

**BREXIT AND
REGIONAL SERVICES EXPORTS:
A HEAT MAP APPROACH**

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Annex 1: Data Methodology

The description and analysis of UK regional services exports in Briefing Paper 14 is based upon two most recent Office for National Statistics (ONS) publications that estimate services exports by NUTS-1 region, by sector and by destination. The Office for National Statistics considers the associated data as “experimental statistics.” We combine ONS estimates of regional services exports by sector and destination for 2015, published in July 2017, with data on regional services exports by sector for the period 2011-2015, as published in May 2017.

The two ONS datasets mainly used in UKTPO Briefing Paper 14 are:

1. Office for National Statistics: “Estimating the value of service exports by destination from different parts of Great Britain: 2015”, available at <https://www.ons.gov.uk/businessindustryandtrade/internationaltrade/articles/estimatingthevalueofserviceexportsabroadfromdifferentpartsoftheuk/2015>.
2. Office for National Statistics: “Estimating the value of service exports abroad from different parts of the UK: 2011 to 2015”, available at <https://www.ons.gov.uk/businessindustryandtrade/internationaltrade/articles/estimatingthevalueofserviceexportsabroadfromdifferentpartsoftheuk/2011to2015>.

The main source for cross-border services exports is the International Trade in Services survey (ITIS), an annual firm-level questionnaire administered by ONS, together with the Annual Business Survey (ABS) sub-sample. However, the ITIS sampling frame does not cover businesses from transport, travel, banking, other financial institutions, insurance and pensions, higher education, charities, and a large proportion of businesses from within the legal profession. As a result, information from ITIS contributes only about 55% (in 2015) to the total value of services exports.

It is therefore desirable to broaden the coverage by obtaining additional information from the UK Balance of Payments (published by ONS as the Pink Book). Data on exports of transportation, travel, financial and insurance/pension services, respectively, are therefore taken from the Pink Book, with information on travel originating from the International Passenger Survey (IPS).

The resultant combination of “functional categories” provide a much more complete picture of services exports, even though the categories—strictly speaking—are not comparable. That is because individual services items in the Pink Book are based upon a commodity classification whereas the firm-level ITIS survey is based upon the SIC industry affiliation of firms. Table A.1 below sets out the full sector definitions and provides the associated SIC headings as far as ITIS categories are concerned. The combination of functional categories thus described could potentially lead to some double counting in instances in which firms from a given SIC sector export other types of services that would be part of the Pink Book’s commodity classification (e.g. transport services). This is possible but the effect, if any, is presumably small. In our view, the benefit of a comprehensive picture on services exports by far outweighs the risk from this methodological inconsistency.

Figures from ITIS constitute the primary source of information as described above, but in this survey firms report services exports only at the national level. Hence, in order to construct regional exports, ONS then apportion national figures to regions on the basis of firms’ regional employment shares by industry derived from the micro-data of the Inter-Departmental Business Register (IDBR). In a nutshell, national-level service export values for each country of destination are apportioned to the NUTS1 areas based on the number of employees located in a given region in a given sector. Because

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a single firm may have various locations across the country, using employment reflects the assumption that each part of the firm contributes to its UK-level exports. As the Office for National Statistics point out, using firms' head office locations would unduly skew the regional distribution of exports by overestimating values for London and underestimating those of geographically peripheral areas. National figures from Pink Book functional categories are apportioned to regions in a similar way using a variety of indicators, including visitors' spending from travel, employment data in transport, and indicators of economic activity in the financial sector from the Bank of England for financial services.

Since the ONS regional services export statistics by destination (ONS 2017a) do not include the four functional categories that are classified according to the Pink Book's commodity taxonomy, we apportion export values by region and functional category in 2015 for transport, travel, financial and insurance/pension as being destined to EU and non-EU countries, respectively, using the national split as reported for 2015 in the Balance of Payments for each NUTS1 region.

For further details on the data, we refer the reader to the comprehensive methodology sections in the aforementioned two ONS publications.

Table A.1: Unabbreviated sector definitions (coverage) of ONS ITIS

Functional category	SIC07 section (if applicable)
Primary and utilities (agriculture, mining, utilities)	A, B, D, E
Manufacturing	C
Transport*	<i>Balance of Payments</i>
Travel*	<i>Balance of Payments</i>
Construction	F
Wholesale and motor trades	G (division 45, 46)
Retail	G (division 47)
Information and communications	J
Real estate, professional, scientific and technical services	L, M
Insurance and pension services*	<i>Balance of Payments</i>
Financial*	<i>Balance of Payments</i>
Administrative and support services	N
Public admin, health and education; arts, entertainment and recreation; other services	O, P, Q, R, S

* Data for these entries originate from the Pink Book and thus do not follow the SIC07 criteria.

