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Regulatory Impact

IMPACTS OF REGULATION (EU) 2019/1793

QUANTITATIVE ANALYSIS

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FOREWORD

The aim of Implementing Regulation (EU) 2019/1793 is to ensure public and animal health by increasing the effectiveness of border controls to detect and prevent unsafe products from entering EU markets.

The Regulation sets out:

- **Increased official controls**: Temporary increases in the frequency of official controls for food and feed products of non-animal origin from non-EU countries. Such products are listed in Annex I of the Regulation, along with the frequency of checks, for example 20% or 50% of consignments.
- **Emergency measures**: Either an official certificate, or special conditions for entry into the EU, required for products from specific countries of origin where there has been non-compliance with EU food and feed safety rules, or identified risks. Consignments must be accompanied by an official certificate issued by the competent authority of the country of origin, ensuring compliance with EU safety standards. Such products are listed in Annex II of the Regulation.

The Regulation reflects the EU's commitment to maintaining food and feed safety standards while also facilitating trade by ensuring that only safe products can enter the EU. However, for low- and middle-income countries, the Regulation can have both positive and negative impacts on their food and feed exports to the EU. The aim of this report is to provide a quantitative market analysis of such measures on low- and middle-income countries' trade with the EU. It focuses primarily on trade flows, as well as pricing, as revealed by detailed examination of trade data in selected export value chains.

This analysis was undertaken by Dr Peter Talks, an economist with extensive experience in agricultural trade, and investment policy issues in developing countries, including as an adviser to the FAO, USAID, the World Bank Group, EBRD, OECD, and USDA.

This analysis complements a related report investigating the qualitative impact of increased controls under Regulation 2019/1793 on exports of Kenyan green beans and Vietnamese dragon fruit (Q-Point, 2025).

1. EXECUTIVE SUMMARY

1.1 Introduction

Implementing Regulation (EU) 2019/1793 specifies temporary increased official controls (Annex I measures) and emergency measures including country of origin testing and certification requirements (Annex II measures) to protect EU consumers from unsafe food products.

This report investigates the impacts on trade flows of selected products and countries that have been subject to temporary increased controls and emergency measures. Four value chains were selected for more extensive analysis: groundnuts, fresh beans, hazelnuts, and dragon fruit, covering 17 countries.

The primary quantitative technique applied was shift-share analysis, which provides insights into trade dynamics by helping to isolate the factors contributing to trade performance. Shift-share analysis compares the evolution of one country's trade flows to the EU in a given product relative to all EU imports of that product. It also weighs up a country's exports to the EU against those to non-EU destinations. Results are broken down into three effects:

- how the product is performing relative to national export trends
- how the product is performing relative to EU demand
- competitiveness of the country's product on EU markets.

Shift-share analysis provides a robust framework for understanding the changes in market share that are due to global factors versus those due to internal country-specific changes. This highlights pathways for development and areas needing intervention (Piezas-Jerbi and Nee, 2009).

As all products, countries of origin, and markets have their own specificities, the shift-share analysis was complemented by a detailed analysis of the factors driving the changes for each product.

1.2. Loss of EU market share

In some cases, exporting countries have not managed to maintain exports to the EU in light of increased controls. Examples include coriander leaves, basil, mint, and parsley from Vietnam; Chinese celery and yardlong beans from Cambodia; and groundnuts from Senegal and Sudan.[1] These sectors have seen their exports fall to zero during the 3 years following the introduction of measures. In the absence of trade and controls, these products have subsequently been moved from Annex II to Annex I, or removed from the scope of the Regulation entirely. In other cases, trade to the EU market has continued following the introduction of increased controls.

In 2020, Vietnamese dragon fruit were placed in Annex II due to pesticide residue concerns, and the control frequency was increased in both 2022 and 2024. Between 2019 and 2023, while the EU dragon fruit market doubled, Vietnamese exports to the EU increased by only 20%. EU retailers diversified their sourcing of dragon fruit, and Vietnam lost its position as the dominant supplier. In this period of growing EU demand for dragon fruit, the unit values of Vietnamese exports to the EU were high, and at the same time Vietnam's exports to its major export market, China, dropped by 50% due to the growing competitiveness of China's domestic dragon fruit production. Vietnam was nevertheless unable to capitalise on these strong economic incentives to expand exports to the EU.

[1] Other sectors whose trade has ceased following the introduction of additional controls are Brazil nuts from Brazil, groundnuts from The Gambia, *Capsicum* from Pakistan, locust beans from Malaysia, watermelon from Nigeria, sesame seeds and betel leaves from India, groundnuts from Madagascar, and watermelon from Sierra Leone.

A shift-share analysis was conducted on the export of fine beans from Kenya for the period 2012–2014, during which time increased temporary controls under Annex I were applied (5% in 2013). These increased controls correlate with clear shifts in trade performance, and the rapidly expanding export growth that Kenya had previously experienced was curtailed. Exports to the EU-27 also declined by 20%.

Shift-share analysis also includes an industry mix effect, used to assess the growth of Kenyan bean exports to the EU relative to the growth of the total import market for green beans in the EU. In this case, it was negative, with Kenya failing to gain from the expansion of the EU market, resulting in a decline in competitiveness on EU markets. In summary, the introduction of increased controls on Kenyan beans was associated with a substantial decline in exports to the EU, a failure to take advantage of expanding EU demand, and a loss of market competitiveness. Nevertheless, exports of Kenyan beans to the EU showed considerable resilience compared to total Kenyan exports, implying that there was an ability to maintain market presence despite broader export challenges (see section 1.3).

1.3. Flight to quality

For Kenyan beans, exports to the EU, and the EU market share, both declined. Furthermore, unit values (i.e. the price at time of importing into the EU) rose relative to both competitor country beans and Kenyan export unit values. This suggests that the increase was not due to higher shipping costs, but rather a shift towards higher value beans, or put another way, the loss of low- and medium-value segments for Kenyan exports to the EU. Kenya exports high value fresh beans, and retailers continued to source these. However, non-premium market segments have diversified to beans from countries such as Senegal and Morocco.

This finding implies that some types of operator may be more severely affected than others by increased controls. In the case of Kenya, this is likely to have been small- and medium-sized operators, who do not have the same resources to comply with additional requirements as larger-scale operations. As a result, different types of operator in a given country would require different mitigating measures to address the underlying food safety challenges.

1.4. Extra challenges for perishable products

For highly perishable items, the time taken for analysis and the implementation of temporary increased controls can lead to a loss of product quality, resulting in a loss of market share. These products require rapid turnover and timely sales to maintain their freshness and appeal. Delays caused by increased controls not only compromise quality, but also make it difficult to compete effectively in the EU market. This underscores the necessity for expedited regulatory processes for perishable goods to ensure that producers can maintain their market position and meet the high standards expected by EU consumers.

1.5. Loss of production and revenue in affected countries

In the case of Kenyan beans, exports to the EU were reduced, as noted above, but exports were not immediately redirected to other countries. Given that the domestic market for this product is more limited, some farmers and traders will have exited from producing beans. Smaller operations, in particular, may have lost revenue as a result of increased controls.

Opertators may also develop their business plans based on targeting different markets, factoring in a percentage of exports to the EU which are typically the most profitable. Loss of the EU market could therefore be more disruptive to overall business viability than may first be inferred from the quantities concerned.

1.6. Delayed response to increased control measures

For groundnut, since 2019, 12 countries have been subject to temporary increased controls for aflatoxin contamination, a risk that is common to most groundnut producers. This analysis focuses on exports from

Argentina and China, which are both subject to increased controls, and an additional country, Nicaragua, that is not.

There were three changes to the controls status of Argentine groundnut exports to the EU between 2020 and 2023. The expected impacts, such as decreased competitiveness on EU markets following the implementation of additional measures, did not occur in the year after the changes were implemented, but were apparent in later years. This suggests that there is a long response lag to changes brought about by increased controls, or that other factors are influencing trade.

A complementary qualitative study on the impacts of Regulation 2019/793 (Q-Point, 2025) also notes that in Kenya, larger-scale operators with significant experience of food safety, and with product or management certification, were able to respond to issues raised by increased controls more rapidly than small and medium-sized enterprises.

1.7. Increased controls decrease trade, with only limited improvement once lifted

Chinese groundnut exports to the EU faced mandatory checks and export certification (under Annex II) from the introduction of Regulation 2019/1793 until 2021, when exports were moved to Annex I listing, following improved management of aflatoxin contamination. The introduction of Annex II measures in 2019 saw a loss in competitiveness of Chinese groundnuts on EU markets.

Following the shift from Annex II to Annex I listing in 2021, there was moderate growth in Chinese exports and an expansion in EU demand. However, the overall competitiveness of Chinese groundnuts continued to decline on EU markets, albeit at a slower rate. This suggests that the challenges in maintaining China's competitive position on EU import markets were reduced, but still present.

Chinese exports to the EU outperformed the expected level based on growth of national exports during this period, but by less than may have been anticipated given EU market growth. Therefore, Chinese groundnut exports were not fully capitalising on EU market growth, or more simply, Chinese exports to the EU had recaptured only some of the losses that occurred due to the imposition of temporary increased controls. There may be a longer lag between lifting measures and the recovery of export markets, or there may be other factors that influence the trade pattern.

The impact of the increased controls on Chinese groundnut trade mirrored the experience of Argentina: the removal of the increased controls led to the recovery of some, but by no means all, the previous market position. This could suggest either that a return to 'pre-increased controls' trade will only occur over a longer time frame, or that the loss of trade reflects the elimination of 'lower quality' (i.e. higher risk) product from EU markets. If the latter, it could be argued that Regulation 2019/1793 has successfully helped to protect EU consumers from aflatoxin contamination. Closer inspection of the domestic industry's ability to respond to aflatoxin contamination risk would shed more light on these arguments.

The same impact was recorded in Kenyan beans when the initial increased controls were lifted in 2015. Kenyan exports to the EU improved marginally, while total Kenyan exports continued to fall by 40%. EU import demand for the period 2014 2018 for beans continued to expand by 19%. The shift-share analysis for this period demonstrates that while Kenyan exports to the EU substantially outperformed Kenyan exports in the national growth effect (i.e. exports to the EU outperformed total exports), they failed to respond to the growth in EU demand. The removal of restrictions did not see Kenyan fresh bean exports to the EU return to their previous levels, and while they fared better in the EU than in other export markets, there was an important loss of EU market share.

1.8. Unaffected countries gain market share

Where an important supplier to the EU has been affected by temporary increased controls and emergency measures, other suppliers have substantially grown their exports and EU market share. This was the case for Nicaragua and groundnuts; Morocco and Senegal in the fresh beans market; and for Ecuador and dragon fruit.

It is interesting to note that Nicaragua's ability to export groundnuts (without increased controls) coincided with both the development of Nicaragua's overall exports and EU demand increasing, coupled with an impressive gain in competitiveness on EU markets.

This observation also reinforces the previous finding that there is no automatic 'bounce back' from lifting measures; once EU purchasers have sought out new suppliers as a result of increased controls, they do not quickly return to the original suppliers once measures are lifted.

1.9. Conclusion

Increased temporary controls and emergency measures can have long-lasting implications for developing country producers and exporters (summarised in Table 1). They are not always able to respond to the challenges of increased controls in the short-term, and even after measures are lifted, loss of market share may be long-lasting.

Further intervention, such as additional technical assistance, may be needed in affected countries to rebuild export markets. This should take into account the ability of different producers to respond to the challenges, and address the underlying causes of contaminants and residues in exports. It requires a nuanced understanding of the context to design effective mitigation measures. Furthermore, not all operators in a country are affected, or responsible for high-risk practices; technical assistance should be targeted accordingly. Investment in development of national policies to mitigate negative impacts and improve food safety standards may also be important.

