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European Agri-Food Trade and Brexit: The First 3 Years of the EU-UK Trade and Cooperation Agreement

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European Agri-Food Trade and Brexit: The First 3 Years of the EU-UK Trade and Cooperation Agreement

Jeremy Jelliffe and Adam Gerval

Abstract

Brexit marked the beginning of a new era in European trade, with implications for global commerce as the United Kingdom has sought to broaden its import sources for agricultural commodities. Since formally leaving the European Union on January 31, 2020, the United Kingdom has kept strong, but weakening, trade links to the European bloc. This analysis seeks to quantify the degree of change in the trade dynamic across a range of agri-food and related commodity groups. This analysis is done by measuring the difference in trade trends between United Kingdom and the European Union relative to the rest of the world and their average bilateral trade over the last decade.

The following is addressed:

- Do post-Brexit trends for European Union-United Kingdom agri-food trade differ from their trade with the rest of the world?
- Which product categories experienced the largest relative changes?

Key findings include:

- United Kingdom trade openness is high in agri-food relative to other regions but has contracted since 2016.
- Relative to trade with the rest of the world, rates of agri-food trade growth in the European Union and the United Kingdom suggest that both regions are diversifying to other trading partners despite observed increases in bilateral trade.

About the Authors

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European Agri-Food Trade and Brexit: The First 3 Years of the EU-UK Trade and Cooperation Agreement

Summary

Brexit, the United Kingdom's departure from the European Union on January 31, 2020, impacted the global economy, with effects mostly experienced by the United Kingdom (UK) and the European Union (EU). At the sectoral level, the agri-food and related industries faced challenges post-Brexit—principally from labor and supply chain constraints (Bakker et al., 2022; Sumption, 2022). The EU-UK Trade and Cooperation Agreement (TCA), which established post-Brexit trade rules between the partners, went into effect January 1, 2021.¹ The TCA is recognized as a first of its kind agreement, where the movement of goods and services has become more restricted compared to the prior arrangement when the United Kingdom was part of the European Union (Posen, 2022). In other words, trade agreements typically increase free trade, while the TCA does precisely the opposite (Ayele et al., 2021). Notably, post-Brexit trade friction led to an estimated 15-percent decline in trade in the first half of 2021 following the TCA (Du & Shepotylo, 2022). Trends in UK agri-food and related trade contributed to this overall decline under the new TCA rules (Du et al., 2024; Kerr, 2024). Recently, the United Kingdom exhibited record 5-year declines in overall trade, as UK exports fell to the lowest level among the Group of 7 countries (United Kingdom Office for Budget Responsibility, 2023, 2024; United Kingdom Office for National Statistics, 2024).²

Despite these factors, the European Union and United Kingdom remain highly integrated through strong historical trade, policy alignment, and the demand for regional products in food and agriculture that are familiar to consumers. In 2022, UK exports to the European Union exhibited the greatest growth in value terms compared to all other trade partners. However, post-Brexit trends in agri-food trade indicate that the European Union and United Kingdom diverged from one another, increasing their trade flows with the rest of the world. That notwithstanding, shocks to the sector, such as adverse weather events during 2023 in the United Kingdom and European Union regions such as Spain, that normally supply the United Kingdom with fresh produce, contributed to concern over the effects of Brexit and the TCA on food supply and prices (Jones, 2023; Jopson, 2023; Kollewe & Partridge, 2023; Speed, 2024). Changes in consumer prices (related to Brexit and the TCA) received considerable attention in the related literature (Bakker et al., 2022; Crowley et al., 2022). On balance, recent patterns for agri-food and related trade between the European Union and the United Kingdom are neither entirely driven by Brexit nor completely unrelated. The aim of this research is to examine the extent that trade in agri-food and related products shifted over the first few years of the post-Brexit TCA.

The authors computed trends in agri-food trade between the United Kingdom and the European Union both directly and relative to trade in these products with the rest of the world using data from Trade Data Monitor. The comparative approach, in the EU case, accounted for concurrent shocks to the global economy and sector-specific ones by differencing out trends with the rest of the world to effectively document trends

¹ The TCA was finalized on December 24, 2020, signed December 30, 2020, and went into effect on May 1, 2021. The date that the TCA entered into effect is based on the initial period when the TCA was implemented provisionally, from January 1, 2021, to April 30, 2021.

² The Group of 7 (G7) members are Canada, France, Germany, Italy, Japan, the United Kingdom, and the United States.

in agri-food and related trade associated with the TCA. In this way, the authors observed a relative decline in agri-food trade between the United Kingdom and the European Union compared to the average growth with all other partners. Finally, notably since Brexit, there have been increased UK and EU imports of biofuels from Brazil, China, and the United States as European climate and energy policies shifted demand for renewables. The authors find that this factor was one of the top contributors to the observed relative decline in EU-UK trade post-TCA. Yet, this concurrent policy shift (and increased European biofuels imports) only accounts for part of the observed relative decline in EU-UK agri-food and related trade under the TCA, which was substantial across sectoral commodity groups (i.e., bulk, intermediate, consumer-oriented, and agricultural-related products).

The Effects of the TCA: From Predicted to Revealed Outcomes in the Literature

To evaluate the effects of Brexit and the TCA, researchers have largely relied upon economic modeling and counterfactual analysis. Much of the analysis in the lead-up to Brexit relied upon economic modeling (Jelliffe et al., 2023), such as computable generalized equilibrium (CGE) analyses (box 1) and gravity models of trade. In this report, the authors focus on the latter counterfactual approaches to estimation that emerged as a principal thread in the literature as data from the post-Brexit economy became available.

An evaluation of the effects of Brexit and/or the TCA (with a synthetic counterfactual or “doppelganger” to forecast expected performance relative to observed outcomes) is well established. A popular version of this type of analysis was introduced by Springford (2018), where a no-Brexit doppelganger UK economy is synthesized from composite macroeconomic trends for economies with similar growth trajectories to the pre-Brexit United Kingdom. Observed outcomes for this doppelganger United Kingdom are used as the counterfactual basis of comparison with actual UK performance to estimate the effects of Brexit. This type of analysis is done *ex post* (after the event) as the analysis relies on data from observed outcomes. An advantage of this type of analysis is that it accounts for other factors that could simultaneously affect many countries, such as the Coronavirus (COVID-19) pandemic,³ which are often not foreseeable *ex ante* (leading up to the event) when selecting between modeling scenarios. In this way, evidence of different trends between trade partners following the enactment of a new policy or trade agreement is, in the strictest sense, only observable *ex post*.

A drawback of the synthetic counterfactual approach is related to the assumptions on which the basis of comparison (e.g., the doppelganger United Kingdom) is constructed. In the case of Springford (2018) and subsequent analyses using this methodology, researchers questioned the inclusion of a large set of comparison countries, each weighted differently, to generate the doppelganger UK control most closely aligned with pre-TCA trends; as an alternative, the researchers recommended a parsimonious approach with a simplified comparison group that includes fewer countries to present the major drivers of observed divergences between the pre- and post-Brexit UK economic trajectories (Gudgin & Lu, 2023).

Following such critiques of this earlier doppelganger work, updated analyses by Springford (2024) also stressed the importance of picking “the right counterfactual” and examined additional intra-EU trends to

³ A challenge for the analysis of Brexit effects is how simultaneous shocks like the COVID-19 pandemic affected regions differently, as discussed in recent work by Gupta et al. (2023); the authors make the general assumption that the general effect from COVID-19 can be accounted for by applying differencing approaches that cancel out the common shock. Furthermore, the depth and duration of the effects from COVID-19 on the United Kingdom are partly attributed to the contemporaneous Brexit shock and counted as part of the Brexit effect for this reason.

illustrate the relative shortfall of UK trade with the EU, post TCA. Their study found that for “food, live animals, beverages, and tobacco,” relative growth in UK and EU trade (relative to intra-EU trade) was down by 24 percentage points (Springford, 2024). Also, UK exports to the European Union were up 15 percent (relative to EU-EU trade that increased by 39 percent), and UK trade with the rest of the world grew by 80 percent from December 2020 to August 2023. Zooming out to the broader UK economy, the Springford (2024) study also estimated that UK gross domestic product (GDP) declined by 4 to 5 percent compared to a scenario where the United Kingdom remained a member of the European Union; another recent study by analysts at Goldman Sachs bank attributed a similar 5-percent GDP contraction from Brexit in the wake of the TCA (Barnett, 2024).

