover a range of downstream activities, including woodworking industries, large parts of the furniture industry, pulp and paper manufacturing and converting industries, and the printing industry. There were around 397 000 enterprises active in wood-based industries across the EU in 2018 (nearly 20% of manufacturing enterprises), employing 3.1 million people (10.3% of the manufacturing total) and contributing to EUR 139 billion in gross added value (7.1% of the manufacturing industry).

[64] They made up 70% of total goods exports to the UK, with passenger cars accounting for almost one-third of that figure.

Within the wood-based industries, EU furniture has a worldwide reputation for its creative capacity for new designs and its responsiveness to new demands. The EU is a world leader in the high-end segment of the furniture market, with two out of every three high-end furniture products sold in the world produced in the EU. The EU is also the headquarters to some of the largest and most important sector players, with around one third of the top 200 largest furniture companies in the world located here. The sector is labour-intensive and dynamic, and dominated by SMEs and micro firms. It employs around 1 million workers in 130 thousand companies generating an annual turnover of around EUR 96 billion[65].

Figure 2.9: EU wood products and furniture exports change compared to 2016, main destinations



While China dominates international trade in the furniture sector, this sector remains especially important for the EU as several Member States, such as Italy, Germany and Poland[66], are among the top global exporters. The UK was one of the main markets for EU producers, but since the Brexit referendum exports towards the UK have remained stagnant compared to intra-EU trade or other extra-EU destinations, the USA and China in particular (see figure 2.9). The increase in EU exports to the UK in 2021 was almost entirely driven by an increase in wood products, while furniture remained almost unchanged. For some Member States, the impact since the referendum has been worse. For instance German furniture exports to the UK - the fifth most important foreign market - have seen a negative slide since 2016[67], with German manufacturers suffering a decrease of 11% to EUR 690 million until 2019.

Key exporters of wood products to the UK (i.e. highest LFI) are Latvia, Finland, Estonia, Sweden, and Lithuania, since Nordic and Baltic countries in Europe have

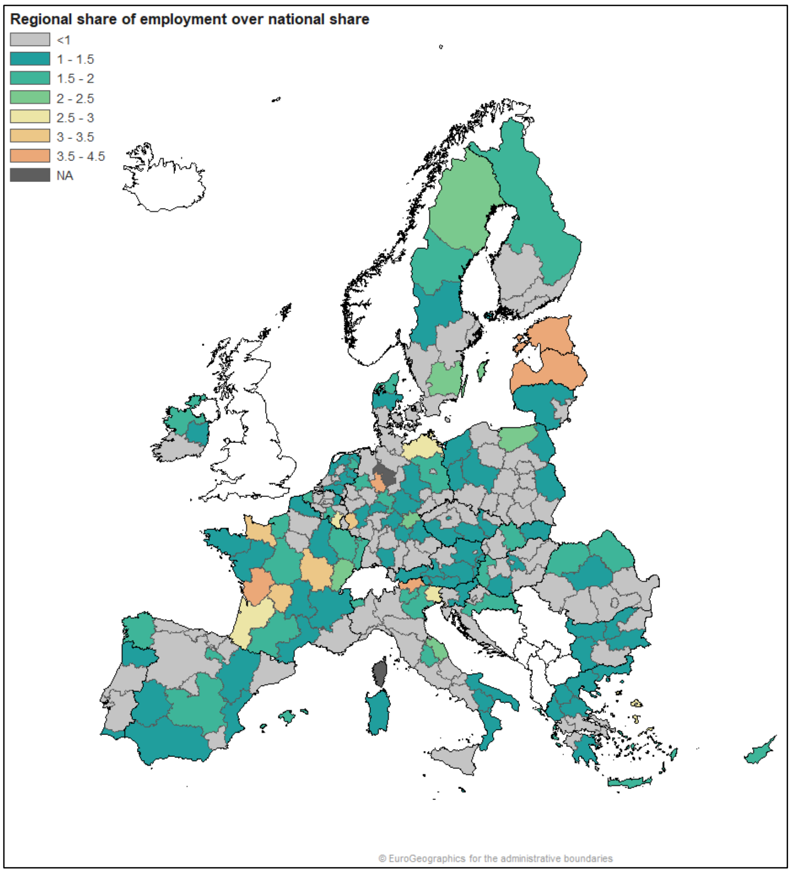
[65] https://ec.europa.eu/growth/sectors/raw-materials/related-industries/forest-based-industries/furniture-industry_it

[66] The Polish furniture industry is a global player. In the last ten years, the production of furniture in Poland has doubled and exports increased by 116%. In 2019, the furniture industry revenue amounted to nearly EUR 12 billion and increased by 5% year-on year. Poland is listed as the sixth largest furniture manufacturer in the world (following China, the USA, Germany, Italy and India).

[67] Timber Online, *Brexit will be a problem for the furniture industry*, on-line article 3 February 2020.

forest-based economies and heavily rely on wood production and exports. Estonia, Latvia, Finland and Sweden account for around one-third of the EU export value of wood products. The countries that are more specialised in the furniture sector than the UK are Lithuania, Estonia, Slovakia, Romania, Poland, and Italy. However, France, Germany and Spain, which have a lower LFI at national level, also have regions that are particularly exposed.

Figure 2.10: Regional exposure for the wood and furniture sector



Source: own elaboration based on Eurostat. Data are not available for regions in dark grey.

Lithuania is highly specialized in both wood products and furniture, with these representing 7.5% and 21.3% respectively of total exports to the UK, which is the 6th largest export market for domestically produced exports. Both these sectors experienced a strong drop in exports to the UK following the Brexit referendum[68]. Similarly, for **Latvia**, the UK is the sixth-largest export market and two-thirds of Latvia's exports to the UK are wood and sawn wood. Overall, exports to the UK fell by 12% in the first eight months of 2020[69].

In **Sweden**, the most exposed regions are Småland, the center of the national furniture industry[70], and Upper Norrland, which is highly specialized in wood products. At national level, wood products is the second export sector towards the UK, after vehicles.

[68] For instance, wooden furniture decreased by -7.7% and wooden windows by -10.3% in 2017 compared to 2016, the highest drops among the most exported product groups. See Notten, *Brexit's impact on Lithuanian exports*, presentation, 26 April 2018.
[69] Eng.slm.lv, *How will Brexit affect Latvian exports?*, on-line article 2 November 2020.
[70] IKEA headquarters are located in Älmhult.

Similarly, wood products is **Finland's** third most exported sector to the UK, after paper and paperboard, and mineral fuels. North and East Finland is the most exposed region.

Warmińsko-Mazurskie Voivodship, a region with a high HHI, is a traditionally agricultural region located in north-east **Poland**. Also called "the green lungs of Poland", its timber resources have contributed to the development of a strong wood and furniture sector. The region is the Polish furniture hub and leads in the export of furniture and joinery, with about a 14.3% share of domestic furniture production. It is therefore the region most exposed to the effects of Brexit. Overall, furniture is the third most exported sector to the UK at national level after machinery and vehicles, and it jumped to more nearly EUR 1.1 billion in 2021 from around EUR 820 million in 2020.

In eastern Member States other regions that are highly specialized in wood and furniture production, include the North-West and North-East of **Romania,** Central Slovakia in **Slovakia**, and West-Transdanubian in **Hungary**.

In **Italy** the furniture sector is the most exposed sector at national level according to the LFI. Two NUTS2 regions could be particularly at risk: Friuli-Venezia Giulia and Marche. Friuli-Venezia Giulia is the third Italian region in terms of furniture exports, after Lombardy and Veneto, with furniture exports contributing to nearly 40% of total regional exports, and the UK was its main trade partner. In 2020, the year of the pandemic, regional exports towards the UK experienced the sharpest drop among key EU destinations (-39%), and the UK became the second market after France[71]. Marche also experienced a strong contraction in furniture exports towards the UK in 2020, -22.1% with respect to 2019, the highest decrease among the principle regional export destinations[72]. Finally, the Autonomous Province of Alto-Adige has several manufacturing activities linked to the wood sector, but overall exports towards the UK account for a mere 3% and are mainly based on agri-food products, beverages and automotive components.

Nouvelle-Aquitaine in **France**, established in 2014 through the merger of three NUTS2 regions, Aquitaine, Limousin and Poitou-Charentes is one of the most exposed areas. It is France's leading region in terms of wooded areas (2.8 million hectares) and home to timber harvesting, sawmilling and furniture-making activities, as well as the paper industry. However, woods products and furniture represent a marginal share of French exports to the UK, and most of the production is for the internal market.

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[71] UdineToday, *Export del Mobile Fvg: settore arredo in difficoltà, tiene il Legno*, on-line article 13 November 2020.

[72] Regione Marche- Performance e Sistema Statistico, *Commercio estero della regione Marche - dati 2020.*

Similarly, trade in these products between the UK and the **Netherlands** is not particularly relevant, although Drenthe (North Netherlands), also underlined in the analysis by Thissen *et al.* (2019), shows the highest exposure among the Dutch provinces.

North Rhine-Westphalia in **Germany** could be particularly exposed, as it hosts some of the largest furniture manufactures, especially in Detmold[73]. In the Mecklenburg-Vorpommern Länder, the manufacture of wooden, wicker and cork products make up the third largest industrial sector with a share of some 9% of total industrial turnover. A local cluster has formed around the woodworking industry in the Hanseatic city of Wismar. The direct vicinity of the settlement area to the sea port enables worldwide export of wooden products to international ports. However, furniture and wood products represent a small share of German exports to the UK. German furniture exports to the UK (fifth market) fell by 9.3% to EUR 421.3 million in 2020 as a whole, with German furniture companies blaming the extra administrative work involved in exporting to the UK as a result of Brexit (rules and evidence about a product's origin, in particular). In fact 94% of the manufacturers surveyed at the beginning of 2021 complained about the additional red tape involved in customs formalities[74]. The new customs clearing procedures and new rules governing pallets and export packaging were making handling even more difficult. For 2021, 42% of companies expected a further decline in exports to the UK.

2.2.4 Agri-food products

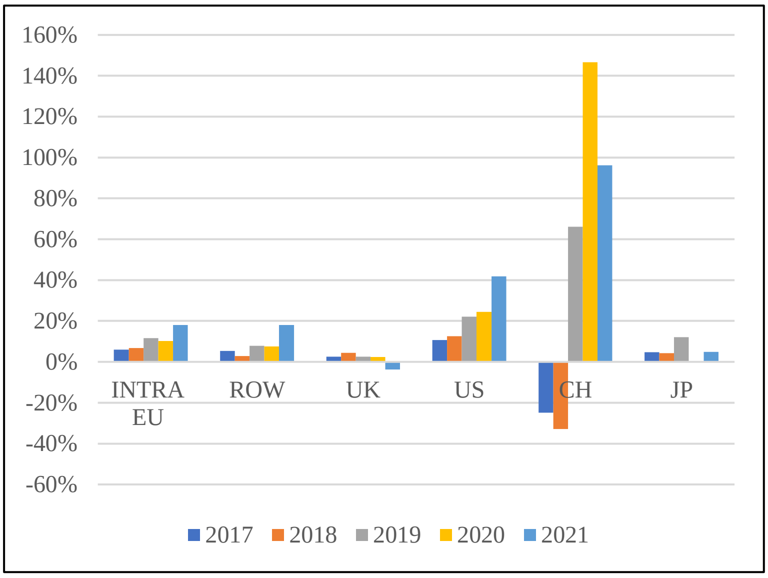
Agriculture and food related industries and services together provide almost 44 million jobs in the EU, including regular work for 22 million people within the agricultural sector itself (European Commission 2019). Food production and the processing chain account for 7.5% of employment and 3.7% of total added value in the EU. The output of the EU agricultural sector was estimated at EUR 427 billion in 2017. In 2020, overall EU27 agri-food trade (exports plus imports) reached a value of EUR 306.5 billion, 1% more than in 2019. EU27 exports increased by 1.4% compared to 2019, reaching EUR 184.3 billion, while imports reached EUR 122.2 billion, 0.5% higher than in 2019 (European Commission, 2021*d*).

The most important EU27 export destinations in 2020 were the UK, the USA, China, and Japan. More than 52% of EU agri-food exports went to these five

[73] The Schieder Möbel Holding GmbH, one of the largest European furniture manufacturers, is based here.
[74] According to an internal survey carried out by the Association of the German Furniture Industry (VDM) and the Associations of the Wood and Furniture Industry in North-Rhine Westphalia (VHK). Moreover, around half of the survey respondents also mentioned additional waits at the border, with 30% of businesses reporting delivery delays. See EUWID, *German furniture producers bemoan extra Brexit red tape*, on-line article 18 March 2021.

countries. The UK was therefore the first destination for the EU agri-food sector, underlining the importance of possible trade disruptions due to Brexit. Figure 2.11 shows the trends in EU exports for the agri-food sector[75] with top trade partners compared to 2016. In the last few years, EU exports to the UK grew at a slower pace than both intra-EU trade and trade towards other extra-EU partners. Moreover, agri-food exports to the UK were the only ones to register a decrease compared to other destinations in 2021, and world trade in the sector was only marginally affected by the pandemic. In fact, the decline in the value of EU agri-food exports overall in January 2021was mostly due to the decrease of EUR 792 million in exports to the UK. This could be the first indication of the effects of Brexit on the EU sector overall. Moreover, as underlined in the latest monitoring report on EU agri-food trade by the European Commission (2021*d*), anticipation of the UK's departure from the EU single market, had already produced an import disruption in 2020. The value of monthly imports in agri-food products from the UK continued to fall (-EUR 1 199 million, or -7%) compared to 2019[76].

Figure 2.11: EU agri-food products exports change compared to 2016, main destinations



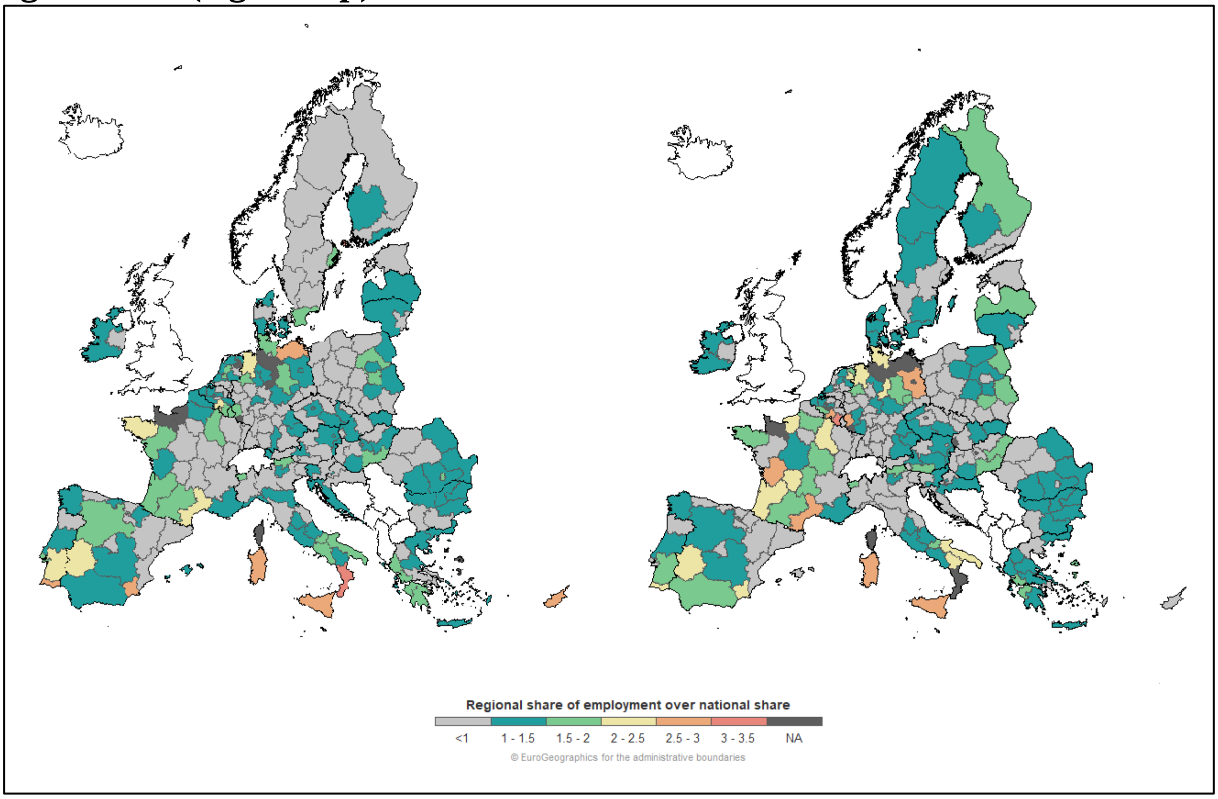
Even though the agri-food sector accounts for a small percentage of EU trade flows (around 5% and 1% of total intra and extra EU exports respectively), it remains an important sector for many European economies. Non-tariff measures introduced by the TCA, such as sanitary and phytosanitary standards, certifications procedures, and labelling, could significantly limit some Member States and regions from accessing the UK market and vice versa. The perishable nature of many agri-food products further impacts on trade flows in case of custom barriers and delays. The UK imports most of its agri-food products from the EU27, in particular dairy products, meat (poultry and pork), fruit, vegetables, and processed food. Agri-food products are among the top in terms of comparative advantage for several Member States. According to the LFI index analysis, Ireland, Denmark and Poland are especially exposed for meat and meat processing

[75] The products included in the calculations are: HS07 – edible vegetables; HS16 – preparations of meat and fish; HS20 – preparations of vegetables and fruits; HS08 – edible fruits and nuts and HS02 – meat, as these agri-food products represent most of the EU-UK trade value in the sector (highest LFI).
[76] While decreasing imports from the UK have affected the majority of agri-food products, the highest loss in value was reported for spirits and liqueurs (-16%).

products, while Spain, Belgium and Greece for fruit, vegetables, and dairy products. Moreover, in Greece and Poland, the agriculture sector accounts for around 10% of the total employment in the country. The analysis at regional level also shows that several regions in Portugal, Italy, France and Germany have a higher share of employment in food production with respect to their national average.

The maps in figure 2.12 represent the regions most effected by Brexit in the agri-food sector. The specialisation of regions in this sector, as explained in box 2.2, is captured by analysing employment both in agriculture (NACE A)[77] and in the manufacturing of agri-food products (NACE C10).

Figure 2.12: Regional exposure for the agri-food sector (left map) and for agriculture (right map)



Source: own elaboration based on Eurostat. Data are not available for regions in dark grey.

[77] One limitation in the analysis lies on the availability of data as the division of labour at the NUTS2 level is not disaggregate for type of agricultural products but includes all the NACE-A classification. For instance, a country such as Bulgaria, has a high percentage of employment in agricultural activities, but this is mostly limited to the cultivation of cereals and industrial crops (European Commission 2021*e*), that are of less interest in the EU-UK trade analysis. Moreover, several regions in Scandinavian Member States have a high level of employment when considering the NACE-A classification but this data is influenced by the sub-classification A2 – forestry and logging, not by agri-food cultivation. For the purpose of this work, details on the forestry and wood industry in these countries are presented in a separate section (2.2.3).

Ireland's agri-food industry remains a key component of its economy, accounting for some 8% of GDP and providing more than 160 000 jobs, mainly in the Northern and Eastern Region and in the Southern Region. It accounts for a major proportion of the exports of Irish-owned enterprises and its products are sold in over 180 markets around the world among which the UK is the biggest. This market accounted for one third of all Irish agri-food exports in 2021, although in 2016, the year of the Brexit referendum, it was 37%. With nearly EUR 1.3 billion, meat was the third most exported product in 2020, after pharmaceutical products and organic chemicals, while, with more than EUR 872 million, dairy products were in fifth position after machinery. According to a very recent report published by the Irish Food Board (Bord Bia 2022)[78], in 2021 the value of Ireland's food, drink and horticulture exports increased by 4% to a record EUR 13.5 billion in 2021. The value of exports to the UK was EUR 4.4 billion, showing a slight overall decline compared to 2020, A more pronounced decrease was registered for some dairy products and poultry[79]. However, the full impact of Brexit red tape is expected to hit Irish food exports in 2022, as more UK checks on imports enter into force[80]. According to the Department of Agriculture, around 60 000-70 000 export health certificates are issued every year for exports to third countries, but an additional 240 000 are expected due to the UK's departure from the EU.

The UK accounts for around 15% of **Spain**'s exports in agriculture, food, and drink. The two most exposed regions are Murcia and Extremadura. The prior is particularly exposed as its exports to the UK represented 3% of its GDP, double that of the national average, and more than 9% of its total sales abroad go to the British market (second export market), compared to the Spanish average of 7%[81]. The agri-food sector accounts for 75% of these sales[82]. Extremadura, instead, is a region with a high HHI, as around 40% of its manufacturing employment is in food production. This is mostly in vegetables and meat. However, at national level, exports of edible vegetables (second most exported product to the UK after vehicles) and edible fruits (fourth most exported product to the UK) increased in

[78] For a short summary, see Irish Food Board, *Irish Food and Drink Exports Enjoyed a Record Year as Value of Sales Up 4% to €13.5bn in 2021*, on-line article 12 January 2022.
[79] Some categories also saw a shift in exports to Northern Ireland rather than to Great Britain, due to a combination of serving new customers in Northern Ireland and also partly as a route for onward shipment to northern parts of Britain.
[80] The most complicated checks involve export health certificates that require Irish veterinary inspectors to sign off on agri-foods before they can be sent to Britain. The deadline for health certificates has been split so that most meat and food products will require a certificate from July 2022, while dairy products will require certificates from September. Composite products, such as pizzas and ready meals, and fish products will not require certificates until November. Irish Times, *Full impact of Brexit red tape to hit Irish food exports in new year,* on-line article 28 December 2021
[81] Cinco Dias, *La huerta murciana y la automoción aragonesa, las grandes víctimas de un Brexit duro*, on-line article 25 August 2020
[82] *Impact of Brexit on agri-food trade between the European Union and the United Kingdom*, NAT Section Meeting of 25 April 2019.

2021 compared to 2020, reaching a total of EUR 2.36 billion from EUR 2.13 billion while, other agri-food products, such as meat, declined.

Together with Spain, Italy, Portugal and Greece account for most of the European production of olives and olive oil. In **Portugal**, the regions of Algarve and Alentejo are particularly exposed as most of the national olive oil production is concentrated here[83]. Algarve has also a high HHI. However, a preliminary analysis[84] has estimated that the most heavily impacted sectors, for Portugal, are automotive (-EUR 90 million) and consumer goods (-EUR 92 million). Agriculture, food and drinks is third (-EUR 57 million), but mostly concerns Portuguese exports of alcoholic beverages and fish products, followed by edible vegetables and fruits. The Central Region hosts some of the most reputed wine producers in Portugal[85] as well as an important aquaculture production cluster[86]. Algarve is also a major aquaculture centre.

Italy, on the other hand, seems to be particularly affected by its exports of extra virgin olive oil to the UK. During the first five months of 2021 these decreased by 13%. Exports of other agri-food products such as Italian ‘pasta’ (-28%) and tomato sauce (-16%) experienced even more dramatic declines. There is concern that non-EU food and drinks that do not comply with EU safety standards could be favoured in the UK over Italian products and that Brexit could lead to a rise in counterfeits and Italian food product imitations[87]. The most exposed regions are those in the south of Italy (the most disadvantaged area in Italy) such as Puglia, Basilicata, and Campania, with the highest exposure in Calabria[88]. Sicily and Sardegna show higher exposure both in terms of employment in agriculture and in food processing. With the exception of Puglia, all the southern Italian southern regions cited have a HHI values higher than the Italian average, identifying their economies as more vulnerable to possible trade disruption.

Dairy products and edible fruit and vegetables are the most exported products to the UK by **Greece**, after pharmaceutical products. Concerning olive oil, Greek exports seemed in countertendency compared to Italy or Spain in the first quarter of 2021 with respect to the same period in 2020, showing a significant increase, both in terms of quantity (+27.6%) and value (+33.1%)[89]. Concerning other agricultural products, there is no available information on export dynamics for

[83] For instance, the SOVENA group is located in Alentejo.
[84] Rujas J., Romero I., Ledesma S. and Ardiaca P., *Portugal-Brexit,* on-line presentation.
[85] For instance, the wine ‘regions’ of Dão DOC and Bairrada DOC are located here.
[86] The Spanish company Pescanova has a production centre in Mira.
[87] MailOnline, *Brexit takes a bite out of the Mediterranean diet: Producers warn UK's stocks of Italian pasta, extra virgin olive oil and tomatoes are running low because of red tape,* on-line article, 7 September 2021.
[88] The region is famous for producing and exporting the famous ‘Tropea onion’. See Srettoweb, *Brexit: a rischio la Cipolla Rossa di Tropea e tutti i prodotti IGP calabresi, ecco perché,* on-line article 17 February 2020.
[89] Greek Food News, *43,7% rise in Greek EVOO exports to the UK in 2021,* on-line article 14 June 2021.

2021, but there could be additional costs for Greek fruit and vegetable exporters to the UK due to the burden of customs duties foreseen in the TCA[90]. Most of the territory in Greece is exposed in these sectors, but Western Greece, where the agri-food sector holds a dominant position[91], and the Peloponnese Region, traditionally based on agricultural production[92], seem to be more at risk of Brexit effects. Both regions have also a high HHI.

With EUR 57 billion, agri-food exports in **France** represent 13% of the total exports 9 % of which go to the UK and 54% to the rest of the EU. The UK is the third destination for French agri-food exports (after Germany and Belgium) and France accounts for 10% of the UK's agri-food imports, after the Netherlands and Ireland. One particularly exposed region is Brittany, as the UK is the fourth largest recipient of its agri-food exports (9%), especially for meat and dairy products. Cereal products, bakery products and fruit and vegetable products are also particularly sensitive to Brexit (see Henry *et al.* 2018). Over the first nine months of 2021, farming and agri-food exports to the UK from Brittany fell by 19% compared to the same period in 2019, bringing a loss in turnover of EUR 53.2 million for the sector[93]. The main reasons were rising costs and increased delivery times, especially in the first quarter of 2021 as new measures were put in place. Another particularly exposed region in agri-food products is the Poitou-Charentes, the most important region for the production of goat's milk cheeses in France and homeland to the majority of goat cheeses. Instead, the Occitanie region, which encompasses the vineyards of Languedoc, Roussillon, part of the South West and the Rhone Valley, is a leader in organic winemaking. In 2018, around 350 wine companies in the region exported EUR 100 million worth of wines to the UK, corresponding to 23% of the French wines exported to the UK[94]. France is the UK's leading supplier of wine, ahead of Italy, New Zealand, Australia and Spain. However, while some French wine producers noted that apart from a slight fall in exports to the UK in 2020 due to the pandemic and related restrictions, the additional administrative burdens brought about by Brexit have not had a significant impact[95], for French operators who have never before shipped their wine to a third country, the additional administrative burden might be higher. The cost of the new procedures also mainly affects small and medium-sized businesses.

