Office for National Statistics

Article

Patterns of Welsh trade by destination, product and business characteristics: 2019

The main patterns and characteristics of Welsh trade in goods using experimental trade statistics for 2019.

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Release date:
18 December 2020

Next release:
To be announced

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1 . Main points

- Welsh goods exports were highly concentrated with 47% of the total export value going to Germany, the USA and France combined.
- Wales imported the most goods from the USA, accounting for approximately 20% of the total import value.
- Machinery and transport equipment was an important commodity group for international trade in Wales, accounting for 46.9% of total exports and 33.6% of total imports.
- The largest proportion of two-way trade in similar goods was in machinery and transport equipment, suggesting integration of supply-chains in this category.
- Micro and small businesses (1 to 49 employees) constituted the largest number of trading businesses, they traded a few products to a small number of countries; large businesses (over 250 employees) traded a greater number of products to more countries, with a greater average value per product traded.
- Foreign-owned businesses represented a larger proportion of the total trade value and were more diversified in terms of products and countries, compared to domestic-owned businesses.

2 . Definition of a Welsh business

This article examines the patterns and characteristics of Welsh businesses that trade in goods using experimental statistics in 2019.

In this section, we define:

- a Welsh business as a reporting unit that has at least one local unit in Wales
- Welsh trade as the trade that originates from the local units in Wales

The reasons for this are as follows. As explained in the Data sources, quality and methodology section, we have linked HM Revenue and Customs (HMRC) trade in goods data with the Inter-Departmental Business Register (IDBR) in order to apportion the trade to UK regions. The IDBR is a comprehensive list of businesses registered for VAT and/or PAYE. It is organised hierarchically, so that businesses are structured into enterprise units which contain reporting units which can in turn be split into local units. Also, for large firms, enterprise units can be gathered into a higher level called an enterprise group.

Usually the reporting unit level is used as our business level, because it helps to split large enterprise units into their different industrial branches and it facilitates comparisons with other publications that are produced at reporting unit levels (that is the survey collection level). In terms of reporting trade, it provides a better account of trade by industry than the enterprise level.

Importantly, a business may have a different geographical location depending on which level of the business hierarchy you are looking at. For example, a large firm may have an enterprise unit registered in London and most of its employment there, while also having multiple local units in Wales. That leads to the question: how do we count this business for our regional trade estimates for Wales?

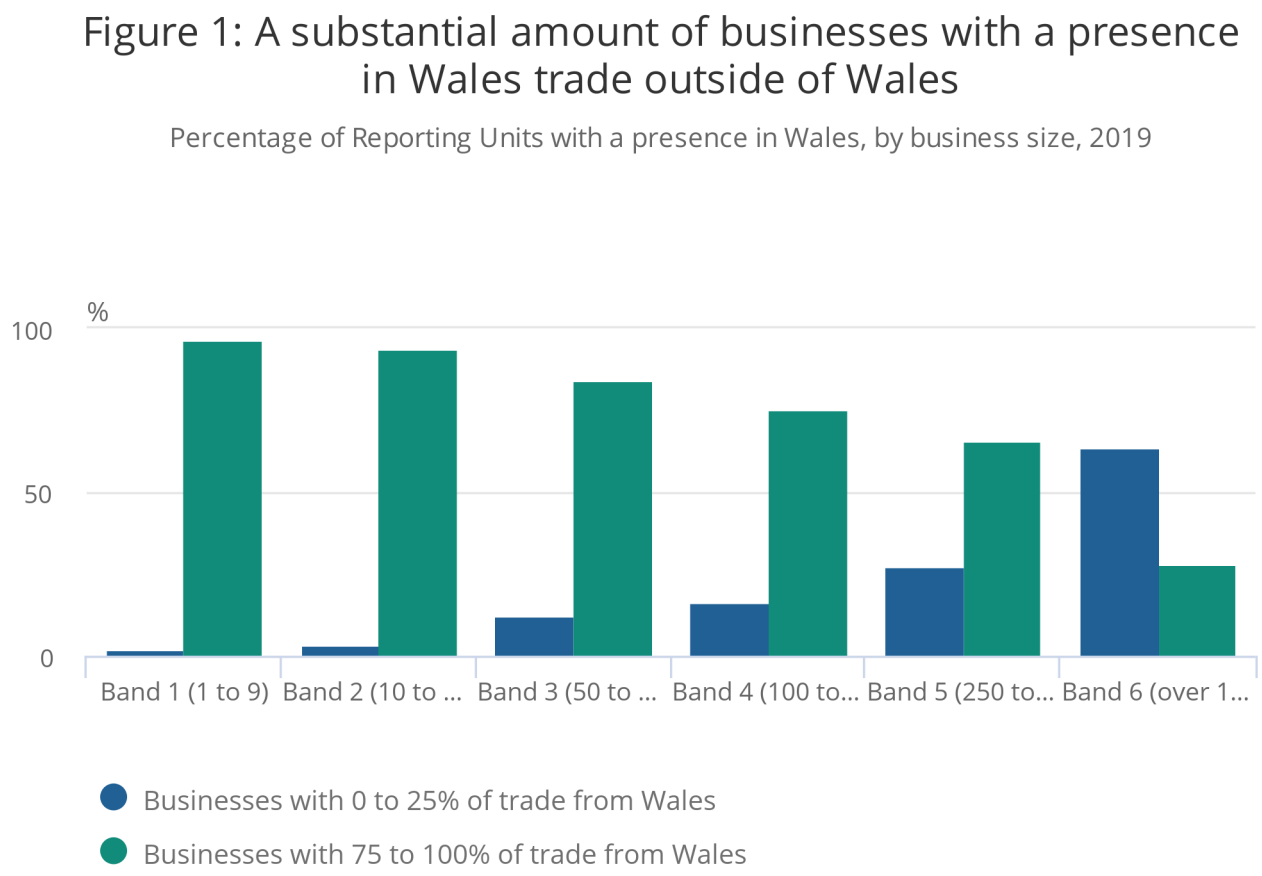
A simple solution could be to define a Welsh business as a reporting unit that has a presence in Wales (that is at least one local unit in Wales) and report its trade as Welsh trade. However, a reporting unit that has most of its trade in Scotland and one local unit in Wales would all count as Welsh trade, which would be misleading.

Figure 1 shows the reporting units with a presence in Wales by business size (based on the number of employees they have). Most reporting units have either most of their trade (over 75%) from Wales or a small amount of their trade from Wales (under 25%). There are very few (less than 10% across all size bands) businesses with a moderate amount (between 25% and 75%) of their trade value coming from Wales, hence Figure 1 excludes these.

The proportion of trade from Wales is computed using the local units' estimated trade and their region. Figure 1 shows the percentage of reporting units for different employment size bands which have either most of their trade coming from Wales (over 75%), or most of their trade coming from elsewhere (under 25% coming from Wales).

Figure 1: A substantial amount of businesses with a presence in Wales trade outside of Wales

Percentage of Reporting Units with a presence in Wales, by business size, 2019



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

Notes:

1. Employment size band indicates number of employees at the reporting unit level.

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

In the smallest size band (1 to 9 employees), a dominant majority of reporting units (96.4%) trades predominantly from Wales. That is what we would expect: a small business that has only one working site that is in Wales will be trading only from Wales.

In the largest size band (1000 plus employees), a large majority of reporting units (64.0%) have up to a quarter of their trade value happening in Wales. However, there is still a significant minority of reporting units (27.9%) that trades mostly from Wales. In other words, most large businesses that have a presence in Wales have the majority of their trade happening from sites that are outside Wales.

Importantly, if we take all reporting units that have a presence in Wales and compute the proportion of trade happening in Wales, we obtain 32.4%. This means that if we reported 100% of the trade of reporting units that have a presence in Wales, 68.6% of that trade would be wrongly attributed to Wales. In order to avoid this, all the trade values that you will see in this publication will be from the local units in Wales, while the business statistics, or business counts will be computed at the reporting unit level (if not stated otherwise).

3 . Main characteristics of Welsh businesses who trade

First focusing on business size and trading status, Table 1 shows that 5.1% of Welsh businesses declared either export, import or both export and import activities in 2019. These trading businesses accounted for 71.5% of the total employment in Wales. The UK follows a similar pattern with 5.8% of businesses declaring trade in goods transactions. However, these trading businesses only accounted for 40.1% of total UK employment.

Table 1: Percentage breakdown of business activity by business size and trading status, Wales and UK, 2019

		Businesses which declared				Employment in businesses which declared			
Country	**Employment size band**	**Export and import trade**	**Export only**	**Import only**	**No trade**	**Export and import trade**	**Export only**	**Import only**	**No trade**
Wales	**Band 1 (1 to 9)**	0.8	0.5	1.1	85.4	0.0	0.0	0.0	3.2
	Band 2 (10 to 49)	0.5	0.2	0.3	7.7	0.2	0.1	0.1	2.3
	Band 3 (50 to 99)	0.2	0.0	0.1	0.8	0.2	0.0	0.1	0.9
	Band 4 (100 to 249)	0.3	0.0	0.1	0.4	0.7	0.1	0.2	1.1
	Band 5 (250 to 999)	0.4	0.0	0.1	0.3	3.0	0.3	0.6	2.5
	Band 6 (1000 and over)	0.4	0.0	0.1	0.2	57.5	1.9	6.3	18.6
	Total	2.6	0.9	1.6	95.0	61.7	2.4	7.4	28.5
UK	**Band 1 (1 to 9)**	1.5	0.8	1.6	86.3	0.4	0.2	0.4	17.7
	Band 2 (10 to 49)	0.7	0.2	0.4	6.8	1.5	0.4	0.7	12.0
	Band 3 (50 to 99)	0.0	0.0	0.0	0.0	1.3	0.2	0.4	4.3
	Band 4 (100 to 249)	0.2	0.0	0.1	0.7	2.2	0.3	0.6	4.7
	Band 5 (250 to 999)	0.1	0.0	0.0	0.3	4.4	0.4	1.0	6.1
	Band 6 (1000 and over)	0.1	0.0	0.0	0.1	20.2	1.0	4.5	15.1
	Total	2.7	1.0	2.1	94.2	29.9	2.5	7.7	59.9

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

Notes

1. Figures shown may not sum exactly to 100% due to rounding.
2. Numbers of businesses, numbers of employment and business size are based upon information from the Inter-Departmental Business Register (IDBR).
3. Employment size band indicates number of employees at the reporting unit level.

The results show that Welsh businesses who declared trade transactions were more likely to declare both import and export activities, across all employment size-bands, compared to declaring exports or imports only. In 2019, Welsh businesses that both exported and imported accounted for 61.7% of the total employment in Wales. In the UK however, businesses that both exported and imported accounted for only 29.9% of the total UK employment.

Table 1 shows that large businesses (over 250 employees) represented only 1.5% of Welsh businesses in 2019 but accounted for 90.7% of the total workers in Wales. Large businesses that declared both export and import activities employed 60.5% of the total Welsh workers, compared with 24.6% for the UK. However, large Welsh businesses that did not declare trade transactions employed 21.1%, a similar proportion to the UK with 21.2%.

For Wales, Table 1 also shows that micro (1 to 9 employees) and small (10 to 49 employees) businesses accounted for the largest share of total business in Wales (96.5%) but employed only 5.9% of the total employees (sum of all rows over Band 1 and 2 for Wales). This pattern was similar for the UK (98.1%), however small and micro businesses accounted for 33.3% of all UK employees.

Looking at trading status, only 3.4% of micro and small businesses in Wales declared trade in goods transactions, accounting for 0.4% of all Welsh workers. Those businesses that did not declare trade transactions employed 5.5% of Welsh workers. This compares with the UK where 5.2% of micro and small businesses declared trade in goods transactions, employing 3.6% of workers. However, those micro and small businesses that did not declare trade employed 29.7% of the total employees in the UK.

When looking at the ownership of the business, Table 2 shows that in Wales 98.6% of all businesses were domestic businesses. Only a small proportion of these domestic businesses declared trade in goods in 2019, compared with the majority of foreign-owned (owned outside of the UK) businesses declaring trade activity. A similar pattern was seen in the UK where 98.1% of all businesses were of domestic ownership. Again, only a small proportion of domestic businesses declared trade in goods, compared with nearly half of foreign-owned businesses declaring trade activity.

Table 2: Percentage breakdown of business activity by business ownership and trading status, Wales and UK, 2019

		Businesses which declared				Employment in businesses which declared			
Country	**Business ownership**	**Export and import trade**	**Export only**	**Import only**	**No trade**	**Export and import trade**	**Export only**	**Import only**	**No trade**
Wales	**Domestically-owned**	1.8	0.8	2.0	94	40.3	1.3	5.2	24.5
	Foreign-owned	0.8	0.0	0.1	0.4	21.4	1.1	2.2	4.1
	Total	2.6	0.8	2.1	94.4	61.7	2.4	7.4	28.6
UK	**Domestically-owned**	2.2	1.0	2.2	92.7	19.1	2.1	6.3	57.3
	Foreign-owned	0.7	0.1	0.2	1.1	10.9	0.5	1.3	2.6
	Total	2.9	1.1	2.4	93.8	30.0	2.6	7.6	59.9

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

Notes

1. Figures shown may not sum exactly to 100% due to rounding.
2. Numbers of businesses, numbers of employment and business size are based upon information from the IDBR.

Domestic businesses employed 71.3% of all workers in Wales. The businesses that declared both exports and imports accounted for the highest share of total employment in Wales, at 40.3%. Domestic businesses that did not declare trade activities accounted for 24.5% of all Welsh workers. In the UK, 84.8% of workers were employed by domestic businesses, comprising of 19.1% employed by businesses that declared both export and import activities, and 57.3% that declared no trade.

We also see that business characteristics in Wales and the UK vary by industry. In Wales, businesses in the manufacturing, mining and quarrying, and the wholesale and retail industries were the most likely to declare trade in goods transactions in 2019. The industries with the smallest proportion of businesses in Wales declaring trade in goods transactions were in agriculture, forestry and fishing, accommodation and food services, and construction.

In the UK, businesses in the mining and quarrying, manufacturing, and wholesale and retail industries were most likely to declare trade in goods transactions. Agriculture, forestry and fishing, the public sector, and accommodation and food services industries represented the smallest proportion of businesses that declared trade in goods transactions for the UK.

