Office for National Statistics

Article

Patterns of Northern Ireland trade by destination, product and business characteristics: 2012 to 2016

The main characteristics of Northern Ireland trade in goods using experimental trade statistics.

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1 . Main points

- New figures show that Northern Irish businesses conducted most international trade with the Republic of Ireland, accounting for around 27% of exports and 23% of imports; however, a separate data source, which includes intra-country trade, highlights that the rest of the UK remains Northern Ireland's biggest market.
- More than 50% of Northern Ireland's goods exports went to just two countries, the Republic of Ireland and the USA; the Republic of Ireland was the most important destination for food and live animals, while the USA was the most important destination for machinery and transport.
- Food and live animals represented around 33% of the total Northern Irish exports going to the Republic of Ireland, of which the top sub-category was milk and cream products.
- Almost 70% of exporting businesses in Northern Ireland were small (employing 0 to 49 workers), selling a small number of products to a few markets.
- Domestic businesses in Northern Ireland were less diversified in terms of products and markets compared with foreign-owned businesses.
- The biggest proportion of two-way trade in similar products was in food and live animals, suggesting integration of supply-chains in this category.

2 . Introduction

This analysis examines the main characteristics of Northern Ireland's trade in goods activity using experimental trade statistics for 2012 to 2016. This article documents the findings of a joint project between Office for National Statistics (ONS) – which led the project – Her Majesty's Revenue and Customs (HMRC) and the Northern Ireland Statistics and Research Agency (NISRA), to link HMRC-recorded declarations of trade in goods with records from the UK's Inter-Departmental Business Register (IDBR).

This analysis also builds on recent analysis of equivalent data for the UK as a whole. As set out in a companion article, ONS undertook the task of creating a new, linked dataset containing trade in goods transactions data and information from the UK's IDBR (PDF, 2.2MB). The resulting dataset enables rich analysis of trade, which can be used to assess the characteristics of trade in goods, including the mix of products and the variety of export destinations.

We recognise that high levels of specialisation amongst exporters can be a positive feature if the specialisation is in areas of high current demand and future growth prospects; however, concentration in a relatively narrow range of products and/or markets can bring exposure to risk (Lawless and others, 2017). The novelty of this analysis is twofold. First, we use the new, granular dataset to examine the extent of product and destination diversity in the trading behaviour of businesses based in Northern Ireland. Second, we estimate the extent of supply-chain integration between the Northern Irish and global economy.

This analysis makes use of recently-developed methodologies in the field of applied international trade to analyse the contribution of the extensive and intensive margins to the value of Northern Irish exports, both across destination markets and with a focus on trade with the Republic of Ireland. We examine the extent of the integration of cross-border as well as global supply-chains by examining the extent of trade in intermediate products by applying the UN Broad Economic Categories (BEC) classification system. We also consider the extent of two-way trading (businesses that simultaneously import and export similar products).

To address these issues, in this article, we consider the following main research questions and related sub-questions:

- What is the prevalence of international trade in goods among businesses based in Northern Ireland and how does this compare with similar data for the UK as a whole? What are the characteristics of Northern Irish businesses that trade?
- How diversified are exporters located in Northern Ireland in terms of products and destination markets?
- What is the extent of cross-border supply chain integration for businesses in Northern Ireland?
    - How common is trade in both directions (imports and exports) by the same business in similar products?
    - What is the extent of supply-chain dependencies assessed by distinguishing the HMRC data into final, intermediate, capital and consumption goods[1] by origin and destination?

While the new dataset that we use is highly detailed, it is limited in several important respects, as documented in the accompanying article (PDF 2.2MB). In particular, our trade data does not capture all trade with the European Union (EU) because of Intrastat reporting rules. These rules specify that traders who export and/or import relatively low values are not required to report detailed trade declarations to HMRC to reduce administrative burden on these traders. Lower thresholds apply to non-EU trade, meaning that our dataset captures most low-value trades with non-EU countries but may omit low-valued trade with EU countries.

As barriers to goods trade may be lower between Northern Ireland and the EU – facilitated by a land border, for instance – there are some grounds for thinking that this may be more important for Northern Ireland than for the UK as a whole. Changes in these reporting thresholds may also be important in explaining apparent changes in the prevalence of trading behaviour through time. For alternative estimates of exporters of goods or services, readers can consult the recently-released Northern Ireland Broad Economy Sales and Exports Statistics (BESES) 2016 (PDF, 378KB).

This dataset is also limited to trade in goods alone, and therefore does not capture trade in services, nor does it capture onward shipping of content traded through supply chains. It also depends on an apportionment exercise (PDF, 2.2MB), which is documented in our accompanying article. We also acknowledge the limitations associated with the UN BEC classification, which separates goods into consumption, capital, intermediate and other goods categories. Certain goods are allocated into a single category for analytical purposes, even though a product could be considered both an intermediate good and a final good depending upon how it is used or sold.

Despite these limitations, our analysis still covers almost 80% of the Northern Ireland economy and provides highly-detailed information about the prevalence of trade declarations among Northern Irish businesses. BESES, the experimental annual measure of Northern Irish businesses' sales to foreign markets, indicates that goods exports account for 78% of Northern Ireland's total exports, whereas services account for the remaining 22% of total exports.

The article is structured as follows: we provide a summary of the data sources and linkage methods we used for the analysis, then we analyse patterns of Northern Irish trade in goods by product and destination markets, we present analysis of the performance of exporters using extensive and intensive margins of trade, and lastly, we attempt to estimate the extent of supply-chain linkages for Northern Irish businesses.

Notes for: Introduction

1. The categories of capital, intermediate and consumption goods are defined by the UN Broad Economic Categories classification system.
2. In 2016, an Intrastat threshold of £250,000 applied to exports to the EU, whereas that of £1,500,000 applied to imports from the EU. For a comprehensive explanation regarding Intrastat thresholds please see Wales and others (2018).

3 . Data sources and summary of the methods for data linkage

In this section we provide a summary description of the dataset we used in the analysis. For a comprehensive explanation of the methodology, including commentary about robustness checks we encourage readers to consult the recently published Economic Statistics Centre of Excellence discussion article examining the link between business performance and trade in goods status at the businesses level (PDF, 2.2MB) by Wales and others (2018). The methodological section in that article sets out full details of the datasets we used as well as the matching, linking and apportionment methodology. We would welcome feedback on these experimental methods.

In this analysis, we use the dataset generated by Wales and others (2018), which was created by linking records from HM Revenue and Customs (HMRC)'s trade in goods declarations with snapshots of the Inter-Departmental Business Register (IDBR) at the enterprise group[1] level. Information on the value of trade, the product, country of destination or origin and the port of entry or exit are associated with a range of business identifiers and characteristic information including ownership, industry and employment at the various levels of the trading business.

Having linked the goods transactions to the enterprise group, the value of those trades is apportioned across the constituent reporting units belonging to that enterprise group. The majority of businesses have a single reporting unit and therefore trade from any Value Added Tax (VAT) reference linked to that business is all allocated to that single reporting unit. Under more complicated scenarios when, for example, a VAT reference is linked to multiple reporting units, values of imports and exports were apportioned across the constituent reporting units of a business.

As set out in the accompanying article, there is a range of methods for apportioning trade across reporting units. One way to apportion trade is to take the employment in each reporting unit as a proportion of all employment in the whole enterprise group and using this proportion to allocate values of trade from the enterprise group to each unit. This is conceptually problematic if an enterprise group comprises several different reporting units that belong to different industries. This approach also allocates large proportions of a company's trade to reporting units with high employment, irrespective of whether the traded product is a close fit for the industrial activity of the reporting unit.

Our preferred apportionment mechanisms attempt to address these shortcomings by constructing "weights" for each reporting unit, which give a sense of the intensity with which different industries trade different products. The results presented in this article are based upon these experimental weighted trade values. For a comprehensive explanation of the apportionment strategy, please see the Wales and others (2018) discussion paper.

For this analysis, we extracted trade values for Northern Ireland from the UK-linked dataset by matching the records associated with reporting units recorded in the Northern Irish IDBR. Throughout this article, we use the term "business" in reference to reporting units[1]. Our trade values, drawn from HMRC record-level data, differ somewhat from the estimates published in HMRC's Regional Trade Statistics (RTS), whereby in 2016 our overall estimate is 6.6% lower than the RTS estimate for Northern Ireland. The main differences between our methodology and the RTS methodology relate to different linkage methods, as well as differences in the apportionment method. Table I in Appendix A shows the corresponding differences between our estimates and HMRC-published RTS estimates.[2] The details of the RTS methodology used by HMRC are also available.

Notes for: Data sources and summary of the methods for data linkage

1. The Inter-Departmental Business Register (IDBR) categorises a business from the lowest-level units, the offices, branches, factories, warehouses, and so forth known as “local units”, with collections of local units being controlled by a “reporting unit”, collections of reporting units belonging to an “enterprise” and collections of enterprises belonging to an “enterprise group”.

2. In our analysis conducted at the reporting unit level, we exclude aggregate estimates for businesses operating below the Intrastat reporting threshold as they cannot be assigned to any particular trader. In Table I in Appendix A, we include below the threshold estimates to enable more accurate comparison between RTS estimates with our own.

4 . Patterns of Northern Ireland trade by country of destination and product

Characteristics of traders

Only a small proportion of businesses trade goods internationally, but these businesses account for a large proportion of total employment. The first panel in Table 1 shows the proportion of businesses that declared international trade in goods transactions in 2016 and the proportion of non-trading businesses, as well as their respective employment shares by different employment size-bands[1] for Northern Ireland. The second panel shows the equivalent information for UK businesses.

The results suggest that only 4.3% of businesses in Northern Ireland traded according to trade declarations in 2016, but they employed 25% of all workers. These trends are similar to those for the UK as a whole: 4.6% of UK businesses traded in 2016, but they accounted for 40% of employment.

Table 1 shows that large businesses (250 or more workers) represented only 1.8% of businesses in Northern Ireland. However, large businesses that declared trade transactions employed 18% of Northern Ireland’s workers and large businesses that did not declare trade transactions employed 35% of workers, thus the 1.8% of businesses employed 53% of workers in Northern Ireland. In the UK as a whole, large businesses that declared trade transactions employed nearly 34% of workers and large businesses that did not declare trade transactions employed 22% of workers, thus 2% of businesses employed nearly 56% of all workers.

Table 1 also shows that micro and small businesses (fewer than 50 workers) accounted for 96% of all businesses in Northern Ireland in 2016 and they employed 34% of workers in Northern Ireland. Only 3% of Northern Ireland’s workers were employed by micro or small businesses that declared trade transactions in 2016, whereas 31% worked for micro or small businesses that did not declare trade transactions. Hence, the composition of businesses in terms of their size varies between Northern Ireland and UK economies and these differences account for a large part of the difference in the prevalence of international trade goods behaviour. In particular, the lower prevalence of trade in goods behaviour in the biggest businesses drives the lower prevalence of employment in large trading businesses located in Northern Ireland compared with those in the UK.

