Characteristics of exporting firms in Northern Ireland

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Background

International trade is vitally important for regional growth. Understanding how international trade interacts with local supply chains is necessary for developing business and trade policy. Given Northern Ireland's new trading arrangements, it is increasingly important to understand how trade impacts Northern Ireland's economy, as well as the differences between exporting and non-exporting firms.

Understanding how employment differs between exporting and non-exporting firms is especially valuable, but past research into exporting and the labour market in the UK is sparse. Gaining insight into this interaction allows researchers, businesses, and policymakers to identify which groups in society are potentially benefitting the most from trade and which groups may be getting "left behind."

Summary

This project uses novel datasets and input-output (IO) modelling to investigate the differences between exporting and non-exporting firms in Northern Ireland, and to understand the scale of employment supported by exporting in Northern Ireland. In particular, we sought to answer two questions:

- What is the scale of employment supported by exporting in Northern Ireland, and what is the nature of this employment, particularly with regards to gender?

- What is the nature of exporting versus non-exporting firms in Northern Ireland, at a detailed sectoral level?

In order to answer these questions, we used IO tables for Northern Ireland and the UK, published by Northern Ireland Statistics and Research Agency (NISRA) and the Office for National Statistics (ONS) respectively. IO tables show purchasing and sales volume between industries, households, and abroad. These tables can be used to model how various aspects of the economy, such as the labour market, interact with the supply chain.

Past work on understanding the impact of exports on the labour market in the UK is sparse. A recent publication did estimate this, but relied upon a simple regionalisation of the UK IO table to estimate results

in Northern Ireland. It also did not use detailed microdata and so assumed that exporters have the same characteristics as industry averages.

We expand on this research by using detailed microdata on the Northern Ireland economy, the Northern Ireland IO table, and industry averages to estimate the impact of exporting on the Northern Ireland labour market and explore how exporter firm characteristics differ from non-exporters. Utilising local data, rather than regionalising national data, can help improve the robustness of these results, and perhaps shed greater insight into Northern Ireland's exporting sectors.

In 2018, Northern Ireland sold £17.7 billion in goods and services to Great Britain and internationally[1]. Producing these exports requires the use of products from supply chains across Northern Ireland. Including these supply chain impacts, we estimate that Northern Ireland's exports supported £27.5 billion in output, £11.8 billion in Gross Value Added (GVA), and nearly 170,000 full-time equivalent (FTE) jobs[2]. This means that one out of every four jobs in Northern Ireland is either directly related to or supported by exporting.

Examining gender effects, we find that only 29% of the jobs that are either directly or indirectly supported by exports are held by women. By comparison, 47% of jobs are held by women across Northern Ireland's economy.

The estimates above rely on industry averages and do not explore the impact of differences in the characteristics of exporting and non-exporting firms. For this reason, we have used microdata to explore these differences.

Examining the nature of exporting and non-exporting firms in Northern Ireland, we found that exporting firms account for 54% of all business turnover in Northern Ireland while employing only 35% of workers. Exporting firms furthermore account for 55% of all purchases and 50% of GVA. Employee costs per employee are nearly double for exporters compared to non-exporters, indicating significantly higher wages. 78% of all imports go to exporting firms. In total, productivity – here measured by GVA per employee – is around £58,000 in exporting firms, compared to £32,000 in non-exporting firms. Higher labour productivity means our estimates of the jobs supported by exports are likely biased upwards.

In order to demonstrate how Northern Ireland-specific data can improve results, we compared our results to the Northern Ireland input-output model, and to a model that uses a UK IO table regionalised to Northern Ireland. We find that regional survey data directly attributed over 200,000 full time-equivalent jobs to exporting firms. This is nearly double the number of FTE jobs that our Northern Ireland IO model estimated. Our regionalised UK IO model underestimated the volume of employment even further, attributing only 70,000 FTE jobs to exporting. This demonstrates the importance of using Northern Ireland-specific data when attempting to understand the impact of trade on Northern Ireland.