Researchers also implemented differencing approaches to estimate how the TCA shifted trade patterns between the partners and the rest of the world. Ayele and coauthors reported on the qualitative details of the TCA, along with an analysis of how trade shifted in the first quarter under the TCA (i.e., first quarter (Q1), 2021) (Ayele et al., 2021a; Ayele et al., 2021b). The first report, as well as more recent work by Bennett and Vines (2022) and Barnard and Leinarte (2022), found that certain aspects of the TCA posed new challenges to trade between the European Union and the United Kingdom, such as complex Rules of Origin requirements and nontariff measures. In the subsequent report, Ayele and authors (2021) estimated the relative changes in UK imports and exports with the European Union in the first quarter of the TCA using difference approaches, such as double (DD) and triple (DDD) differences estimation. The findings indicated that when accounting for trends with other trade partners, UK exports to the European Union fell by 15 percent, and imports from the European Union fell by 32 percent. However, UK exports and imports with the European Union experienced greater declines in the agri-food sector at 35.6 and 25.7 percent, respectively, while the downstream textile industry experienced the largest declines in UK exports to the European Union at 62.6 percent. Thus, their work provided some of the earliest estimates of the immediate effects of the TCA on EU-UK trade using an established methodology. Another event study by Freeman et al. (2022) on the TCA applied difference-in-differences methods and estimated an immediate and persistent 25 percent decline in UK imports from the European Union. Furthermore, results indicated that trade declines were the greatest for consumer-oriented goods compared to other categories, such as capital and intermediates. Gasiorek and Tambari (2023) also applied differencing methods (i.e., DD and DDD), as well as the synthetic counterfactual approach to analyze the immediate and persistent effects of the TCA over the first year of the agreement. They found an immediate 41 percent EU-UK trade loss following January 2021, while over the remainder of the year, UK imports from the European Union recovered more slowly than exports to the European Union, with a cumulative decline of about 26 percent. Further work by Du et al. (2023) applied a hybrid synthetic DD approach and similarly found that over the 15-month period from 2019 to the first quarter of 2022, the United Kingdom experienced an estimated 20 to 42 percent decline in the number of product varieties exported. Another recent DD study accounted for issues with the 2021 EU trade data⁴ by relying on UK data and estimated that Brexit reduced EU-UK trade flows by about 20 percent (Kren & Lawless, 2024).

A common finding across studies is the relative importance of the EU market for UK firms that drove different effects of the TCA, for example, the lesser importance of the UK market for EU firms. In this way, some studies strictly focused on the effects of Brexit on the British economy to show declines in gross domestic product, trade, and higher inflation and interest rates (Minford & Zhu, 2024). Other recent work has turned to the European Union and examined the experience of single market firms under the TCA. Like Springford (2024), an earlier study estimated the effects of Brexit on intra-EU trade and found that trade increased by 4.6 percent following the TCA, with a more modest bump of 1.5 percent following the Brexit referendum, which suggested a redirection of EU trade from the United Kingdom to other member states

⁴ After the United Kingdom left the European Union, the data collection methodology for UK-EU trade changed, passing from the Intrastat survey to customs declarations. The European Union implemented the methodological change immediately in January 2021, while the United Kingdom waited until 2022. This change mainly affected EU imports from the United Kingdom, as reported by EU countries, at least for 2021 (Gasiorek & Tambari, 2021). Moreover, staged customs controls might affect UK imports from the European Union (ONS, 2023).

(Buigut & Kapar, 2023). An examination of trade between Spanish firms and the United Kingdom revealed a general decline of 24 percent and 27 percent for exports and imports, respectively (de Lucio et al., 2024). However, the effect was 59 percent greater for imports subject to sanitary and phytosanitary standards (SPS) rules, having declined by 43 percent. Larger firms also experienced greater relative declines in trade with the United Kingdom compared to smaller ones. In addition, the study found that Spanish firms were less likely to enter and more likely to exit the UK market, and existing suppliers had reduced the number of products traded with the United Kingdom.

Computable Generalized Equilibrium Modeling of Brexit and the TCA

Many studies of the expected economic effects of Brexit and the European Union-United Kingdom (EU-UK) Trade and Cooperation Agreement (TCA) are based on Computable Generalized Equilibrium (CGE) modeling (see Jelliffe et al., 2023, for additional background). Typically, these analyses are done in the lead-up to the shock, i.e., *ex ante*, to predict the effects of the trade agreements on trade flows and economic output, for example, the gross domestic product. In some cases, data following the shock are used to update model estimates of longer run effects. In this way, CGE analyses have continued to inform the literature on the effects of Brexit and the TCA. Fusacchia et al. (2022) applied the global trade analysis project (GTAP) CGE model to estimate the effect of the TCA on total United Kingdom trade and predicted a decline of 7.9 percent for exports and 14.2 percent for imports, with declines in the value-added components of these trade flows equaling 6.3 percent and 13.7 percent, respectively.

Under the agricultural and food categories, the projected decline in gross exports from the United Kingdom equaled \$1.6 billion and \$8.4 billion, respectively, with the latter exhibiting the biggest proportionate losses in United Kingdom exports to the European Union. The authors attributed these estimates to large increases in nontariff measures on food and agriculture. They concluded that “for imports, all non-EU suppliers will become relatively more competitive in the United Kingdom as EU firms start to face more barriers” (Fusacchia et al., 2022). More recent work used the same CGE methodology to examine the indirect effects of Brexit on UK and EU trade, with a large share of the Global South and found these effects to be small (Montalbano et al., 2023).

Taken together—synthetic counterfactual, differencing, event study, and modeling approaches—share a common feature in that they account for global trends and/or control for other trade shocks, ones outside the European Union and the United Kingdom or between the European Union and the United Kingdom and the rest of the world. In doing so, the studies provided insights into how Brexit shifted patterns in the global economy and trade. The results were mostly consistent, showing a downturn in EU-UK trade relative to each other’s trade with the rest of the world. In addition, this effect has been more pronounced for the United Kingdom, as the country is more reliant on the European Union as both a supplier and export market, which has resulted in larger relative losses to trade and economic performance, for example, gross domestic product. Translated into consumer welfare effects, a recent study found that UK consumption experienced a 1.1-percent decline compared to a 0.1-percent decline in the European Union (Tamberi, 2024). These results were derived from an *ex post* trade analysis that applied a gravity modeling framework to estimate trade elasticities and related increases in trade costs under the TCA. Nontariff barriers (such as sanitary and phytosanitary measures, new certification and paperwork requirements, and/or technical barriers to trade) have driven most of the added trade costs under the TCA, with trade cost increases estimated for exports from the United Kingdom to the European Union and from the European Union to the United Kingdom at 1.7 and 5.3 percent, respectively (Tamberi, 2024).