These regulatory measures are referred to as 'temporary' measures. Implicit in this term is that remedial action can be taken, the measures will be lifted, and trade will continue. This study demonstrates that this expectation is not supported by the empirical evidence. Exporting country sectors listed in Annexes I and II face reductions in trade and loss of market share, and may be less able to exploit growth in EU markets. But these trade effects are far from 'temporary'. Affected sectors struggle to regain their position on the European market even after measures are lifted, being unable to claw back market share as EU buyers establish new business relations in other origins.

This study also demonstrates that increased controls have different impacts on various market segments. Following the imposition of increased controls or special measures, exporters of high value produce may maintain or even consolidate market share, but suppliers of lower value produce, may find themselves excluded from the EU market.

As a result, exporting countries should place much greater emphasis on not being listed in either Annex I or Annex II of Regulation 2019/1793. This suggests a need for both more comprehensive monitoring and scrutiny of potential compliance risks, and pre-emptive investment in terms of testing and monitoring pesticides and contaminants.

Table 1. Potential impacts on trade of temporary increases in controls

Type of impact	Examples
Reduction in exports	• **Kenyan beans: 2012–2023**, exports to EU declined by 23.8% while EU imports increased by 57.1%
Long-term loss of EU market share	• **Kenyan beans: 2019–2023**, market share dropped from 9.6 to 7.8% • **Vietnamese dragon fruit: 2019–2023**, market share dropped from 64.5 to 37%
Trade does not recover following easing or lifting of increased controls	• **Argentine groundnuts:** underperformed by 28.9% in 2021–2022 (after moving from Annex II to Annex I) • **Chinese groundnuts** underperformed by 8% in 2021–2023 (after moving from Annex II to Annex I) • **Kenyan beans: 2014–2018**, underperformed by 49.8% (after removal from Annex I)
Other countries without increased controls capture EU market share	• **Vietnamese dragon fruit: 2019–2023**, exports to EU increased by just 19.2%, compared with 108% (all exporters) and 310% (South America, now the dominant supplier) • **Nicaraguan groundnuts: no increased controls**, EU market share up from 1.6% (2017–2019) to 4.5% (2023), an increase of 281%

2. IMPLEMENTING REGULATION 2019/1793

2.1. Overview

Regulation (EU) 2019/1793 establishes increased controls for certain products where potential risks to public health are identified in relation to contaminants/pesticides. A decision to introduce increased controls can be taken, for example, in the case of repeat interceptions at EU border controls due to the presence of contaminants or pesticide residues in produce from an exporting country.

The European Commission has the power to place products on:

- **Annex I** of the Regulation, which lists products and their countries of origin that are subject to a **temporary increase of official controls** at EU border control posts and control points
- **Annex II**, which lists products and their countries of origin that are subject to **emergency measures** – special conditions for entry into the EU. Competent authorities in the exporting country are required to provide each consignment being exported to the EU with an official certificate that the products are compliant with EU food and feed safety standards.

The Regulation replaces and consolidates Regulations 669/2009 and 884/2014. Regulation 669/2009 required increased EU inspections of food and feed products listed from specific origins in its Annex I, and the use of a common entry document for these products.

Since Regulation 2019/1793 entered into application on 14 December 2019, it has been amended twice a year from 2020 to 2024, in particular revising the list of products and exporting countries in Annexes I and II.

The Regulation references the EU Rapid Alert System for Food and Feed (RASFF) as one of the sources of information for determining the need for increased controls or emergency measures.

The most frequent food and feed safety issues cited in Annexes I and II are the presence of aflatoxins, unauthorised or excessive pesticide residues, and chemical contaminants. RASFF notification data is used to complement the quantitative analysis presented in this report.

2.2 Annex I in practice

For products from origins listed in Annex I, imports into the EU are subject to more frequent inspections at EU border posts, such as identity and physical checks, including sampling and laboratory analysis. Annex I sets out the inspection frequency – for example, jackfruit from Malaysia is subject to a 20% frequency check due to possible pesticide residue issues.

Consignments must also be accompanied by a Common Health Entry Document (CHED) to ensure border controls undertake the required inspections. The operator responsible for the consignment must submit the CHED through the EU Trade Control and Expert System (TRACES NT) at least 24 hours before the consignment's arrival at the EU border post.

Traders and exporters must navigate the complex landscape of import controls and administrative requirements, therefore there is a need for information flows to keep them up to date on updates to the Annexes, requirements, and procedures.

The enforcement of EU safety standards through the Regulation can encourage positive changes in non-EU countries regarding public health, trade reputation, and market access. This includes incentivising low- and middle-income countries to improve their food safety and quality control systems to meet EU requirements, which in turn can help improve EU market access. It may also encourage more capacity building and technical

assistance in non-EU countries for improving agricultural practices and food safety. However, these are often medium-term and dynamic impacts that also typically require focused measures to ensure.

There are also a number of potentially negative impacts that could impact exporters of products listed in Annex I, including the following.

- Delays. Increased controls may lead to delays at the border before a product is released for entry into the EU market. This can affect the timeliness of delivery.
- Costs. While cost vary depending on the type of CHED and the level of inspection required, it is typically between EUR 50 and EUR 100 per consignment. As a product may be held for longer at a border post, for example while awaiting laboratory results, this can increase costs, such as increased storage or logistics costs. If a consignment is rejected, the costs of its destruction are borne by the operator.
- Competitiveness. Higher costs and risk may impact a product's price, competitiveness, or attractiveness in its target market. For example, higher costs can lead to lower levels of renumeration for the producer and/or make the product uncompetitive in the target market. EU purchasers, such as supermarkets, may also seek to diversify supply sources due to the risk of disruption to product availability.
- Reputational risk. Countries or companies with more frequent non-compliance with EU requirements might have their products viewed with greater scrutiny, impacting on market reputation and, ultimately, access.
- Adaptation. Exporting businesses may need to adjust their supply chain management procedures, for example, quality control, sourcing, and logistics, due to the Regulation.
- Information. There is a need to inform producers and exporters in exporting countries about EU requirements to ensure compliance and minimise border rejections.

Larger-scale agricultural and trade operators, who are likely to have some form of food safety certification such as GLOBALG.A.P., ISO 22 000, IFS Food Standard, or BRC Global Standard for Food Safety, are able to respond relatively rapidly to the challenges of increased controls. Larger-scale operators in Kenya exporting green beans to the EU were reported to have adapted in around 6 months, whereas small and medium operators with less experience of food safety, or without product or management certification, took several years to adapt or were more likely to cease exporting to EU markets (Q-Point, 2025).

This suggests that the impacts of the Regulation will not be the same for all levels of operator for a product in a given country, and that smaller-scale operators may need additional support when faced with Annex I listing.

2.3 Annex II in practice

In the case of Annex II listing, on top of the increased controls for Annex I, there are further special (emergency) measures: competent authorities in the exporting country are required to carry out identity and physical checks on all export consignments, including sampling and laboratory analyses, and to certify compliance with EU food and feed rules. The additional burdens in terms of official inspections, documentation, and certification can be challenging for public authorities, especially in countries where resources or capacity are scarce.

Entry to the EU of products listed in Annex II is conditional on providing analytical reports showing compliance with EU standards for the contaminants listed in Annex II, mainly relating to aflatoxins and pesticide residues.

The reports must be issued by laboratories following EU sampling and analysis procedures that are recognised either by the exporting country's competent authorities, or by the EU. The exporting country's competent authority must issue the certificate following the model set out in Annex IV of the Regulation.

The situation for exporting countries is particularly problematic if there are no suitable national analytical facilities with the required accreditation for the analysis of contaminants and pesticide residues (ISO/IEC 17025); or if laboratory services and certificate issuance cannot be accessed on a timely basis.

In addition to the issues impacting Annex I products, the pre-entry testing and certification requirements create additional costs, delays, and complications for exporters and competent authorities.

For example, an Annex II product subject to aflatoxin controls requires samples from each consignment to be tested, as well as a certificate for each consignment.

For compound foods, if they contain more than 20% of product(s) listed in Annex II, they are also subject to Annex II measures[2].

2.4 Amendments to the Regulation

Since Regulation 2019/1793 was published, there have been 10 amending Regulations, published twice a year, reflecting that the measures are being continuously adapted to take in new evidence on risk, as well as efforts by impacted exporting countries to improve their food and feed safety.

This underlines the need for exporters, traders, and exporting country competent authorities to stay abreast of the EU entry requirements set out in the Regulation.

Exporters should engage with their national competent authorities or EU importers to ensure they fully comply with these rules, which are designed to protect public health, but which can significantly affect trade dynamics.

For example, regarding groundnuts, the range of groundnut-containing products has been expanded by a 2020 amendment to Regulation 2019/1793, and there have been numerous changes since 2019 (and before under the previous Regulation) as new evidence on risk levels has come to light (see Table 2).

2.5 United Kingdom

Due to the exit of the UK from the EU on 31 January 2020, the UK adopted the Official Controls (Imports of High Risk Food and Feed) (Amendment) (EU Exit) Regulations 2019, which implements similar rules to Regulation 2019/1793 and subsequent amendments. The EU CHED notification system was also adapted and implemented as part of UK import procedures. As of February 2025, there does not appear to be any significant divergence between the Regulation in force in the EU and UK rules.

[2] The 20% limit is cumulative of any products listed in Annex II.

Table 2. Groundnuts – country coverage and changes to Annexes I and II

Country	Pre-2019	2019/1793	2020	2021	2022	2023	2024
Argentina		Annex II, 5%		Moved Annex II to I, 5%		Removed Annex I	
Bolivia		Annex I, 50%				Moved Annex I to II, 50%	
Brazil		Annex II, 10%		Removed Annex II, was 20% Added Annex I, 20%	Removed Annex II	Increased Annex I, 30% pesticide residues Removed Annex I, aflatoxins	Removed Annex I
China		Annex II, 20%		Moved Annex II to I, 10%			
Egypt	Added Annex II, 30% (date unknown)	Annex II, 20%				Annex II, increased to 30%	
Gambia		Annex II, 50%				Moved to Annex I (no trade), 50%	Removed Annex I (no trade)
Ghana	2014, added Annex I, 50%	Annex II, 50%					Moved to Annex I (no trade), 50%
India	2014, added Annex I, 20% Added Annex II, 30% (date unknown)	Annex II, 10%		Annex II, increased to 50%			
Madagascar	2016, Annex I	Annex I, 50%				Removed (no trade)	
Senegal	2017 added Annex I	Annex I, 50%	Added Annex II, 50%			Removed (no trade)	
Sudan		Annex II, 50%				Moved to Annex I (no trade), 50%	Removed Annex I (no trade)
USA		Annex I, 10%		Annex I, increased to 20%			

3. METHODOLOGY

3.1. Measuring the impact

The increased official controls and emergency measures set out in Regulation 2019/1793 have the potential to impact trade flows. In order to assess this impact, it is necessary to go beyond simple, static aggregate trends. The time frames and sample sizes of products affected are relatively small, and trade may be impacted by many factors which are often not possible to disaggregate. Furthermore, each product and market has its own specificities and dynamics.

This study uses shift-share analysis to provide insights into trade dynamics by helping to isolate the factors contributing to trade performance. This provides more nuanced insights that can be used to draw out policy implications and strategic guidance, which will be particularly relevant for developing countries (Piezas-Jerbi and Nee, 2009). Shift-share analysis has also been used to evaluate the impacts of regional trade agreements and agricultural trade, such as EU trade agreements with the countries of North Africa (FAO, 2015).