Annex 2: Methodology for recovering Mode 5 services trade by region and destination

In Section 4 of the Briefing Paper entitled ‘Embodied Services Exports’ we draw on HMRC regional trade statistics, in combination with the OECD-WTO Trade in Value Added (TiVA) database, to construct a ballpark estimate for the value of services that are exported as inputs embodied in merchandise goods exports. In regard to the HMRC data, it should be noted that the methodology employed by HMRC to apportion goods exports to regions is not the same as the method employed by ONS for apportioning cross-border services exports. HMRC have in the past used a survey of large firms to apportion goods exports to regions, although more recently have adopted a methodology that is more similar to the ONS approach in that HMRC now apportions figures according to number of employees in each region. The differences in methodology imply, however, that values of ONS regional services exports estimates and HMRC regional trade in goods statistics may not be directly comparable. This should be kept in mind when interpreting Figure 4 in the Briefing Paper.

Within the realm of goods trade statistics, the following classification issue needs to be addressed. In the TiVA database, the manufacturing sector comprises of categories 15 to 37 classified according to ISIC Rev.3. By contrast, the HMRC regional trade statistics are classified according to SITC Rev.4 at the 2 digit level. Hence, in order to understand how much of services is exported as Mode 5 through manufacturing export, a conversion of ISIC Rev.3 data to SITC Rev.4 is needed.

For this concordance we proceed on the basis of conversion tables provided by the UN Statistical Division between different classification criteria.¹ A direct conversion table ISIC Rev.3 – SITC Rev.4 is not readily available, but assuming transitivity among the available conversion tables it is possible to get from the ISIC Rev.3 to the SITC Rev. 4 as follows:

- ▶ Convert the SITC Rev.4 into CPC Ver. 2
- ▶ Convert the CPC Ver. 2 into ISIC Rev. 4
- ▶ Convert ISIC Rev. 4 into ISIC Rev. 3.1
- ▶ Convert ISIC Rev. 3.1 into ISIC Rev.3

The sequence of the concurring process is: SITC 4 → CPC 2 → ISIC 4 → ISIC 3.1 → ISIC 3.

Once the relation SITC Rev.4 – ISIC Rev.3 has been established, we select ISIC Rev.3 categories 15-37 and the corresponding SITC Rev. 4 categories. At the two-digit level, there are 62 SITC Rev.4 categories that are present in the ISIC3 15-37 range and 35 that are not (total=97). We then obtain data from the HMRC database for those categories differentiating exports to the EU and to the ROW. To get the amount of services embodied in those exports, we scale the HMRC export figures by 0.213 following the information from TiVA.

Whilst HMRC data contain information for Northern Ireland as well as at least one more recent year, we keep with the 11 nations and regions for the period 2011-2015 for consistency with the rest of the services export analyses.

¹ Available at <https://unstats.un.org/unsd/cr/registry/regot.asp?Lg=1>.

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The “estimation” of the value of services inputs embodied in manufacturing exports at the regional level involves the following principal assumptions:

1. The share of services value added is the same across all regions, across destinations (namely EU and non-EU countries), and in every year over the period 2011-15. This share is 21.3% as per the TiVA database for the UK in 2011.
2. That share is also constant across all gross manufacturing exports as obtained from the TiVA database and HMRC, respectively. This assumption can potentially be relaxed since the TiVA database contains more detailed information for services input shares of disaggregated manufacturing sectors.
3. The value of services inputs thus recovered from manufacturing exports of a given region is attributed entirely to that originating region.

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Annex 3: Concentration of Cross-Border Services Exports across UK Regions

For gauging the ‘vulnerability’ of regions to potential changes in market access conditions, a final relevant aspect is the concentration of exports in each sector across regions. Everything else equal, the adverse impact of potentially diminished export prospects to the EU is going to be felt more in specific locations in instances in which all exports of a given services type or industry are concentrated in one or two regions, as compared to another sector in which its exports are evenly spread across all regions.

For that purpose we construct the shares of the 11 regions in national exports to any destination, i.e. including both EU and ROW countries, within each service sector (Table 4). In general, services exports are quite spatially concentrated. Specifically, in most sectors, London and the South East would, between them, account for about two-thirds of all services exports. Including the East of England means that those three regions would typically account for 70% or more of all sectoral services exports.