From the context of policy changes, given observed shifts in trade and related costs, researchers at UK in a Changing Europe, an academic think tank in London, have been tracking regulatory divergence post Brexit (Reland, 2024). This sort of qualitative information is useful for understanding the vectors of policy alignment

and divergence, as well as for beginning to examine how these may disrupt trade between the European Union and the United Kingdom. For example, “dynamic regulatory alignment” for sanitary and phytosanitary standards has entered into public discourse as European Union and United Kingdom regulators and businesses seek to ensure that trade can proceed by limiting future policy divergences (Berg, 2024). Yet, areas of divergence have been observed and could lead to meaningful challenges in the future for businesses that seek to trade between the United Kingdom and the European Union, as some experts have indicated likely divergences between the European Union and the United Kingdom post-Brexit (Wachowiak & Zuleeg, 2022). The agri-food and related sectors are subject to multiple regulatory regimes that have received attention in the EU-UK regulatory divergence tracker. Included are sectors related to pesticides, food marketing, carbon border adjustment measures (CBAM), gene editing (GE), new genomic technologies (NGTs) and precision breeding, food additives, sanitary and phytosanitary standards (SPS), rules of origin (ROO), single use plastics, veterinary certificates, and viticulture and wine rules. In some cases, regulatory alignment has been achieved through adopted European Union regulations by the United Kingdom, for instance, single use plastics.

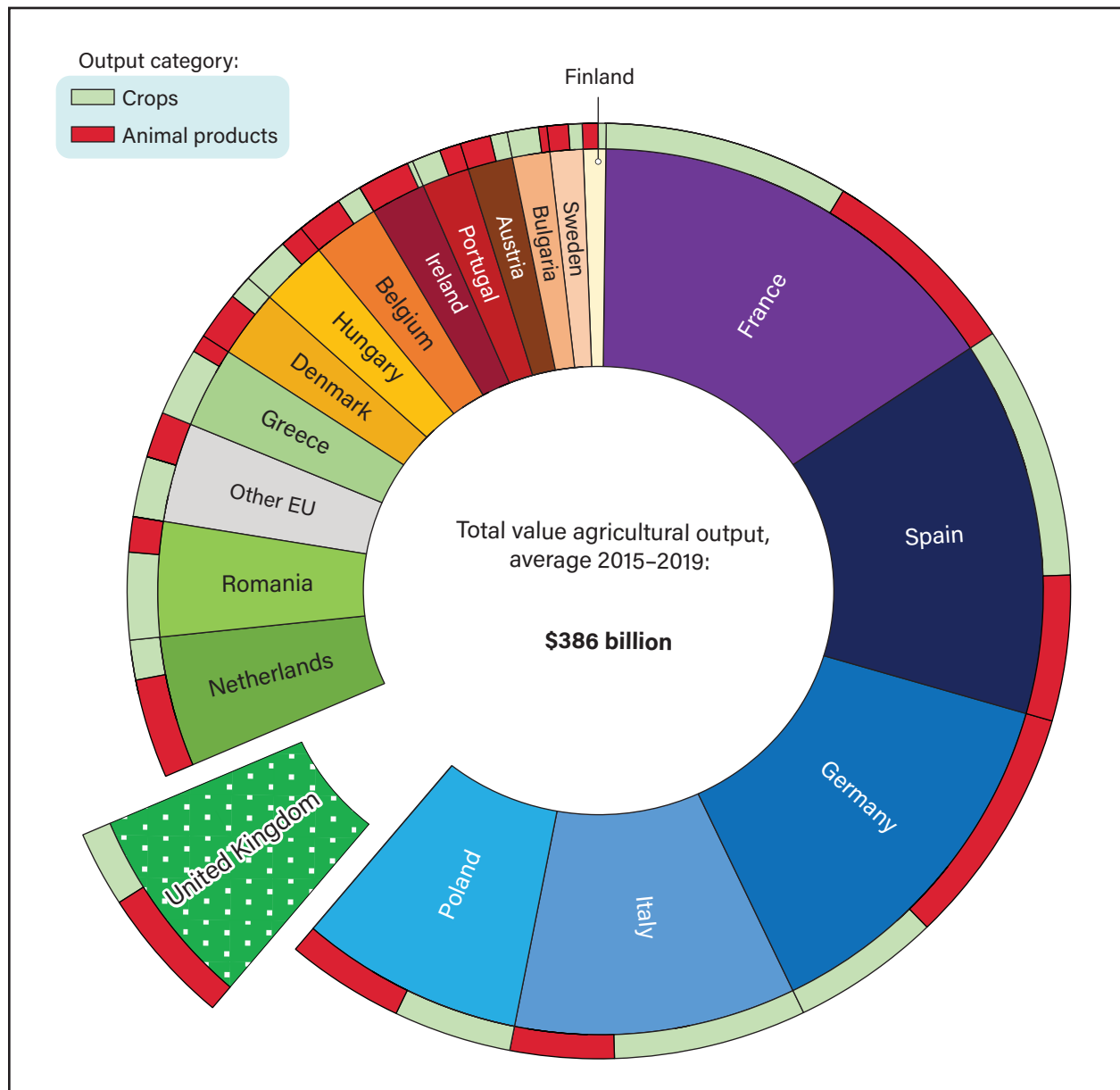
Most available studies have focused on the entire UK economy, with some degree of sectoral breakdown in the analysis. A recent study examined the effects of a possible EU-UK veterinary agreement in the context of deep-trade agreements and agri-food trade; the authors estimated that including SPS agreements in the TCA could increase UK “agri-food exports by 22.5 percent and imports by 5.6 percent, while also adding 0.22 percent to the agricultural sector’s value added” (Du et al., 2024). Following that work, this study also strictly considered agri-food and related sectors, which in this case, was defined by the USDA, Foreign Agricultural Service. The authors applied a simple analytical approach to differencing out global trends from EU-UK trade to examine the relative shifts in UK and EU agri-food trade associated with Brexit. Unlike prior work that looked at the immediate effects (e.g., the first quarter to year following the TCA), this study considered the first 3 years of quarterly trade under the TCA. Realistically, this report presents a clear picture of the post-TCA landscape of agri-food and related trade and highlights some interesting dynamics relative to the long-standing pattern of sectoral trade between the European Union and the United Kingdom.

The United Kingdom and European Agriculture

As a member of the European Union, the United Kingdom contributed approximately 7.5 percent of the European bloc’s total agricultural output (figure 1). This number placed the United Kingdom sixth among EU member states overall and by category: seventh for crops, fourth for animal products, and first for aquaculture. The latter two output categories reflected British specialization in sheep, cattle, and fish production, such as farmed salmon.

Figure 1

Average agricultural output for European Union plus United Kingdom, indicating crops and animal products shares, 2015–19



Note: Real output measured in 2015 purchasing power parity dollars. Total value of agricultural output includes crop and animal products, with their respective shares in light green and dark red shown in the exterior ring; aquaculture excluded; United Kingdom share extended to highlight their contribution; European Union (EU) 27 countries are: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Republic of Ireland, Romania, Slovakia, Slovenia, Spain, and Sweden. Other EU category includes Croatia, Cyprus, Estonia, Latvia, Lithuania, Luxembourg, Malta, Slovakia, and Slovenia.