For an analysis of the impacts of Regulation 2019/1793 on countries' trade flows to the EU, shift-share analysis enables comparisons of:

- the evolution of a product's trade flows to the EU relative to all EU imports of that product
- the exporting country's performance in the EU relative to the country's total exports of the product.

Results are decomposed into three effects:

- how the product is performing relative to national export trends
- how the product is performing relative to EU demand
- competitiveness of the country's product.

In shift-share analysis, trade data captures the results of many interacting effects that cannot always be disaggregated. Therefore, in this report the statistical analysis is complemented by adding an element of product-, country-, or market-specific context and understanding. In practice, products are rarely homogeneous. For example, while Kenya produces and exports green beans to the EU, the green beans from competitor countries such as Morocco, Egypt, and Senegal all have different characteristics in terms of quality, availability, price, reliability, and consumer perception.

Assessing price trends by using unit value information in trade data also complements the shift-share analysis. Thus the results presented in this report combine quantitative and qualitative approaches to give greater insight into how a country's product has been affected by Regulation 2019/1793.

Piezas-Jerbi and Nee (2009) highlight how policy implications can be drawn from shift-share analysis. This includes helping to identify countries with negative competitiveness effects that could be targeted with policies to address issues such as improving productivity, facilitating trade, or developing production capacity. Shift-share analysis has been used to assess the impacts of trade policies on different aspects of economic performance, from employment to supply chain dynamics, offering nuanced insights for policymakers. In this report, the statistical analysis combined with contextual information aims to identify key issues to address going forward in order to mitigate trade impacts of Annex I and II listing in low- and middle-income countries.

3.2. Data sources

Trade data for EU imports is taken from Eurostat.[3] Data is recorded at the level of extra-EU-27 imports for all time periods, including before 2021 when the UK was part of the EU-28. This is to ensure comparability between data before and after the UK's exit from the EU, and to measure the impact of Regulation 2019/1793 rather than Brexit-related changes.

This means that imports from the UK are recorded as extra-EU trade even before the exit of the UK from the EU. Where there was an important re-export of product from either the UK or EU to each other, it has been noted for clarity in the analysis. For example, up to 10% of EU-27 groundnut imports came from the UK up to 2021, when this trade declined to negligible amounts. In practice, groundnuts from non-EU countries such as Brazil and Argentina continue to be imported into the EU-27 but no longer transit the UK.

Intra-EU data is not included in the analysis, such as a consignment of groundnuts being shipped from Rotterdam to elsewhere in the EU. The exception is for beans (CN 0708 20) where several EU Member States, notably Spain, compete with non-EU suppliers of beans.

For several products, such as green beans, greater clarity was achieved by reviewing both the UK and EU-27 trade flows. For example, for Kenyan green beans, the UK and EU-27 account for over 90% of Kenyan exports. For UK imports of green beans, the analysis was undertaken both with and without EU-27 data. In the other direction, UK exports of green beans to the EU were negligible. Many of the products on Annexes I and II are tropical and not produced in the UK.

For export data, official national trade statistics sources were used, such as the Viet Nam Customs Office and Ecuador's Central Bank. In some cases, non-EU countries use different eight-digit trade codes, particularly for products which are more significant for the exporting country than for the EU. For example, Vietnamese dragon fruit trade data has separate eight-digit trade codes for different types of dragon fruit (white flesh, red flesh), while for the EU it is an "ex." product within a broader set of fresh fruit products.

For "ex." products, the product in question is part of, but not all of, the trade for a given CN code. It is important to only measure the affected product. For example, Eurostat eight-digit CN trade data does not enable "Ex. 0810 9020 – dragon fruit" to be isolated from other products in this category.[4] For dragon fruit-exporting countries, this is an important product with its own unique six- or eight-digit trade code, therefore the export values can be collated from the official trade data sources of exporting countries, but EU import values are either not available or must be estimated from other sources. Products in this category are clearly marked in section 4.

In the case of dragon fruit for which EU import data is not available, a proxy was built from the official trade statistics databases of 90 countries using export data. It is noted that this introduces three sources of error: (i) incomplete country coverage; (ii) using export values (effectively FOB) rather than import values (CNF)[5] might skew results towards countries with lower export prices to compensate higher shipping costs, or not account for substantial differences between maritime and air shipping of the same product; and (iii) import trade data is perceived to be more accurate. However, the proxy enabled additional analysis to be undertaken with the above caveats.

For some countries such as Tunisia and Sudan, where direct access to official trade statistics is not publicly available, either UN Comtrade[6] data or mirror data is used. Mirror data builds a picture of a country's trade

[3] https://ec.europa.eu/eurostat
[4] A unique 10-digit EU TARIC code for dragon fruit is used by customs authorities, however this is not publicly available.
[5] FOB, freight on board; CNF, cost and freight (or cost, no insurance, freight).
[6] https://comtradeplus.un.org

based on the data recorded in partner countries. Although this introduces a margin of error, in some cases it provides a superior proxy for trade flows than Comtrade data. This is particularly true for unit value and value calculations, where EU imports would be recorded as CNF values while non-EU country export data is measured in FOB terms. Where such data is used, it is noted in the analysis.

Trade data was extracted using the Global Trade Tracker[7] database, which also enables all values to be calculated in euros, and to account for products which have revised trade codes over the period in review. Data was generally available from 2010 (2012 for several countries) to September 2024.

3.3. Shift-share analysis

In order to investigate the question of whether measures taken based on Regulation 2019/1793 have impacted on selected countries' trade flows of those products to the EU, shift-share analysis provides relevant statistical insights.

Shift-share analysis is a quantitative technique used to attribute change in a variable, in this case export market performance, to different underlying factors. Regarding the impact of the Regulation on trade flows of affected countries to the EU, shift-share analysis enables a comparison of the evolution of a product's trade flows to the EU relative to all EU imports of the given product, as well as the export performance of the product to the EU relative to the exporting country's total exports of the product. For detail see Annex I.

For example, if exports to the EU of a product had increased 8% over the time frame investigated, while at the same time the EU imports for the same products from the rest of the world had increased by 20%, the relative performance of EU imports from the exporting country compared to the rest of the world has been a slower rate of growth.

Shift-share analysis enables this type of comparison to be carried out by decomposing the effects of changes in export performance relative to other products and similar products elsewhere. For export analysis, the shift-share approach typically breaks down the growth in exports into the following three components.

- **National growth effect** – Represents the overall growth of the market; more formally, it is the growth that would have occurred if exports had grown at the same rate as the total exports of the country.
- **Industry mix effect** – Captures how the product's export growth performs relative to EU demand preferences.
- **Competitive effect**, or interaction effect – Represents how well a product from a country performs relative to other countries. It reveals the difference between the actual growth and the expected growth (based on national growth effects and industry mix effects), indicating a product's competitive advantage or disadvantage in the EU market.

Using the example of Kenyan green bean exports to the EU, the **national growth effect** assesses whether the beans sector in Kenya is growing or declining in relation to Kenya's overall export growth. If beans are a fast-growing part of Kenyan exports, this could positively impact the share of beans in EU imports from Kenya.

The **industry mix effect** looks at how much growth in Kenyan exports to the EU can be attributed to the general growth in the EU green bean import market. If EU total green bean imports are growing, this would naturally lift Kenyan bean exports as well.

The **competitive effect** measures Kenya's competitiveness in exporting beans to the EU compared to other exporting countries. If Kenyan beans capture a larger share of the EU market than expected, based on overall EU import growth and Kenyan export growth, this suggests Kenya is gaining competitiveness in this sector. In

[7] https://www.globaltradetracker.com

other words, it measures the country's advantage (or disadvantage) in Kenyan beans, beyond general EU and national growth trends.

Shift-share analysis uses two time periods. The base periods selected for this analysis are assessed on a case-by-case basis, depending on when Annex I and II measures were introduced, and whether trade flows were also affected by either Covid-19 disruptions or issues connected to the UK's exit from the EU at the end of 2020.

3.4. Price analysis

In order to deepen the insights provided by the shift-share evidence and product/market analysis, assessing the evolution of unit prices is informative for some markets.

The increased controls and in-country testing and certification measures required for Annex II products all entail additional costs. There is little clarity available on the costs of increased controls. The competent authorities of EU Member States generally do not publish fee schedules. Actual fees are calculated based on the time and complexity of the evaluation.

In exporting countries, there may be a greater variation in costs of additional testing, food safety measures, and issuing of certificates. The figures presented have not been verified, therefore should be taken as only rough estimates.

For example, for a consignment of fresh beans to be exported from Kenya, a phytosanitary certificate must be applied for from the Kenya Plant Health Inspectorate Service (KEPHIS)[8], as well as an inspection scheduled to check the bean fields, pack house, and pesticide use compliance. Testing may also be required for pesticide residues. It is estimated that the application fee is EUR 15, inspection fee is EUR 37, and lab testing EUR 74 per sample.

Costs from the Vietnamese Plant Protection Department are also not verified, but are of a similar order: EUR 46 for issuing certificates (including application fee and inspection fee), and around EUR 100 for lab testing.

Depending on the market structure, these costs may be absorbed at different stages, such as by the producer, exporting country aggregator, or trader; the EU importer; or the final EU retailer or consumer. Collecting data that is disaggregated and reliable enough to model such pass-through price effects would require considerable time and resources and is beyond the scope of this report.

Furthermore, unit values do not enable disaggregation of other price effects such as seasonal or annual price variations, changes in transport costs, or changes in the competitive structure of target markets.

With these caveats in mind, for some products a simple presentation of unit values of the concerned product provides additional insights to complement the shift-share analysis and market overviews. For example, for Kenyan green beans, following the imposition of increased control measures, there was a noticeable increase in EU import unit values, both nominally and relative to competitor countries. However, this may be due to other factors, such as a shift in the quality composition of exports or changes in costs of air freight to the EU.

[8] https://www.kephis.go.ke/phytosanitary-services

4. RESULTS

Shift-share analyses and their interpretation are presented for four product groups: groundnuts, fresh beans, hazelnuts, and dragon fruit.

4.1. Groundnuts – Argentina, China, Nicaragua

Groundnuts (peanuts) are susceptible to aflatoxin contamination. EU imports of groundnuts are subject to increased controls from 12 countries (Annex I), including the leading suppliers of groundnuts to the EU (see Table 2). There have also been frequent revisions to increased control requirements (Annex II), reflecting a continuous re-evaluation of aflatoxin risk and efforts to reduce this.

Groundnuts subject to increased controls are covered by CN codes 1202 41 00 and 1202 42 00 (in-shell and shelled groundnuts, respectively), as well as four trade lines for products containing groundnuts (such as peanut butter): 2008 11 10, 2008 11 91, 2008 11 96, 2008 11 98, and oilcake from groundnut oil, 2305 00 00.

In practice, most groundnut trade in this group is in shelled groundnuts (CN 1202 42 00). For example, 98.3% of Argentine groundnut exports to the EU between 2015 and September 2024 were in this category. Therefore the analysis concentrates on this product line.

Argentina

Regulation 2019/1973 brought three changes for EU imports of Argentine groundnuts: addition to Annex II in 2019; moving to Annex I in late 2021; and removal from increased controls in 2023 (see Table 3).

Table 3. Argentina – Regulation 2019/1793 requirements for groundnuts

Date	Change	Trade impacted from:
Regulation 2019/1793, November 2019	Initiated in Annex II, 5% (aflatoxins)	January 2020
December 2021	Moved Annex II to Annex I, 5%	January 2022
Regulation 2023/174, February 2023	Removed from Annex I	March 2023

The shift-share analysis focused on four scenarios, as shown in Table 4. For scenario 4, a 12-month period was selected to avoid seasonal patterns and ensure comparability with the previous scenarios.