Table 1: Breakdown of business activity by size of business and trading status, Northern Ireland and UK, 2016

Country and size of enterprise group	Percentage of all businesses which declared trade transactions	Percentage of all businesses which did not declare trade transactions	Percentage of all employment in businesses which declared trade transactions	Percentage of all employment in businesses which did not declare trade transactions
Northern Ireland				
Micro (0 to 9 employment)	2.0	84.9	0.6	18.4
Small (10 to 49 employment)	1.3	8.0	2.3	12.8
Medium (50 to 249 employment)	0.6	1.5	3.9	8.8
Large (250 or more employment)	0.5	1.3	18.1	35.1
Businesses of all sizes	4.3	95.7	24.9	75.1
UK				
Micro (0 to 9 employment)	2.4	84.1	0.7	17.4
Small (10 to 49 employment)	1.2	7.7	2.1	11.8
Medium (50 to 249 employment)	0.6	2.0	3.7	8.6
Large (250 or more employment)	0.4	1.6	33.7	22.0
Businesses of all sizes	4.6	95.4	40.3	59.7

Source: Office for National Statistics, ONS estimates using HMRC data

Notes:

1. Percentages are based on the reporting unit classifications of businesses.

2. Numbers of businesses, numbers of employment and business size are based upon information from the Inter-Departmental Business Register.

3. The breakdowns of businesses by size used throughout this article have been compiled according to the international standard definitions devised by the European Commission. We use the employment levels of each enterprise group to classify the size band that its reporting units belong to. Size bands are defined as:

· Micro businesses: with fewer than 10 employment

· Small businesses: with 10 to 49 employment

· Medium-sized businesses: with 50 to 249 employment

· Large businesses: with 250 or more employment

4. Figures shown may not sum exactly to 100% due to rounding.

Foreign-owned businesses operating in Northern Ireland are also much more likely to declare trade in goods transactions than domestically-owned businesses, although foreign-owned businesses are fewer in number than in the UK as a whole. Table 2 shows that in 2016 in Northern Ireland, 1.2% of all businesses were foreign-owned while the rest were domestically-owned businesses. A similar pattern applies to the UK, where 1.5% of businesses were foreign-owned.

Foreign-owned businesses employed 12% of workers in Northern Ireland, comprising 8% employed by foreign-owned businesses that declared trade transactions in 2016 and 4% by businesses that did not declare trade. In the UK, foreign-owned businesses employed around 14% of workers, comprising 12% employed by foreign-owned businesses that submitted trade declarations in 2016, and 2% that did not. However, when compared with the Republic of Ireland there is a relatively low number of foreign-owned business located in Northern Ireland, with evidence to suggest that foreign direct investment (FDI) from the USA represents a sizeable share of the total FDI received by Northern Ireland (Byrne, 2017).

Table 2: Breakdown of business activity by ownership of business and trading status, Northern Ireland and UK, 2016

Country and enterprise group ownership status	Percentage of all businesses which declared trade transactions	Percentage of all businesses which did not declare trade transactions	Percentage of all employment in businesses which declared trade transactions	Percentage of all employment in businesses which did not declare trade transactions
Northern Ireland				
Domestically-owned business	3.9	94.9	16.8	71.1
Foreign-owned business	0.4	0.8	8.2	4.0
All businesses	4.3	95.7	24.9	75.1
UK				
Domestically-owned business	4.1	94.4	28.3	57.5
Foreign-owned business	0.4	1.0	12.0	2.2
All businesses	4.6	95.4	40.3	59.7

Source: Office for National Statistics, ONS estimates using HMRC data

Notes:

1. Numbers of businesses, numbers of employment and business ownership are based upon information from the Inter-Departmental Business Register.

2. Figures shown may not sum exactly to 100% due to rounding.

Trading patterns also vary by industry. In Northern Ireland, businesses in mining and quarrying (B, including oil extraction), manufacturing (C), wholesale and retail (G) were the most likely industries to declare trade transactions. The smallest proportions of businesses that declared trade transactions were in agriculture, forestry and fishing (A), the public sector (O, P and Q) and accommodation and food services (I).

In the UK, it is businesses in the manufacturing (C), wholesale and retail (G), mining and quarrying (B, including oil extraction) and electricity, gas and steam, and water supply, sewerage and waste collection (D and E) industries that were most likely to declare trade transactions. In the UK, the smallest fractions of private sector businesses that declared trade transactions were in agriculture, forestry and fishing (A), construction (F) and accommodation and food services (I).

While Table 3 shows that only a minority of businesses in the most prevalent industries declared trade in 2016, the proportions of employment accounted for by traders differ significantly across industries. In 2016 in Northern Ireland, 27% of businesses in mining and quarrying (B) reported either exports or imports while the share of employment accounted for by businesses with trade in goods declarations was almost 70%. In manufacturing (C), 20% of businesses that declared trade accounted for around 78% of workers and in information and communication (J), 5% of businesses declared trade, accounting for 54% of employment in this industry.

In the UK, 20% of businesses in manufacturing (C) reported either exports or imports in 2016 while the share of employment in trading businesses was 75%. In mining and quarrying (B), the employment share accounted for by businesses that declared trade was around 82%, while in wholesale and retail (G), the 15% of businesses declaring trade in goods accounted for 67% of workers in that industry in 2016.

Table 3: Breakdown of business activity in Northern Ireland and UK by industry of business and trading status, 2016

Breakdowns of business activity in Northern Ireland by industry of business and trading status, 2016

Standard Industrial Category (SIC) 2007	Percentage of Northern Ireland businesses in this industry which declared trade transactions	Percentage of Northern Ireland businesses in this industry which did not declare trade transactions	Percentage of Northern Ireland employment in this industry working for businesses which declared trade transactions	Percentage of Northern Ireland employment in this industry working for businesses which did not declare trade transactions
A: Agriculture, forestry and fishing	0.3	99.7	2.2	97.8
B: Mining and quarrying	27.2	72.8	69.4	30.6
C: Manufacturing	20.4	79.6	78.2	21.8
D, E: Water supply, sewerage, waste management and remediation activities; and electricity, gas, steam and air conditioning supply	6.9	93.1	27.5	72.5
F: Construction	1.6	98.4	16.7	83.3
G: Wholesale and retail trade; repair of motor vehicles and motorcycles	12.0	88.0	40.3	59.7
H: Transport and storage	3.3	96.7	33.7	66.3
I: Accommodation and food services	1.0	99.0	9.1	90.9
J: Information and communication	4.8	95.2	53.8	46.2
K: Finance and insurance activities	1.7	98.3	50.2	49.8
L, M: Real estate, professional, scientific and technical activities	1.8	98.2	15.1	84.9
N: Administrative and support services	4.1	95.9	32.3	67.7
O, P, Q: Public administration; Education; Human health and social work	0.8	99.2	5.0	95.0
R, S: Arts, entertainment and recreation and Other services	1.4	98.6	12.4	87.6

Breakdowns of UK business activity by industry of business and trading status, 2016

Standard Industrial Category (SIC) 2007	Percentage of UK businesses in this industry which declared trade transactions	Percentage of UK businesses in this industry which did not declare trade transactions	Percentage of UK employment in this industry working for businesses which declared trade transactions	Percentage of UK employment in this industry working for businesses which did not declare trade transactions
A: Agriculture, forestry and fishing	0.6	99.4	7.3	92.7
B: Mining and quarrying	14.4	85.6	82.1	17.9
C: Manufacturing	20.0	80.0	75.1	24.9
D, E: Water supply, sewerage, waste management and remediation activities; and electricity, gas, steam and air conditioning supply	6.6	93.4	73.7	26.3
F: Construction	1.1	98.9	19.5	80.5
G: Wholesale and retail trade; repair of motor vehicles and motorcycles	15.3	84.7	67.2	32.8
H: Transport and storage	3.3	96.7	61.7	38.3
I: Accommodation and food services	1.0	99.0	27.8	72.2
J: Information and communication	2.8	97.2	52.7	47.3
K: Finance and insurance activities	1.3	98.7	63.5	36.5
L, M: Real estate, professional, scientific and technical activities	2.1	97.9	25.4	74.6
N: Administrative and support services	2.5	97.5	28.3	71.7
O, P, Q: Public administration; Education; Human health and social work	0.8	99.2	24.9	75.1
R, S: Arts, entertainment and recreation and Other services	2.8	97.2	24.8	75.2

Source: Office for National Statistics, ONS estimates using HMRC data

Notes:

1. The industrial sections presented are the industry of the reporting unit based upon the UK Standard Industrial Classification (SIC) 2007.

2. Proportions of employment are based upon information from the Inter-Departmental Business Register.

3. Figures shown may not sum exactly to 100% due to rounding.

Export patterns by country of destination

We continue by examining the extent of Northern Ireland exports diversification by looking at the destination of exports and comparing export patterns with those of the UK. It should be noted that the HM Revenue and Customs (HMRC) trade data does not contain transactions between Northern Ireland and Great Britain, because that is intra-regional trade within the UK.

The Northern Ireland Statistics and Research Agency (NISRA), which is responsible for collecting Broad Economy Sales and Exports Statistics (BESES), provides an experimental measure of domestic, regional and export sales by businesses located in Northern Ireland to markets in Great Britain and the rest of the world.

BESES figures for goods and services in 2016 show that 35% of the total turnover of Northern Ireland businesses was sold outside Northern Ireland. Of these total sales, the majority (58%) went to Great Britain whereas the remaining 42% were exported to the rest of the world, therefore in 2016 Great Britain continued to be the most important market for businesses located in Northern Ireland.

Sales to Great Britain were worth one and a half times the value of all Northern Ireland exports and nearly four times the value of exports to the Republic of Ireland in 2016. However, the sale of finished products to Great Britain relies upon cross-border trade in raw materials and components through integrated supply chains, meaning trade with both Great Britain and the Republic of Ireland are vital to Northern Ireland's economy (NISRA, 2018). We estimate the extent of supply-chain interdependencies between Northern Ireland and the Republic of Ireland in Section 6 but acknowledge that further research is needed to investigate supply-chain linkages between Northern Ireland and Great Britain.

Figure 1 shows that businesses that declared exports to the Republic of Ireland represented almost 67% of all exporters and they accommodated almost 74% of all workers employed in exporting businesses in 2016. Businesses whose only reported exports were to the Republic of Ireland accounted for 32% of exporters and accommodated almost 17% of Northern Irish workers employed in exporting businesses. This indicates that businesses that have a more diversified portfolio of trading partners tend to employ more people.