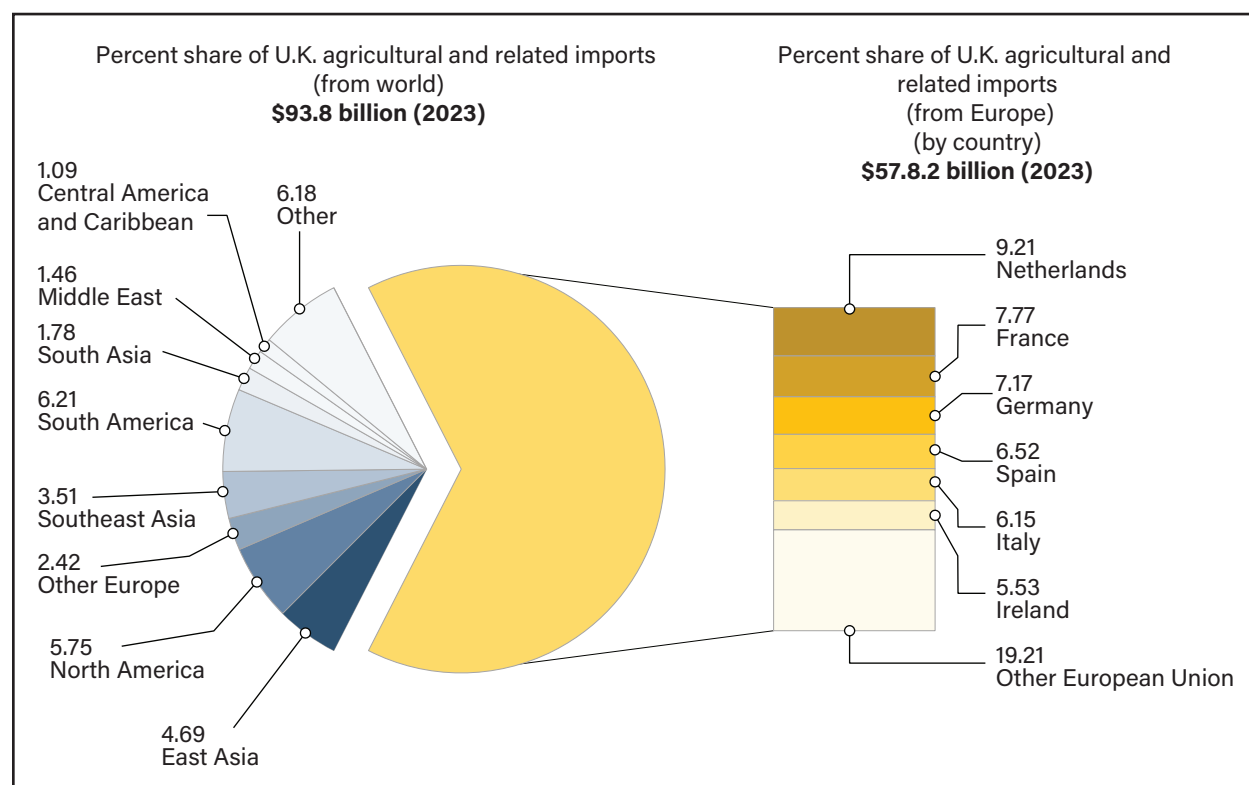
Source: USDA, Economic Research Service (ERS) using data from USDA, ERS International Agricultural Productivity data product, 2023.

Despite this sizable contribution to European agriculture, nearly half of the total United Kingdom food consumption is imported, making the UK one of the world's largest markets for foreign agri-food goods (Trade Data Monitor, 2024). Evident factors that have supported the UK's import orientation include the United Kingdom's sizable population relative to land area, limited agricultural output, and a high-income economy that drives demand for consumer-oriented products (Jelliffe et al., 2023). The European Union is the predominant supplier of agricultural goods to the United Kingdom (figure 2), providing 59 percent of total agri-food and related imports in 2022 (Trade Data Monitor, 2024). The European Union ships a

diverse range of agri-food commodities to the United Kingdom, largely consumer-oriented food products. The European Union supplies most foodstuffs like pork, dairy, produce, and bakery goods. In recent years, however, the volume of goods from the European Union has declined as a proportion of total UK imports. Between 2010 and 2020, the European Union provided nearly 70 percent of all agri-food and related imports to the United Kingdom. Since the accession of the TCA in January 2021, the proportion of EU agri-food and related imports to the United Kingdom fell from 68.9 percent in 2020 to 59.2 percent in 2022 (Trade Data Monitor, 2024).

Figure 2

United Kingdom (UK) agri-food and related imports by region, with European Union (EU) breakdown for top suppliers, 2023

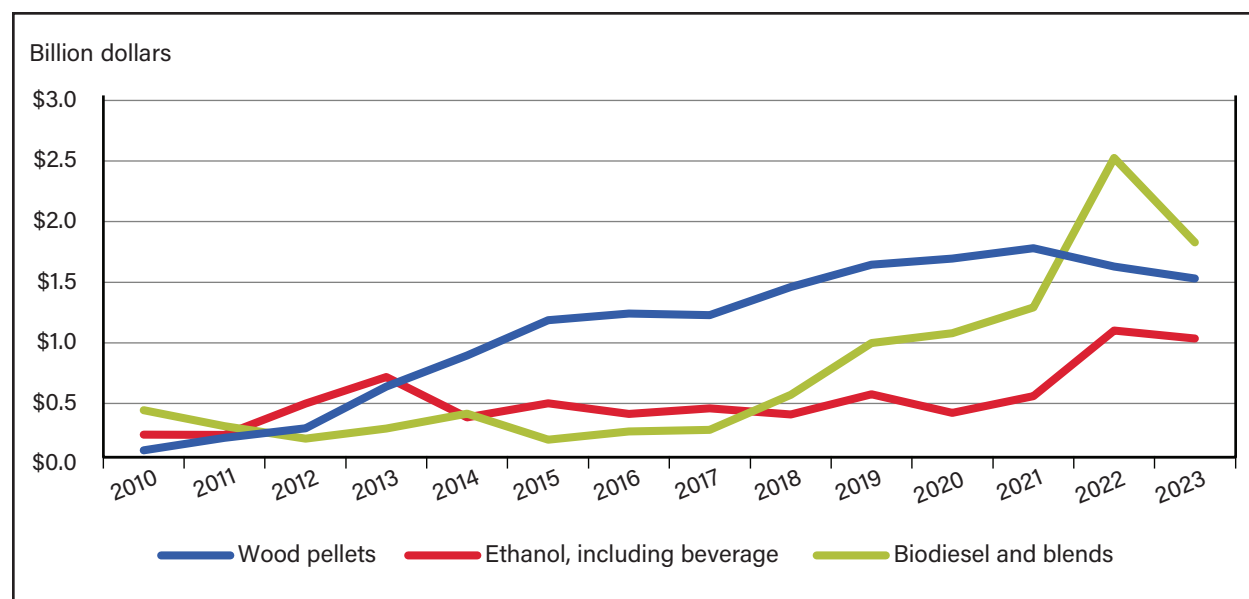


Note: The proportion of United Kingdom-Netherlands trade is likely due to the "Rotterdam Effect," which refers to miscalculations in trade data due to the flow of goods through ports. In this case, the effect refers to Rotterdam, which is the largest seaport in Europe.

Source: USDA, Economic Research Service using data from Trade Data Monitor, 2024.

Much of the deviation from historic trade patterns is due to UK climate and energy strategy to achieve net-zero carbon emissions that has led to increased imports of ethanol (nonbeverage), biodiesel, and wood pellets. Such policies have resulted in the most significant shifts in UK trade patterns since 2010. During this period, forest products have emerged as the largest imported commodity group, while imports of biodiesel and ethanol (nonbeverage) have respectively increased by 1,106 percent and 356 percent since 2010 (figure 3). Wood pellets, particularly, served as the catalyst for such significant growth in recent years, where biomass is often used as a source of alternative energy in converted coal-fueled power plants. United Kingdom wood pellet imports are a boon for exporters of forest products, which account for 17 percent of all imported forest products. The United States has been the biggest beneficiary of this trend, providing 64 percent of all United Kingdom wood pellet imports in 2022 (Trade Data Monitor, 2024).

Figure 3
United Kingdom imports of forest products and ethanol, 2010–23



Source: USDA, Economic Research Service using data from Trade Data Monitor, 2024.

Other countries gained further market share from the European Union due to shifts in UK climate and energy policy. UK imports of biodiesel increased twelvefold since 2012, with Chinese biodiesel exports to the United Kingdom increasing by more than 800 percent between 2021 and 2022. Likewise, Brazil saw a significant increase in export value to the United Kingdom between 2021 and 2022 across many commodities, but increases in ethanol exports saw the largest rise by value, increasing by \$329 million between 2021 and 2022 (Trade Data Monitor, 2024).