There are two exceptions to this regularity. On the one hand, nearly three-quarters of exports from firms in the primary and utilities sector (73%) originate from Scotland, so these particular kinds of activity are highly concentrated in one region outside London and the South East. On the other hand, exports of services from manufacturing sector firms are more evenly distributed across UK regions than most other sectors. Only about a quarter of such exports originate from London, the East or the South East. Instead, and perhaps not surprisingly, the North West contributes 25% of services exports from this sector, with another 8-10% each coming from the South West, Scotland and the East Midlands, respectively.

Table 4: Distribution of total exports, percent, by region and sector, 2015

Region	Sector												
	Primary	Manuf.	Transp.	Travel	Constr.	Whole-sale & Motor Trade	Retail (ex. Motor Trade)	ICT	Profess. services	Insuranc e & Pension	Financia l Support	Admin and Other	Public Admin and Other
North East	0.2	5.0	2.2	1.3	1.4	0.9	1.4	0.6	1.1	1.9	1.7	1.4	0.6
North West	2.6	25.3	8.9	5.6	3.1	16.3	5.8	2.8	5.7	9.7	7.0	7.0	19.6
Yorkshire & Humber	2.1	5.1	4.1	2.3	2.4	1.8	3.4	1.4	1.7	3.3	5.0	1.6	2.6
East Midlands	4.1	8.6	2.0	2.1	1.4	2.0	2.9	1.9	1.3	1.4	2.9	1.7	2.0
West Midlands	1.6	6.1	2.2	3.8	3.2	2.3	3.6	2.6	2.0	6.7	4.3	1.9	1.7
East England	2.5	7.4	6.6	4.5	9.6	3.0	5.2	5.5	6.8	7.4	3.8	5.3	3.1
London	2.2	4.0	45.9	55.4	61.7	41.9	40.4	53.6	47.0	18.5	56.1	57.5	52.6
South East	8.7	13.3	15.6	10.4	4.1	25.2	24.8	25.7	21.7	25.2	6.1	16.3	10.8
South West	1.4	10.1	3.8	4.9	5.2	4.1	7.2	2.6	2.6	8.2	4.5	2.6	1.2
Wales	1.4	6.8	1.8	1.9	0.7	0.4	1.8	0.9	0.6	7.3	1.9	0.8	0.2
Scotland	73.2	8.4	7.0	7.9	7.3	2.2	3.6	2.5	9.6	10.4	6.7	3.9	5.6
<i>Concentration index</i>	<i>5,485</i>	<i>1,268</i>	<i>2,567</i>	<i>3,340</i>	<i>4,020</i>	<i>2,696</i>	<i>2,407</i>	<i>3,601</i>	<i>2,872</i>	<i>1,418</i>	<i>3,370</i>	<i>3,678</i>	<i>3,326</i>

Source: ONS (2017a) and authors’ calculations.

Notes: ‘Concentration index’ denotes the Herfindahl–Hirschman Index, defined as the sum of squared export shares per sector. It ranges from zero to 10,000 with higher values indicating a higher concentration of exports across regions.

Whilst in most sectors a considerable part—often the majority—of services exports originate from London, that region has also seen some dramatic changes in concentration over the 2011-15 period.

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Most starkly, London has lost 17 percentage points in exports from the wholesale/motor trade sector (Table 5), most of which went to the North West. London has also lost 5.3 percentage points in the exports of financial services, a good deal of which went to Scotland, although basically every region exported relatively more financial services. London and the South East, between them, lost 7 percentage points in services exports from public administration sector firms, whereas the North West exported 9.5 percentage points more of these services in 2015 compared to 2011. Lastly, London did gain considerably in exports of services from the construction sector (12 percentage points), at the expense of the East, the South East and Wales, respectively.