Figure 1: Percentage of Northern Irish exporters and employment by trader status

2016

Source: Office for National Statistics, ONS estimates using HM Revenue and Customs data

Notes:

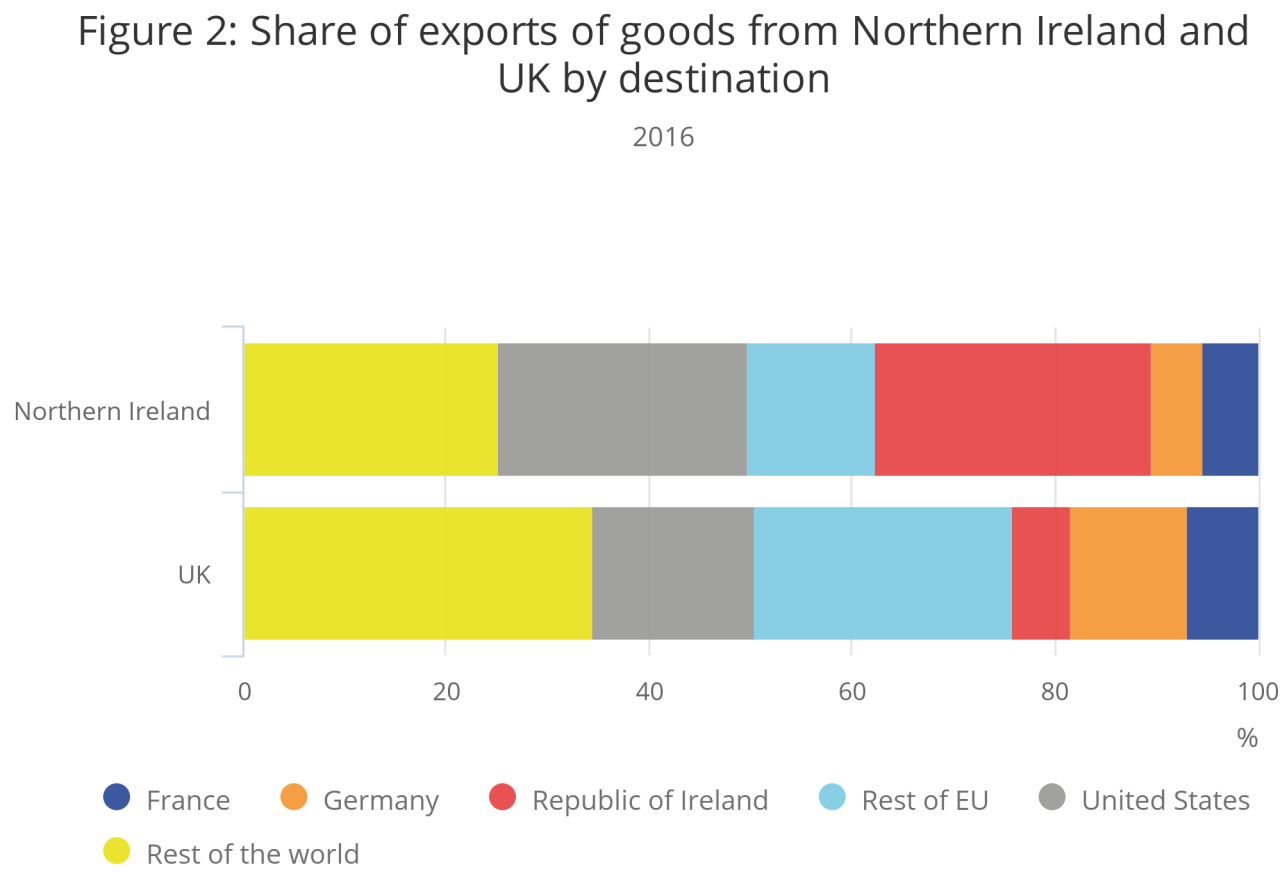
1. RoI means Republic of Ireland.
2. A business is a trader if it declares any incoming or outgoing international goods trade transactions in 2016
3. Businesses that export to RoI includes both businesses which sell only to the Republic of Ireland, and businesses which sell to the Republic of Ireland and any other destination.

Comparing exports from Northern Ireland with exports from the whole UK by destination, Figure 2 shows that the Republic of Ireland was the single-largest destination for goods exports from Northern Ireland, accounting for approximately 27% of the total value of declared exports in 2016. The second-largest destination for goods exports from Northern Ireland was the USA, accounting for approximately 25% of declared exports. However, the single most important destination for UK-declared exports in 2016 was the USA, with approximately 16%, and second was Germany accounting for around 11% of exports.

Goods exports from Northern Ireland were highly concentrated, with more than 50% going to the Republic of Ireland and the USA combined. This pattern differs to the UK because UK exports were spread over a wider range of destinations. Also, Canada was a more important trading partner for goods exports from Northern Ireland, occupying fifth place, whereas it was 16th place for the UK (not shown in Figure 2). Between 2012 and 2016, the share of exports from Northern Ireland to the Republic of Ireland as a proportion of total declared goods exports decreased by 3 percentage points, whereas the proportion of exports to the USA increased by 12 percentage points.

Figure 2: Share of exports of goods from Northern Ireland and UK by destination

2016



Source: Office for National Statistics, ONS estimates using HM Revenue and Customs data

Notes:

1. Figures shown may not sum exactly to 100% due to rounding.

Export patterns by commodity

We next compare Northern Ireland and the UK's exports structure, differentiating between commodities as defined by broad Standard Industrial Trade Classification (SITC)[2]. Many of the UK trends are replicated for Northern Ireland. Figure 3 shows that in 2016, the three SITC categories of machinery and transport equipment, chemicals and related products, and miscellaneous manufactured articles when grouped together represented a little under three-quarters of the total exports and the corresponding figure for the UK was a little over three-quarters.

However, one important difference between Northern Ireland and the UK was the relative contribution of declared exports of food and live animals. In 2016, food and live animals' exports from Northern Ireland accounted for around 14% of goods exports from Northern Ireland, whereas the same category accounted for slightly less than 5% of the total exports from the UK (Figure 3). The share of food and live animals' exports from Northern Ireland as a proportion of all exports decreased slightly from 2012 to 2016 (by just under 4 percentage points), whereas the proportion of chemicals and related products exports increased by around 12 percentage points. In 2016, chemicals and related products accounted for around 22% of total Northern Irish goods exports, while this figure was close to 19% for the UK.

Figure 3: Share of exports of goods from Northern Ireland and UK by SITC1 category

2016

Source: Office for National Statistics, ONS estimates using HM Revenue and Customs data

Notes:

1. For further information about the Standard International Trade Classification (SITC), see USND classifications.

2. Figures shown may not sum exactly to 100% due to rounding.

Figure 4 provides an overview of the structure of declared exports by top four SITC1 commodity groups, from Northern Ireland by destination. Northern Ireland exports to the Republic of Ireland differ in composition relative to exports to other markets and the relative importance of these gross flows differs.

As Figure 4 demonstrates, trade with the Republic of Ireland is as important to Northern Ireland as trade with the rest of the world, and the ranking of exported commodities varies by destination of exports. For example, food and live animals' exports represented the most important category exported to the Republic of Ireland, at 33%, although food and live animals' exports were less important for other, selected trading destinations as shown in Figure 4. Machinery and transport equipment accounted for a larger proportion of Northern Ireland exports than food and live animals, and this was the most important category exported to the rest of the world, the rest of EU, France and Germany. The category with the highest proportion of exports going to the USA was chemicals and related products.

Figure 4: Distribution of exports of goods from Northern Ireland to selected destinations by SITC1 category

Download the data

A more granular breakdown based on most important SITC3 categories exported to the Republic of Ireland shows that “milk and cream, and milk products other than butter or cheese” (SITC3 code 022) accounted for £152 million, or 8% of the total, declared exports to the Republic of Ireland in 2016. As Table 4 shows, this category was followed by non-alcoholic beverages, representing almost 6% of total exports to the Republic of Ireland. Indeed, the four SITC3 product groups of milk and cream products, non-alcoholic beverages, feeding-stuff for animals, and cereal preparations and preparations of flour starch of fruits and vegetables, when combined amounted to around 21% of total exports to the Republic of Ireland in 2016.

InterTradeIreland (2017) examined how cross-border trade could be affected by increases in trade restrictions and found that the reduction in trade between Northern Ireland and the Republic of Ireland would be between two and three times higher than the impact on trade between the Republic of Ireland and Great Britain depending on the scenario and other assumptions. This was driven largely by the different sectoral composition of trade, with a greater share of agri-food products present in cross-border trade.

The agri-food sector (dairy and meat in particular) has been highlighted by several studies as being particularly exposed to the effects of any changes in trading patterns because systematically-higher tariffs tend to apply in this sector (InterTradeIreland, 2017). While direct trade links may be exposed to potential costs from tariffs, two-way trade also risks disruption from delays (Studnicka and Lawless, 2018). This is particularly important for perishable goods such as food.

Table 4: Value and percentage of exports from Northern Ireland to the Republic of Ireland by top four SITC3 categories, 2016

SITC3	SITC3 Description	Export value (£, million)	Percentage of total exports to trading partner (%)
022	Milk and cream and milk products other than butter or cheese	152	8.0
111	Non-alcoholic beverages, n.e.s.	111	5.8
081	Feeding stuff for animals (not including unmilled cereals)	71	3.7
048	Cereal preparations and preparations of flour or starch of fruits or vegetables	69	3.6

Source: Office for National Statistics, ONS estimates using HMRC data

Notes: For further information about the Standard International Trade Classification (SITC), please see details about the classification compiled by the United Nations Statistics Division.

We next examine the selected four broad commodity categories (SITC1) exported from Northern Ireland and present selected destination markets for each in Figure 5.

In 2016, amongst the four most important product categories in relation to the value of their respective exports we select:

- machinery and transport equipment, such as engines, pumps, electrical components and vehicles
- chemicals and related products, which includes plastics and toiletries as well as specialist chemicals
- miscellaneous manufactured articles, which includes items like clothing, jewellery, office supplies, toys, cameras, and building equipment
- food and live animals

Figure 5 shows that the most important destination for machinery and transport equipment, and chemicals and related products, was the USA. Around 21% of machinery and transport equipment, and 57% of chemicals and related products, were exported from Northern Ireland to the USA in 2016.

For miscellaneous manufactured articles, both the Republic of Ireland and the USA were equally important export destinations jointly representing half of total exports from this category. In contrast, the most concentrated product group was food and live animals, of which almost two-thirds was exported to the Republic of Ireland alone. The Republic of Ireland was also the top destination for manufactured goods classified chiefly by material, which includes specific worked materials such as leather, glass, paper, fabrics, pottery and processed metals like steel and copper (not shown in Figure 5).

Figure 5: Distribution of exports of goods from Northern Ireland by destination and SITC1 category

2016

Download the data

Considering the rest of the world share, the Chinese economy is an important destination for exports from Northern Ireland for several goods, namely miscellaneous manufactured articles, machinery and transport equipment, and to a lesser extent chemicals and related products (not presented in Figure 5). However, this should not be over-emphasised as the share of exports sold to China remains modest relative to the closer destination markets of the EU.

Other than food and live animals, the Republic of Ireland was the most important destination for miscellaneous manufactured articles and for manufactured goods classified chiefly by material (the latter category is not shown in Figure 5). The USA was the most important country of destination for the top two SITCs: machinery and transport equipment, and chemicals and related products. The EU represented a particularly important destination for exports from the food and live animals' category.

If we compare the Northern Ireland share of trade (both exports and imports) with its major destinations, Figure 6 shows that most trade by businesses located in Northern Ireland was conducted with the Republic of Ireland. This is consistent with findings by Studnicka and Lawless (2018) who investigated trading patterns of Irish businesses and found that the highest share of trade to and from the Republic of Ireland was assigned to Northern Ireland and Great Britain. This means that for many businesses the main (and in approximately 32% of cases: the only) international engagement is on a cross-border basis.

Figure 6: Share of top ten goods trade destinations from Northern Ireland

2016

Source: Office for National Statistics, ONS estimates using HM Revenue and Customs data

Notes:

1. Canada has been omitted from the top ten for reasons of confidentiality.

Notes for: Patterns of Northern Ireland trade by country of destination and product

1. The breakdowns of businesses by size used throughout this article have been compiled according to the international standard definitions devised by the European Commission. Size bands are defined as:

    - Micro businesses: with fewer than 10 employment
    - Small businesses: with 10 to 49 employment
    - Medium-sized businesses: with 50 to 249 employment
    - Large businesses: with 250 or more employment

    Reporting units all belong to an enterprise group, such as the branches of a national supermarket or the showrooms of a car retailer, so while each separate reporting unit may only employ a small number of employees, those reporting units when added together may belong to a large enterprise group. Therefore, we use the employment levels of each enterprise group to classify the size band that its reporting units belong to. This is to avoid overstating those businesses which have a small number of employees located in Northern Ireland, but which have a large number of employees in their UK-wide enterprise group.