Table 3: Percentage breakdown of business activity by industry and trading status, Wales and UK, 2019

Country	Standard Industrial Category (SIC)	Businesses which declared				Employment working for businesses which declared			
		Export and import	Export only	Import only	No trade	Export and import trade	Export only	Import only	No trade
Wales	A - Agriculture, Forestry and Fishing	0.2	0.1	0.2	99.5	10.1	0.6	3.7	85.6
	B - Mining and Quarrying	9.8	1.6	4.1	84.4	88.9	..	..	5.8
	C - Manufacturing	14.1	4.2	3.7	78.0	86.7	1.6	2.3	9.4
	D,E - Electricity, Gas, Steam and Air Conditioning Supply and Water Supply: Sewerage, Waste Management and Remediation Activities	7.4	2.0	2.5	88.0	90.1	..	..	3.5
	F - Construction	0.5	0.3	0.6	98.6	48.2	3.7	15.2	32.9
	G - Wholesale and Retail Trade; Repair of Motor Vehicles and Motorcycles	4.5	1.5	7.6	86.4	90.9	0.5	3.4	5.2
	H - Transportation and Storage	1.6	0.4	0.7	97.3	88.0	0.6	1.9	9.5
	I - Accommodation and Food Service Activities	0.5	0.1	0.5	98.9	53.7	5.5	7.4	33.3
	J - Information and Communication	2.2	1.0	1.2	95.6	84.9	0.5	6.4	8.2
	K - Financial and Insurance Activities	5.6	1.6	2.1	90.6	80.3	..	..	14.0
	L - Real Estate Activities	0.9	0.7	0.8	97.7	23.4	17.7	11.9	47.0
	M - Professional, Scientific and Technical Activities	2.0	0.7	1.0	96.3	68.2	1.1	5.2	25.4

	N - Administrative and Support Services Activities	2.1	0.6	1.1	96.2	26.7	5.5	21.0	46.9
	O,P,Q - Public Administration and Defence; Compulsory Social Security, Education, Human Health and Social Work Activities	0.9	0.3	0.9	98.0	9.5	2.6	10.3	77.6
	R,S - Arts, Entertainment and Recreation and Other Service Activities	0.9	0.5	1.0	97.7	40.8	5.3	9.6	44.3
	A - Agriculture, Forestry and Fishing	0.3	0.2	0.3	99.3	4.3	1.0	4.4	90.3
	B - Mining and Quarrying	14.7	3.6	3.6	78.2	80.5	2.0	3.4	14.2
	C - Manufacturing	12.4	4.7	4.7	78.3	67.2	4.9	4.9	23.1
	D,E - Electricity, Gas, Steam and Air Conditioning Supply and Water Supply: Sewerage, Waste Management and Remediation Activities	4.8	2.2	5.7	87.4	59.4	2.6	10.4	27.6
	F - Construction	0.6	0.2	0.7	98.4	12.6	1.5	6.2	79.7
	G - Wholesale and Retail Trade; Repair of Motor Vehicles and Motorcycles	5.6	2.5	8.1	83.8	59.1	2.7	6.6	31.6
	H - Transportation and Storage	1.7	0.9	0.9	96.6	52.8	1.9	7.1	38.1
	I - Accommodation and Food Service Activities	0.4	0.1	0.9	98.6	18.6	2.1	6.2	73.0
UK	**J - Information and Communication**	1.8	0.7	1.3	96.2	42.0	3.1	7.2	47.7

K - Financial and Insurance Activities	9.3	2.3	2.6	85.8	54.5	4.5	5.4	35.6
L - Real Estate Activities	1.7	0.4	1.2	96.7	6.2	2.2	4.5	87.1
M - Professional, Scientific and Technical Activities	2.1	0.7	1.1	96.1	26.3	2.2	4.6	67.0
N - Administrative and Support Services Activities	2.6	0.8	1.4	95.2	16.5	2.9	9.2	71.4
O,P,Q - Public Administration and Defence; Compulsory Social Security, Education, Human Health and Social Work Activities	0.6	0.2	0.6	98.6	8.9	1.9	11.3	78.0
R,S - Arts, Entertainment and Recreation and Other Service Activities	1.2	0.7	1.5	96.7	17.2	2.4	7.0	73.4

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

Notes

1. Figures shown may not sum exactly to 100% due to rounding.
2. Numbers of businesses, numbers of employment and business size are based upon information from the IDBR.
3. The industrial sections presented are the industry of the RU based upon the UK Standard Industrial Classification (SIC).
4. The symbol '..' denotes values that have been suppressed for reasons of confidentiality.

Table 3 shows that businesses that trade are more likely to declare both export and import instead of just one-directional trade. In Wales, 22% of businesses in the manufacturing industry declared trade transactions, comprising of 14.1% that declared both export and import, 4.2% that declared export only, and 3.7% that declared import only.

Business employment shares in Wales and the UK also vary by industry. For example, in the wholesale and retail industry, only 13.6% of businesses declared trade in goods in Wales. However, these trading businesses accounted for 94.8% of the total employees in this industry. Whereas, in the UK, 16.2% of businesses in the wholesale and retail industry declare trade in goods activities, representing 68.4% of the employment share.

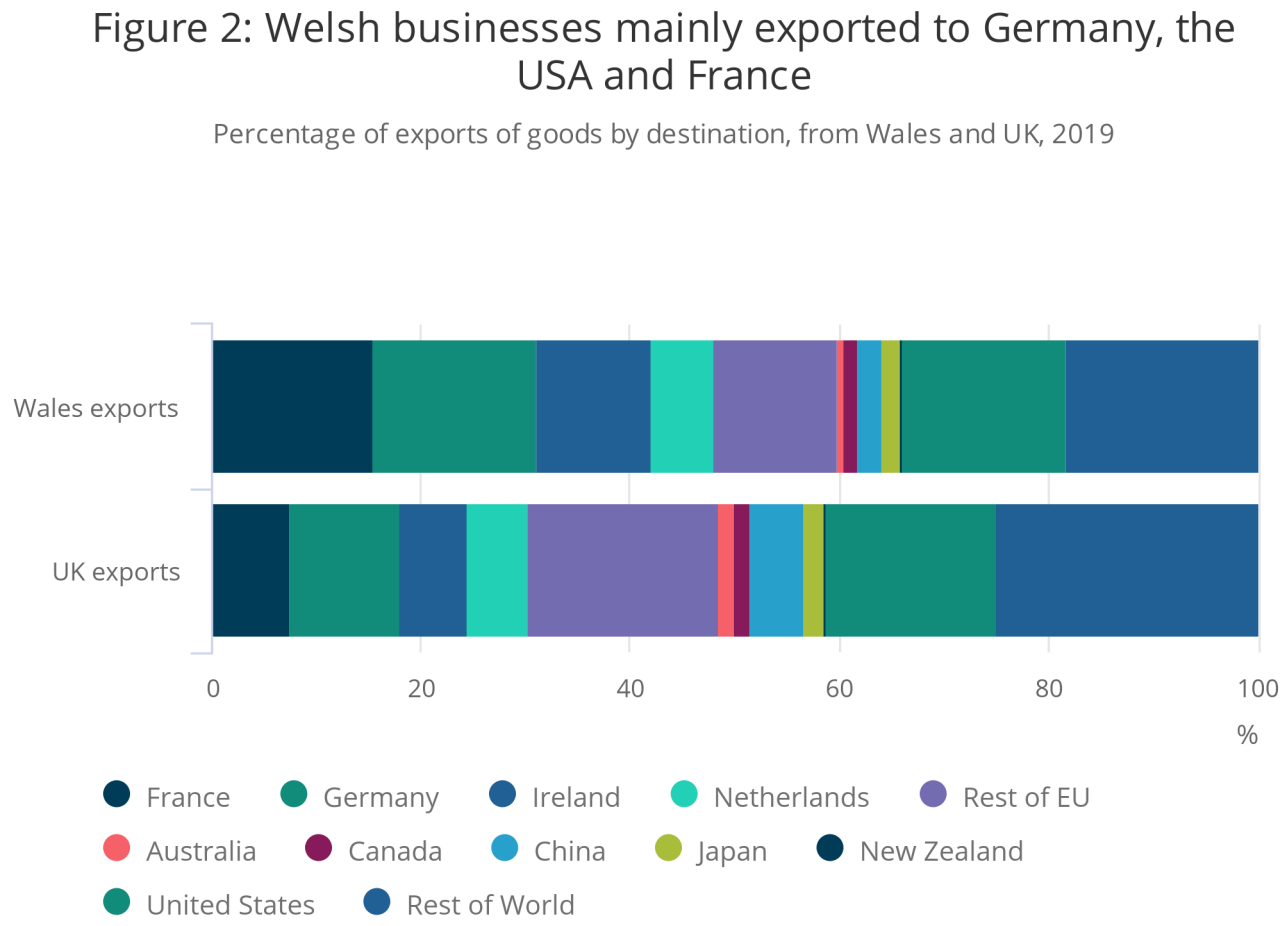
In Wales, only 3.8% of businesses declared trade in the administrative and support service industry, and accounted for 53.2% of total employment in this industry. In comparison to the UK, where 4.8% of businesses declared trade, but these administrative and support service businesses represented 28.6% of employment.

4 . Trade patterns by country

To understand the extent of Welsh trade diversification, we first look at the destination of Welsh exports. Figure 2 compares exports from Wales with the exports from the UK (which includes Wales) in 2019 by selected destinations. For Wales, goods exports were highly concentrated with 47% going to Germany, the USA, and France combined (15.8%, 15.8%, and 15.4% respectively). For the UK, the top three countries are the same, but they accounted for only 34.3% of UK exports. The largest UK export destination was the USA, accounting for 16.3% of declared exports, followed by Germany which accounted for 10.5% of exports.

Figure 2: Welsh businesses mainly exported to Germany, the USA and France

Percentage of exports of goods by destination, from Wales and UK, 2019



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

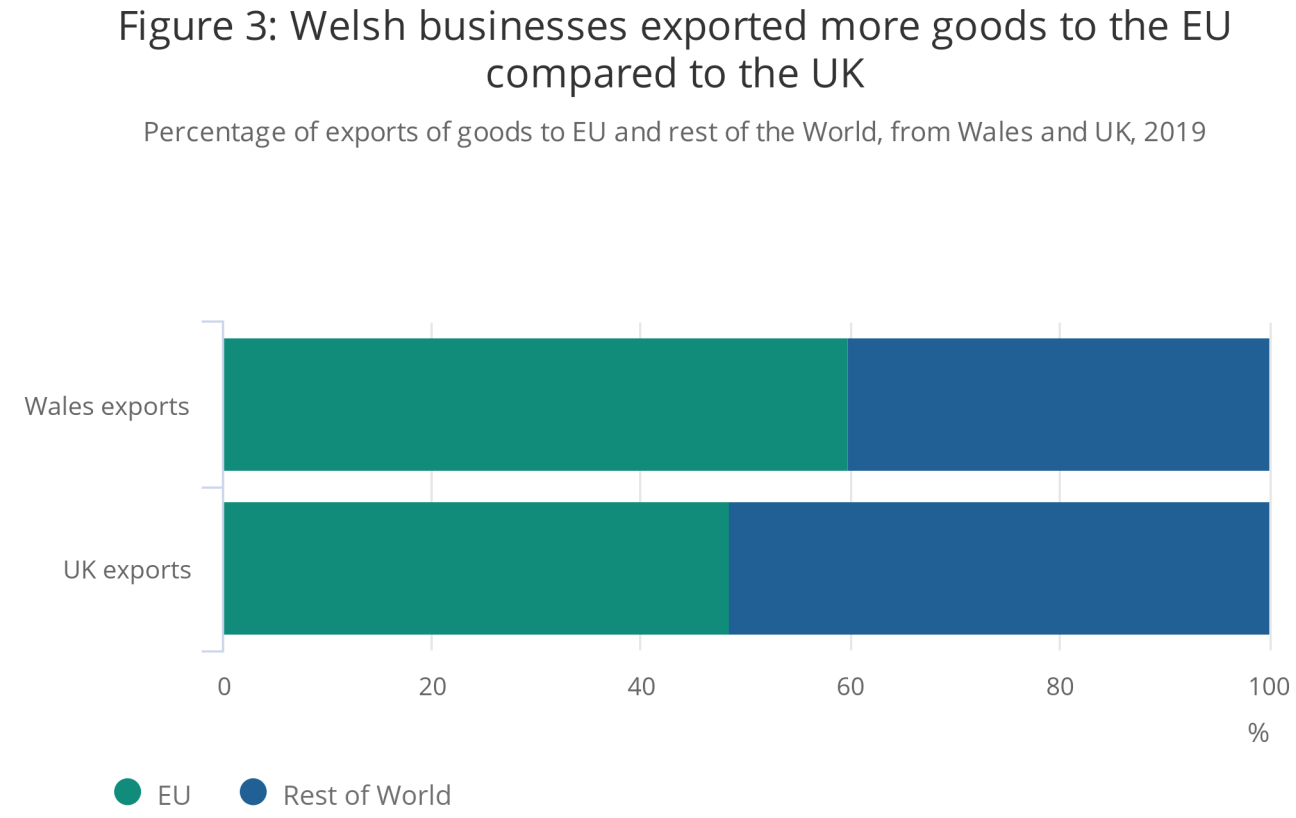
Notes:

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

Figure 3 provides a high-level comparison of exports to the EU and Rest of the World. For Wales, 59.8% of total exports in 2019 went to the EU, the other 40.1% went to countries in the Rest of the World. However, for UK exports, there was a slightly more even proportion between the EU and Rest of the World, accounting for 48.6% and 51.3% respectively.

Figure 3: Welsh businesses exported more goods to the EU compared to the UK

Percentage of exports of goods to EU and rest of the World, from Wales and UK, 2019



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

Notes:

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

Figure 4 compares imports to Wales with imports to the UK by selected countries. Wales imported the most goods from the USA in 2019, accounting for approximately 20% of declared imports. This was followed by Germany which represented 8% of total imports, then China at 6%. The UK imported the most goods from Germany, accounting for 14% of total imports. This was followed by China, Netherlands, and the USA, representing 9.8%, 8.9%, and 8.8% of total declared imports for the UK.

Figure 4: Welsh businesses mainly imported goods from the USA, Germany and China

Percentage of import of goods by country of origin, to Wales and UK, 2019

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

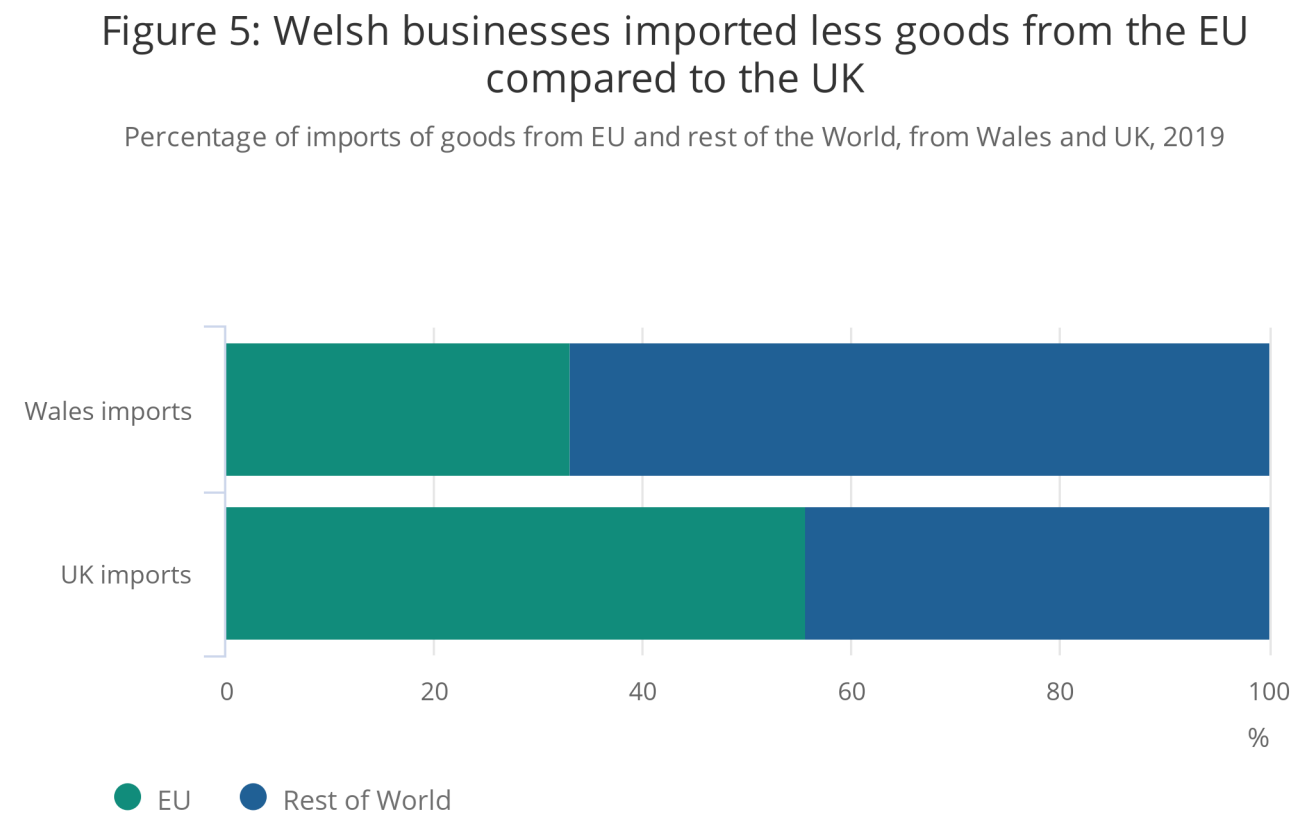
Notes:

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

Comparing imports from the EU and Rest of the World, we can see that there was a notable difference between Wales and the UK, shown in Figure 5. In 2019, 33.1% of imports to Wales came from the EU and 66.9% from the Rest of the World. Whereas, the equivalent figures for the UK were 55.6% and 44.5% respectively.