Table 4. Argentina –Shift-share scenarios for groundnuts

Scenario	Event	Start	End
1	Overview	2019	2023
2	Addition to Annex II	2019	2021
3	Annex II => Annex I	2021	2022
4	Annex I => removal	03/2022–02/2023	03/2023–02/2024

Table 5. Argentina–EU trade in groundnuts (EUR million)

Trade	2019	2021	2022	03/2022–02/2023	2023	03/2023–02/2024
Argentina exports to EU	238	457	545	556	535	521
Argentina total exports	387	701	760	773	754	723
EU total imports	669	671	865	863	924	961

Source: Eurostat, and National Institute of Statistics and Census Argentina

Table 6. Argentina – Shift-share analysis for groundnuts

Statistic	Scenario 1 2019–2023		Scenario 2 2019–2021		Scenario 3 2021–2023		Scenario 4 03/2022–03/2023	
	EUR million	%	EUR million	%	EUR million	%	EUR million	%
National growth effect	225.7	76.0	193.1	88.2	38.5	43.7	–36.0	102.8
Industry mix effect	90.7	30.5	0.7	0.3	132.1	150.1	63.1	–180.4
Competitiveness effect	–19.4	–6.5	25.2	11.5	–82.6	–93.9	–62.2	177.6
Total change	297		219		88		–35	

Scenario 1 (2019–2023), overview: Argentine groundnut exports to the EU are slightly underperforming relative to overall national export growth and EU groundnut import market growth. Despite overall growth in total exports and EU imports, the specific competitive position of Argentine groundnut exports to the EU has slightly weakened. While shift-share analysis cannot determine causality of trade changes, factors that would typically explain the loss of competitiveness include increased competition from other countries' exports, changes in market dynamics, or market entry difficulties (such as trade barriers).

Scenario 2 (2019–2021), addition to Annex II: in this period there was a stronger national growth effect, reflecting overall growth in Argentine groundnut exports, and suggesting national level improvements in export capacity. For the industry mix effect (0.3%), the EU market for imported groundnuts was essentially static during this period, with minimal market growth opportunities. In terms of competitiveness, Argentine exporters slightly outperformed market expectations, with modest improvements in market positioning.

Scenario 3 (2021–2022), move from Annex II to Annex I: during this period, EU imports from Argentina were no longer subject to certification and testing requirements prior to shipping. While there was moderate growth in overall Argentine groundnut exports, there was also very strong growth in the EU import market (150%), with expanding opportunities in the EU market. However, Argentine exports to the EU under-performed market expectations by 28.9% with a substantial loss of competitiveness, suggesting that Argentine exporters struggled to maintain their market position.

Scenario 4 (March 2022–February 2023 to March 2023–February 2024), removal of increased controls: during this period, there was a 6.5% decline in Argentinian exports and positive growth in EU import markets (11.4%). While exports to the EU marginally outperformed relative to total exports, there were significant competitive challenges for Argentine exports to the EU.

Over the period 2019 to 2023, Argentine groundnut exports to the EU faced three major changes in a relatively short period – initiation of additional controls, removal of national certification and testing requirements (moving from Annex II to Annex I), and removal of increased controls. It is not known how rapidly the Argentinian groundnut sector and traders were able to respond to these changing regulatory requirements. If adjustment was immediate, and competitor countries were not affected by changing requirements for their exports, then scenario 2 would have been expected to see a loss in competitiveness, and scenario 3 gains in competitiveness. In fact, the opposite was observed. This suggests that there is a longer response lag, or that other factors may explain trade performance.

The 2022/23 harvest was significantly affected by droughts, particularly in Córdoba, the main groundnut-producing region. This led to a 35% decrease in production, which in turn reduced export volumes and led to an increase of 30% in world groundnut prices. The 2023/24 harvest showed a recovery, with a 70% increase from the previous year, reaching 1.6 million tons, boosting export capabilities.

There was a strong competitiveness gain in scenario 4 when all additional control requirements were removed. In 2023, there was a notable increase in demand for groundnuts from the EU. Argentine exports to the EU increased, overtaking China as the third largest export market – that is, Argentine exports reoriented partially towards the EU at the same time as increased control restrictions were removed.

China

EU imports of groundnuts from China were added to Annex II in Regulation 2019/1793 with a control frequency of 20%. In 2021, they were moved to Annex I, with a control frequency of 10%. This meant that for trade from 2022, pre-export controls and certifications were no longer required for EU entry.

Table 7. China–EU trade in groundnuts (EUR million)

Trade	2017–2019 (average)[9]	2019	2021	2023
China's exports to EU	32	24	15	19
China's total exports	222	223	143	160
EU total imports	685	669	671	924

Source: Eurostat, and General Administration of Customs, People's Republic of China

[9] Date for 2017–2019 is the annual average over this period.

Table 8. China –Shift-share scenarios for groundnuts

Scenario	Event	Start	End
1	Overview	2019	2023
2	Overview (smoothed base period)	2017–2019	2023
3	Added to Annex II	2019	2021
4	Annex II => Annex I	2021	2023

Table 9. China – Shift-share analysis for groundnuts

Statistic	Scenario 1 2019–2023		Scenario 2 2017/19–2023		Scenario 3 2019–2021		Scenario 4 2021–2023	
	EUR million	%	EUR million	%	EUR million	%	EUR million	%
National growth effect	–6.8	135.6	–8.9	68.7	–8.6	95.7	1.8	44.6
Industry mix effect	9.1	–183.0	11.2	–85.9	0.1	–0.8	5.7	141.4
Competitiveness effect	–7.4	147.4	–15.2	117.1	–0.5	5.1	–3.4	–86.0
Total change	–5		–13		–9		4	

Between 2019 and 2023, Chinese exports of groundnuts fell by 28%, including a 21% reduction in exports to the EU. Using the annual average of 2017–2019 as the base period (scenario 2), the same decline in total Chinese exports was recorded; however, the decline in exports to the EU was steeper (–41%). This suggests that the 2017–2019 period covers the peak performance of Chinese groundnuts to the EU. This is also the period when sufficient risk with aflatoxins in Chinese groundnuts was recorded at EU borders for the product to be added to Annex II controls.

At the same time (2019–2023), the EU's total imports of groundnuts increased by 38%. The negative competitiveness performance suggests that Chinese exports declined by a faster rate than would have been expected. These results suggest that additional factors were creating a competitive challenge for Chinese access to EU markets. This conclusion is reinforced by changing the base period to the average of 2017–2019.

Assessing the period 2021–2023 (scenario 4) captures when EU imports of groundnuts were moved from Annex II to Annex I due to reduced risks of aflatoxin contamination. While there was moderate growth in Chinese exports and an expansion in EU demand, the competitiveness decline was less than in scenarios 2 and 3, suggesting that the challenges in maintaining China's competitive position on EU import markets were reduced, but still present. Chinese exports to the EU outperformed the expected level based on growth of national exports during this period. Therefore Chinese groundnut exports were not fully capitalising on EU market growth, underperforming expectations by 8%.

Nicaragua

EU imports of groundnuts from Nicaragua are not covered by increased controls under the Regulation, whereas all the main suppliers faced increased controls at some point between 2019 and 2023.

Table 10. Nicaragua–EU trade in groundnuts[10] (EUR million)

Trade	2015	2016	2017	2018	2019	2020	2021	2022	2023
Nicaraguan exports to EU	8	4	11	10	11	12	14	25	42
Nicaraguan total exports	89	70	99	96	85	78	84	103	119

Source: Ministry of Development, Industry and Commerce Nicaragua

Table 11. Nicaragua–EU trade in groundnuts (EUR million)

Trade	2017–2019 average	2023
Nicaraguan exports to EU	11	42
Nicaraguan total exports	93	119
EU total imports	685	924

Source: Ministry of Development, Industry and Commerce Nicaragua

Table 12. Nicaragua – Shift-share analysis for groundnuts

Statistic	**Overview 2019–2023**	
	EUR million	**%**
National growth effect	3.1	9.9
Industry mix effect	3.8	12.4
Competitiveness effect	24.1	77.7
Total change	31	

While both the growth of Nicaraguan world exports of groundnuts and growth of EU demand created an opportunity to expand EU exports, there was an exceptional gain in market competitiveness in the EU, meaning a substantial expansion in market share for Nicaraguan groundnuts.

Discussion

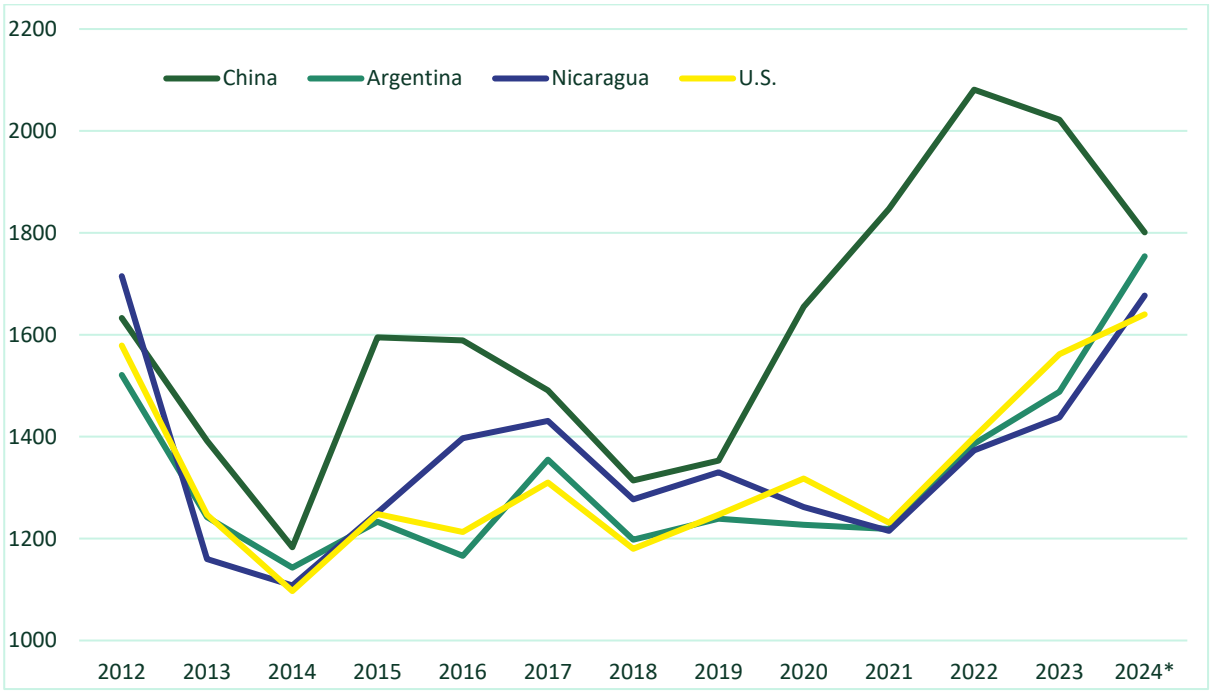
It is interesting to note that Nicaragua's ability to export groundnuts without increased controls coincided with both the development of Nicaragua's overall exports and EU demand increasing, coupled with an impressive gain in competitiveness on EU markets. In contrast, both Argentina and China lost market competitiveness in the EU during a time when there was considerable change in control requirements for

[10] Groundnuts defined as CN 1204, including shelled and unshelled groundnuts.

both countries' exporters. Furthermore, while both countries' groundnut exports to the EU recovered from additional disruption, they did not regain their share of EU markets following the removal of increased controls. A reversion to the mean may occur over a longer time frame, or 'lower quality' produce may be deterred from EU markets. The second argument suggests that Regulation 2019/1793 has helped to protect EU consumers from aflatoxin contamination, and that even larger exporters have had their export flows impacted. Closer inspection of the ability of the industry in non-EU countries to respond to aflatoxin contamination risk would shed more light on this argument.

