

ESRI
SURVEY AND
STATISTICAL
REPORT SERIES
NUMBER 117
July 2023

STRUCTURE OF INTERNATIONAL GOODS TRADE FOR IRELAND AND NORTHERN IRELAND

Janez Kren and Martina Lawness



STRUCTURE OF INTERNATIONAL GOODS TRADE FOR IRELAND AND NORTHERN IRELAND

Janez Kren

Martina Lawless

May 2023

ESRI SURVEY AND STATISTICAL REPORT SERIES

NUMBER 117

Available to download from www.esri.ie

© The Economic and Social Research Institute
Whitaker Square, Sir John Rogerson's Quay, Dublin 2

<https://doi.org/10.26504/sustat117>



This Open Access work is licensed under a Creative Commons Attribution 4.0 International License (<https://creativecommons.org/licenses/by/4.0/>), which permits unrestricted use, distribution and reproduction in any medium, provided the original work is properly credited.

ABOUT THE ESRI

The Economic and Social Research Institute (ESRI) is an independent research institute working towards a vision of '**Informed policy for a better Ireland**'. The ESRI seeks to support sustainable economic growth and social progress in Ireland by providing a robust knowledge base capable of providing effective solutions to public policy challenges.

The Institute was founded in 1960 by a group of senior civil servants, led by Dr T.K. Whitaker, who identified the need for independent and in-depth research to support the policymaking process in Ireland. Since then, the Institute has remained committed to independent research and its work is free of any expressed ideology or political position. The Institute publishes all research reaching the appropriate academic standard, irrespective of its findings or who funds the research.

The ESRI brings together leading experts from a variety of disciplines who work together to break new ground across a number of research initiatives. The expertise of its researchers is recognised in public life and researchers are represented on the boards and advisory committees of several national and international organisations.

ESRI researchers uphold the highest academic standards. The quality of the Institute's research output is guaranteed by a rigorous peer review process. Research is published only when it meets the required standards and practices. Research quality has also been assessed as part of two peer reviews of the Institute, in 2010 and 2016.

ESRI research findings are disseminated widely in books, journal articles and reports. Reports published by the ESRI are available to download, free of charge, from its website. ESRI staff members communicate research findings at regular conferences and seminars, which provide a platform for representatives from government, civil society and academia to discuss key findings from recently published studies and ongoing research.

The ESRI is a company limited by guarantee, answerable to its members and governed by a Council, comprising a minimum of 11 members and a maximum of 14 members, who represent a cross-section of ESRI members: academia, civil service, state agencies, businesses and civil society.

THE AUTHORS

Martina Lawless is a Research Professor at the Economic and Social Research Institute (ESRI) and an Adjunct Professor at Trinity College Dublin (TCD). Janez Kren is a post-doctoral research fellow at the ESRI and an Adjunct Associate Professor at TCD.

ACKNOWLEDGEMENTS

This research was carried out as part of Economic and Social Opportunities from Increased Cooperation on the Shared Island, a joint research programme on the all-island economy between the ESRI and Ibec. We would like to thank Fergal O'Brien, Michael D'Arcy, Nola Hewitt-Dundas, Alan Bridle, Adele Bergin and Seamus McGuinness for their helpful comments and discussion.

This report has been accepted for publication by the Institute, which does not itself take institutional policy positions. The report has been peer reviewed prior to publication. The authors are solely responsible for the content and the views expressed.

TABLE OF CONTENTS

LIST OF ABBREVIATIONS.....	iii
EXECUTIVE SUMMARY.....	vi
CHAPTER 1 Introduction.....	1
CHAPTER 2 Data sources.....	3
2.1 Data on trade flows.....	3
2.2 Additional data sources.....	6
2.3 Chapter summary.....	6
CHAPTER 3 Trade partners.....	7
3.1 Main trading partners.....	7
3.2 Distance and size in trade relationships.....	9
3.3 Gravity estimation of trade flows.....	10
3.4 Chapter summary.....	13
CHAPTER 4 Sectoral composition of trade.....	15
4.1 Sectoral shares of trade.....	15
4.2 Chapter summary.....	19
CHAPTER 5 Trade structure.....	21
5.1 Sector structure by destination.....	21
5.2 Chapter summary.....	27
CHAPTER 6 Specialisation and similarity.....	29
6.1 Concentration of trade by partner and product.....	29
6.2 Openness and range of products traded.....	33
6.3 Revealed comparative advantage.....	35
6.4 Tests of similarity of trade structure.....	36
6.5 Unit values of trade flows.....	38
6.6 Chapter summary.....	39
CHAPTER 7 Conclusions and discussion.....	41
REFERENCES.....	45
APPENDIX.....	47

LIST OF TABLES

Table 1	Top 10 destinations and origin (shares in 2021, ranked by total trade).....	8
Table 2	Results from model of Northern Ireland and Ireland trade, 2021.....	12
Table 3	Composition of total trade by broad sector, 2021 (%)	16
Table 4	Total trade by BEC sector, 2021 (%).....	17
Table 5	Bilateral trade by BEC sector, 2021.....	18
Table 6	Herfindahl–Hirschman concentration Index, 2021.....	32
Table 7	Import and export similarity index, 2021	37
Table 8	Bilateral trade similarity, 2021.....	38
Table A1	Country acronyms.....	47
Table A2	Broad sectoral categories	47
Table A3	Revealed comparative advantage by hs2 sector	48
Table A4	Top 20 HS4 products with highest Revealed comparative advantage	49

LIST OF FIGURES

Figure 1	Northern Ireland trade with EU members, data comparison, 2021.....	5
Figure 2	Ireland and Northern Ireland trade by distance, 2021	10
Figure 3	Northern Ireland imports structure, 2021	22
Figure 4	Ireland imports structure, 2021.....	23
Figure 5	Northern Ireland exports structure, 2021	25
Figure 6	Ireland Exports structure, 2021	26
Figure 7	Ireland–Great Britain trade, 2021.....	27
Figure 8	Market concentration of imports and exports, 2021	29
Figure 9	Product concentration of imports and exports, 2021	31
Figure 10	Combined partner–product concentration of imports and exports, 2021.....	32
Figure 11	Trade openness – Correlation between trade and country income level, 2021	33
Figure 12	Number of products traded by country, 2021.....	35
Figure 13	Revealed comparative advantage by broad sector and CN8, 2021.....	36
Figure 14	Median unit values, 2021.....	39

ABBREVIATIONS

BEC	Broad economic categories
CN8	Eight-digit combined nomenclature export product code
CSO	Central Statistics Office
EU	European Union
FDI	Foreign direct investment
IE	Ireland
IMF	International Monetary Fund
GB	Great Britain
GDP	Gross domestic product
HS2	Two-digit harmonised system product code
NES	Not elsewhere specified
NI	Northern Ireland
NISRA	Northern Ireland Statistics and Research Agency
OLS	Ordinary least squares
ONS	Office for National Statistics
PPML	Poisson Pseudo Maximum Likelihood
REU	Rest of the EU (EU27 excluding Ireland)
RoW	Rest of the world
UN	United Nations
UK	United Kingdom

EXECUTIVE SUMMARY

This report examines newly available data for 2021 on Northern Ireland's goods exports and imports and equivalent data for Ireland on a detailed product and market level. This allows, for the first time, the trade structures of both economies to be investigated on a consistent basis, giving new insight into both overall international trade patterns for each economy and how cross-border trade looks within this broader context.

TOTAL TRADE VALUES

- Northern Ireland reported a total of €7.6 billion in goods imports and €10.5 billion in goods exports in 2021 (excluding sales to Great Britain).
- Of these flows, approximately 35 per cent of imports (€2.6 billion) come from Ireland and 53 per cent of exports go to Ireland (€5.6 billion). Ireland has considerably higher overall total goods imports and exports, at €99.8 billion and €160.3 billion respectively in 2021.

DETERMINANTS OF TRADE

- The pattern of trade across partner countries is strongly impacted by distance and the size of the partner economy.
- We find that the 2021 levels of cross-border trade were higher than would be expected using the simple framework of distance and economic size, suggesting relatively high levels of trade integration on the island.

COMPARISON OF TRADING PARTNERS

- Sales and purchases with Great Britain account for the largest proportion of Northern Ireland's external sales while for international trade (i.e., excluding Great Britain) Northern Ireland's goods imports and exports are reasonably heavily concentrated in cross-border trade with Ireland.
- Comparing the most important trading partners, the top ten partner countries for both Ireland and Northern Ireland are dominated by the UK and EU Member States along with the United States (US), China and Switzerland.
- Ireland has a notably different ordering of trade partners, with the United States playing a dominant role in total Irish goods exports and imports.
- We find that trade concentration in a small number of partner countries is particularly high for Northern Ireland, largely coming from the substantial share of imports and exports accounted for by Ireland.

SECTORAL PATTERNS

- At a sectoral level, both Northern Ireland and, even more notably, Ireland have high concentrations of trade in the chemicals and pharmaceuticals sector. This level of concentration of trade in a single sector is sharply different to the spread of trade across the sectors in the UK and rest of the EU.
- Looking in more depth at the composition of trade, we find cross-border trade looks quite different in both directions to the aggregate trade structures of Ireland and Northern Ireland. This mainly comes about from a much greater variety of goods being traded cross-border relative to the more specialised patterns of overall trade.
- The food and beverages sector accounts for a considerably larger share of cross-border trade than it does in the overall trade structure of either country.
- Ireland's trade is the most heavily specialised in terms of products.

CHAPTER 1

Introduction

International trade is strongly linked to better overall economic performance, particularly in relatively smaller countries where the size of the domestic market may limit the ability of firms to achieve economies of scale.¹ For both Ireland and Northern Ireland, the continuing development of international markets and support for domestic firms beginning to export are core policy objectives. In addition, the importance of cross-border trade between the two economies was increasingly recognised throughout the Brexit negotiation process when the potential for substantial changes in trade relationships highlighted the degree of integration between the two economies.

Goods trade between Ireland and Northern Ireland has grown substantially since the exit of Great Britain from the EU's single market and Customs Union. Flynn et al. (2021) showed that the share of Northern Ireland in Ireland's total imports increased from 1.5 per cent to almost 5 per cent in the first six months after Brexit. The unique status of Northern Ireland with its access to both the EU and UK markets has driven this recent substantial increase in cross-border trade and has the potential to continue to feed into broader economic linkages across the island. As exporting firms have systematically better outcomes across a range of key indicators, including employment and productivity, expanding participation in exporting can make an important contribution to the broader performance of the economy (Wagner, 2019). Cross-border trade can be a stepping stone in this regard to broader export participation by firms.

While Brexit brought a new focus to cross-border trade, evidence on the broader structure of trade across international markets, including how these compare between Northern Ireland and Ireland, has been largely absent. This report examines new data on Northern Ireland's exports and imports on a detailed product and market level, which became available for 2021. As equivalent data were also already available for Ireland, the trade structures of both economies overall can be investigated, giving new insight to all-island patterns of international trade. The data also allow us to examine how the structure of cross-border trade looks relative to Ireland and Northern Ireland's trade with other trading partners. Due to data limitations, previous work on cross-border trade was restricted to looking at these flows in isolation, whereas this report places them in the broader context of aggregate trade structures.

The newly available data underpinning this report came about due to the separate reporting to Eurostat of Northern Ireland's trade to all partner countries since the beginning of 2021. Prior to this, Eurostat data were collected on the basis of the

¹ See for example Dowrick et al. (2004).

UK as a whole, with the Central Statistics Office (CSO) being the only statistical agency that distinguished in its data collection between Northern Ireland and Great Britain. However, as a result of the Northern Ireland Protocol, which has Northern Ireland retain access to the EU single market and Customs Union, data collection procedures have changed, and Northern Ireland now provides Eurostat with its own trade information at a detailed product and partner country level. This gives a great deal of more granular information on Northern Ireland's trade structure than was previously available. One limitation is important to note from the outset, however: these detailed data do not include Northern Ireland's trade with Great Britain as such internal trade data are not made publicly available.

The structure of the report is as follows. Chapter 2 introduces the new trade data for Northern Ireland and some supplementary sources used in the report. Chapter 3 looks at the patterns of trade for Ireland and Northern Ireland across their main trading partners. Chapter 4 overviews the broad sectoral structure of the trade flows. The partner and sectoral aspects of the composition of trade are then brought together in Chapter 5, which looks at variation in the sectoral structure of trade across the major trading partners and how cross-border trade in particular compares to the aggregate structure. Chapter 6 presents a range of indicators of trade specialisation and similarity of trade flows across different sets or partners. It also examines a number of aggregate indicators of trade openness and average unit values of trade flows. Chapter 7 concludes.

CHAPTER 2

Data sources

2.1 DATA ON TRADE FLOWS

The focus of this report is to document and explore the patterns of international goods trade by both Ireland and Northern Ireland across their trading partners and products. While detailed trade data for Ireland have been collected by the CSO for many years and incorporated into the wider EU data by Eurostat, data at an equivalent level of detail were not available for Northern Ireland before 2021, as any data sent by the UK to Eurostat were provided on an aggregate UK basis. This is therefore the first time a detailed study of international goods trade has been possible for the island of Ireland as a whole.

The key data source that underpins this analysis is the separate reporting of Northern Ireland goods trade to Eurostat since January 2021. Prior to this date, when the UK was a member of the EU's single market and Customs Union, data on trade flows were reported to Eurostat by the UK as a whole. As part of the Northern Ireland Protocol to the EU–UK Withdrawal Agreement, Northern Ireland retained access to the EU single market in goods and one of the obligations of that membership is the regular reporting of trade data to Eurostat. This information is collected for all members of the single market and compiled by Eurostat into a single dataset known as Comext. The Comext data contain detailed product-level information on goods imports and exports across all partner countries, which we explore in the following chapters.²

The crucial exception to the coverage of the Comext data is that the Northern Ireland data do not include trade with Great Britain, because those flows are internal UK transactions. This is an important limitation as Great Britain is the largest market for sales outside of Northern Ireland as discussed in Chapter 3. Data on trade between Northern Ireland and Great Britain are collected by HM Revenue & Customs on a comparable basis to the Comext data but, to date, these have not been made publicly available. The only information from this source is the total level of trade from Great Britain to Northern Ireland in 2021.³ The level of trade in the opposite direction, from Northern Ireland to Great Britain, is available from a firm-level survey data on the trade activity of Northern Ireland business collected by the Northern Ireland Statistics and Research Agency (NISRA).⁴ It should be noted however that the survey data may not correspond completely with the administrative trade statistics, due to differences in the methodologies used. While we use the NISRA estimate rather than leave out this important context of the

² These data can be accessed at [Focus on Comext - International trade in goods - Eurostat \(europa.eu\)](https://ec.europa.eu/eurostat/tgm/table.do?tab=table&init=1&language=en&plugin=1).

³ See: [Summary of movements of goods into Northern Ireland from Great Britain 2021 - GOV.UK \(www.gov.uk\)](https://www.gov.uk/government/statistics/summary-of-movements-of-goods-into-northern-ireland-from-great-britain-2021).