Figure 5: Welsh businesses imported less goods from the EU compared to the UK

Percentage of imports of goods from EU and rest of the World, from Wales and UK, 2019



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

Notes:

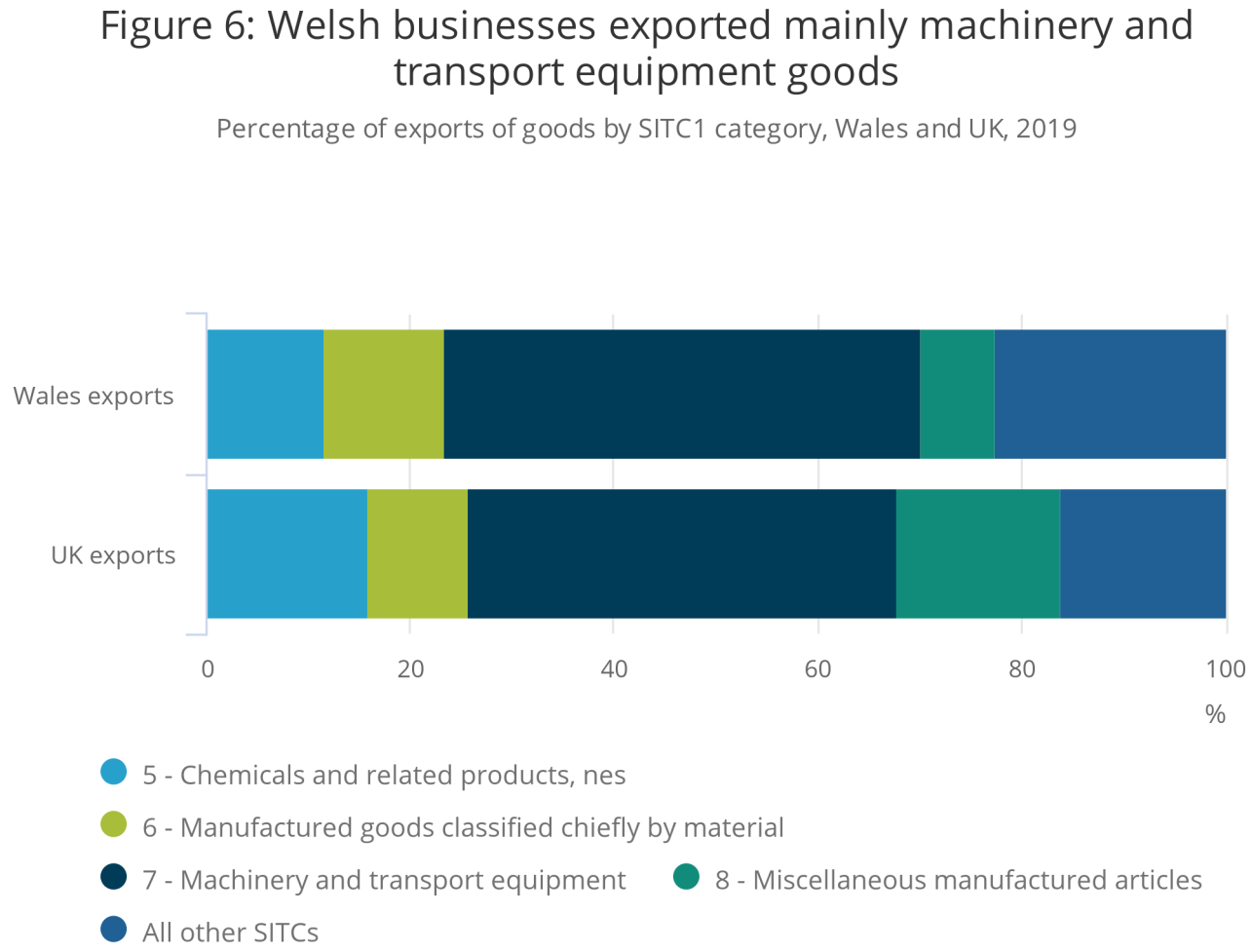
1. Figures shown may not sum exactly to 100% due to rounding.

5 . Trade patterns by commodity

Looking at the commodities as defined by the Standard International Trade Classification (SITC), we compare the export structure of Wales and the UK (Figure 6) and the import structure of Wales and the UK (Figure 7). Many of the UK trends are replicated for Wales, however there are some notable differences in certain commodities.

Figure 6: Welsh businesses exported mainly machinery and transport equipment goods

Percentage of exports of goods by SITC1 category, Wales and UK, 2019



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

Notes:

1. Please see Standard International Trade Classification (SITC), for further information about classifications.

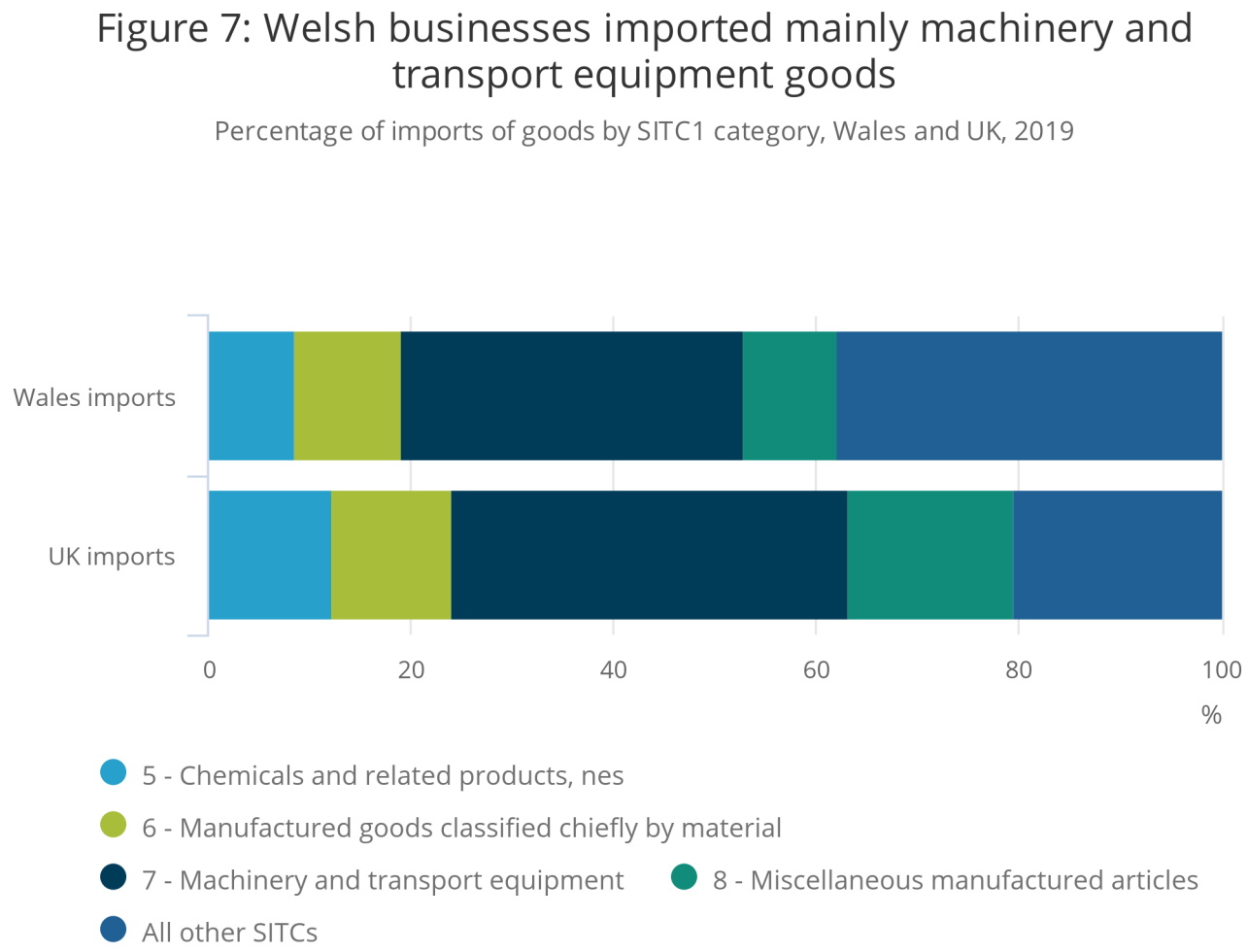
2. Figures shown may not sum exactly to 100% due to rounding.

Figure 6 shows that the machinery and transport category is an important commodity group for Wales and the UK, representing a large proportion of total exports in 2019 (46.9% and 42% respectively). The results show that when combined the machinery and transport equipment, manufactured goods, and chemicals and related products categories accounted for 70.2% of total exports for Wales and 67.8% for the UK. The largest difference in export patterns was observed in the miscellaneous manufactured articles category, which accounted for only 7.3% of total exports in Wales but represented 16.1% for the UK.

For imports, the machinery and transport equipment category was the most dominant commodity group, representing 33.6% of total imports for Wales and 39.2% for the UK. The results show that imports were highly concentrated for the UK as the chemical and related products, manufactured goods, machinery and transport equipment, and miscellaneous manufactured articles categories combined represented 79.6% of total imports. This pattern was slightly less concentrated for Wales, with the equivalent categories representing 62.2% of total imports.

Figure 7: Welsh businesses imported mainly machinery and transport equipment goods

Percentage of imports of goods by SITC1 category, Wales and UK, 2019



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

Notes:

1. Please see Standard International Trade Classification (SITC), for further information about classifications.
2. Figures shown may not sum exactly to 100% due to rounding.

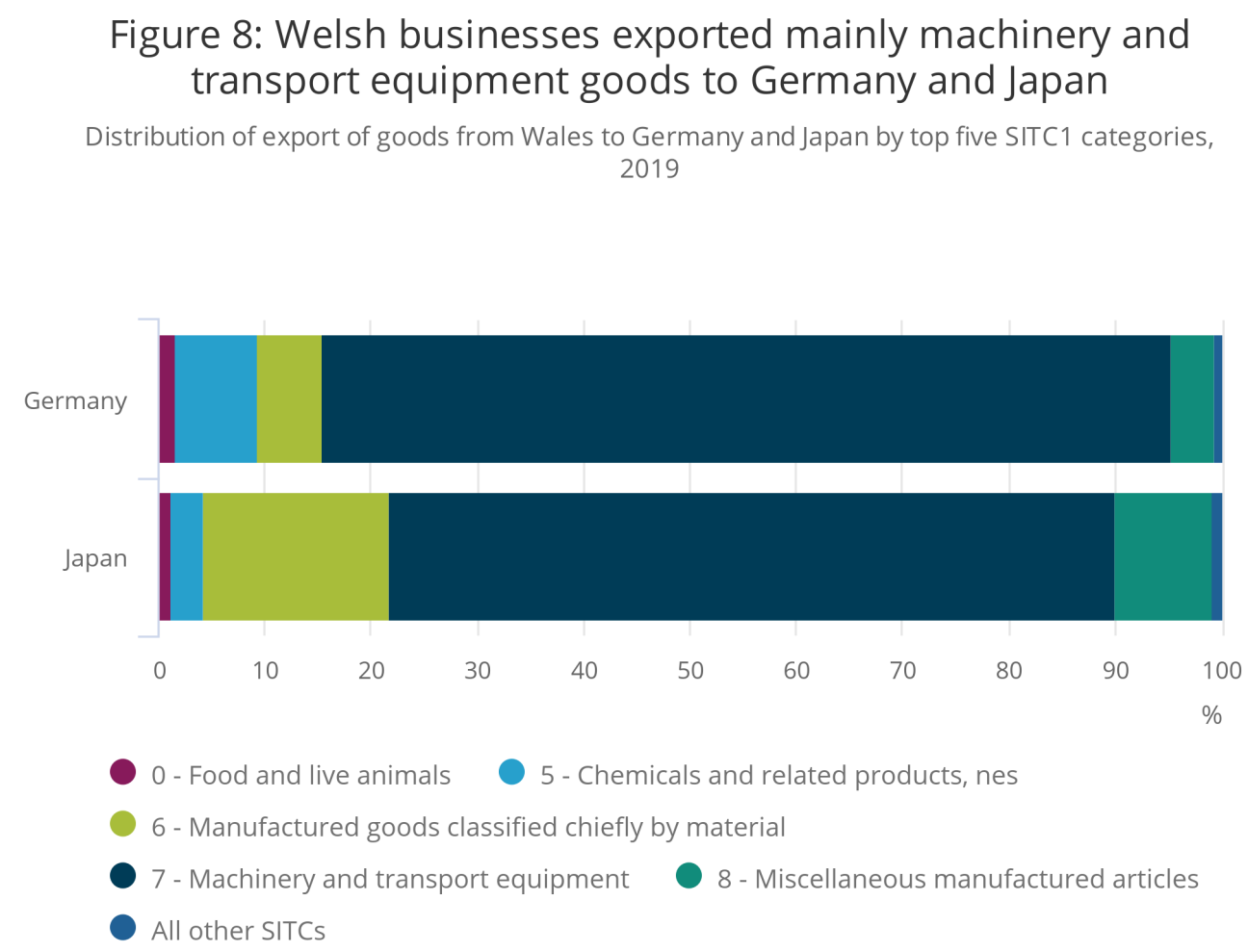
To further understand the diversification in the Welsh economy, we provide a detailed breakdown of Welsh trade activity, looking at the most important country destinations and origins by top commodity groups. The results show that Welsh trade to different markets varies in composition and size.

Looking at the structure of Welsh goods exports by selected countries and their top five SITC1 categories, the results show that the machinery and transport equipment category is an important commodity group as it features in the top five SITC1 categories for all selected countries.

As shown in Figure 8, the machinery and transport equipment category represented a large proportion of total exports for Germany (79.9%) and Japan (68.3%). Other important categories for Welsh exports include chemicals and related products, manufactured goods, and miscellaneous manufactured articles. The four SITC categories described are included in the top five commodity groups for all selected countries apart from Canada and the Republic of Ireland, indicating that Welsh exports are mainly concentrated within these categories. To see the full analysis table, please see worksheet 7. Distribution of exports of goods from Wales by selected countries and top five SITC1 categories, 2019.