As a bulk commodity, groundnut price differences can have an important impact on trade volumes. A review of EU import unit values reveals that Chinese groundnuts have not always been price competitive with other major suppliers (2015–2016 and 2020–2023). It should also be noted that the spread between Argentine and US unit values rose to a record level in the first 9 months of 2024 (EUR 92/tonne), therefore the decline in Argentina's EU market competitiveness and performance in Argentina's scenario 4 may have been due to higher prices, whereas in the previous decade the Argentine/US price spread at EU entry was less than EUR 20/t in most years. This does not take into account quality, consumer preference, regulatory status (such as Annex I or II requirements), risk, or seasonality factors.

Figure 1. EU groundnut import unit values (EUR/tonne)



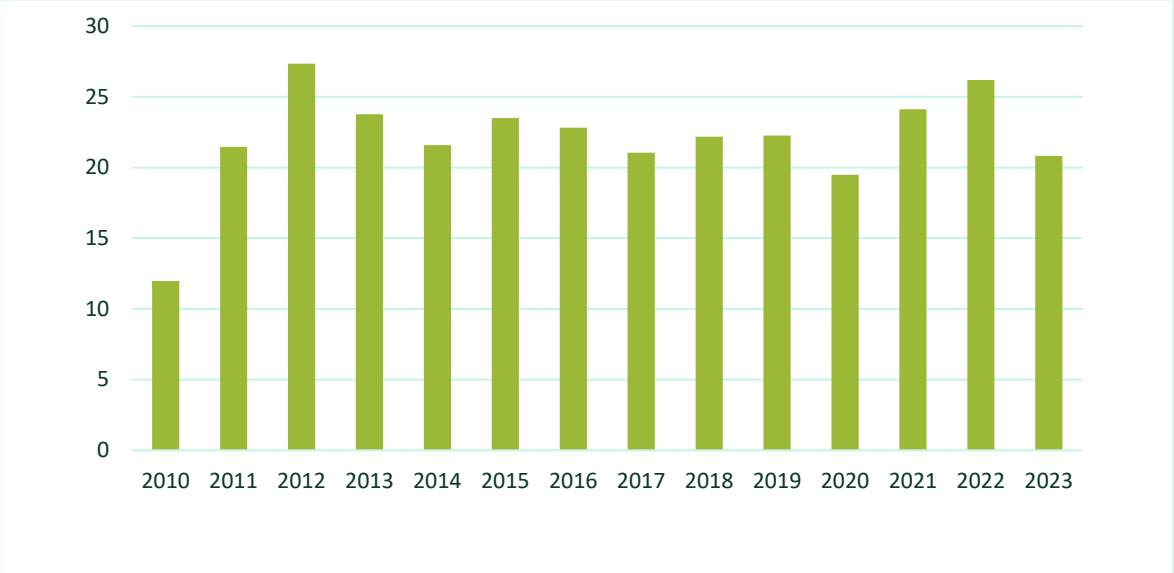
Source: Eurostat

4.2. Beans – Kenya

Fresh beans from Kenya (CN 0708 2000) are an important export product for the country. Over 90% of Kenyan fresh beans are exported to either the EU or the UK, both of which operate very similar increased controls legislation. The remaining exports are to the United Arab Emirates (UAE). Almost all of the trade is transported by air freight for rapid dispatch to supermarkets across Europe.

From 2010 to 2013, Kenyan bean exports to the EU-27 grew rapidly from EUR 12 million in 2010 to EUR 27 million in 2012. Kenya continued to record bean export values near or over EUR 20 million for the rest of the decade.

Figure 2. Kenya – Fresh beans exports to the EU-27 (EUR million)



Source: Kenya National Bureau of Statistics

Table 13. Kenya–EU trade in fresh beans (EUR million)

Trade	2010	2012	2014	2018	2023
Kenyan exports to EU	12.0	27.3	21.6	22.2	20.8
Kenyan total exports	42.8	91.0	58.4	35.4	31.8
EU total imports	361	371	476	565	567

Kenyan beans were first subject to 10% increased controls in **January 2013** due to pesticide residue concerns in Regulation 669/2009, the predecessor to Regulation 2019/1793. They were removed from the list in July 2015 before being added again in **January 2019**, with an increased control frequency of 5%. In Regulation 2019/1793, the 5% increased controls was maintained in Annex I, subsequently increased to 10% in **May 2020**.

Table 14. Kenya – Shift-share scenarios for fresh beans

Scenario	Event	Start	End
1	5% increased controls introduced in 2019, 10% from 2020 onwards	2018	2023
2	Controls introduced 2013, 5% in 2013 and 2014	2012	2014
3	Increased controls removed in 2015, no restrictions in force by end 2018	2014	2018
4	Controls introduced 2013 (5%), overview to 2023	2012	2023

Table 15. Kenya – Shift-share analysis for fresh beans

	Scenario 1 2018–2023		Scenario 2 2012–2014		Scenario 3 2014–2018		Scenario 4 2012–2023	
	EUR million	%	EUR million	%	EUR million	%	EUR million	%
National growth effect	–2.3	161.3	–9.8	171.6	–8.5	–1,417.8	–17.8	273.2
Industry mix effect	–7.1	508.0	7.7	–135.6	4.0	673.1	14.4	–221.9
Competitiveness effect	8.0	–569.2	–3.6	64.0	5.1	844.7	–3.2	48.7
Total change	–1.4		–5.7		0.6		–6.5	

In scenario 1 (2018–2023), Kenyan beans faced no increased controls in the base period, with 5% increased controls introduced in 2019, expanded to 10% from 2020 onwards. Both Kenyan total bean exports and exports to the EU declined by 6% and 10%, respectively, over this period, while EU imports rose marginally by 0.3%. Kenyan beans gained competitiveness in EU import markets following strongly negative national growth effects and industry mix effects. While exports to the EU fell, the decline would have been expected to be greater.

Scenario 2 (2012–2014) captures the initial introduction of controls in 2013, so that the base period was free from increased controls, while in 2013 and 2014 there were 5% increased controls for Kenyan beans entering the EU. There was a substantial decline in total Kenyan bean exports to the EU-27 during this period of –36% and –20%. The national growth effect was strongly positive as exports to the EU outperformed overall exports. However, the industry mix effect was negative, with Kenya failing to gain from the expansion of the EU market, resulting in a decline in competitiveness on EU markets. Therefore the introduction of increased controls on Kenyan beans was reflected in a substantial decline in exports to the EU, and a failure to take advantage of expanding EU demand and a loss of market competitiveness.

In scenario 3 (2014–2018), the increased control requirements in force in the base period were removed in 2015, so that no restrictions were in force by the end of the period. Kenyan exports to the EU improved marginally, while total Kenyan exports continued to fall by 40%. EU import demand for beans continued to expand by 19%. The shift-share analysis for this period reflects this with a large gain in competitiveness, Kenyan exports substantially outperforming Kenyan exports in the national growth effect, offset by a failure to respond to the growth in EU demand in the industry mix effect. The removal of restrictions did not see

Kenyan exports to the EU return to their previous levels, and while they fared better in the EU than other export markets, there was an important loss of EU market share.

Scenario 4 (2012–2023) assesses the year before any restrictions were in place through to 2023, the most recent annual data available. Kenyan exports to the EU declined by 24% and total exports fell by 66%, while EU imports grew by 52%. The national growth effect was positive, with the decrease far less than expected based on the shrinking total exports.

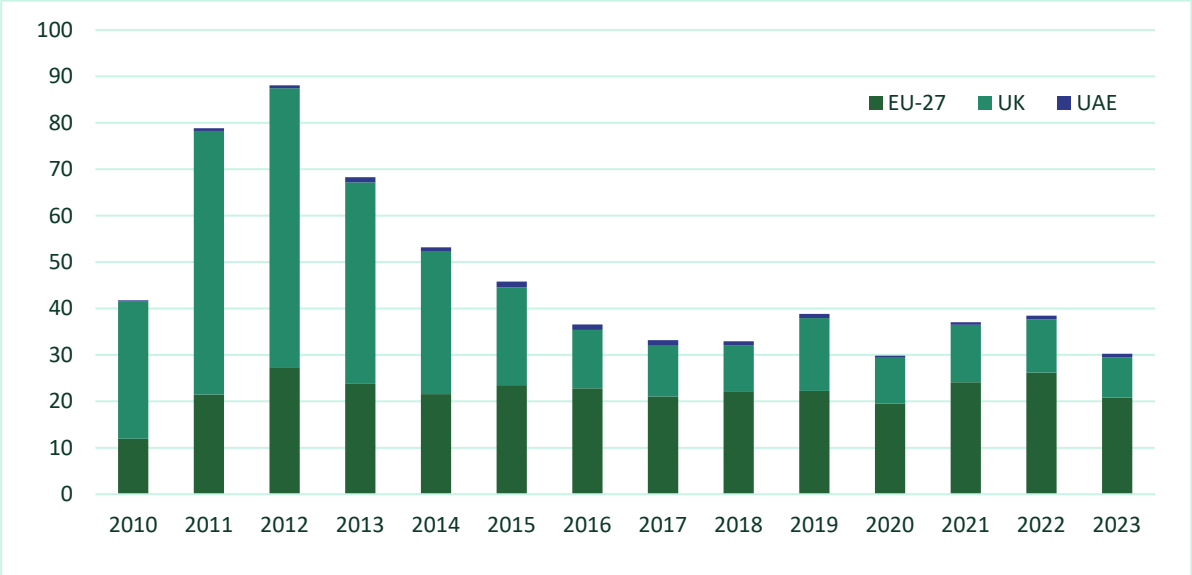
The industry mix effect would have been expected to contribute to a growth in Kenyan exports due to expanding import demand in the EU, but this metric was strongly negative, meaning a loss of EU market share. There was a small decline in competitiveness in EU markets.

Discussion

Kenyan bean exporters' experience of increased controls correlates with clear impacts on trade performance. Rapidly expanding export growth was curtailed at the time when increased controls were introduced, and total Kenyan bean exports never recovered from this. Exports of Kenyan beans to the EU showed considerable resilience compared to total Kenyan exports, implying that there was an ability to maintain market presence despite broader export challenges. However, there was a large loss in EU market share and a failure to take advantage of expanding EU demand for beans.

This combination of results is usually indicative of challenges in the national market, such as production constraints, quality/supply chain disruptions, or market access issues. Although these analyses cannot point specifically to these issues, they can however be used to inform a more detailed market analysis of the sector.