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[90] Greek Food News, *Negative impact of Brexit to vegetable exports to the UK*, on-line article 7 January 2021.

[91] The region holds high market shares in the production of specific agricultural products (e.g. strawberries) and many PDO-PGI and traditional products.

[92] The sub-regions of Messinia and Laconia are famous for their extra virgin olive oil (of the Koronean variety) considered to be one of the best in the world, while Kalamata is known for its world-famous olives.

[93] Euronews, *A year since Brexit: How has it affected European exporters to the UK?*, on-line article 27 December 2021.

[94] France Bleu, *Brexit: quelles conséquences économiques dans la région toulousaine?*, on-line article 31 January 2020.

[95] Euractiv, *Brexit, climate change nothing to 'wine' about, say French growers*, on-line article 27 April 2021.

Other regions that seem to be particularly exposed include Denmark, Belgium, the Netherlands, and Germany, especially in meat-related products. In this sector, **Denmark** is the biggest supplier of pig meat to the UK (see UECBV 2021), and the second exporter (25%) to the UK after Ireland (57%). Meat and edible meat is the third sector for Danish exports towards the UK, and it experienced a remarkable decrease in 2021, falling to EUR 304 million from around EUR 370 million in 2020. Midtjylland, Denmark's largest agricultural area, which hosts the Danish Crown Group, the largest meat-processing company in Europe is a key exposed region.

Belgium is one of the top five suppliers of pig meat to the UK, and production is mainly concentrated in southern Wallonia, specifically in the provinces of Namur and Luxembourg (see SPW 2020), which seem to be particularly exposed to Brexit effects. Both provinces have also a high HHI. The **Netherlands** is one of the top five suppliers of beef, pig meat and sheep meat to the UK. Meat in fact ranks first for Dutch agri-food products exported to the UK, and a preliminary analysis has estimated a higher impact for this sector compared to other agri-food products (van Berkum *et al.*2018). Brexit has caused a major decrease in Dutch food exports to the UK[96]. In the first eight months of 2021, exports of vegetables, meat and dairy to the UK decreased compared to the prior year. The most exposed Dutch regions are in the north, such as Friesland, Groningen and Drenthe, which have a large food industry and related centres of knowledge and excellence.
a
Agri-food processing and agricultural products are also key sectors for several regions in eastern Europe. However, the UK prevalently imports machinery and equipment from eastern EU Member States, and agri-food products represent a small share of total UK imports. Thus, Brexit effects should be minimal on these regions that are more specialized in agriculture-related activities. For instance, for **Hungary**, trade with the UK is small at national level (4% of exports, and 2% of imports) and, of this, agri-food products represent a marginal proportion. Agriculture and agri-food production is mostly concentrated in the Great Hungarian Plain, which involves the southern regions of Southern Great Plain, Southern Transdanubia, and the Northern Great Plain. Similarly, trade with the UK in agri-food products constitutes a small share for both **Bulgaria** and **Romania**, where agriculture is still an important sector for a large part of the regional working population.

Interestingly, **Poland**'s agri-food product exports to the UK experienced an increase in 2021, despite Brexit. Differently to other eastern Member States, these are more important in the overall exports towards the UK. The British market is

[96] Fresh Plaza, *Fewer agri products from the Netherlands shipped to UK due to Brexit*, on-line article 20 December 2021.

in fact an important destination for meat and edible meat offal (31.8% of total agri-food exports to the UK in 2017), tobacco (19%), preparations of cereal, flour, starch or milk (13.2%), vegetables (8.6%) and dairy products (7.2%)[97]. In particular, the export of meat products (the fifth sector in total Polish exports)[98] reached EUR 592 million in 2021, increasing by nearly EUR 10 million compared to the previous year. At regional level, the most exposed regions in agri-food products are Podlaskie Voivodeship, also called the 'Dairy Valley' as it boasts the highest milk production and processing levels in Poland[99], and Lubelskie Voivodeship, where nearly 40% of workers are employed in agriculture, more than twice the national level (see case study in chapter 3). Both these Polish regions have an HHI higher than the national average.

[97] See Zawojska (2019) for a complete analysis of agri-food trade between Poland and the UK,

[98] Poland is also the third largest supplier of beef to the UK (UECBV 2021).

[99] Podlaskie is home to European milk processing giants, such as Mlekovita (the largest dairy group in Central and Eastern Europe), Mlekpol (one of the largest dairy producers in Europe), and Piątnica (recognized by the London Stock Exchange as one of the most inspiring European companies). See https://investinpodlaskie.pl/en/agri-food-sector/.

3 LRAS and Brexit: experiences from the ground

This chapter presents eight cases studies of regions dealing with the impact of Brexit. Each case provides an overview of the region, stressing the links with the UK, and analyses the effective or potential impact of Brexit on its economy, with specific focus on trade. Key challenges, but also opportunities, are then discussed. The last section of each case illustrates the remedies adopted or planned to mitigate the negative impact of Brexit. Other than desk research and data (when available) analysis, key information was also collected through interviews with both LRA representatives and economic stakeholders. The sample of cases also includes three regions previously analysed in the CoR report in 2018 (Hesse, Flanders, and Lubelskie), to allow for a comparison between the situation described in 2018 (i.e. before Brexit) and the current one, after the TCA. Other than ensuring a geographical balance, the eight LRAs offer a broad overview of different regional economic backgrounds and stress how the impact of Brexit can be asymmetric, both across EU regions and sectors:

• **Flanders** in Belgium is an export-oriented region with significant trade relations with the UK, which is its fourth most important trading partner. Brexit has impacted both on trade and student mobility, while also increasing the region's attractiveness to foreign investors. The regional government has put a number of tools and initiatives in place to mitigate the effects of Brexit. Companies that want to move markets, participate in events, retrain, or educate themselves can apply for specific regional subsidies. Moreover, the 'Brexit Impact Scan' is an inspiring tool enabling all Belgian businesses to estimate the impact of Brexit on their trade costs and to determine what is needed for them to comply with the new EU-UK trade rules.

• **Hesse,** one of the strongest and most dynamic economies in Germany, is an important trade partner for the UK, in terms of both goods and capital. The UK is likewise a major supplier of commodities to the Hessian economy. While Brexit has reduced the importance of the UK for regional trade, it has affected individual enterprises, such as SMEs or those without extra-EU trade relations, more than specific sectors. Moreover, R&D cooperation projects with the UK have become more difficult. The state government offers several measures to deal with Brexit, targeting above all SMEs, aimed at reinforcing cooperation, technology and innovation to make better use of foreign market growth potentials.

• **Lubelskie**'s economy, in Poland, is dominated by the role of agriculture. Moreover, the region has historically experienced significant outflowing migration, especially toward the UK and depopulation. Key exports to the UK are agri-food products, followed far behind by chemicals and machinery. Economic relations with the UK have not been significantly affected by Brexit, and regional trade dynamics are similar to national ones, with stable exports to the UK, even growing, in recent years. However, a slight reduction in both permanent and temporary migration toward the UK has been observed since Brexit, with returning migrants apparently having a positive impact on the local economy.

• **Normandy** in France is one of the most severely affected regions due to its high exposure in the fisheries sector. In fact, key remedial actions are mainly focussed on this sector, through the supporting measures at national level specifically designed for fisheries. The case also highlights the boost in trade relations between Normandy and Ireland, since relations with British ports have decreased significantly. Moreover, among the effects of Brexit, the interruption of the Interreg Programme France (Channel) England is undoubtedly creating additional challenges for local enterprises and communities.

• **South East** in Ireland is among the fastest growing regions in the EU, but it has a higher unemployment rate and lower per capita income than the national average. One third of its people are employed in sectors estimated to be either severely or moderately affected by Brexit. However, data shows a sharp loss in overall imports from the UK since 2015, and a decline in the export of specific products in early 2021. The Port of Waterford and Rosslare-Europort, strategic for the regional economy and trade due to their geographic proximity to EU trading partners, are seen as extremely important in Ireland's response to Brexit. Companies have mostly taken remediation measures autonomously and/or with support from the national government.

• **Veneto** in Italy is one of the most important regions for Italian trade and before the covid19 pandemic and Brexit the UK was one of its top trade partners. Brexit significantly impacted on Veneto-UK trade flows, especially at the beginning of 2021, and the UK is currently no longer among the top most important destinations for Veneto's exports. Agri-food, beverages, and furniture sectors have been most affected. However, it seems that enterprises in these most exposed sectors have been able to re-orientate their exports towards different EU markets, as the example of Veneto's wine sector illustrates.

• **West Sweden** is specialised in several sectors such as automotive, chemicals, pharmaceuticals, foodstuffs, and business services, and hosts the port of Gothenburg, the most important port in Scandinavia. It has significant trade and economic relations with the UK. Exports to the UK fell sharply between 2019 and 2020, especially in Västra Götaland, but preliminary data for 2021 indicate an increase, even though differing by sector. It seems that although Brexit is not having a particular effect on local companies, the costs and challenges of dealing with the TCA might be higher for local service companies or SMEs with no trade experience with extra-EU countries.

• **Zeeland**, one of the largest agricultural regions in the Netherlands, has high specialization in the chemical industry and, with the North Sea Port, in trade and logistic activities. Since the Brexit referendum, the relative contribution of trade with the UK has decreased more sharply than trade with other partner countries. However, the main impact of Brexit is related to the loss of future EU interregional cooperation projects. The case also illustrates the creation of the Straits Committee, which involves, other than Zeeland, another seven LRAs across the Netherlands, Belgium, France and the UK. This is probably the only spontaneous interregional initiative in the EU to mitigate Brexit effects and maintain cooperation links across the channel.

Table 3.1: Case studies overview

LRA	Key sectors of specialisation	Main Brexit impact	Remedial actions
Flanders, Belgium	Services, chemicals, pharmaceuticals, logistics, automotive, agri-food products, mineral products, textiles	***Negative:*** • Estimated job loss, especially in East- and West-Flanders • Flat trading volume to the UK • Loss of student mobility ***Positive:*** • Increasing attractiveness for foreign investors • Increased trade relations with Netherlands, France and Germany	•Regional Brexit Action Plan, which contained round tables, social media campaigns, business advisors and helpdesk • Regional subsidies to change markets, participate in events, retraining and education • Planned use of the BAR
Hesse, Germany	Automotive and supply industry, mechanical and industrial engineering, metal and electrical industry, chemical and pharmaceutical sector, biotechnology and medical technology	***Negative:*** • Trade decline with the UK (it became the 7th most important destination compared to 3rd and 4th places prior to Brexit.) • Higher challenges for SMEs or enterprises without extra-EU trade relations • Difficulties in R&D cooperation and additional costs for the recognition of professional qualifications ***Positive:*** • Reorientation of markets from the UK toward Hesse (especially regarding the financial sector) • Estimated increase in trade and relations with Ireland	•Regional initiatives to support SMEs in market reorientation • Improvement of support infrastructures for cooperation, technology and innovation
Lubelskie, Poland	Agri-food products, construction, chemicals, machinery	***Negative:*** • Gradual reduction of share of UK export • Slight reduction in both permanent and temporary migration toward the UK • Expected increase in challenges for exporters due to sanitary and quality checks on agri-food products ***Positive:*** • Returning migrants are a positive stimulus for start-ups and a local connection with the UK market	• Exchange of solutions and facilitation of business networks

Normandy, France	Fisheries, energy, transport equipment, pharmaceutical, food, glass and textile industry, logistic activities	***Negative***: • Trade imbalance with the UK in 2021, after years of surplus • Strong impact on fisheries • Strong impact on tourism, student and passenger mobility • Loss of cross-border cooperation programmes ***Positive***: • Launch of new service and start-ups to deal with the Brexit, job creation • Increasing trade relations with Irish ports	• Use of national initiatives to support fishery activities • Planned use of the BAR
South-East, Ireland	Agriculture, food processing and beverages, construction, mechanical engineering	***Negative:*** • Sharp decrease in imports from the UK • Drops in exports to the UK in some specific sectors, like food, beverages, fuel and animal fats. • Potential negative impact on jobs for one third of workers ***Positive***: • Significant growth in traffic in Rosslare Europort, which offers direct connection to continental Europe • Adaptation process has helped companies become more competitive	• PrepareForBrexit information website with Post-Brexit Advisory Support and Evolve Strategic Planning Grant • Use of national initiatives to support fishery, agriculture and agri-food sectors, such as Capital Investment Scheme for the processing and marketing of Agricultural Products • Support from the European Maritime and Fisheries Fund (EMFF) Programme • Use of BAR to finance Rosslare Europort infrastructure for additional customs procedures
Veneto, Italy	Machinery, furniture, articles of clothing, agri-food products, and beverages	***Negative***: • High impact on exports in 2020 and first half of 2021 • Loss of the UK among the top trade partners • Estimated higher impact on GDP compared to other Italian regions ***Positive***: • Enterprise re-orientation towards new markets • Increased regional exports towards new EU destinations	• Enterprises associations information and help-desk initiatives
West Sweden	Automotive, chemical, foodstuff, pharmaceutical, mining, transport, storage, logistic	***Negative***: • Sharp decrease in exports toward the UK in some specific sectors and in the Västra Götaland county • Higher costs for SMEs to deal with the new rules ***Positive***: • Continuing cooperation in Horizon • Wider use of tariff preferences and duty savings	• Information campaigns

Zeeland, the Netherlands	Chemical industry, logistics, tourism, fishery and agriculture	***Negative***: • Strong impact on cross-border cooperation projects • Fall in trade • Estimated impact on GDP higher than for other Dutch regions ***Positive***: • Certain industries can expect to improve their competitive positions	• Creation of the Straits Committee • Announced support initiatives at national level financed through the BAR for companies operating in sectors affected by Brexit

Box 3.1: Brexit impact on municipalities, key findings from structured interviews

To obtain a more complete overview of the impact of Brexit on LRAs, additional structured interviews (in the form of questionnaires) were conducted with seven representatives of municipalities from Romania, Spain and Latvia. Key results are:

• Municipalities (one from Romania and the two from Spain) reported a negative impact on their exports, while for the others these remained unchanged; the same was true on the import side. The Latvian municipality, however, also reported a significantly negative impact on imports, while one of the Spanish municipalities specified that the TCA had significantly impacted on imports.

• Textiles and apparel, tourism, chemicals, and food products were the sectors indicated as the most affected. One Spanish municipality also reported a negative impact on e-commerce and the property market for the sale of second residences.

• Two municipalities reported that Brexit and the TCA had had a negative impact on local economic growth (i.e., reduced GDP) and had reduced FDI from the UK. The municipality in Latvia, instead, noted a negative impacted on employment (i.e., job destruction).

• One municipality in Spain specified that the fact that the TCA allows for the avoidance of custom tariffs in exports and the postponement of the border procedures till July 2022 is a positive aspect. However, the negative aspects include costs for the management of procedures, licences, etc. for drivers and road transport, and the loss of UK clients/importers in general. Moreover, the TCA has had a notably high impact on tourism and building sales.

• One Spanish municipality stressed that Brexit has created new trade opportunities in the metallurgical industry and wine sector.

• None of the respondents were aware of the BAR, but four out of seven are now interested in using it.

• Only one municipality, from Spain, reported local initiatives to mitigate the effects of Brexit. Implemented by the regional government of Galicia, these are: the IGAPE[100] RESPONDE BREXIT Service, with personalized services for

[100] Instituto Galego de Promoción Económica. See http://respondebrexit.igape.es/.

companies with specific queries about Brexit, including a personalized online self-diagnosis tool for enterprises, which enables them to determine the impact of Brexit, in order to anticipate and adopt necessary measures[101]; the Brexit office in London for direct advisory services in the UK[102]; information and training services[103]; the Brexit Cheque, foreseeing financial aid based on personalized consultancy services (business diagnosis and preparation of a contingency plans), subsidizing up to 80% of the costs.

3.1 Flanders (Belgium)

Regional economy overview

Flanders is the most populous region in Belgium, with approximately 6.6 million inhabitants in 2021 and it is also one of the most urbanised regions in the EU. Flanders is a relatively wealthy region, with a GDP per capita of more than EUR 34 000 (in PPP) and a productivity per employed person of EUR 79 000 (also in PPP) in 2020 (Statistiek Vlaanderen, 2021). Flanders' labour market has improved over the past decade, with 193 thousand unemployed in 2021 as compared to nearly 265 thousand in 2010 (Statistiek Vlaanderen, 2022). However, long-term unemployment has increased, with 36% of the unemployed having been unemployed for longer than two years, as compared to 24% in 2010.

Flanders is also a heavily export-oriented region. In fact, it is responsible for the vast majority of Belgium's exports (83.2%), far surpassing the figures for the regions of Wallonia and Brussels[104]. This is in part due to its function as a logistics hub with several large ports and good multimodal connections – primarily the port of Antwerp, the second largest port in Europe in 2018 with 224 million tonnes in maritime goods turnover, as well as the ports of Zeebrugge, Ghent, and Oostende (Flanders Department of Mobility and Public Works, 2018). Since the financial and economic crisis of 2009, exports have grown steadily, reaching new records year after year[105].

Flanders has a typical well-developed economy based on services (73.3% of GDP) and industry (25.8%) with only a limited impact from the primary sector

[101] This tool has a checklist with questions covering five areas: 1) Strategy and business model, 2) Taxation and Customs, 3) Legal and Regulatory Framework, 4) Organization and People, and 5) Financial Environment, and provides an assessment report on the impact of Brexit and the degree of exposure to it.
[102] About customs and administrative management; supply chain; tax consultancy; labor consultancy, especially worker mobility; product homologation, new certifications, and industrial property.
[103] Igape Brexit, a fortnightly newsletter with the latest news and developments on the issue. Webinars with the participation of international experts and sectors and companies particularly affected. Reports and thematic notes for direct download and of maximum interest to companies
[104] Invest in Flanders, *Flanders, a strong backbone for international trade*, on-line figures.
[105] Flanders Fiannce and Budget, *The Key Strenghts of Flanders*, on-line figures.

(0.9%). The main exports are chemical and pharmaceutical products, labour-intensive products like diamonds and minerals, and capital-intensive goods (including vehicles). With EUR 27.1 billion exported in 2018, the UK ranked fourth in the principal destinations after Germany (EUR 58.9 billion), the Netherlands (EUR 42.2 billion) and France (EUR 39.7 billion). Flanders' share of the total Belgian exports to the UK accounts for 86% (Departemement Buitenlandse Zaken, 2019). Key products exported to the UK from Flanders before Brexit (Flanders Department of Foreign Affairs 2017) were transport equipment, for which the UK was the first destination in 2016, chemical and pharmaceutical products, and machinery. Other important products were plastics, agri-food products, mineral products and textiles.

Brexit impact

As an export-oriented region with significant exports to the UK, Flanders was assessed as particularly vulnerable to Brexit turbulences. In a 2019 assessment, Belgium was deemed to be the most badly affected country in the case of a hard Brexit, potentially losing approximately 2.35% of its GDP and 42 000 jobs (Vandenbussche, 2019*a*). Flanders would have been more affected than Wallonia (Vandebussche 2019*b*)[106], with job losses to the tune of 28 000 in a hard Brexit scenario. Most jobs would have been lost in the Province of Antwerp (7 900 jobs estimated to be lost), and, relatively speaking, the impacts would have been strongest in East- and West-Flanders (1.15% and 1.28% of all jobs). The most affected sectors, accordingly, were food and beverages, administrative and support, as well as textile activities.

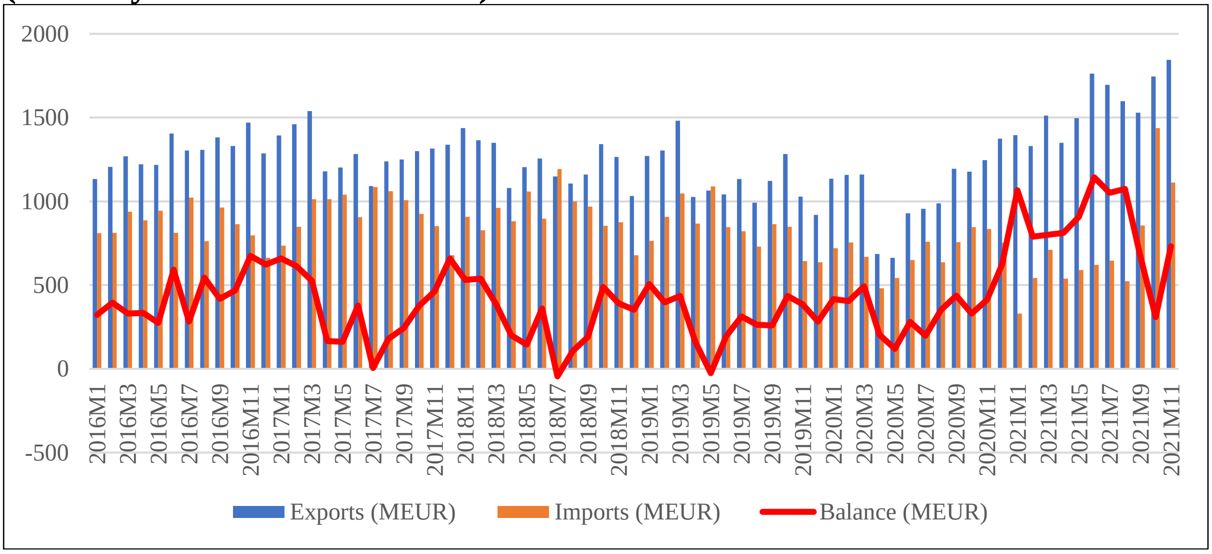
As underlined before, the UK was Flanders' fourth most important trading partner in 2016 (Brexit referendum), signalling a high degree of interlinkage (Departement Buitenlandse Zaken, 2018)[107]. Overall, Flanders has maintained a positive trade balance with the UK over recent years, exporting on average more than importing. Although 2019 and 2020 saw the lowest export volumes to the UK, there was a strong recovery in 2021[108]. In 2019, EUR 13.7 billion was exported to the UK, a drop from the EUR 15.5 billion in 2016. This fell further to EUR 12.7 billion in 2020. However, exports started to increase in the second half of 2020, and in 2021 reached a higher level than that of the 2017-2020 period. Imports, on the other hand, experienced a significant decrease between the end of 2020 and the beginning of 2021, but then increased rising above 2019 levels by the end of 2021.

[106] Vandenbussche, H (2019b). Regional, Provincial and Municipality-Level Analysis of the Impact of Brexit on Belgium. Report prepared for Flanders Department of Foreign Affairs, Belgium November 2019

[107] Departement Buitenlandse Zaken (2018). Actieplan Brexit. November 2018

[108] Please note that this figure does not include December 2021 data. As such, the 2021 export volume is underestimated.

Figure 3.1: Trade balance between Flanders and the UK, 2016 – 2021 (monthly data in EUR million)



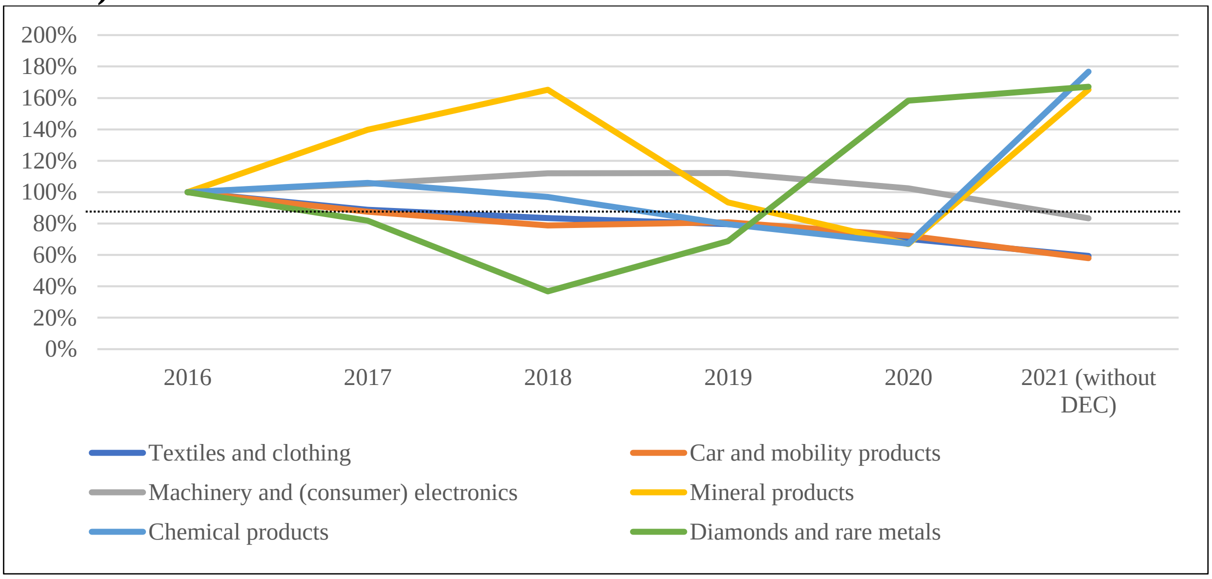
Source: own elaboration based on NNB Stat (2022), Dataset: Buitenlandse handel -Vlaams gewest - Nationaal concept.

Interviews with public representatives suggest that trade with the UK did not experience significant growth to the same extent that occurred with other important trade partners in 2021. As companies wanted to avoid legal uncertainties, they moved their export schedule up. In fact, while trade volume to the UK stabilised between the second half of 2020 and the end of 2021, trade grew with the Netherlands (+ 28%), Germany (+ 31%), and France (+20%). When analysing the period November 2020 to November 2021 in more detail, the representatives point to a substantial increase in export volumes.

The composition of Flemish exports to the UK from 2016 to 2021 (excluding December 2021 data) is presented in the figure below. In 2016 the most important sectors in terms of export volumes to the UK were: car and other mobility products (24% of all exports); chemical products (16%); agri-food products and machinery/consumer electronics (approx. 9% each). Between 2016 and 2021, this split changed significantly. Car and other mobility products declined notably from 24% of the export share in 2016 to just 12% in 2021 (i.e. 58% of their 2016 volumes, EUR 2.14 billion). Machinery and electronics declined to 83% of their 2016 levels, or approx. EUR 1.11 billion, and this sector is no longer among the top exports to the UK. Another sector experiencing remarkable decline is textiles, which dropped to 59% of its 2016 volumes, or around EUR 483.5 million. Overall, the economic impact of Brexit has been observed to a higher extend in sectors relying on high TCA regulatory compliance, such as agri-food products and beverages, machinery, cars, and textiles.
Positive developments were, however, observed in chemical products, which increased by 77% in comparison to their 2016 levels to EUR 4.43 billion; mineral products, which increased by 65% in comparison to their 2016 export volumes to

EUR 1.75 billion; and diamonds and rare metals, which increased by 67% as compared to 2016 levels to EUR 1.14 billion.