Table 5: Changes in the distribution of total exports, in percentage points, 2011-15

Region	Sector												
	Primary	Manuf.	Transp.	Travel	Constr.	Whole-sale & Motor Trade	Retail (ex. Motor Trade)	ICT	Profess. services	Insurance & Pension	Financial	Admin Support	Public Admin and Other
North East	-0.4	0.7	0.1	0.0	0.1	0.1	-0.6	-0.1	0.0	0.5	0.1	-0.2	-0.3
North West	-1.4	8.4	0.2	0.2	-0.5	10.3	-1.7	-0.4	0.1	-0.7	1.1	0.9	9.5
Yorkshire & Humber	0.7	1.0	0.6	-0.4	-2.3	0.1	-0.8	0.1	-0.5	-0.4	-0.5	-0.3	1.3
East Midlands	1.0	3.5	0.0	-0.2	0.3	1.3	-1.6	-0.1	-0.3	-0.1	0.2	-2.4	-3.1
West Midlands	0.0	2.2	0.0	0.5	0.1	1.1	-3.6	-0.5	0.0	-1.5	0.4	-0.9	0.3
East England	-0.1	-4.0	-1.1	0.1	-4.3	0.1	-3.1	1.1	-2.8	0.2	0.9	0.6	-1.5
London	-1.6	-2.8	4.3	1.5	12.1	-17.0	1.5	0.9	0.0	1.3	-5.3	2.9	-3.6
South East	4.7	-6.1	-2.6	-0.5	-3.3	2.7	9.4	-1.4	0.1	2.4	0.8	2.7	-3.6
South West	-3.6	0.3	-0.3	-0.6	0.3	0.4	2.5	-0.3	-0.3	-0.9	0.3	-1.5	0.8
Wales	0.6	0.4	-0.9	0.0	-2.5	-0.1	-0.6	0.0	0.0	1.5	0.2	0.0	0.2
Scotland	0.0	-3.6	-0.2	-0.7	-0.1	1.0	-1.3	0.5	3.7	-2.2	2.0	-1.9	-0.1

Source: ONS (2017a) and authors' calculations.

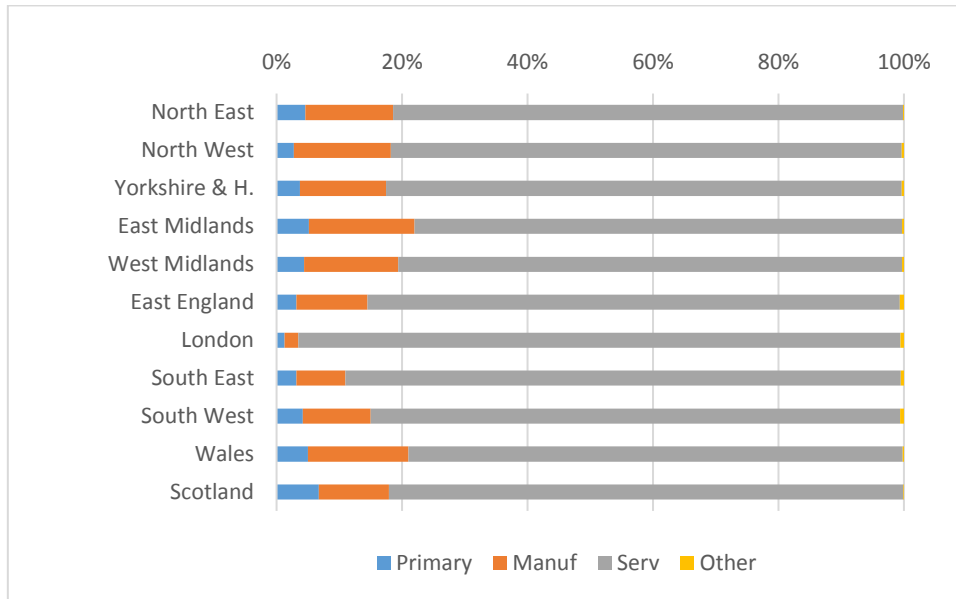
Notes: Increases in regional shares of services exports per sector are highlighted in green, decreases in orange; changes sum to zero within each sector column.

Overall, these patterns suggest that changes in services export conditions would heavily affect London and neighbouring regions because of the spatial concentration of many services exports in these locations. At the same time, the concentration of services exports across UK regions is subject to quite dynamic changes, most of which go in the direction of spreading services exports more evenly across space. In particular, services exports from manufacturing sector firms are appreciably less concentrated and the bulk of such exporting activity is located in Northern regions.

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Annex 4: Additional figures

Figure A.1: Gross Value Added Shares by Region and broad sector, 2015



Sources: Office for National Statistics (2016) “Regional gross value added (income approach) reference tables: Table 6”; and authors’ calculations. Note: 2015 figures of regional GVA are denoted ‘provisional’ in ONS Table 6.

Figure A.2: Mode 5 services exports, by region and destination, 1996-2015



Sources: HMRC export statistics by region; OECD/WTO TiVA Database; and authors’ calculations.