Figure 3. Kenya – Exports of fresh or chilled beans (CN 0708 20) to the EU-27, UK, and UAE (EUR millions)

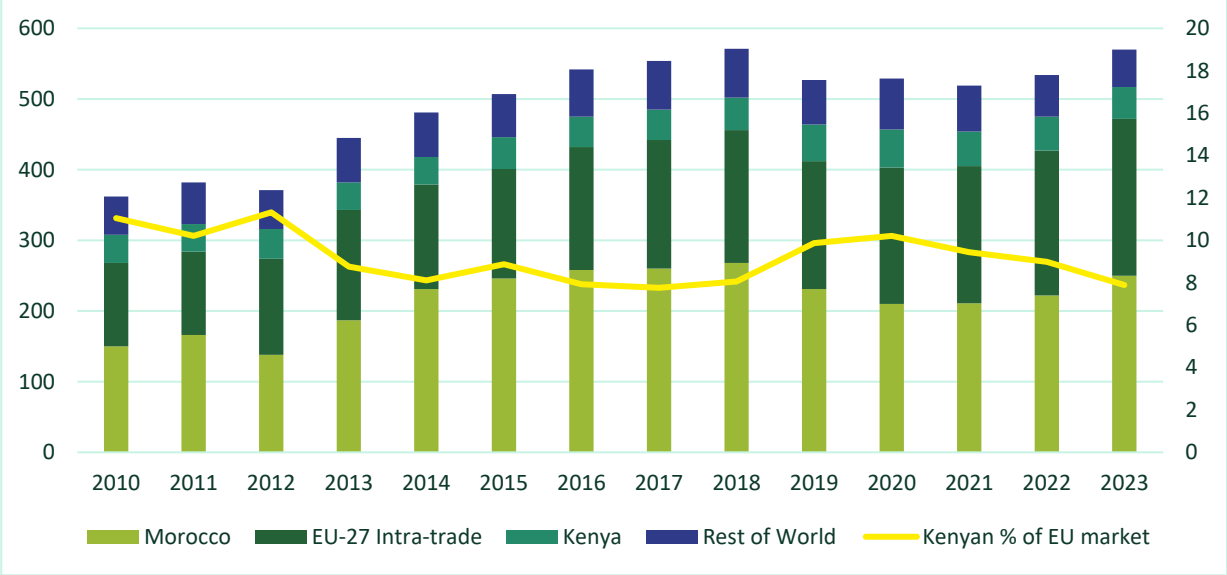


Source: Kenya National Bureau of Statistics

Kenyan fresh or chilled beans are air freighted to two main markets, EU-27 and UK, with a small market in the UAE. Expansion of exports to the EU and UK continued through the 2000s, peaking in 2012. The first increased controls were introduced in 2013.

EU-27 bean imports (including intra-EU-27 trade) expanded between 2010 and 2023, with growth of the main suppliers Morocco and internal EU trade, while imports from both Kenya and the rest of the world declined by 25% and 23%, respectively. The rest of the world saw imports from Egypt more than halve from EUR 32 million to EUR 14 million over this period, while Senegal increased from EUR 10 million in 2010 to EUR 23 million in 2023.

Figure 4. EU bean imports (EUR million) and Kenyan percentage of EU market (including intra-EU trade)



Source: Eurostat

Ninety-seven per cent of fresh and chilled beans imported into the EU come from the four countries in Table 16: Morocco, Senegal, Kenya, and Egypt. 2019 represented a high-water mark in terms of EU imports from Kenya, with 17,800 t imported. Imports declined continuously through to 2023. While extra-EU imports of beans also declined from 2021 to 2023, Kenya's share of EU imports fell from a peak of 9.6% in 2019 to 7.8% in 2023.

Table 16. EU imports of beans (0708 2000) by volume (kilotonnes)

Origin	2015	2016	2017	2018	2019	2020	2021	2022	2023
Extra-EU	178	198	184	199	186	193	199	175	162
Morocco	130	146	131	144	135	137	146	129	121
Senegal	10	11	13	15	12	16	19	19	14
Kenya	16	16	16	15	18	17	15	14	13
Egypt	17	19	18	17	13	16	12	9	10
Kenya (%)	**8.9**	**8.0**	**8.7**	**7.5**	**9.6**	**8.6**	**7.5**	**7.9**	**7.8**

Source: Eurostat.

EU import unit values reveal the price per tonne of imports. While Kenyan unit values have long been higher than their direct competitors – Egypt, Morocco, and Senegal – since 2020 there has been a much larger increase in import prices for Kenyan beans.

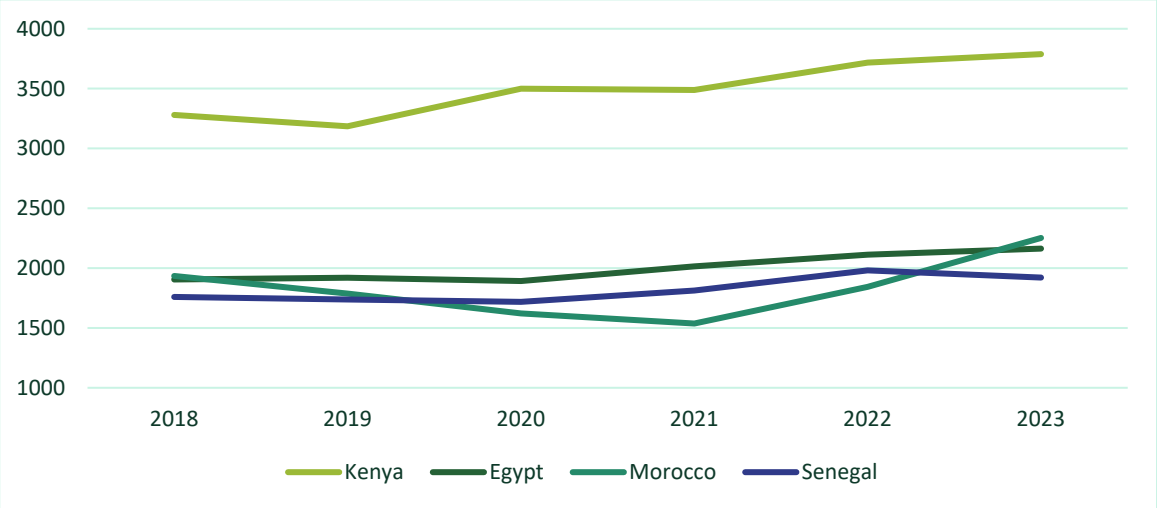
Table 17. EU imports of beans (0708 2000) by value (EUR/tonne)

Origin	2019	2020	2021	2022	2023
Kenya	3,185	3,499	3,489	3,717	3,788
Egypt	1,919	1,892	2,014	2,112	2,163
Morocco	1,787	1,621	1,537	1,843	2,252
Senegal	1,738	1,718	1,812	1,981	1,921

Note: Monthly import volumes and unit prices do not display any significant seasonality.

Source: Eurostat

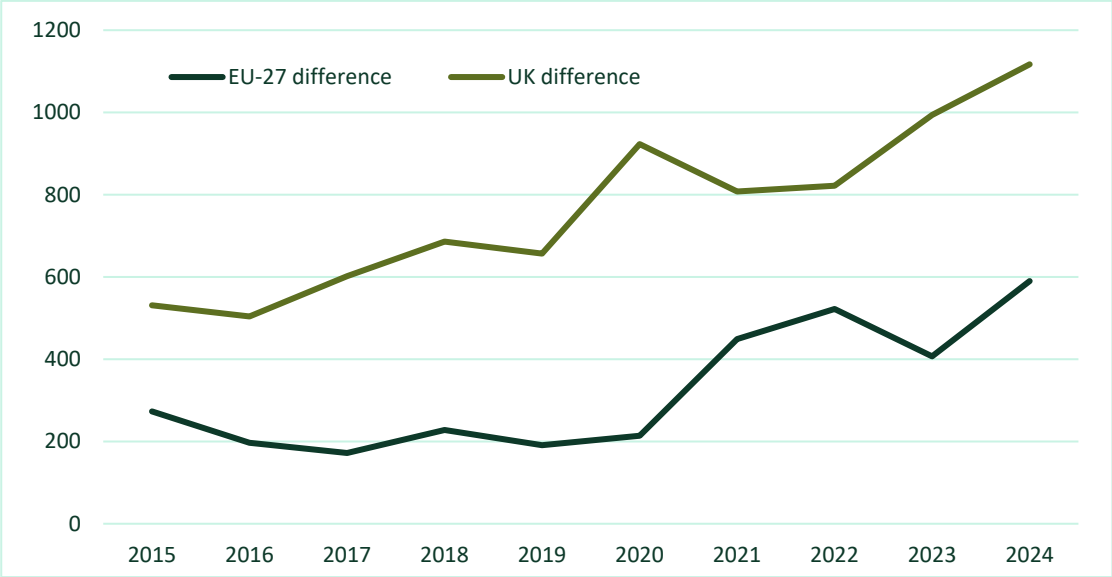
Figure 5. EU bean imports – unit values from selected countries (EUR/tonne)



Source: Eurostat

There has also been a marked increase in the difference between Kenyan export values and EU (and UK) import values.

Figure 6. Difference between EU and UK import values and Kenyan export unit values (EUR/tonne)



Source: Eurostat, UK HMRC data, and Kenya National Bureau of Statistics

The rise in Kenyan import unit values from 2019 to 2023 could be due to:

- increased production and shipping costs to the EU
- a switch from lower-value beans to the highest category of fine beans (CBI, 2022)
- increased costs of customs compliance (due to higher frequency of regulatory controls and risk of consignments being refused).

Senegalese and some Egyptian fresh beans are exported by air to the EU; however, they have not noticeably increased in price, suggesting that unless there are Kenya-specific reasons for an increase in shipping costs, freight costs are unlikely to be the main driver of the unit value and Kenya/EU price differences.

In the 2000s and into the early 2010s, Kenyan production of beans for export rapidly expanded, drawing in new producers, including small and medium-sized farmers who may have more limited rsources to the demands of EU controls.

Importers may respond by requiring high-level food safety certifications such as GLOBALG.A.P. or BRC Global Standard for Food Safety, undertaking actions with producers to raise quality and standards (for example, the UK Coop supermarket's programme with Kenyan small farmers), or diversifying to other origins.

Kenya's unique agronomic characteristics and experienced bean producers mean that the country can produce the highest quality fresh/chilled beans, unmatched by skilled producers in Egypt, Morocco, and Senegal. However, in other price and quality segments of the fresh bean market, these three countries are all competitive (CBI, 2022).

It is therefore likely that larger-scale Kenyan producers have been able to respond to the challenges of increased controls by increasing quality controls and certifications, while this is more challenging for small- and medium-sized producers (Q-Point, 2025).

While it is not possible to attribute any of these changes directly to the increased controls requirements, they are likely to have influenced the environment where smaller-scale Kenyan producers have ceased to produce. Almost all fresh beans produced in Kenya are exported, there is only a limited domestic market, and no other export markets have been developed outside the EU, UK (which has similar increased control requirements to the EU), and a small market in UAE. Larger-scale producers have been better placed to undertake efforts to continue to develop higher quality bean exports. The increased unit values are likely to reflect an increasing proportion of higher quality beans in exports, as lower quality beans are replaced in EU and British supermarkets with production from Morocco and Senegal.

Higher-quality beans also entail elements of services to customers, such as higher quality or food safety standards, product availability requirements over time, and packing standards. Larger-scale producers are better positioned to be able to respond to these challenges.