2. The Standard International Trade Classification (SITC) is a UN product classification used for international trade statistics (export and import values and volumes) allowing for international comparisons of commodities and manufactured goods.

5 . Margins of export

International evidence has found a great deal of variation in businesses' exports by product and market destinations (Bernard and others, 2012). Growing empirical evidence has also shown that only a fraction of businesses export and that those that export differ significantly from those that do not. A more recent strand of the literature is concerned with the dynamics of the extensive and intensive margins of trade and significant presence of short-lived export participation. This literature highlights the importance of marketing costs (Arkolakis, 2010), learning about foreign demand and learning about foreign partners (Araujo and others, 2012) to rationalise the presence of small exporters, short-lived export participations and the extensive exports growth of some young exporters (Mion and Muuls, 2014).

In this section, we apply the extensive and intensive margins analytical framework with the aim of assessing whether there are any notable differences in relation to export performance and the extent of specialisation and diversification between businesses of different size, ownership and industry.

To identify and understand variation in export performance, businesses' exports can be broken down by the number of products exported and/or numbers of countries exported to, known as the "extensive margin" and the average export sales per product and/or average export sales per country, known as the "intensive margin". The terms extensive and intensive margins of trade refer to different elements in the differences of changes that occur across businesses, markets or time, in the volume and value of exports and imports, and which combine to result in the observed differences in overall volume and value at aggregate level (Mion and Muuls, 2014; 13). Hence, for example, any given level change in total exports over time may result from a number or a combination of change in any of the following categories presented in Table 5.

Table 5: Extensive and intensive margins

	Extensive margin	Intensive margin
Businesses	Total number of exporters	Value or volume of exports per business
Countries	Total number of export destination countries	Value or volume of exports per country; Average number of countries
Product	Total number of products exported	Value or volume of exports per product; Average number of products

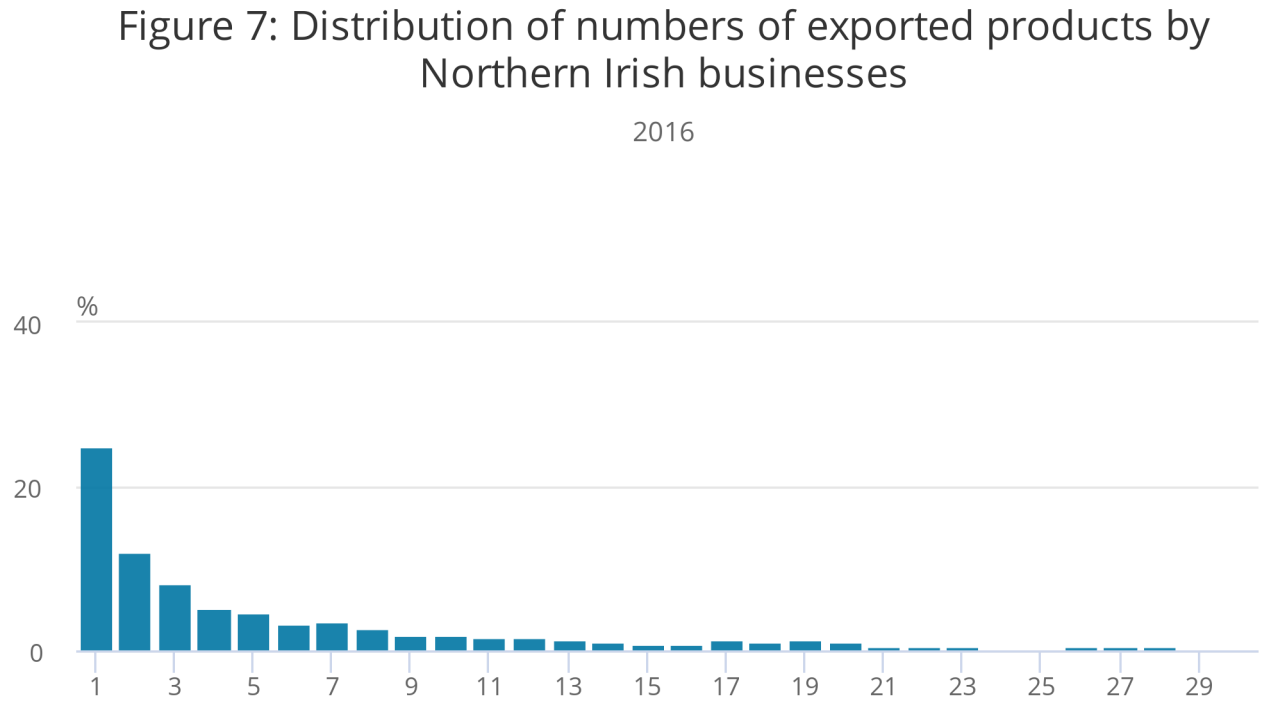
Source: Office for National Statistics

A change in the number of exporters from Northern Ireland, or a change in the total number of countries exported to, would be referred to as a change at the extensive margin, while a change in the average value or volume per exporter, or the average number of products or countries exported to, would be referred to as an intensive margin.

Figure 7 shows that 25% of Northern Irish exporters were exporting only one product, whereas only 0.4% exported 30 products in 2016. This indicates a very high specialisation or low diversification amongst a quarter of Northern Irish exporters. We measure product diversification using a count of products traded by a business, where a product is defined by the Combined Nomenclature (CN8) level customs classification. CN8 is a tool for classifying goods, set up to meet the requirements both of the Common Customs Tariff and other EU external trade statistics.

Figure 7: Distribution of numbers of exported products by Northern Irish businesses

2016



Source: Office for National Statistics, ONS estimates using HMRC data

Notes:

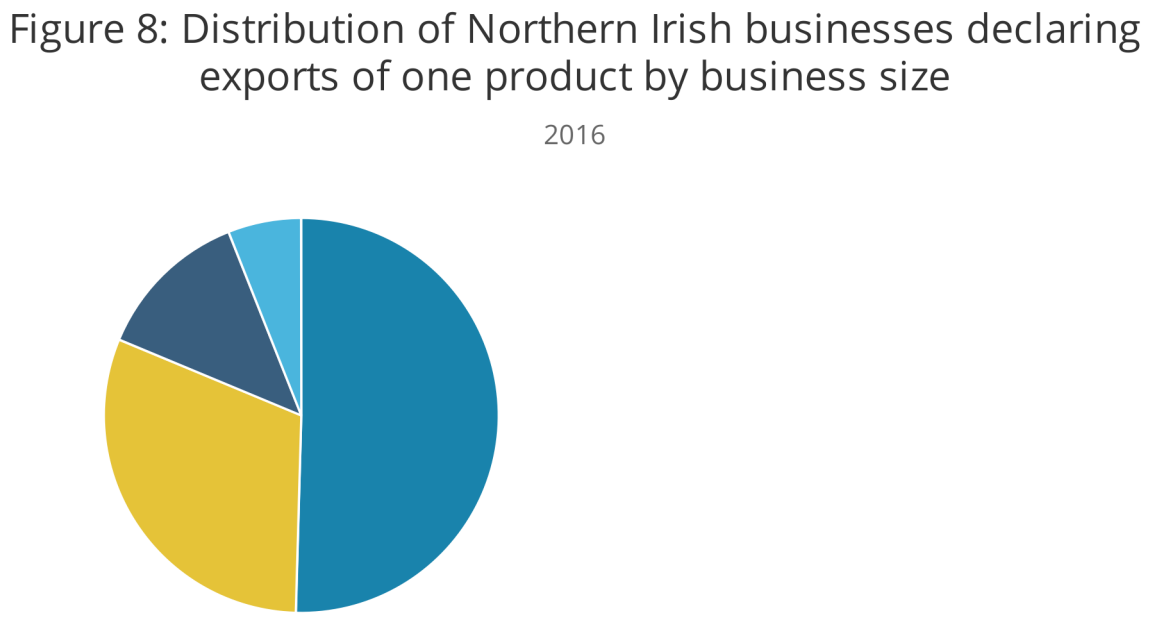
1. Product is defined by the CN8-level customs classification.

2. Businesses which export more than 30 products have been excluded.

Analysis by business size shows that 81% of businesses in Northern Ireland that exported only one type of product were either micro or small businesses (0 to 49 workers), whereas 6% of all businesses that exported only one type of product in 2016 were large, as shown in Figure 8.

Figure 8: Distribution of Northern Irish businesses declaring exports of one product by business size

2016



Source: Office for National Statistics, ONS estimates using HM Revenue and Customs data

Notes:

1. Product is defined by the CN8-level customs classification.

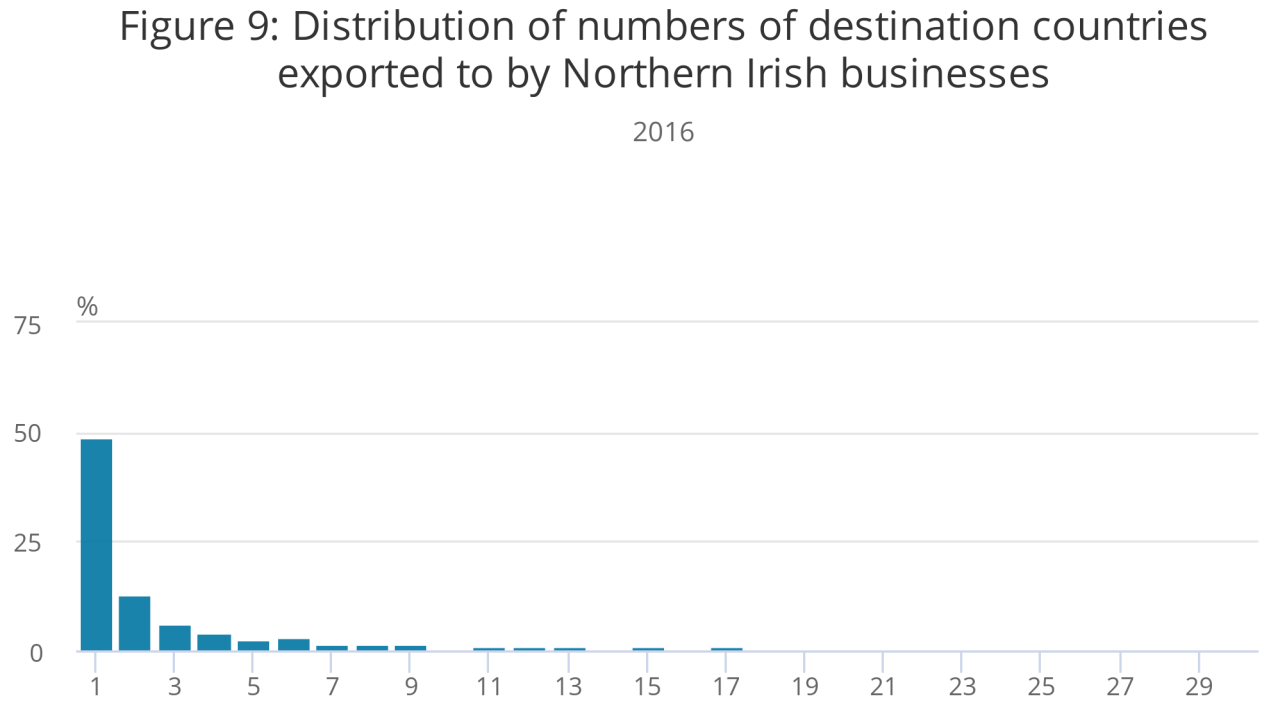
2. The breakdowns of businesses by size used throughout this article have been compiled according to the the the international standard definitions devised by the European Commission. We use the employment levels of each enterprise group to classify the size band that its reporting units belong to. Size bands are defined as:
   · Micro businesses: with fewer than 10 employment
   · Small businesses: with 10 to 49 employment
   · Medium-sized businesses: with 50 to 249 employment
   · Large businesses: with 250 or more employment

3. Figures shown may not sum exactly to 100% due to rounding.

Figure 9 shows that almost half of businesses located in Northern Ireland exported to only one destination in 2016. We have shown in Figure 1 that the share of total exporters who exported to the Republic of Ireland only was 32%, hence the proportion of all businesses that exported to only one country but not to the Republic of Ireland was around 17%.