⁴ See: [Broad Economy Sales and Exports Statistics | Northern Ireland Statistics and Research Agency \(nisra.gov.uk\)](https://www.nisra.gov.uk/broad-economy-sales-and-exports-statistics).

contribution of Great Britain for Northern Ireland's external sales, we do have to apply a note of caution that the sources are quite different. With this caveat in mind, we will incorporate the information available from both sources on Northern Ireland–Great Britain trade in this report when examining patterns of aggregate goods trade.

For the chapters on granular trade composition, we rely on the data collected in Comext. Within the EU single market, these data are collected from two perspectives: the exporting country and the importing country. With Northern Ireland trade being collected separately from the UK total for the first time in 2021, the fact the data are reported twice (once by Northern Ireland and also by the EU partner country) gives us an initial check on any potential issues with the data quality. Figure 1 presents a comparison of trade values (panel A) and number of products (panel B), as reported by Northern Ireland and each partner country.

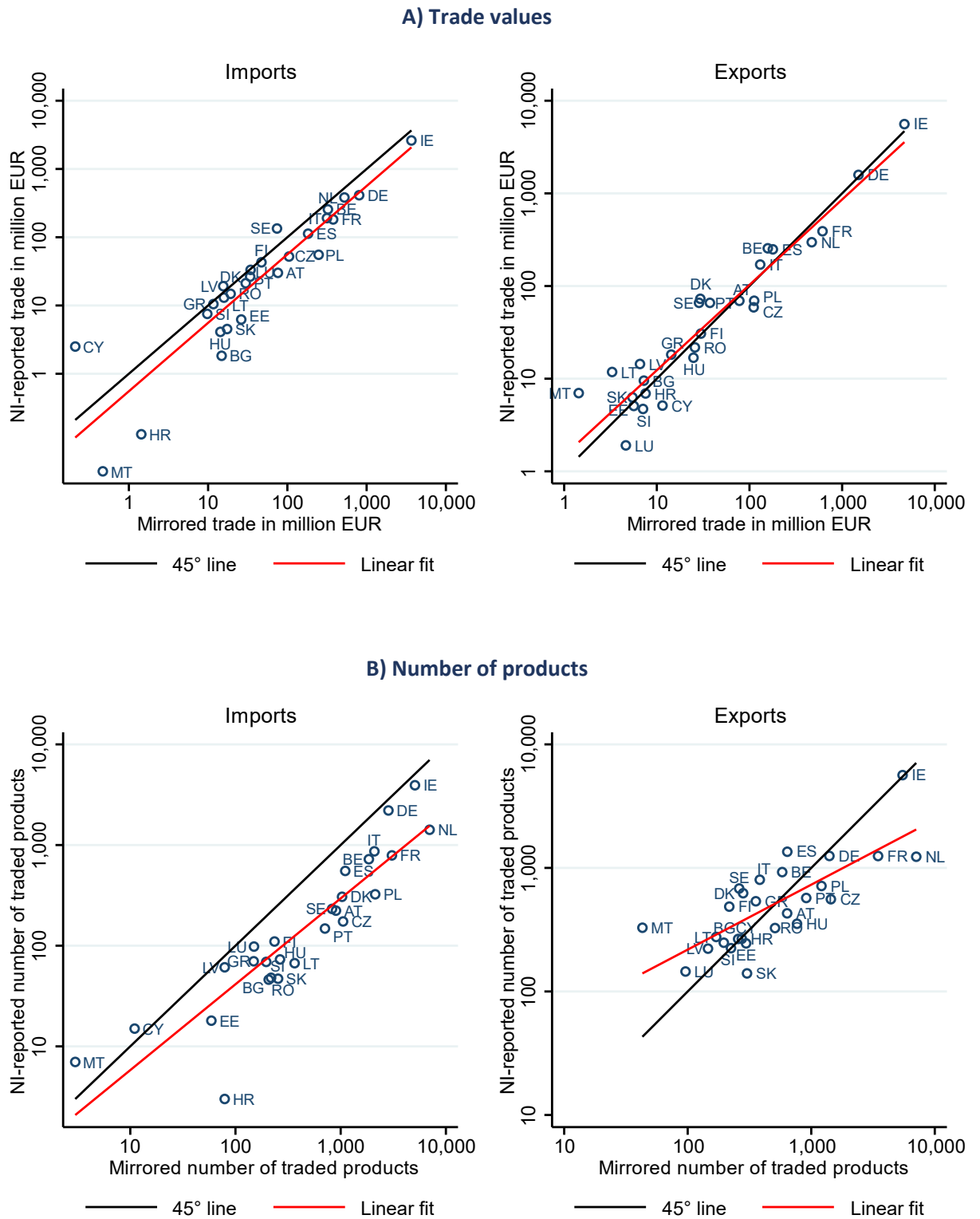
Some minor differences in this type of 'mirror' data comparison are common in international trade, particularly as the exporting country typically reports free-on-board (essentially factory gate) values, whereas the value reported by the importing country will include transport and insurance costs. For trade values, we find that the numbers reported by Northern Ireland and by the partner countries are close to identical. There is slightly more deviation in the mirrored reporting of the number of products, suggesting that some low-value flows in individual product lines may be omitted in some cases. We will focus on using the values and product numbers reported from the Northern Ireland side for the remainder of the report. This comparison of mirrored values gives us solid reassurance that these data are reliable.

The addition of Comext as a source of information on Northern Ireland's trade in general, and trade with Ireland in particular, should help to reconcile some of the existing differences across sources in measuring these flows. Up to now, data sources on cross-border trade have involved different methodologies and thus have not always given a consistent picture of the level or growth rate of these flows. That said, we would note that the overall figures reported in the Comext data continue to show some discrepancies in the mirrored flows, specifically in terms of cross-border trade values.

Northern Ireland reports a total of €7.6 billion in goods imports and €10.5 billion in goods exports. Of these flows, approximately 35 per cent of imports (€2.6 billion) come from Ireland and 53 per cent of exports go to Ireland (€5.6 billion). Ireland has considerably higher overall total goods imports (€99.8 billion) and exports (€160.3 billion). Exports from Ireland to Northern Ireland are reported as being €3.7 billion in the Comext data and imports from Northern Ireland are recorded as being €4.7 billion. In both directions, we find that higher trade flow amounts are reported by the exporter than as having been received by the importer. This is most

likely due to different reporting thresholds being applied to import and exports, which results in some smaller transactions not being fully allocated to a specific product or partner country.

FIGURE 1 NORTHERN IRELAND TRADE WITH EU MEMBERS, DATA COMPARISON, 2021



Source: Comext. Labels are abbreviated country names.

2.2 ADDITIONAL DATA SOURCES

We use some additional data sources on the characteristics of the economies and trading partners to help understand the patterns of trade.

For the size of each country, we use data on gross domestic product (GDP) and population for 2021 taken from the International Monetary Fund (IMF) World Economic Outlook. This source has a single entry for the UK. To get separate data for Northern Ireland and Great Britain, we use the Office for National Statistics (ONS) shares for Northern Ireland in total UK GDP (2 per cent) and total UK population (3 per cent).

Distance is frequently identified as a major driver of trade patterns across countries, proxying not just transportation costs but also familiarity and similar supply and demand structures. We get information on distance by using the Mayer and Zignago approach (CEPII, 2011), which is recalculated using the World Cities Database (simplemaps.com) in order to include distance between Northern Ireland and all potential trading partners. Distance is calculated as a population-weighted harmonic mean of geodesic pairwise distances between major settlements (settlements with more than 10,000 residences, and up to 100 largest cities per polity). For example, Ireland has 20 such settlements in the database, while Northern Ireland has eight.

2.3 CHAPTER SUMMARY

This chapter describes a new detailed data source on Northern Ireland trade. This has become available since January 2021 due to the Northern Ireland Protocol to the EU–UK Withdrawal Agreement. The data are collected by Eurostat and contain detailed product-level information on goods imports and exports across all partner countries, except for trade with Great Britain which is not included. The rest of this report will use these data to examine in detail the international goods trade patterns of Ireland and Northern Ireland across partner countries and products. The reliability of the data is confirmed through a comparison of trade values and number of products reported by Northern Ireland and each partner country.

CHAPTER 3

Trade partners

In this chapter, we examine the geographic patterns of trade of Ireland and Northern Ireland. We begin with descriptive evidence on the shares of imports and exports across partner countries. We then explore the extent to which these patterns are related to the size and distance of the partner countries. The final question we address in this chapter is whether cross-border trade between Ireland and Northern Ireland and east–west trade with Great Britain differ from the patterns estimated from the overall international trade flows.

3.1 MAIN TRADING PARTNERS

In Table 1, we calculate the shares of imports and exports accounted for by the top ten trading partners and compare these across Northern Ireland, Ireland, the United Kingdom (UK) overall and the rest of the European Union (EU) (i.e., excluding Ireland). Although the precise ordering of the trade partners varies somewhat, we can see that across all four, the top ten partner lists are dominated by EU Member States along with the United States (US), China and Switzerland. Germany is the most significant individual trading partner among the EU Member States in each case, with the exception of the large share of Northern Ireland’s trade accounted for by Ireland.

Looking first in detail at Northern Ireland, the main destination for sales outside of Northern Ireland itself is Great Britain. After that, both imports and exports are reasonably heavily concentrated in cross-border trade with Ireland. Ireland purchased 28 per cent of Northern Ireland’s external sales and accounted for 12 per cent of external purchases (equivalent to 53 per cent of total Northern exports and 35 per cent of Northern Ireland’s imports if the internal UK trade is excluded). The next most important export partner for Northern Ireland is Germany, accounting for 8 per cent of external sales (or 15 per cent of total exports). Other individual markets account for much smaller shares of total exports but the cumulative share of the rest of the EU excluding Ireland is approximately 18 per cent of external sales (one-third of the total exports of Northern Ireland). On the import side, the individual shares of EU partner countries are smaller, with none dominating to the extent that Germany did for export flows. Outside of the EU, the US and China are also in the top ten partner countries but are relatively more important as import sources than as export destinations.

The most striking difference in the pattern of trade across countries for Ireland compared to Northern Ireland (and indeed to the rest of the EU) is the dominance of the US, both as an import and an export partner. Over 30 per cent of total Irish goods exports go to the US and 17 per cent of imports are sourced there. In subsequent chapters, we delve into further detail on the product composition of this trade and highlight the importance of the pharmaceutical sector in these flows.

Great Britain is the next most important source of imports for Ireland (14 per cent) and is also a substantial export market (9 per cent), although these are shares that have reduced considerably in the aftermath of Brexit relative to the historic patterns of trade between the two countries (Flynn et al., 2021). Northern Ireland makes up almost 5 per cent of Ireland’s total goods imports and slightly over 2 per cent of exports, which are sizeable shares given the much smaller size of the Northern Ireland economy relative to the other top ten partner countries.

Of the individual EU Member States, Germany and France are the largest import partners; Germany is also one of the most substantial export destinations for Ireland. Although the pattern across individual countries varies, the overall share of the EU in both exports and imports is very similar. Ireland also has similar shares of both imports and exports accounted for by China. This is in contrast to the patterns for Northern Ireland, the UK and the rest of the EU, all of which have much higher shares of imports accounted for by China relative to its share in their exports.

TABLE 1 TOP 10 DESTINATIONS AND ORIGIN (SHARES IN 2021, RANKED BY TOTAL TRADE)

Northern Ireland	Imports	Exports	Ireland	Imports	Exports
*Great Britain	65.49	46.38	US	17.01	31.00
Ireland	11.93	28.58	Great Britain	14.15	8.84
Germany	1.88	8.10	Germany	7.97	11.00
US	3.22	1.78	China	7.12	7.50
China	2.81	1.08	France	10.61	3.29
Netherlands	1.74	1.52	Belgium	3.76	8.44
France	0.83	1.99	Netherlands	5.63	5.83
Belgium	1.17	1.31	Northern Ireland	4.71	2.29
Spain	0.51	1.27	Switzerland	4.87	1.75
Italy	0.87	0.87	Italy	2.07	2.71
*Rest of EU	9.52	18.03	*Rest of EU	37.35	37.91
UK	Imports	Exports	Rest of EU	Imports	Exports
US	9.09	13.40	Germany	14.12	14.11
China	14.68	7.00	China	9.10	4.39
Germany	10.52	9.17	Netherlands	8.30	4.69
Netherlands	5.90	7.88	France	4.93	7.64
Switzerland	2.53	9.06	US	4.09	6.43
France	4.13	5.85	Italy	4.85	5.04
Ireland	2.65	6.58	Belgium	5.20	4.35
Belgium	4.45	4.47	Poland	3.74	3.74
Norway	5.60	0.93	Great Britain	2.31	4.89
Italy	3.28	2.72	Spain	3.44	3.60
*Rest of EU	39.63	39.72	*Rest of EU	60.00	61.07
			Ireland	1.47	0.64
			Northern Ireland	0.07	0.06

Notes: * Trade between NI and GB from NISRA Economic Trade Statistics. Subtotal for EU excluding Ireland. Data on China flows include Hong Kong and Macao.

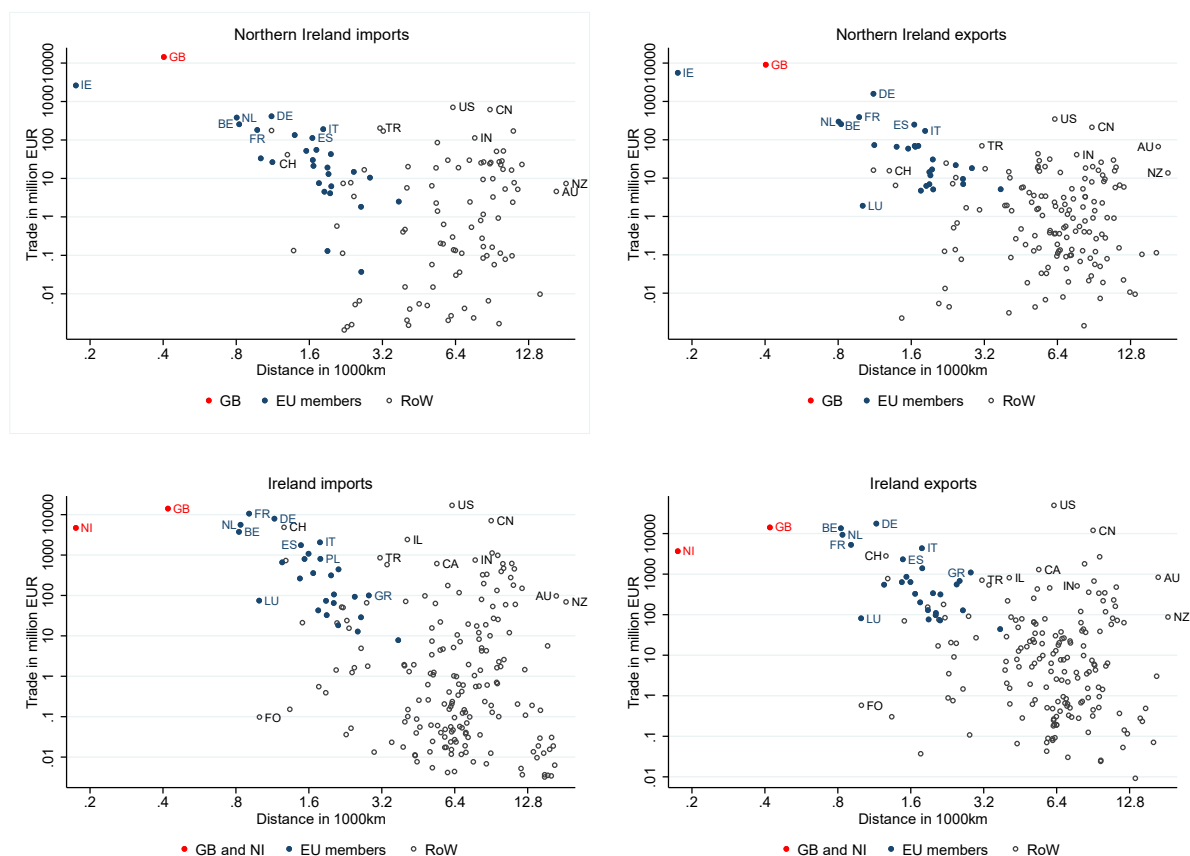
The patterns for the imports and exports of the UK and the rest of the EU are also presented in the table for comparison. The US is the largest individual export partner for the UK and China is the largest source of imports. Within the EU, Germany is the largest individual trading partner, with the total share of the EU (excluding Ireland) at just under 40 per cent for both imports and exports of the UK.