Figure 8: Welsh businesses exported mainly machinery and transport equipment goods to Germany and Japan

Distribution of export of goods from Wales to Germany and Japan by top five SITC1 categories, 2019



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

Notes:

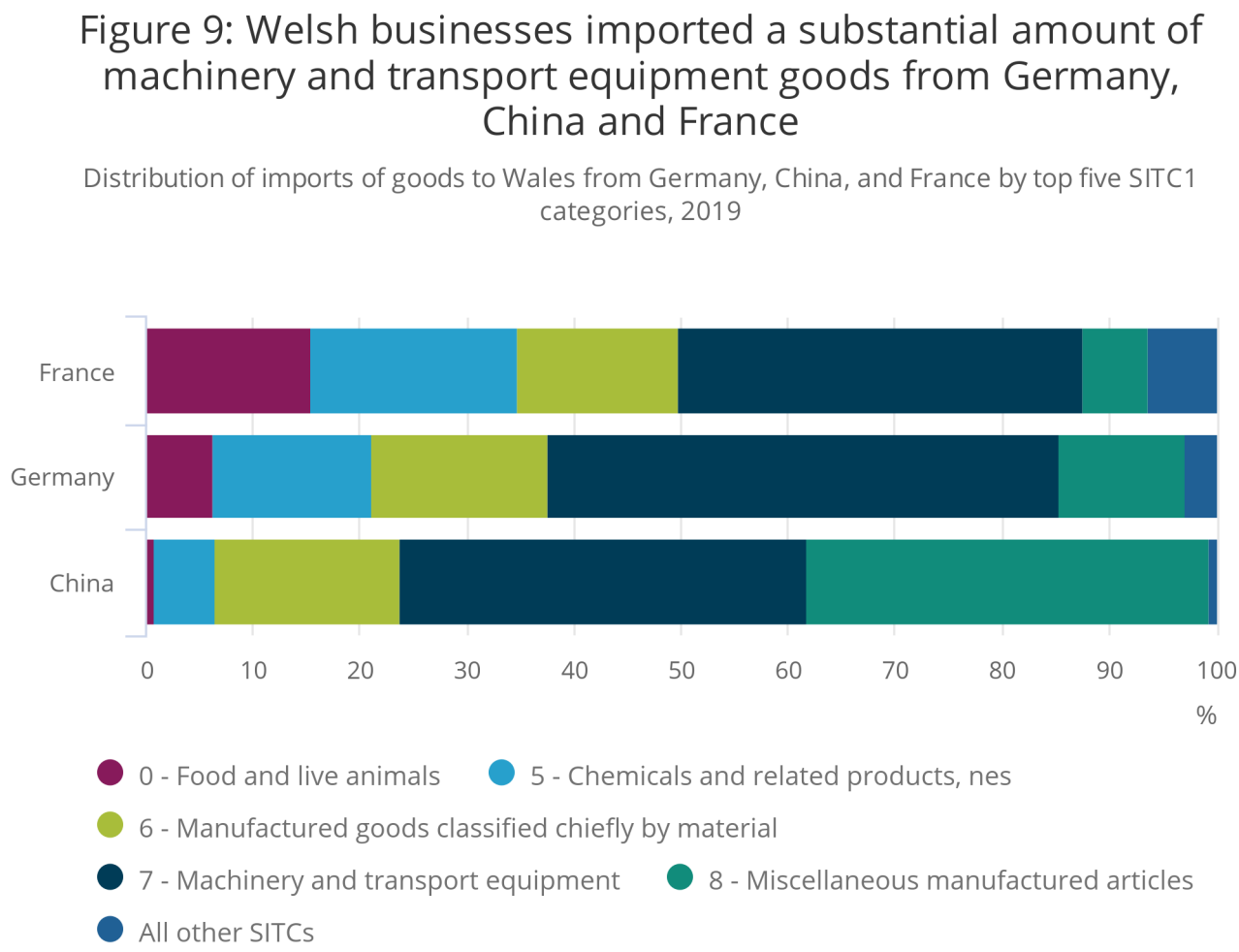
1. Please see Standard International Trade Classification (SITC), for further information about classifications.

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

Looking at the structure of Welsh imports by selected countries and their top five SITC1 categories, the results also show that the machinery and transport equipment category was an important commodity group for imported trade. Again, this commodity group featured in the top SITC1 categories for all selected countries. As shown in Figure 9, this commodity group accounted for 37.9% of total imports from China, 47.7% from Germany, and 37.9% from France.

Figure 9: Welsh businesses imported a substantial amount of machinery and transport equipment goods from Germany, China and France

Distribution of imports of goods to Wales from Germany, China, and France by top five SITC1 categories, 2019



Source: Office for National Statistics, ONS estimates using HMRC

Notes:

1. Please see Standard International Trade Classification (SITC), for further information about classifications.

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

Imports were less concentrated in terms of commodity groups compared to exports, showing more diversification across the selected countries. However, categories including chemicals and related products, manufactured goods, machinery and transport equipment, and miscellaneous manufactured articles still appear to be among the most important commodity groups for imports to Wales. To see the full analysis table, please see worksheet 8. Distribution of imports of goods to Wales by selected countries and top five SITC1 categories, Wales, 2019.

We have also produced results showing the structure of Welsh exports and imports by SITC1 category and top five countries. For Welsh exports, the results show that Germany, the Netherlands, the Republic of Ireland, France and the USA are also important destinations for a variety of commodity groups. These countries each feature in the top five countries for a commodity group at least six times for exported goods. These countries also represented the top five destinations for manufactured goods and accounted for 46.6% of the total exports within this category.

For imports to Wales, the results show that for chemicals and related products, 60.9% of total imports within this category came from the Netherlands, Germany, Belgium, the USA, and France. A similar pattern was also seen in the manufactured goods category, with the top five countries accounting for 49.8% of total imports, which comprised of Germany, the Netherlands, the USA, China, and Belgium. This indicates that goods imports within these categories were highly concentrated. To see the full analysis tables, please see worksheet 9 (exports) and 10 (imports) in the Patterns of Welsh trade by destination, product and business characteristics dataset.

6 . Supply-chain analysis of Welsh businesses

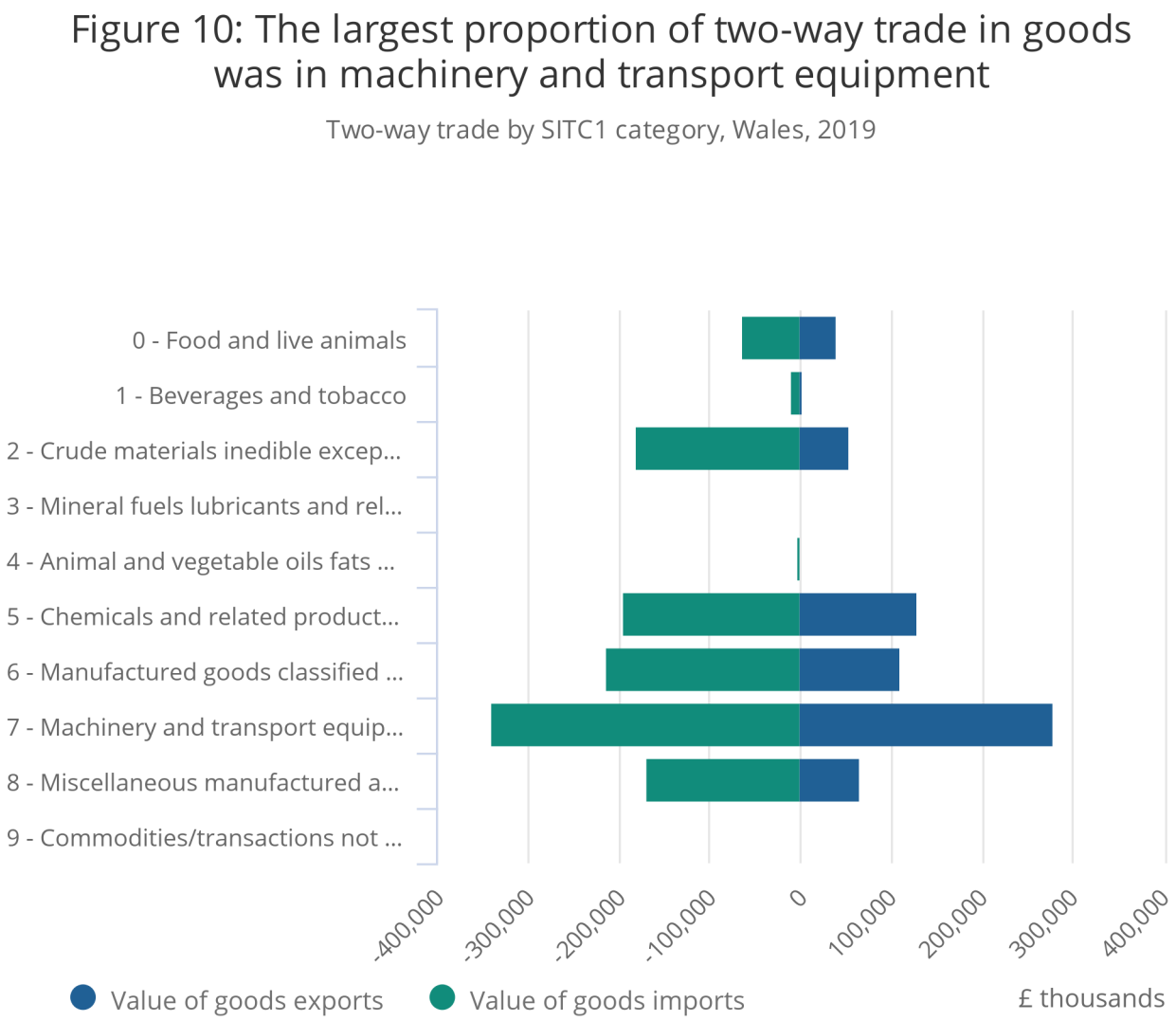
Participation in global supply-chains and business performance are considered key factors for economic growth. Understanding the extent of business product coverage and specialisation is necessary to inform policy and wider decision making. Links to the global supply-chain exist when businesses trade in intermediate products, rather than final, with other countries. At each stage of the process a product is modified or combined with other products to create a new product, until the process is complete, and the finished product is sold and classed as the final output.

In this section we attempt to estimate the level of global supply-chain integration in Wales. Firstly, we present analysis on the patterns of two-way traders, that is businesses that simultaneously export and import products that are closely aligned. Secondly, we provide estimates on trade in intermediate goods by applying the UN Broad Economic Categories (BEC) classification.

Figure 10 shows the share of trade among Welsh businesses that trade in both directions within each Standard International Trade Classification (SITC1) category. The results show that the machinery and transport equipment category had the largest proportion of business that simultaneously exported and imported, having exported £277.2 million and imported £338.2 million in 2019, indicating considerable supply-chain linkages within this category. Other categories with a large proportion of simultaneous trade included manufactured goods and chemicals and related products.

Figure 10: The largest proportion of two-way trade in goods was in machinery and transport equipment

Two-way trade by SITC1 category, Wales, 2019



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

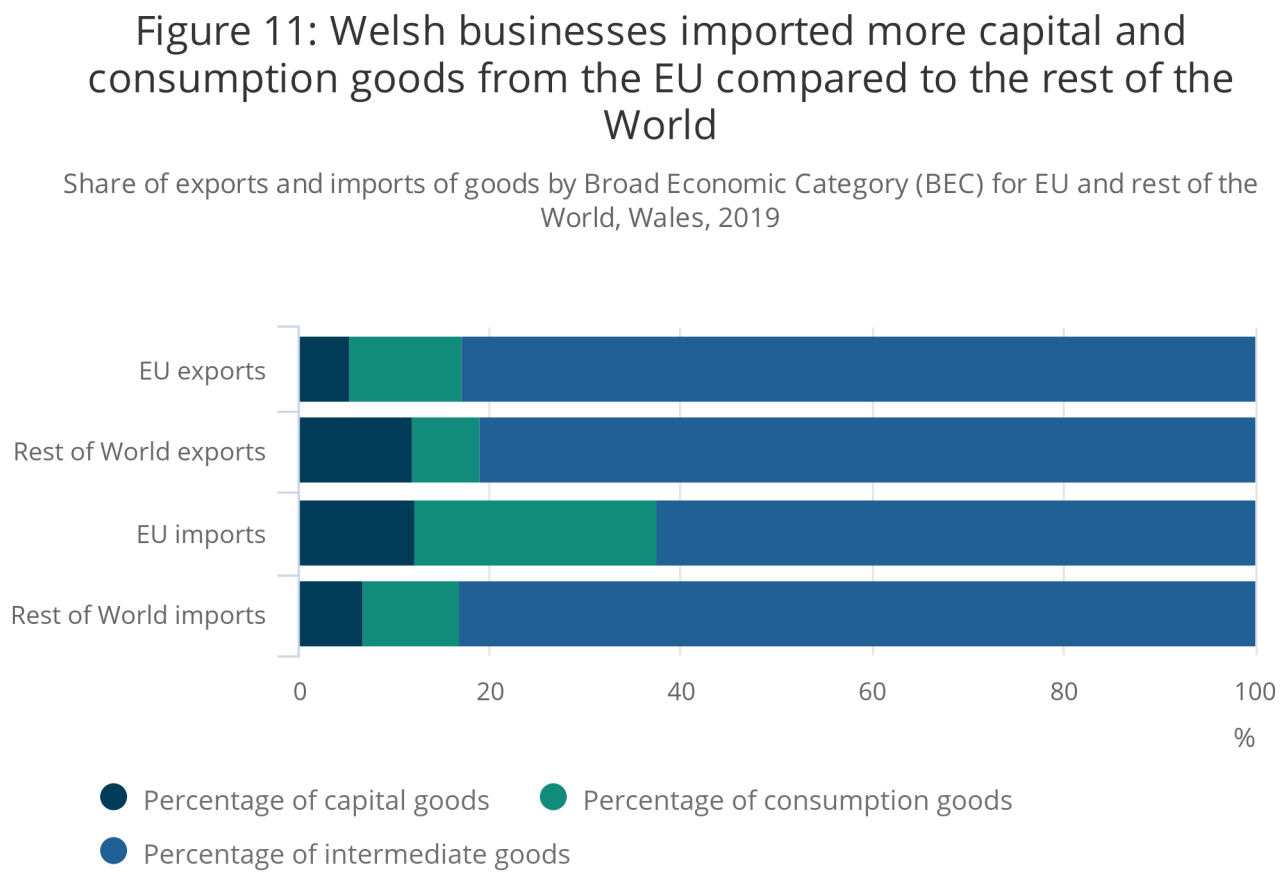
Notes:

1. Please see Standard International Trade Classification (SITC), for further information about classifications.
2. The symbol ".." denotes values that have been suppressed for reasons of confidentiality.
3. Two-way trade is defined as trade by businesses which simultaneously import and export products in the same SITC1 category.
4. Trade estimates for SITC category 3 (exports and imports) and category 9 (exports) have been suppressed for reasons of confidentiality.

Another way to investigate the level of global supply-chain integration is to examine the extent of trade in intermediate goods. Figure 11 shows the share of Welsh exports and imports by BEC to the EU and Rest of the World. The results show that Welsh businesses were more likely to trade in intermediate goods, rather than capital or consumption goods.