Figure 9: Distribution of numbers of destination countries exported to by Northern Irish businesses

2016



Source: Office for National Statistics, ONS estimates using HM Revenue and Customs data

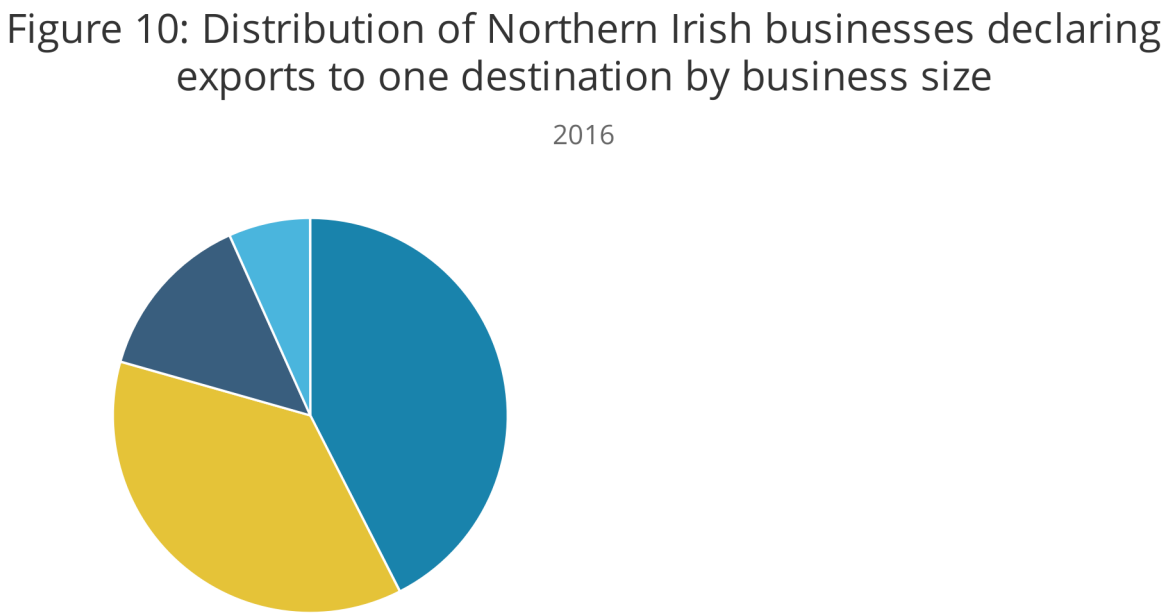
Notes:

1. Businesses which export to more than 30 destinations have been excluded.

A similar pattern of a relatively low diversification applies when we investigate a proportion of businesses that exported to only one country by size. Figure 10 shows that 80% of all businesses that exported to only one country were micro and small, whereas the corresponding figure for large businesses was around 7%.

Figure 10: Distribution of Northern Irish businesses declaring exports to one destination by business size

2016



Source: Office for National Statistics, ONS estimates using HM Revenue and Customs data

Notes:

1. The breakdowns of businesses by size have been compiled according to the international standard definitions devised by the European Commission. We use the employment levels of each enterprise group to classify the size band that its reporting units belong to. Size bands are defined as:
   · Micro businesses: with fewer than 10 employment
   · Small businesses: with 10 to 49 employment
   · Medium-sized businesses: with 50 to 249 employment
   · Large businesses: with 250 or more employment

In Table 6 we decompose total exports from Northern Ireland so that the first column divides businesses by size. Most goods-exporting businesses in Northern Ireland are micro and small businesses, selling a few products to a small number of destinations, while export values are dominated by a relatively smaller group of more globalised large businesses selling many products to many destinations. In 2016, the top two groups of exporters were micro businesses (0 to 9 workers) and small businesses (10 to 49 workers), each individually accounting for 34% of total exporters. Medium businesses (50 to 249 workers) accounted for 18%, whereas large businesses (250 or more workers) accounted for 14% of total exporters.

The decomposition in Table 6 reveals a similar pattern found for the UK (Mion and Muuls, 2014) and the Republic of Ireland (Lawless and others, 2017) with both studies using the same CN8 eight-digit commodity classification. A relatively large difference between average (mean) and median figures, indicates the presence of outliers (medians are not shown in Table 6). The presence of outliers is particularly prominent amongst large businesses, suggesting that there are few very large businesses that drive exports in this category.

Table 6: Export margins of Northern Irish businesses by business size, 2016

Business size	No. of businesses	Average no. of products	Average no. of destinations	Total exports (£, thousands)	Average exports (£, thousands)
Micro	635	8	3	445,024	701
Small	630	15	4	697,895	1,108
Medium	337	20	9	1,307,556	3,880
Large	263	97	24	4,591,022	17,456

Source: Office for National Statistics, ONS estimates using HMRC data

Notes:

1. Product is defined by the CN8-level customs classification.

2. The breakdowns of businesses by size used throughout this article have been compiled according to the the international standard definitions devised by the European Commission.

We use the employment levels of each enterprise group to classify the size band that its reporting units belong to. Size bands are defined as:

· Micro businesses: with fewer than 10 employment

· Small businesses: with 10 to 49 employment

· Medium-sized businesses: with 50 to 249 employment

· Large businesses: with 250 or more employment

We next look at the level of diversification of goods exports to examine how specialised were trade flows between Northern Ireland and the Republic of Ireland, compared with other export destinations.

One of the main findings is that Northern Irish exports to the Republic of Ireland are most diversified in terms of products, whereas Northern Irish exports to the rest of the EU are fairly concentrated in a few products, except for large businesses. The destination that attracted the highest number of exporting businesses was the Republic of Ireland, followed by the rest of the world (Table 7). The Republic of Ireland received the highest value of total exports from Northern Ireland as well as the highest average numbers of products exported. In 2016, of all exporters, 67% sold their goods to the Republic of Ireland.

It should be noted that a relatively large proportion of businesses exported to the rest of the world-excluding the EU and USA (over half of the exporters), whereas a smaller number of businesses exported to the rest of the EU. These figures should be interpreted with caution given that a significant number of exporters to the Republic of Ireland and the EU may have been omitted from our sample given Intrastat threshold rules.

Table 7: Export margins of Northern Irish businesses by destination and size, 2016

Country	Business size	No. of businesses	Average no. of products	Average no. of destinations	Total exports (£, thousands)	Average exports (£, thousands)
Republic of Ireland	Micro	325	12	1	302,855	932
	Small	456	17	1	448,369	983
	Medium	273	17	1	637,374	2,335
	Large	187	86	1	511,409	2,735
Rest of EU	Micro	107	3	4	35,199	329
	Small	181	5	5	120,787	667
	Medium	153	9	8	343,823	2,247
	Large	152	59	14	1,135,876	7,473
USA	Micro	136	3	1	37,622	277
	Small	148	3	1	31,602	214
	Medium	112	6	1	98,553	880
	Large	138	24	1	1,560,923	11,311
Rest of the world	Micro	305	3	3	69,348	227
	Small	276	4	4	97,137	352
	Medium	195	9	8	227,806	1,168
	Large	215	38	17	1,382,814	6,432

Source: Office for National Statistics, ONS estimates using HMRC data

Notes:

1. Product is defined by the CN8-level customs classification.

2. The breakdowns of businesses by size used throughout this article have been compiled according to the the international standard definitions devised by the European Commission.

We use the employment levels of each enterprise group to classify the size band that its reporting units belong to. Size bands are defined as:

· Micro businesses: with fewer than 10 employment

· Small businesses: with 10 to 49 employment

· Medium-sized businesses: with 50 to 249 employment

· Large businesses: with 250 or more employment

Table 7 shows that large businesses had a significantly larger portfolio of products compared with micro, small and medium businesses. Average exports by micro businesses were higher to the Republic of Ireland than they were to other destinations, whereas the opposite was true for average exports by large businesses, which had smaller values for the Republic of Ireland compared with other destinations.

Hence, in comparison with other destinations, the Irish intensive margin (average exports) is smaller for large businesses while it is larger for micro and small businesses, whereas extensive margin is higher for micro and small businesses compared with medium and large ones. This suggests that whilst it is more difficult to export to the USA, or to the rest of the world, than to the Republic of Ireland, those large businesses that do achieve exporting to those more distant markets will export larger values.

Table 7 also indicates that the respective contribution to both the extensive and intensive margins is higher for exports to the Republic of Ireland compared with the USA. Total exports to the Republic of Ireland (£1.9 billion) were slightly higher compared with the USA (£1.7 billion) and the number of exporting businesses was higher (1,241 for Ireland and 534 for the USA). Also, the average number of products exported to the Republic of Ireland was higher for all business size categories as well as average export values for three categories (micro, small and medium). However, average export values by large businesses to the USA were around four times larger than those to the Republic of Ireland and the large difference between average and median exports to the USA indicates the presence of significant outliers (few businesses that export very large values to the USA).

In summary, the highly-skewed nature of the product distribution across businesses is largely in keeping with the international evidence, which shows that most exporters are small in terms of product and destination coverage, but export volumes overall are dominated by the few extremely large exporters with a wide product and market scope.

The size and the respective contribution to the extensive and intensive margins varied significantly between domestic and foreign-owned businesses, as shown in Table 8. For example, the extensive margin was driven largely by domestic businesses, as there were almost eight times as many domestic businesses as there were foreign-owned businesses in 2016. In contrast, the contribution to the intensive margin was driven by foreign-owned businesses, with their average number of products and average number of destinations both being three times higher. In addition, average (mean) exports per business were around five times higher for foreign-owned businesses.

Table 8: Export margins of Northern Irish businesses by business ownership, 2016

Business ownership	No. of businesses	Average no. of products	Average no. of destinations	Total exports (£, thousands)	Average exports (£, thousands)
Domestic	1,653	20	6	4,189,466	2,534
Foreign	212	66	19	2,852,031	13,453

Source: Office for National Statistics, ONS estimates using HMRC data

Notes:

1. Product is defined by the CN8-level customs classification.

Table 9 shows that the extensive margin for exports to all destinations was driven by domestic businesses, as the total number of businesses was higher compared with foreign-owned businesses, but the contribution to the intensive margin to all destinations was driven by foreign businesses with regards to both average number of products and average export values. Table 9 hence shows that foreign-owned businesses were more diversified when compared with domestic businesses across all destination markets, as they exported a relatively wider portfolio of products but also had larger average exports per business.