Total rest of EU trade is dominated by internal trade flows, with around 60 per cent of EU trade being with other EU Member States. The shares of trade accounted for by China and the US are substantial but notably lower than they were in the cases of Ireland and the UK. Given the much greater size of the overall rest-of-the-EU group, the shares accounted for in its trade by Ireland, Northern Ireland and the UK are much smaller than the share that the EU represented in the trade of any of these three economies. Great Britain is one of the top ten trade partners of the rest of EU group, accounting for slightly over 2 per cent of imports and almost 5 per cent of exports. Neither Ireland nor Northern Ireland are in the top ten trade partners for the rest of the EU but we include their trade shares for comparison. Ireland accounts for 1.47 per cent of the rest of the EU's imports and 0.64 per cent of exports. Northern Ireland accounts for 0.07 and 0.06 per cent of the rest of the EU's total imports and exports respectively.

3.2 DISTANCE AND SIZE IN TRADE RELATIONSHIPS

The level of trade flowing between countries is robustly related to the size of their markets and the cost of moving goods between them. Figure 2 illustrates the downward-sloping relationship between trade flows and distance to partner country for imports and exports of Northern Ireland (top panel) and Ireland (bottom panel). Data for Great Britain are highlighted in red. For Northern Ireland, the value for imports from Great Britain comes from different sources than the rest of the data (the HMRC and NISRA releases described in Chapter 2).

Members of the EU and a number of other markets (US, China, Australia and New Zealand) are individually labelled. These highlighted non-EU Member States are above the otherwise downward-sloping pattern, indicating that country size and other facilitators of trade such as common language contribute to overall trade levels.

FIGURE 2 IRELAND AND NORTHERN IRELAND TRADE BY DISTANCE, 2021

Note: Trade between Northern Ireland and Great Britain from NISRA Economic Trade Statistics; other data from Eurostat Comext. Country acronyms detailed in Appendix A1.

3.3 GRAVITY ESTIMATION OF TRADE FLOWS

A common way to systematically examine the strength of these and other country characteristics in relation to trade movements is to estimate a gravity model. This method links trade between country pairs to the fundamental factors that work either to attract or to restrict trade, such as the size and income level of the economies (capturing supply and demand) and the distance between them (as a broad proxy for transport costs). The gravity approach to modelling trade has a long history, having first been used in the 1960s.⁵

It should be noted that the gravity model specification used in this section is very minimalist, with just distance and size considered. A wide variety of other country characteristics have been investigated using a similar framework. One weakness of the type of specification used here is that spillover effects from interactions between other markets are not directly modelled.

Sharing a common border is one example of an additional factor that might impact trade costs and which has been incorporated into gravity models. The border on

⁵ The technique acquired its name from the parallel with the physical force of gravity determined by the combined mass of two bodies and the (inverse square) of the distance between them.

the island of Ireland has been examined a number of times in terms of its impact on trade in goods. The first work to estimate the border effect was Fitzsimons et al. (1999) in a study that examined how well the popular gravity model explained trade between Ireland and Northern Ireland. Using aggregate data between 1970 and 1992, they found no evidence of trade in either direction being affected in a statistically significant way by the border relative to the levels expected by distance and market size. Later research, estimating a similar model at a sectoral level from 1988 to 2007, found evidence that cross-border trade was lower than it would have been predicted to be by a gravity equation for all Irish trade (InterTradeIreland, 2009). These estimates, however, were reached before the change in trade structure arising from Brexit and are therefore important to update. As noted earlier, the share of Northern Ireland in Ireland's total imports increased considerably in early 2021, going from 1.5 per cent to almost 5 per cent (Flynn et al., 2021).

In Table 2, we look at the strength of these basic factors of distance and size (GDP) of the partner countries in determining the levels of trade flows to and from Ireland and Northern Ireland. We then add indicator variables for cross-border trade and for trade with Great Britain to examine how these particular flows deviate from the baseline patterns. These indicators are dummy variables that have a value of one if the trade is between Ireland and Northern Ireland and zero otherwise or separately is one for trade with Great Britain and zero otherwise. This allows us to examine whether these particular trade flows differ from the patterns expected from the basic characteristics of distance and size, which are also included in the estimation.

TABLE 2 RESULTS FROM MODEL OF NORTHERN IRELAND AND IRELAND TRADE, 2021

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Northern Ireland				Ireland			
	Imports	Imports	Exports	Exports	Imports	Imports	Exports	Exports
In(distance)	-1.917*** (0.212)	-0.692*** (0.144)	-1.959*** (0.077)	-1.312*** (0.191)	-0.917*** (0.104)	-0.979*** (0.099)	-0.747*** (0.130)	-0.910*** (0.174)
In(GDP)	1.436*** (0.196)	0.896*** (0.049)	1.098*** (0.066)	0.949*** (0.094)	0.986*** (0.082)	1.075*** (0.058)	1.138*** (0.114)	1.217*** (0.101)
IE/NI dummy		2.242*** (0.432)		1.458*** (0.501)		1.616*** (0.315)		1.534** (0.704)
GB Dummy		2.882*** (0.339)		1.297*** (0.491)		-0.483** (0.227)		-0.909** (0.439)
Constant	23.014*** (0.950)	17.451*** (1.107)	25.722*** (0.333)	21.864*** (1.042)	21.312*** (1.166)	21.117*** (0.777)	19.280*** (1.526)	19.991*** (1.729)
Observations	190	190	190	190	190	190	190	190
Pseudo R-sqd	0.929	0.982	0.973	0.984	0.914	0.936	0.898	0.916

Notes: Poisson Pseudo Maximum Likelihood (PPML). Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1.

The results in Table 2 are in logs and estimated with an ordinary least squares (OLS) regression, so the coefficients can be interpreted as a percentage change or elasticity. In the basic specification, a 10 per cent increase in distance to a partner country reduces the value of both the import and export flows for Northern Ireland by slightly over 19 per cent (Columns 1 and 3). These are unusually high effects in the context of the international literature in this area, where an average distance effect is typically in the region of 10 per cent (Disidier and Head, 2008). The distance coefficients for Ireland are very close to this international average across all four specifications.

As expected, trade is considerably higher in both directions when the partner country is larger, with all coefficients on gross domestic product (GDP) being positive and highly statistically significant. The baseline impact for GDP is also larger for Northern Ireland, both in terms of imports (Column 1) and exports (Column 3) compared to those for Ireland (in Columns 5 and 7 respectively). Much of this appears to be driven by the large share of Northern Ireland's trade with the close, high-income countries of Ireland and Great Britain as, when these two trade flows are added to the model, the coefficients on distance and GDP for Northern Ireland trade reduce considerably. In Columns 2 and 4, the effects of distance and GDP on trade for Northern Ireland are much more comparable, albeit still higher, with those of the specifications for Ireland.

Looking at the indicator variables for cross-border trade, the level of cross-border trade flows between Ireland and Northern Ireland are positive and significant in all specifications. This indicates higher levels of trade integration than the basic factors of distance and size can account for. This is in contrast to the results

referred to above that were undertaken in earlier time periods and which showed cross-border trade below levels predicted by similar gravity-style models. The magnitude of the effect varies somewhat by trade direction, with Ireland to Northern Ireland trade levels being particularly above the level explained by distance and GDP.

Northern Ireland's level of trade with Great Britain is also considerably higher than can be accounted for solely by distance and GDP. Trade between Ireland and Great Britain, using these data for 2021, is somewhat lower than would be expected, although this may be specific to this time period given the sharp reductions in this trade in the early months of the year relative to previous trade flows. The results in this analysis apply to just a single year of data at a time when considerable changes in trade policy were being introduced. It is therefore possible that some reflect temporary adjustments and will need to be re-evaluated as a longer time span of data becomes available.

3.4 CHAPTER SUMMARY

This chapter discusses the patterns of trade in Northern Ireland, Ireland, the UK and the rest of the EU. The top ten trading partners are dominated by EU Member States along with the US, China and Switzerland. Germany is the most significant individual trading partner of the EU Member States. The US is the dominant trading partner for Ireland in both imports and exports. Great Britain is the most important destination for sales outside of Northern Ireland, followed by Ireland. This chapter also discusses the importance of the pharmaceutical sector in Ireland's trade with the US. It uses a gravity model to analyse the importance of basic country characteristics, such as size and bilateral distance in relation to trade movements.

CHAPTER 4

Sectoral composition of trade

In this chapter, we look at the overall composition of trade from the Comext data to and from Ireland and Northern Ireland, both by broad sector and by a classification of product use. Here, we aggregate the data to quite high-level sectoral and use groups, while the more detailed product-level data will be used in subsequent chapters to examine specialisation and concentration. This will give initial insight into the similarity of sectoral-level trade structures between the two economies, while also showing how they compare to the composition of trade in the United Kingdom (UK) and rest of the European Union (EU). We then expand this to take an initial look at how this sectoral structure differs by trading partner, a theme that will be developed further in Chapter 5.

4.1 SECTORAL SHARES OF TRADE

In Table 3, we calculate the shares of total imports and exports across 22 broad sectors. For both Northern Ireland and Ireland, two sectors stand out as particularly dominant – the chemicals and pharmaceuticals sector and the machinery and electrical equipment sector. In Northern Ireland, chemicals and pharmaceuticals made up close to 12 per cent of imports and over 23 per cent of exports in 2021. The sector accounts for about double these shares in Ireland: 20 per cent of imports and over 55 per cent of exports. This level of concentration of trade in a single sector is sharply different to the spread of trade across the sectors in the UK and rest of the EU. We will come back to this concentration issue and look at it using more granular data in Chapter 6.

The second sector accounting for a substantial, but less dominant, share of trade in both economies is machinery and electrical equipment. This makes up a roughly similar share of the total exports from both economies, at close to 13 per cent. Its share of imports is substantially higher (21 per cent) for Ireland compared to Northern Ireland (11 per cent). The shares of this sector are broadly similar to its importance in the trade structures of the UK and the rest of the EU, whereas the substantial chemicals and pharmaceuticals share is uncommon in these other economies. One other sector, transportation equipment, makes up a sizeable share of imports for Ireland, at close to 19 per cent of the total. This is mainly driven by imports of large aircraft, which accounted for 14 per cent of total imports in 2021, likely linked to a considerable degree to the aircraft leasing sector.

The shares of other sectors are more broadly dispersed but the relatively high share of food in Northern Ireland's export structure is noteworthy, with over 5 per cent of total exports accounted for by meat and fish and 7 per cent by the dairy sector.

TABLE 3 COMPOSITION OF TOTAL TRADE BY BROAD SECTOR, 2021 (%)

	Northern Ireland		Ireland		UK		Rest of EU	
	Imp.	Exp.	Imp.	Exp.	Imp.	Exp.	Imp.	Exp.
Live animals	0.5	0.2	0.3	0.3	0.1	0.2	0.1	0.2
Meat and fish	5.6	5.3	1.2	2.9	1.8	1.1	1.8	1.7
Dairy	3.1	7.2	0.7	2.0	0.5	0.5	0.7	0.9
Vegetable products	4.1	1.6	1.5	0.2	2.3	0.4	2.4	2.1
Products of milling industry, oil, fats	1.8	1.2	0.8	0.2	0.7	0.4	1.3	1.1
Foodstuffs	3.8	3.9	2.5	1.8	2.4	1.6	2.0	2.5
Beverages	2.2	4.4	1.0	1.0	1.3	2.2	0.7	1.2
Residues of food and tobacco	5.3	1.9	1.2	0.3	0.6	0.3	0.9	0.9
Mineral products	8.2	4.7	6.6	0.8	11.3	8.1	11.2	5.5
Chemicals and pharmaceuticals	11.8	23.4	20.2	55.7	6.0	9.1	9.0	9.6
Other organic chemicals	2.4	1.9	2.5	3.0	1.9	2.8	2.1	2.6
Other chemicals	2.3	1.4	1.5	2.6	2.1	2.1	2.1	2.3
Plastic and rubber	8.5	4.6	3.9	1.4	3.9	3.3	5.6	5.8
Raw hides, skins, leather and furs	0.2	0.3	0.2	0.1	0.5	0.3	0.5	0.7
Wood and wood products	7.7	4.5	2.1	0.7	2.8	1.8	2.7	3.3
Textiles	1.1	0.4	0.2	0.1	0.4	0.3	0.6	0.6
Carpets, footwear, umbrellas	2.9	3.6	3.5	0.2	4.8	1.9	4.6	3.8
Stone, glass	2.0	1.4	1.9	0.9	13.5	15.7	2.7	2.8
Metals	6.7	6.2	3.3	0.9	4.7	5.8	8.9	8.8
Machinery, electrical	11.3	12.9	20.7	13.2	20.7	21.7	23.6	24.0
Transportation	4.3	3.3	18.7	2.3	10.4	12.5	10.3	13.1
Miscellaneous	4.1	5.6	5.7	9.4	7.1	7.7	6.2	6.5
Total	100	100	100	100	100	100	100	100

An alternative summary of the trade structures is to aggregate the products into the United Nations (UN) classification known as BEC, or ‘broad economic categories’. The sector groups in the BEC framework are food and beverages, industrial supplies, fuels and lubricants, capital goods, transport and consumer goods, with a final residual category (goods not elsewhere specified) for products that do not fall into any of the broad groups. The shares of each of these groups of products in total imports and exports are shown in Table 4.