Future changes are likely as the United Kingdom enters additional trade accords in the coming years. Since Brexit went into effect in January 2020, the United Kingdom has negotiated several trade deals—notably, bilateral agreements with Australia, New Zealand, Canada, and Mexico—while negotiations remain ongoing with India and South Korea. The United Kingdom has acceded to the multilateral accord the Comprehensive and Progressive Trans-Pacific Partnership (CPTPP), while negotiations for membership to the Gulf Cooperation Council (GCC) remain ongoing. Additionally, the United Kingdom was able to roll-over 68 trade agreements that are identical to those negotiated during the UK’s time in the European Union. These agreements involve several countries, such as notable agri-food exporters like South Africa, Colombia, Guatemala, and Turkey.

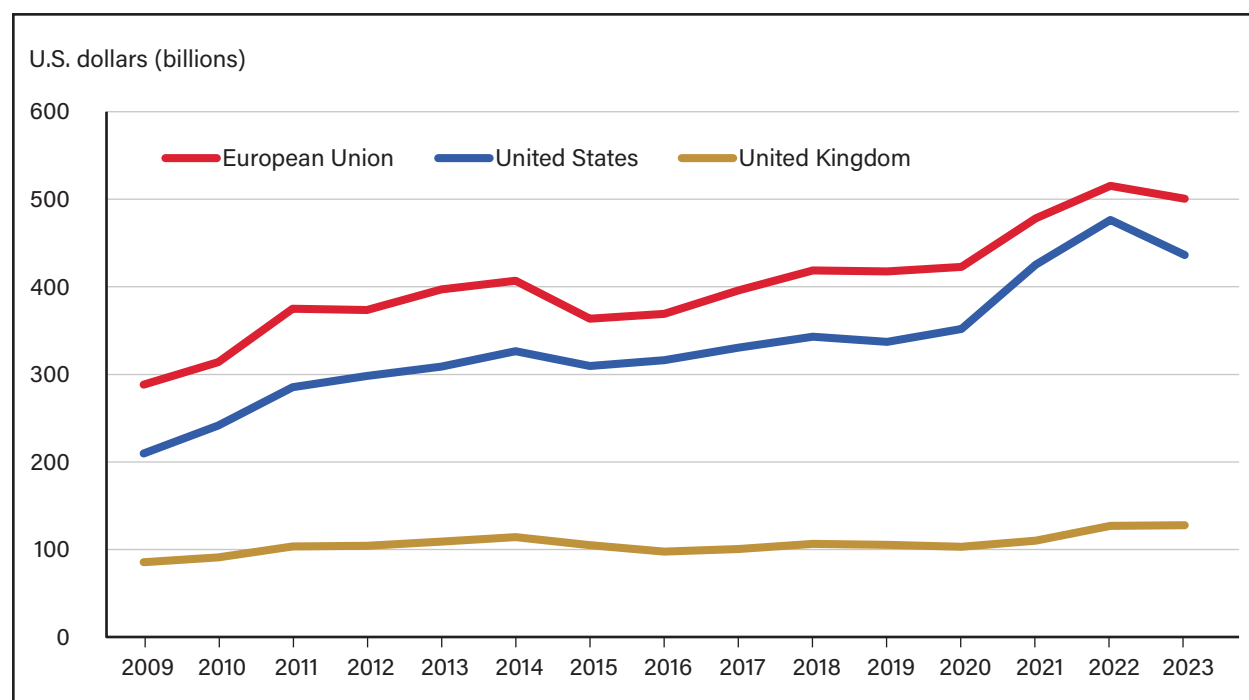
A Global Britain and Trends in Agri-Food Trade Openness

Since Brexit, the United Kingdom has sought several bilateral agreements to diversify UK sources of agri-food goods and lessen UK reliance on the European Union. Such policy initiatives ostensibly show a greater willingness to further integrate with global agri-food trade. Yet, recent work by Brakeman et al. (2023) suggested that following Brexit, this “Global Britain” posture does not lead to sufficient trade creation to compensate for trade losses with the European Union. Furthermore, when accounting for the level of integration within the global market, the United Kingdom has withdrawn slightly from international trade compared to its pre-Brexit trajectory. Trade openness (as a metric) is defined as the total value of trade (imports plus exports)

divided by gross domestic product (GDP) (Hunsaker, 2024). Here, the authors calculated sector specific trade openness for agriculture as the sum of agricultural exports and imports (i.e., total agricultural trade) divided by agriculture’s contribution to GDP. While countries like the United States and the European Union have expanded trade dramatically over the last decade, UK agricultural trade has expanded only slightly. Since 2010, total agricultural trade from the United States and the European Union has increased by 6.8 percent and 4.8 percent—an increase of \$234 billion and \$202 billion—respectively, while in the United Kingdom, trade has expanded only 3.3 percent (\$36 billion) (figure 4). This number is in part due to the resilience of their respective agricultural sectors during the COVID-19 pandemic and a surge in exports following the global recovery in the years following 2020 (Gerval, 2022). As such, the United States and the European Union have continued to exhibit an openness to trade, proceeding along their pre-Brexit trajectories in the years since the referendum, whereas the United Kingdom has exhibited a shift from their pre-Brexit openness to trade after the 2016 referendum (figure 5). This finding is consistent with research on how the Brexit referendum affected the British economy in anticipation of “a future decline in productivity growth in the tradable sector” (Broadbent et al., 2023).

Figure 4

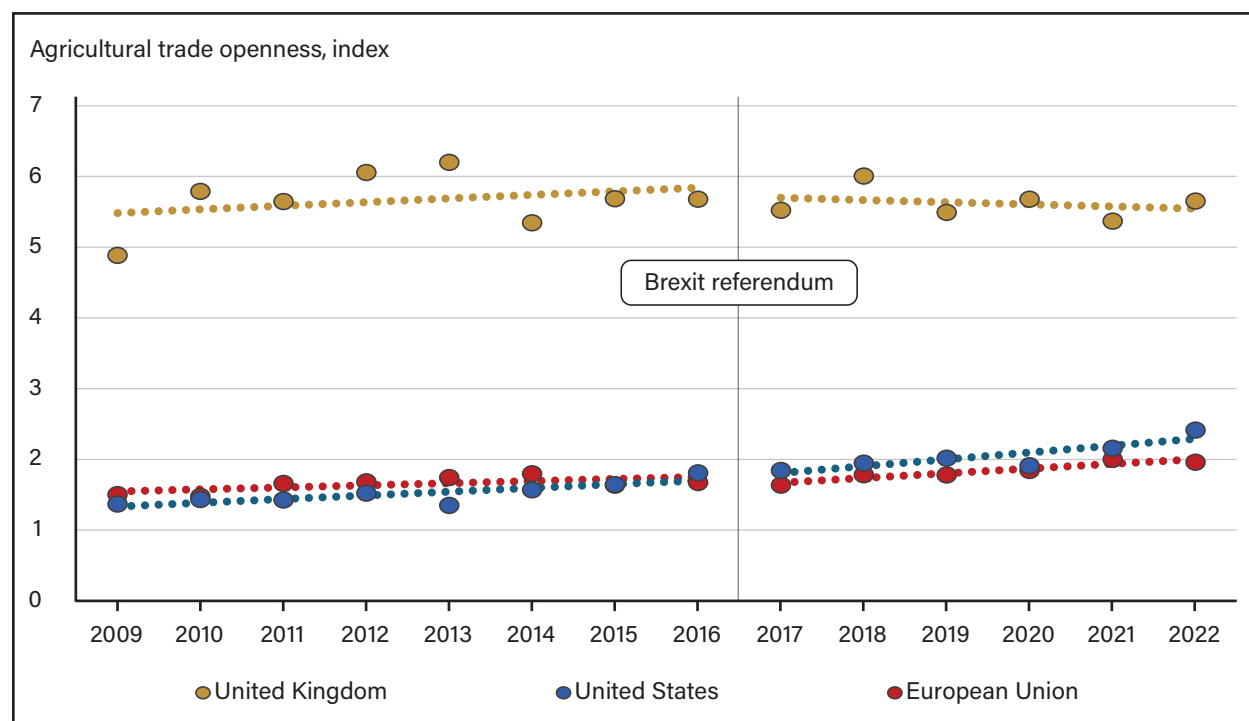
Total agricultural and related trade for the United States, the European Union, and the United Kingdom, 2009–23



Source: USDA, Economic Research Service using data from Trade Data Monitor, 2024.