4.3. Hazelnuts – Türkiye, Georgia, Azerbaijan

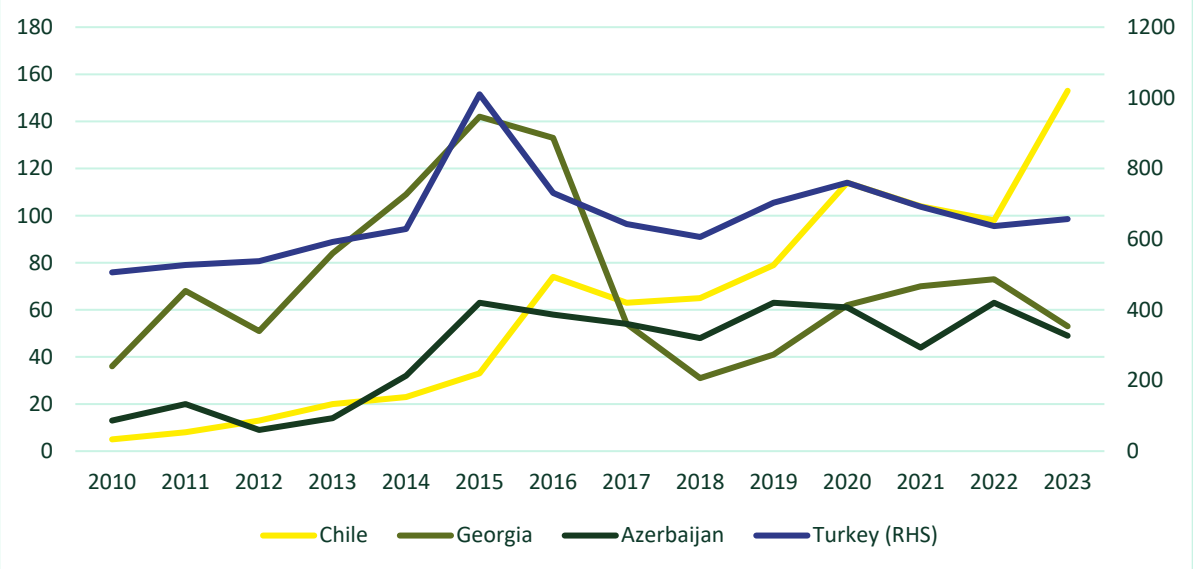
Between 2009 and 2018, 65% of global hazelnut production was in Türkiye, with a further 4% in Azerbaijan and 3% in Georgia. In 2023, the EU-27 imported EUR 945 million of hazelnuts (shelled and unshelled), of which 70% came from Türkiye, 6% from Georgia, and a further 5% from Azerbaijan. Since 2019, EU imports from Chile have doubled in value, reaching EUR 153 million in 2023.

EU imports of hazelnuts from Türkiye, Georgia, and Azerbaijan have faced increased controls due to aflatoxin risks (Table 18).

Table 18. Hazelnuts – Changes to Annexes I and II

Origin	Pre-2019	Regulation 2019/1975	2021	2022	2024
Türkiye		Annex II: 5%	Moved from Annex II to Annex I, 5% controls	Removed	
Georgia	Annex I of Regulation 669/2009, 20% (aflatoxins), raised to 50% in 2019	Annex I: 50%	Lowered to 20% (November)	Raised to 30% (July)	Reduced to 20% (July)
Azerbaijan		Annex I: 20%, then Annex II: 20%		Moved from Annex II to Annex I, 20%	

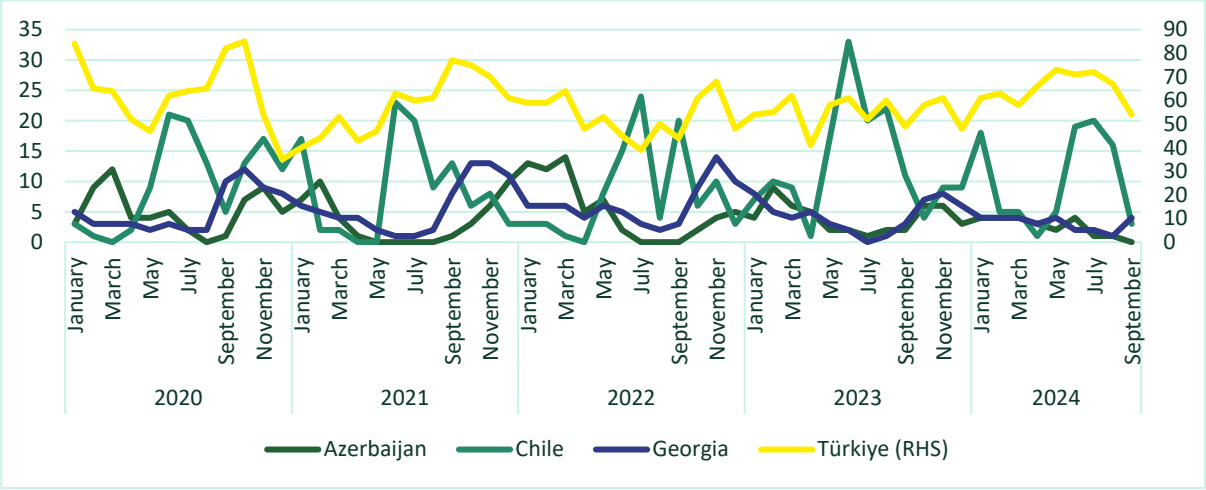
Figure 7. EU imports of hazelnuts, selected countries (EUR million)



Source: Eurostat.

Notes: Türkiye is graphed to the right-hand axis. Hazelnuts includes shelled and unshelled hazelnuts (CN 0802 21 and 0802 22).

Figure 8. EU imports of hazelnuts (EUR million)



Notes: These four countries account for 100% of extra-EU-27 hazelnut imports. Türkiye is graphed to the right-hand axis.

Table 19. Türkiye–EU trade in hazelnuts (EUR millions)

Trade	Base year	End year	Base year	End year	Base year	End year
	2015	2023	2018	2023	2020	2023
Turkish exports to EU	1,057	669	535	669	671	669
Turkish total exports	1,479	918	790	918	918	918
EU total imports	1,264	945	755	945	1,005	945

Table 20. Türkiye – Shift-share analysis for hazelnuts

Statistic	Scenario 1 2015–2023		Scenario 2 2018–2023		Scenario 3 2020–2023	
	EUR million	%	EUR million	%	EUR million	%
National growth effect	–400.9	103.3	86.7	64.7	0.0	0.0
Industry mix effect	–266.8	68.8	134.6	100.5	–40.1	2003.0
Competitiveness effect	279.7	–72.1	–87.3	–65.2	38.1	–1903.0
Total	–388		134		–2	

Table 21. Georgia–EU trade in hazelnuts (EUR millions)

Trade	Base year	End year	Base year	End year	Base year	End year
	2015	2023	2018	2023	2020	2023
Georgian exports to EU	129	46	30	46	61	46
Georgian total exports	157	75	47	75	75	75
EU total imports	1,264	945	755	945	1,005	945

Table 22. Georga – Shift-share analysis for hazelnuts

Statistic	Scenario 1 2015–2023		Scenario 2 2018–2023		Scenario 3 2020–2023	
	EUR million	%	EUR million	%	EUR million	%
National growth effect	–67.4	81.2	17.9	111.7	0.0	0.0
Industry mix effect	–32.6	39.2	7.5	47.2	–3.6	24.3
Competitiveness effect	16.9	–20.4	–9.4	–58.9	–11.4	75.7
Total	–83		16		–15	

Table 23. Azerbaijan–EU trade in hazelnuts

Trade	Base year	End year	Base year	End year	Base year	End year
	2015	2023	2018	2023	2020	2023
Azerbaijan exports to EU	63	49	48	49	61	49
Azerbaijan total exports	82	120	93	120	111	120
EU total imports	1,264	945	755	945	1,005	945

Table 24. Azerbaijan – Shift-share analysis for hazelnuts

Statistic	Scenario 1 2015–2023		Scenario 2 2018–2023		Scenario 3 2020–2023	
	EUR million	%	EUR million	%	EUR million	%
National growth effect	29.2	–208.5	13.9	1,393.5	4.9	–41.2
Industry mix effect	–15.9	113.6	12.1	1,207.9	–3.6	30.3
Competitiveness effect	–27.3	195.0	–25.0	–2,501.5	–13.3	110.9
Total	–14		1		–12	

Due to Türkiye's dominant position in world hazelnut production and trade, as well as the importance of Turkish exports for the EU market, the shift-share analysis does not reveal any major changes. Given that EU importers are reliant on Turkish hazelnuts and that there are limited other available suppliers, this is perhaps unsurprising.

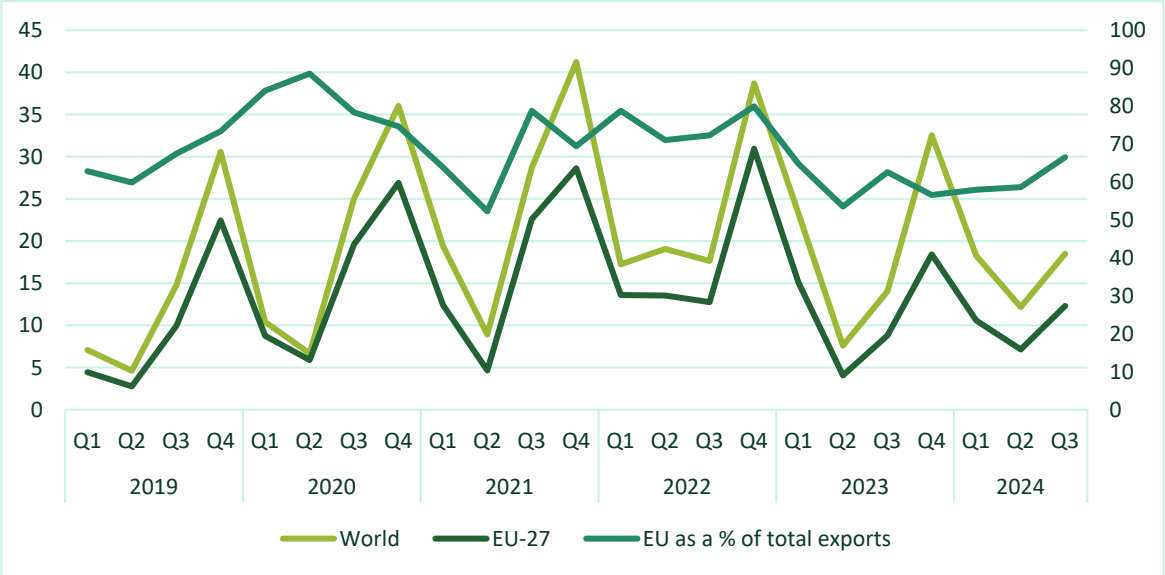
In 2014 and 2015, Georgian exports of hazelnuts to the EU rapidly expanded in light of the EU–Georgia deep and comprehensive Free Trade Agreement. However, from 2016 Georgian production and exports were heavily impacted by the brown marmorated stink bug (OECD, 2020), which reduces yields by up to 30%.

EU imports of hazelnuts from Georgia were initially placed in Annex I of Regulation 669/2009 with a control frequency of 20%, due to aflatoxin risks. This level was raised to 50% in July 2019, and continued in Regulation 2019/1973. The control frequency was lowered to 20% in November 2022, raised to 30% in July 2022, and reduced to 20% again in July 2024.

In February 2024, the National Food Agency of Georgia reported that the European Commission had positively assessed the state system for controlling the presence of aflatoxins (Agenda.ge, 2024).

For Georgia, the shift-share analysis results are sensitive to the choice of base year due to varying production and hence export levels, while increased controls were maintained from 2019 to 2024, albeit at varying control frequencies.