TABLE 4 TOTAL TRADE BY BEC SECTOR, 2021 (%)

By sector	Northern Ireland		Ireland	
	Imports	Exports	Imports	Exports
Food and beverages	19.0	23.1	7.3	8.3
Industrial supplies	42.2	23.7	30.8	52.7
Fuels and lubricants	6.2	4.2	6.1	0.6
Capital goods	11.3	14.2	19.6	16.7
Transport	5.8	6.0	20.6	3.2
Consumer goods	15.5	28.8	15.5	18.6
Goods n.e.s.	0.0	0.0	0.0	0.0
Total	100	100	100	100

Note: n.e.s. = Not elsewhere specified.

On the export side, the most notable difference between Northern Ireland and Ireland is the much more substantial share accounted for by food and beverages in Northern Ireland's export profile (23 per cent) compared to that of Ireland (8 per cent). The dominance of the chemicals and pharmaceuticals sector is evident in the high share of Ireland's exports in the industrial supplies category. This is also a substantial contributor to exports of Northern Ireland, but not at the same scale as in Ireland. When classified in this way the rest of the export structure of the two economies is somewhat more comparable. On the import side, again there is a much greater share of the total accounted for by food and beverages in Northern Ireland than in Ireland, with the large share of goods imports accounted for by transport equipment, the other main area of divergence between the two trading structures.

We next look at how this structure varies across some of the main bilateral trading relationships. Table 5 shows the shares of each of the BEC groups for cross-border trade and for both Northern Ireland's and Ireland's trade with the rest of the EU, the United States (US), China and the rest of the world. For Ireland, we also include the structure of its trade with Great Britain but this is not available for Northern Ireland.

TABLE 5 BILATERAL TRADE BY BEC SECTOR, 2021

By sector:	A: Northern Ireland imports from							B: Northern Ireland exports to						
	IE	GB	REU	US	CN	RoW	Total	IE	GB	REU	US	CN	RoW	Total
Food and beverages	35	.	21	1	1	4	19	27	.	15	22	55	26	23
Industrial supplies	35	.	47	33	36	55	42	29	.	16	10	17	28	24
Fuels and lubricants	3	.	3	0	0	20	6	7	.	0	0	0	7	4
Capital goods	6	.	11	23	25	9	11	7	.	21	27	11	29	14
Transport	2	.	10	6	11	4	6	4	.	7	29	15	5	6
Consumer goods	18	.	7	37	27	8	15	26	.	42	13	1	5	29
Total	100	.	100	100	100	100	100	100	.	100	100	100	100	100
By sector:	C: Ireland imports from							D: Ireland exports to						
	NI	GB	REU	US	CN	RoW	Total	NI	GB	REU	US	CN	RoW	Total
Food and beverages	14	26	8	1	1	4	7	24	35	7	2	6	12	8
Industrial supplies	26	30	29	30	23	41	31	44	34	57	65	13	42	53
Fuels and lubricants	19	8	2	5	0	7	6	2	3	0	0	0	1	1
Capital goods	16	6	17	15	38	29	20	13	9	13	12	62	15	17
Transport	7	3	30	41	6	5	21	5	3	2	3	5	6	3
Consumer goods	18	26	14	8	33	14	16	11	16	21	18	14	24	19
Total	100	100	100	100	100	100	100	100	100	100	100	100	100	100

Notes: Country acronyms detailed in Appendix A1.

Beginning with imports for Northern Ireland, Panel A of Table 5 shows substantial variation across the contributions of each of the broad BEC sectors to the imports across the key trading partners. Imports from Ireland are much more concentrated in food and beverages relative to the overall pattern of imports (35 per cent of imports from Ireland are in this category compared to 19 per cent overall). Counterbalancing this large share accounted for by food and beverages, imports from Ireland have lower relative shares for most other product groups, such as industrial supplies and capital goods. Food and beverages is also one of the larger import sectors from the rest of the EU, but it makes up a very small share of imports from further afield.

The pattern for Irish imports (Panel C) has some similarities, with food and beverages accounting for much larger shares of imports from Northern Ireland and Great Britain relative to its share from other markets. Ireland's imports from Northern Ireland are quite broadly dispersed across the sectoral categories while more concentration in transport equipment and industrial supplies is evident in regard to other markets such as the US.

Northern Ireland's exports (Panel B) have quite a different pattern across markets, with food and beverages comprising a substantial component across all broad destinations. Industrial supplies and capital goods also make up considerable shares across all markets. Consumer goods, on the other hand, are primarily a

feature of trade with Ireland and the rest of the EU. As we noted above, Ireland's exports are heavily dominated by industrial supplies, which account for more than half of the total (Panel D). Looking across markets, we see that this broad sector is particularly important for exports to the rest of the EU and to the US. Although still a large share of the export mix, it accounts for a relatively smaller share of exports going to Northern Ireland and Great Britain. In these markets, the food and beverages sector accounts for a much larger share of trade than the sector does in total exports.

4.2 CHAPTER SUMMARY

This chapter examines the trade structures of Ireland and Northern Ireland across 22 broad sectors. Two sectors stand out as particularly dominant: the chemicals and pharmaceuticals sector and the machinery and electrical equipment sector. Chemicals and pharmaceuticals make up close to 12 per cent of Northern Ireland's imports and over 23 per cent of exports in 2021, while the sector accounts for 20 per cent of imports and over 55 per cent of exports in Ireland. Another sector, transportation equipment, makes up a sizeable share of imports for Ireland, at close to 19 per cent of the total.

The structure of trade in the two economies is somewhat comparable when classified using the UN BEC (broad economic categories) classification. The most notable difference between Northern Ireland and Ireland is the much more substantial share accounted for by food and beverages in Northern Ireland's export profile (23 per cent) compared to that of Ireland (8 per cent). This chapter also looks at how this structure varies across some of the main bilateral trading relationships. These patterns of sector–destination mix in the next chapter are considered in more detail in Chapter 5.

CHAPTER 5

Trade structure

In the previous two chapters, we examined the pattern of top destinations and the broad sectoral structure of trade for Northern Ireland and Ireland. In this chapter, we put the two together, looking at overall imports and the largest trade regions with a more detailed product breakdown. In doing so, we get considerable information on the structure of trade and how the mix of products varies between closer and more distant trade partners. It also allows us to examine the structure of cross-border trade in the context of the broader structure of each of the economy's trading patterns. This has been a theme of previous research in relation to Ireland's trade, but up to now it has not been possible to consider this in any degree of detail for Northern Ireland.

5.1 SECTOR STRUCTURE BY DESTINATION

We first look at imports, with the patterns for Northern Ireland presented in the tree map of Figure 3 and the same for Ireland in Figure 4. The broad sectoral categories considered are listed in Appendix Table A2. The share of each sector is proportionate to the size of its box in the figure and the sectors are grouped by colour into broader categories for ease of comparison. Exports of Northern Ireland and Ireland are represented in the same way in Figures 5 and 6 respectively. To maintain comparability between the Northern Ireland and Ireland data, we do not include Ireland's trade with Great Britain in these initial graphs. Instead, this is examined separately at the end of the chapter (Figure 7).

In terms of Northern Ireland's total imports of €7.6 billion in 2021, the dominant sectors were food and chemicals. Figure 3 adds some further detail to the composition of these sectors. Comparing the five country and region maps to that of total imports, we see the dominance of food and beverages in imports from Ireland but with the sector representing much smaller shares of other markets. Imports from the United States (US) are strongly concentrated in chemicals and pharmaceuticals, for example, while machinery and electrical equipment accounts for 20 to 25 per cent of trade from more distant markets such as China and the rest of the world group.

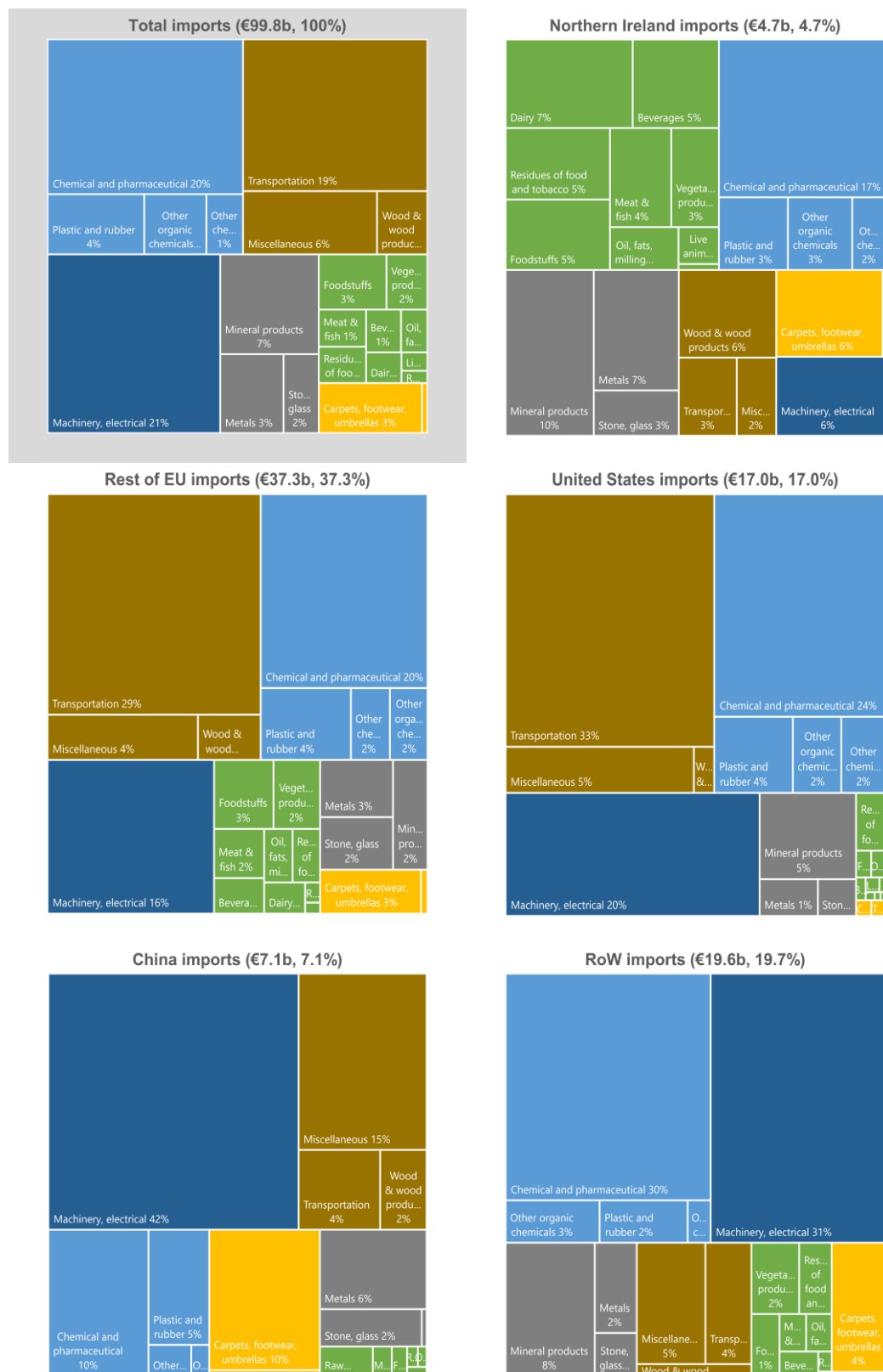
As noted earlier, the broad chemicals and pharmaceuticals sector is the largest contributor to total imports into Ireland. The two most obvious points of contrast between the import structure of Ireland and that of Northern Ireland are, however, the very large share (19 per cent) coming from transport equipment sourced primarily from the US and France, which is related to the large service activities in aircraft leasing and the comparatively small share accounted for by the food and beverages sector.

FIGURE 3 NORTHERN IRELAND IMPORTS STRUCTURE, 2021



Notes: RoW=Rest of world. A full list of sectors is available in Table A3 in the appendix.

FIGURE 4 IRELAND IMPORTS STRUCTURE, 2021



Notes: RoW=Rest of world. A full list of sectors is available in Table A3 in the appendix.

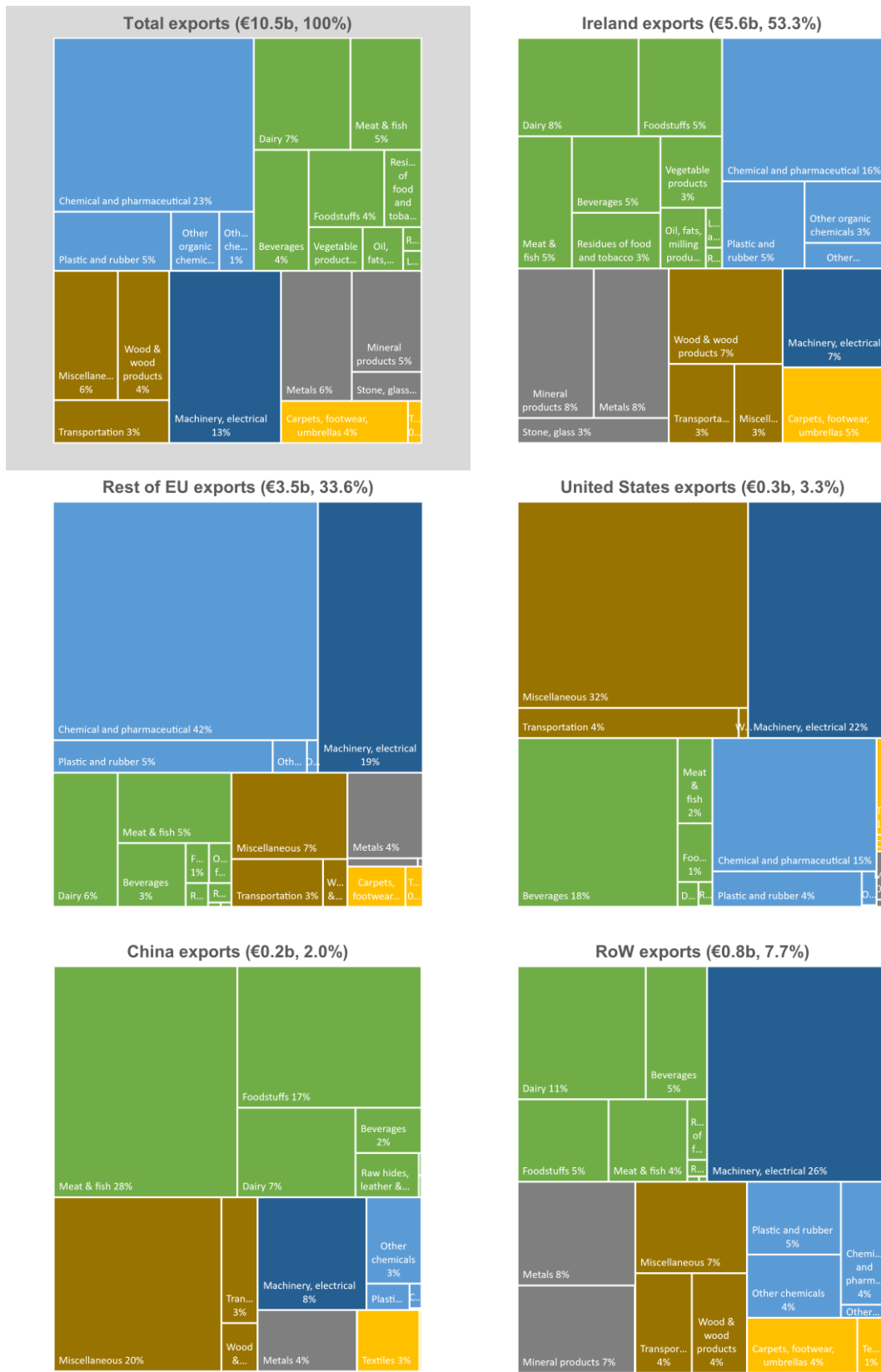
We should also note the difference in absolute value of trade for the two economies – at €99.8 billion, imports to Ireland are more than 12 times larger than those coming into Northern Ireland. This is somewhat impacted by the lack of data on trade from Great Britain to Northern Ireland in this source but is mainly a reflection of the less internationally open structure and lower foreign direct investment (FDI) intensity of the Northern Ireland economy overall.