What we did

In order to investigate the scale of employment supported by exporting in Northern Ireland, we constructed three input-output (IO) models based on published IO tables from 2018 and Business Register of Employment Survey (BRES) data from 2017 and 2019. BRES employment data is a highly disaggregated

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[1] This figure excludes re-exported imports.
[2] For simplicity, we refer to full-time equivalent employment as "jobs," "FTE jobs" and "FTE employment" interchangeably.

source of employment by gender and sector[3]. We then examined business microdata to examine the characteristics of exporting and non-exporting firms, to demonstrate how data access can improve our understanding of these firms.

The first two IO models we constructed use Northern Ireland IO tables published by NISRA. Model 1 describes how much output, employment, and GVA is supported by economy-wide exports in a specific sector. In contrast, Model 2 describes how much economy-wide output, employment, and GVA is supported by a specific sector's exports. This allows us to see how much each sector's exports impact the entire economy (Model 2) and also how much economy-wide exports impact each individual sector (Model 1). The third model's methodology is directly comparable to Model 1 but uses a UK IO table and UK exports. We used a similar methodology to previous work in understanding how exporting interacts with employment and created a regionalised IO model. Examining regionalised data in this manner demonstrates a degree to which modelled results can be improved through better and more consistent access to region-specific data.

For these models, we looked at the direct, indirect, and induced effects of exporting on employment, output, and GVA. Both induced and indirect effects relate to the impact that direct effects – in this case, export value – have on additional output. Direct effects refer to the actual volume of export sales, and the proportion of employment and GVA which result from it. Indirect effects refer to the additional output, employment, and GVA which are generated in supply chains to meet the demand of creating these exports. Induced effects refer to the economic activity generated from the wage spending of employees employed directly in exporting industries and indirectly in their supply chains, on good and services across the economy.

For our second stream of work, examining the characteristics of exporting and non-exporting firms, we extracted microdata from two linked business surveys: the Northern Ireland Annual Business Inquiry (NIABI) and the Broad Economy Sales and Exports Statistics (BESES). We used the linked dataset to create a series of descriptive statistics, which compared exporting and non-exporting firms in Northern Ireland across key economic indicators such as GVA, turnover, purchases, employee costs, exports, and imports. We further examined exports and imports by destination and source locations.

When comparing survey data to modelled results it is important to note that IO modelling uses industry averages so risks overestimating employment numbers since exporters often have fewer employment per £1m of output than comparable exporters in the same industry. IO modelling also risks underestimating other indicators such as wages and wage spending impacts, since exporting firms typically pay higher wages.

What we found

Results from Models 1 & 2: Northern Ireland sold £17.7 billion in exports, which, accounting for spill over effects, supported a total of £48 billion in output, £18 billion in GVA and over 250,000 jobs

Based on export figures from the 2018 Northern Ireland IO table, Northern Ireland sold £17.7 billion[4] in goods and services beyond its borders. We estimate that this directly supported £7.4 billion in GVA and over 107,000 full-time equivalent jobs, 28.8% of which were held by women. Adding in indirect effects, this resulted in £27.5 billion in total output, £11.8 billion in GVA, and nearly 170,000 FTE jobs (Table 1). In the

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[3] BRES does not include agriculture employee jobs, although this is a relatively small proportion of employment (NISRA, 2020b)
[4] This figure excludes re-exported imports.

accompanying tables, the totalled direct and indirect effects are referred to as Type I effects. Type II effects refer to direct, indirect, and induced effects.

Table 1: Direct, indirect, induced, and total effects of Northern Ireland exports on output, employment, and GVA (Model 1 & 2)

Effect	Exports (£m)	Output (£m)	Employment	Female Employment	Percent Female	Male Employment	GVA (£m)
Direct	17,700	17,700	107,194	30,859	29%	76,335	7,401
Indirect		9,773	62,354	18,824	30%	43,530	4,395
Type I (Direct + Indirect)	17,700	27,473	169,548	49,683	29%	119,865	11,796
Induced		20,429	87,941	44,728	51%	43,214	6,552
Type II (Type I + Induced)	17,700	47,903	257,489	94,411	37%	163,078	18,348

Results from Models 1 & 2: Food product manufacturing, construction & wholesale trade sectors have largest volume of FTE employment supported by exports

Examining the top exporting industries can give some further insight into the low proportion of women in export-related work. The top five industries in terms of export sales are in manufacturing, construction, and wholesale, which employ men at disproportionate rates (Table 2 - see Table A1 for SIC industry descriptions).