Figure 3.2: Flanders' export volumes of selected sectors to UK (2016 = 100%)



Source: own elaboration based on NNB Stat (2022), Dataset: Buitenlandse handel -Vlaams gewest - Nationaal concept.

Nevertheless, the fluctuations illustrated above may not solely be attributed to the impact of Brexit. Fluctuations in export volumes may arise due to external factors not directly or solely related to Brexit. For instance, exports in mineral products may also have been influenced by the increased price of fossil fuels in the energy markets in 2021. Or, increases in pharmaceutical volumes may have been affected by the pandemic.

One significant effect of Brexit is that Flanders has increased its attractiveness to foreign investors. Inflow of foreign investments totalled nearly EUR 2.9 billion in 2021, half a billion more than that of the previous year[109]. The region attracted 295 new foreign investment projects, representing more than 6 200 potential new jobs. Brexit has also driven a record number of British investments into the region. Since 2016, 95 foreign companies indicated they had invested in Flanders due to Brexit, accounting for around 3 100 jobs, and an overall investment volume of EUR 2.2 billion. Businesses from the UK accounted for 49 investment projects in Flanders. Of this total, Brexit was the reason for the decision to start doing business from Flanders in 30 cases.

Concerning human capital mobility, student flows saw a significant decrease compared to previous years. The highest level of outgoing students was observed

[109] The Business Times, *Brexit drives increase in UK investment projects in Flanders*, on-line article 18 January 2022.

in 2017, with more than 1 000 students, while in the last academic year, only 200 went to the UK. One reason for this decline is the UK's withdrawal from the Erasmus Programme, as this accounted for around 70% of outgoing students. Alternative exchange channels are more complicated than Erasmus (higher administrative burden), and are accordingly, less attractive. In terms of research projects, the UK will still participate in Horizon Europe, but some impacts are expected. In Horizon 2020, approx. 50% of all Flemish projects involved a UK partner. The flow of professors and related academics coming to Flanders or going to the UK will likely be impeded due to differences in labour laws.

Finally, in terms of the cultural and tourism sectors, no concrete data is available, but negative trends are observable due to the higher administrative burden for cultural sector activities in the UK. In terms of tourism, while incoming and outgoing is not impeded, people seem to be waiting and observing. School trips to West Flanders ("Flanders Fields") were important sources of UK tourism: there are challenges tied to the cross-channel movement of busses and schools are taking the necessary steps to plan these trips.

Key challenges and opportunities

In general, according to the interviews, the TCA is deemed to be very important, as it provides the general framework for EU-UK trade.

However, there are specific challenges for Flanders and its sectors. For agri-food products and beverages, there are tight sanitary and phytosanitary checks at the border. This is particularly burdensome for products which have a short expiry date as any delays reduce the shelf life in the target market. While the UK has not fully implemented these rules yet, Flanders did so in January 2021. This has created legal uncertainty among companies, and some may change export market once these rules are implemented in full.

Rules of origin are instead a big factor for the automotive industry, making it burdensome to trade across the EU-UK border. This sector in Flanders, as illustrated above, has experienced a remarkable drop since the Brexit referendum, and full implementation of the rules of origin may further affect car exports towards the UK. Trade in vehicles is particularly important for the Port of Zeebrugge, the largest car handling port in the world with a total annual volume of 2.8 million new vehicles (in 2019), of which no less than 1 million were exported to the UK[110]. About 35% of all cargo in Zeebrugge is UK-related. More controls, longer transit times and the higher costs related to Brexit could lead to major challenges and a subsequent decrease in trade with the UK. Moreover, as

[110] Associated British Ports, *Brexit-proof: the Port of Zeebrugge*, on-line article 17 September 2019.

UK ports are currently struggling with logistic problems, this might also impact Flanders' port supply chains. While the longer-term effects are still difficult to predict, Brexit does not seem to have caused any significant delays or congestion in Zeebrugge, and after a few weeks of the TCA, cargo volumes were slowly rising towards their usual levels[111]. Similarly, the port of Antwerp recorded an 11.1% yearly growth in total throughput with the UK and 12.1% with Ireland in the first half of 2021 compared to the first six months of 2020[112].

Overall, it is important to look at which sectors diverge (i.e., if there is divergence, UK-based companies will have to adapt to continue to serve the EU market) in terms of regulatory aspects. A number of companies were based in the UK to service the EU market. As easy access to the EU market is no longer a given (due to rules of origins etc), in the long term they may want to relocate.

Remediation actions implemented

According to the interviewees, Flanders came into Brexit relatively well prepared. After the Brexit referendum, Flanders started preparing companies and a Brexit Action Plan was set up in November 2018 (Departement Buitenlandse Zaken 2018). The Flemish government has, in fact, set up several tools and programmes to alleviate the impact of Brexit including company round tables, social media campaigns, a business advisory to companies (changes to procedures, customs, sanitary and phytosanitary checks), a Brexit helpdesk on any questions regarding changes to the regulatory framework, support for the internationalisation of SMEs and international diversification (i.e. shifts away from UK markets)[113]. One particular initiative is the 'Brexit Impact Scan'[114] (a similar tool is used by Galicia region in Spain as reported in box 3.1), which is an instrument available to all companies in Belgium to estimate the impact of Brexit on their trade costs and provide an indication of what is needed to deal with the new EU-UK trade rules.

Specific subsidies have also been set-up at regional level for companies to change markets, participate in events, retraining and education. For instance, the SME Growth Subsidy was aimed at companies that want to diversify and enter new markets besides the UK (Flanders Investment & Trade, 2019). It focuses on strategic advice with a subsidy up to EUR 25 000 a year per company for consultancy, and an annual grant of EUR 25 000 for the recruitment of strategic employees. For international customisation, up to EUR 18 750 for start-ups and EUR 15 000 for mature organizations can be allocated to projects in emerging countries and developing economies, but Brexit-related projects could also

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[111] Espo.be, *Port pro of the month: Tom Hautekiet (BE)*, on-line article 29 Janaury 2021.
[112] Port Technology, Port of Antwerp sees traffic surge despite Brexit and pandemic, on-line article 13 July 2021.
[113] See Flanders Investment & Trade (2019) for more detail.
[114] https://brexit-impact-scan.be/nl/#/welkom. An English demo video is available at flandersinvestmentandtrade.com.

receive this funding if the application is well substantiated. Moreover, in 2020 the regional government announced (Department of Chancellery and Foreign Affairs, 2020) extensions to 2021 and 2022 for the Flanders Investment and Trade export promotion plan and the Flanders' Agricultural Marketing Board initiatives, with additional support measures for companies severely affected by a hard Brexit (e.g. for compliance with customs and regulatory obligations).

Moreover, the BAR, which could support similar activities to those previously initiated by the regions is currently in its implementation phase. An important activity currently underway is the mapping of the biggest Brexit-related problems, in terms of the companies and sectors most affected. These will then be targeted through funding. The BAR is seen as an appropriate tool to help mitigate the effects of Brexit, and facilitate EU economies in taking the necessary actions to alleviate these impacts. However, it must be noted that it is not possible to compensate all the negative impacts with the BAR, as funding comes with issues such as timing or rules-compliance, such as those regarding state-aid. It is thus not expected to fully compensate the losses in the export market.

3.2 Hesse (Germany)

Regional economy overview

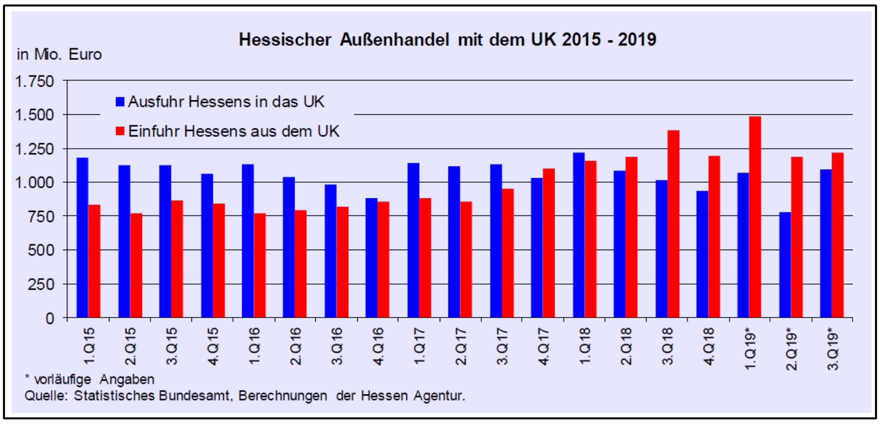
Hesse is one of the strongest economies in Germany, and one of the most dynamic economic regions in Europe with above-average labour productivity and a stable job market. Major multinational companies form the backbone of its economy, which is focused around a multi-faceted range of medium-sized companies. Its economy is based on several specialisations, including the automotive and supply industry, mechanical and industrial engineering, metal and electrical industry, the chemical and pharmaceutical sector, biotechnology and medical technology. Well-developed activities are also found in the mobility and logistics sector, ICT, financial services, aerospace, and environmental technology.

Hesse’s economy also benefits from its central location and advanced infrastructure. It is a major European hub boasting some of the most important motorway connections in Germany and the continent’s largest commercial airport in Frankfurt am Main. The regional economy of Hesse therefore has strong international economic ties. Due to its continuously increasing share of exports in total turnover, the industrial export quota reached 54.7% in 2019, making Hesse the 4th most export dependent state in Germany, while the importance of exports to the UK reflected the German average (Schrader und Jessen-Thiesen 2021).
In Hesse, the export quota varies strongly across sectors. In 2019, it was highest in the automotive industry as well as the chemical and pharmaceutical industries,

which had export quotas between 68% and 70% (Hessisches Ministerium für Wirtschaft, Energie, Verkehr und Wohnen 2020) and are the most R&D intensive sectors in Hesse (Hessisches Ministerium für Wirtschaft, Energie, Verkehr und Wohnen 2021).

The UK was among the most important trade partners for Hesse with regard to the flow of both goods and capital without significant reductions until 2019, being the 3rd most important destination for exports from Hesse in 2015, and 4th in 2018. The overall value was relatively stable ranging between EUR 4 and 4.5 billion (Hessisches Ministerium für Wirtschaft, Energie, Verkehr und Wohnen 2019). The UK was also an important source of goods imported by the Hessian economy, especially in the automotive, chemical and pharmaceutical, and machinery industries (Hessisches Ministerium für Wirtschaft, Energie, Verkehr und Wohnen 2019). Imports grew between 2015 and 2018 with a notable increase of 30% in 2018 compared to 2017.

Figure 3.3: Foreign trade between Hesse and the UK 2015-2019*



Source: reproduced from Hessisches Ministerium für Wirtschaft, Energie, Verkehr und Wohnen (2019)
*Note: *blue = exports from Hesse, red = imports to Hesse*

Overall, this trade development took place under unchanging trade conditions, i.e. conditions regarding tariffs, waiting time at the border, certificates for the origin of goods and value-added tax (VAT) rules. Although enterprises had already started preparing for Brexit under different scenarios, trade with the UK was still expected to suffer from Brexit once the new conditions came into place (Hessisches Ministerium für Wirtschaft, Energie, Verkehr und Wohnen 2019).

In 2015, Hessian enterprises engaged in foreign direct investments (FDI) in the UK of about EUR 21 billion, which corresponds to more than 12% of all FDI from Hesse, or one sixth of all German FDI in the UK, making Hesse the third most important German investor in the UK. Reversely, British enterprises only invested about EUR 6 billion in Hesse, which accounted for around 9 % of all FDI in Hesse. Between 2010 and 2015 Hesse's share of FDI in the UK shrank while FDI from the UK in Hesse increased, both in total and in share, during the same period. Direct investments in both directions are dominated by banking, financial, and insurance services between the financial centres of Frankfurt and London (Hessisches Ministerium für Wirtschaft, Energie, Verkehr und Wohnen 2018).

Regarding migration, the number of British citizens applying for naturalisation in Hesse was low prior to the Brexit vote, i.e. less than 80 naturalisations in 2015. In the following years, however British citizens became the second largest group of migrants applying for naturalisation, accounting for 6% of naturalisation in Hesse in 2018[115].

Hesse and the UK have been part of the Interreg cooperation programme Northwest Europe, with players from different sectors cooperating in various joint projects[116]. They are not involved in other territorially restricted programmes.

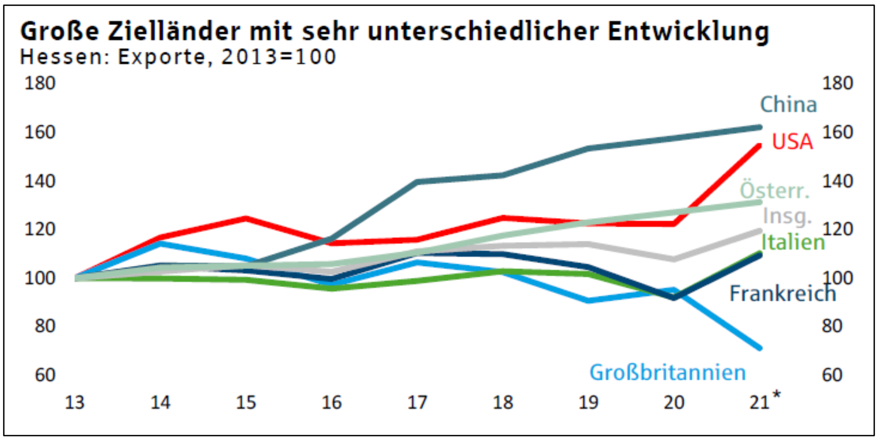
Brexit impact

According to the German Industrial Association BDI, German industry has adapted to the changes in conditions induced by Brexit. Supply chain challenges have not been overwhelming due to adjustments in purchasing and sales markets, implying that the UK has become a less important destination for German exports. At the same time, the abolition of the free movement of people has caused significant challenges for the service sector[117]. Apart from the impacts on trade and employment, further impacts in terms of increasing differences are expected in environmental standards, working conditions and administration[118].

[115] Statistik Hessen, *Zahl der Einbürgerungen in Hessen im Jahr 2018 um 9 Prozent auf 12 520 gestiegen*, on-line article 12 June 2019.
[116] See e.g. List of operations of the Interreg NWE 2014-2020 Programme (https://www.nweurope.eu/media/7212/list-of-beneficiaries-september-2021.pdf).
[117] BDI, *Brexit: Deutsch-britische Wirtschaftsbeziehungen, on-line* article 31 January 2022.
[118] Staatskanzlei Hessen, *Folgen des Brexit - Landesregierung wirbt für Finanzplatz Frankfurt,* on-line article 17 September 2021.

Before assessing the impacts of Brexit on trade and other relations between Hesse and the UK, two other conditions should be kept in mind as they may contribute to making the impact assessment fuzzy (Hessisches Ministerium für Wirtschaft, Energie, Verkehr und Wohnen 2021). Firstly, rather than a straightforward agreement on future rules, Brexit has created many uncertainties, which negatively impact on enterprise planning. Secondly, the changes in trading conditions resulting from Brexit took place during the pandemic and thus intersected with the pandemic impacts of border closures, loss of production and international supply chain disruptions followed by material shortages, supply bottlenecks and insufficient transport capacities.

Figure 3.4: Exports dynamics with selected main destinations (2013 = 100)



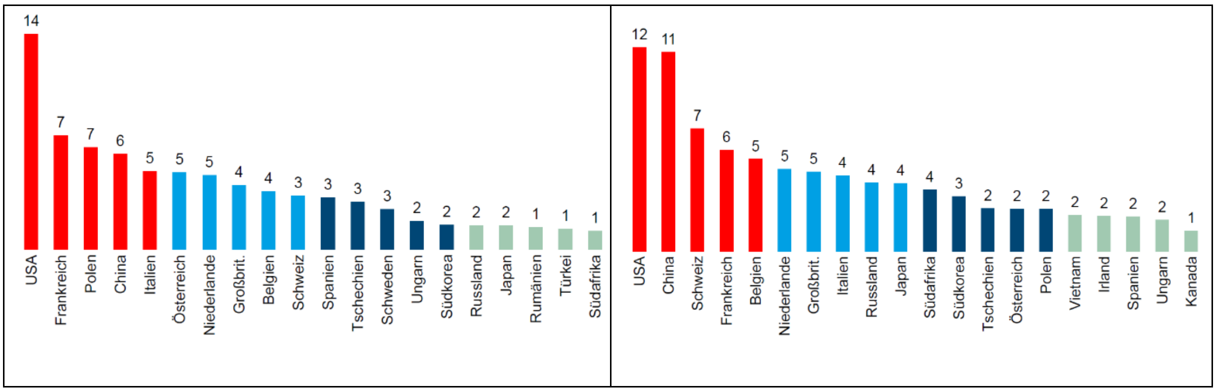
Source: Extrapolation from rate of change January-November 2021, see Bahadori (2022) based on Statistisches Bundesamt, Helaba Research & Advisory

Bearing these conditions in mind, in 2020, trade with the UK was positive, since exports from Hesse grew by about 5% despite the pandemic reaching about EUR 4 billion. As a result, the UK remained the 4th most important destination for Hesse exports and the seventh most important import partner[119]. However, preliminary trade figures for 2021[120] indicate the decreasing role of trade between Hesse and the UK. Figure 3.4 compares the change over time (2013-2021) for selected countries that are important for Hesse's trade. In 2021, it is apparent that the export trend with the UK was in nett contrast to that of other important export destinations. While exports grew for all other major destinations, the UK was the only one with a significant reduction.

This development contributed to the UK becoming a less important trade partner for Hesse in 2021 especially for exports (figure 3.5). With only 5 % of exports from Hesse, it fell to 7th in the most important destination ranking compared to its 3rd and 4th places prior to Brexit. Imports from the UK seem to be less affected remaining at about 4 % of all imports to Hesse and ranking the UK the 7th most important origin of imports.

[119] Hessen Trade & Invest - Brexit Update, *Resilienz ist auch eine Frage des Standorts,* on-line article 12 May 2021.
[120] January-November 2021.

Figure 3.5: Principal export destinations (left) and (% of all exports) and the main origins of imports (right) to Hesse (% of all imports), January-November 2021



Source: Bahadori (2022) based on Statistisches Bundesamt, Helaba Research & Advisory.

Overall, although exports to the UK decreased in 2021 in nett contrast to other export destinations, the impact of Brexit does not necessarily seem to be sector-specific but rather a challenge especially for those SMEs or enterprises without extra-EU trade relations. For instance, according to the chemical industry association (VCI) a tentative assessment concludes that this sector's enterprises were well prepared for Brexit and were therefore not affected by major shortages. This was, however, mainly achieved through changes to storage, which comes with higher storage costs and is part of long-term entrepreneurial planning[121].

Technology producers have also reported marginal effects. For instance, ABICOR BINZEL, a Hesse welding technology producer with 38 locations worldwide including one in the UK (Manchester), has not perceived any major changes yet. This might be attributable to the advantages of its worldwide trade experience including trade outside the EU[122]. It underwent intensive preparation for Brexit, especially in the last six months of 2020 (for example, replenishing stocks in its UK warehouse to ensure seamless delivery). The only difference was thus caused by rare and marginal delays in transport.

Key challenges and opportunities

The potentially dramatic impact on SMEs was confirmed in the Hesse small business report (Hessisches Ministerium für Wirtschaft, Energie, Verkehr und Wohnen 2020). Strong ties between Hesse and the UK are not limited to large enterprises but also involve SMEs, which represent more than 99% of the enterprises in Hesse. These businesses are central for employment and training,

[121] Hessen Trade & Invest, *Man wurschtelt sich in vielem so durch" – nach dem Brexit steckt der Teufel noch immer im Detail*, on-line article 25 February 2021.
[122] Brexit Update, *Resilienz ist auch eine Frage des Standorts*, on-line article 12 May 2021.

supply, innovation and economic performance and are the backbone of the Hessian economy[123]. Thus, one challenge was preparing SMEs for Brexit and developing opportunities for Hesse as an international business location, through guided economic development activities in Hesse (see following section). Apart from enterprises with trade relations with the UK, other enterprises in Hesse were expected to indirectly face challenges, for instance if their customers had close relations with the UK (Hessisches Ministerium für Wirtschaft, Energie, Verkehr und Wohnen 2018).

The main challenges for 2021 mentioned by the regional economic development agency Hessen Trade & Invest[124] confirmed previous expectations and added specifications based on the data collected on the initial experience. Uncertainty, especially regarding the final agreement, until shortly before the deadline, hampered the adaptation measures for many enterprises in Hesse. Continuous challenges refer to different aspects of trade, investments and tariffs as well as staff mobility, which create uncertainties and/or additional costs. The example from the chemical industry illustrates this. The EU REACH Regulation[125] defines uniform procedures for the registration, evaluation, authorisation and restriction of chemical substances in the EU and was initially incorporated into UK law. However, this may develop differently in the future. As of 1st January 2021, enterprises were required to reregister chemical substances exported to the UK. This implies additional costs in terms of money, time and staff. The application of norms and standards also affects various sectors and may become more relevant in the long term with both the CE and the UKCA label[126]. Overall tariff rules are considered to be among the most complex implications. To benefit from tariff free treatment, enterprises have to prove that the traded goods were produced entirely or to a certain percentage in the EU area. This creates additional work because of the need to break down the supply chains of exported goods. Moreover, the exchange of data and data sharing is challenging and requires registration processes that may lead to considerable costs for enterprises both in the EU and in the UK.

Finally, R&D cooperation is central for Hessian enterprises, especially in view of the excellence of British science, but has become more difficult with Brexit. Although UK institutions are likely to continue cooperating in projects such as Horizon, there is likely to be an increase in administrative costs. Additional costs

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[123] https://wirtschaft.hessen.de/Mittelstand

[124] Hessen Trade & Invest, *„Man wurschtelt sich in vielem so durch" – nach dem Brexit steckt der Teufel noch immer im Detail*, on-line article 25 February 2021.

[125] Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006.

[126] The CE label confirms product compliance with legal safety and health requirements in line with EU directives and regulations and is applied in the European Economic Area (EU, EFTA and Turkey). The UKCA label was created in the context of Brexit as a British variant of the CE label. By applying the UKCA label manufacturers declare conformity to the UK regulations for specific technical and medical products.

will also be incurred for the recognition of professional qualifications as the same rules applying to other extra-EU party countries will now be applicable.

Due to these challenges the UK has become less attractive for Hessian enterprises, which could be beneficial for market reorientation. For instance, it may increase the potential for relations with Ireland. According to the Hesse Ministry for Economic Affairs, Energy, Transport and Housing, Irish enterprises are searching for new customers and suppliers on the continent. This offers opportunities for enterprises in Hesse involved in trade, especially since Ireland is already an established trading partner with Hesse. Sectors in which Ireland is an important destination include chemical and pharmaceutical products, while it is also an important country of origin for food industry imports. Combined with the good professional and academic qualifications of the young generation, Ireland is an interesting location for Western European, and thus Hessian, enterprises[127].

Other potential opportunities in Hesse are linked to the financial sector since Brexit implies a change in perspectives regarding the location of finance institutions other than London. Frankfurt/Main offers excellent location conditions for finance, as it is not only especially well connected to the world logistically through its airport, but also technologically via Europe's largest internet hub. These advantages are complemented by the location of the European Central Bank and the European Insurance Supervisory Authority EIOPA headquarters, the innovativeness of the metropolitan area and the quality of the often internationally trained employees in the metropolitan area[128].

Remediation actions implemented

Remediation actions were implemented not only through policy initiatives, but also included actions taken by enterprises, especially those with direct economic relations with the UK – even though these were delayed and challenged by the delayed agreement. Measures taken by the enterprises went beyond changing storage planning and included, for instance establishing branches or subsidiaries, restructuring existing subsidiaries, reorganising supply chains, establishing distribution alliances with UK partners or changing production processes that do not require on-site services (Hessisches Ministerium für Wirtschaft, Energie, Verkehr und Wohnen 2018).

To help enterprises in Hesse access new markets the state government has offered several measures targeting above all SMEs. These measures aim to make use of

[127] Hessen Trade & Invest - Brexit Update, Von leeren Versprechungen und leeren Regalen, on-line article 28 October 2021.
[128] Staatskanzlei.hessen.de, *Folgen des Brexit - Landesregierung wirbt für Finanzplatz Frankfurt*, on-line article 17 September 2021.

foreign market growth potential for Hessian enterprises. Accompanying Brexit, a working group was implemented to coordinate domestic and foreign activities with the enterprises involved. Support includes state organised delegations and business trips, the promotion of enterprise participation in trade fairs abroad, brokerage for business partners and the provision of information and advice. The latter includes inter alia specific information on events and sources on Brexit, country specific market advice and access to contacts in other countries that offer on-site advice for market entry. At the same time, the state promotes cooperation with Hessian companies and investment in Hesse as part of its location marketing. One measure specifically aimed at expanding cooperation at European level is the Enterprise Europe Network Hessen (EEN Hessen), which is located at the regional economic development agency Hessen Trade & Invest.

In view of Brexit, SMEs in Hesse consider the measures to be particularly important for the promotion of Hesse as a location and to support the access to new sales markets. One area of focus is strengthening Hesse's key sectors. These activities are closely coordinated with technology and innovation support to achieve the best framework for effective support for internationalisation (Hessisches Ministerium für Wirtschaft, Energie, Verkehr und Wohnen 2020). This support infrastructure is appreciated by enterprises in Hesse[129]. A good development infrastructure is considered not only beneficial in view of Brexit, but beyond to improve the resilience of the regional economy regardless of the topic influencing business life, be it the pandemic, Brexit, the Green Deal or digitalisation.

Complementing these business promotional measures is the Federal Council Initiative of Hesse, which aims to further develop the location advantages of Frankfurt/Main in finance. In this context, the state government aims to establish an Anti-Money Laundering Authority (AMLA), the EU's anti-money laundering and counter-terrorist financing agency, in the Frankfurt metropolitan area[130].

3.3 Lubelskie (Poland)

Regional economy overview

Lubelskie is one of the 16 administrative provinces (Voivodeships) of Poland located in the eastern part of the country, on the border of Ukraine and Belarus.

[129] Hessen Trade & Invest - Brexit Update, Resilienz ist auch eine Frage des Standorts, on-line article 12 May 2021.
[130] Staatskanzlei.hessen.de, *Folgen des Brexit - Landesregierung wirbt für Finanzplatz Frankfurt*, on-line article 17 September 2021.