Figure 5

An index of agricultural trade openness for the European Union, the United States, and the United Kingdom, 2009–22



Note: The agricultural trade openness index is calculated as total agricultural trade divided by agricultural gross domestic product (GDP). Both are measured in value.

Source: USDA, Economic Research Service using data from Trade Data Monitor, 2024, and the World Bank.

The shift from its prereferendum trajectory is indicative of a contraction in the UK's engagement with global trade in agri-food goods. Where the European Union and the United States have increased agri-food exports commensurate with significant import growth, United Kingdom exports increased by 2.8 percent compared to imports that rose by 3.5 percent.⁵ This number is significant given the UK's reliance on imports to satisfy domestic demand. This finding may be due to protection from global markets or other policies meant to safeguard some of the United Kingdom's less competitive sectors. Likewise, the TCA reduced UK export growth by imposing border checks on British goods entering the European Union single market. On the UK side, the imposition of additional checks on EU imports began a few years later in 2024 (United Kingdom Department for Environment, Food and Rural Affairs, 2023).⁶ In part, these checks help to address producer concerns over recent trade agreements' threat to domestic production—with fears of cheaper imports cultivated with lower environmental, animal, and health standards (Jelliffe et al., 2023).

⁵ These percentages are calculated by the authors using data from Trade Data Monitor.

⁶ Note, at the time of writing, insufficient data are available to determine the magnitude of effects on agri-food and related imports from UK border checks. Future analysis is further complicated by the phased-in approach to increased rates of UK border inspections over time.

Data and Methods

This analysis aims to quantify the deviation from average trade between the United Kingdom and the European Union relative to trade with the rest of the world before and after the Brexit referendum, with particular interest in trends around the implementation of the Trade and Cooperation Agreement (TCA). In this report, the authors considered a simplified approach to estimating differential trends following the enactment of the TCA. The analysis begins by calculating the average quarterly trade values of BICO (bulk, intermediate, and consumer-oriented) commodity groups, as well as agricultural-related products (i.e., biodiesel blends, forest products, and seafood products) from 2012 to 2023. These values were then subtracted from the quarterly trade values. Next, the percentage change from the historical mean was calculated from the absolute mean deviation. For the European Union and the United Kingdom, the percent quarterly deviation for the rest of the world was subtracted from that of the EU-UK. This process was performed for the trade relationships between the European Union and the United Kingdom, as well as for both the European Union and the United Kingdom with the rest of the world. The resulting value was the percent deviation from the 12-year average trade between the European Union and the United Kingdom relative to the rest of the world. This value was the principal metric used in this study as evidence to illustrate how trade patterns have changed from the pre-Brexit era in the years following the referendum, as well as how the TCA has affected trade trends.

Groupings were also considered for the agri-food and related sector, broken down by commonly used subcategorizations (e.g., trade flows and Bulk, Intermediate, Consumer-Oriented (BICO) classification). Trade was grouped by total flows, along with a breakdown by imports and exports. By product category, the annual quarterly data were compiled across four primary commodity groupings (i.e., BICO) and agricultural-related for each trade partner between 2012 and 2023 using data from the Trade Data Monitor database (2024).⁷

This 12-year average serves to standardize trade values, with the zero axis representing the baseline. The average deviation was then taken for the years prior to the Brexit referendum (2012 to 2016), the years prior to the TCA (2017 to 2020), and individually from 2021 onward. The prereferendum years illustrated trade trends prior to Brexit relative to trade in the post-Brexit years. Similarly, this same comparison was performed for the pre- and post-TCA years. The individual years were the basis of the analysis, which illustrated the degree of change in the EU-UK trade dynamic since the TCA came into effect in January 2021.

Findings

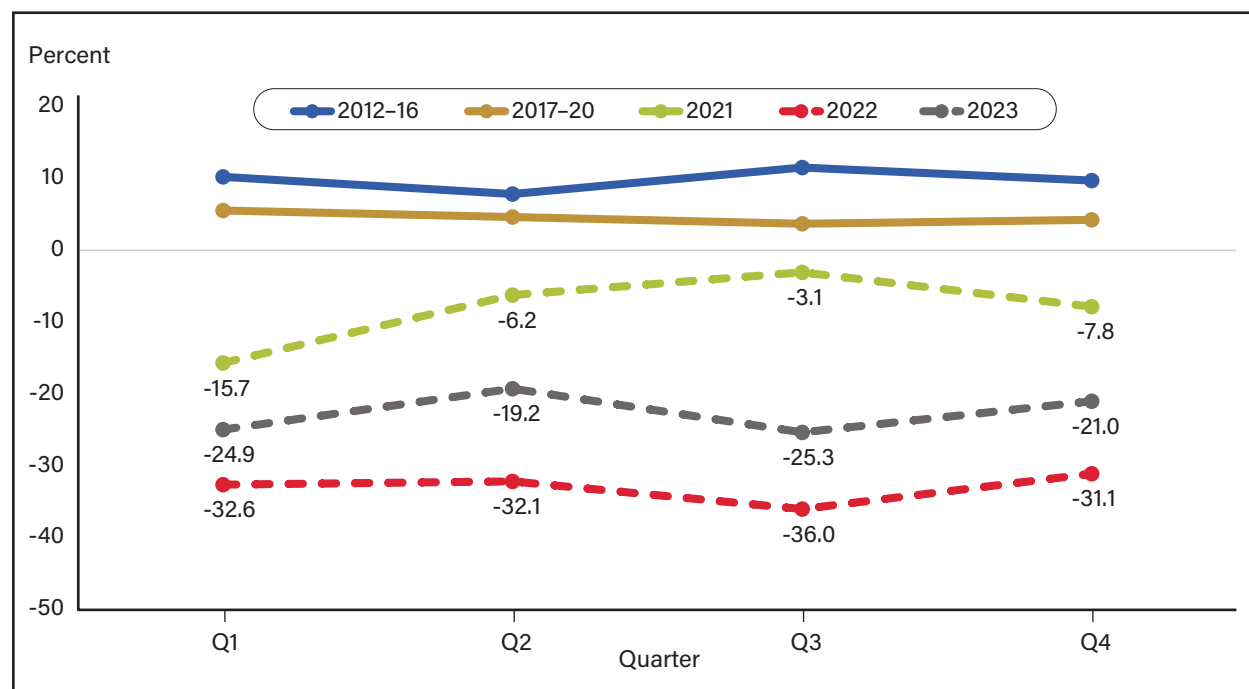
Since the Brexit referendum, the United Kingdom exhibited a noticeable departure from its formerly traditional trade patterns. This finding has been manifested by shifting some of the UK's reliance on agri-food imports from the European Union to non-EU countries. Since the implementation of the TCA, the United Kingdom has exhibited a negative deviation from the pre-Brexit and pre-TCA periods for agri-food trade with the European Union (figure 6). There was an overall deviation from average trends across the period of interest for agricultural and agricultural-related goods. Periods were broken out by pre- and post-Brexit referendum, as well as the subsequent years since the UK's formal departure from the European Union. Negative values indicate the degree of deviation from trade with the European Union and a greater degree of trade with the rest of the world. Positive values signify an increase in trade with the European Union from the

⁷ See footnote 3 regarding issues with changes to UK and EU trade data collection that occurred during the study period. Note that since the principal analysis relies on UK trade data, the related data issues should not affect the main results of the analysis. The analysis using EU data could be affected, but the authors see that their estimates appear to be consistent with other recent studies that corrected for this data issue (e.g., Du et al., 2024).

historical average. The average annual deviation from the mean ranged from -8.2 percent in the initial year (2021) to -33.0 in 2022, rising slightly to -22.6 in the final year of this analysis, 2023.