Table 2: Standard Industrial Classification (SIC) code, industry description, and total exports for the top five exporting industries

SIC	Industry description	Total Exports (£m)
10	Manufacture of food products	2,302
28	Manufacture of machinery and equipment N. E. C.	920
30	Manufacture of other transport equipment	1,232
F	Construction	2,212
46	Wholesale trade, except of motor vehicles and motorcycles	1,579

These same sectors, unsurprisingly, have the largest volume of FTE employment supported by exporting, whether directly or indirectly (Model 1). They furthermore support the highest volume of FTE employment economy-wide (Model 2) (Table 3).

None of the highest employing sectors are female-dominant. Only Sector 10 (the manufacture of food products) surpasses the average volume of export-supported female employment, which is 29% for Type I effects economy-wide. These figures are based on industry-wide averages, however, and it is unclear whether exporting firms are more or less likely to employ women.

Comparing type I effects between the two models, more female-dominant jobs are supported in the sectors which supply to these five sectors (Model 2) versus in the sectors themselves (Model 1). Comparing the two models also illustrates how integrated each of these sectors are. Sector 46, for instance, has 6,500 jobs that

are supported indirectly by economy-wide exporting (Model 1). Exporting firms in Sector 46 only indirectly support around 4,200 jobs in other industries, however (Model 2).

Table 3: Sectors with the highest volume of FTE employment supported by industry-wide exporting (Model 1) and which support the highest volume of FTE employment across all other sectors (Model 2)

SIC	Model	Total effects on FTE employment			Effects on female FTE employment			Effects on male FTE employment		
		Direct	Indirect	Type I (Direct + Indirect)	Direct	Indirect	Type I (Direct + Indirect)	Direct	Indirect	Type I (Direct + Indirect)
All Sectors		107,194	62,354	169,548	30,859	18,824	49,683	76,335	43,530	119,865
10	1	9,522	3,228	12,750	2,917	989	3,905	6,606	2,239	8,845
	2		9,685	19,208		3,056	5,973		6,629	13,235
F	1	8,493	4,392	12,885	1,140	589	1,729	7,353	3,802	11,156
	2		10,904	19,397		2,486	3,626		8,418	15,772
46	1	9,548	6,553	16,101	2,425	1,664	4,089	7,123	4,889	12,012
	2		4,195	13,743		1,129	3,553		3,066	10,189

Results from Models 1 & 2: Food product manufacturing, construction & wholesale trade sectors have the highest GVA and output supported by exports

Looking to GVA supported by exports, the three sectors with the highest GVA supported by total Northern Ireland exports (Model 1) also support the highest GVA across all other sectors (Model 2) (Table 4).

A similar trend is seen in output supported by exports. The same three sectors have the highest export volume and, unsurprisingly, the highest volume of output supported by exports economy wide (Table 5).

Table 4: Sectors with the highest Type I effects of exporting on GVA, both in the sector itself (Model 1) and economy-wide (Model 2)

SIC	Total GVA (£m)	Direct effects of exports on GVA (£m)	Model 1 effects on GVA		Model 2 effects on GVA	
			Indirect (£m)	Type I (£m)	Indirect (£m)	Type I (£m)
10	1,113	549	186	735	796	1,345
F	3,199	819	423	1,243	795	1,614
46	2,109	855	587	1,441	280	1,135

Table 5: Sectors with the highest Type I effects of exporting on output in, both in the sector itself (Model 1) and economy-wide (Model 2)

SIC	Total exports (direct effects) (£m)	Model 1 effects on output		Model 2 effects on output	
		Indirect (£m)	Type I (£m)	Indirect (£m)	Type I (£m)
10	2,301.7	780.2	3,081.9	1,926.3	4,138.2
F	2,211.9	1,143.7	3,355.6	2,021.6	4,323.3
46	1,579.1	1,083.8	2,662.9	571.9	2,151.0

Results from Models 1 & 2 and Model 3 (UK regionalised results): Exporting in Northern Ireland accounts for a larger share of its output than the UK as a whole

Model 3 is an IO model which is directly comparable to Model 1 but uses regionalised UK data. An immediate note is that exporting in Northern Ireland accounts for a larger share of its output than the UK as a whole, and regionalised data may underestimate the degree to which GVA, employment, and total output are supported by exporting. In 2018, 32.5% of Northern Ireland output was supported by exports, compared to 24.6% of UK output for the same time period. We only look at the impact of international exports for a like for like model comparison.