Looking across the main geographic groupings, high shares of Ireland's imports from the rest of the EU and the US have similar structures, with large shares accounted for by chemicals and transportation. For imports from China and the rest of the world, machinery and electrical equipment becomes a much larger contributor, as does the 'miscellaneous' category for imports from China, which captures a wide range of consumer products. Trade coming from Northern Ireland has quite a different structure. While chemicals and pharmaceuticals are still one of the largest sectors, food and beverages and mineral products account for much larger shares than they do in any other market. Within food, we note that a particularly large share (7 per cent of the total) is from the dairy sector in Northern Ireland.

The structure of Northern Ireland imports from Ireland is of course mirrored by that of exports from Ireland to Northern Ireland and vice versa. In comparing the import and export numbers (in Figures 5 and 6), we observe a discrepancy in the reporting of the magnitudes, with higher trade flow amounts reported in both cases by the exporter than as having been received by the importer. This may be due to different reporting thresholds being applied to import and exports, resulting in smaller transactions not being fully allocated to a specific product or partner country.

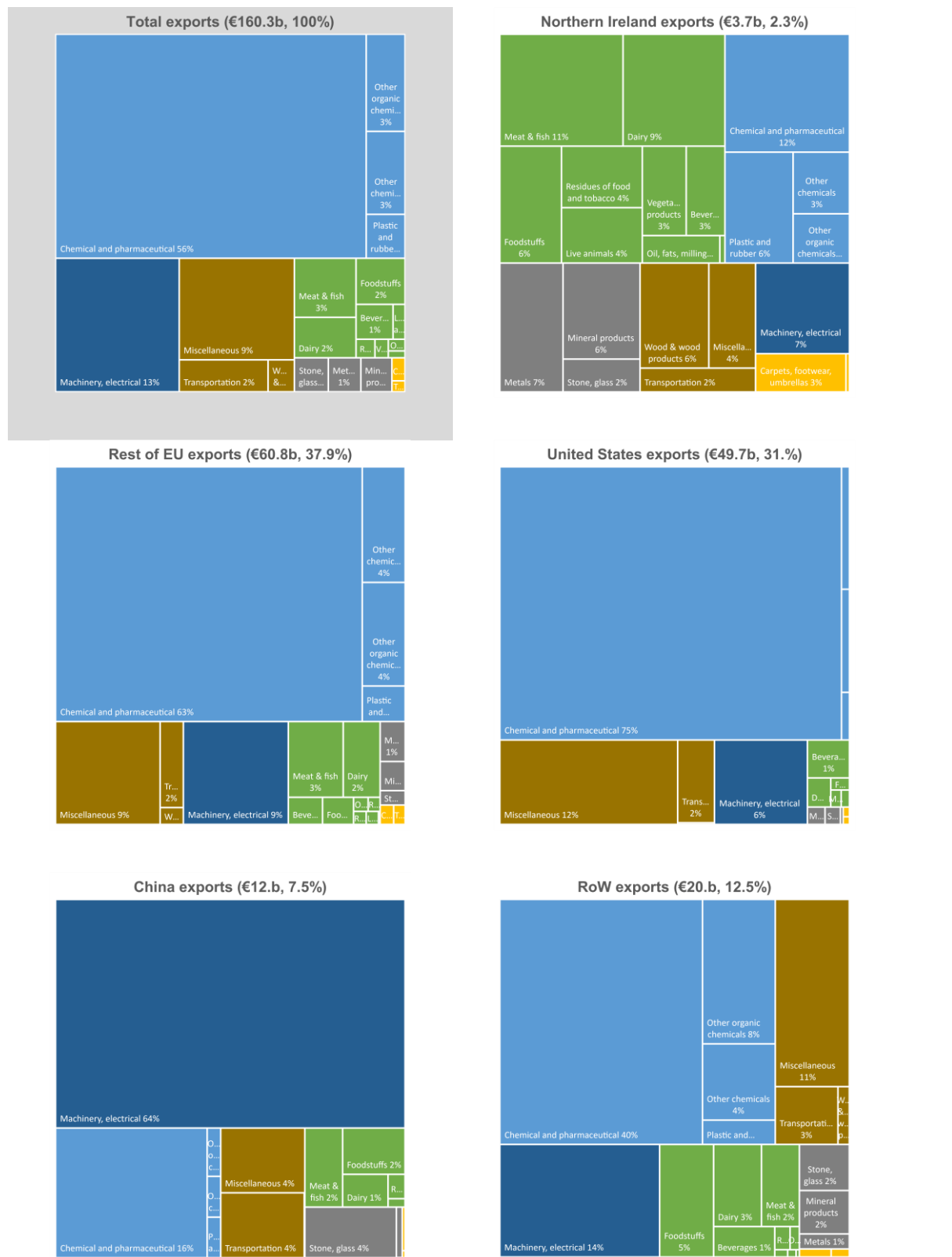
As Ireland accounts for more than half of Northern Ireland's total exports, the composition of total exports from Northern Ireland and the composition of its exports to Ireland are broadly similar. Food and beverages displace chemicals and pharmaceuticals as the largest sector but the combination of the two make up the bulk of exports in the two top maps of Figure 5. For other markets, there is considerable variation in the sectoral structure, with chemicals and pharmaceuticals dominating exports to the rest of the EU but playing a relatively small role in exports to China or to the rest of the world, where food and beverages are the largest share of exports. Irish exports (Figure 6) are clearly dominated across most markets by chemicals and pharmaceuticals, with machinery and electrical equipment exports to China a notable exception. Ireland's exports to Northern Ireland have quite a different structure. Although chemicals and pharmaceuticals comprise a relatively substantial component, they do not represent the majority, as with the other main trading partners. Rather, food and beverages account for the largest overall sector, with meat and fish as well as dairy particularly important sub-sectors.

FIGURE 5 NORTHERN IRELAND EXPORTS STRUCTURE, 2021

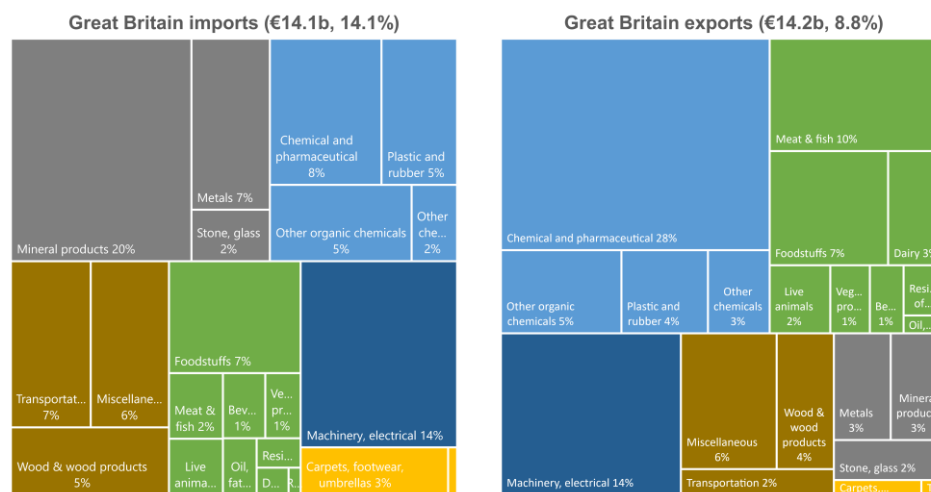


Notes: RoW=Rest of world.

FIGURE 6 IRELAND EXPORTS STRUCTURE, 2021



Notes: RoW=Rest of world.

FIGURE 7 IRELAND–GREAT BRITAIN TRADE, 2021

Notes: RoW=Rest of world.

Detailed trade information is not available for trade between Northern Ireland and Great Britain. However, we can compare trade between Ireland and Great Britain to that of its overall structure and other individual markets as above. For imports, Figure 7 shows that mineral products make up a much larger share of trade for Great Britain than in the overall structure but the other large contributors – chemicals and pharmaceuticals, food and beverages and machinery – are broadly similar to those of the totals. On the export side, chemicals and pharmaceutical trade is the largest individual sector, though somewhat less dominant than for many other markets. As was the case with the export structure of Ireland with Northern Ireland, the composition is more varied than that of overall exports, with food and beverages in particular accounting for a substantial share.

5.2 CHAPTER SUMMARY

This chapter examines the trade structures of Northern Ireland and Ireland in detail. Food and chemicals are the dominant sectors for Northern Ireland. In Ireland, the broad chemicals and pharmaceuticals sector is the largest contributor to total imports. The chapter discusses how the trade structures vary across the main geographic groupings. For Ireland, the structure with the US and the rest of the EU is similar, with large shares accounted for by chemicals and transportation. However, trade coming from Northern Ireland has a different structure, with food, beverages and mineral products accounting for much larger shares.

CHAPTER 6

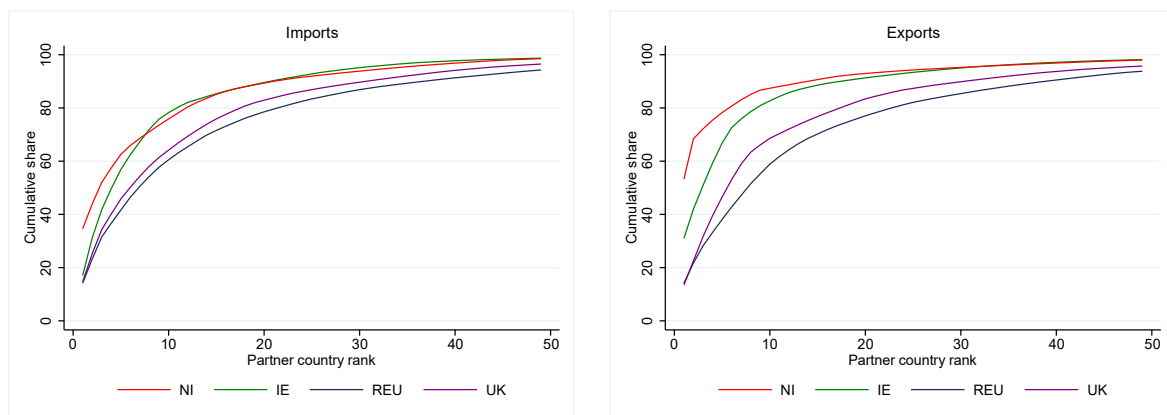
Specialisation and similarity

In the previous chapters, we looked at the contribution of individual partner countries and sectors to overall trade in Northern Ireland and Ireland. This chapter zooms out somewhat to present a range of measures of the degree of specialisation or concentration of trade across both partner countries and products, and then looks at some formal measures of similarity between trade structures of Northern Ireland and Ireland. The chapter further examines overall openness to trade and how extensive trade is, in terms of the range of products traded. The final section looks at an important summary feature of the product range by calculating how the average value of products traded compares to international norms.

6.1 CONCENTRATION OF TRADE BY PARTNER AND PRODUCT

In the previous chapters documenting the partner country and sectoral composition of trade, we noted examples where particularly large shares of trade were accounted for by specific partner countries and sectors. In this section, we take a different look at partner and product concentration, taking into account the entire set of markets and products, in a way that allows the extent of concentration to be compared more clearly across different economies. We do this by ranking the partner countries or products from the largest to smallest in terms of their shares of trade. We then examine the cumulative share of trade at each point along the ranking. This allows us to compare the degree of reliance on different numbers of partner countries, even though the identity of the individual partners may vary (as shown in Table 1).

FIGURE 8 MARKET CONCENTRATION OF IMPORTS AND EXPORTS, 2021



Note: NI=Northern Ireland, IE=Ireland, REU=Rest of EU, UK=United Kingdom.

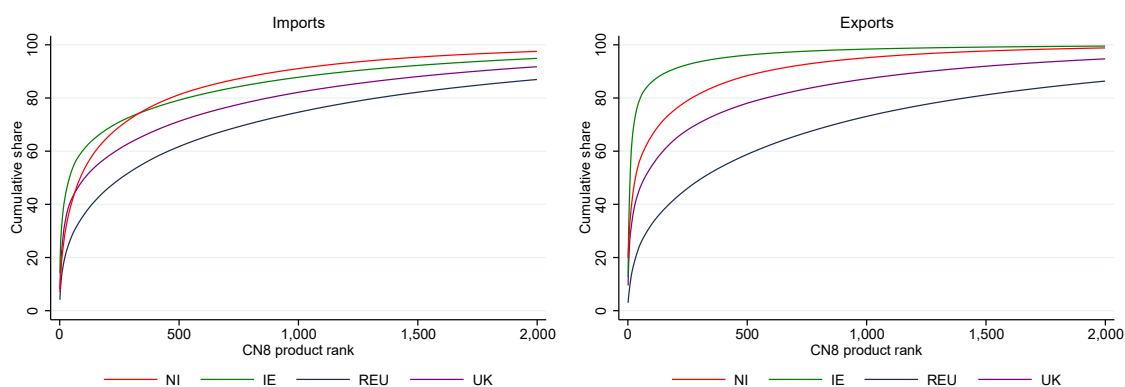
Figure 8 shows market concentration for imports and exports. At the left-most point on each graph is the share of trade accounted for by the largest partner country. Moving to the right shows how much more of total trade is accounted for

as we add each subsequent market until we begin to come close to accounting for all trade, as more and more markets are included. In both of these charts, we end at 50 markets where the cumulative share of trade converges very closely to 100 per cent and additional markets are adding very small amounts to the total share.

We present the data for Northern Ireland, Ireland, the rest of the European Union (EU) and the United Kingdom (UK). The higher the line, the more concentrated in a smaller number of partner countries is the trade structure. For imports, we see that the line for Northern Ireland starts off as the highest of the four, indicating the substantial share of imports accounted for by a single country (as Ireland makes up 35 per cent), whereas the other four all start at a similar point – slightly below 20 per cent. For Ireland, this relates to the 17 per cent of imports coming from the United States (US), for the UK the largest import partner is China, at 15 per cent, and for the other EU countries this relates to imports from Germany, which account for 14 per cent. By the time we reach the point of the top ten partner countries, both Northern Ireland have converged to have these ten countries account for approximately 80 per cent of total imports (albeit with a slightly different combination of partners included in this top ten, as shown in Table 1). The rest of the EU and the UK are more diversified, with the top ten countries accounting for more like 60 per cent of total imports.