Figure 11: Welsh businesses imported more capital and consumption goods from the EU compared to the rest of the World

Share of exports and imports of goods by Broad Economic Category (BEC) for EU and rest of the World, Wales, 2019



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

Notes:

1. Products have been grouped into three broad categories which are used in the international classification known as Broad Economic Categories (BEC) as compiled by the UN.

2. The other goods categories from the BEC classification has been removed for reasons of confidentiality.

3. Percentages are based on the three BEC categories in the table and may not sum to 100% due to rounding.

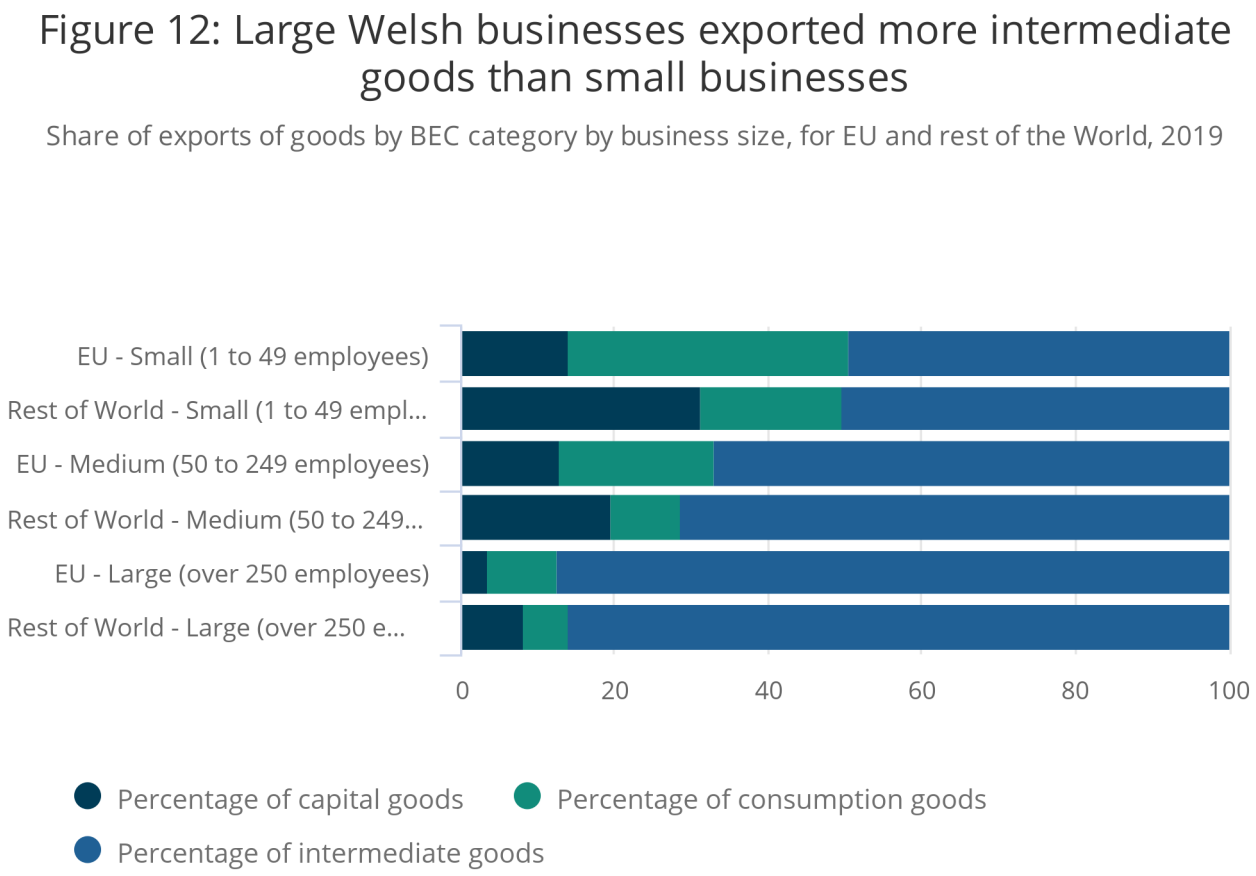
Figure 11 shows that intermediate goods represented the largest category of goods exports to both the EU and Rest of the World at 82.8% and 81%, respectively. The results also show that Welsh businesses exported more capital goods to the Rest of the World at 11.9%, than to the EU at 5.5%. As trade in capital goods is also considered to include products involved in the production process, these results suggest strong supply-chain links into the global market.

For goods imported to Wales from the EU, 62.5% were classified as intermediate, whereas the equivalent figure for the Rest of the World was larger at 83.1%. Consumption goods, which are defined as final products, represented a larger proportion of goods imports from both the EU and Rest of the World, compared with capital goods.

We next breakdown Welsh exports and imports categorised by BEC, firstly by business size and then ownership. Figure 12 shows Welsh exports by BEC and business size. The results show that large businesses (over 250 employees) are more likely to export intermediate goods, compared with small (1 to 49 employees) and medium (50 to 249 employees) sized businesses.

Figure 12: Large Welsh businesses exported more intermediate goods than small businesses

Share of exports of goods by BEC category by business size, for EU and rest of the World, 2019



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

Notes:

1. Products have been grouped into three broad categories which are used in the international classification known as Broad Economic Categories (BEC) as compiled by the UN.

2. The other goods categories from the BEC classification has been removed for reasons of confidentiality.

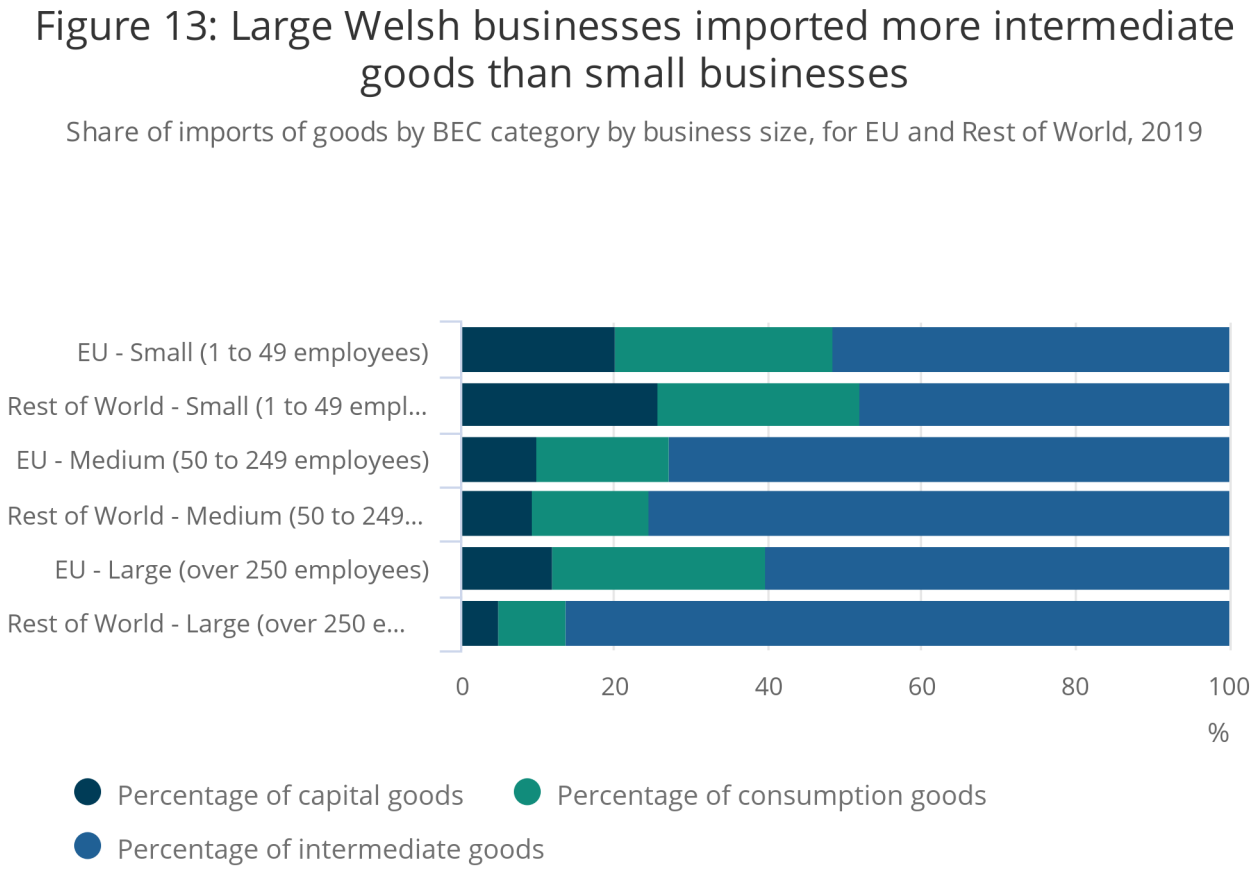
3. Percentages are based on the three BEC categories in the table and may not sum to 100% due to rounding.

4. Employment size bands are defined as small (1 to 49 employees), medium (50 to 249 employees) and large (over 250 employees).

For large businesses, the share of total exports of intermediate goods to the EU was 87.4% and 86% to the Rest of the World, whereas the equivalent figure for small businesses was 49.4% and 50.3%. This suggests that large businesses in Wales are more integrated in the global supply chains.

Figure 13: Large Welsh businesses imported more intermediate goods than small businesses

Share of imports of goods by BEC category by business size, for EU and Rest of World, 2019



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

Notes:

1. Products have been grouped into three broad categories which are used in the international classification known as Broad Economic Categories (BEC) as compiled by the UN.

2. The other goods categories from the BEC classification has been removed for reasons of confidentiality.

3. Percentages are based on the three BEC categories in the table and may not sum to 100% due to rounding.

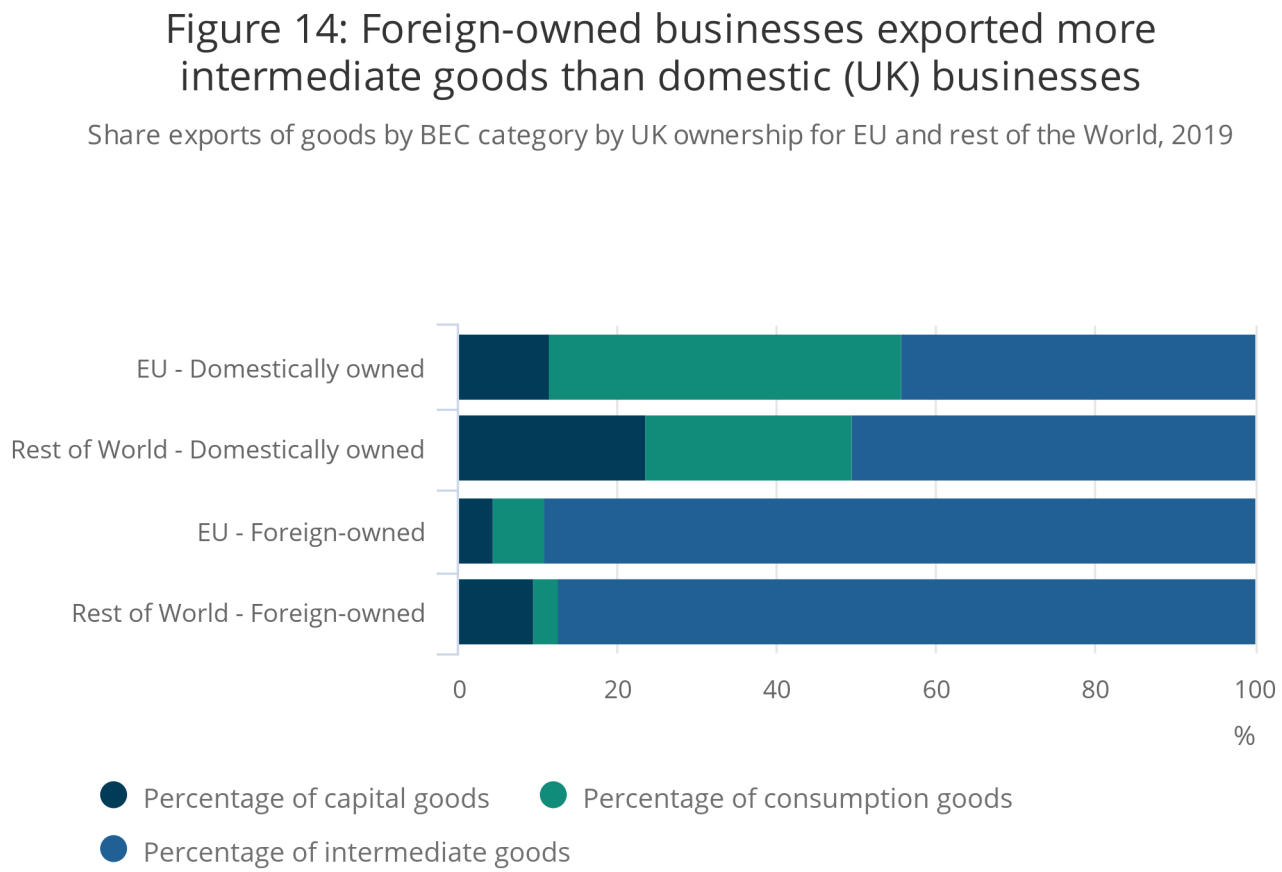
4. Employment size bands are defined as small (1 to 49 employees), medium (50 to 249 employees) and large (over 250 employees).

Figure 13 shows a similar pattern for goods imported to Wales. Large businesses were more likely to import intermediate goods from both the EU and Rest of the World. However, the share of total imports was larger for the Rest of the World at 86.4%, than for the EU which was 60.2%. The results also show that smaller businesses import more capital goods than medium and large-sized businesses. For small businesses, the share of total imports of capital goods from the EU was 20.2% and 25.6% for the Rest of the World, the equivalent figure for medium sized business were 10% and 9.4%, and 12.1% and 5% for large businesses.

Looking at businesses by ownership, Figure 14 suggests that foreign-owned businesses are more likely to export intermediate goods than domestically owned businesses.

Figure 14: Foreign-owned businesses exported more intermediate goods than domestic (UK) businesses

Share exports of goods by BEC category by UK ownership for EU and rest of the World, 2019



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

Notes:

1. Products have been grouped into three broad categories which are used in the international classification known as Broad Economic Categories (BEC) as compiled by the UN.