Figure 6

Percent deviation from 12-year quarterly average of total agricultural and related trade between the United Kingdom and the European Union, relative to the rest of the world, 2012-23

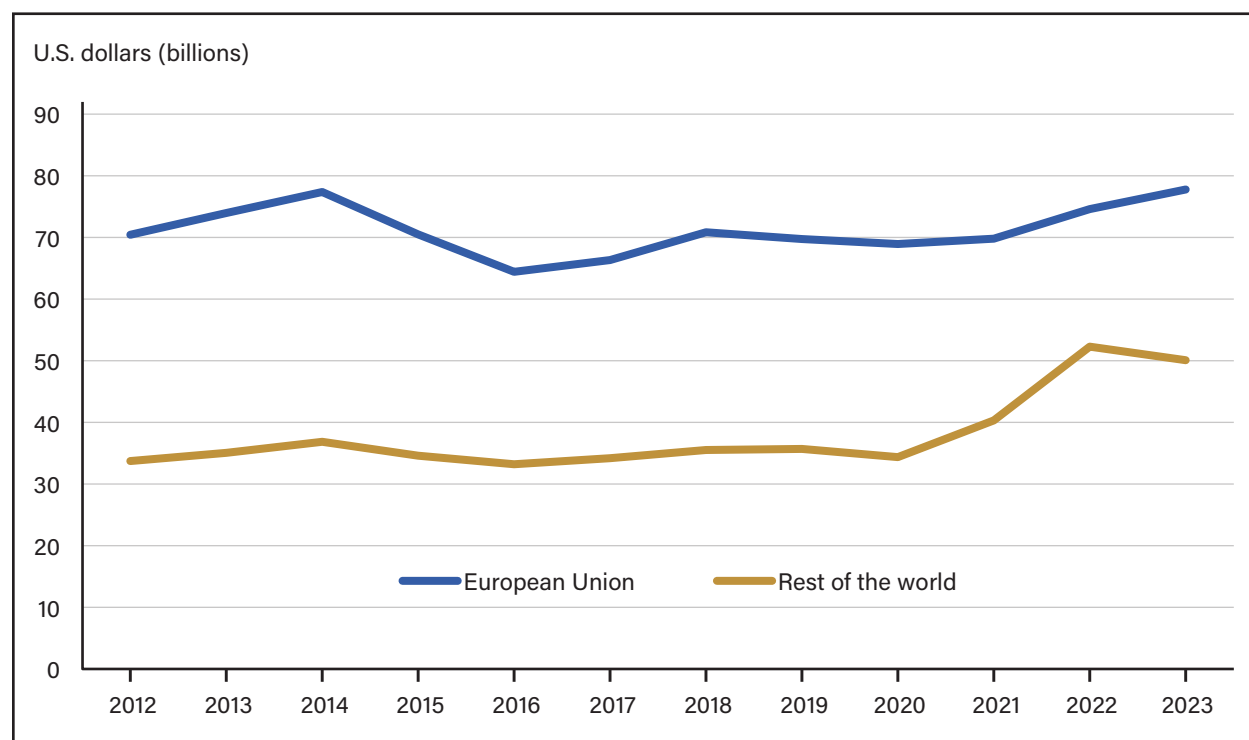


Note: This figure shows the percent deviation from 2012-23 average agri-food and related trade (i.e., x-axis) for the European Union-United Kingdom relative to their trade with the rest of the world. The periods prior to the Brexit referendum (2012-2016) and implementation of the European Union-United Kingdom Trade and Cooperation Agreement (TCA) (2017-20) were grouped into single lines; annual series were used for the TCA period (2021-23).

Source: USDA, Economic Research Service using data from Trade Data Monitor, 2024.

Figure 7

United Kingdom agricultural and related trade with the European Union compared to United Kingdom trade with the rest of the world, 2012–23



Note: Trade with the European Union is subtracted from trade with the rest of the world.

Source: USDA, Economic Research Service using data from Trade Data Monitor, 2024.

Ostensibly, the results of this analysis suggest that the United Kingdom is moving away from its long-standing trading partner. However, the total value of European Union exports to the United Kingdom has not fluctuated significantly since 2010; the total value of 2023 EU exports to the United Kingdom was like that of 2012 to 2015. Rather, UK trade with the rest of the world has been increasing, rising by an average of 23.5 percent in 2021 and 2022 (figure 7), an average increase of nearly \$9 billion each year. Much of this deviation from past trends was due to the surge in UK demand for biodiesel and ethanol. Since 2010, the value of biodiesel and ethanol imports has increased by 773 and 498 percent, respectively. Brazil, China, and the United States have captured much of this growing UK import demand (table 1). While deviation of forest products, the UK's largest imported commodity group, shifted to a lesser degree than ethanol and biodiesel, wood pellets are responsible for an increasing share of the commodity group. The United Kingdom began importing wood pellets in 2012. Since then, UK wood pellet imports have increased 419 percent and currently accounted for 19 percent of all forest product imports in 2023 (Trade Data Monitor, 2024).

Table 1

United Kingdom biofuels import growth from the United States, Brazil, China, and the European Union, 2021–23

Country	Ethanol (percent)	Biodiesel (percent)	Forest products (percent)
United States	168	88	2
Brazil	784	-61	2
China	824	412	8
European Union	-32	-28	15

Source: USDA, Economic Research Service calculations using data from Trade Data Monitor, 2024.

Looking at specific commodity groupings, the United Kingdom has diverted some of its agri-food trade away from the European Union. As with overall trade, the deviation from traditional trade patterns with the European Union is growing over time. In 2021, bulk trade was largely in line with prererendum and TCA trade patterns, while agricultural-related trade grew due to a significant increase in UK imports of EU forest products. However, both commodity groups began to exhibit deviations from the average in 2022 and 2023. In contrast, trade of consumer-oriented and intermediate goods deviated across each quarter. Deviation across all commodity groups grew substantially in 2022 and 2023 from the 12-year average (table 2).

Table 2

United Kingdom and European Union agri-food and related trade compared globally by commodity group, quarterly mean 2021–23

Commodity grouping (BICO category)	United Kingdom			European Union		
	Total (percent)	Export (percent)	Import (percent)	Total (percent)	Export (percent)	Import (percent)
Agri-food and related	-25.7	-12.9	-33.0	-21.3	-14.6	-37.7
Agriculture	-26.7	-18.4	-33.8	-21.6	-14.2	-39.7
Bulk	-28.7	37.5	-33.1	-30.1	-18.5	-48.7
Intermediate	-40.9	-12.5	-53.4	-22.0	-1.2	-49.7
Consumer	-22.6	-20.4	-26.9	-19.2	-16.0	-31.0
Agricultural-related	-9.9	38.4	-16.4	-17.2	-18.3	-24.2

Note: Trade with the European Union is subtracted from trade with the rest of world trade; Bulk, Intermediate, Consumer Oriented (BICO) classification is defined by U.S. Department of Agriculture, Foreign Agricultural Service, Production, Supply and Distribution data.