In total, UK data regionalised using Northern Ireland GVA and output underestimates GVA and output supported by exporting for all sectors by between 20-40%. Models 1 & 2 also report that 41% of total employment in Northern Ireland is export-supported, compared to 34% of employment in Model 3 (Table 6).

Table 6: Comparison of direct, indirect, and induced effects of exporting on output, employment, and GVA between Models 1&2 and Model 3

Effects	Output (£m)		Total FTE		Female FTE		Male FTE		GVA (£m)	
	Model 1&2	Model 3	Model 1&2	Model 3	Model 1&2	Model 3	Model 1&2	Model 3	Model 1&2	Model 3
Direct	17,700	10,379	107,194	70,492	30,859	24,238	76,335	46,254	7,401	4,501
Indirect	9,773	7,157	62,354	53,124	18,824	18,329	43,530	34,795	4,395	3,396
Type I	**27,473**	**17,536**	**169,548**	**123,616**	**49,683**	**42,567**	**119,865**	**81,049**	**11,796**	**7,896**
Induced	20,429	12,209	87,941	91,311	44,728	42,627	43,214	48,683	6,552	6,979
Type II	**47,903**	**29,745**	**257,489**	**214,926**	**94,411**	**85,194**	**163,078**	**129,732**	**18,348**	**148,75**

Characteristics of exporters compared to non-exporters[5]: Exporting firms have higher turnover, total purchases and employment costs

We examined several different business characteristics by exporter and non-exporter status: turnover, GVA, purchases, employee costs, and exports and imports.

All exporting firms have higher total turnover and productivity (measured here as GVA per employee) across the entire economy than all non-exporting firms. Exporting firms also have higher total employee costs, which likely indicates higher wages. Total GVA across all sectors is evenly split between exporters and non-exporters. Furthermore, exporting firms economy-wide have higher purchases, imports and sales to Great Britain (Table 7).

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[5] Sectors K and 92 are not included for analysis in this section. Sector 92 is non-exporting in NIABI/BESES data and Sector K is not surveyed.

Table 7: Turnover, total purchases, GVA and employment costs (in £millions) by exporting and non-exporting firms

SIC	Turnover (£m)		Total Purchases (£m)		GVA (£m)		Employment Costs (£m)	
	Non-Exporter	Exporter	Non-Exporter	Exporter	Non-Exporter	Exporter	Non-Exporter	Exporter
All Sectors	30,828	36,777	19,482	24,624	11,980	11,769	6,144	6,484

Source: FAI analysis of ABI/BESES (NISRA, 2021)

Characteristics of exporters compared to non-exporters: Exporting firms in electricity, gas, steam and air conditioning supply, water supply, sewerage, waste management and remediation, and water transport sectors have the largest GVA per employee

We expect exporters to be larger firms, therefore some of these findings for exporting firms as a whole are outcomes of these size differences. We explore GVA per employee, as a measure of productivity, which accounts for firm size.

Exporting firms have almost double the productivity of non-exporting firms across the entire economy. Exporting firms account for 50% of GVA but only 35% of all FTE employment (Table 8). Some of these results appear unusually large. For example, Sector E (water supply, sewerage, and waste management) is an interesting outlier, with total GVA at over 8 times greater for exporting firms than non-exporting firms, which is driving the substantial difference in productivity. Based on our current analysis, we are uncertain why these results are so large; however this is an area that may be useful to investigate in future work.