2. The other goods categories from the BEC classification has been removed for reasons of confidentiality.

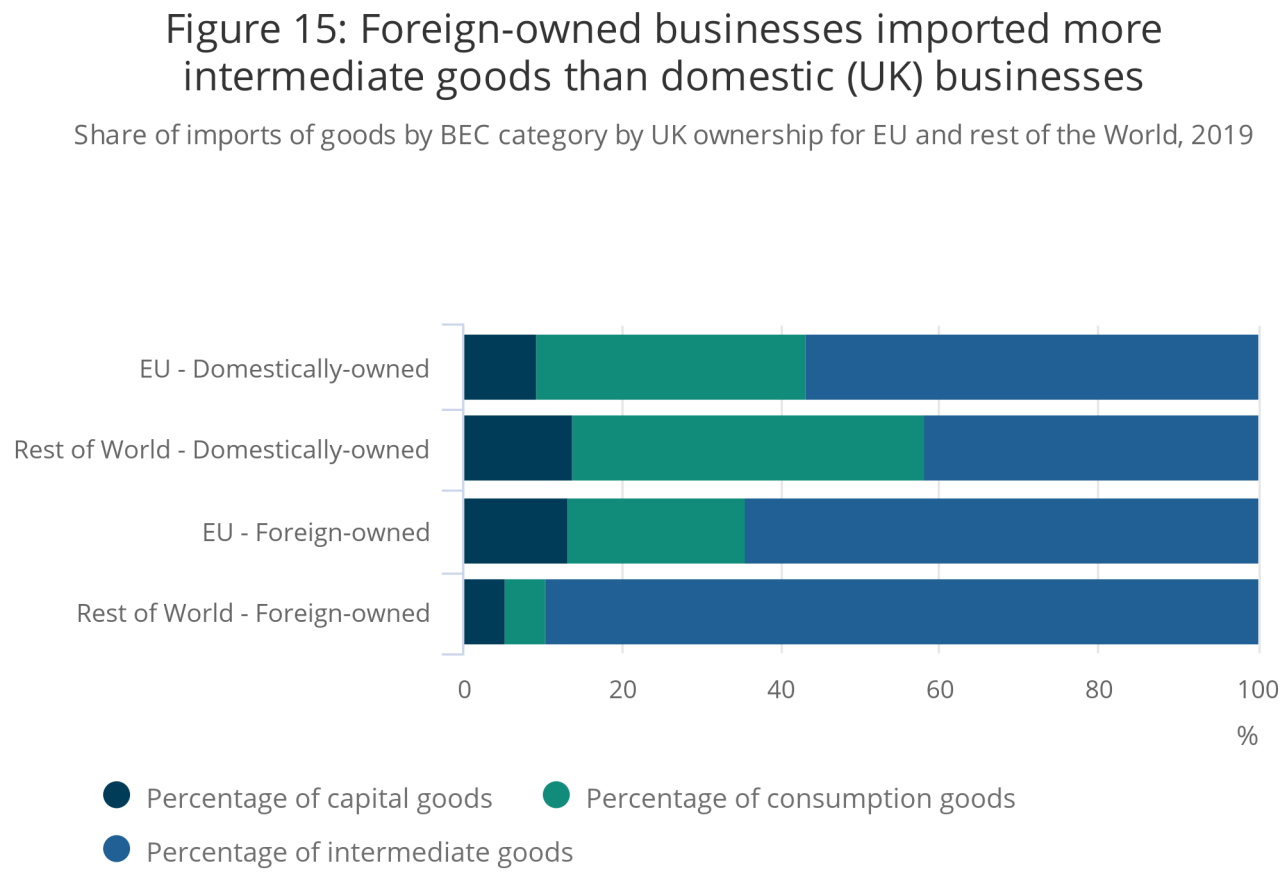
3. Percentages are based on the three BEC categories in the table and may not sum to 100% due to rounding.

The share of total exports of intermediate goods by foreign-owned businesses was 89.1% to the EU and 87.5% to the Rest of the World. The equivalent figures for domestically owned businesses were 44.3% to the EU and 50.3% to the Rest of the World. The results also show that the share of total exports for both capital and consumption goods by domestically owned businesses was larger compared with the share from foreign-owned businesses. For example, the share of consumption goods exported by domestically owned businesses to the EU was 44.1%, compared with 6.4% for foreign-owned business. These results indicate that foreign-owned businesses in Wales are more integrated within the global supply chains than domestically owned businesses.

Figure 15 shows that foreign-owned businesses also imported a larger share of intermediate goods compared to domestically owned businesses. The share of intermediate goods imported by foreign-owned businesses from the EU was 64.3% and 89.5% from the Rest of the World. Whereas, the equivalent estimates for domestically owned businesses were 56.9% and 41.7% respectively.

Figure 15: Foreign-owned businesses imported more intermediate goods than domestic (UK) businesses

Share of imports of goods by BEC category by UK ownership for EU and rest of the World, 2019



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

Notes:

1. Products have been grouped into three broad categories which are used in the international classification known as Broad Economic Categories (BEC) as compiled by the UN.

2. The other goods categories from the BEC classification has been removed for reasons of confidentiality.

3. Percentages are based on the three BEC categories in the table and may not sum to 100% due to rounding.

For a more detailed breakdown of Welsh trade by BEC, including import and export activities to selected countries and employment size bands, please see worksheets 17 to 26 in the Patterns of Welsh trade by destination, product and business characteristic dataset.

7 . International trade margins

International trade relates to the process of businesses buying and selling products to and from other countries. The import and export behaviour of businesses is vital to economic growth and development. International research has highlighted that growth in trade is driven by changes in both the extensive and intensive margins.

The terms extensive and intensive margins of trade refer to different factors in which changes can occur across businesses, markets or time, in the volume or value of exports and imports, and which combine to result in the observed difference in overall volume and value at aggregate level (Mion and Muuls, 2014). Extensive margins refer to differences in the total number (of exporters or importers), while intensive margins refer to differences in the average volume or value (of exporter or importer, or of product).

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

To identify and understand the variation in Welsh business performance, we split this analysis section into two: international export margins and international import margins. In each section we present analysis on the extensive trade margins, including total number of exporting or importing businesses, and analysis on the intensive margins, including average value per product and/or country.

International export margins

Export diversification is key to economic growth, however international evidence suggests that only a small number of businesses export. There is also a considerable amount of variation between exporting businesses, in terms of products and market destinations (Bernard and others, 2012).

Concentration in a relatively low range of products and/or markets can bring exposure to risk, however high levels of specialisation amongst exporters can be a positive feature if specialisation is in areas of high demand and future growth prospects.

Figure 16 shows that 23.4% of Welsh exporters were exporting only one product in 2019, accounting for 8.1% of the total employment in Wales. Only 0.6% of Welsh businesses were exporting 30 products, accounting for less than 1% of the total employment in Wales (0.6%). This result suggests a very low diversification or high specialisation in almost a quarter of Welsh exporters.

Figure 16: Over half of Welsh businesses export up to five products and represent less than 20% of total employment

Distribution of number of businesses and employment by number of exported goods, Wales, 2019

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

Notes:

1. Figures shown may not sum exactly to 100% due to rounding.
2. Businesses which export or import more than 30 products have been excluded.
3. Product is defined by the Standard International Trade Classification (SITC).
4. The symbol “..” denotes values that have been suppressed for reasons of confidentiality.

Looking at businesses size, Table 4 shows that 74.1% of businesses that declared exports in one product were of a micro (1 to 9 employees) or small (10 to 49 employees) size. Whereas, only 11.5% of businesses that exported one product were of a large size (over 250 employees).

Table 4: Distribution of number of businesses and employment by size bands for businesses trading one product, Wales, 2019 (export)

Employment size band	Percentage of businesses	Percentage of employment
Band 1 (1 to 9)	52.8	0.4
Band 2 (10 to 49)	21.3	1.2
Band 3 (50 to 99)	5.3	1.0
Band 4 (100 to 249)	4.5	1.9
Band 5 (250 to 999)	4.9	6.2
Band 6 (1000 and over)	6.6	89.4

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

Notes

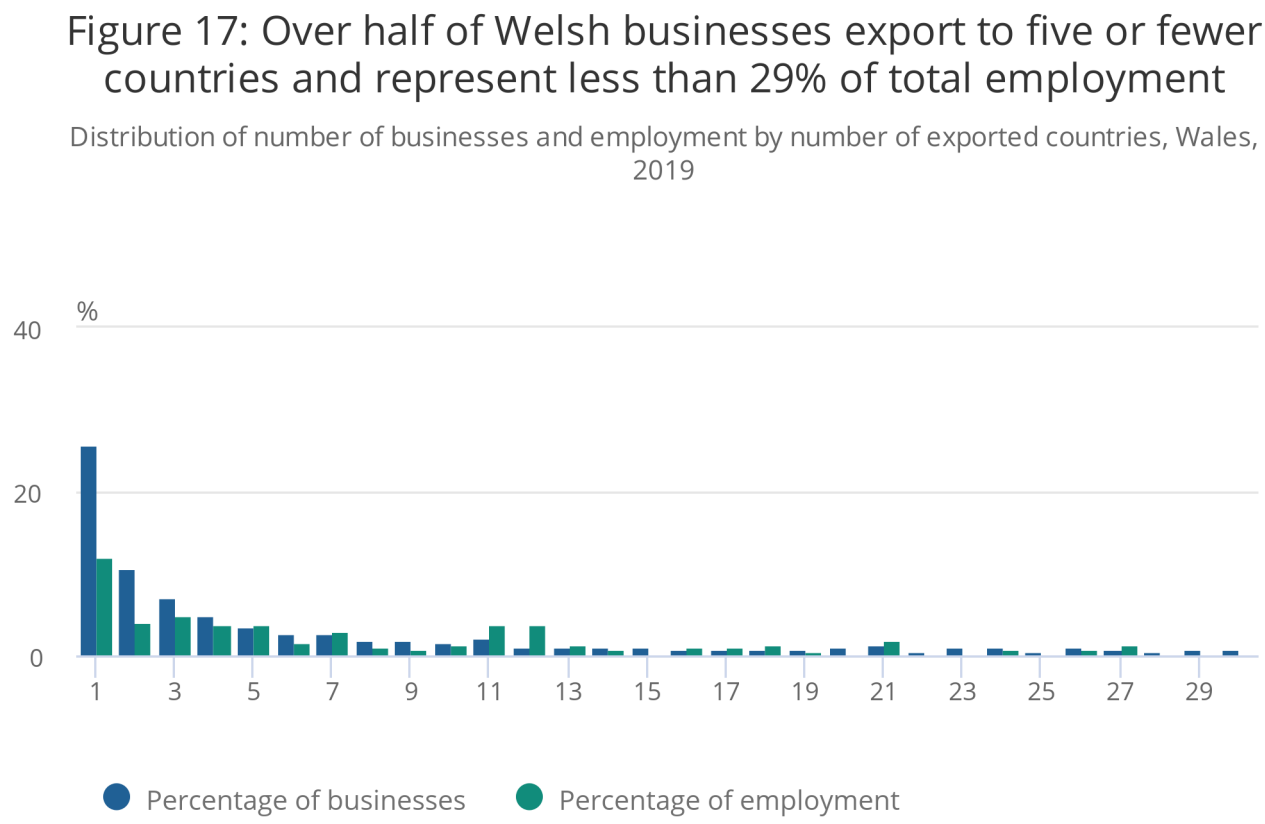
1. Percentage of businesses may not sum to 100% due to a number of businesses reporting zero employees.

2. Employment size band indicates number of employees at the reporting unit level.

If we look at number of export destinations, Figure 17 shows that 25.8% of Welsh businesses declared exports to only one country, accounting for 12% of the total employment in Wales. Only 0.7% of Welsh businesses exported to 30 countries which indicates a low diversification in relation to export market destinations.

Figure 17: Over half of Welsh businesses export to five or fewer countries and represent less than 29% of total employment

Distribution of number of businesses and employment by number of exported countries, Wales, 2019



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

Notes:

1. Figures shown may not sum exactly to 100% due to rounding.
2. Businesses which export or import to more than 30 countries have been excluded.
3. The symbol ".." denotes values that have been suppressed for reasons of confidentiality.

Table 5 shows the proportion of businesses that declared export to only one country in 2019 by business size. Similar to the pattern observed for number of exported products, 73.1% of businesses that exported to one country were micro or small businesses, whereas the corresponding figure for large businesses was 13%.

Table 5: Distribution of number of businesses and employment by size bands for businesses trading with one country, Wales, 2019 (export)

Employment size band	Percentage of business	Percentage of employment
Band 1 (1 to 9)	52.7	0.3
Band 2 (10 to 49)	20.4	0.8
Band 3 (50 to 99)	6.1	0.8
Band 4 (100 to 249)	4.1	1.3
Band 5 (250 to 999)	5.2	4.9
Band 6 (1000 and over)	7.8	91.9

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

Notes

1. Percentage of businesses may not sum to 100% due to a number of businesses reporting zero employees.

2. Employment size band indicates number of employees at the reporting unit level.

For Welsh exporters, the size of product and destination markets varied significantly between businesses of different sizes. Table 6 shows that the most exporting businesses in Wales are micro (1 to 9 employees), who export a few products to a small number of destinations. However, looking at the value of export trade, these micro-sized businesses only accounted for 1.2% in 2019. Table 6 shows that the value of export trade is dominated by a smaller number of larger (over 250 employees) businesses that export multiple products to many destinations, representing 80% of the total exports.

For a more detailed breakdown of Welsh goods exports by business size and export destinations, please see the data provided in data sources.

Table 6: International trade margins of Welsh businesses by size bands, Wales, 2019 (export)

Employment size band	Number of businesses	Average number of countries	Average number of products	Total trade value (£ thousands)	Average trade value (£ thousands)
Band 1 (1 to 9)	1,598	8	10	219,546	137
Band 2 (10 to 49)	813	11	12	633,586	779
Band 3 (50 to 99)	329	18	23	882,665	2,683
Band 4 (100 to 249)	387	22	34	1,857,553	4,800
Band 5 (250 to 999)	496	24	52	6,792,716	13,695
Band 6 (1000 and over)	585	23	90	7,577,003	12,952

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

Notes

1. Figures shown may not sum exactly to 100% due to rounding.
2. Products defined by Standard International Trade Classification (SITC).
3. Employment size band indicates number of employees at the reporting unit level.

Table 7 provides a breakdown of Welsh export margins by business ownership. The results show that the extensive margin was driven largely by domestic-owned businesses, as they accounted for 75.4% of total exporters in 2019. However, the intensive margins, including average number of products and countries, were driven by foreign-owned businesses. Additionally, the average export value per business was significantly higher for foreign-owned businesses compared with domestic businesses.

Table 7: International trade margins of Welsh businesses by UK ownership, Wales, 2019 (export)

Business ownership	Number of businesses	Average number of countries	Average number of products	Total trade value (£ thousands)	Average trade value (£ thousands)
Domestically-owned	3,321	11	21	2,770,250	834
Foreign-owned	1,082	25	53	15,336,457	14,174

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

Notes

1. Products defined by Standard International Trade Classification (SITC).

To summarise, the results show that most Welsh exporters are small in terms of their size and of domestic ownership, which are less diversified in terms of their product and destination reach compared with larger and foreign-owned exporters. However, export volumes were dominated by the few extremely large and foreign-owned exporters, which both have a wider product and market reach.

Table 8 shows businesses in the wholesale and retail, and manufacturing industries were the top two industry sectors, accounting for the largest share of exporting business in Wales. Wholesale and retail exporters accounted for 30.9% of exporters, employing 42.7% of the total workers in this industry. Whereas, 28.7% of exporting businesses were in the manufacturing industry, and accounted for only 5.6% of the total employment. Businesses in the mining and quarrying, agriculture, forestry and fishing, and real estate activities industries represented the smallest share of exporting businesses in Wales in 2019.

Looking at the diversification of Welsh exporters by business industry, Table 8 shows that businesses in the transport and storage, wholesale and retail, and accommodation and food services industries were the most diversified in terms of products, with the average number of products exported were 49, 44, and 39 respectively. The electricity and gas, the public sector, and manufacturing industries were also the most diversified in terms of export destinations, exporting on average to 28, 20, and 18 destinations respectively. The table also shows that businesses in the agriculture, forestry and fishing industry were the least diversified in Wales, exporting only 6 products to 7 destinations on average.