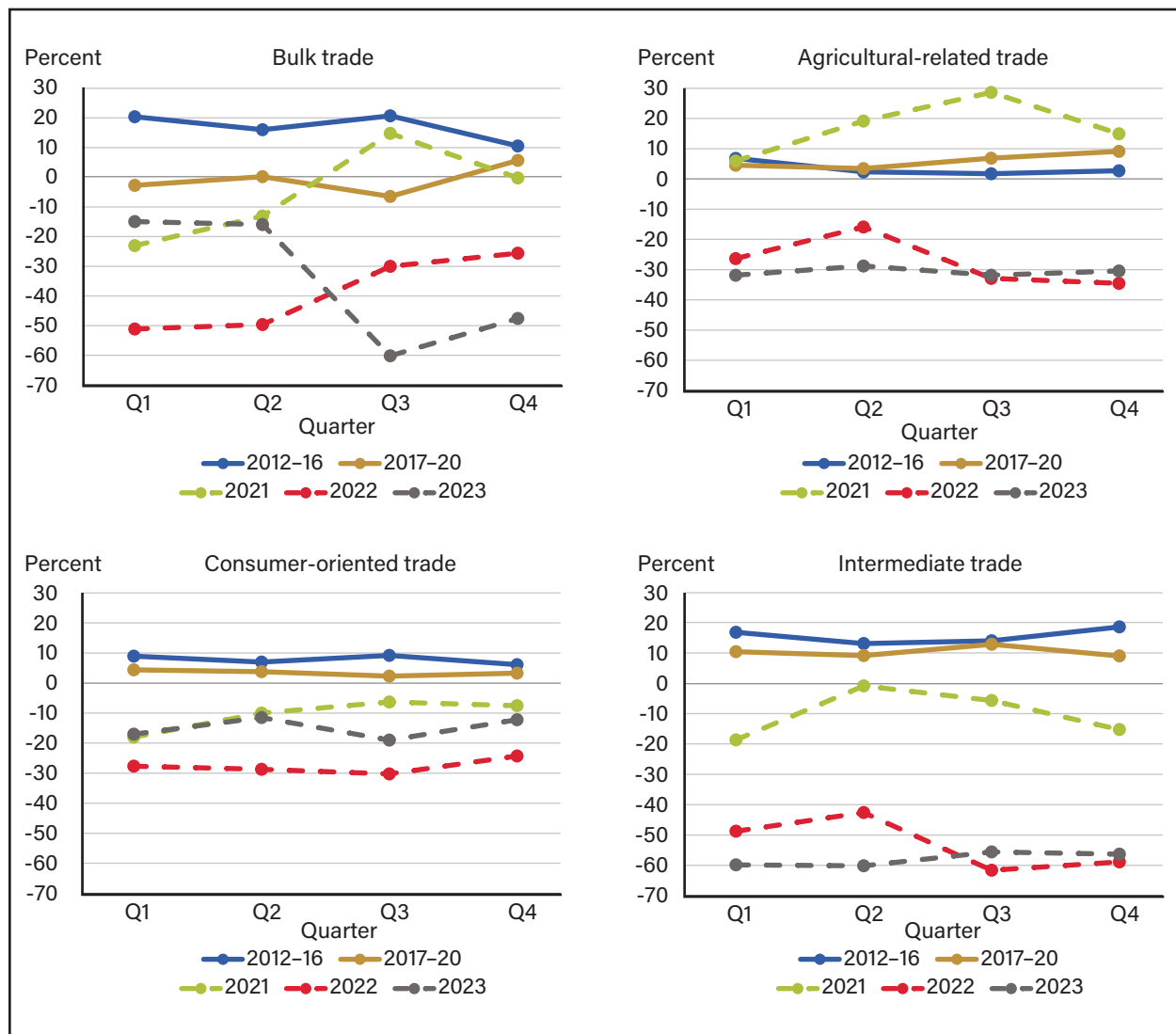
Source: USDA, Economic Research Service calculations using data from Trade Data Monitor, 2024.

Relative to the rest of the world, EU-UK total agri-food and related trade was estimated to have declined by 25.7 percent (United Kingdom) and 21.3 percent (European Union). The larger declines experienced by the United Kingdom are indicative of the stronger effects of Brexit experienced by the United Kingdom from leaving the EU single market, which has been documented in the literature (Gasiorek & Tamberi, 2023; Tamberi, 2024). Consumer-oriented goods experienced the most uniform relative decline by category, where the negative values indicate a downward deviation from the baseline 12-year average, having the smallest range (~25 percent) and exhibiting entirely negative values for all quarters following the TCA (figure 8). By category, consumer-oriented shows the least variation in relative decline across import and export and by partner (table 2). These findings for consumer-oriented goods are further consistent with prior research for the broader EU-UK economy, e.g., Freeman et al. (2022). The categories that experienced the greatest declines or increases in relative trade were, respectively, on the import side for intermediates and on the export side for bulk and agricultural-related (United Kingdom) or intermediate (European Union). Specifically, 2021–23 mean-quarterly intermediate-goods imports for the United Kingdom and European Union were estimated at -53.4 percent and -49.7 percent, respectively.⁸ In both cases, the major contributor to the observed relative decline is from increased imports of ethanol (nonbeverage) from Brazil. For the United Kingdom, relative increases in exports to the European Union occurred in the bulk and agricultural-related categories. The increase in bulk exports to the European Union was driven by wheat, barley, and oats. Export increases under the agricultural-related category were also driven by biofuels, as the United Kingdom reexported biodiesel to the European Union.

⁸ Applying the same analysis to the European Union, the authors saw a similar deviation from historical trends. Trade patterns returned closer to the average in 2023 compared to 2021 and 2022, which saw a more significant deviation from past trends.

Figure 8

Percent deviation from 12-year quarterly average of total trade between the United Kingdom and the European Union, relative globally by commodity group, 2012–23



Note: Trade with the European Union is subtracted from trade with the rest of world. The dashed lines represent years following the implementation of the Trade Cooperation Agreement and the Brexit referendum.

Source: Trade Data Monitor, 2024.

Conclusion

The European Union and United Kingdom entered into a trade and cooperation agreement in January 2021, following multiple years of Brexit negotiations. This new arrangement affected commerce between the partners and, in doing so, opened trade to other partners. This development has been particularly relevant to the food and agriculture sector, with added costs at the border. While the United Kingdom and the European Union remain strongly linked as top food suppliers to one another, the relative export growth rate for non-European suppliers to these regions has outpaced that of the EU-UK under the EU-EK Trade Cooperation Agreement (TCA). The authors observed that relative trade declines between the United Kingdom and the European Union were greatest for the United Kingdom—with a differential trade trend with the rest of the world of 25.7 percent, while for the European Union, it was 21.3 percent. The largest relative declines came from imports of intermediate goods, while some areas experienced relative gains during this period, such as UK bulk and intermediate exports to the EU. The common driver of these relative trends is European demand for biofuels to meet Europe's regulatory targets for renewable energy production. In this way, Brazil, China, and the United States benefited from increased energy exports to Europe, while increases in the United Kingdom's agricultural-related exports also resulted from European Union demand for biofuels.

This analysis fits into the established body of literature that has examined the trade effects of Brexit and/or the TCA. Most of these studies considered the entire economy with some degree of breakdown into various sectors. This study examines the agri-food and related sectors and decomposes findings into component subsectors. In doing so, new information is offered about how and where differential trends have appeared in the wake of the TCA. In addition, a measure of trade openness to UK agriculture was applied, since this has become a more widely used metric among analysts. The authors find that, while the United Kingdom is highly open to agri-food trade (relying heavily on imports to meet domestic demand) since the 2016 Brexit referendum, this metric has trended downward. The United Kingdom's agri-food trade has increased at a higher rate with the rest of the world compared to the European Union, the UK's largest trade partner. This too is reflected in the general findings from other analyses of UK trade patterns post Brexit.

Finally, the authors consider some apparent limitations of the study, and the selected methods used in the analysis. First, much of the information presented here is observational and points to areas that have been noted in the ongoing literature and economic analysis of the UK post-Brexit. The authors' methodologies reveal apparent shifts following the TCA with observed differential trade patterns. The authors used a simple approach that differences out mean trade between the partners and the rest of the world to control for other factors that could be affecting these trade patterns. Since Brexit and the TCA coincided with the COVID-19 pandemic and the subsequent recovery period, this differencing out mean trade with non-European trade partners can partially control for common global economic factors. At the same time, it does not fully address the unique characteristics of these regions. To handle this, some studies have turned to other methods, such as multiple regression analysis or groupings as a counterfactual basis, for example, the Group of 7. Yet, for the sake of clarity, the authors considered these patterns using a simple and intuitive approach to reveal some apparent shifts over the first 3 years of the TCA. Additional work is needed to explore these developments and to identify plausible causal effects of the TCA on agri-food and related trade, as well as the broader global economy.

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