Figure 9. Georgia – exports of hazelnuts (EUR million) and percentage of exports to the EU (right-hand side)

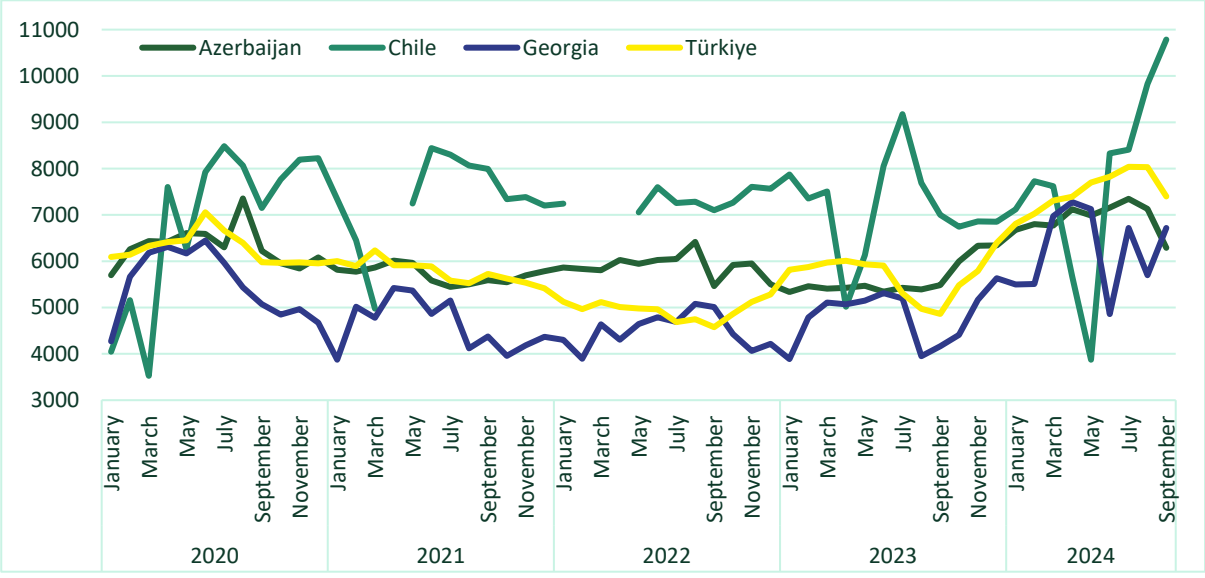


Notes: CN 0802 21 and 0802 22, unshelled and shelled hazelnuts respectively. Between 2019 and 2024, 87% of Georgian exports were shelled.

Azerbaijan moved from Annex I to Annex II in 2020 and back again in 2022. In scenario 3 (2020–2023), despite overall growth in hazelnut exports, there was a loss of competitiveness in EU markets, as seen in the declining share of exports to the EU.

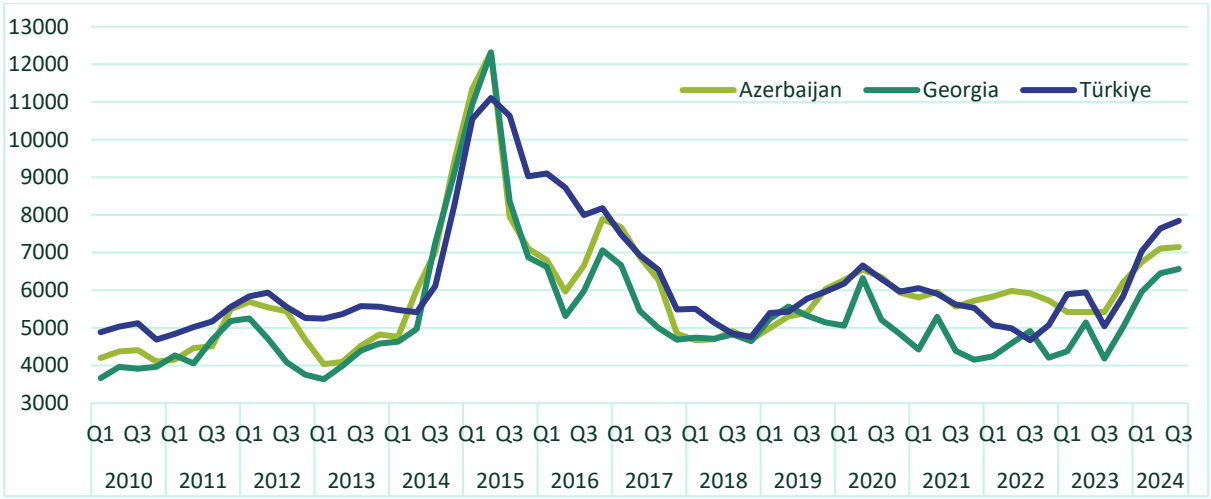
There is no clear correlation between changes to the increased controls required for this product from the three countries and their relative unit prices (Figures 10 and 11).

Figure 10. EU import unit values, hazelnuts (EUR million), monthly



Source: Eurostat

Figure 11. EU import unit values, hazelnuts (EUR million), quarterly



Source: Eurostat

4.4. Dragon fruit – Vietnam

Dragon fruit from Vietnam (ex. 0810 9020) were placed in Annex II of Regulation 2019/1973 due to concerns over pesticide residues. The control frequency was 10%. Regulation 2021/2246 increased the inspection rate to 20% from 6 January 2022. This was subsequently increased to 30% on 2 July 2024. In 2017, Vietnamese exports of dragon fruit in all forms exceeded USD 1 billion for the first time, and maintained this until 2021, when competition from domestically grown fruit in China, its main export market, reduced export revenues.

Dragon fruit (pitahaya) is relatively easy to grow, supporting limited rainfall (down to 500 mm/year) and low quality soils (Wakchaure *et al*., 2021). The plant is native to southern Mexico, and production has expanded to China, Vietnam, India, and Thailand, as well as other Latin American countries. It is also produced in Spain. The largest producer is Vietnam, 1.07 million tonnes in 2017, followed by China, 0.7 million tonnes. In 2017, roughly half of Vietnamese production was exported. China is the largest importer.

In 2023, increased Chinese production led to a sharp decline in import volumes, in both volume and value terms (–50% and –43%, respectively) (Table 25). All Chinese imports of dragon fruit were from Vietnam. Prices in China were also reported to have halved (Jing Zang, 2023).

Table 25. Vietnam dragon fruit exports (EUR millions)

Destination	2019	2020	2021	2022	2023
Global	751	823	720	452	311
China	717	794	693	428	282
EU	6	5	8	7	7
Rest of world	27	24	19	17	21

Source: Vietnam customs office

With no exclusive CN code for dragon fruit trade in the EU, data are compiled from the export statistics of the main exporters, where available (Table 26). This data serves as a proxy for EU imports, at least in terms of trends if not absolute levels.

Table 26. Selected dragon fruit exporters to the EU (EUR millions)

Exporting country	2019	2020	2021	2022	2023
Vietnam	6.2	4.7	8.3	7.0	7.4
Thailand	0.5	0.1	0.1	0.6	1.0
Indonesia	0.1	0.1	0.1	0.0	0.1
Andes group	2.8	1.2	4.5	5.7	11.5
Total	9.6	6.2	13.0	13.3	20.0

The Andes group includes Colombia, Peru, and Ecuador, with most exports coming from Ecuador.

Source: Vietnam customs office, Thai customs department, Statistics Indonesia, Central Bank of Ecuador, National tax and customs directorate of Colombia and the national Peruvian superintendency of tax administration.

The shift-share analysis (Table 27) is heavily influenced by the collapse in exports to China. Exports to the EU increased by 20% from 2019 to 2023, despite the introduction of Annex II measures, and the increasing frequency of controls in 2022 and 2024.

Table 27. Vietnam – Shift-share analysis for dragon fruit

Statistic	2015–2023
	EUR million
National growth effect	–387.2
Industry mix effect	668.9
Competitiveness effect	–280.5
Total change	1.2

However, between 2019 and 2023, EU dragon fruit imports doubled from EUR 9.6 million to 20.0 million (Table 28). The increased EU market would have been expected to double Vietnamese exports to the EU, whereas they only increased by 20%. This suggests a significant loss of competitiveness on EU markets.

Table 28. Vietnam–EU trade in dragon fruit (EUR millions)

Trade	Base year	End year
	2015	2023
Vietnamese exports to EU	6.2	7.4
Vietnamese total exports	751	282
EU total imports	9.6	20.0

Source: Vietnam customs office and Eurostat

Discussion

While there is no causality in the explanation, Vietnam has been unable to take advantage of a major growth of the EU dragon fruit market, which is surprising given that it was the leading supplier to the EU until 2023, and that there has been a substantial exportable surplus in Vietnam with falling prices since 2022.

Based on discussions with supermarket buyers in the UK, purchasers have looked to diversify their sources of dragon fruit, with a major supermarket switching from Vietnam alone to Ecuador, Mexico, Thailand, and Vietnam[11]. The Vietnamese dragon fruit they continue to purchase are understood to be from food safety-certified suppliers.

These factors suggest that Vietnam has not been able to fully benefit from the growth of EU markets, despite higher export unit values (see Table 29). The increased control requirements – or perhaps more correctly, the risk that Vietnamese dragon fruit may have excessive pesticide residues – is likely to be a contributing issue to this.

[11] Discussions with UK major supermarket purchasers and fruit importers, October 2024.

Table 29. Vietnam export unit values (EUR/kg)

Destination	2019	2020	2021	2022	2023
World	0.55	0.57	0.55	0.57	0.37
China	0.54	0.56	0.53	0.55	0.34
EU	2.01	4.56	6.09	4.87	3.52
Rest of world	0.81	1.00	1.29	1.22	1.37

Source: Vietnam customs office and author's calculation

It would be interesting to further this analysis by assessing the supply characteristics and logistics capacity of the dragon fruit sector in Vietnam. For example, Thailand has developed an export market in the USA for higher value-added dragon fruit products, such as frozen dragon fruit juices, shipped in small package sizes that can easily be distributed to customers. This also negates the need to rely on air freight, reducing shipping costs.

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ANNEX: SHIFT-SHARE METHODOLOGY

In the shift-share analysis in this report, a product's share in exports to the EU is measured in a base period both for the product and for the comparison group (total exports of the product from the country, or EU imports from all countries of the product) (Equation 1).

$$S_{c,i,t} = \frac{Q_{c,i,t}}{\sum_i Q_{c,i,t}} \quad (1)$$

The growth rate over the sample period is calculated (Equation 2).

$$G_{c,i,t+1} = \left(\frac{Q_{c,i,t+1} - Q_{c,i,t}}{\sum_i Q_{c,i,t}}\right) \quad (2)$$

Where *S* is the product's share of total, *G* is the product's growth, and *c* is the comparator.

The evolution of exports can be split into three parts.

Firstly, the net shift effect (or *national growth effect*) (Equation 3) indicates the impact of structural shifts due to the country's overall export of the product, with a positive result indicating a shift towards higher growth products.

$$NSE_{c,i} = \sum_i \left(S_{o,i,t}\left(G_{c,i,t+1} - G_{o,i,t+1}\right)\right) \quad (3)$$

Secondly, the intra-sectoral effect (or *industry mix effect*) shows the impact of growth rate differences between EU imports of the product from the focus country and total EU imports of the product, with a positive effect indicating faster growth for the focus country's product (Equation 4).

$$ISE_{c,i} = \sum_i \left(G_{o,i,t+1}\left(S_{c,i,t} - S_{o,i,t}\right)\right) \quad (4)$$

Thirdly, the interaction effect (or *competitiveness effect*) measures the joint effect of differences due to sectoral division and sectoral growth rates (Equation 5). This can be interpreted as the covariance between the sectoral division of a product's growth rate to the EU and to world markets.

$$I_{c,i} = \sum_i \left(G_{c,i,t+1} - G_{o,i,t}\right)\left(S_{c,i,t} - S_{o,i,t}\right)\right) \quad (5)$$

The three elements can be combined to give the relative performance of the sector.

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