Table 8: GVA per employee by exporting and non-exporting firms

	SIC	GVA per employee (£)		
		Non-Exporter	Exporter	% Difference
All Sectors		31,918	58,461	96%
Sectors with the highest productivity	35	247,566	338,020	37%
	E	57,472	279,948	387%
	50	143,190	258,058	80%
Sectors with the largest differences in productivity	E	57,472	279,948	387%
	26	22,780	86,804	281%
	17	17,910	58,497	227%

Source: FAI analysis of ABI/BESES (NISRA, 2021)

Characteristics of exporters compared to non-exporters: Exporting firms in manufacturing, construction and wholesale trade industries have the largest value of sales and exports

Breaking down sales by destination, it is interesting to note that firms that export outside of the UK have significantly higher sales to Great Britain compared to non-exporters, with £10 billion in external sales compared to £1.6 billion. Manufacturing, which covers sectors 10 to 17 and 19 to 32, is heavily represented in the top 3 exporting industries, regardless of destination (Table 9).

Table 9: The value of goods and services exported outside the UK and sold to Great Britain by exporting and non-exporting firms[6]

Region of goods and services sales and exports	SIC	Non-Exporter sales	Exporter sales
Great Britain	All Sectors	1,633	9,971
	10/11-12	35	2,887
	F	445	1,562
	46	229	1,170
Republic of Ireland	All Sectors	-	3,982
	46	-	1,041
	10/11-12	-	674
	F	-	368
The rest of the European Union	All Sectors	-	2,320
	28	-	368
	26/27	-	325
	29/30	-	279
The rest of the world	All Sectors	-	4,429
	29/30	-	1,124
	26/27	-	784
	28	-	457

Source: FAI analysis of ABI/BESES (NISRA, 2021)

Characteristics of exporters compared to non-exporters: Exporting firms in manufacturing, construction and wholesale trade industries have the largest value of purchases and imports

Finally, exporting firms have a higher total value of purchases from Great Britain and total imports across all regions. Sector 46, which covers most wholesale trade, is the top importing sector and has the highest purchases from Great Britain. Sectors 26 through 30, which cover a range of manufacturing sectors, have the highest imports from outside the EU. Sectors 10 and 11-12 also cover some manufacturing sectors and are heavy EU importers as well (Table 10).

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[6] For the purpose of this analysis, certain sectors are combined to avoid disclosure.

Table 10: The value (in £millions) of goods and services imported from outside the UK and purchased from Great Britain by exporting and non-exporting firms

Region of goods and services purchases and imports	SIC	Non-Exporter purchases	Exporter purchases
Great Britain	All Sectors	5,011	8,247
	46	619	1,859
	45	594	1,250
	F	304	1,170
The Republic of Ireland	All Sectors	768	1,884
	46	183	577
	10/11-12	10	378
	26/27/28/29/30	7	154
The rest of the European Union	All Sectors	491	1,904
	46	62	545
	26/27/28/29/30	13	517
	10/11-12	1	212
The rest of the world	All Sectors	350	1,861
	26/27/28/29/30	6	770
	46	51	421
	21/22/24/25	2	116

Source: FAI analysis of ABI/BESES (NISRA, 2021)

Why it matters

A recent report from the Centre for Inclusive Trade Policy used citizen's juries to analyse the importance of trade policy to UK participants (Grimes et al., 2023). These juries demonstrated that participants in Northern Ireland care deeply about the societal impact of trade policy, value the economic growth derived from trade, and believe strongly that trade should achieve non-economic benefits, such as overseas human rights. In particular, they found that while trade following the UK's exit from the EU was a concern for all participants, the Northern Ireland participants were more concerned about delays in trade than other nations. The report furthermore showed that people expect the government to address trade policy and work towards socioeconomic growth.

Comparing our region-specific results to the regionalised results demonstrates how important timely region-specific data is. Given that exports account for a higher proportion of Northern Ireland's employment and output compared to the UK, it is unsurprising that trade would be a high priority for the Northern Ireland economy. Northern Ireland in particular demonstrates a unique trading landscape due to the land border with the Republic of Ireland and changing trade policy between the UK and the EU. Better understanding and identification of exporting firms can help inform policymakers as the trade landscape changes.