Table 9: Exports margins by destination and business ownership, 2016

Country	Business ownership	No. of businesses	Average no. of products	Average no. of destinations	Total exports (£, thousands)	Average exports (£, thousands)
Republic of Ireland	Domestic	1,086	22	1	1,531,211	1,410
	Foreign	155	53	1	368,796	2,379
Rest of EU	Domestic	469	15	7	689,974	1,471
	Foreign	124	35	12	945,710	7,627
USA	Domestic	437	6	1	1,170,311	2,678
	Foreign	97	20	1	558,390	5,757
Rest of the world	Domestic	837	9	6	797,970	953
	Foreign	154	31	15	979,136	6,358

Source: Office for National Statistics, ONS estimates using HMRC data

Notes:

1. Product is defined by the CN8-level customs classification.

In summary, our findings confirm that both smaller and domestically-owned exporters were less diversified in relation to their product and destination portfolios compared with large and foreign-owned exporters.

In 2016, micro businesses exported eight products on average while large businesses exported 97. Micro businesses exported to an average of three destination countries, while the corresponding figure for large ones was 24 countries. Domestic businesses exported 20 products on average, to an average of six destinations, while the average number of products exported by foreign-owned businesses was 66, to an average of 19 destination countries.

The average (mean) number of products and countries was consistently higher than the median, giving us an indication of the importance of a few larger multi-product and multi-destination businesses in determining an overall pattern of exports.

If we look at the diversification of exports by categorising businesses into different industrial sectors, using the sections defined by the UK Standard Industrial Classification, Table 10 shows that businesses in wholesale and retail trade including repair of motor vehicles and motorcycles, and those in manufacturing, were the most diversified, with an average number of products exported of 37 and 17 respectively. Agriculture, forestry and fishing was amongst the least diversified sectors, producing only four products per business on average and exporting to an average of only two destinations, while the industry that had the most diversified portfolio of export destinations was real estate, professional, scientific and technical activities, exporting to 12 destinations.

Businesses in manufacturing, and real estate, professional, scientific and technical activities were the top two sectors in relation to average exports, while the significant differences between mean and median values for both sectors indicate that a small number of outlier businesses were driving the overall export figures. Column one in Table 10 shows the percentage of exporters as a proportion of all businesses in a given industry, whereas column two represents the percentage of employment by exporters as a proportion of all industry employment. Manufacturing exporters accounted for almost 16% of all businesses in this sector, while these exporting businesses employed around 75% of people who worked in manufacturing in 2016. Information and communication exporters accounted for only around 3% of all businesses in this sector, while employing around 33% of people who worked in information and communication in 2016.

Table 10: Export margins of Northern Irish businesses by industry, 2016

Industry	Exporters as a percentage of all businesses in this sector	Exporters as a percentage of all employment in this sector	Average no. of products	Average no. of destinations	Total exports (£, thousands)
A: Agriculture, forestry and fishing	0.2	1.7	4	2	29,221
B: Mining and quarrying	24.3	67.5	13	6	25,209
C: Manufacturing	15.8	75.1	17	10	4,777,758
D, E: Water supply, sewerage, waste management and remediation activities; and electricity, gas, steam and air conditioning supply	4.5	16.1	5	6	78,319
F: Construction	0.7	6.0	8	2	30,182
G: Wholesale and retail trade; repair of motor vehicles and motorcycles	7.2	34.4	37	6	1,299,873
H: Transport and storage	2.3	11.0	16	..	..
I: Accommodation and food services	0.1	0.3	..	..	..
J: Information and communication	2.6	33.1	11	7	15,722
K: Finance and insurance activities	0.9	19.8	8	4	156
L, M: Real estate, professional, scientific and technical activities	1.1	10.9	19	12	465,543
N: Administrative and support services	2.2	16.7	12	..	..

O, P, Q: Public administration; Education; Human health and social work	0.3		3.2		..		..		..
R, S: Arts, entertainment and recreation and Other services	0.4		3.0		2		7		1,671

Source: Office for National Statistics, ONS estimates using HMRC data

Notes:

1. The symbol “..” denotes values that have been suppressed for reasons of confidentiality.

2. The industrial sections presented are the industry of the reporting unit based upon the UK Standard Industrial Classificat

3. Product is defined by the CN8-level customs classification.

Exports of goods from Northern Ireland grew between 2012 and 2016 from £5,741 million to £7,041 million. Among the businesses contributing to the £5,741 million of exports in 2012, some did not export in 2016, but others did.

We are able to identify the businesses that exported products in both 2012 and in 2016, which we refer to as “stayers”, in Table 11. Those stayer businesses exported £5,128 million of the £5,741 million total exports in 2012 and those same stayer businesses exported £6,465 million of the £7,041 million total exports in 2016. Therefore, we know that £723 million of the total £1,300 million growth between 2012 and 2016 was attributable to the businesses that exported in both years and thus stayers contributed 56% to the total growth in exports, while new exporters contributed a substantially large share of 44% of exports growth over this period.

Table 11: Dynamics of goods exporters between 2012 and 2016

2012	No. of businesses	Percentage of businesses (%)	Average no. of products	Average no. of destinations	Total exports (£, thousands)	Average exports (£, thousands)
Stayers	1,225	64.4	28	8	5,128,173	4,186
Exiters	677	35.6	17	5	613,166	906
All businesses	1,902	100.0			5,741,339	

2016	No. of businesses	Percentage of businesses (%)	Average no. of products	Average no. of destinations	Total exports (£, thousands)	Average exports (£, thousands)
Stayers	1,225	65.7	31	9	6,464,739	5,277
Entrants	640	34.3	13	5	576,758	901
All businesses	1,865	100.0			7,041,497	

Source: Office for National Statistics, ONS estimates using HMRC data

Notes:

1. Product is defined by the the CN8-level customs classification.

2. Stayer is a business which exported both in 2012 and 2016. Exiter is a business which exported in 2012, but not in 2016. Entrant is a business which exported in 2016, but not in 2012.

We should note that 8% of total exports in 2016 came from businesses that did not export in 2012, implying that the contribution of new exporting businesses remains important to the economy. We would like to emphasise that changes in patterns of trade can derive from changing business choices, perhaps opting to withdraw from exporting if it is not profitable, or opting to start exporting when an opportunity arises and there is sufficient financial backing to support it. Changes can also derive from basic changes in the business environment, as businesses open, close, merge and split, or as businesses change their locations between different regions of the UK.

6 . Supply-chain linkages

Given the geographic proximity and the common land border between Northern Ireland and the Republic of Ireland, we demonstrated in the previous section that the Republic of Ireland was the most important destination market for goods exports from Northern Ireland. This is not surprising as most models of trade, such as the gravity model, predict a particularly strong trade connection between Northern Ireland and the Republic of Ireland (InterTradeIreland, 2009).

In this section we attempt to estimate the level of integration of cross-border and global supply chains. A supply chain exists when different businesses trade in raw or intermediate products, at each stage making modifications to a product or combining products to create new products, until eventually the output is sold or traded as a “final” product. To do this we present some description of the patterns of two-way traders, particularly those that are trading in both directions in products that are closely aligned, and we also estimate trade in intermediate products, following the approach by Studnicka and Lawless (2018). In this effort, we are motivated by the important aspect of global trade that is related to the expansion of trade in intermediate goods (Studnicka and Lawless, 2018).

Data are collected on the Combined Nomenclature (CN8) classification of products and there are about 9,500 different products in this classification. These products can be grouped into four broad categories using the international classification known as Broad Economic Categories (BEC) as compiled by the UN. These categories are: consumption goods, intermediate inputs, capital goods, and other goods.

The BEC classification is likely to underestimate the effect of supply-chain links between Northern Ireland and the Republic of Ireland because much of the trade in food (dairy and meat products in particular), as well as trade in beverages, is classified as final consumption (Studnicka and Lawless, 2018). However, these sectors are known to have significant cross-border trade between Northern Ireland and the Republic of Ireland for the purposes of manufacturing and processing (Studnicka and Lawless, 2018).

The importance of cross-border trade within the agri-food sector was also recognised in the Statistical Review of Northern Ireland Agriculture (PDF, 2.1MB) (2016) by the Department of Agriculture, Environment and Rural Affairs (DAERA), which is part of the Northern Ireland Executive. DAERA indicated that Northern Ireland exported £125 million worth of raw milk as an intermediate product and £245 million of meat products in 2015 to the Republic of Ireland.

In addition, the Northern Ireland Statistics and Research Agency (NISRA) recently published Cross-Border Supply Chain Report focusing on the frequency with which goods are moved across the border between Northern Ireland and the Republic of Ireland, and the purposes for which they are used. NISRA's analysis of HM Revenue and Customs (HMRC) data indicated that almost 40% of Northern Ireland trade (total exports and imports) with the Republic of Ireland comprised trade in intermediate goods. When Northern Irish businesses who were both exporting and importing agri-food products (meat and fish products, food, dairy products and beverages) were also included, NISRA estimated that two-thirds of goods traded with the Republic of Ireland can be considered as part of such supply-chain activity. This wider definition of supply-chain activity reflects agri-food products that were intensively traded across the border.

As mentioned previously, one way to investigate the level of integration of supply-chains is to look at businesses that are simultaneously engaged in trading in both directions and particularly those that are trading in both directions and in products that are closely aligned to one another. For example, a business that imports grain and exports wheat is trading in both directions in products that are part of the same Standard Industrial Trade Classification (SITC1) group, in this case group 0; similarly a business that imports cars and exports trucks is also trading in both directions in SITC1 group 7.