The total export value and average export per business was dominated by businesses in the manufacturing industry, representing a total of £16.4 billion in 2019 with the average per business at £12.9 million. This indicates that this industry is not only a diversified industrial sector for Wales, but also important for export trade.

Table 8: International trade margins of Welsh businesses by industry, Wales, 2019 (export)

Industry	Percentage of businesses in this sector (%)	Percentage of employment in this sector (%)	Average number of countries	Average number of products	Total trade value (£ thousands)	Average trade value (£ thousands)
A - Agriculture, Forestry and Fishing	1.0	0.1	7	6	84,807	1,844
B - Mining and Quarrying	0.3	0.3	15	32	16,092	1,149
C - Manufacturing	28.7	5.6	18	24	16,380,393	12,959
D,E - Electricity, Gas, Steam and Air Conditioning Supply and Water Supply: Sewerage, Waste Management and Remediation Activities	1.8	2.5	28	36	181,461	3,669
F - Construction	2.7	2.6	14	37	21,473	182
G - Wholesale and Retail Trade; Repair of Motor Vehicles and Motorcycles	30.9	42.7	14	44	943,925	694
H - Transportation and Storage	3.0	9.6	17	49	124,283	934
I - Accommodation and Food Service Activities	1.5	8.8	9	39	1,984	31
J - Information and Communication	4.0	5.9	13	13	23,840	137
K - Financial and Insurance Activities	5.3	6.7	17	23	..	..
L - Real Estate Activities	1.3	0.5	9	8	..	..
M - Professional, Scientific and Technical Activities	8.9	4.4	11	18	152,490	389

N - Administrative and Support Services Activities	6.3	4.9	13	17	155,213	556
O,P,Q - Public Administration and Defence; Compulsory Social Security, Education, Human Health and Social Work Activities	2.0	3.1	20	32	1,514	58
R,S - Arts, Entertainment and Recreation and Other Service Activities	2.3	2.3	16	35	8,867	176

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

Notes

1. Products defined by Standard International Trade Classification (SITC).
2. The symbol '..' denotes values that have been suppressed for reasons of confidentiality.
3. The industrial sections presented are the industry of the reporting unit based upon the UK Standard Industrial Classification (SIC).

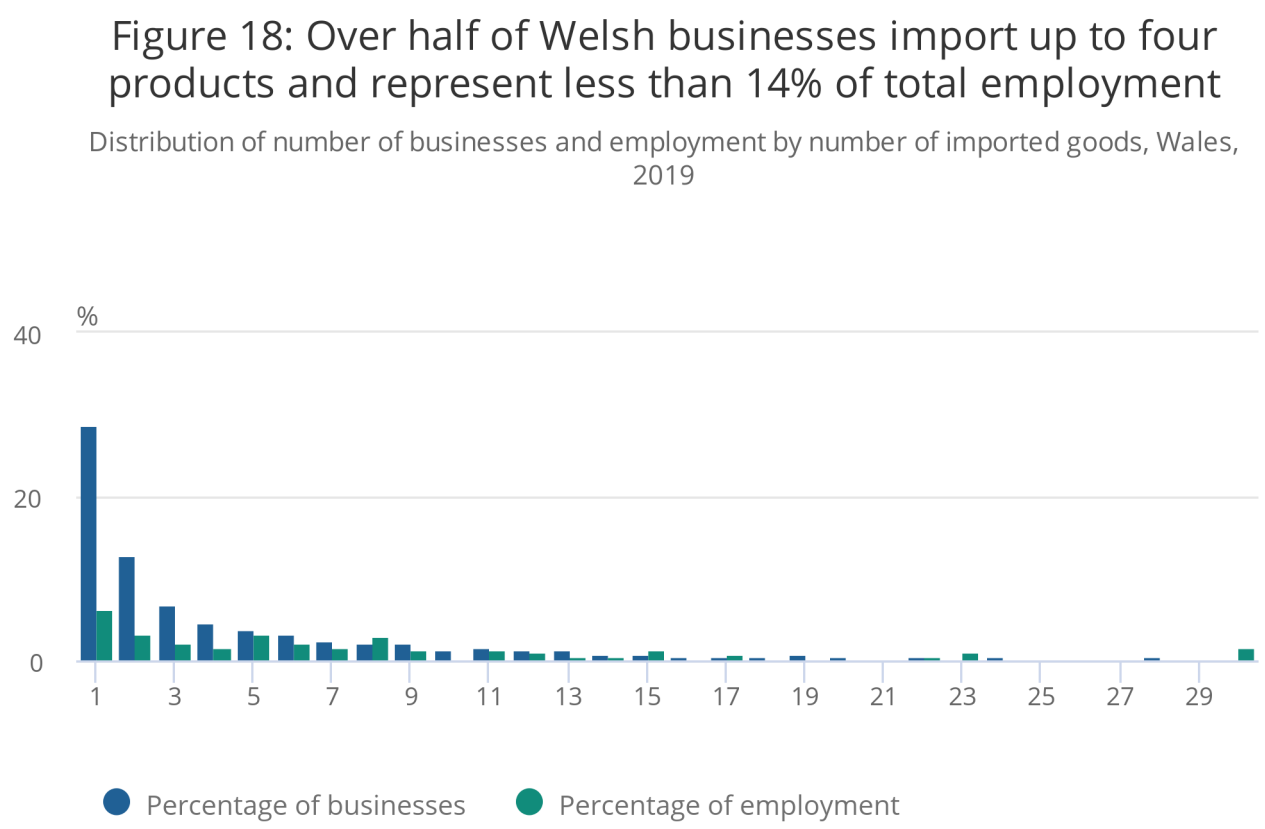
International import margins

In this section we present equivalent analysis on international import margins of Welsh trade. It should be noted that the patterns observed for imports, at a high level, are broadly similar to those described in the export section above. However, there are some diversions when looking at business level information, in terms of business size, ownership and industry.

Figure 18 shows that 28.7% of businesses imported only one product in 2019, representing 6.4% of the total employment. However, only 0.4% of Welsh businesses imported more than 30 products. Similar to the export trends detailed above, this result indicates a low diversification or high specialisation amongst goods imported by Welsh businesses.

Figure 18: Over half of Welsh businesses import up to four products and represent less than 14% of total employment

Distribution of number of businesses and employment by number of imported goods, Wales, 2019



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

Notes:

1. Figures shown may not sum exactly to 100% due to rounding.
2. Businesses which export or import more than 30 products have been excluded.
3. Product is defined by the Standard International Trade Classification (SITC).
4. The symbol “..” denotes values that have been suppressed for reasons of confidentiality.

If we breakdown businesses that imported one product by size, Table 9 shows that 64.6% were micro (1 to 9 employees) and small (10 to 49 employees) businesses, whereas 6.8% were by large (over 250 employees) businesses. Although these large businesses represented a smaller proportion of businesses that imported one product, they accounted for most of the employment, at 94.7%.

Table 9: Distribution of number of businesses and employment by size bands for businesses trading one product, Wales, 2019 (import)

Employment size band	Percentage of businesses	Percentage of employment
Band 1 (1 to 9)	50.6	0.6
Band 2 (10 to 49)	14.0	1.5
Band 3 (50 to 99)	3.3	1.2
Band 4 (100 to 249)	2.6	2.1
Band 5 (250 to 999)	2.8	6.9
Band 6 (1000 and over)	4.0	87.8

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

Notes

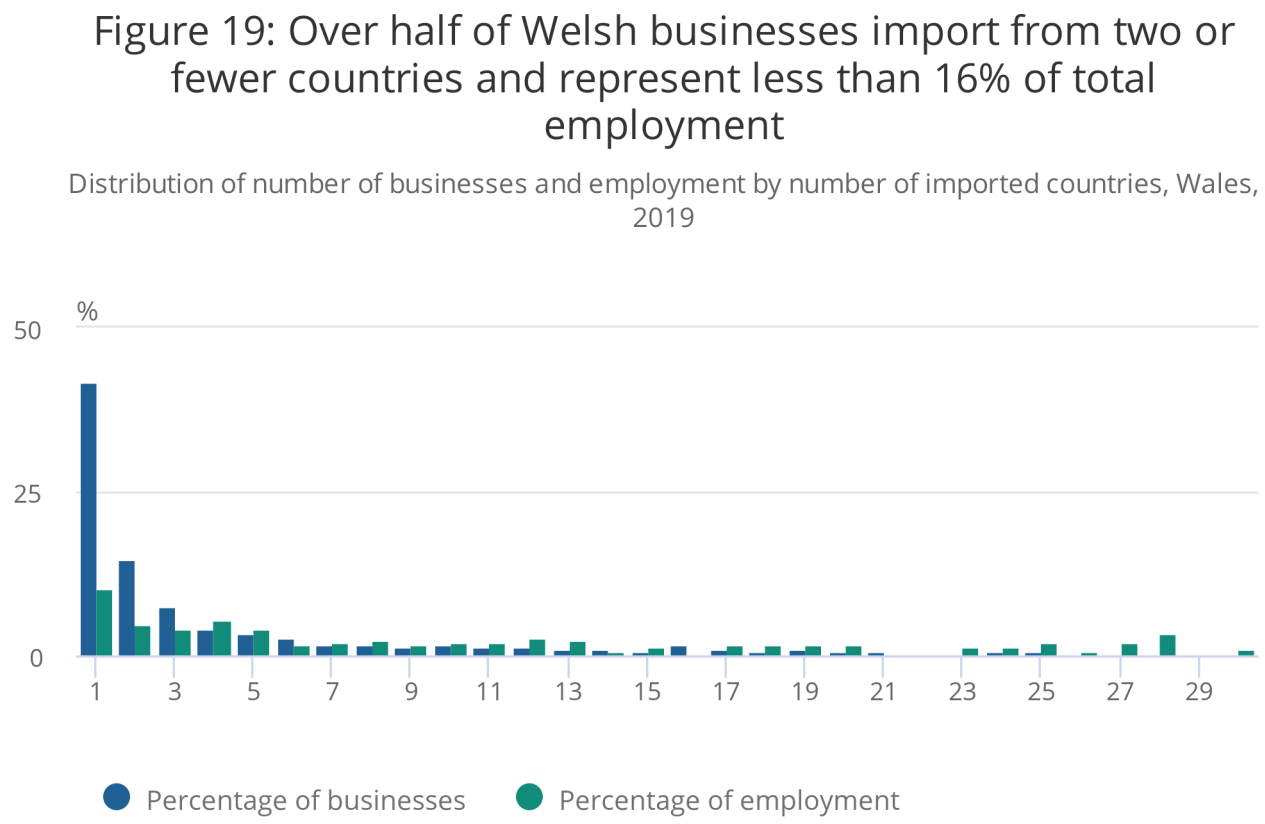
1. Percentage of businesses may not sum to 100% due to a number of businesses reporting zero employees.

2. Employment size band indicates number of employees at the reporting unit level.

Looking at origins of imports, Figure 19 shows that 41.9% of businesses imported goods from only one country, representing 10.4% of the employment in Wales. However, only 0.2% of businesses imported goods from 30 countries. This indicates a low diversity import portfolio in terms of countries for over 40% of Welsh importers.

Figure 19: Over half of Welsh businesses import from two or fewer countries and represent less than 16% of total employment

Distribution of number of businesses and employment by number of imported countries, Wales, 2019



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

Notes:

1. Figures shown may not sum exactly to 100% due to rounding.
2. Businesses which export or import to more than 30 countries have been excluded.
3. The symbol ".." denotes values that have been suppressed for reasons of confidentiality.

Almost 50% of the businesses importing products from one country were micro businesses whereas, 7.3% were large businesses (over 250 employees). Again, these large businesses accounted for most of the employment in businesses that imported from one country (95%), compared to the micro (0.6%) and small businesses (1.3%).

Table 10: Distribution of number of businesses and employment by size bands for businesses trading with one country, Wales, 2019 (import)

Employment size band	Percentage of businesses	Percentage of employment
Band 1 (1 to 9)	49.5	0.6
Band 2 (10 to 49)	13.7	1.3
Band 3 (50 to 99)	3.4	1.1
Band 4 (100 to 249)	2.7	2.0
Band 5 (250 to 999)	3.3	7.4
Band 6 (1000 and over)	4.0	87.6

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

Notes

1. Percentage of businesses may not sum to 100% due to a number of businesses reporting zero employees.

2. Employment size band indicates number of employees at the reporting unit level.

Looking at Welsh imports by business size, Table 11 shows that the majority of importing businesses were of micro size (1 to 9 employees), representing 43.4% of all businesses. These micro businesses imported a few products from a small number of countries. However, micro-sized businesses only represented 1.8% of the total import trade value in 2019 whereas, large businesses (over 250 employees) accounted for 80.4% of the total trade value. The results demonstrate that large businesses also imported more products from a wider range of countries, indicating a higher diversification compared with smaller sized businesses.

Table 11: International trade margins of Welsh businesses by size bands, Wales, 2019 (import)

Employment size band	Number of businesses	Average number of countries	Average number of products	Total trade value (£ thousands)	Average trade value (£ thousands)
Band 1 (1 to 9)	2,241	3	9	336,704	150
Band 2 (10 to 49)	908	4	14	867,984	956
Band 3 (50 to 99)	364	7	26	740,583	2,035
Band 4 (100 to 249)	438	11	44	1,655,189	3,779
Band 5 (250 to 999)	554	14	72	8,464,013	15,278
Band 6 (1000 and over)	657	16	97	6,258,961	9,527

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

Notes

1. Figures shown may not sum exactly to 100% due to rounding.
2. Products defined by Standard International Trade Classification (SITC).
3. Employment size band indicates number of employees at the reporting unit level.

In terms of business ownership, Table 12 shows the extensive margin was largely driven by domestic businesses, as there were over four times as many domestic businesses as there were foreign-owned businesses in 2019. However, the contribution to the intensive margin was driven by foreign-owned businesses, as their average number of products and countries was 14 and 75 respectively, compared to 5 and 17 for domestic owned businesses. Additionally, foreign-owned business average import per businesses was notably larger compared with domestic businesses.

Table 12: International trade margins of Welsh businesses by UK ownership, Wales, 2019 (import)

Business ownership	Number of businesses	Average number of countries	Average number of products	Total trade value (£ thousands)	Average trade value (£ thousands)
Domestically-owned	4,865	5	17	3,228,069	664
Foreign-owned	1,189	14	75	15,386,315	12,941

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

Notes

1. Products defined by Standard International Trade Classification (SITC).

Table 13 provides a breakdown of Welsh import diversification by business industry. The results show that the manufacturing and wholesale and retail industries represented the largest proportion of importing businesses in Wales. The wholesale and retail industry was also important in terms of employment, accounting for 40.9% of total employment across importing businesses.

The electricity and gas, mining and quarrying, and transport and storage industries were the top three industrial sectors in terms of product and country diversification, with the average number of imported products at 95, 59, and 42 respectively.

Like Welsh exporters, the manufacturing industry dominated the total import value and average import per business, representing a total of £14.9 billion with the average per business at £12.1 million. This also indicates that the manufacturing industry is the most diversified and important industrial sector for import trade in Wales.