Exporting firms also support domestic supply chains. However, some groups in the labour market are less likely to benefit from trade, which has important implications when dealing with future trade and domestic policy. Notably, women are underrepresented in exporting industries, and are likely to benefit less from trade expansion. Analysing supply chain integration more fully can help firms and policymakers understand how changes to trade policy can affect not only individual firms, but the entire socioeconomic system in Northern Ireland.

What next?

The key assumption in our modelling was that exporters act like average firms in their industry. The employment split by gender within industries is a notable example of this assumption and is likely to bias the results. Ultimately, without the required linked microdata, we do not know if exporting firms are more or less likely to employ women. Linking and weighting Business Register and Employment Survey (BRES) data would both allow us to better answer this question and use input-output modelling to understand export effects on the supply chain. Furthermore, linking the datasets to other key datasets such as the Annual Purchases Survey would allow us to better identify the supply chains of exporting firms. Linking to NISRA's Earnings and Employees Study would allow for a significant expansion in the number of labour market characteristics that could be explored.

However, given that we do not have access to this data, we have instead opted to explore descriptive statistics comparing exporting and non-exporting firms. These statistics help to explain the differences around the firms, and support our understanding of where our results are likely to over- or underestimate the impact of exporting.

Additional characteristics of firms will be interesting to examine in the future, such as types of expenditures for exporting firms compared to importing firms within the same sector. With BRES data linkages, examining which areas of Northern Ireland are most impacted by trade and have higher concentrations of exporting firms would be useful to examine.
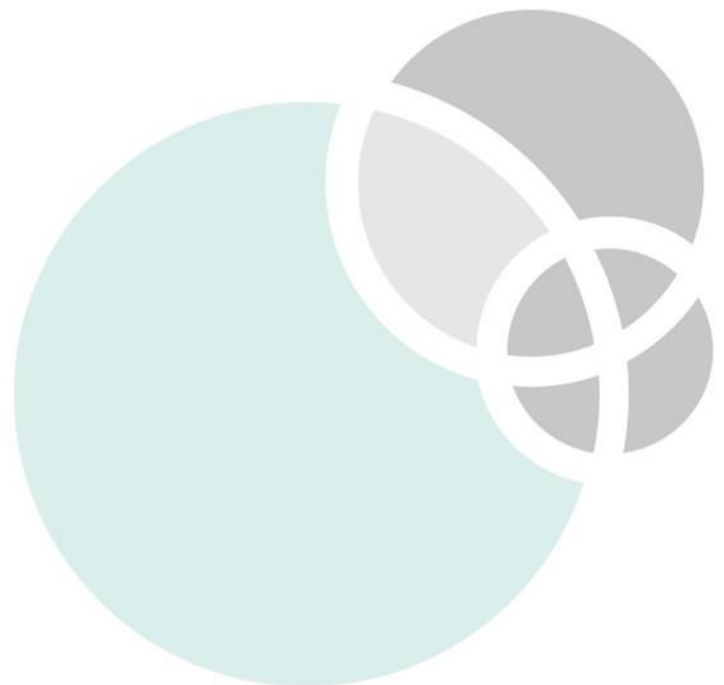
Finally, because Northern Ireland input-output tables include some volume of sales to Great Britain in their exporting figures, it would be interesting to conduct additional IO modelling using both definitions of exporting, to see how these results may differ.
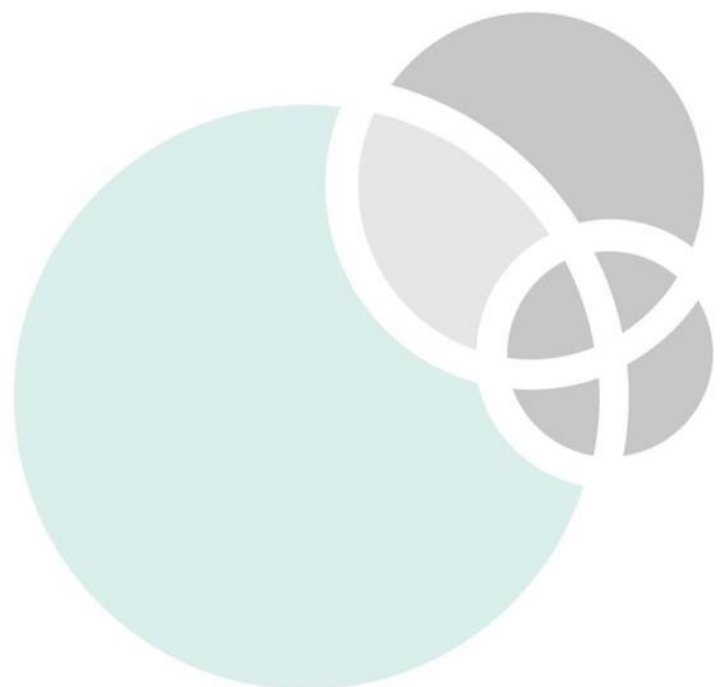
Appendix