With nearly 2.1 million inhabitants, around 5.5% of the country's population, it is the third largest region in Poland in terms of area, but also one of the least urbanized regions. Lubelskie Voivodeship is - in statistical terms - the least developed region in Poland[131] (EURE 2021). However, considering overall social and environmental aspects, Lubelskie's performance is less disadvantaged and closer to the national average[132].

The economy of Lubelskie Voivodeship can be included in the group of traditional economies, as the dominant role of agriculture in employment is evident. Nearly 40% workers in the region work in agriculture, more than twice that of the country average. The region is, in fact, highly specialized in fruit and vegetable crops, milk processing and the production and processing of grains. Industry and construction employ an additional 17% of the active population. In particular, the Lubelskie Voivodeship is characterized by an above-average share of employment in the machinery, automotive and aviation industry (6.1% in comparison to 5.9% in Poland as a whole) with Germany being the largest recipient of goods from these sectors. Moreover, the region is responsible for 3.5% of the total production of furniture and 2% of production in the wood industry in Poland. It also hosts some of the largest companies operating in the chemical industry.

Compared to other voivodeships and the general situation in Poland, the Lubelskie Voivodeship economy is characterized by low competitivity and innovation. Moreover, the Lubelskie Voivodeship is an area of significant outflowing migration and depopulation (see Flaga and Wesołowska 2018). The UK has been and remains the first main destination for both permanent and temporary migrants from Lubelskie.

The data on exports by sector[133] (2015-2019) from Lubelskie province to the UK reveal that the largest share was accounted for in agri-food products with around 63% of the total value. This was followed by the chemical industry with 19% and the machinery industry with 12%. Among the unprocessed products, exports were dominated by fruit and vegetables. Processed products most frequently exported to Great Britain were dairy products, meat preparations and so-called miscellaneous food preparations.

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[131] In 2017, the value of Gross Domestic Product per capita according to PPS purchasing power parity (% of the EU28 average) for the Lubelskie Voivodeship was 48% (country average at 68%). Moreover, At the end of December 2018, the unemployment rate in Lubelskie Voivodeship amounted to 8.0% and was lower by 0.8% than the previous year. In Poland, the unemployment rate fell by 0.8% compared to December 2017 and amounted to 5.8%.

[132] The EU Social Progress Index for Poland is 61.8. On NUTS2 level is ranges from 57.7 to 67.2. Lubelskie could be rated with 61.1. See European Commission (2020), EU Social Progress Index – 2020.

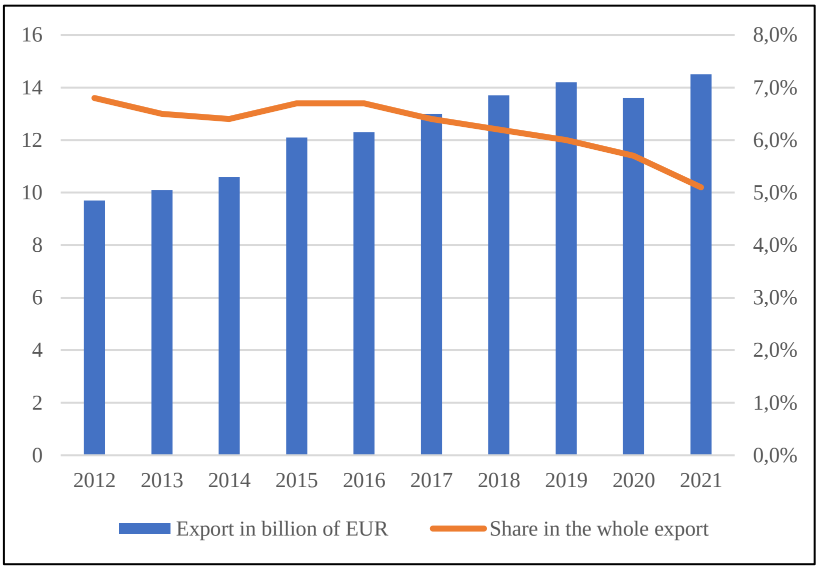
[133] Data provided by Lubelskie Voivodenship Marshall`s Office, based on interview. Official data are not available for free consultation.

Brexit impact

According to interviews, principal economic relations with the UK before and after Brexit, have not been significantly affected. Additionally, cultural and educational exchanges are continuing and no major changes have been observed. The region continues to receive invitations from its UK partners and participate in various events as well. Institutions dealing with boosting or establishing cooperation between entrepreneurs from the UK and Lubelskie province have not noticed any significant changes either. The initiatives aimed at connecting stakeholders and facilitating networking, e.g., business breakfasts or business leaders' platform meetings, were influenced far more by the pandemic restrictions than by Brexit. Although there is a significant overlap in time between the two occurrences, overall relationships between Lubelskie and the UK have not changed due to Brexit.

Data at national level reveal that trade between Poland and the UK suffered some fluctuations, especially in the first part of 2021. The value of UK goods exported to Poland fell by 57% month on month in January 2021 (to EUR 223 million from EUR 556 million in December 2020)[134] This represents the lowest single month value for UK exports to Poland since Apr 2007. The value of Polish goods exported to the UK fell by 25% month on month in January 2021 (to EUR 906 million from EUR 1.2 billion in December 2020). However, the value of Polish goods sold to the UK in January 2021 was still higher than either April or May 2020, when lockdown hit both nations' economies.

Figure 3.6: Total export from Poland to the UK and the share of the UK export in the whole export from Poland, from 2012 to 2021



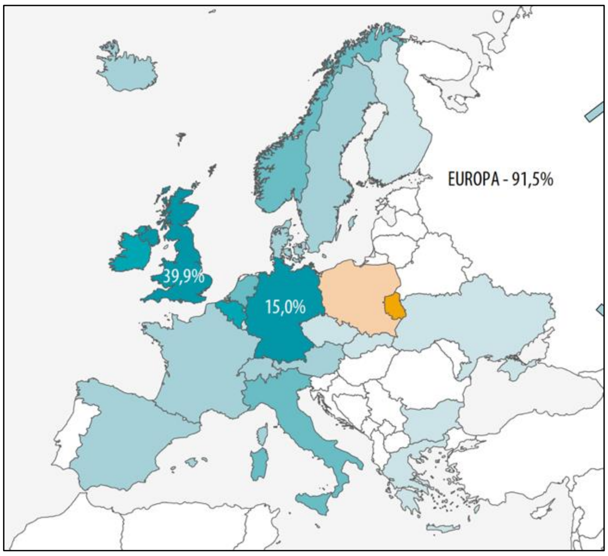
Source: Based on stat.gov.pl, Obroty towarowe handlu zagranicznego ogółem i według krajów w styczniu 2022 roku.

Overall, total exports from Poland to the UK in 2021 (EUR 14.5 billion) closed at a higher value with respect to both 2020 (EUR 13.6 billion) and 2019 (EUR 14.2 billion). This confirms the trend in the last ten years, which saw the value of

[134] British Polish Chamber of Commerce, *Brexit hits UK exports of goods to Poland more than twice as hard as Polish exports to the UK* on-line article 2021.

exports to the UK continuously increase from EUR 9.7 in 2012. However, since 2016, the year of the Brexit referendum, the share of exports to the UK over total exports has decreased lightly from 6.7% to 5.1%, with exports towards other destinations increasing at a higher rate with respect to those towards the UK. Interviews confirm that the trend in Lubelskie has been similar to the national one, with the value of exports continuously increasing and the share to the UK remaining quite stable over time. From information obtained from entrepreneurs, mainly operating in the food industry, wholesalers and companies running their shops in the UK, it is understood that there were some concerns about future developments immediately after Brexit. However, due to the fact that companies were provided with sufficient information beforehand regarding the changes in trade regulations, they were well prepared and the new regulatory situation did not significantly affect them. Some enterprises assume that business is improving with time, regardless of Brexit.

Figure 3.7: Main destinations of temporary migrants from Lubelskie in 2018



Source: Lubelskie Voivodeship w Lublinie (2019).

Concerning migration flows, between 2005 and 2016 the number of Polish citizens moving to the UK was constantly larger than the number of those leaving[135]. This can be interpreted as a direct consequence of the EU accession of Poland and the associated facilitation of access to the UK labour market. 2017, following the Brexit referendum, was the first year since EU enlargement in which slightly more Polish people left the UK than arrived. In 2018, the inflow dropped even further while the outflow remained at a similar level to that in 2017. Thus, it seems that the vision of Brexit did indeed deter some migrants from coming and encourage others to leave the UK (Jancewicz *et al.* 2020). Data available up to 2019 on people emigrating from Lubelskie Voivodeship to the UK seems to indicate a slight reduction in both permanent and temporary migration. Before the Brexit referendum, in 2014, half of those migrating temporarily went to the UK, and nearly one third of those migrating permanently, for a total of 1 048 migrants. The number of temporary migrants to the UK dropped to 40.6% in 2017 and below 40% in 2018, and then slightly increased to 41.3%. The number of permanent migrants dropped to 25.2% in 2018 and then increased to 33.2% in 2019. Overall,

[135] Both numbers were almost equal only in 2008, the year when the global financial crisis started, when outflows increased somewhat and inflows decreased significantly.

in absolute terms, the number of migrants to the UK decreased by -45.3%, from 1 037 in 2014 (287 permanent and 750 temporary) to 567 in 2019 (109 permanent and 458 temporary), slightly higher than the overall reduction of Lubelskie migrants abroad (-40.9%). The lowest value was recorded in 2016 with 87 permanent and 373 temporary migrants, for a total of 461 migrants.

Table 3.2: Migrants from Lubelskie Voivodeship

	2014		2015		2016		2017		2018		2019	
	Total	To the UK	Total	To the UK	Total	To the UK	Total	To the UK	Total	To the UK	Total	To the UK
Permanent	933	30.8 %	-	-	264	33.1 %	279	26.2 %	292	25.2 %	328	33.2 %
Temporary	1500	50.7 %	1215	49.7 %	817	45.7 %	1230	40.6 %	1057	39.9 %	1109	41.3 %

Source: based on Lubelskie Voivodeship w Lublinie (2015, 2016, 2017, 2018, 2019, and 2020).

However, even in the years before Brexit, the migration balance in the Lubelskie province was positive. Polish citizens returning to the region, before and after Brexit, have been a positive stimulus for a greater number of start-ups, the increase in regional consumption and a potential inspiration and source of contact with the UK market.

Key challenges and opportunities

Despite Brexit, trade relationships between the UK and Poland are continuing. Lubelskie is one of the most significant regional players in agri-food production in Poland and it continues to export goods as it did before Brexit. The tradition of commercial exchange is a great advantage for the regional enterprises.

However, it is not yet clear whether the new regulations and demands regarding formalities will discourage new companies from entering in this market. The subject was vividly discussed a few years ago as Brexit was impending. However, already at that time enterprises did not express any fear of the consequences. There was enough time to adapt and they used the time to prepare well in terms of accounting and document adjustment to deal with the new rules. Nowadays, as far as trade with the UK is concerned, turnover is at the same level as before or even increasing. There were no particular signals of additional difficulties for SMEs either.

In this context, the TCA did not bring about significant changes for companies from the Lubelskie region as they were prepared and well adapted. For some of the enterprises, trade with the UK is the priority in their business model, so they accurately prepared for the changes. Generally, there is still a very positive attitude towards trade exchange and business connections with the UK. Overall, this in line with what was perceived at national level, with Polish exporters not facing major disruptions in their trade relation with the UK[136]. Some delays have been reported by importers[137] and there are some concerns about services, which are not covered by the TCA, and uncertainty about the evolution of trade relations between the EU and the UK in these sectors. Similarly, the effects of potential increasing sanitary and quality checks on agri-food products could create some challenges for Lubelskie exporters, as agricultural products are the most exported to the UK.

Remediation actions implemented

There were a number of meetings, seminars and training sessions before Brexit. which were organised by the Department of Economy and Entrepreneurship. Support for the Lubelskie province, was also provided by the national ministries and other central level institutions. A great effort was put into preparing for the changes and new formal demands. Furthermore, there were events, during which larger enterprises, which were already involved in trade with the UK shared their experiences and approaches for successful adaptation to the new regulations.

The BAR foresees EUR 173.6 million for Poland, of which around EUR 172.2 million is destined for sectors or companies involved in the trade in goods and services with the UK, and the remaining for the fisheries sectors. These are the amounts set in the BAR regulation of October 2021[138], but the annual pre-financing amounts based on the provisional allocation to Member States has not been approved yet (see section 1.6 in chapter 1). Interviews highlight that the BAR could well be used to support the enterprises. In times of transformation and change, it is always beneficial for companies to get financial support. However, for the purpose of planning and the predictability of enterprises' finances, it should be clearly stated when and who is eligible for the funding. Consequently, it should be executed in a designated manner, independently of other circumstances and negotiations.

Considering the type of support, it is recommendable to focus more on motivation measures than compensation. Therefore, other support measure such as tax relief

[136] British Polish Chamber of Commerce, *Brexit and UK-Polish trade – the experience after two months* on-line article 2021.

[137] For instance one British Polish Chamber of Commerce member firm which imports goods from the UK reported that typical delivery time has increased from five working days to 12, and that of six deliveries made after 1 January, three had failed to reach Poland because of incorrect or missing paperwork, the fault of either exporter or haulier – or over-zealous border controls. One delivery was dropped off in the Netherlands in error, forcing the importer to have to pay Dutch VAT to release the goods for onward travel (to reclaim it, the business will have to register for VAT in the Netherlands). Another member firm, exporting goods from Poland to the UK, has reported no great difficulties (although onward transit to Northern Ireland has become far more problematic).

[138] Regulation (EU) 2021/1755 of the European Parliament and of the Council of 6 October 2021 establishing the Brexit Adjustment Reserve.

initiatives would be preferable to temporary compensation payments. The exchange of solutions and facilitation of business networks which used to take place before the pandemic are also considered to be the appropriate and very effective ways to support trade development. These may help new enterprises to enter the UK market by learning from the experience of other companies from the region and may contribute to establishing new business connections with the UK, also in the new branches of economy.

Although there was no break in trade connections with the UK due to Brexit, it is still recommendable to negotiate the reduction of regulatory requirements for imports. This could be solved at the EU level, but the interviewees representing the Lubelskie region expect negotiations at national level to be more effective, as national institutions have a more direct overview of the territorial needs and could take more tailored initiatives to support regions and businesses.

3.4 Normandy (France)

Regional economy overview

A world-famous region, linked to Paris by the Seine River and close to London, Normandy occupies a strategic position at the heart of North-Western Europe and has a first-class infrastructure that makes it the third largest port complex in Europe and the largest in France: 50% of France's international maritime transport and 60% of French container traffic is handled in Normandy (CCI Normandie 2019).

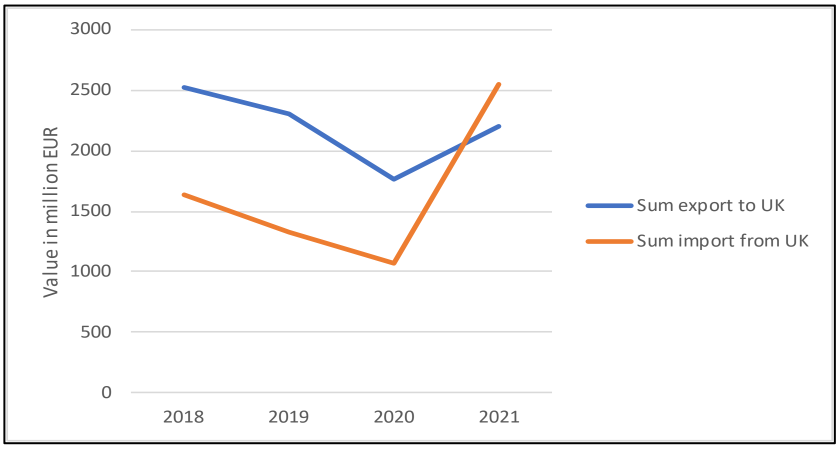
Normandy represented 4% of the French GPD in 2018. Its economy is driven by a strong industrial sector and it is the leading French region with 20% of its added value stemming from industrial activities. Sectors linked to energy (nuclear, oil) and transport equipment (automobile, aeronautics) are strongly established, while activities in the pharmaceutical, food and glass industries (with the “Glass Vallée”) are also specific to the region. After declining for several years, the textile industry has recently been revitalised, in particular, due to a regained interest in flax-based textile such as linen fabrics (flax fibre is used in a wide range of sectors, e.g. insulation in the construction sector). Flax is in fact referred to as Normandy’s blue gold as the region is the world leading region for the production of flax textiles, with over 50% of flax textiles produced in Normandy[139]. Having struggled to fight the competition of Chinese or Indian textile companies, numerous long-established family-owned textile enterprises from the region are now striving, focussing on the niche market of high-quality “made in France” flax

[139] France Info, *La Normandie leader mondial de la production de lin : on vous explique tout*, on-line article 24 April 2019.

fabrics. The flax industry is one of the region's main drivers for job creation. Overall, a vast array of local actors, i.e. farmers, cooperatives and flax fibre processing enterprises are benefiting from this eco-friendly, high potential material all along its value chain.

Moreover, the presence of the lower Seine valley, with its opening to world trade through the estuary and the major ports of Le Havre and Rouen, also makes Normandy the leading French region for its share of logistic activities. Tourism is well developed, particularly in the department of Calvados, however much less in the other three departments. The agricultural economy is also a strong feature of the Normandy landscape (especially cattle breeding). Its economic weight is in line with the average of the French regions, but more substantial in the western part of Normandy (INSEE 2020). Last but not least, with its 638 kilometres of coastline, Normandy is the leading French region for the maritime economy and the second most important region for the fishing industry (CESER 2017).
In 2019, before Brexit and the pandemic, Normandy was the second most open French region with 35% of its GPD linked to exports (CCI Normandie 2019). The main imported and exported products to and from Normandy were pharmaceutical and chemical products, fertilizers, plastics and synthetic rubber (Direccte de Normandie 2020). In the context of an international sanitary crisis, the region's total exports decreased by 10% and imports by 22% in 2020 compared to 2019. In 2020, Germany was Normandy's main client with 10.4% of the region's exports going across the Rhin, while the UK was 6th with 5.6%[140] (INSEE 2021). Figure 3.8, which presents the total imports and exports between Normandy and the UK, illustrates the sharp drop in commercial exchanges in 2020, followed by a commercial deficit in 2021.

Figure 3.8: Normandy's trade with the UK



Source: Own calculations based on lekiosque.finances.gouv.fr (2022)

Ties between Normandy and the UK have been historically strong and were embedded within the daily lives of citizens on each side of the Channel (CESER 2017). They take various forms, ranging from the large numbers of English schoolchildren visiting Mont Saint-Michel or the D-Day landing beaches, French-British rugby tournaments, exchanges between the 350 twin

[140] https://www.insee.fr/fr/statistiques/5396110?sommaire=5017361

cities, to Erasmus students studying in universities and schools in both countries. Moreover, 70 ferry rotations link the two sides of the Channel every day allowing many English people to reach their second homes in Brittany, Normandy or Périgord in only a few hours.

Besides, the two sides of the channel have been involved in cross-border cooperation programmes (e.g. the Interreg France Channel England). For more than 30 years, these exchanges and practices animated the cross-border and maritime space: he border no longer existed, the Channel had become a buffer zone, a space for transit, rest or leisure. However, Brexit has called this daily life into question.

Brexit impact

In the years since the Brexit referendum, the UK's share in Normandy's total exports has been fluctuating. In 2016, the UK was Normandy's second client (with 7.2% of products exported), and in 2017 it became the fifth (CCI Normandie 2018). In 2019, the UK's share in Normandie's total exports was 7.2%, it then dropped to 5.6% in 2020 before sightly increasing to 5.8% in 2021[141]. Imports, on the other hand, increased immediately after the Brexit vote (due to the sharp devaluation of the Pound Sterling[142]), then decreased until 2020, followed by a sharp increase in 2021.

The TCA is, therefore, pivotal for Normandy. Without this agreement, for instance, the export of certain meat or dairy products would have been subject to higher tariffs of over 40% (in both directions), the export of cars would have been subject to a 10% tariff (Chambres d'agriculture de Normandie 2021). The agreement also provided, to some extent, solutions to appease the very thorny issue of fishing rights. The allocation of licences to fishermen in Normandy and agreements on fish species quotas are still being disputed. Despite the agreement, Brexit has negatively impacted on the trade of fish and seafood products (due to administrative procedures, "red tape"), particularly for British fishermen as the country exported 76% of its fishing catch, three quarters of which was destined to the EU market (in 2018)[143]. Overall, the direct consequences of Brexit are increased costs, paperwork and border delays. This is a particularly problematic issue for the trade of perishable goods such as fish and seafood.

Another direct impact of Brexit is the interruption of the Interreg Programme France (Channel) England[144]. Although this will not lead to direct economic

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[141] https://lekiosque.finances.gouv.fr/site_fr/telechargement/telechargement_regions.asp
[142] L'Agricolteur Normand, *Brexit : le secteur laitier normand en première ligne*, on-line article 28 February 2020.
[143] Toute l'Europe, *Quotas, licences des bateaux : pourquoi la pêche reste un sujet de préoccupation dans la relation post-Brexit*, on-line artcile 4 November 2021.
[144] The Programme should however continue until the end of the programming period.

impacts, given the type of projects supported, research in key sectors with high economic potential will be hindered, reports the Normandie Region. For example, the programme finances renewable energy research (e.g. tidal energy), and blue economy projects (e.g. biofuels using algae). Moreover, the programme supports projects dedicated to improving sustainable marine resources (e.g. fish stocks), bringing together actors from both sides of the Channel to increase their cooperation. In the light of the high pace of the disappearance of certain species of fish (due to overfishing), and given the tensions between French and English fishermen (due to Brexit), the end of such projects is certainly regrettable.

Key challenges and opportunities

Normandy's fishing industry will still face substantial challenges linked to its dependency on British fishing zones. The difficulties will continue as French fishermen must progressively reduce their fishing catch by 25% (by 2026).

Delays and red tape, especially in strategic entry points such as at the Le Havre harbour remain a challenge as post-Brexit checks and controls are gradually being implemented (since 1 January 2022). On 1 July 2022, the final set of controls on products of animal and plant origin will come into force, with export health certificates and phytosanitary certificates required for all consignments. While guidance on how to prepare for such controls is being delivered on both sides, a substantial risk is the lack of readiness, especially for small and medium sized enterprises[145].

On the positive side, several initiatives, services and start-ups have been launched, e.g. online platforms supporting traders and haulers to navigate the complex bureaucratic procedures linked to Brexit. In Le Havre, this has led to the creation of new jobs and investments (e.g. in new information systems)[146]. It is however certainly too early to assess the impact of Brexit in terms of job creations (or losses as a matter of fact).

Moreover, to circumvent the transport gridlock with the UK, the relations between Normandy and Ireland have seen a fresh new boost. Before Brexit, the UK was used as a "landbridge" between Ireland and the European Union. Relations with British ports have dropped considerably, but this has been offset by traffic with the three Irish ports (Cork, Rosslare and Dublin), through which goods now transit to France and the rest of Europe. Normandy harbours are particularly benefitting

[145] The Guardian, *What the UK and hauliers can expect from long-delayed Brexit controls*, on-line article 29 December 2021 and Les Echos, *Brexit: les PME mal préparées aux nouveaux contrôles douaniers*, on-line article 31 December 2021.
[146] Ouest France, *TEMOIGNAGES. Ce qui a changé pour ces entreprises du Havre avec le Brexit*, on-line article 8 February 2021 and Le Parisien, *Brexit: le transporteur de Caen qui facilite les déclarations en douane*, 8 February 2021.

from this development (due to their geographical location). For example, juggernaut traffic between the Cherbourg-en-Cotentin harbour increased from 35 000 in 2019 to 110 000 in 2021. Weekly cargo lines have multiplied, and new ones have been created (e.g. between Roscoff and Cork, to be operational in March 2022). Thomas Byrne, Minister of European Affairs of Ireland referred to these new routes as “Brexit Busters”[147].

Remediation actions implemented

Currently, there are no regional measures to mitigate the Brexit effects on the Norman economy. However, there are supporting measures at national level, specific for fisheries. The European Commission approved, in April 2021, under EU State aid rules, three French schemes worth EUR 100 million in total, to support the fisheries sector affected by the withdrawal of the UK and the consequent quota share reductions foreseen in the provisions of the TCA (European Commission 2021*b*). Overall, support for French fishermen takes the following forms[148]:

1) Immediate cash flow support measures for the sector: fishermen and fishmongers will be able to benefit from a flat-rate aid of up to EUR 30 000 depending on their dependence on products caught in British waters.

2) Complementary measures to the emergency measures:
   - For fishermen, temporary stoppages of their activity will be compensated at 30% of the certified reference turnover. For those who do not wish for recourse to temporary stoppages during this period, compensation for part of the loss of turnover will be provided.

   - For fish traders, compensation for part of the loss of turnover will be granted if the company is dependent on products caught in British waters.

3) Medium- and long-term measures:

   - The extension of long-term partial activity for employees of companies dependent on British waters.

   - A fleet exit plan for vessels dependent on British waters that wish to stop their activity. The French Minister of the Sea (Annick Girardin) announced, last November 2021, the creation of a plan for the withdrawal of fishing

[147] Les Echos, *Brexit: le pari gagnant des ports français de la Manche avec l'Irlande*, on-line article 8 December 2021.
[148] Prefet du Calvados, *Accord sur le Brexit: ce qui change pour les pêcheurs français*, on-line article 30 December 2020.

vessels from the fleet (“plan de sortie de flotte”) to compensate them for their loss of revenue or those who could not obtain a fishing licence. The plan, which is criticised by the fishermen and authorities of the two mostly affected regions (Brittany and Normandy), would be financed by the French government, and possibly by the BAR (40 to 60 million EUR)[149].

- Restructuring aid from the French government under the employment protection plan.

- Mobilisation of the National Employment Fund for training courses lasting 6 to 12 months to validate acquired experience, support job retraining and professional mobility to other maritime sectors, which are currently creating jobs.

- Investment aid within the framework of the recovery plan and the European Maritime, Fisheries and Aquaculture Fund (EMFAF).

Moreover, the BAR is expected to further support French fishermen (amongst other stakeholders affected by Brexit). With a total amount of more than EUR 735 million, France will be the fourth biggest beneficiary, after Ireland, the Netherlands and Germany. EUR 51 million of this package will support French fishermen. Indeed, if many sectors and economic activities are now facing difficulties linked to Brexit, it is the fisheries sector that is the hardest hit due to a significant loss of access to British waters[150].

The French government has given the National Agency for the Cohesion of Territories (Agence nationale de la cohésion des territoires) responsibility to administrate and allocate the budget to the regions. As of January 2022 no decision had been taken vis-à-vis the allocation of this aid to the regions[151].