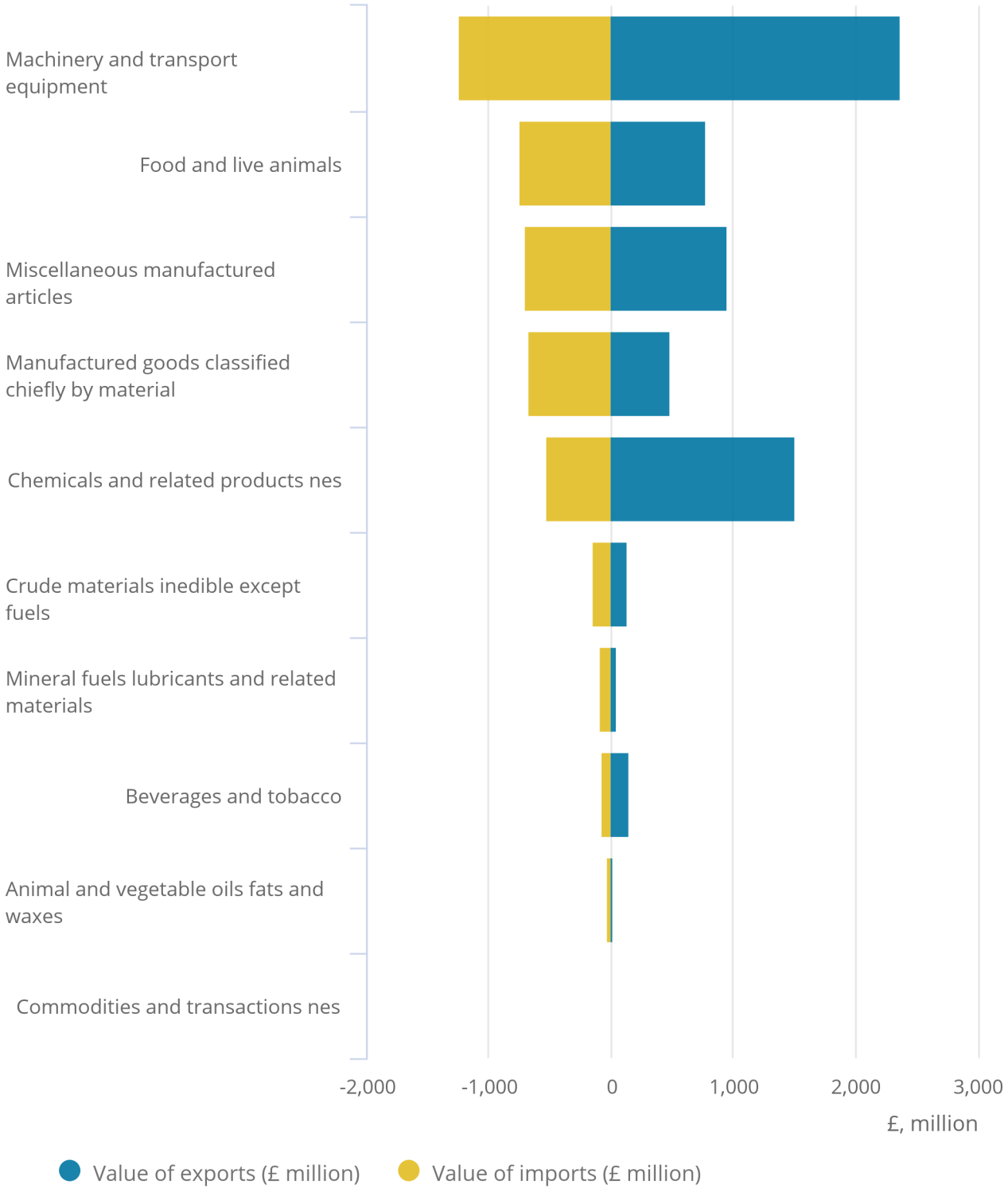
Figure 11 presents share of trade amongst businesses that were simultaneously exporting and importing goods within each SITC1 category. This chart shows that businesses that were simultaneously exporting and importing food and live animals were very prevalent, having exported £775 million and imported £747 million in this category in 2016, indicating substantial supply-chain linkages within this category. Another category with a large proportion of simultaneous trade was crude materials, inedible, except fuels.

Figure 11: Two-way trade by SITC1 category, Northern Ireland

2016

Figure 11: Two-way trade by SITC1 category, Northern Ireland

2016



Source: Office for National Statistics, ONS estimates using HM Revenue and Customs data

Notes:

1. For further information about the Standard International Trade Classification (SITC), see USND classifications.

2. Two-way trade is defined as trade by businesses which simultaneously import and export products in the same SITC1 category.

For goods exported from Northern Ireland to the Republic of Ireland, 60% were classified as intermediate, dairy, meat and beverages according to the BEC, as shown in Figure 12. The corresponding figure for imports was around 70%. Note that where possible we present dairy, meat and beverages as separate categories from consumption goods because evidence suggests strong cross-border supply-chain integration in these categories, which would otherwise be treated as consumption goods. For goods sold to the rest of the world (excluding the Republic of Ireland), 50% were intermediate goods, which is lower compared with intermediates (including dairy, meat and beverages) exported to the Republic of Ireland. The corresponding figure for imports was 55%.

Northern Irish businesses were more likely to trade in capital goods with the rest of the world than with the Republic of Ireland. Trade in capital goods can also be considered as a further type of input to the production process and provides some indication of the integration of Northern Ireland into global markets.

Figure 12: Share of exports and imports of goods by Northern Irish businesses by broad economic category and destination

2016

Source: Office for National Statistics, ONS estimates using HM Revenue and Customs data

Notes:

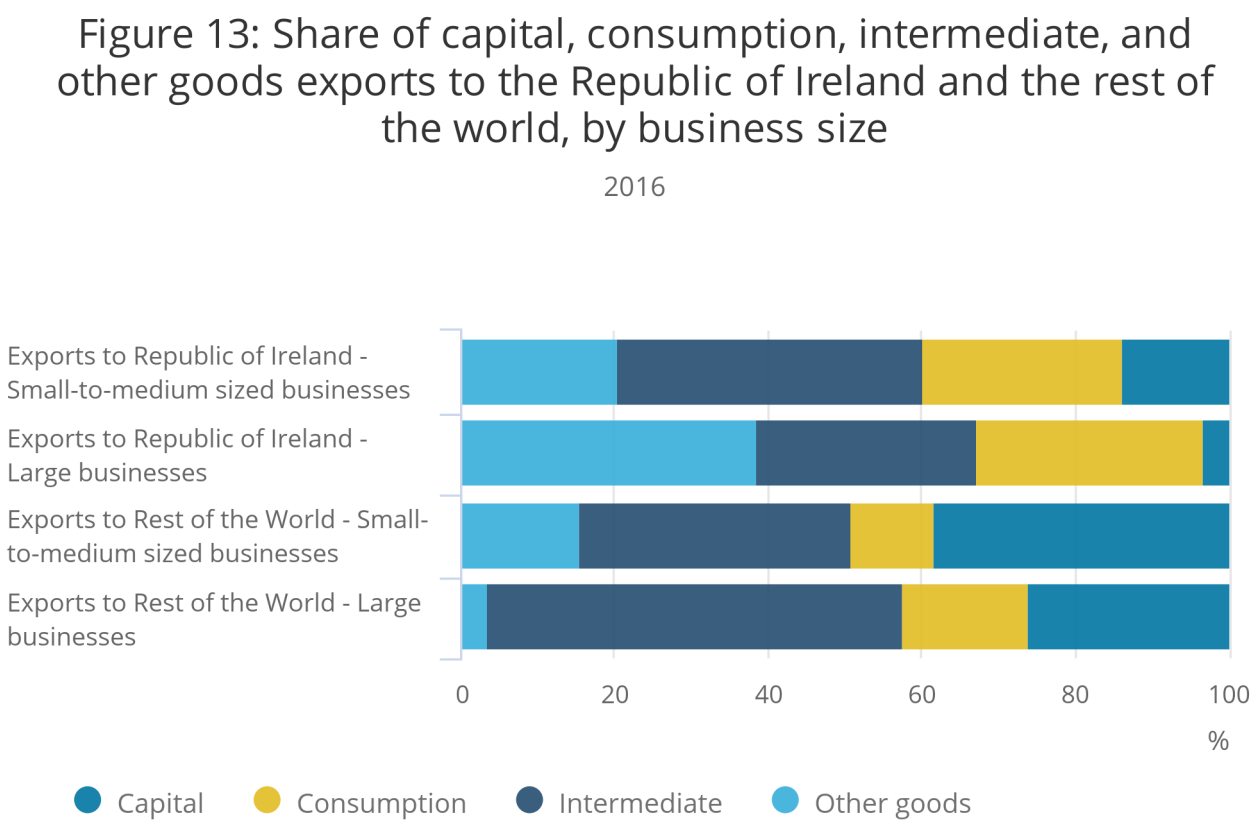
1. Products have been grouped into seven categories. The four categories of capital, consumption, intermediate and not classified are the broad categories used in the international classification known as Broad Economic Categories (BEC) as compiled by the UN. The three categories of dairy, meat and beverages are derived from the Standard International Trade Classification (SITC), which is a product classification of the UN used for international trade statistics. The values of dairy, meat and beverages would normally fall into the BEC category results, but they have been counted separately in this analysis.

2. Figures shown may not sum exactly to 100% due to rounding.

If we distinguish businesses by their size, Figure 13 shows that when we consider exports of intermediate goods it is large businesses that sell more to the rest of the world compared with micro, small and medium businesses. The share of total exports of intermediate goods by large businesses was 54%, while the corresponding figure for other businesses was around 36%. This indicates that for the share of their exports, large businesses located in Northern Ireland are more integrated within global supply-chains. Large businesses' exports of intermediate, meat, dairy and beverages including non-classified goods combined, accounted for 67% of total exports to the Republic of Ireland alone, while the corresponding figure for all other businesses was slightly lower (60%).

Figure 13: Share of capital, consumption, intermediate, and other goods exports to the Republic of Ireland and the rest of the world, by business size

2016



Source: Office for National Statistics, ONS estimates using HM Revenue and Customs data

Notes:

1. Products have been grouped into seven categories. The four categories of capital, consumption, intermediate and not classified are the broad categories used in the international classification known as Broad Economic Categories (BEC) as compiled by the UN. The three categories of dairy, meat and beverages are derived from the Standard International Trade Classification (SITC), which is a product classification of the UN used for international trade statistics. The values of dairy, meat and beverages would normally fall into the BEC category results, but they have been counted separately in this analysis. In this table, the values of dairy, meat and beverages has been combined with goods not classified into the "Other goods" category.

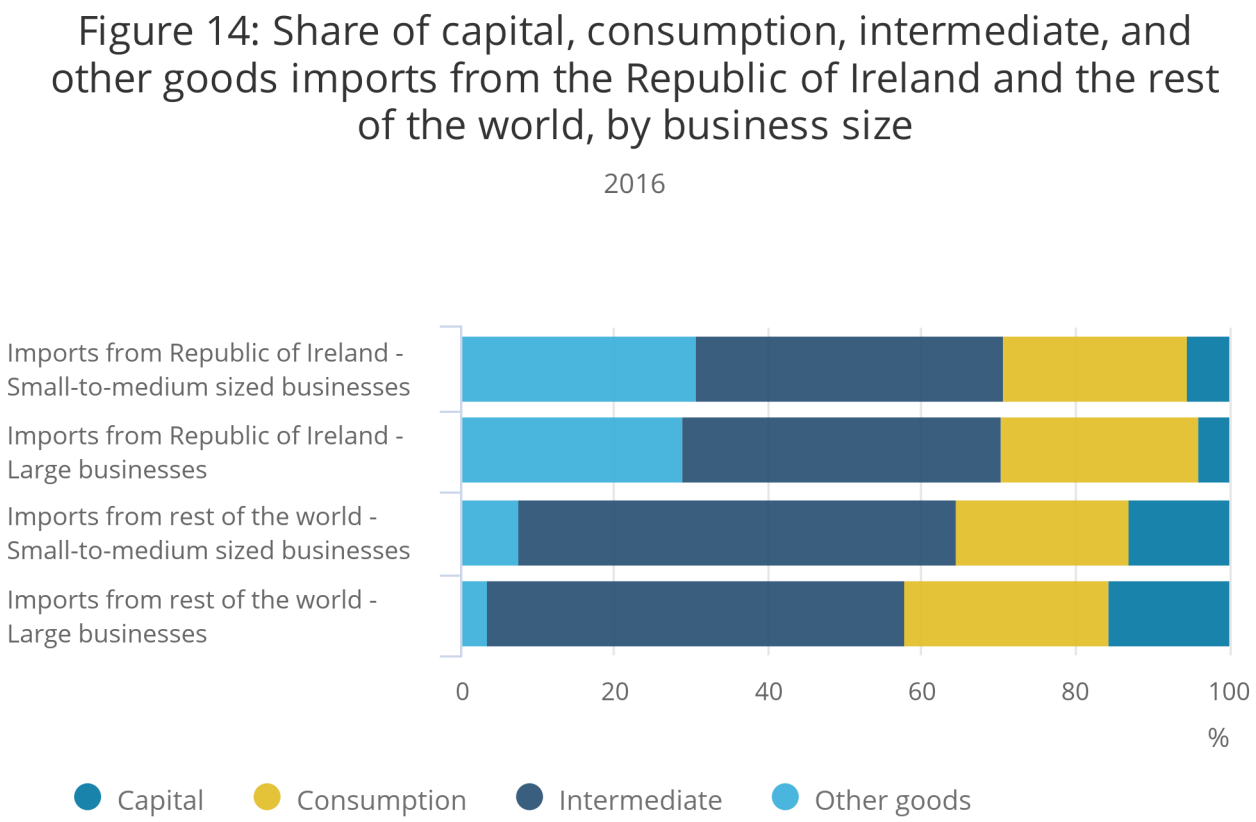
2. Figures shown may not sum exactly to 100% due to rounding.