Table A1: Standard Industrial Classification (SIC) code and industry descriptions

SIC	Sector Description
10	Manufacture of food products
11	Manufacture of beverages
12	Manufacture of tobacco products
17	Manufacture of paper and paper products
21	Manufacture of basic pharmaceutical products and pharmaceutical preparations
22	Manufacture of rubber and plastic products
24	Manufacture of basic metals
25	Manufacture of fabricated metal products, except machinery and equipment
26	Manufacture of computer, electronic and optical products
27	Manufacture of electrical equipment
28	Manufacture of machinery and equipment N. E. C.
29	Manufacture of motor vehicles, trailers and semi-trailers
30	Manufacture of other transport equipment
35	Electricity, gas, steam and air conditioning supply
45	Wholesale and retail trade and repair of motor vehicles and motorcycles
46	Wholesale trade, except of motor vehicles and motorcycles
50	Water transport
E	Water Supply; Sewerage, Waste Management and Remediation Activities
F	Construction

Source: ONS (2022b)

Acknowledgements

About ADR UK

ADR UK (Administrative Data Research UK) is a partnership transforming the way researchers access the UK's wealth of public sector data, to enable better informed policy decisions that improve people's lives. By linking together data held by different parts of government and facilitating safe and secure access for accredited researchers to these newly joined-up and de-identified data sets, ADR UK is creating a sustainable body of knowledge about how our society and economy function – tailored to give decision makers the answers they need to solve important policy questions.

ADR UK is made up of four national partnerships (ADR England, ADR Northern Ireland, ADR Scotland and ADR Wales), and the Office for National Statistics (ONS), which ensures data provided by UK Government bodies is accessed by researchers in a safe and secure form with minimal risk to data holders or the public.
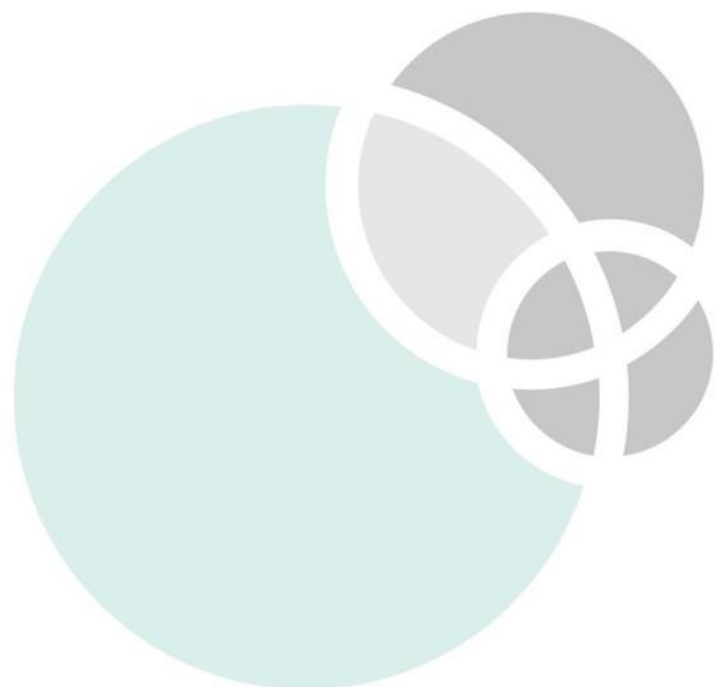
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