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[149] Ouest France, *Pêche. « Nous ne pouvons pas nous résoudre à un plan de sortie de flotte »*, on-line article 18 November 2021 and France Info, *Brexit: la France sacrifie-t-elle ses pêcheurs normands?*, on-line article 19 November 2021.
[150] Euractiv, *Le Parlement européen adopte la Réserve d’ajustement au Brexit*, on-line article 16 September 2021 and tBanque des Territories, *Réserve d'ajustement au Brexit : les premiers versements attendus à la fin de l'année*, on-line article 6 October 2021.
[151] Régions de France, Le directeur de la stratégie européenne de régions de France à Bruxelles expose à localtis les objectifs de cette présence Bruxelloise, on-line article 4 January 2022.

3.5 South-East (Ireland)

Regional economy overview

South East is the fourth most populous Irish region with more than 580 000 inhabitants (Ireland South East Development Office, 2019). Its +126% GDP growth between 2010 and 2019, places it among the fastest growing NUTS 3 regions in the EU. Growth was even faster in some territories neighbouring Southern Region[152],at +176% in the same period. Economic growth was accompanied by rapid growth in employment, +22% between 2012 and 2019, while the unemployment rate decreased from 18% to less than 7%. However, compared to other Irish regions, recovery from the 2008 financial crisis was relatively slow in South East, with income reaching 2007 levels only in 2019.

The region promotes itself as an attractive alternative to Dublin in terms of cost savings for businesses, available income for employees and the quality of the living environment. Moreover, the Port of Waterford and Rosslare-Europort, geographically close to EU trading partners, play a strategic role for the regional economy and trade, and are seen as extremely important in Ireland's response to Brexit (Government of Ireland, 2018). At the same time, South East is confronted by multiple structural challenges. Compared to other Irish NUTS 3 regions, it is characterised by the highest unemployment rate, low average income per person, limited income growth, a high share of workers on minimum wage. Public investments in large innovation projects and higher education R&D are also relatively low.

The region has historically been characterised by prosperous agriculture, with large farms and extensive natural assets. However, some key local industries have been struggling to remain competitive in the face of economic globalisation, as exemplified by the closure of the Waterford Crystal production plant in Dungarvan in 2005. Currently, the local economy is characterised by a large number of SMEs, many of which are specialised in low tech production activities in the fields of construction, food and beverage processing, and mechanical engineering. Their main markets are domestic or the UK. Local tourism also primarily attracts domestic or British tourists.

Brexit impact

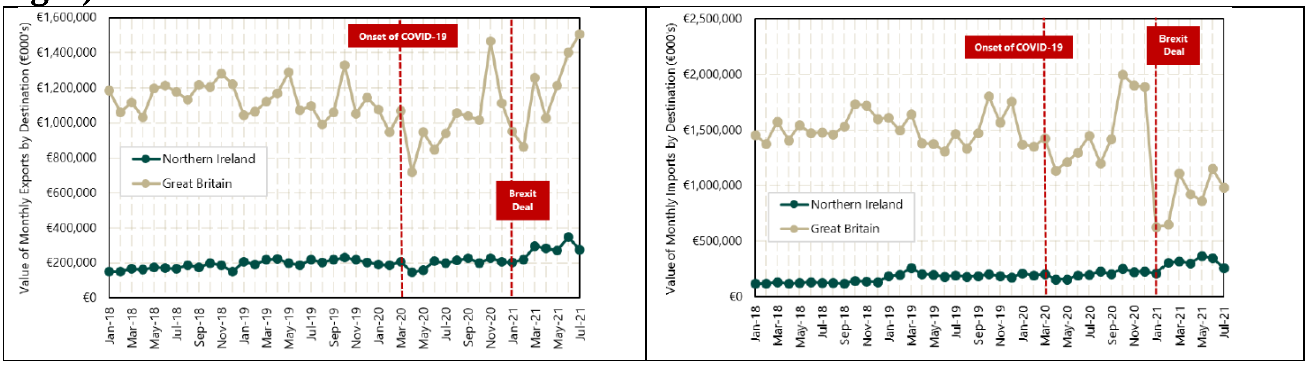
National figures show that Irish imports from the UK fell sharply between the end of 2020 and the beginning of 2021 (SOLAS and Department of Social Protection,

152 Southern Region is a NUTS 2 Irish region and includes three NUTS 3 regions: Mid-West (Clare, Tipperary, Limerick City and County), South-East (Carlow, Kilkenny, Wexford, Waterford City and County, and South-West (Kerry, Cork and Cork City).

2021). The proportion of imports to Ireland fell from 30.8% in 2015 and 20.2% in 2020 to 8.2% in 2021. This was somewhat offset by an increase in imports from Northern Ireland, which rose from 2% in 2015 and 2.4% in 2020 to 5.7% in 2021 (Flynn, Kren and Lawless, 2021)[153].

No statistically significant decline in total exports to the UK has been identified. Despite the drop between November 2020 and February 2021, exports recovered their pre-Brexit levels. However, significant drops in exports to the UK were seen in some sectors, such as food, beverages, fuel and animal fats. Food and beverages are, as mentioned above, particularly important activities in the South East region. Considering the low margins of many SMEs in this sector, even limited changes in export volumes could have a major impact on profitability.

Figure 3.9: The value of total Irish trade with Great Britain and Northern Ireland between January 2018 and July 2021 (exports on left, imports on right).



Source: reproduced from SOLAS and Department of Social Protection (2021).

The dramatic impact of Brexit on imports compared to exports is partly due to the fact that new checks and procedures, regulated by the Northern Ireland Protocol (see section 1.1 in chapter 1), are more stringent on imports from the UK than on exports to the UK. While the EU imposed new checks and procedures from 1st January 2021, the UK opted for a phased implementation. The new procedures and checks on exports to the UK are only expected to be fully operational by mid-2022. Companies in food processing in the South East region indicate that customs checks have not yet been set up. Further effects of Brexit may therefore occur when this is the case.

However, a systemic review by Daly and Lawless in 2020 (before the TCA) on the sectoral overlap of covid19 and Brexit concludes that adding the Brexit shock to that of the pandemic has widened the range of sectors exposed to risk but that the impacts have not been magnified by interaction effects. The analysis also indicates that the share of employment in sectors ranked 'red' (i.e. severely

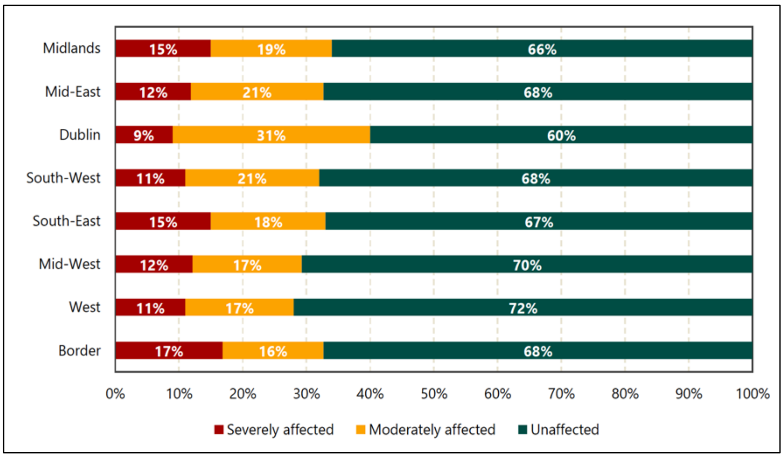
153 Flynn, Kren and Lawless (2021) also note that the distinction between Northern Ireland and Great Britain in trade statistics was not a priority before Brexit. This may generate some biases in times series.

affected) for Brexit ranges from 9% in Dublin to 14% in South-East, Border and Midland.

The analysis by SOLAS and the Department of Social Protection published in October 2021 identifies agriculture, financial services, and food and manufacturing industries as the three sectors most severely impacted by Brexit at national level. Agriculture, and the food and manufacturing industries are highly dependent on exports to the UK. Financial services may be severely impacted by changes in market access between the UK and the EU. Brexit is not expected to have any impact on tourism.

At regional level, nearly 65 000 people employed in South East (4th quarter 2019) were employed in sectors considered to be either severely or moderately affected by Brexit, accounting for 33% of employment in the region (compared to a share of 34% nationally). Of these, 15% of employees are in sub-sectors expected to be severely impacted (against 12% nationally) and 17 to 18% in sub-sectors expected to be moderately impacted (against 22% nationally). The agriculture sector is the largest across both the severely and moderately affected sectors in the region (accounting for 13 300 jobs). Of the 28 300 people employed in industry (4th quarter 2019), almost 60% were employed in either the severely or moderately affected sectors. Most of the severely impacted employment (75%) is in meat-related production activities, while employment connected to the elaboration of metal products accounted for a large share of employment in moderately affected sectors. Within the transport sector, employment in freight transport by road is considered particularly exposed to risks associated with Brexit. This sub-sector accounts for 40% of employment in transport in South East region, against 23% nationally.

Figure 3.10: Regional shares of employment in sectors affected by Brexit



Source: reproduced from SOLAS and Department of Social Protection (2021)

Brexit has also led to a major shift in freight flows between Ireland and continental Europe. This resulted in significant growth of 'RoRo'[154] traffic in Rosslare Europort, which offers direct connection to continental Europe. The number of RoRo units grew from 32 000 in the third quarter of 2020 to nearly 45 000 in the third quarter of 2021 (Irish Maritime Development Office, 2021). In the same period, the number of RoRo units on EU routes from Rosslare went from 6 700 to 28 000. Rosslare Europort has thus become Ireland's number one port for direct European freight[155]. These findings are consistent with Rosslare Europort's yearly figures for 2020 and 2021 (Rosslare Europort, 2022), indicating that the number of RoRo units has increased by +371%. Taking into account the parallel decrease of traffic to and from the UK (-34%), the overall freight volume has increased by 50%. At the beginning of 2022, 30 direct services were operating weekly between Rosslare and Europe. Le Havre became a new destination as of November 2021. Previously established destinations are Dunkirk, Cherbourg and Bilbao. In parallel, a new LoLo route between the Waterford port and Rotterdam was established in July 2020.

Figure 3.10: Direct routes between Ireland and continental Europe, illustrating the importance of Rosslare port

Source: reproduced from Irish Embassy Paris.

[154] Roll-on/roll-off or RoRo ships are cargo ships designed to carry wheeled cargo, such as cars, trucks, semi-trailer trucks, buses, trailers, and railroad cars, that are driven on and off the ship on their own wheels or using a platform vehicle, such as a self-propelled modular transporter. This is in contrast to lift-on/lift-off (LoLo) vessels, which use a crane to load and unload cargo.

[155] Rosslare Europort, *Rosslare Europort makes history in 2021, becoming Ireland's number one port for direct European freight*, on-line article 25 January 2022. The head of Dublin Port reports that "*the UK landbridge that offered traders the fastest route between Ireland and the European continent before Brexit will not re-emerge as a preferred option for moving goods*". See Reuters, *Brexit ends UK 'landbridge' for Irish/EU trade, port boss says*, on-line article 21 January 2022

Key challenges and opportunities

Interviews with local actors indicate that SMEs in the South East region will need to adapt to Brexit, and that these adjustments are ongoing. National authorities have encouraged and supported strategic reflection in this field, as exemplified by the website PrepareForBrexit[156] set up by Enterprise Ireland. The website includes also the Post-Brexit Advisory Support to helps businesses (Enterprise Ireland clients) create a strong action plan and identify the opportunities and risks that the new trading environment in the UK may pose to Irish business.

The manufacturing firm Burnside Eurocyl located in Carlow, offers an example of ongoing adaptation efforts[157]. To offset enhanced currency volatility resulting from Brexit, they have changed supplier accounts from sterling to EUR, developed strategic sourcing approaches, and set up teams of staff members in different areas (e.g. administration and logistics). They have also taken measures to the minimise the risks of delays in goods transport resulting from customs procedures and have increased their stocks of raw materials. Maintaining just in time deliveries for clients in the EU is a key challenge.

Moreover, using alternatives to the UK "landbridge" connecting Ireland to the UK has implications in terms of higher costs, travel times, and connection reliability (e.g. in case of stormy weather). As a result, the "landbridge" remains an important route for live fish, other products with a short shelf life and for transport linked to "just in time" production chains. The possibility of a "fallback" to the UK landbridge at some point is also mentioned, as producers and clients adapt to Brexit. It is also argued that growth in direct maritime transport flows was encouraged by the pandemic-induced limits on passenger travel, which made it possible to prioritise freight by using bigger ships for freight routes. Rosslare port may therefore experience both downward and upward fluctuations in transport volumes in coming years.

[156] https://www.prepareforbrexit.com/

[157] TheJournal.ie, *Tonnes of new ferry routes have helped to Brexit-proof Irish trade - but choppy waters could yet be ahead*, on-line article 1st March 2021.

Brexit has also contributed to encouraging some companies to "move up the value chain", as part of a strategy to enhance their competitiveness in broader international markets[158]. The mechanical engineering company Keltech in Waterford has for example specialised in more innovative products. This has allowed them to increase their margins, add new customers in continental Europe while at the same time strengthen their position in the UK market. The Irish nutrition group Glanbia has, jointly with the Dutch company Royal A-ware, invested 140 million EUR in a cheese factory to diversify cheese production[159]. Irish cheese production has until now focused on producing Cheddar, which is mainly consumed in the UK. The new factory will make it possible to produce cheese for other international markets[160].

However, the key challenge in the South East region is to enable companies, especially SMEs, to export to markets other than the UK, to handle uncertainties and additional administration linked to continued trade with the UK and to overcome difficulties transporting goods to the European continent (especially when it comes to products with a short shelf life and just in time deliveries, e.g. spare parts for industrial equipment).

The examples listed above show that this adaptation process could, in some cases, help companies become more competitive and profitable. The regional economy could become more resilient in the medium to long term as a result of exports to a wider range of international markets. Brexit could therefore be considered an opportunity in this regard. Despite significant uncertainties regarding the future evolutions of freight volumes, a potential advantage is linked to the possibility of Rosslare and Waterford ports' asserting themselves as "Gateways to Continental Europe".

Remediation actions implemented

As mentioned above, individual companies have taken remediation measures autonomously and with support from the national government. It is expected that the Brexit may trigger some "creative destruction" within the region, as some smaller companies with low profitability may not be able or willing to adapt.

[158] https://www.prepareforbrexit.com/insights/eurozone-market-for-keltech/

[159] RTE, *€140m cheese plant in Co Kilkenny gets go-ahead*, on-line article 16 February 2022.

[160] TheJournal.ie, *Gouda news: 'Brexit-proof' cheese factory in Kilkenny will cater for European tastes* on-line article 6 December 2020.

As agriculture and agri-food have been particularly affected by Brexit, support from national initiatives includes the Capital Investment Scheme for the processing and marketing of Agricultural Products (first announced in December 2020), with EUR 70 million for food producers and processors in the meat and dairy sectors to help them diversify and win new customers post-Brexit. Major agri-food companies have received significant sums under the scheme. For instance, Slaney Foods in Bunclody (South East) has been given state capital investment support of nearly EUR 2 million to support the "diversification of their offering and to attract new markets and customers" in the wake of Brexit[161].

At national level the PrepareForBrexit website includes also the Post-Brexit Advisory Support to helps businesses (Enterprise Ireland clients) create a strong action plan and identify the opportunities and risks that the new trading environment in the UK may pose to Irish business. Moreover, the Evolve Strategic Planning Grant offers up to EUR 5 000 for companies to help them cover expenses for consultancy services to determine how the company might respond to the threats and opportunities that have arisen as a result of changes to the trading environment in the UK since January 1st 2021.

Companies in South East have also received support from the European Maritime and Fisheries Fund (EMFF) Programme[162]. In February 2021, to support both pandemic and Brexit effects, the Minister for Agriculture, Food and the Marine announced EUR 4.9 million in new investment for seafood processing companies, with a contribution from the European Maritime and Fisheries Fund Programme providing grants of EUR 1 million. Moreover there Further development of the Rosslare Europort is foreseen through infrastructure investment financing utilizing EUR 90 million from the BAR[163]. However, these investments will primarily finance infrastructure required for additional customs procedures resulting from Brexit. Despite the newly established connections to additional European ports, there is no proactive public policy seeking to capitalise on Rosslare port's increasing importance as a "gateway to continental Europe" or to further develop industrial and commercial activities around it., e.g. by establishing an industrial and commercial development zone in connection to the port. This is mainly linked to Irish Rail's ownership and governance of the port, as its main focus in on investing in railways, making it difficult to promote a more proactive approach to port-driven local and regional development. Moreover, Irish transport authorities are wary of taking any measures that could be considered to be in violation of State aid rules.

[161] Indipendent.ie, *Slaney Foods receives almost €2m for market diversification,* on-line article 16 November 2021.
[162] Indipendent.ie, *Sofrimar receives funding boost from fisheries programme,* on-line article 9 March 2021.
[163] Department of Public Expenditure and Reform, *Minister McGrath updates Government on Ports Infrastructure for Brexit,* press release, last updated on 16 December 2021 and Indipendent.ie, *Rosslare set for investment in the region of €90m through the Brexit Adjustment Reserve*, on-line article 16 December 2021.

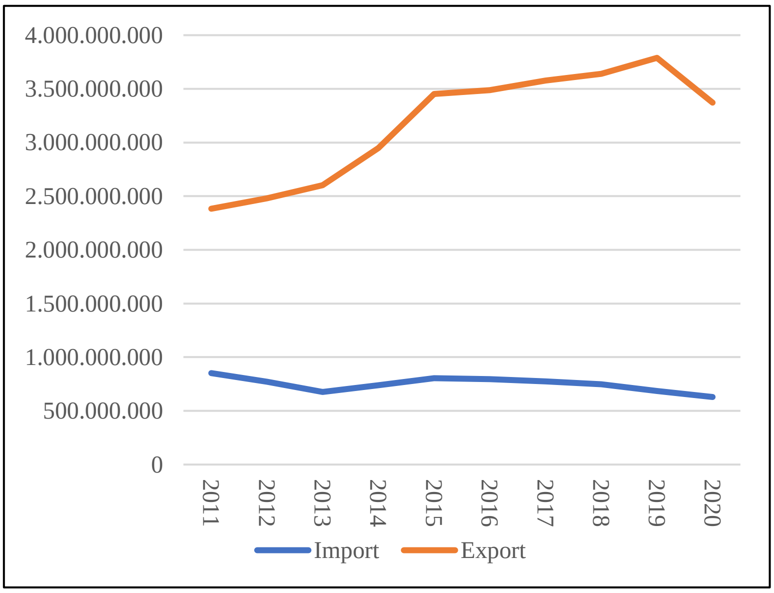
3.6 Veneto (Italy)

Regional economy overview

Veneto Region plays a leading role in the economy of Italy, contributing with a share of 9.2% to the national GDP. This is mostly attributable to the high concentration of productive specializations in the manufacturing sector. The entrepreneurial framework is composed prevalently of small and medium-sized enterprises (SMEs) that make Veneto an economically dynamic and interconnected region. The region has a highly differentiated economy with key specialisation in machinery, furniture, articles of clothing, agri-food products, and beverages (wine in particular with the worldwide renowned Prosecco). The pandemic, which begun in Italy in the early months of 2020, spread rapidly in Veneto, having major repercussions on the regional economic system. However, the economic activities recorded a significant recovery in the second part of 2020 and in the first half of 2021 (Banca d'Italia 2021).

Veneto is one of the strongest export regions in Italy, with more than EUR 17 billion surplus recorded in 2019 (i.e. pre-pandemic level). It is the third Italian region, after Lombardy and Emilia Romagna, in terms of trade with the UK. With nearly EUR 3.8 billion, the UK was the fourth destination for Veneto's exports in 2019, after Germany (EUR 8.3 billion), France (EUR 6.8 billion) and the United States (EUR 5.6 billion). Imports from the UK were nearly EUR 700 million, leading to a trade balance of more than EUR 3.1 billion in trade flows with the UK (18.2% of total regional trade surplus). This surplus, sustained principally by exports, increased constantly over time, with significant growth between 2011 and 2015. Following the Brexit referendum, exports grew more slowly (negative only in 2020, the year of the pandemic), while imports decreased slightly.

Figure 3.11: Veneto trade flows with the UK (EUR)



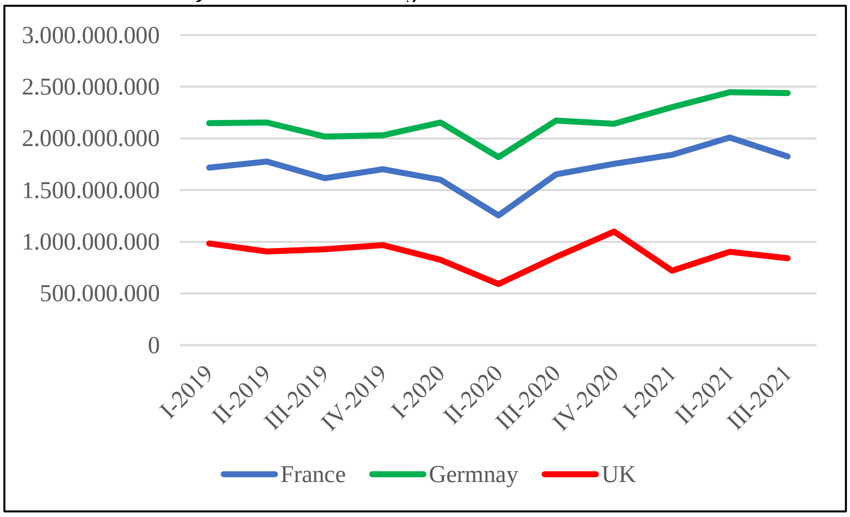
Source: own elaboration based on Sistema Statistico Regione Veneto

The main products exported to the UK in 2019 were machinery (16%), beverages (12%), articles of apparel and clothing (9%), leather products (8%), agri-food products (6%), and furniture (6%). Main imported products were chemical products (17%), agri-food products (13%), computer and electronics (11%), and machinery (9%).

Brexit impact

The pandemic had a significant impact on Veneto's exports in the first half of 2020, but trade flows towards key international markets - including the UK - recovered completely in the second half of the year. This positive trend continued in the first three trimesters of 2021, but for a notable exception in the UK market. Exports to the UK, in fact, experienced a significant drop of 34.4% between the fourth trimester in 2020 and the first in 2021, recovering slightly between the first and second trimester in 2021, before marginally decreasing again between the second and the third. According to the latest data provided by the regional statistics system, exports to the UK were still lower in 2021 than their pre-pandemic level, -26.7% in the first trimester of 2021 compared to the same period before the pandemic. Overall, compared to the same period in 2019, exports to the UK experienced a loss of more than EUR 350 million in the first nine months of 2021. On the contrary, exports towards other EU destination significantly increased[164]:Germany (+EUR 870 million), France (+EUR 570 million), Poland (+EUR 317 million), Belgium (+EUR 314 million). The increase to the United States, +EUR 518 million was also remarkable.

Figure 3.12: Exports value towards three tops EU destinations, 2019-2021 by trimester



Source: own elaboration based on Sistema Statistico Regione Veneto

A significant reduction was seen across the principal export products to the UK in the first part of 2021, especially in the agri-food, beverages and furniture sectors. For instance, data provided by Coldiretti in July 2021[165] revealed that,

[164] An exception among EU countries is Spain with -EUR 168 million.
[165] Coldiretti Veneto, *– 25% Di Pasta Italiana In UK. Crollo Dei Formaggi Veneti (-60%). Con La Brexit Soffre Anche Il Prosecco*, on-line article 13 July 2021.

overall, the consumption of Italian pasta decreased by 25% in the UK in the first months of the year. Among the most affected agri-food products were also Veneto cheeses (-60% in exports) and Prosecco wine (-20%). The key reasons, according to Coldiretti, are to be attributed to the increased bureaucratic and administrative difficulties raised by the TCA. On the contrary, in the same period, Prosecco exports towards other countries increased by 20%, thereby compensating for the loss in the UK market.

Table 3.3: Exports change in first semester 2021, main destinations

Country	Variation with respect to IV-2020	Variation with respect to I-2019
France	5.0%	7.2%
Netherlands	6.2%	4.0%
Germany	7.6%	7.3%
UK	**-34.4%**	**-26.7%**
Spain	5.3%	-13.9%
Belgium	24.2%	28.9%
Sweden	5.8%	8.4%
Austria	4.7%	-3.6%
Swiss	-10.8%	27.7%
Turkey	1.4%	8.4%
Poland	7.8%	18.8%
Romania	-0.1%	0.5%
Russia	-14.5%	9.6%
USA	497%	3.0%

Source: own elaboration based on Sistema Statistico Regione Veneto

The forecast presented by Unioncamere Veneto in autumn 2019[166] quantified that 2.1% of Veneto's GDP could be affected by Brexit, a value higher than the average in the North East (1.8%) and at national level (1.4%). Of this potential loss, 0.3% is due to effects impacting the rest of Italy and 0.5% to the overall effects in the EU. The industrial sectors expected to be most at risk were those with the highest level of specialization, as well as those most exposed to exports (in particular agri-food and textile-clothing). Locally, the provinces of Padova and Treviso, which registered exports to the UK for nearly EUR 1.5 billion in 2019 (a figure which doubled in ten years), were forecast at the end of 2020 to be particularly affected. They were projected to lose around EUR 220 million in 2021, with 42.6% of local companies affected by decreased exports[167].

[166] Nordest Economia, *Brexit al via, a rischio 220 milioni di export tra Padova e Treviso*, on-line article 21 December 2020.

Key challenges and opportunities

Notwithstanding the pandemic, Veneto exports increased in 2021 compared to the first months of 2019 (+6%). The countries that were primary export target markets remained important for the regional economy. However, the UK was the only country in this top group to exhibit a structural decline in trade relations, while exports towards the other countries have mostly grown. Today the UK is no longer part of the top 15 trading partners of Veneto Region, despite its fourth position in 2019. This means that the UK has been replaced by other countries, creating new opportunities for Veneto to explore new markets, redefine its international trade relationships, and mitigate the effects of Brexit after the TCA.

The increased administrative burden induced by the new rules could have pushed local enterprises to search for new destinations as well as for new solutions to enter the UK market. An example is provided by the Italian wine sector, which experienced a very strong growth in re-exports from Belgium to the UK in 2021[168]. The reasons for this phenomenon seem to be linked to the decision of British supermarket chains to move their logistics centres from the UK to Belgium to better manage the new customs procedures. Exports of Italian sparkling wines - including Veneto's Prosecco - from Belgium to the UK grew more than 7 times between January and October 2021compared to the same period in 2020. Belgium exported 110 000 hl of sparkling wines to the UK, of which 58% was Prosecco, equal to over 8.5 million bottles.