Table 13 : International trade margins of Welsh businesses by industry, Wales, 2019 (import)

Industry	Percentage of businesses in this sector (%)	Percentage of employment in this sector (%)	Average number of countries	Average number of products	Total trade value (£ thousands)	Average trade value (£ thousands)
A - Agriculture, Forestry and Fishing	0.9	0.1	4	9	36,823	646
B - Mining and Quarrying	0.3	0.3	10	59	11,521	678
C - Manufacturing	20.3	5.3	9	38	14,863,553	12,084
D,E - Electricity, Gas, Steam and Air Conditioning Supply and Water Supply: Sewerage, Waste Management and Remediation Activities	1.4	2.4	24	95	108,654	2,987
F - Construction	2.6	2.9	7	35	20,916	133
G - Wholesale and Retail Trade; Repair of Motor Vehicles and Motorcycles	45.3	40.9	6	28	2,923,050	1,065
H - Transportation and Storage	2.5	9.0	9	42	197,342	1,298
I - Accommodation and Food Service Activities	1.6	8.4	5	25	7,413	77
J - Information and Communication	3.1	5.9	5	12	71,039	382
K - Financial and Insurance Activities	4.1	6.3	7	28	..	..
L - Real Estate Activities	1.0	0.4	4	13	..	..
M - Professional, Scientific and Technical Activities	7.1	4.4	6	21	167,573	388

N - Administrative and Support Services Activities	5.3	6.8	6	19	121,105	375
O,P,Q - Public Administration and Defence; Compulsory Social Security, Education, Human Health and Social Work Activities	2.1	4.7	9	33	16,753	288
R,S - Arts, Entertainment and Recreation and Other Service Activities	2.3	2.3	8	28	12,079	182

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

Notes

1. Products defined by Standard International Trade Classification (SITC).
2. The symbol '..' denotes values that have been suppressed for reasons of confidentiality.
3. The industrial sections presented are the industry of the reporting unit based upon the UK Standard Industrial Classification (SIC).

8 . Patterns of Welsh trade by destination, product and business characteristics data

Patterns of Welsh trade by destination, product and business characteristics
Dataset | Released 18 December 2020
The main patterns and characteristics of Welsh trade in goods using experimental statistics for 2019.

9 . Glossary

BEC

The Broad Economic Categories (BEC) is compiled by the UN and classifies trade in goods into four broad categories. These categories are: consumption goods, intermediate goods, capital goods, and other goods.

IDBR

The Inter-Departmental Business Register is a comprehensive list of UK businesses used by government for statistics purposes.

SIC

The UK Standard Industrial Classification of economic activities, abbreviated as UK SIC, is a five-digit classification providing the framework for collecting and presenting a large range of statistical data according to economic activity.

SITC

The Standard International Trade Classification (SITC) is a classification of goods used in external trade statistics, allowing for international comparisons.

VAT

Value added Tax: A tax on consumption, which is paid to the tax authorities by the seller on behalf of the consumer. It is not levied on goods used as intermediate consumption.

A full Glossary of economic terms is available.

10 . Data sources, quality and methodology

Data sources and quality

In this analysis, we produced a similar dataset that was created by Wales, Black and others (2018), which links trade in goods transaction data from HM Revenue and Customs (HMRC) with snapshots of the Inter-Departmental Business Register (IDBR) at the enterprise group level. This linked dataset is rich in detail and provides a range of trade information, including value of trade, country of origin or destination, along with a range of business identifiers and characteristics such as employment, ownership, and industry.

While the dataset used in this analysis is highly detailed, it is limited in several ways. Firstly, it is based solely on trade in goods data and therefore does not capture trade in services, nor does it capture onward shipping of traded content through supply chains. Secondly, due to Intrastat reporting thresholds[1], these data do not capture all trade within the European Union (EU). To reduce the administrative burden on traders, those who export and /or import relatively low values are not required to report detailed declarations of trade to HMRC. However, lower thresholds apply to non-EU trade which means that our dataset captures most low-value trade with non-EU countries but may omit low-valued trade with EU countries.

It should also be noted that the HMRC data used for this analysis does not contain transactions between Wales and other UK regions. Currently, there are no official national estimates for intra-regional trade however, most models of trade, such as the gravity model, predict a strong connection between countries that are within close proximity of each other. Experimental statistics produced by the Welsh Government Trade Survey for Wales (PDF, 5MB)[2] indicate that a large share of Welsh trade in goods is to other UK regions. The results show that in 2018, 40% of trade in goods was sold to customers in Wales, 33% went to the rest of the UK, and only 26% went outside of the UK. Therefore, we acknowledge that further research is needed to investigate the estimates of trade between Wales and the rest of the UK.

We also acknowledge the limitations associated with the UN Broad Economic Categories (BEC) classification used within the supply-chain analysis section of this article. This classification separates goods into categories of consumption, capital, intermediate and other goods. A product could be classed as an intermediate and final good depending upon how it is used or sold, however for analytical purposes each product is allocated to a single category.

Methodology

Trade apportionment to UK region

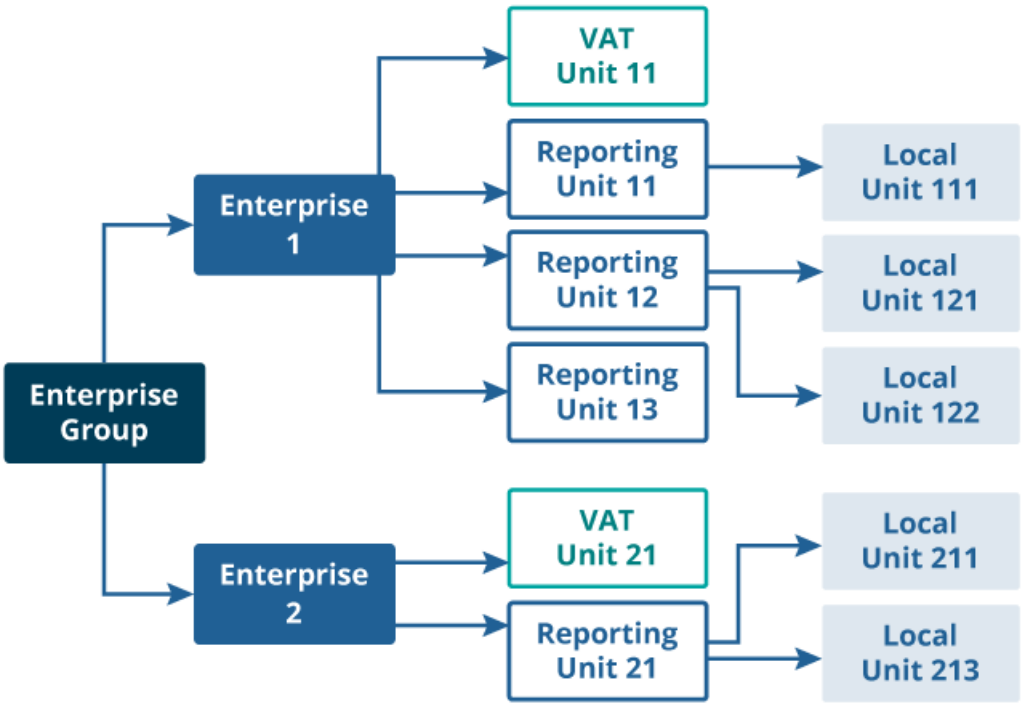
A business can be observed at different levels of granularity: the enterprise group level, the enterprise level, the reporting unit level, the VAT unit level, or the local unit level. A local unit corresponds to one geographical site such as an office or a factory. An enterprise is an organisational unit; it can carry out one or more activities at one or more geographical site. An enterprise group is an association of enterprises bound together by legal and/or financial links. The reporting unit level is an ONS survey level. In most cases, it corresponds to the enterprise, but for complex cases, enterprises can be divided into several reporting units in order to gain a better understanding of the various activities. Finally, the VAT unit is an administrative level used by HMRC for tax purposes. Again, in most cases, it corresponds to an enterprise, but in complex cases, HMRC could have divided the enterprise into several VAT units. The trade data is collected by HMRC at VAT unit level, while the region variable is collected at local unit or reporting unit level by the ONS on the Inter-Departmental Business Register (IDBR).

Most UK businesses have a simple structure. They do not form an enterprise group and their enterprise is linked to only one reporting unit, one VAT unit and one local unit. In these cases, it is very simple to allocate trade to a region as there is one VAT unit (containing the trade information) attached to one local unit (containing the region information).

Despite their majority in number, simple businesses do not represent the majority of trade or output. Most of the trade is accounted for by complex businesses. They can form an enterprise group with multiple enterprises and their enterprises can be linked to many VAT units and reporting units. These reporting units can be linked to many local units.

Figure 20: An enterprise can be subdivided into multiple subunits and combined into an enterprise group

An example of a complex business structure



Source: Generated by the authors

Figure 20 shows an example of how a complex business could be organised. Note that the VAT unit level, at which we link HMRC's trade-in-goods dataset and IDBR, is not directly linked to a reporting unit or local unit level.

These complex structures lead to a methodological challenge when estimating regional trade to the local unit or reporting unit level using the VAT unit level.

Apportionment methods

In order to apportion trade to regions, we need to link HMRC trade in goods data to the data held in the IDBR. The common reference level between VAT unit level (HMRC data) and local unit level (IDBR data) is the enterprise level.

The first step of the method is to aggregate the trade activity from VAT units to enterprise level or enterprise group level when available. We choose to aggregate to the enterprise group level when possible as Wales, Black and others (2018) reported that some complex businesses report all their trade through a single VAT unit – regardless of whether the trade originates from a reporting unit in one enterprise or another. Then we link the data and apportion the trade activity to local units so that the trade is linked to a region. That apportionment is an estimation, and this is where our innovative approach is required.

An important variable that is held in the IDBR at reporting or local unit level is employment. HMRC's Regional Trade in Goods Statistics used this variable so that a business' trade is allocated to a region based on the proportion of its employees that are employed in that region. However, there are other variables that are contained in the IDBR at local or reporting unit level that have been used to refine our estimates.

The 2018 method

In this publication, we build upon the method developed by Wales, Black and others (2018), which was used to publish the Patterns of Northern Ireland trade the same year. In that method, the Standard Industry Classification (SIC) of the local units is used to infer whether it is likely that a local unit trades one product. For instance, let's think of a fictional business "Fish and Trees" that has a local unit in the fishing industry and a local unit in the forestry industry. Both local units have the same number of employees and HMRC's method would allocate 50% of any product traded to each local unit. The intuition behind the ONS 2018 method, is that if the business "Fish and Trees" imports 46 fishing nets from France, it is very likely that 100% of the trade is made by the local unit registered in the fishing industry.

In the 2018 method, the first step was to compute a weight table that contains the average trade by employee for each product or industry. That is very similar to a likelihood table where we would calculate the likelihood for each industry to trade a given product. In the second step, we simply multiplied the employment of each reporting unit with the weight of the corresponding pairs (product, industry) to calculate trade intensity. In a final step, we adjusted the trade intensity obtained in Step 2 to add up to 100% of the enterprise group's trade, while snapping very small values to 0.

One important drawback of the 2018 method is that the weight table could only be computed using a subset of the data, the simple businesses. This is because only the simple businesses have both the trade information (VAT unit level) and employment information (local unit level) required to compute the weight table. This meant that: 1) for industries with few simple businesses, the estimates are unstable; 2) the estimation accuracy depends on whether complex businesses trade in a similar way to simple businesses.

A second drawback is that the 2018 method apportioned the trade to reporting units. We could get a more granular account of the regions and SICs in which a business is active if we apportioned to the local unit level when available. In 2018, we decided to apportion to reporting units because it enabled us to link trade to our survey data and to produce advance analysis such as the UK trade in goods and productivity.

Improved method

In the current method, we tried to solve the main issues of the 2018 method by:

- combining the apportionment by employment method (that is HMRC's current method) with the weighted table method (ONS 2018 method)
- aiming for a local unit apportionment when possible

In the first stage, we apply the apportionment by employment method (similar to HMRC), so that all businesses (simple or complex) have a trade estimate and an employment variable at the local unit level.

In the second stage, we apply the weighted table method on the results of the first stage. This means that we are computing the weighted table using all businesses, as opposed to only using simple businesses.

In the third stage, we aggregate the trade by local unit to the reporting unit and region. That last step enables us to link the trade with other surveys if needed, while still benefiting from using the local unit's region variable, enabling more granularity where it is required. We saw in the analysis section (2. Definition of a Welsh Business) that the apportionment to local units was essential to better understand Welsh trade.

Finally, it is important to note that the employment shares (when applying the apportionment by employment) and the estimated trade shares (after applying the weight table apportionment) are snapped to 0 when they are too small as follows:

For employment shares:

- if the maximum share is greater than 10%, then shares smaller than 1% are snapped to 0.
- if the maximum share is smaller or equal to 10%, then shares smaller than the 20% are snapped to 0.

For the estimated trade shares:

- if the maximum share is greater than 0.1%, then shares smaller than 0.1% are snapped to 0.
- if the maximum share is smaller or equal to 0.1%, then shares smaller than the 20% percentile are snapped to 0.

The intuition is that when there is a very dominant local unit, they are likely to be responsible for all the trade.

Evaluation of the method

The weighted table apportionment method that we started to develop in 2018 is a very exciting method because it is a data-driven approach with many future directions to explore. We compute something similar to a likelihood of trade based on product, flow direction and industry. We are asking the data: what is the likelihood to trade product P in direction D knowing I am in industry I?

We can potentially improve the likelihood estimation by asking the data questions that are more precise. For instance, we could consider including the partner country in the weight table. In that case, we would be asking the data: what is the likelihood to trade product P in direction D with country C knowing that I am in the industry I? In the same way, we could suspect that the trade rate does not necessarily increase linearly with employment. In this case, we could add the employment variable to the weight table and ask the data: what is the likelihood to trade product P in direction D knowing that I am in industry I and have E employees?

One limitation of this approach is that the accuracy of the answer that the data will give you depends on the quantity of data and the number of dimensions you include in the weight table. Having too many dimensions could spread the data too thin and lead to unstable results.

In the same vein, we could explore which granularity levels is the best for each dimension. For instance, the weighted table could use 2-digit SIC or 3-digit SIC to describe the industry dimension. To summarise, there is a lot of work that could be done in exploring the best combinations of dimensions and granularity levels that optimize a stability or granularity trade-off when building the weight table.

In the 2018 method the stability or granularity trade-off was already observed for industries with only few simple businesses.

The method we presented in this publication mitigates this to some extent by combining two methods that allows us to compute the weighted table for all businesses. Because this includes more data, it is more stable. This method has an additional advantage in that it gives less weight to simple businesses when there are many complex businesses in an industry. This means that we depend less on the assumption that simple businesses behave in a similar way to complex businesses.

Whilst the method in this publication gives some improvements on the 2018 method, one potential drawback is how we combine the apportionment by employment method with the weighted table method. To illustrate this, if we have an industry with 100% of complex businesses, our method does not give the same result as the apportionment by employment method. It would be interesting to develop a method that does, as it would be more intuitive and simpler to understand.

Notes for Data sources, quality and methodology:

1. For more information on Intrastat reporting thresholds, see Intrastat general guidelines and GOV.UK guidance on declaring goods using Intrastat.

2. For more information on the Trade Survey for Wales, see information produced by the Welsh Government.

11 . Related links

Patterns of Northern Ireland trade by destination, product and businesses characteristics: 2012 to 2016
Article | Released 13 August 2018
The main characteristics of Northern Ireland trade in goods using experimental trade statistics.

UK trade in goods and productivity: new findings
Article | Released 6 July 2018
This research paper uses HM Revenue and Customs' administrative trade data to analyse the link between productivity and trader status for British businesses.