Figure 14 shows that when we consider imports of intermediate goods, the reverse pattern emerges as it is micro, small and medium businesses that import slightly more from the rest of the world compared with large businesses. The share of total imports of intermediate goods by micro, small and medium businesses was 57%, while the corresponding figure for large businesses was 54%. Large businesses' imports of intermediate, meat, dairy and beverages combined accounted for around 71% of total imports from the Republic of Ireland alone, while the corresponding figure for all other businesses was also around 71%.

These results imply that businesses of all sizes may be affected in the event of potential disruptions to cross-border trade as both large and micro, small and medium businesses seem to be integrated within cross-border supply chains. It is large businesses that are slightly more integrated within global supply chains in relation to exports of intermediate goods.

Figure 14: Share of capital, consumption, intermediate, and other goods imports from the Republic of Ireland and the rest of the world, by business size

2016



Source: Office for National Statistics, ONS estimates using HM Revenue and Customs data

Notes:

1. Products have been grouped into seven categories. The four categories of capital, consumption, intermediate and not classified are the broad categories used in the international classification known as Broad Economic Categories (BEC) as compiled by the UN. The three categories of dairy, meat and beverages are derived from the Standard International Trade Classification (SITC), which is a product classification of the UN used for international trade statistics. The values of dairy, meat and beverages would normally fall into the BEC category results, but they have been counted separately in this analysis. In this table, the values of dairy, meat and beverages has been combined with goods not classified into the "Other goods" category.

2. Figures shown may not sum exactly to 100% due to rounding.

What is missing from current analysis is an assessment of the extent of the supply-chain linkages between Northern Ireland and Great Britain. As mentioned previously, the BESES survey shows that Northern Ireland sold four times more goods and services to Great Britain than to the Republic of Ireland and imported nearly six times more from Great Britain than it imported from the Republic of Ireland in 2016 [1]. However, the current data sources do not provide the equivalent detailed level product information on intra-UK trade. Thus, further research is needed to complete the picture of Northern Ireland trade and supply-chain links.

Notes for: Supply-chain linkages

1. Northern Ireland Broad Economy Sales and Exports Data: Purchases and Imports of Goods and Services 2011 to 2016, NISRA, 2018 see Table 2.1

7 . Conclusion

This article provides novel empirical evidence on the characteristics of Northern Irish businesses that trade, the extent of diversification amongst the Northern Irish exporters in terms of product and destination markets and the extent of cross-border as well as global supply-chain integration amongst Northern Irish traders.

An important novelty of this analysis is that we use the new granular dataset to identify patterns of export concentration and specialisation as well as the extent of supply-chain dependencies amongst Northern Irish businesses that declare international trade in goods transactions. The main research questions laid out in the introduction are revisited here and the evidence on each reviewed.

It is worth emphasising that although our dataset is highly detailed, it does not capture all trade with the EU because of Intrastat reporting rules, which specify that traders who export and/or import relatively low values are not required to report detailed trade declarations to HM Revenue and Customs (HMRC).

- What is the prevalence of international trade in goods among businesses based in Northern Ireland, and how does this compare with similar data for the UK as a whole? What are the characteristics of Northern Irish businesses that trade?

When we consider the prevalence and characteristics of trading businesses we find that only a small proportion of businesses trade goods internationally, but these businesses account for a large proportion of total employment. Hence, although traders account for only around 4.3% of all businesses in Northern Ireland according to trade declarations in 2016, they employed 25% of all workers.

Amongst businesses declaring trade, large businesses employed 18% of all workers in Northern Ireland. In comparison, in the UK as a whole, large businesses that declare trade employed nearly 34% of all workers in 2016.

Foreign-owned businesses operating in Northern Ireland are more likely to declare trade in goods transactions compared with domestically-owned businesses. In 2016 in Northern Ireland, 1.2% of all businesses were foreign-owned and they employed 12% of all Northern Irish workers. Foreign-owned businesses that declare trade, employed 8% of all Northern Irish workers, whereas domestic businesses that declare trade transactions, accounted for almost 17% of all employment.

The proportions of employment accounted for by traders differed significantly across industries. The top two industries in terms of the share of businesses that declare international trade, as well as the share of employment in their respective industries, were mining and quarrying, and manufacturing. In Northern Ireland, 27% of businesses in mining and quarrying that declare trade, employed almost 70% of all workers in this industry in 2016, whereas 20% of all manufacturing businesses that declare trade, employed around 78% of all workers in this industry.

- How diversified are exporters located in Northern Ireland in terms of products and destination markets?

Our analysis of the patterns of goods exports shows that amongst businesses located in Northern Ireland that declare exports, 67% exported to the Republic of Ireland, accounting for almost 74% of all employment in exporting businesses in 2016. Businesses whose only reported exports were to the Republic of Ireland accounted for 32% of all exporters, providing employment for almost 17% of people who work in exporting businesses.

Moreover, if we compare the Northern Ireland share of trade (both exports and imports) with its major destinations we find that most trade by businesses located in Northern Ireland was conducted with the Republic of Ireland. This means that for many businesses, the main (and in approximately 32% of cases: the only) international engagement is on a cross-border basis.

Our analysis of the patterns of goods exports further shows that exports from Northern Ireland were concentrated in the top two destination markets, with more than 50% going to the Republic of Ireland and the USA. The Republic of Ireland was the most important destination for food and live animals, manufactured goods classified by material, and miscellaneous manufactured articles, while the USA was the most important destination for machinery and transport, and chemicals.

When compared with the UK, Northern Irish trade was substantially more reliant on exports of food and live animals, representing around 14% of total exports whereas the equivalent figure for the UK was less than 5%. Food and live animals represented around 33% of the total exports going to the Republic of Ireland, of which the top sub-category was milk and cream products. The most concentrated product group was indeed food and live animals, of which almost two-thirds was exported to the Republic of Ireland alone.

The highly-skewed nature of the product distribution across businesses is largely in keeping with the international evidence, which shows that most exporters are small in terms of product and destination coverage, but export volumes are overall dominated by the few extremely large exporters with a wide product and market scope. Almost 70% of exporting businesses in Northern Ireland were small (up to 49 workers), selling a small number of products to a few markets. While exporting was common amongst smaller businesses, total export values were dominated by large exporters who contributed around 65% of total exports.

Our analysis on the level of diversification of exporters shows that around 25% of Northern Irish exporting businesses sold only one product, while almost 50% exported to only one country. Analysis by business size shows that 81% of businesses in Northern Ireland that exported only one type of product were small (up to 49 workers), whereas 80% of all businesses that exported to only one destination were also small.

Our findings further confirm that both smaller and domestically-owned exporters were less diversified in relation to their product and destination portfolios compared with large and foreign-owned exporters. In 2016, micro businesses exported eight products on average while large businesses exported 97. In addition, micro businesses exported to an average of three destinations while the corresponding figure for large businesses was 24 destinations.

Domestic businesses exported 20 products on average, to an average of six destinations, while the average number of products exported by foreign-owned businesses was 66, to an average of 19 destinations. If we look at the diversification of exports by categorising businesses into different industrial sectors, we find that agriculture, forestry and fishing was amongst the least diversified while the industry that had the most diversified portfolio of export destinations was real estate, professional, scientific and technical activities followed by manufacturing.

- What is the extent of cross-border supply chain integration for businesses in Northern Ireland?
    - How common is trade in both directions (imports and exports) by the same business in similar products?
    - What is the extent of supply-chain dependencies assessed by distinguishing the HMRC data into final, intermediate, capital and consumption goods by origin and destination?

To examine the level of supply chain integration we used both aggregate and firm-level evidence on the share of trade in intermediate products and the shares of trade (particularly within the same sector) by two-way traders.

We find that a very significant share of cross-border trade is accounted for by firms that belong to the food and live animals category, suggesting integration of supply-chains in this category. If we distinguish businesses by their size and consider total exports of intermediate goods we find that it is large businesses that sell more to the rest of the world compared with micro, small and medium businesses.

Large businesses were also more integrated in supply-chains with the Republic of Ireland compared with micro, small and medium ones with respect to their exports. In addition, large businesses' share of total imports in intermediate, meat, dairy and beverages from the Republic of Ireland was equal to those by micro, small and medium businesses. This suggests that businesses of all sizes seem to be integrated within cross-border supply chains, but it is large businesses that are slightly more integrated within global supply chains in relation to exports of intermediate goods. However, the current data sources do not provide the equivalent detailed-level product information on intra-UK trade and this is another important limitation of our analysis. Thus, further research is needed to complete the picture of Northern Ireland trade and supply-chain links.

8 . Authors

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10 . Appendix A: Differences between HMRC and ONS estimates

Table I shows differences between published HM Revenue and Customs (HMRC) Regional Trade Statistics (RTS) estimates and Office for National Statistics (ONS) weighted estimates of Northern Ireland exports for 2016 by Standard Industrial Trade Classification (SITC1).

Table I: Differences between HM Revenue Regional Trade Statistics and Office for National Statistics weighted estimates of Northern Ireland exports by SITC1, 2016

SITC1	SITC1 description	HMRC RTS (£, millions)	ONS weighted (£, millions)
7	Machinery and transport equipment	2,599	2,635
5	Chemicals and related products, n.e.s.	1,609	1,576
8	Miscellaneous manufactured articles	1,166	1,068
0	Food and live animals	1,087	994
6	Manufactured goods classified chiefly by material	720	596
2	Crude materials,inedible,except fuels	208	189
1	Beverages and tobacco	327	170
3	Mineral fuels,lubricants and related materials	69	50
4	Animal and vegetable oils,fats and waxes	27	21
9	Commodities and transactions, n.e.s	13	9
	Total	7,825	7,308

Source: HMRC (RTS), Office for National Statistics, ONS estimates using HMRC data

Notes:

1. Both HMRC (RTS) figures and ONS weighted figures include below the threshold estimates.

2. "ONS weighted" represents ONS estimates using HMRC data.

HMRC RTS estimates are compiled using a different methodology to the ONS weighted estimates. In both cases, trade is reported by enterprises that operate in Northern Ireland and Great Britain, and this trade is apportioned out between the regions.

The HMRC RTS estimates are based on the enterprise’s employment in each region. As described previously, the ONS weighted estimates are based on the type of product traded and the industry code of the enterprise’s workforce in different regions, as well as some adjustments for when enterprises have multiple reporting units or belong to an enterprise group. For more details and robustness tests see Wales and others (2018). Where there is a large number of businesses and value of trade, the differences between the two methods are small.

In SITC1 category "beverages and tobacco" there are relatively fewer businesses and these businesses are structured in a way that produces a relatively large difference in the estimated value of Northern Ireland trade using the two methods. In this case the difference is caused by imputations for a small number of businesses and we are investigating improvements to the weighting methodology. We welcome comments and feedback on experimental methodology, please contact the authors at maja.savic@ons.gov.uk.