Remediation actions implemented

Currently there are no funding initiatives at LRA level to support sectors and enterprises affected by Brexit. The pre-financing of the BAR for Italy was approved in December 2021, but currently there is no information or plan on how the reserve will be used at regional level.

Overall, there is a perception that local enterprises involved in trade with the UK, despite some initial difficulties dealing with the new regulatory framework established by the TCA, have managed to independently re-orientate and re-organize their business towards different markets. Therefore, funding support or other initiatives from public resources is perceived as not necessary, at least in the short-medium term.

However, local enterprise associations started working before the official Brexit and the TCA, to inform companies on the expected new rules and effects of the UK's withdrawal. Among the initiatives, the 'SOS Brexit' web-portal provided

[168] Vinophila, *Il Belgio è diventato il grande ri-esportatore di vino italiano verso il Regno Unito,* on-line article 14 January 2022.

by Confindustria Veneto, the main enterprise association at national and regional level, is a constantly updated information point providing associates with documents and guidelines on the new rules established by the TCA. Moreover, in December 2020, Confindustria Veneto signed a protocol (‘Progetto Brexit’) with the Agenzia Dogane e Monopoli for Veneto and Friuli Venezia-Giulia (ADM. i.e. Customs and Monopolies Agency) to provide, in a synergistic way, optimal support to operators, in anticipation of the UK’s exit from the EU and the related effects that this would entail in the management of their future commercial exchanges. As part of the collaboration activities, the organization of conferences - also in videoconferencing mode - was envisaged in 2021 in order to promote maximum dissemination of the obligations and innovations in the relevant legislation. Targeted meetings have also been organised between ADM officials, the representatives of Confindustria Veneto and groups of companies, to collect their observations on particular issues of interest and provide operational and regulatory information.

3.7 West Sweden

Regional economy overview

West Sweden includes two administrative regions (Västra Götaland and Halland) and four historical provinces (Dalsland, Bohuslän, Västergötland and Halland). Västra Götaland’s population is five times larger than that of Halland (1.74 million *vs* 340 thousand), its GDP per inhabitant is almost 30% higher and close to the national average of EUR 45 thousand, its total exports (EUR 25.7 billion) are 15 times higher and exports to the UK are more than 10 times higher. Within Västra Götaland, the Gothenburg Region is an intermunicipal cooperation entity that includes the 13 municipalities of Greater Gothenburg. With its total population of over 1 million inhabitants, it accommodates more than 40% of the population of West Sweden. The Gothenburg functional area (i.e. commuting areas) includes 27 municipalities, with a total population of 1.4 million inhabitants, i.e. 55% of the population of West Sweden.

The Västra Götaland Region also has the highest volume of private R&D in Sweden, above Stockholm, with 33% of total private R&D investments in Sweden, 61% of investments in the automotive industry, 42% in chemical, foodstuffs and pharmaceutical industries and 27% in business services (Business Region Göteborg, 2021).

Overall, the economy of West Sweden is characterised by the high relative importance of manufacturing and mining activities (18% of GDP), trade and transport, and storage. In terms of manufacturing activities, the largest companies are Volvo and SKF (the world's largest bearing manufacturer, also specialised in seals, lubrication and lubrication systems). In terms of transport, the port of Gothenburg plays a major role as it is the most important port in Scandinavia. Gothenburg also hosts the headquarters of Stena Lines, one of the largest ferry operators in the world as well as Ericsson, AstraZeneca, Saab (military equipment) (Business Region Göteborg, 2021). Moreover, compared with Sweden as a whole, the Gothenburg region clearly has a larger share of employees in business services, information and communication as well as manufacturing.

As highòlighted in chapter 2 (see section 2.2.1), with EUR 15 billion in 2019, the UK is Sweden's fourth largest export market, directly or indirectly supporting 77 400 jobs in Sweden, with vehicles being the main sector of exports. Västra Götaland, and especially Gothenburg where the Volvo Group has its headquarters, is almost entirely responsible for the vehicle exports to the UK, accounting for 62% of Sweden's total exports of motor vehicles and other means of transport, and for 49% of Västra Götaland's total exports (Stockholm Chamber of Commerce 2021). Overall, with EUR 20.8 billion in 2020, the Gothenburg region's total export value constituted 81% of Västra Götaland's total export value and just over 16% of Sweden's merchandise exports (Business Region Göteborg, 2021). With EUR 1.2 billion, the UK is the sixth export market for the Gothenburg region. Imports from the UK amounted to nearly 710 million in 2020. Moreover, figures from 2018 indicated that 222 (8%) of the Gothenburg region's 2 378 companies with foreign ownership had owners based in the UK, after Norway (18%), Germany (12%), Denmark (11%) and the USA (9%).

Brexit impact

As highlighted in the previous section, trade and economic relations between West Sweden, Västra Götaland in particular, and the UK are significant. As shown in the table below, Västra Götaland's export to the UK rank second in importance in Sweden, only after the Stockholm region. However, in contrast to Stockholm, exports fell sharply between 2019 and 2020 (by -27.2%, against -10.7% at national level). Although the relative decrease in Västra Götaland's exports to the UK is ranked third after Södermanlands (-45.2%) and Jämtlands (-33.9%), the absolute decrease of SEK 4.6 billion (around EUR 440 million) is considerably larger than that for any other Swedish region, and corresponds to more than half of the total decrease of Swedish exports to the UK. The decline for Västra Götaland is significant and means that its exports to the UK fell back to 2014 levels. On the contrary, Halland's exports to the UK experienced a slight growth (+0.1%), but Halland's share of export represents only 1.8% of total Swedish exports to the UK, one of the lowest values at regional level.

Table 3.4: Exports to the UK in 2019 and 2020, regional figures

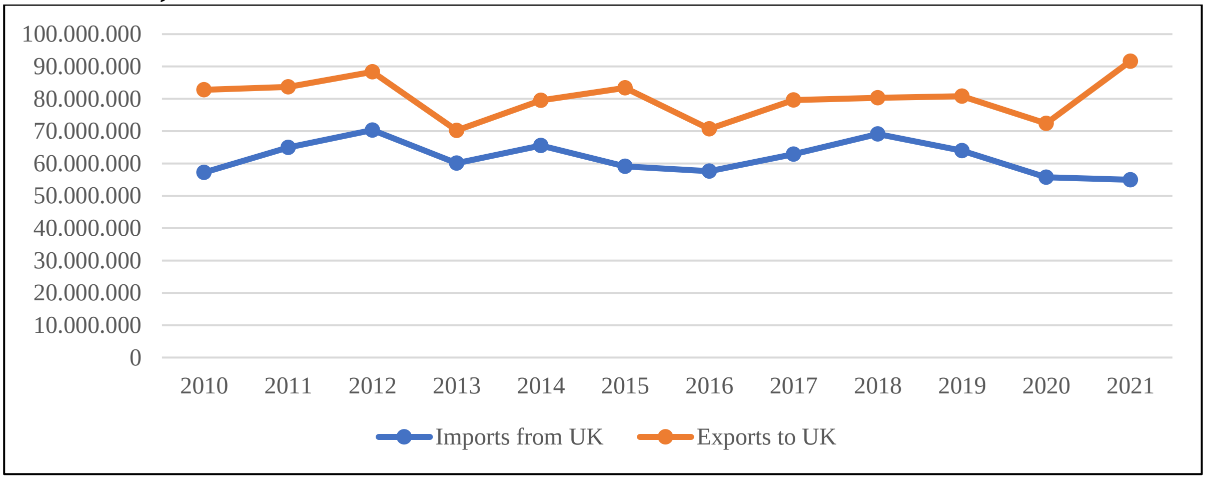
Region	Value of exports (SEK billion)		Change (%)	Share of exports (%)
	2019	2020		
Stockholm	180	181	+0.4%	25.0%
Uppsala	11	12	+10.7%	1.7%
Södermanlands	27	15	-45.2%	2.0%
Östergötland	32	25	-22.0%	3.5%
Jönköping	23	23	+0.8%	3.2%
Kronoberg	46	45	-3.2%	6.2%
Kalmar	12	9	-25.7%	1.2%
Blekinge	5	15	+167.2%	2.0%
Skåne	49	41	+17.0%	5.6%
Halland	**12**	**13**	**+6.0%**	**1.8%**
Västra Götaland	**167**	**122**	**-27.2%**	**16.9%**
Värmland	9	7	-17.8%	1.0%
Örebro	12	12	-2.3%	1.7%
Västmanland	30	35	+15.9%	4.9%
Dalarna	21	17	-16.9%	2.4%
Gävleborg	20	20	+3.9%	2.8%
Västernorrland	19	18	+5.4%	2.5%
Jämtlands	1	1	-33.9%	0.1%
Norrbotten	41	38	-7.5%	5.3%
Non-identified region	83	65	-21.2%	9.0%
Sweden	*808*	*722*	*-10.7%*	*100.0%*

Source: Stockholm Chamber of Commerce (2021). Data for Gotland and Västerbotten not available.

There are no updated regional data for 2021 nor are there regional figures on the evolution of regional exports by branch and by country of destination. However, national figures indicate that oil products and passenger cars are the two branches in which exports to the UK fell most (Stockholm Chamber of Commerce, 2021). As indicated above, these are major economic sectors in Västra Götaland.

National figures provided by the National Board of Trade for the first six months of 2021, indicate that in the first quarter, imports of goods from the UK fell by 26% and by 1.2% in the second quarter compared with the corresponding quarters of 2020. In the first quarter, exports of goods to the UK increased by 0.4% and in the second quarter by 61%. Compared with the fourth quarter of 2020, however, exports decreased by more than 14%. The difference between quarters is larger than usual, as is the case for foreign trade in general. This is because the comparison quarter, the second quarter of 2020, represented the peak of the corona crisis, while merchandise trade for the first quarter of 2020 was barely affected. Overall, recent statistics indicates that between 2020 and 2021, imports of goods from the UK were stable (-1.4%), while exports increased by 26.6%, the strongest increase in the last decade. The increase in exports compared to 2019 values (i.e. pre-covid19) was +13.3%.

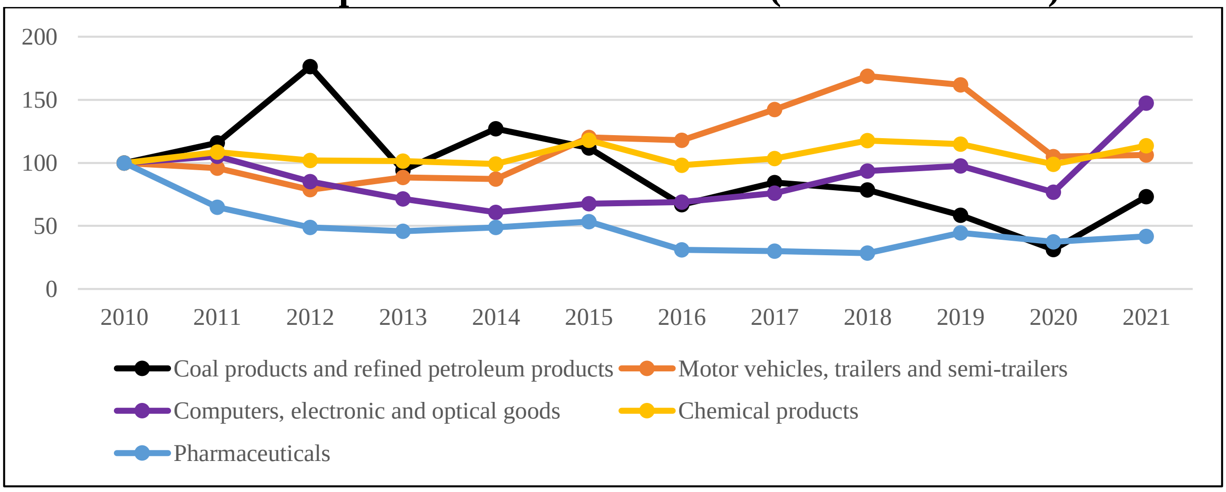
Figure 3.13: Evolution of total Swedish imports and exports to the UK, 2011-2021



Source: Statistics Sweden (Statistikdatabasen, Varuimport och Varuexport, ej bortfallsjusterad, tkr, år)

There was notable variation between different groups of goods (see figure 3.14 below). For example, exports grew strongly for computers, electronic (+92%) as well as for coal and petroleum products (+133%). In part these increases are linked to significant decreases between 2019 and 2020, in the context of the pandemic. Motor vehicle exports remained stable, after a marked decrease between 2019 and 2020 (-35%). Changes in exports in pharmaceuticals and chemical products are consistent with trends in the last decade.

Figure 3.14: Evolution of Swedish exports to the UK 2011-2021 for some selected sectors of importance for West Sweden (index 100 = 2011)



Source: Statistics Sweden (Statistikdatabasen, Varuimport och varuexport, ej bortfallsjusterat efter SPIN2015, handelspartner, tabellinnehåll och månad)

The pattern for services was very similar with exports increasing by 4.9% and imports decreasing by 18% in the first part of the year[169]. As for the goods side, there were large fluctuations between quarters as a result of the pandemic crisis makings it even more difficult to draw conclusions in the short term making it challenging to measure the impact of the TCA, which officially entered into force in May 2021, quantitatively[170]. Overall, however, it can be stated that part of the initial drop in trade is probably due to some companies bunkering goods and inputs before the turn of the year, and bringing their trade forward to avoid the impact of a possible hard Brexit. These are transitory effects of Brexit.

As stated before, there are no updated data to assess the impact of Brexit and the TCA on Västra Götaland's economy in 2021. For Volvo, Brexit has resulted in increased costs due to the limited timeframe in which all the changes for TCA compliance needed to be addressed, however, as the company imports parts and exports cars around the world, it has experience dealing with markets outside the rules of the EU single market. In this sense, and probably for other large companies in the region, Brexit means business as usual[171]. For SMEs with no trade experience with extra-EU countries, or service companies, these costs and challenges can be higher, as underlined in next sections.

Finally, the UK was Sweden's second cooperation partner in Horizon 2020 after Germany in several projects related to medical/healthcare, aviation, transport, ICT and industry, with co-publications mainly in clinical medicine, biomedicine and molecular bioscience. There were UK participants in 191 out of 240 collaborative H2020 projects (80%) where a partner from Västra Götaland was involved. 32 of the projects were coordinated from the UK, and there were UK partners in 10 of 15 projects coordinated from Västra Götaland (CPMR 2018). The UK will continue to participate in Horizon in the 2021-2027 programming period, so the cooperation with Sweden and Västra Götaland should endure in the near future.

[169] In the first quarter of 2021, exports of services to the UK grew by 1.9% and in the second quarter by 8.0% compared with the corresponding quarter of 2020. In the first quarter of 2021, imports of services from the UK decreased by 34%, but in the second quarter imports increased by 4.5%.

[170] The National Board of Trade notes that "*it is difficult to draw any clear conclusions about the impact of Brexit on trade so far. Foreign trade statistics often fluctuate quite sharply from quarter to quarter and even more so on a monthly basis. In addition, there are other factors affecting trade developments, not least the corona pandemic. One should therefore be cautious about drawing too many conclusions based on statistics for such a short period of time as has elapsed so far*."

[171] Automotive logistics, *Brexit means business as usual, but with more work for Volvo and Gefco*, on-line article 19 January 2021. See also cardealermagazine.co.uk, *Volvo: We're ready for Brexit and having a great time sales-wise*, on-line article 2020.

Key challenges and opportunities

The National Board of Trade Sweden has continuously monitored trends in trade patterns since the UK left the Single Market. The general conclusion on the basis of data at national level is that it is very difficult to draw any conclusions at this stage. This is partly because the pandemic crisis occurred in parallel with Brexit. It is therefore unlikely that any conclusions based on quantitative evidence could be drawn for West Sweden.

However, a post-Brexit analysis in November 2021 estimated both firm and consumer use of the TCA in Sweden (National Board of Trade Sweden 2021). More specifically, the report investigated the utilisation of tariff preferences (i.e. normally 0%)[172] in the TCA by Swedish importers during the first six months of 2021. Results show that Swedish firms importing from the UK made use of 84% of the potential value of available duty savings[173]. The importers also increased their use of the free trade agreement from 77% in January to 89% in June, probably as the result of a learning process.

Product and sector level outcomes suggest that intermediate goods accounted for 60% of all imports during the first six months. Their preference savings rate[174] was as high as 80%, while consumer and capital goods showed preference savings rates of 78 and 63%, respectively. Interestingly, albeit not surprisingly, passenger motor cars had a preference savings rate of 94%. At an even more product-specific level, the data suggest that the agri-food and chemical sectors performed well, whereas sectors such as advanced machinery, manufacturing, electronics and textiles struggled, with relatively low preference savings rates.

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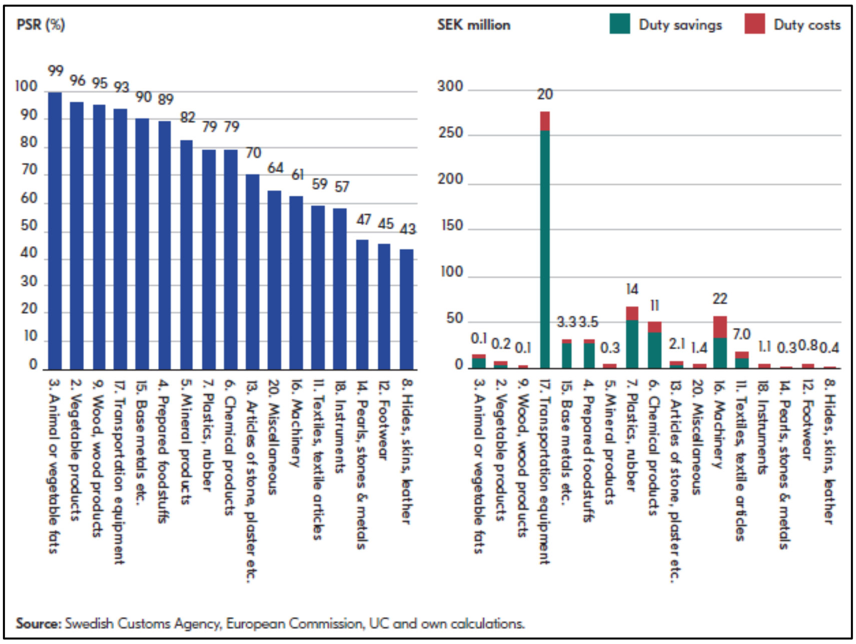
[172] For tariff preferences to be granted, the products must originate from the partner countries. This means that only products that are wholly obtained or that have been subject to a substantial transformation in the partner countries are eligible for tariff preferences. In addition to fulfilling these rules of origin, the origin must also be proved by a certificate of origin or other supporting documentation. There is, accordingly, an additional administrative 'cost' for both exporters and importers for utilising preferential tariffs, which should be balanced by the duty savings. If the origin is denied by the customs authorities in the importing country, the importer must pay the MFN duty (and possibly a fine). In the EU-UK TCA, there is a provision allowing a one-year grace period for exporters to issue a statement of origin without having a supplier's declaration at the time, and the possibility to present supporting documentation after about one year.

[173] Value of imports multiplied by preference margin (i.e. the duties that importers avoid when the tariff preferences are utilised).

[174] Duty savings/potential duty savings (=duty savings + duty costs).

In actual terms, importers benefited from duty savings amounting to SEK 483 million (i.e. nearly EUR 46.4 million) by using tariff preferences. However, importers also had duty costs[175] of SEK 88 million (EUR 8.4 million) when not using the free trade agreement. The report underlines that Swedish firms are now affected by customs administration and additional costs whether they use the tariff preferences or not. As the vast majority of firms importing from the UK are SMEs, these firms tend to take advantage of the tariff benefits to a greater extent than large firms. It is in fact possible that large firms have more complex products and use more subcontractors. For this reason, it might be more difficult for them to prove that all their products originate in the UK. Overall, therefore, the average preference savings rate of the TCA is relatively high. A larger share of firms is likely to be aware of this free trade agreement since they previously benefitted from tariff-free trade, something that may contribute to explaining the high level of preference utilisation. Whether these early stage results can be regarded as a success remains to some extent an open question. The initial high use of tariff preferences may partly be due to intensive information campaigns on the consequences of Brexit that presumably reached firms to a large extent. Moreover, the tariff preferences were set to zero from the start, which gave importers larger incentives to use the free trade agreement from day one. The one-year grace period for exporters to issue a statement of origin without having a supplier's declaration available at the time has also helped them opt for tariff preferences. The utilisation of tariff preferences is likely to increase further over time due to learning as more companies and private consumers start to make use of the available duty savings.

Figure 3.15: Preference savings rates and duty costs by product section for Swedish imports from the UK, January–June 2021



Source: reproduced from National Board of Trade Sweden (2021)

[175] Value of import multiplied by the MFN tariff (the duty that is paid if the tariff preferences are not utilised).

However, as underlined by the National Board of Trade Sweden, the adjustment costs to the TCA have been particularly difficult for smaller companies that have not traded with third countries before and especially for those operating in the agri-food sectors and e-commerce companies where the before and after difference is greatest[176]. In the service sector, for which the UK is Sweden's second largest trading partner, new requirements and rules have, among other things, led to delayed or non-delivery and there is a concern among companies that it may become even more difficult when the UK introduces further controls and rules at the end of the grace period.

Remediation actions implemented

Apart from information campaigns for Swedish businesses and citizens[177], there are currently no other support schemes or initiatives, at national or regional level, to mitigate the negative effects of Brexit. It seems that similarly to the observations in other case studies, that enterprises have managed to adapt to the changes resulting from the TCA and are making extensive use of available tariff preferences.

The BAR foresees an amount of around EUR 109 million at 2022 prices for Sweden, the large majority of which is destined for sectors where the trade in goods and services is affected by Brexit with the remaining portion to be distributed to the fisheries sector. The annual pre-financing for Sweden was only approved in March 2022 by the European Commission (see section 1.6 in chapter 1), so there are no national or local plans to use it yet. Around EUR 42.7 million is foreseen for 2022, EUR 32.6 million for 2023 and EUR 33.3 million for 2024.

[176] See Kommerskollegium, *Sex månader med frihandelsavtalet efter Brexit*, on-line article 30 June 2021.
[177] See for instance https://www.kommerskollegium.se/importera--exportera/eus-handelsavtal/storbritannien-efter-brexit/

3.8 Zeeland (the Netherlands)

Regional economy overview

Zeeland is the least populous and westernmost area of the Netherlands. Contributing to 1.7% of the national GDP, its economy relies on various sectors and activities such as trade, mostly based on the North Sea Port, the chemical industry, tourism, fisheries and agriculture.

Trade and industry, especially chemical goods, provide most of the employment. The region is in fact home to one of the largest chemical clusters in northwestern Europe, with nearly 25 000 people employed in this sector. Additionally, the port represents an important economic catalyst, in which mainly medium-large industrial and logistic companies operate. Approximately 100 000 people are actively working in the North Sea Port[178], producing an added value of EUR 12.5 billion (Provincie Zeeland, 2021). Export, accounting for 34% of Zeeland's economy, is mostly based on large industries.

Agriculture and fishing companies account for 15% of regional employment. Zeeland is in fact one of the Netherlands' largest agricultural regions, with around 83 500 hectares of arable farmland and nearly 2 800 agricultural companies (Venema *et al*. 2021). Onions are the most important Dutch agri-food export product in terms of volume, with Zeeland accounting for almost 80% of all exports, usually done through the port. Apart from primary farming production, Zeeland also excels in food processing.

Zeeland is the second region in the Netherlands after Limburg with the highest proportion of companies involved in international trade in goods (nearly 14%)[179]. Its geographical position, in front of the North Sea, makes it an export-oriented region and a natural economic partner for the UK. Key products exported to the UK before Brexit were in the agri-food sector, which constituted more than 40% of Zeeland's exports to the UK in 2015[180]. Onions were a key export product with 80% of the national production coming from Zeeland, 10% of which was exported to the UK (corresponding to half the onions imported by the UK)[181]. The UK was equally important for the sale of chemical products from multinationals based in Zeeland, with these accounting for 38.2% of total Zeeland exports. In addition, industrial products (13%) and machinery and transport equipment (5.6%) were shipped to the UK. However, Zeeland's key trading partners are Germany (EUR 872 million in exports) and Belgium (EUR 823 million), which accounted for

[178] In December 2017, the port of Ghent and Zeeland Seaports merged to become North Sea Port. In 2021, the merged port handled a total volume of 68.9 million tonnes, making it the ninth largest port in Europe.
[179] https://arbeidsmarktinzicht.nl/content/states/index/77373
[180] De Ondernemer, *Zeeuwse export nog fors na Brexit*, on-line article 25 August 2016.
[181] Zeeland Business, *Gevolgen Brexit blijven onduidelijk*, on-line article.

twice the value of UK exports in 2015. Other than trade relations, Zeeland was also involved in several cooperation projects with UK regions. Among these, as outlined in the third section, Brexit has had a major impact on the loss of resources from the Interreg programme.

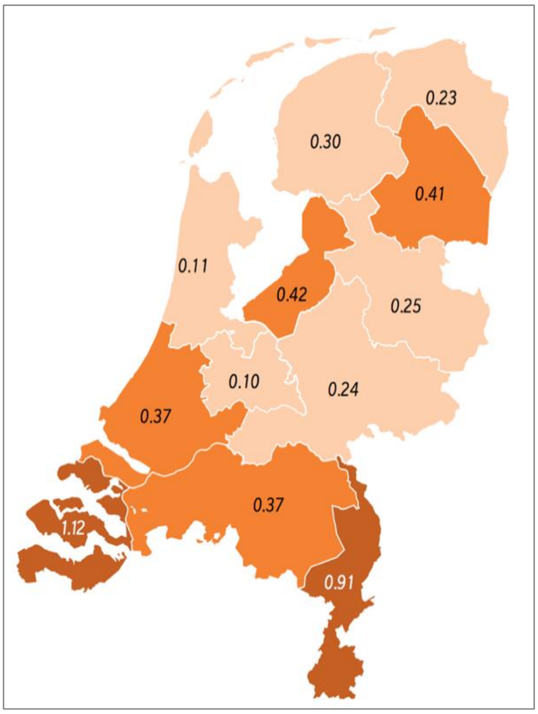
Brexit impact

According to the Centraal Bureau voor de Statistiek (2021), bilateral trade between the Netherlands and the UK took a significant hit in the first three quarters of 2021 due to Brexit. Imports from the UK were hit harder than exports to the UK in January (35% and 26% respectively lower than expected), but then bilateral trade made a strong recovery in March (imports 19% and exports 5% higher than expected). Overall, during the first nine months of 2021, imports from the UK were actually 3% higher than expected, while, exports were 11% lower than expected. This was mainly due to a 35% fall in re-exports, and has resulted in an estimated loss of EIR 3.2 billion for enterprises based in the Netherlands, according to Centraal Bureau voor de Statistiek's model.