On the export side of Figure 8, we see greater contrast between the four economies, with considerably higher concentration in a relatively small number of markets evident for Northern Ireland and Ireland in comparison to the UK and rest of the EU patterns. The high share of Northern Ireland's exports going to its largest trading partner is particularly evident in this comparison, although the top ten markets account for relatively similar shares of total exports for both Northern Ireland and Ireland. It is also worth reiterating at this point that the Northern Ireland concentration might be closer to that of Ireland if data on its trade flows with Great Britain were available for inclusion in this calculation.

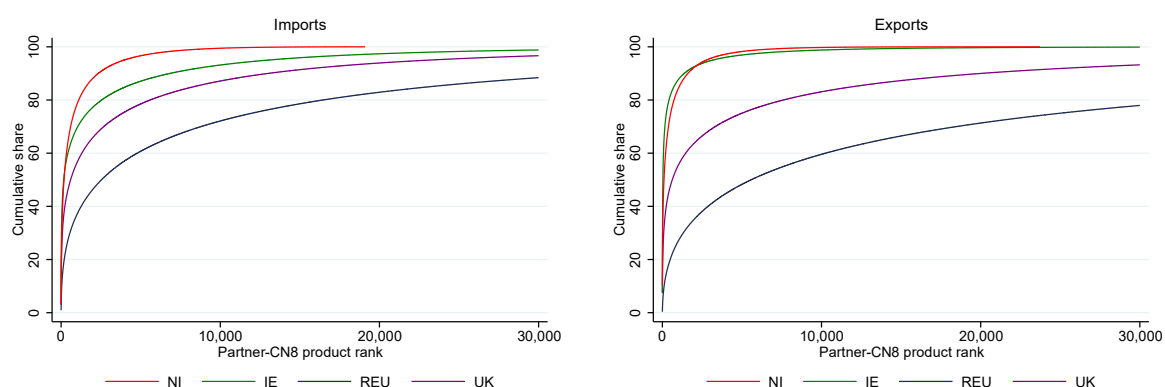
Turning to concentration in products, Figure 9 shows how the cumulative share of trade evolves across the ranking of products. In this instance, we make use of the full set of product detail available in the data rather than the sector aggregations described in the previous chapter. These product definitions are at the CN8 level of customs classifications used by Eurostat. To give an example of the level of detail this represents, there are nine categories of milk, varying by fat content and whether or not any sweetener has been added. For presentational purposes, we end the graphs at the share accounted for by the top 2,000 products as it is converging towards the total at that point and additional products beyond that point add very minor additional shares.

FIGURE 9 PRODUCT CONCENTRATION OF IMPORTS AND EXPORTS, 2021

Note: NI=Northern Ireland, IE=Ireland, REU=Rest of EU, UK=United Kingdom.

The pattern of import concentration in products is somewhat different to that of markets, with Ireland being somewhat more heavily concentrated in its top import products than any of the other economies. The patterns for Northern Ireland and Ireland then begin to converge but, as with market concentration, remain above those of the rest of the EU and the UK. On the export side, the patterns are even more distinct, with Ireland's exports considerably more concentrated in a small number of products than those of the other three economies. Northern Ireland is the next most concentrated but with a more discernible gap with the pattern for Ireland than was evident in the import concentration.

As the final step towards comparing the level of trade concentration, we combine the market and product dimensions. In Figure 10, we rank all product-partner combinations and examine how concentrated each economy is in specific combinations. For imports, Northern Ireland is the most concentrated on this metric, with Ireland following. On the export side, the combined partner-product concentration shows Northern Ireland and Ireland essentially overlapping, with very similar shares of exports accounted for by the top partner-product combinations. The concentration curves of Northern Ireland and Ireland are considerably higher than those of the UK and the rest of the EU, with the latter particularly diversified on this measure compared to the other economies.

FIGURE 10 COMBINED PARTNER–PRODUCT CONCENTRATION OF IMPORTS AND EXPORTS, 2021

Note: NI=Northern Ireland, IE=Ireland, REU=Rest of EU, UK=United Kingdom.

Another way to summarise concentration or specialisation in a single number that can be compared across the economies is to use the Herfindahl–Hirschman index (HHI). This takes the share of each product or each partner country in total import or exports and adds up the square of each share. By squaring the shares, the index gives more weight to larger shares, thereby providing a summary measure of concentration across all products or partners. If all imports or exports were evenly spread across products, for example, the HHI would be close to zero. If a single product accounted for all trade, the maximum level of the HHI concentration measure would be 10,000 (100 per cent*100 per cent).

TABLE 6 HERFINDAHL–HIRSCHMAN CONCENTRATION INDEX, 2021

	CN8-product		Product-partner	
	Imports	Exports	Imports	Exports
Northern Ireland	88	441	42	179
Ireland	274	411	106	143
UK	115	150	31	65
Rest of the EU	40	25	5	2

Table 6 shows the comparison in degree of concentration for imports and exports across our granular definition of products (CN8) and partner countries. For products, Northern Ireland has a concentration measure for imports that falls between that of the UK and the rest of the EU. Ireland, on the other hand, is much more highly concentrated in import products, with a HHI that is multiples of the other three economies. On the export side, Northern Ireland and Ireland have similar degrees of concentration, both considerably higher than those of the UK or rest of the EU. When products are combined with partner countries, Ireland is the most heavily concentrated, while Northern Ireland is closer to the level of the

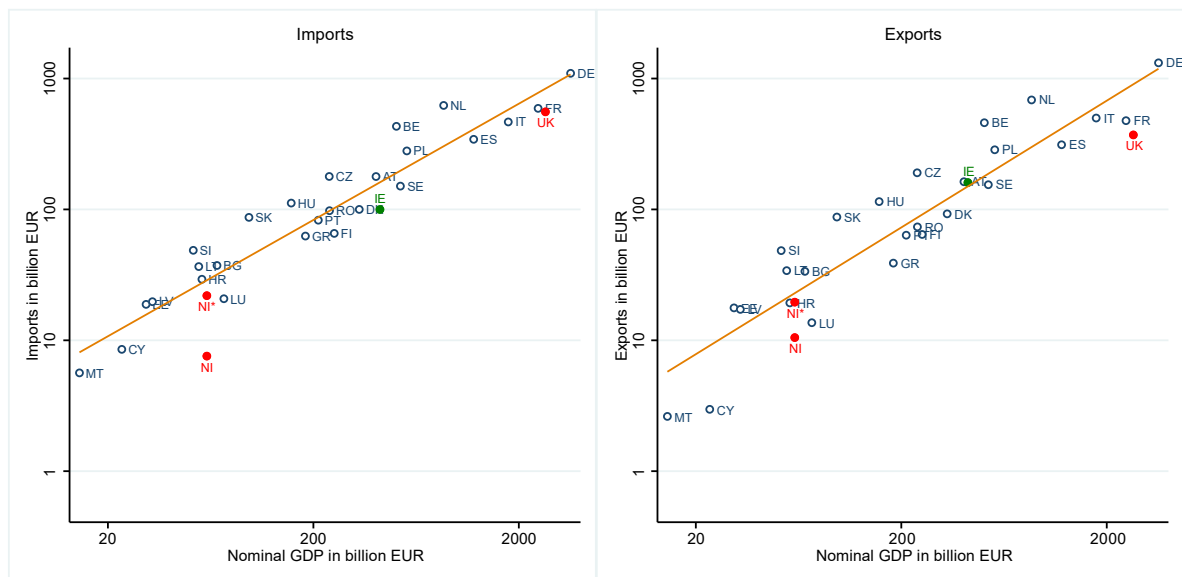
overall UK. On the exports side, however, we see Northern Ireland and Ireland again are much more concentrated than the other economies. Despite the dominance of the broad chemicals and pharmaceuticals sector in Irish exports discussed in Chapter 5, when more narrowly defined products are combined with their destinations, it is Northern Ireland that has the more highly concentrated export portfolio.

6.2 OPENNESS AND RANGE OF PRODUCTS TRADED

That concentration, particularly of exports, leads us to ask how open the two economies are to trade and how wide their export product portfolios are. We might expect both of these characteristics to be related to the size of the economy so in this section we look at openness and product range in a comparative context, taking into account the size, measured by gross domestic product (GDP), across countries.

In measuring trade openness, we are interested in comparing total imports and exports to country size. As we did in the initial examination of trade totals in Chapter 3, in this instance we include the HMRC value for trade from Great Britain to Northern Ireland and the NISRA value for Northern Ireland to Great Britain trade. These are added to the value for Northern Ireland imports, as measured by the Eurostat data. In the imports panel of Figure 11, the Eurostat value is indicated as 'NI' and the value combining Eurostat and HMRC or NISRA data as 'NI*' (both in red).

FIGURE 11 TRADE OPENNESS – CORRELATION BETWEEN TRADE AND COUNTRY INCOME LEVEL, 2021



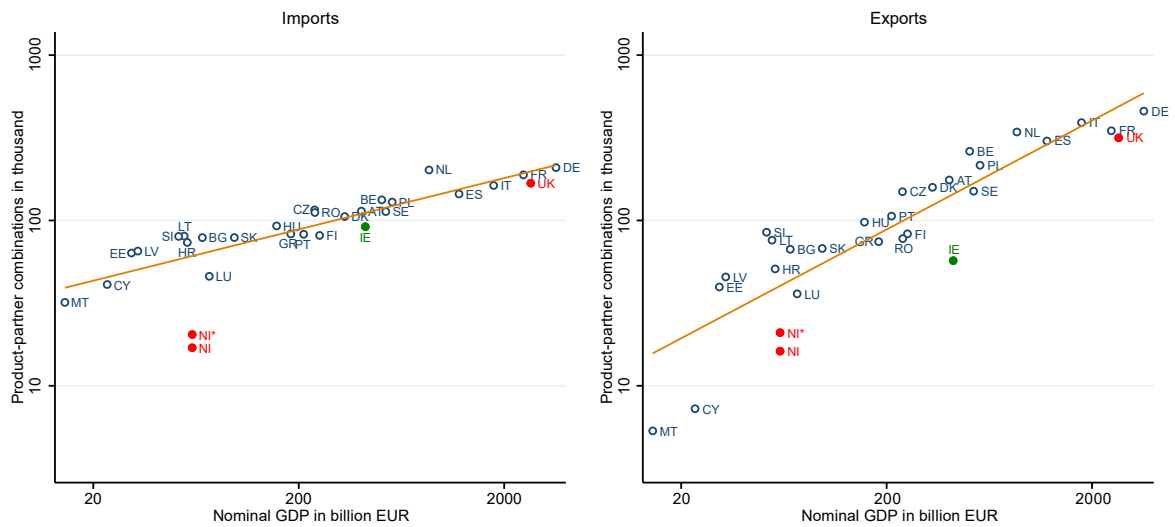
Notes: NI*=Northern Ireland with added GB–NI trade from the NISRA Economic Trade Statistics data. Country acronyms detailed in Appendix A1.

As shown in Figure 11, the relationship between country size and trade values unsurprisingly slopes upwards, with countries generally falling close to the central fitted line. When using the Eurostat data alone, Northern Ireland appears to deviate quite a bit from the level of trade expected for an economy of its size. However, adding in the level of trade with Great Britain brings the NI* level of trade in line with the international norm for an economy of its size.

Both Ireland and the UK are also close to the line linking trade and GDP across countries. Although GDP has been criticised as a measure for Ireland in many circumstances, due to distortions related to multinational activities (see FitzGerald (2015) and Lane (2017)), it seems the most appropriate metric for international trade purposes given that the majority of goods trade is linked to the activities of these multinationals. If an alternative measure such as GNI* was used, the size of Ireland's economy would be proportionately lower, and it would therefore appear to be trading at higher values than those expected.

While the values of trade are roughly in line with the sizes of the two economies, Figure 12 shows that the range (count) of product–partner country combinations in both Northern Ireland and Ireland are below the usual level observed in other countries of comparable size. This is consistent with the findings, presented earlier in this chapter, that both are quite highly concentrated, particularly in terms of their export product portfolios. To account for the undercounting of product–partner observations for Northern Ireland due to absence of granular product data on trade with Great Britain, both graphs indicate where Northern Ireland would be if it traded the same number of products with Great Britain as it does with Ireland.

FIGURE 12 NUMBER OF PRODUCTS TRADED BY COUNTRY, 2021



Notes: Excluding combinations below €1,000. NI* = Northern Ireland where number of products traded with Ireland are counted twice to compensate for lack of product-level data for Northern Ireland–Great Britain trade. Country acronyms are detailed in Appendix A1.

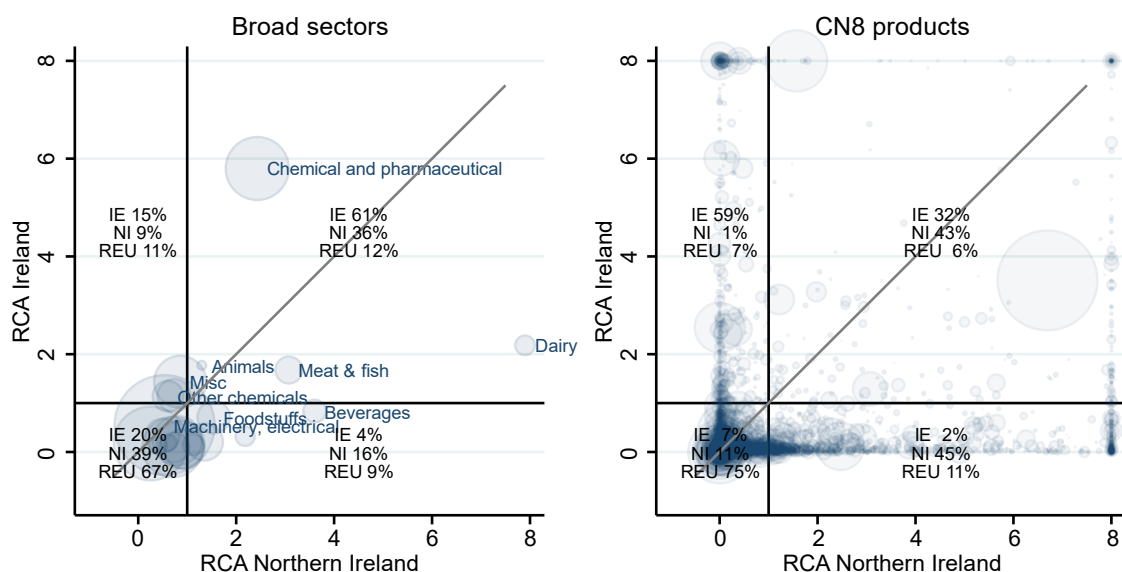
6.3 REVEALED COMPARATIVE ADVANTAGE

The value of trade in any particular product or sector will in part depend on how broadly the product is defined in the classification. Some may appear large at first, but if the same product has a large share of trade in all other countries, then this could be just a statistical artifact. This issue can be addressed by calculating the revealed comparative advantage (RCA) index.