Since the Brexit referendum, the relative contribution of trade with the UK has decreased more sharply than trade with other partner countries. The UK's share in total Dutch imports in fact dropped from approximately 5% in 2015 to 4% in 2021, while exports fell from approximately 8 to 7%. Similarly, trade with the UK also declined for Zeeland[182]. In 2015 this was 8.7% or EUR 472 million, 1% above the national average. In 2019, it decreased to EUR 429 million, or 6.8% of the total value of goods exported by companies in the region. At the same time, companies from Zeeland imported EUR 165 million worth of goods from the British market in 2019 (3.7% of the total import value), an increase from EUR 101 million in 2015.

[182] Data based on DeOndernemer.nl.

Figure 3.16: Relative Brexit impact on GDP of agricultural and chemical industry per province, in %



Source: reproduced from Clifford Change and Oliver Wyman (2018)

There are no updated figures for Zeeland for trade with the UK for 2020 and 2021, but the impact of Brexit at regional level in the Netherlands was largely analyzed before the TCA. According to Chen *et al.* (2018), Zeeland was estimated to have the highest exposure level, with 5.2% of the aggregate economy exposed to Brexit (nearly 10% for primary and manufacturing industries). An analysis carried out in 2018 (Clifford Change and Oliver Wyman 2018) forecasts that the costs of Brexit would be disproportionately high in the south of the Netherlands (figure 3.16). As the chemical and agricultural sectors together accounted for a significant share of the GNP of the southern provinces, Brexit was therefore in relative terms expected to be felt most in Zeeland and Limburg. For Zeeland, the direct costs of Brexit were forecast to be 1.12% of GDP. A more detailed analysis at sectoral level was proposed by Thissen *et al*. (2019). According to this report, Zeeland was one of the most exposed regions in the Netherlands with key sectors at risk of negative Brexit-related changes to their competitive position being crop and animal production, agri-food products, the manufacture of fabricated metal products, chemicals, furniture, wholesale and retail trade.

A further analysis in 2020 (Thissen *et al*. 2020), confirmed that Zeeland was expected to face on average the highest competitive vulnerabilities due to Brexit. Both the large agricultural and chemical sectors, as well as retail trade, could be expected to suffer a negative impact. However, the study also underlined that, despite the average competitive vulnerability of Zeeland, certain industries such as warehousing, telecommunication, and financial services, were expected to improve their competitive positions.

Key challenges and opportunities

While the actual impact of Brexit on Zeeland trade with the UK is still to be clearly assessed, the UK's decision to abstain from participation in the Interreg programme 2021-2027 has undoubtedly affected cooperation between Zeeland and the UK negatively. According to interviewees, the most significant impact of

Brexit, in fact, is expected in the area of lost opportunities to continue cooperation initiatives across different regions in the Channel, which have been highly beneficial to the Zeeland economy.

In fact, the Interreg 2 Seas Programme, which had an overall budget of EUR 256 million, required the participation of at least one UK regional partner in each financed project and it included the coastal areas of Belgium, France and the Netherlands. The main objective was to develop a sustainable, innovative, knowledge-based, inclusive area, where natural resources are protected, and the green economy is promoted. The funds were available to government institutions under public law (e.g. universities, Chambers of Commerce, trade unions), private parties (including SMEs), and non-profit organizations (such as associations). For example, the project "Facet", which involved the NV Economische Impuls, the HZ University of Applied Sciences, and the Camping en Villapark De Paardekree in Zeeland, supported entrepreneurs shifting from a linear to a circular economy in the tourism sector.

Within this context, Zeeland received almost EUR 20 million from the programme, which supported 16 local projects. This approach had a positive impact on the regional innovation scoreboard, which increased over time by +10.6%. In fact, the programme promoted cooperation between regions such as Zeeland with high innovation performance and "moderate innovators". Additionally, it contributed to the improvement of interregional knowledge sharing and cooperation.
Regions participating in the programme, which share common challenges, such as demographic change, healthcare, and climate change, had the opportunity to develop a common approach. The closure of the programme could therefore result in significant loss in terms of social innovation, employment, and efficiency for Zeeland.

Remediation actions implemented

In order to continue the cooperative approach initiated with the Interreg programme, at the beginning of 2020 the Straits Committee, a partnership between European and UK coastal provinces, has been established. The Straits Committee, launched in 2020, includes the territories bordering the Dover Strait area and the Channel-North Sea region, including six LRAs from the Netherlands, Belgium and France, and two from the UK[183]. The member authorities meet up to four times a year at the Straits Executive Committee where each authority is

[183] The Département du Nord and the Département du Pas-de-Calais (France), the Province of West Flanders and the Province of East Flanders (Belgium), the Province of Zeeland and South Holland (the Netherlands) and the Kent and Essex County Councils (United Kingdom).

represented by an elected official, while the working teams set up a meeting twice a month.

The shared vision and plans were adopted in 2021 (Straits Committee 2021) and offer a 10-year plan to help members work together to promote economic development, fluidity of trade, resolve disruptions, tackle climate change, and support young people. The Straits Committee is a multilateral forum for dialogue, providing a flexible framework for extending cooperation to local stakeholders such as those from the voluntary sector, education or the business sector. It supports the modernisation and digital transformation of local industry and encourages and promotes circular economy value chains by supporting contact and knowledge exchange between institutes and research centres, SMEs, producers, consumers and local authorities. Thus, stakeholders are able to create a positive environment which supports and promotes innovative practices aimed at decreasing the ecological footprint of the economy. The LRAs of the Straits Committee also seek to promote cross-border cooperation on both sides of the channel by providing technical and financial support for local cross-border initiatives in various fields.

Figure 3.17: The LRAs in the Straits Committee

Source: *https://straitscommittee.eu/*

Within this context, the Committee organised an event in 2020, where 300 representatives from the regions worked on climate change, the labour market, education, and youth. In 2022, a second event will be organised, in which young students and teachers from the member regions will meet in Bruges to focus on the design and development of local projects. Moreover, in 2021, the “Small Project Initiative” was launched with a budget of EUR 30 000 per LRA. Projects under the Initiative must be carried out in cooperation with at least two organizations based in two different countries in the territories covered by the Committee, but may take place in only one country. Key themes to be financed are: innovative projects for a thriving economy; initiatives to address the challenges of climate change; initiatives aimed at young people; projects that help to build a gateway between the UK and the EU; projects supporting post-covid19 recovery.

Moreover, under the BAR, the Netherlands can claim about EUR 866 million, of which EUR 710 million in compensation for losses in trade with the UK and the remainder intended for the fisheries sector. In February 2022, the central government announced a specific EU trade programme of EUR 32 million to support Dutch companies operating in sectors affected by Brexit until 2023, in the form of market consultancy, knowledge development or coaching, industrial research, trade show visits, trade missions or partnerships[184]. Additional initiatives have recently been announced to support income loss in fisheries due to Brexit[185].

[184] See on-line rvo.nl, *Brexit Adjustment Reserve (BAR): EU-Handelsprogramma.*
[185] See on-line rvo.nl, *Brexit Adjustment Reserve (BAR): Visserij.*

4 Conclusions and recommendations

This report has investigated the impact of Brexit on EU LRAs, focusing on the potential effects of the EU-UK TCA entered into force in 2021. After a review of the most recent literature on the macroeconomic effects of Brexit on EU economies, trade, migration flows, and the new legislative competition framework, it analysed in detail the exposure of EU regions to Brexit considering the four main sectors of EU specialisation with respect to the UK: vehicles, machinery, furniture and wood, and agri-food products. Eight specific case studies complement the quantitative analysis carried out in chapter 2, allowing one to explore the different dimensions other than trade flows in more depth. The various findings from this intensive research are illustrated in the first section, while policy recommendations are listed in the second.

4.1 Key study findings

Higher costs for trade due to the TCA

The general picture emerging from this report is that the TCA has undoubtedly created new challenges for EU businesses involved in trade with the UK, and several sectors across different EU regions have been significantly impacted. Literature has highlighted the **key limitations of the TCA**. Despite the fact that it has prevented the potentially larger disruptive effects on trade and investment flows of a no-deal scenario, **the TCA implies higher costs for trade.** These costs are especially pertinent to exporters subject to the rules of origin and the animal and plant health checks. The prior impacting more heavily on sectors where components and parts are extremely complex and numerous such as the vehicle sector, which ranks first in terms of EU trade with the UK, while the latter could render agri-food trade more costly. The decline in EU-UK trade in early 2021 for several Member States and regions, as observed by the data and case study analysis in this report, can mainly be attributed to the **lack of time for businesses to adapt to the new rules**, considering the extremely short period between the TCA's publication and its entry into force, together with **the lack of guidance to familiarize businesses with the legislative framework.**

Costs for the EU may rise in the future

The TCA foresees the avoidance of tariffs and quotas on goods, which benefits several sectors, however, it is currently, too early to understand whether these can compensate the higher costs. Some products are still under grace periods and the costs might therefore be even higher in the near future once these end. Moreover, the TCA does not cover the service sectors. This report has considered the impact on the service sectors only marginally, but recent literature suggests that Brexit effects could be conspicuous for these activities. This aspect was also highlighted in the Hesse, West Sweden, and South East Ireland case studies. Overall, the total costs of the TCA could therefore be more pronounced for European businesses, once the costs for the service sectors are added to those for manufacturing. Moreover, **the TCA's precarious base** (agreed relations could end up in a no-deal-like state if either party decides to terminate them) and **persisting elements of uncertainty** (for instance, long adjustment periods for some sectors such as fisheries, which are potentially subject to changes, and review of the TCA after five years) **further create a degree of unpredictability for enterprises and individuals which may suffer further impacts in the future**.

<u>Decreasing EU exports to the UK due to the TCA</u>

The TCA, however, implies **significantly greater costs for the UK than for the EU as a whole,** as the UK is strictly dependent on imports from the EU27. Exports from several Member States to the UK have significantly decreased, and for some regions - as illustrated by the Veneto or Hesse case studies - the UK is no longer among the key trade partners. This dynamic was observed in 2020 and, in particular, in the first part of 2021. Of course, part of the disruption in EU-UK trade in the last two years has been related to the pandemic, but by observing data, it is clear that the highest drop was registered in early 2021, after publication of the TCA.

Overall, trade with the UK partially recovered in 2021 but, as evidenced in chapter 2, while intra-EU exports and exports towards extra-EU countries recovered completely in 2021 from the significant drop experienced in 2020 (due to the pandemic), **EU exports to the UK in 2021 did not counterbalance the losses incurred in the previous year**. For some of the sectors considered in the study's quantitative analysis, the situation at EU level registered in 2021 was even worse if compared to 2016 data. For instance, in 2021, EU exports to the UK decreased by 39% compared to 2016, while intra-EU exports increased by 13%. EU machinery exports towards other EU destinations and outside the EU saw remarkable increases across all five years compared to 2016, but those towards the UK decreased by 14% and 10% in 2020 and 2021 respectively against 2016. This may suggest that the TCA has impacted on EU-UK trade, and that, at the same time, in some sectors, **EU businesses have been able to re-orientate their exports** towards new markets to compensate for the decrease in trade relations with the UK. Findings from case studies, for instance Veneto, Hesse, and South-East Ireland, seem to confirm this tendency.

Asymmetric effects across EU regions and sectors

The effects of Brexit are somewhat asymmetric across the EU regions. The results from this report broadly confirm the literature forecast, with **regions in northern and western Europe more exposed to Brexit than regions in southern or eastern Europe.** Proximity to the UK market undoubtedly also plays a role. This seems to be confirmed by the case study analysis, in which, for example, overall effects appear to be more pronounced for South East in Ireland, Normandy in France and Zeeland in the Netherlands, with respect to Veneto in Italy or Lubelskie in Poland.

However, the analysis carried out in chapter 2 has revealed that, when sectoral effects are considered, the picture concerning EU regional trade relations with the UK appears to be more intricate. **Almost all regions in the EU are exposed in at least one of the main EU sectors of specialisation with respect to the UK**, i.e., vehicles, electrical machinery, wood products and furniture, and agri-food products. Therefore, several other regions far from northern and western Europe are also at risk, for example, regions in southern Germany, Slovakia, west Poland, and west Romania (vehicles), in the Czech Republic and northern Italy (machinery), in Poland, eastern Germany and northern-east Italy (furniture), and in southern Spain, southern Portugal, southern-east France, and southern Italy (agri-food products).

Moreover, some regions, which are particularly exposed, are also less diversified in terms of their production sectors. Examples include Castilla y Leon in Spain and Basilicata in Italy (vehicles), Central-Moravia and Moravia-Silesia in Czech Republic (machinery), Warmińsko-Mazurskie Voivodship in Poland (furniture), Extremadura in Spain, southern regions in Italy, Podlaskie Voivodeship and Lubelskie Voivodeship in Poland (agri-food products). **For less diversified regions even small disruptions in trade with the UK could have significantly adverse effects on their production and supply chain**. This problem could be particularly severe for those territories which also exhibit lower levels of GDP and higher unemployment rates. Finally, regions might be particularly exposed in sectors in which the EU does not have a comparative advantage compared to the UK (for instance, chemical and pharmaceutical products for Flanders) or which are extremely important for local communities (as in the case of Normandy for the fisheries sector) despite their small weight on EU trade.

Higher costs for SMEs

One key finding that emerged from the case studies, especially from Hesse and West Sweden, is that **Brexit effects may be more significant for SMEs or enterprises without extra-EU trade relations**, for whom the costs and

challenges of dealing with the TCA can be higher. Larger and more internationalised companies might have had the advantage of worldwide trade experience including trade outside the EU, and were therefore easily able to prepare for Brexit and adapt to the new rules. They may also have fewer costs to re-orientate and re-organize their business towards different markets.
Moreover, the industrial supply chain can be complex within specific sectors and involve numerous companies, including SMEs, across many EU regions in different Member States. This is the case, for instance, in the automotive industry, for which compliance with the rules of origin may be particularly challenging. Brexit could therefore indirectly also impact on those SMEs in the value chain located in regions that are less exposed to Brexit, but whose specialisation depends on other more exposed regions.

Negative impact on EU workers and student mobility towards the UK

One of the key limitations of the TCA is the **lack of agreement on mobility**, and this may affect several trade sectors, especially those in services which rely on the movement of people. As underlined by the OECD's analysis described in chapter 1, the end of free movement of people between the EU and the UK may be responsible for a 0.7% GDP loss in the UK economy and 0.2% in the EU economy in the medium term (leading to a total loss of 4.4% and 0.6% respectively due to the TCA). The impact of the TCA on migration, especially of workers, is currently unclear, as there is very little information at both national and regional level on EU-UK people flows.

However, overall, EU net migration towards the UK was negative in 2020, and there are indications that, since the Brexit referendum, many EU workers have returned to their countries of origin or moved toward other destinations. Preliminary data for 2021 seem to confirm this pattern, indicating a significant reduction in EU-based jobseekers looking for work in the UK. **The highest impact, however, is on student mobility**, with a more evident drop in applications to UK universities originating from EU country members since the referendum. This was exemplified in the case study of Flanders. The fact that the UK has chosen not to participate in the new Erasmus+ programme 2021-2027, could further limit EU students access to UK universities in the future.

More difficult interregional cooperation with the UK

The cost of leaving the EU Cohesion Policy for the UK is high, potentially worsening the level of its regional disparities, as underlined by the CPMR. Despite the fact that the UK will take part in the Horizon programme for 2021-2027, **the interruption of the Interreg Programmes could create challenges for those local EU enterprises and communities** involved in the projects financed during the 2014-2020 programming period. This problem was highlighted by the Normandy and Zeeland case studies, in which it emerged that closure of the programme could result in significant social innovation, employment, and efficiency losses. Moreover, as illustrated in the Hesse case study, R&D cooperation with the UK may incur increasing administrative costs and additional costs for the recognition of professional qualifications.

New opportunities

The report has not clearly identified any 'winner' regions (i.e., those with market potentials as a consequence of Brexit), but for some regions, at sectoral or even at enterprise level, Brexit may bring about new opportunities.

Firstly, as illustrated by the examples in chapter 2, **some Member States increased exports in specific products to the UK in 2021**, **improving the competitive position of their regions specialised in these**. For instance, key exporters of meat to the UK, such as Denmark or Germany, or of dairy products such as Ireland and the Netherlands, saw a remarkable drop in exports towards the UK after adoption of the TCA. On the contrary, Poland's agri-food product exports to the UK - meat in particular - experienced an increase in 2021, despite Brexit. The Lubelskie case study seems to confirm this recent pattern for Polish trade towards the UK. In fact, its trade relations with the UK remained unchanged or even increased after Brexit. Similar examples can also be found in machinery, furniture, and vehicles, involving other eastern Member States and regions. This may indicate that the UK is changing its import partners, for specific products, preferring those where production costs - and therefore trade costs - are lower. The final outcome could thus be a redistribution - at least in specific niches of exports - of trade benefits towards more disadvantaged regions.

Secondly, **some regions have increased their attractiveness**. This is the case, for instance, of Flanders concerning foreign investors or of Hesse concerning the financial sector. There are also new opportunities for EU enterprises for market reorientation towards Ireland. Ireland has, in fact, gained in terms of attractiveness despite Brexit. Although its trade with the UK has been heavily affected, as seen in the South East case study, logistic activities related to its ports have experienced substantial growth since Brexit. This has also benefitted the Normandy harbours and allowed Irish ports to establish new connections and trade relations with other EU partners.

Finally, at business level, numerous enterprises - especially those that are larger and have past experience in trade with extra-EU countries - have been able to re-orientate their exports towards alternative destinations. **The increased administrative burden induced by the TCA rules could push local enterprises**

to re-organize their business towards different markets. There are also cases in which enterprises have adopted new solutions to enter the UK market, as illustrated in the Veneto case study. Brexit could therefore induce businesses to innovate their business strategy, explore new markets and alternative destinations to the UK, and establish new trade relations with other partners for imported goods and services.

<u>Remedial actions</u>

Pre-financing of the BAR has only recently been approved for 14 Member States. It is therefore too early to assess its effectiveness. However, from the case studies, there are indications for its use for the fisheries sector (Normandy in France) and for port infrastructure regarding customs procedures (South East Ireland). In the Netherlands, specific programmes for trade and fisheries have recently been announced by central government. Some regions - for instance, Flanders and Lubelskie – have pointed out **that the BAR could be an appropriate tool to help mitigate the impact of Brexit, but it is not expected to fully compensate all the negative effects**, as funding comes with issues such as timing or rules-compliance, such as those regarding state-aid. This seems to confirm what was already stressed by the CoR, which also highlighted the time limit for use of the BAR and the insufficient allocation of funding. There are also concerns on how enterprises - and Member States - will justify the expenditure and additional costs due to Brexit to be covered by the BAR. Moreover, **the overall degree of LRA involvement is still unclear**, another weakness of the BAR stressed both by the CoR and the CPMR.

The case study analysis has revealed that **most of the measures adopted,** at both national and regional level and even before the TCA, **were information campaigns, initiatives to support SMEs in market reorientation, exchange of solutions and facilitation of business networks**. These were often organised with the support of business associations. In Hesse, initiatives to help enterprises access new markets are closely coordinated with technology and innovation support. One interesting initiative set up by Belgium to monitor the Brexit effects on companies, is the ‘Brexit Impact Scan’ to estimate its impact on firms’ trade costs and provide them with an indication of what is needed to deal with the new EU-UK trade rules.

There are also examples of the use of funds and subsidies for local enterprises or sectors particularly affected by Brexit. Flanders, which also has a regional action plan for Brexit, has specific subsidies for companies to change markets, participate in events, retraining and education. In South East Ireland, agri-food companies are using a national investment scheme to help them diversify and win new customers post-Brexit, while enterprises operating in fisheries are also using resources from the EMFF Programme 2014-2020, in which funds have been allocated to support companies from both pandemic and Brexit effects. Several resources both from the BAR as well as national initiatives are expected for fishery companies in France, also benefitting enterprises located in Normandy, the region together with Brittany most affected by the new rules concerning fisheries set out in the TCA.

At interregional level one initiative worth citing is the Straits Committee, which includes six LRAs from France, the Netherlands (including Zeeland), Belgium (including Flanders), and two from the UK. This initiative is inspiring, not only because it aims to continue the cooperative approach initiated with the Interreg programme, but also because it offers its members a 10-year plan to work together to promote economic development and trade between EU regions and the UK, resolve disruptions, tackle climate change, and support young people.

4.2 Policy recommendations

This study has shown that Brexit effects are asymmetric across sectors and EU regions, impact more on smaller companies, may reduce human capital mobility and cooperation across EU and UK enterprises, and negatively affect regions and communities involved in interregional projects with the UK.

Additional challenges are expected for those firms, sectors and regions with significant trade relations with the UK once the rules set out in the TCA are fully applied. There are also opportunities to be exploited, however post-Brexit re-positioning of EU-UK relations is in a critical situation what with the EU economy still bearing the impact of the pandemic and the future for EU trade ever more uncertain due to the evolving war in Ukraine.

Key recommendations from the study for policy actions to mitigate the current and expected effects of Brexit include:

- The EU, **Member States, LRAs and their associations should monitor and quantify the Brexit impact, focusing on the effects of the TCA for 2021 and the upcoming years.** A proper estimate of the effects of Brexit is the first step for policy makers to better assess enterprise, sectoral, and regional needs and to design more tailored support measures. At EU level, a Brexit scan tool for enterprises, such as that adopted in Belgium, might help collect data and information directly from enterprises.

- The asymmetric impact of Brexit and the TCA calls for the active involvement of LRAs at national level. BAR pre-financing is currently being approved by the European Commission, so **Member States are called to involve LRAs and key regional socio-economic stakeholders in designing the use of the BAR right from the beginning so as to** better meet the regional economic impacts of Brexit and ensure fair distribution of the resources across the most impacted regions and enterprises.

- As a support instrument, **the BAR needs to be reinforced**. The eligibility period should be extended and additional amounts made available. Moreover, sectoral impact assessments reflecting regional needs should be produced both at EU and national level, to better orientate Member States and regions in allocating the BAR funds. The BAR has correctly put emphasis on fisheries and coastal communities, but as shown in this study, the TCA may impact on several different sectors across EU regions. Territorial or sectoral earmarking in the form of minimum targets for the areas most affected could also be introduced, in order to reduce discretion regarding the distribution of funds.

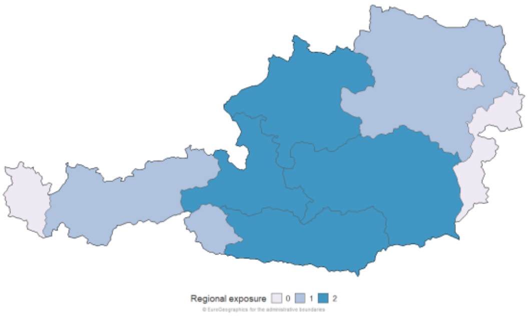
- Although the TCA is now in force, its full effect will probably take some time to come through. **Socio-economic and institutional stakeholders at LRA level, therefore, need to develop concrete regional action plans** to design, target and drive implementation of the support measures, and to identify new opportunities for business and local economic growth. Clear information campaigns should also be continued in the future, as the TCA may be subject to changes.

- **Member States and LRAs should consider creating regional funding support initiatives for the most affected enterprises and sectors.** Member States should also consider creating a national list of experts supporting businesses in trade internationalization strategies and providing vouchers for SMEs to activate them. The list could be also at EU level and organized on a sectoral basis. A little financial support for consultancy or market analysis might also be particularly helpful, especially for SMEs, which often cannot afford to undertake these services internally.

- **A specific fund at EU level could be set-up to support bottom-up initiatives for bilateral and multilateral cooperation across EU and UK regions**. This, a sort of a BAR for interregional cooperation targeting EU regions**,** should aim to continue the cooperation partnerships initiated under the previous programming period and create opportunities for new relations.