The RCA index is calculated as the product export share divided by share of the same product in a reference country (or a group of countries). In this application, we divided shares in Irish and Northern Irish exports (s_{ik}) for a product or sector (k) with corresponding product share of rest of the EU27 Member States ($s_{REU,k}$).

$$RCA_{ik} = \frac{s_{ik}}{s_{REU,k}} \quad s_{ik} = \frac{x_{ik}}{X_i}$$

If the value of RCA is greater than one, then the economy has a *comparative advantage* in the product compared to the rest of the EU. If the value is below one then it has a comparative disadvantage.

FIGURE 13 REVEALED COMPARATIVE ADVANTAGE BY BROAD SECTOR AND CN8, 2021

Notes: IE=Ireland, NI=Northern Ireland, REU=Rest of EU. Bubble size represents sector or products share in REU total exports. Overlaid text shows the share of exports in each of four quadrants. Values winsorised at eight.

The left panel of Figure 13 shows RCAs by broad sectors. Northern Ireland has a particularly high comparative advantage in dairy, with 7 per cent of Northern Ireland's exports related to dairy products while for rest of the EU this share is 1 per cent. This results in an RCA of eight. Meanwhile, Ireland also has comparative advantage in dairy, but it is significantly smaller, with a RCA of two. Similarly, Northern Ireland has higher RCA than Ireland in other food-related sectors. Both Northern Ireland and, even more so, Ireland have a large comparative advantage in chemicals and pharmaceuticals.

The right panel of Figure 13 uses detailed product-level RCA indices. Even though we see noticeable overlap on a sectoral level, on a more granular level the product RCAs show significant differences in specialisation patterns. The RCA calculations show 59 per cent of Irish exports are in products in which Ireland has comparative advantage and Northern Ireland has not. Conversely, 45 per cent of Northern Irish exports are in products where Northern Ireland has comparative advantage and Ireland has a disadvantage. There is an overlap of 32 per cent of Ireland's exports and 43 per cent of Northern Ireland exports in products where both economies have a comparative advantage. Specific instances of sectors and products with the highest RCA scores for each economy are included in Appendix Tables A3 and A4.

6.4 TESTS OF SIMILARITY OF TRADE STRUCTURE

So far, we have compared various examples of shares of trade within the same sectors in Ireland and Northern Ireland. This section presents a more formal index of the similarity of the trade structures, using the Finger and Kreinin (1979) index. This is constructed by first calculating the share (s) of each product (k) in both countries' (i and j) trade structure, applying the calculation separately to imports

and exports. The shares of each product are then compared, the smallest one chosen from each pair and these smaller shares aggregated across all products. If the structure is exactly the same, the resulting sum will be one (i.e., if every single product has the same share of trade in both countries) and it will be zero if there is no similarity at all (this would be if both countries traded entirely different products).

$$\text{Similarity}_{ij} = \sum_k \min[s_{ik}, s_{jk}]$$

$$s_{ik} = \frac{x_{ik}}{X_i}$$

The results for the similarity index for each pair of trade structures is shown in Table 7, with the top panel calculated at a very fine product level and the lower panel comparing structures at a broader sector level. Looking first at the product level, Ireland's import structure is most like those of the UK and rest of the EU, with a lower similarity score when this structure is compared to that of Northern Ireland. The Northern Ireland import structure has essentially the same, relatively low, similarity index score against all three other comparison countries. The omission of trade with Great Britain may however bias this calculation downwards.

TABLE 7 IMPORT AND EXPORT SIMILARITY INDEX, 2021

	CN8-level imports				CN8-level exports			
	IE	NI	REU	UK	IE	NI	REU	UK
Ireland	1.00	0.33	0.52	0.49	1.00	0.25	0.22	0.22
Northern Ireland	0.33	1.00	0.34	0.33	0.25	1.00	0.29	0.25
Rest of the EU	0.52	0.34	1.00	0.68	0.22	0.29	1.00	0.52
UK	0.49	0.33	0.68	1.00	0.22	0.25	0.52	1.00
	HS2-level imports				HS2-level exports			
Ireland	1.00	0.61	0.72	0.68	1.00	0.51	0.43	0.40
Northern Ireland	0.61	1.00	0.63	0.59	0.51	1.00	0.62	0.52
Rest of the EU	0.72	0.63	1.00	0.84	0.43	0.62	1.00	0.74
UK	0.68	0.59	0.84	1.00	0.40	0.52	0.74	1.00

Note: REU=Rest of the EU.

When the comparison is made at a broader sectoral level in the lower panel, the broad patterns remain the same although the absolute values of the index are higher as it is easier to have more similarity in broad sector contributions than in very fine-grained product portfolios. On the export side, the similarity scores are almost all notably lower than they are for imports. This is the case both for the product and sector level calculations and indicates generally greater specialisation in each economy on the export side compared to import demand.

The calculations in Table 7 compared the total trade structure to all destinations for the different economies. In Table 8 (below), we compare the bilateral structures. In other words, we calculate how alike the Ireland-to-Northern-Ireland trade is to trade flows from Northern Ireland to Ireland. These calculations show that the cross-border trade has quite considerably higher similarity index scores than those for the total trade structure comparison above. This is consistent with the greater diversity of goods traded cross-border compared to the highly concentrated nature (particularly Ireland's) of broader international trade.

TABLE 8 BILATERAL TRADE SIMILARITY, 2021

IE to NI trade similarity with	CN8	HS2	NI to IE trade similarity with	CN8	HS2
Mirrored flow*	0.69	0.83	Mirrored flow*	0.76	0.89
NI to IE	0.42	0.75	IE to NI	0.42	0.75
IE to GB	0.35	0.61	GB to IE	0.32	0.56
IE to RoW	0.21	0.33	RoW to IE	0.23	0.46
RoW to NI	0.31	0.64	NI to RoW	0.29	0.54

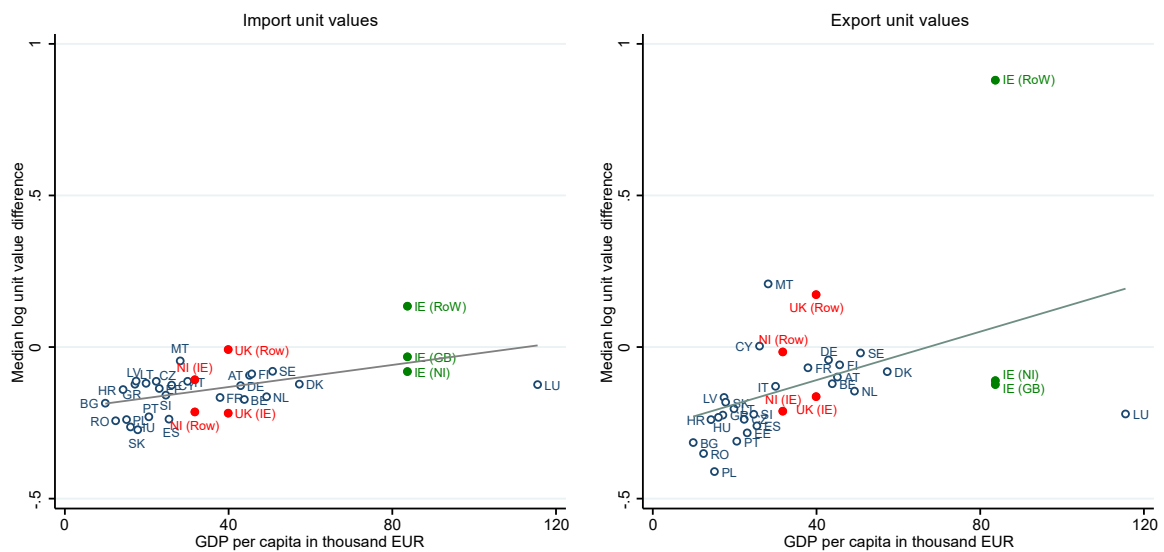
Notes: Comparison with IE-reported data. IE=Ireland, NI=Northern Ireland, GB=Great Britain, RoW=Rest of world. RoW includes other EU members. Mirrored flow = NI-reported. Mirrored flow* = excluding products where trade is below €1,000.

6.5 UNIT VALUES OF TRADE FLOWS

Another aspect of trade structure that can be useful to compare across markets is the unit value of the goods trade. As Eurostat collects data on both values and volumes (typically in metric tonnes), the unit value of each product traded can be calculated. In order to make a comparison across countries, we examine the extent to which the unit values of each country's trade deviates from the median prices for the same product traded from all destinations. This is shown in Figure 13. For Ireland, three measures of how the unit values of its trade compare to the median are included: one for its overall international trade, one for trade with Great Britain and one for trade with Northern Ireland. Likewise, both Northern Ireland and the UK have two indicators – one for their total trade and one for trade with Ireland.

The unit value deviation from the median for Ireland's total exports stands out sharply as being well above all other observations in the data. However, when we look at Ireland's exports to Northern Ireland (and also Great Britain), the unit value is actually below the median for the products traded. A similar pattern of lower unit values relative to the median can be seen for Northern Ireland's exports to Ireland and also for the UK's exports to Ireland, although the shift is less stark than that for Ireland. Lower unit value trade is generally to be expected in neighbouring markets, with lower costs of entry to firms and lower transport costs facilitating trade that may not be profitable with more distant markets.

FIGURE 14 MEDIAN UNIT VALUES, 2021



Note: Country acronyms detailed in Appendix A1.

6.6 CHAPTER SUMMARY

This chapter discusses the degree of specialisation or concentration of trade in Northern Ireland and Ireland. It also looks at formal measures of similarity across the trade structures of Northern Ireland and Ireland. For imports, Northern Ireland starts off with the highest concentration among the economies in question, indicating the substantial share of imports accounted for by a single country (Ireland). However, Northern Ireland and Ireland then converge to have the top ten countries account for approximately 80 per cent of total imports. The rest of the EU and UK are more diversified, with the top ten countries accounting for more like 60 per cent of total imports. For exports, there is a greater contrast between the four economies, with considerably higher concentration in a relatively small number of markets evident for Northern Ireland and Ireland in comparison to patterns for the rest of the EU and the UK.

The chapter analyses the combined market and product dimensions to compare the level of trade concentration. For imports, Northern Ireland is the most concentrated, with Ireland following. On the export side, the combined partner–product concentration shows Northern Ireland and Ireland essentially overlapping, with very similar shares of exports accounted for by the top partner–product combinations. Finally, the chapter uses the Herfindahl–Hirschman index (HHI) to summarise concentration in a single number that can be compared across the economies. The comparison shows that Northern Ireland has a concentration measure for imports that falls between that of the UK and the rest of the EU. Ireland is much more highly concentrated in import products, with a HHI that is multiples of the other economies. For exports, Northern Ireland and Ireland both have HHIs that are multiples of the rest of the EU and the UK.

CHAPTER 7

Conclusions and discussion

This report examines newly available data on Northern Ireland's goods exports and imports and equivalent data for Ireland on a detailed product and market level. This allows, for the first time, the trade structures of both economies to be investigated on a consistent basis, giving new insight into both overall international patterns trade for each economy and how cross-border trade looks within this broader context. As noted throughout the report, there is one important limitation to the new Northern Ireland trade data: they do not include trade with Great Britain. Despite this omission, a broad array of interesting patterns can be found in this new granular source of information.

The key data source that underpins this analysis is the separate reporting of Northern Ireland goods trade to Eurostat since January 2021. As with the data collected for Ireland and all other members of the EU's single market, this contains detailed product-level information on goods imports and exports across all partner countries. This allows us to compare Ireland and Northern Ireland's trade structures using the same data source for the first time and to examine cross-border trade in comparison to these aggregate patterns.

Comparing the most important trading partners, the top ten partner countries for both Ireland and Northern Ireland are dominated by EU Member States along with the United States (US), China and Switzerland. Sales and purchases with Great Britain account for the largest proportion of Northern Ireland's external sales while for international trade (i.e., excluding Great Britain) Northern Ireland's goods imports and exports are reasonably heavily concentrated in cross-border trade with Ireland. Ireland purchased 53 per cent of total Northern Ireland exports and accounted for almost 35 per cent of Northern Ireland's imports. The next most important export partner for Northern Ireland is Germany, accounting for 15 per cent of total exports. Other individual markets account for much smaller shares of total exports but the cumulative share of the rest of the EU excluding Ireland is approximately one-third of the total exports of Northern Ireland.

Ireland has a notably different ordering of trade partners, not just in contrast to Northern Ireland but also to the EU aggregate, with the US playing a dominant role in total Irish goods exports (30 per cent share) and imports (17 per cent share). Northern Ireland makes up almost 5 per cent of Ireland's total goods imports and just over 2 per cent of exports, which are sizeable shares given the much smaller size of the Northern Ireland economy relative to the other top ten partner countries.

Investigating the role of distance and market size as determinants of trade flows, we find the expected positive and highly statistically significant effects of both. Expanding this to examine whether cross-border trade deviates from the basic pattern, we find higher levels of trade integration than can be accounted for by these fundamental economic characteristics. This is in contrast to previous research findings on this topic, which showed cross-border trade below levels predicted by similar models, with the different effect likely arising from the sharp increase in cross-border trade since Brexit. Northern Ireland's level of trade with Great Britain is also considerably higher than can be accounted for solely by distance and GDP.

At a sectoral level, both Northern Ireland and, even more notably, Ireland have relatively high concentrations of trade in the chemicals and pharmaceuticals sector. In Northern Ireland, chemicals and pharmaceuticals made up close to 12 per cent of imports and over 23 per cent of exports in 2021. The sector is even more dominant in Ireland, accounting for 20 per cent of imports and over 55 per cent of exports. This level of concentration of trade in a single sector is sharply different to the spread of trade across the sectors in the UK and the rest of the EU. The second sector accounting for a substantial, but less dominant, share of trade in both economies is machinery and electrical equipment. The shares of other sectors are more broadly dispersed, apart from a relatively high share of food in Northern Ireland's export structure.

Looking in more depth at the composition of trade, we find considerable differences in the types of goods traded across trading partners. In particular, cross-border trade looks quite different in both directions to the aggregate trade structures of Ireland and Northern Ireland. This mainly comes about from a much greater variety of goods being traded cross-border relative to the more specialised patterns of overall trade, in particular exports. The food and beverages sector accounts for a considerably larger share of cross-border trade than it does in the overall trade structure, with 24 per cent of goods going from Ireland to Northern Ireland in this sector, and 27 per cent of goods going from Northern Ireland to Ireland.

We find that trade concentration in a small number of partner countries is particularly high for Northern Ireland, given the substantial share of imports and exports accounted for by Ireland. Ireland's trade is somewhat less dominated by a single partner country, but for both Northern Ireland and Ireland, the top ten partner countries account for approximately 80 per cent of total imports and exports. In terms of concentration in products, it is Ireland that stands out as being the most heavily specialised. This is particularly the case in terms of exports. Northern Ireland has a more concentrated export product portfolio than the UK or the rest of the EU but is well behind that of Ireland.

Looking at openness and product range, we find that the values of overall goods trade are roughly in line with the sizes of the two economies. However, the range of product–partner country combinations in both Northern Ireland and Ireland are below the usual level observed in other countries of comparable size, reflecting the degree of specialisation in both trade structures – mainly on the partner country dimension for Northern Ireland and the product dimension for Ireland. Looking at the similarity measures for different trade flows, we find again a much greater diversity of goods traded cross-border compared to the highly concentrated nature (particularly Ireland’s) of broader international trade.

In terms of the policy implications, this new source of information is likely to be helpful over time in monitoring and targeting supports for international trade. As noted in the introduction, international trade is important for economic growth, especially for smaller countries. Both Ireland and Northern Ireland have policy priorities of developing international markets and supporting domestic firms to export. Cross-border trade can play a role as an accessible first step into broader exporting and, hence, a greater degree of information on these flows and on how they compare to trade with other markets may help in the development of such policies.

REFERENCES

- Disdier, A.C. and K. Head (2008). 'The puzzling persistence of the distance effect on bilateral trade', *The Review of Economics and Statistics*, Vol. 90, No. 1, pp. 37-48.
- Dowrick, S. and J. Golley (2004). 'Trade openness and growth: Who benefits?', *Oxford Review of Economic Policy*, Vol. 20, No. 1, pp. 38-56.
- Fitzsimons, E., V. Hogan and J.P. Neary (1999). 'Explaining the volume of North–South trade in Ireland: A gravity model approach', *Economic and Social Review*, Vol. 30, No. 4.
- Finger, J.M. and M.E. Kreinin (1979). 'A measure of export similarity and its possible uses', *The Economic Journal*, Vol. 89, No. 356, pp. 905-912.
- FitzGerald, J. (2015). 'Problems interpreting the national accounts in a globalised economy — Ireland', *Quarterly Economic Commentary: Special Articles*.
- InterTradeIreland (2009). *A gravity model approach to estimating the expected volume of North/South trade*, InterTradeIreland, www.intertradeireland.com.
- Lane, P. (2017). The treatment of global firms in national accounts, *Economic Letters, Central Bank of Ireland*, Vol. 2017, No. 1.
- Wagner, J. (2019). 'Effect of international activity on firm performance', *IZA World of Labor*.

APPENDIX

TABLE A1 COUNTRY ACRONYMS

EU Member States							
Belgium	BE	Greece	EL	Lithuania	LT	Portugal	PT
Bulgaria	BG	Spain	ES	Luxembourg	LU	Romania	RO
Czechia	CZ	France	FR	Hungary	HU	Slovenia	SI
Denmark	DK	Croatia	HR	Malta	MT	Slovakia	SK
Germany	DE	Italy	IT	Netherlands	NL	Finland	FI
Estonia	EE	Cyprus	CY	Austria	AT	Sweden	SE
Ireland	IE	Latvia	LV	Poland	PL		
Other countries							
Australia	AU	India	IN	China	CN	New Zealand	NZ
Canada	CA	Northern Ireland	NI	Faroe Islands	FO	Turkiye	TR
Great Britain	GB	United Kingdom	UK	Israel	IL	United States	US

TABLE A2 BROAD SECTORAL CATEGORIES

Live animals	Other chemicals
Meat and fish	Plastic and rubber
Dairy	Raw hides, leather and furs
Vegetable products	Wood and wood products
Oil, fats, milling products	Textiles
Foodstuffs	Carpets, footwear, umbrellas
Beverages	Stone, glass
Residues of food and tobacco	Metals
Mineral products	Machinery, electrical
Chemicals and pharmaceuticals	Transportation
Other organic chemicals	Miscellaneous

TABLE A3 REVEALED COMPARATIVE ADVANTAGE BY HS2 SECTOR

Sector		Sh. IE	Sh. NI	RCA IE	RCA NI	Sector		Sh. IE	Sh. NI	RCA IE	RCA NI
1	Live animals	0.3	0.2	1.77	1.30	50	Silk and articles	0.0	0.0	0.02	0.00
2	Meat and offal	2.0	4.1	2.29	4.63	51	Wool and articles	0.0	0.0	0.17	0.02
3	Fish and crustaceans	0.3	0.4	0.74	0.91	52	Cotton and articles	0.0	0.0	0.00	0.14
4	Dairy products	2.0	7.2	2.18	7.90	53	Other vegetable fibres	0.0	0.0	0.02	1.32
5	Products of animal origin	0.0	0.1	0.46	1.58	54	Man-made filaments	0.0	0.0	0.06	0.19
6	Live trees and plants	0.0	0.1	0.04	0.46	55	Man-made staple fibres	0.1	0.0	0.79	0.12
7	Edible vegetables	0.1	0.5	0.24	1.14	56	Wadding, felt, nonwovens	0.0	0.3	0.09	1.50
8	Edible fruits and nuts	0.0	0.2	0.03	0.38	57	Carpets, rugs, mats	0.0	0.4	0.08	4.25
9	Coffee, tea, spices	0.0	0.1	0.08	0.46	58	Special woven fabrics	0.0	0.0	0.02	0.53
10	Cereals	0.0	0.5	0.07	1.10	59	Impregnated, coated textiles	0.0	0.0	0.07	0.26
11	Products of milling	0.0	0.4	0.25	2.68	60	Knitted or crocheted fabrics	0.0	0.1	0.09	1.53
12	Oil seeds and oleaginous fruits	0.0	0.0	0.11	0.11	61	Clothing and accessories	0.1	1.0	0.07	0.91
13	Lac, gums, resins	0.0	0.0	0.39	0.10	62	Articles of apparel	0.1	0.9	0.06	0.84
14	Vegetable plaiting materials	0.0	0.0	0.19	0.20	63	Other made-up textiles	0.0	0.8	0.17	2.85
15	Animal or vegetable fats	0.1	0.8	0.13	1.40	64	Footwear	0.0	0.2	0.02	0.28
16	Meat, fish, and seafood	0.5	0.7	1.55	2.15	65	Headgear	0.0	0.0	0.04	0.44
17	Sugars and sugar confectionery	0.1	0.3	0.35	1.24	66	Umbrellas, walking sticks	0.0	0.0	0.03	0.31
18	Cocoa and cocoa preparations	0.2	0.3	0.42	0.62	67	Prepared feathers, flowers	0.0	0.0	0.25	1.44
19	Preparations of cereals	1.1	2.1	1.55	2.82	68	Stone, plaster, cement	0.1	0.5	0.35	1.21
20	Vegetable juices and extracts	0.1	0.5	0.22	0.94	69	Ceramic products	0.0	0.1	0.03	0.30
21	Edible preparations	0.3	0.8	0.47	1.32	70	Glass and glassware	0.1	0.7	0.22	1.42
22	Beverages and vinegar	1.0	4.4	0.84	3.60	71	Pearls, precious stones	0.7	0.1	0.45	0.04
23	Food industry waste	0.3	1.9	0.53	3.58	72	Iron and steel	0.2	3.1	0.07	1.07
24	Tobacco and substitutes	0.0	0.0	0.00	0.02	73	Articles of iron, steel	0.2	2.1	0.11	0.93
25	Salt, sulphur, earth, stone	0.1	0.6	0.62	2.77	74	Copper and articles	0.0	0.1	0.04	0.14
26	Ores, slag, ash	0.1	0.0	0.46	0.01	75	Nickel and articles	0.0	0.0	0.08	0.02
27	Mineral fuels, oils	0.6	4.2	0.12	0.84	76	Aluminium and articles	0.1	0.5	0.08	0.40
28	Inorganic chemicals	0.6	0.2	0.94	0.26	78	Lead and articles	0.0	0.0	0.74	0.22
29	Organic chemicals	19.5	0.4	9.55	0.18	79	Zinc and articles	0.0	0.0	0.01	0.05
30	Pharmaceuticals	35.6	22.8	5.12	3.28	80	Tin and articles	0.0	0.0	0.03	0.00
31	Fertilizers	0.0	0.4	0.10	1.77	81	Other base metals	0.0	0.1	0.28	0.96
32	Tanning and dyeing extracts	0.1	0.2	0.12	0.32	82	Tools, cutlery, machinery	0.1	0.1	0.27	0.27
33	Essential oils, perfumes	2.9	1.0	2.61	0.91	83	Misc. articles of base metal	0.1	0.2	0.25	0.30
34	Soaps, lubricants, candles	0.0	0.3	0.06	0.47	84	Nuclear reactors, boilers	5.1	9.7	0.37	0.70
35	Albuminoids	0.5	0.1	1.68	0.32	85	Electrical machinery	8.1	3.2	0.80	0.31
36	Explosives, pyrotechnics	0.0	0.0	0.41	0.07	86	Railway and tramway locomotives	0.0	0.0	0.06	0.01
37	Photo and cinematographic goods	0.0	0.0	0.81	0.08	87	Vehicles other than railway	0.3	2.3	0.02	0.21
38	Miscellaneous chemical products	2.1	1.3	1.08	0.67	88	Aircrafts and parts	2.0	0.9	1.70	0.80
39	Plastics and articles	1.1	4.0	0.25	0.87	89	Ships, boats, floating structures	0.0	0.1	0.02	0.15
40	Rubber and articles	0.2	0.6	0.19	0.51	90	Optical, photographic, measuring	8.9	2.0	2.49	0.57
41	Raw hides and skins	0.0	0.2	0.39	1.52	91	Clocks, watches	0.1	0.0	0.92	0.02
42	Articles of leather	0.0	0.1	0.08	0.20	92	Musical instruments	0.0	0.0	0.07	0.12
43	Furskins and articles	0.0	0.0	0.01	0.01	93	Arms, ammunition	0.0	0.0	0.00	0.18
44	Wood and articles	0.4	2.2	0.35	1.78	94	Furniture	0.1	3.3	0.08	1.96
45	Cork and articles	0.0	0.0	0.00	0.01	95	Toys	0.1	0.1	0.12	0.10
46	Manufactures of straw	0.0	0.0	0.02	0.31	96	Miscellaneous goods	0.1	0.1	0.31	0.49
47	Pulp of wood	0.1	0.2	0.21	0.87	97	Works of art	0.0	0.0	0.39	0.04
48	Paper and paperboard	0.1	1.7	0.09	1.13						
49	Printed books, newspapers	0.1	0.4	0.18	1.32	T	Total	100	100		

Notes: IE=Ireland, NI=Northern Ireland. Revealed comparative advantage greater than one are highlighted in green.

TABLE A4 TOP 20 HS4 PRODUCTS WITH HIGHEST REVEALED COMPARATIVE ADVANTAGE

Rank	HS4	Product group name	Share IE	Share NI	Share REU	RCA IE	RCA NI
NORTHERN IRELAND							
1	8474	Mineral processing machinery	0.0	3.0	0.1	0.33	23.98
2	0401	Milk and cream, not sweetened	0.1	2.6	0.1	0.94	22.95
3	0405	Butter and milk-derived fats/oils	0.7	1.0	0.1	8.73	13.07
4	8427	Fork-lift and handling trucks	0.3	2.0	0.2	1.50	11.86
5	2701	Coal and similar fuels	0.0	1.0	0.1	0.26	11.72
6	0201	Fresh or chilled bovine meat	1.0	1.5	0.2	6.52	9.73
7	0402	Milk and cream, concentrated or sweetened	0.4	1.1	0.1	2.93	9.55
8	8502	Electric generators and converters	0.0	1.5	0.2	0.13	9.28
9	2208	Undenatured ethyl alcohol and spirits	0.8	1.9	0.2	3.43	8.30
10	2202	Sweetened non-alcoholic beverages	0.1	1.5	0.2	0.27	6.66
11	2203	Malt beer	0.1	0.8	0.1	1.11	6.40
12	3004	Therapeutic medicaments in measured doses	11.9	20.5	3.8	3.16	5.45
13	7010	Glass containers and closures	0.0	0.6	0.1	0.42	5.34
14	1602	Preserved meat (excl. sausages)	0.4	0.6	0.1	3.09	4.66
15	9401	Seats and parts (excl. medical)	0.0	2.4	0.5	0.06	4.63
16	0406	Cheese and curd	0.7	1.9	0.4	1.54	4.46
17	4819	Paper-based packing containers	0.1	1.0	0.2	0.28	4.29
18	9026	Instruments for measuring liquids/gases	0.0	0.7	0.2	0.23	4.13
19	1901	Food preparations not containing cocoa	0.8	0.7	0.2	4.52	4.04
20	3925	Plastic builders' ware, n.e.s.	0.1	0.6	0.1	0.60	3.94
IRELAND							
1	2935	Sulphonamides	1.8	0.0	0.0	66.82	0.01
2	2934	Nucleic acids, salts; heterocyclic compounds	3.8	0.0	0.1	42.24	0.03
3	2933	Nitrogen heterocyclic compounds	9.8	0.0	0.3	34.56	0.03
4	2937	Hormones, prostaglandins, thromboxanes	3.4	0.0	0.1	33.37	0.00
5	3302	Odoriferous substance mixtures, for industry	2.6	0.0	0.1	18.71	0.03
6	0405	Butter and milk-derived fats/oils	0.7	1.0	0.1	8.73	13.07
7	9001	Optical fibres, cables, lenses, mirrors	0.8	0.0	0.1	8.28	0.07
8	3002	Blood and immunological products	23.1	2.0	2.9	8.02	0.68
9	8542	Electronic integrated circuits, parts	5.9	0.0	0.8	7.40	0.00
10	9021	Orthopaedic appliances and hearing aids	3.2	0.0	0.5	6.77	0.04
11	0201	Fresh or chilled bovine meat	1.0	1.5	0.2	6.52	9.73
12	3824	Binders and chemical preparations, n.e.s.	1.4	0.1	0.3	4.97	0.41
13	1901	Food preparations not containing cocoa	0.8	0.7	0.2	4.52	4.04
14	9018	Medical, dental and veterinary instruments	4.0	0.6	0.9	4.29	0.65
15	2208	Undenatured ethyl alcohol and spirits	0.8	1.9	0.2	3.43	8.30
16	3004	Therapeutic medicaments in measured doses	11.9	20.5	3.8	3.16	5.45
17	8523	Sound recording media	0.6	0.0	0.2	2.98	0.07
18	8473	Parts/accessories for bicycles, vehicles, etc.	0.6	0.0	0.3	2.47	0.03
19	8802	Powered aircrafts	1.9	0.0	0.8	2.26	0.04
20	7113	Precious metal articles of jewellery (excl. old)	0.6	0.1	0.3	2.11	0.20

Notes: IE=Ireland, NI=Northern Ireland. N.e.s. = Not elsewhere specified. RCA=Revealed comparative advantage. RCA greater than one are highlighted in green.

Whitaker Square,
Sir John Rogerson's Quay,
Dublin 2
Telephone **+353 1 863 2000**
Email **admin@esri.ie**
Web **www.esri.ie**
Twitter **@ESRIDublin**