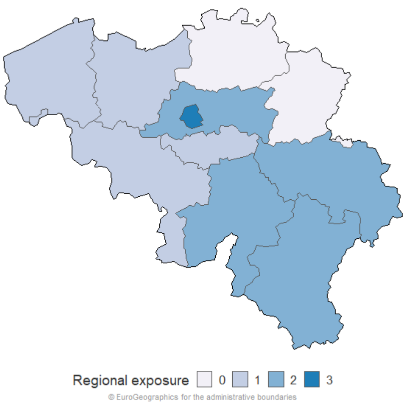
Annex I - Regional exposure by Member State

Austria



NUTS2 ID	NUTS NAME	1° - C29 vehicles	2° - C28 machinery	3° - C16 wood	HHI ratio	Regional exposure
AT11	Burgenland (AT)				▲ 1.04	0
AT12	Niederösterreich				0.92	1
AT13	Wien				0.88	0
AT21	Kärnten				▲ 1.16	2
AT22	Steiermark				0.93	2
AT31	Oberösterreich				0.92	2
AT32	Salzburg				0.89	2
AT33	Tirol				0.85	1
AT34	Vorarlberg				▲ 1.41	0

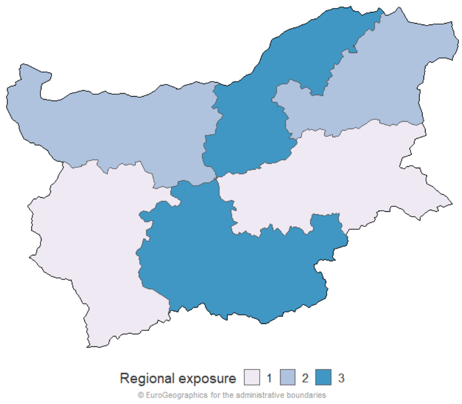
Belgium



NUTS2 ID	NUTS NAME	1° - C21 pharmaceutical	2° - C10 food	3° - C11 beverages	HHI ratio	Regional exposure
BE10	Région de Bruxelles-Capitale				0.86	3
BE21	Prov. Antwerpen				0.82	0
BE22	Prov. Limburg (BE)				0.71	0
BE23	Prov. Oost-Vlaanderen				0.68	1

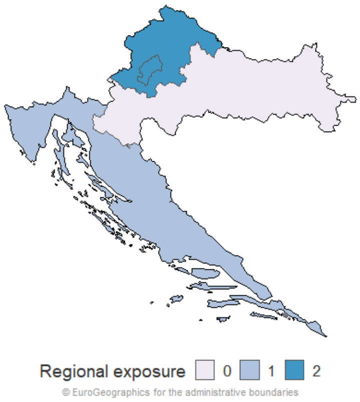
BE24	Prov. Vlaams-Brabant				0.75	2
BE25	Prov. West-Vlaanderen				0.71	1
BE31	Prov. Brabant wallon				▲ 2.28	1
BE32	Prov. Hainaut				0.85	1
BE33	Prov. Liège				0.81	2
BE34	Prov. Luxembourg (BE)				▲ 1.11	2
BE35	Prov. Namur				▲ 1.43	2

Bulgaria



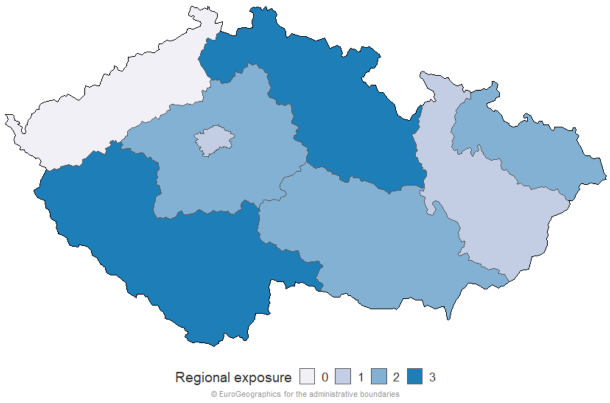
NUTS2 ID	NUTS NAME	1° - A agriculture	2° - C20 chemicals	3° - C14 apparel	HHI ratio	Regional exposure
BG31	Severozapaden				▲ 1.09	2
BG32	Severen tsentralen				▲ 1.10	3
BG33	Severoiztochen				▲ 1.01	2
BG34	Yugoiztochen				▲ 1.12	1
BG41	Yugozapaden				0.87	1
BG42	Yuzhen tsentralen				0.82	3

Croatia



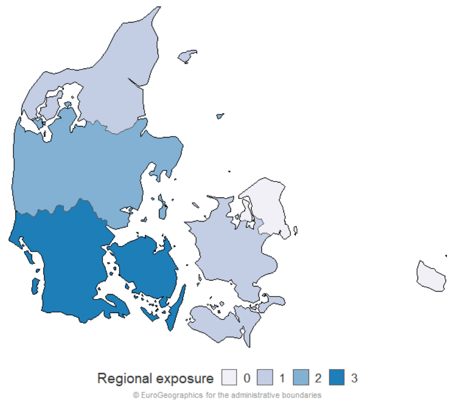
NUTS2 ID	NUTS NAME	1° - C27 electrical machinery	2° - C21 pharmaceutical	3° - C24 basic metals	HHI ratio	Regional exposure
HR02	Panonska Hrvatska				▲ 1.02	0
HR03	Jadranska Hrvatska				▲ 1.03	1
HR05	Grad Zagreb				0.97	2
HR06	Sjeverna Hrvatska				0.97	2

Czech Republic



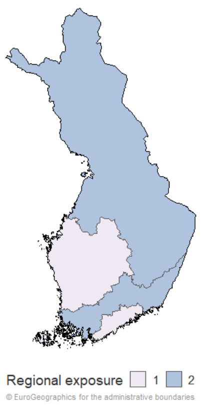
NUTS2 ID	NUTS NAME	1° - C29 vehicles	2° - C32 games and toys	3° - C27 electrical machinery	HHI ratio	Regional exposure
CZ01	Praha				0.75	1
CZ02	Strední Cechy				▲ 1.40	2
CZ03	Jihozápad				▲ 1.01	3
CZ04	Severozápad				0.90	0
CZ05	Severovýchod				▲ 1.00	3
CZ06	Jihovýchod				0.89	2
CZ07	Strední Morava				▲ 1.03	1
CZ08	Moravskoslezsko				▲ 1.02	2

Denmark



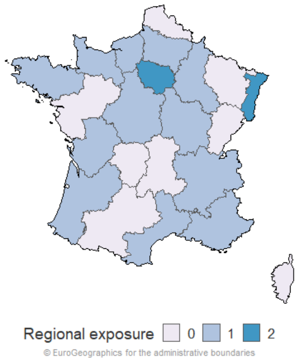
NUTS2 ID	NUTS NAME	1° - C27 electrical machinery	2° - C28 machinery	3° - A agriculture	HHI ratio	Regional exposure
DK01	Hovedstaden				▲ 1.12	0
DK02	Sjælland				0.85	1
DK03	Syddanmark				0.98	3
DK04	Midtjylland				▲ 1.02	2
DK05	Nordjylland				▲ 1.03	1

Finland



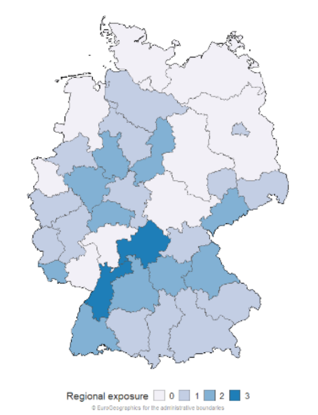
NUTS2 ID	NUTS NAME	1° - C17 paper	2° - C16 wood	3° - C19 minerals	HHI ratio	Regional exposure
FI19	Länsi-Suomi				0.86	1
FI1B	Helsinki-Uusimaa				0.69	1
FI1C	Etelä-Suomi				0.69	2
FI1D	Pohjois- ja Itä-Suomi				0.93	2
FI20	Åland				▲ 1.83	1

France



NUTS2 ID	NUTS2 NAME	1° - C29 vehicles	2° - C11 beverages	3° - C20 chemicals	HHI ratio	Regional exposure
FR10	Île de France				0.47	2
FRB0	Centre - Val de Loire				0.54	1
FRC1	Bourgogne				0.55	1
FRC2	Franche-Comté				0.84	0
FRD1	Basse-Normandie				0.61	1
FRD2	Haute-Normandie				0.79	1
FRE1	Nord-Pas-de-Calais				0.65	0
FRE2	Picardie				0.75	1
FRF1	Alsace				0.57	2
FRF2	Champagne-Ardenne				▲ 1.03	1
FRF3	Lorraine				0.61	0
FRG0	Pays-de-la-Loire				▲ 1.09	0
FRH0	Bretagne				▲ 1.40	1
FRI1	Aquitaine				▲ 1.12	1
FRI2	Limousin				▲ 1.05	0
FRI3	Poitou-Charentes				0.71	1
FRJ1	Languedoc-Roussillon				▲ 1.28	1
FRJ2	Midi-Pyrénées				▲ 1.05	0
FRK1	Auvergne				▲ 1.50	0
FRK2	Rhône-Alpes				0.52	1
FRL0	Provence-Alpes-Côte d'Azur				0.95	1
FRM0	Corse				▲ 1.78	0
FRY1	Guadeloupe				▲ 1.23	1
FRY2	Martinique				▲ 1.59	2
FRY3	Guyane				▲ 1.64	0
FRY4	La Réunion				▲ 1.45	1
FRY5	Mayotte				▲ 1.25	0

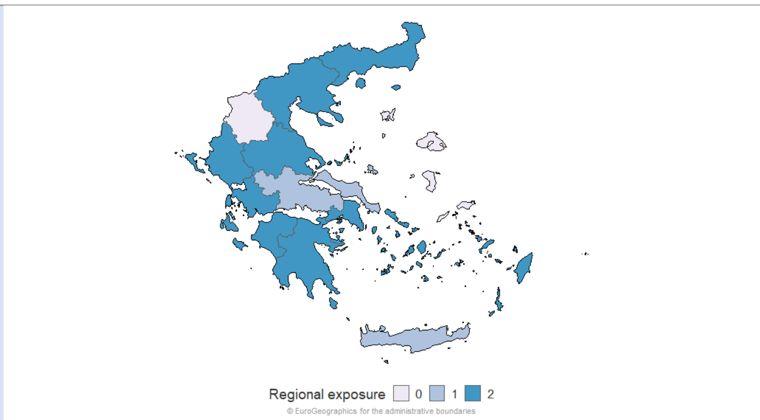
Germany



NUTS2 ID	NUTS2 NAME	1° - C29 vehicles	2° - C28 machinery	3° - C27 electrical machinery	HHI ratio	Regional exposure
DE11	Stuttgart				▲ 1.60	2
DE12	Karlsruhe				0.90	3
DE13	Freiburg				▲ 1.00	2
DE14	Tübingen				▲ 1.10	1
DE21	Oberbayern				▲ 1.08	1
DE22	Niederbayern				▲ 1.14	1
DE23	Oberpfalz				0.95	2
DE24	Oberfranken				0.87	1
DE25	Mittelfranken				0.89	2
DE26	Unterfranken				▲ 1.06	3
DE27	Schwaben				▲ 1.00	1
DE30	Berlin				0.81	1
DE40	Brandenburg				0.60	0
DE50	Bremen				▲ 1.58	1
DE60	Hamburg				▲ 1.09	0
DE71	Darmstadt				0.76	0
DE72	Gießen				▲ 1.08	2
DE73	Kassel				0.80	1
DE80	Mecklenburg-Vorpommern				0.92	0
DE91	Braunschweig				▲ 1.00	2
DE92	Hannover				0.86	1
DE93	Lüneburg				▲ 1.45	1
DE94	Weser-Ems				0.93	0
DEA1	Düsseldorf				0.93	0
DEA2	Köln				0.76	1
DEA3	Münster				▲ 1.01	1
DEA4	Detmold				▲ 1.01	2
DEA5	Arnsberg				▲ 1.23	2
DEB1	Koblenz				0.93	1
DEB2	Trier				0.98	1

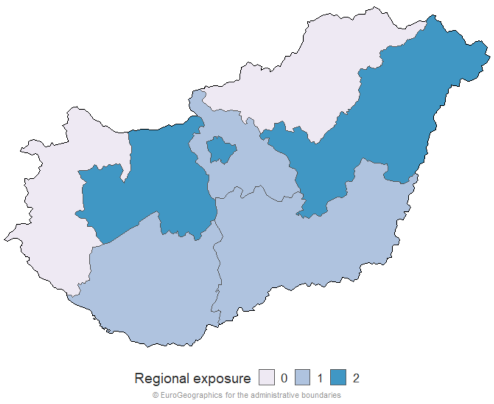
DEB3	Rheinhessen-Pfalz				▲ 1.26	0
DEC0	Saarland				▲ 1.34	2
DED2	Dresden				▲ 1.00	1
DED4	Chemnitz				0.80	2
DED5	Leipzig				0.99	1
DEE0	Sachsen-Anhalt				0.74	0
DEF0	Schleswig-Holstein				0.74	0
DEG0	Thüringen				0.80	0

Greece



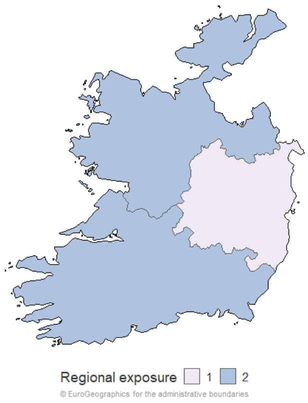
NUTS2 ID	NUTS NAME	1° - C21 pharmaceutical	2° - A agriculture	3° - C10 food	HHI ratio	Regional exposure
EL30	Attiki				0.44	2
EL41	Voreio Aigaio				0.57	0
EL42	Notio Aigaio				0.97	2
EL43	Kriti				▲ 1.15	1
EL51	Anatoliki Makedonia, Thraki				0.73	2
EL52	Kentriki Makedonia				0.77	2
EL53	Dytiki Makedonia				0.87	0
EL54	Ipeiros				▲ 1.78	2
EL61	Thessalia				▲ 1.19	2
EL62	Ionia Nisia				▲ 1.16	2
EL63	Dytiki Ellada				▲ 1.40	2
EL64	Sterea Ellada				0.55	1
EL65	Peloponnisos				▲ 1.41	2

Hungary



NUTS2 ID	NUTS NAME	1° - C27 electrical machinery	2° - C21 pharmaceutical	3° - C22 rubber and plastic	HHI ratio	Regional exposure
HU11	Budapest				0.74	2
HU12	Pest				0.84	1
HU21	Közép-Dunántúl				▲ 1.07	2
HU22	Nyugat-Dunántúl				▲ 1.45	0
HU23	Dél-Dunántúl				0.97	1
HU31	Észak-Magyarország				0.95	0
HU32	Észak-Alföld				0.83	2
HU33	Dél-Alföld				▲ 1.16	1

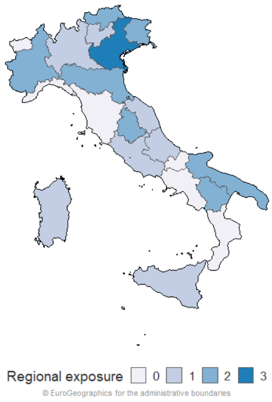
Ireland



NUTS2 ID	NUTS NAME	1° - C20 chemical[186]	2° - A agriculture	3° - C10 food	HHI ratio	Regional exposure
IE04	Northern and Western				▲ 1.00	2
IE05	Southern				▲ 1.23	2
IE06	Eastern and Midland				0.77	1

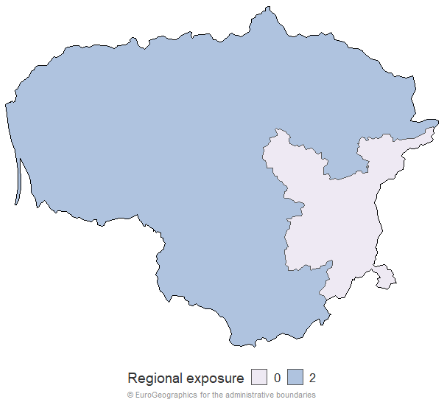
[186] Data on employment in the manufacturing of chemical products are not available for Ireland on Eurostat as they are considered confidential

Italy



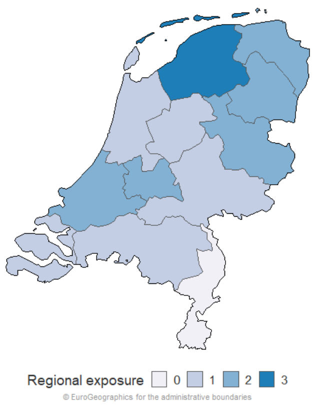
NUTS2 ID	NUTS NAME	1° - C31 furniture	2° - C28 machinery	3° - C11 beverages	HHI ratio	Regional exposure
ITC1	Piemonte				0.93	2
ITC2	Valle d'Aosta/Vallée d'Aoste				▲ 1.41	0
ITC3	Liguria				0.84	0
ITC4	Lombardia				0.81	1
ITF1	Abruzzo				0.78	1
ITF2	Molise				▲ 1.40	0
ITF3	Campania				0.84	0
ITF4	Puglia				0.82	2
ITF5	Basilicata				▲ 1.69	2
ITF6	Calabria				▲ 1.54	0
ITG1	Sicilia				▲ 1.19	1
ITG2	Sardegna				▲ 1.37	1
ITH1	Provincia Autonoma di Bolzano/Bozen				0.91	2
ITH2	Provincia Autonoma di Trento				0.73	1
ITH3	Veneto				0.77	3
ITH4	Friuli-Venezia Giulia				0.92	2
ITH5	Emilia-Romagna				▲ 1.04	2
ITI1	Toscana				0.76	0
ITI2	Umbria				0.82	2
ITI3	Marche				0.79	1
ITI4	Lazio				0.66	1

Lithuania



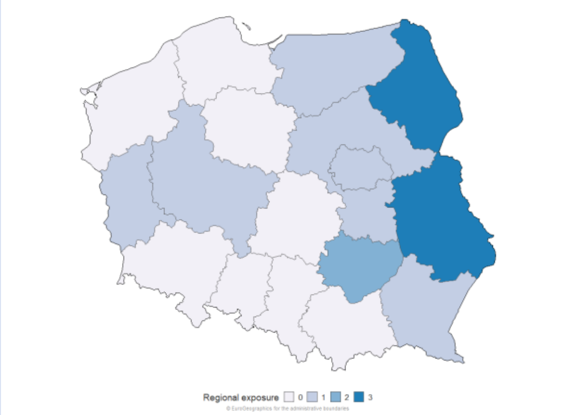
NUTS2 ID	NUTS2 NAME	1° - C31 furniture	2° - C16 wood	3° - C20 chemicals	HHI ratio	Regional exposure
LT01	Sostines regionas				0.84	0
LT02	Vidurio ir vakaru Lietuvos regionas				▲ 1.16	3

The Netherlands



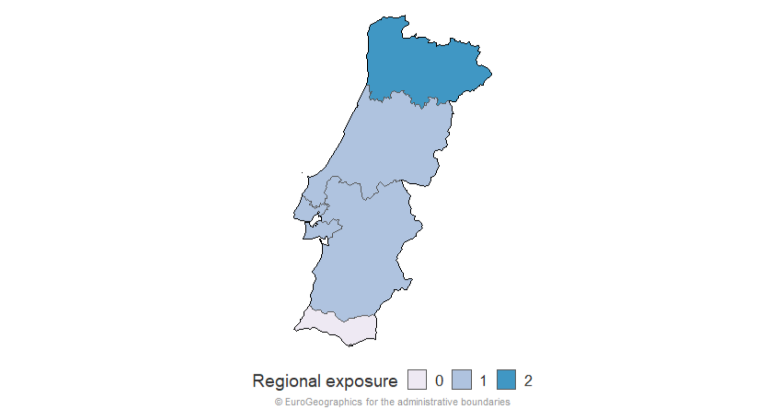
NUTS2 ID	NUTS NAME	1° - C27 electrical machinery	2° - C32 other manufacturing	3° - A agriculture	HHI ratio	Regional exposure
NL11	Groningen				0.88	2
NL12	Friesland (NL)				▲ 1.04	3
NL13	Drenthe				▲ 1.54	2
NL21	Overijssel				0.77	2
NL22	Gelderland				0.90	1
NL23	Flevoland				▲ 1.30	1
NL31	Utrecht				▲ 1.13	2
NL32	Noord-Holland				0.93	1
NL33	Zuid-Holland				0.78	2
NL34	Zeeland				▲ 1.17	1
NL41	Noord-Brabant				0.81	1
NL42	Limburg (NL)				0.75	0

Poland



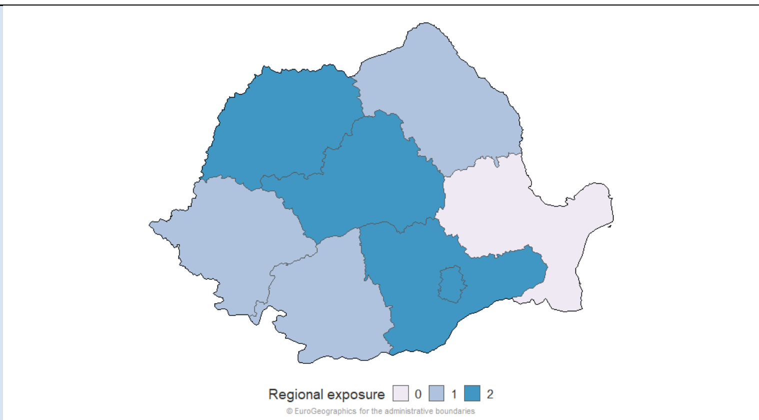
NUTS2 ID	NUTS2 NAME	1° - C28 machinery	2° - C31 furniture	3° - C10 preparation of meat	HHI ratio	Regional exposure
PL21	Malopolskie				0.82	0
PL22	Slaskie				0.95	0
PL41	Wielkopolskie				0.92	1
PL42	Zachodniopomorskie				0.94	0
PL43	Lubuskie				0.81	1
PL51	Dolnoslaskie				0.88	0
PL52	Opolskie				0.89	0
PL61	Kujawsko-Pomorskie				0.93	0
PL62	Warminsko-Mazurskie				▲ 1.28	1
PL63	Pomorskie				0.93	0
PL71	Lódzkie				0.89	0
PL72	Swietokrzyskie				▲ 1.23	2
PL81	Lubelskie				▲ 1.09	3
PL82	Podkarpackie				0.84	1
PL84	Podlaskie				▲ 1.24	3
PL91	Warszawski stoleczny				0.95	1
PL92	Mazowiecki regionalny				▲ 1.42	1

Portugal



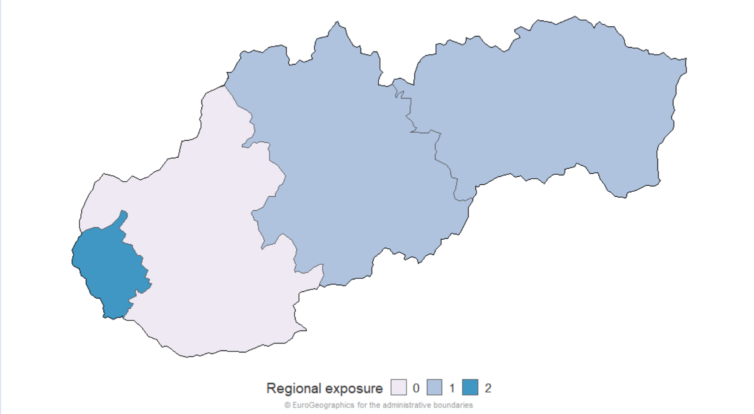
NUTS2 ID	NUTS2 NAME	1° - C29 vehicles	2° - C14 apparel	3° - C27 electrical machinery	HHI ratio	Regional exposure
PT11	Norte				0.52	2
PT15	Algarve				▲ 1.08	0
PT16	Centro (PT)				0.52	1
PT17	Área Metropolitana de Lisboa				0.53	1
PT18	Alentejo				0.82	1

Romania



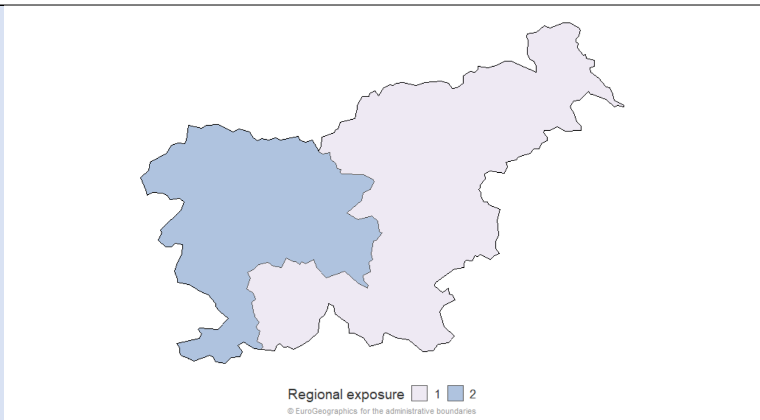
NUTS2 ID	NUTS2 NAME	1° - C28 machinery	2° - C31 furniture	3° - C27 electrical machinery	HHI ratio	Regional exposure
RO11	Nord-Vest				0.80	2
RO12	Centru				0.91	2
RO21	Nord-Est				▲ 1.03	1
RO22	Sud-Est				▲ 1.06	0
RO31	Sud-Muntenia				▲ 1.02	2
RO32	Bucuresti - Ilfov				0.82	2
RO41	Sud-Vest Oltenia				0.98	1
RO42	Vest				▲ 1.37	1

Slovakia



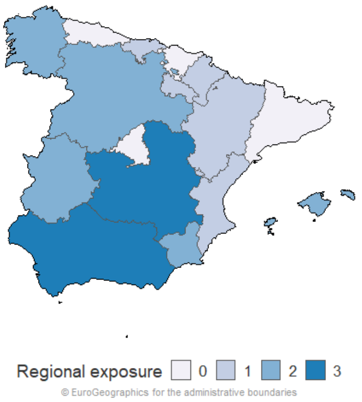
NUTS2 ID	NUTS2 NAME	1° - C29 vehicles	2° - C27 electrical machinery	3° - C32 other	HHI ratio	Regional exposure
SK01	Bratislavský kraj				▲ 1.76	2
SK02	Západné Slovensko				0.74	0
SK03	Stredné Slovensko				0.72	1
SK04	Východné Slovensko				0.78	1

Slovenia



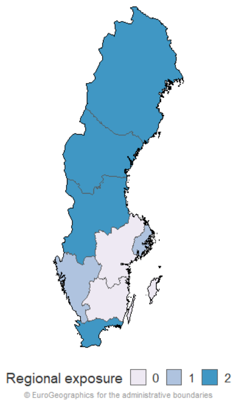
NUTS2 ID	NUTS2 NAME	1° C27 – electrical machinery	2° C31 – furniture	3° C29 – vehicles	HHI ratio	Regional exposure
SI03	Vzhodna Slovenija				▲ 1.06	1
SI04	Zahodna Slovenija				0.94	2

Spain



NUTS2 ID	NUTS2 NAME	1° - C29 vehicles	2° - A agriculture	3° - C10 food	HHI ratio	Regional exposure
ES11	Galicia				0.75	2
ES12	Principado de Asturias				0.86	0
ES13	Cantabria				0.83	1
ES21	País Vasco				0.76	0
ES22	Comunidad Foral de Navarra				0.78	1
ES23	La Rioja				0.71	1
ES24	Aragón				0.74	1
ES30	Comunidad de Madrid				0.44	0
ES41	Castilla y León				▲ 1.02	2
ES42	Castilla-la Mancha				0.71	3
ES43	Extremadura				▲ 1.48	2
ES51	Cataluña				0.57	0
ES52	Comunitat Valenciana				0.52	1
ES53	Illes Balears				0.82	2
ES61	Andalucía				0.78	3
ES62	Región de Murcia				▲ 2.10	2
ES63	Ciudad de Ceuta				▲ 2.41	1
ES64	Ciudad de Melilla				▲ 1.63	1
ES70	Canarias				▲ 1.09	3

Sweden



NUTS2 ID	NUTS2 NAME	1° - C16 wood	2° - C32 other	3° - C17 paper	HHI ratio	Regional exposure
SE11	Stockholm				0.99	1
SE12	Östra Mellansverige				0.96	0
SE21	Småland med öarna				0.96	1
SE22	Sydsverige				0.79	2
SE23	Västsverige				▲ 1.28	1
SE31	Norra Mellansverige				▲ 1.09	2
SE32	Mellersta Norrland				▲ 1.00	2
SE33	Övre Norrland				0.92	2

Other Member States*

MS ID	NAME	1° Sector	2° Sector	3° Sector	HHI	MS Exposure
CY00	Cyprus	A agriculture	C32 other	C30 transport, other than vehicles	0.18	0
EE00	Estonia	C19 petroleum	C16 wood	C31 furniture	0.06	3
LV00	Latvia	C16 wood	A agriculture	C19 petroleum	0.10	2
LU00	Luxembourg	C24 iron and steel	C13 textiles	C15 footwear	0.16	0
MT00	Malta	C30 transport, other than vehicles	C16 wood	C20 chemicals	0.11	0

** as these Member States have no NUTS2 level, the ratio of employment within each sector is calculated over EU average*

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ISBN 978-92-895-1229-9
doi:10.2863/59463

QG-01-22-288-EN-N

Publications Office
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