# Spatial Targeting for Trade and External Investment
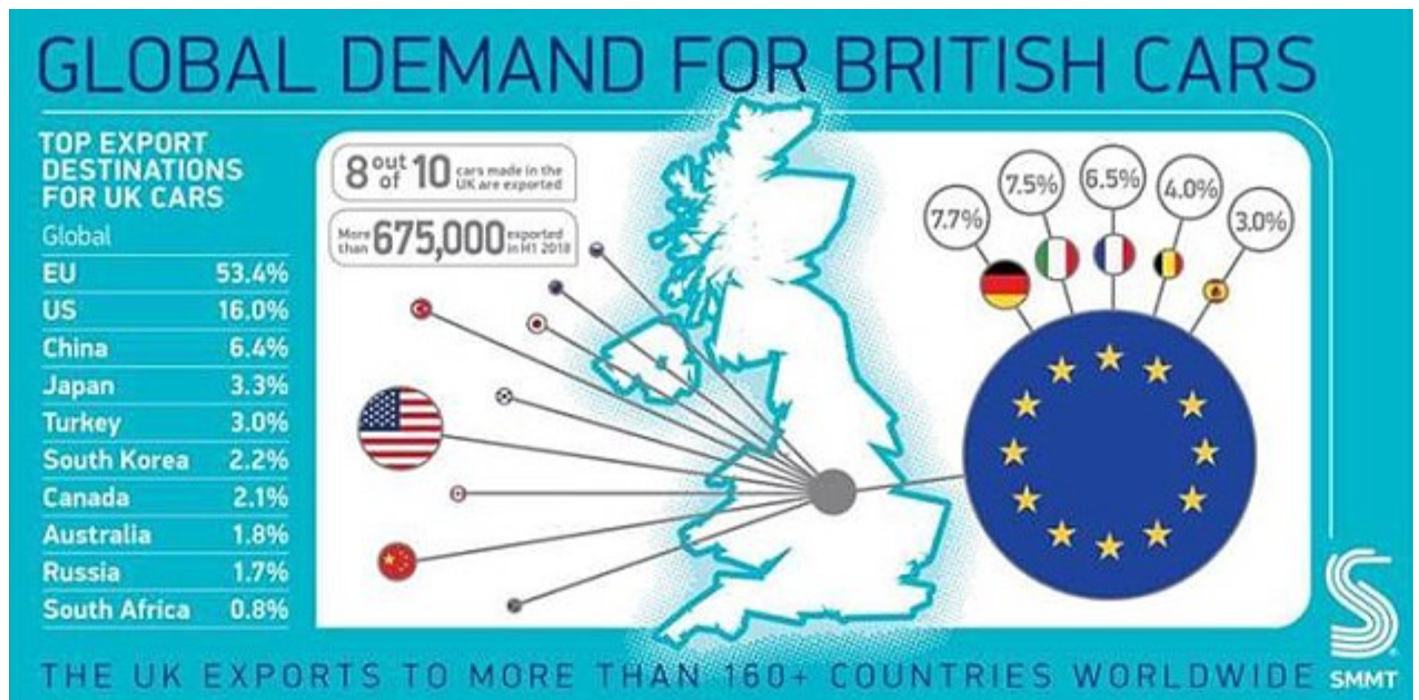## A Report to the NE LEP

(December, 2020)

By
Richard Harris and John Moffat[a]
(Department of Economics & Finance, Durham University Business School)

*[this page is blank to allow double-sided printing* **Save Paper***]*

# Contents

*[this page is blank to allow double-sided printing* 🌲 *Save Paper]*

Executive Summary

This report presents evidence from micro-data on productivity in the North East (Chapter 2) and regional differences in engagement in trade and foreign investment (Chapters 3-5). Finally, a simple analysis is provided of the possible short-run implications to trade of a no-deal Brexit (Chapter 6).

Chapter 2 shows that the North East region is ranked eighth out of 11 regions in terms of mean total factor productivity (TFP), which is the preferred definition since it measures the productivity of all factors of production (labour, capital and intermediate inputs) and not just the productivity (output-per-worker) of employees. When only manufacturing is considered, its ranking rises to sixth. Compared to London, the leading region, the difference in the mean of TFP is 0.28 (i.e., the North East had average TFP that is over 86% lower). Focusing on urban areas, Tyneside has the lowest mean TFP of all 12 of the major urban areas analysed. The North East LEP is ranked 33rd while Tees Valley is ranked 20th out of 46 LEPs. Decomposition of the gap in TFP shows that, while engagement in trade and external investment is associated with higher *ln* TFP, this is not the major source of the London-North East difference. As such, increasing such activities alone is unlikely to lead to any substantial catch-up of the North East with London.

The reason why the gap in *ln* TFP is not the result of a lack of engagement in trade or external investment is explained in Chapter 3. Specifically, the North East region has relatively high levels of involvement in trade and external investment. In the NE LEP, 25.1% of plants are engaged in exporting while 28.6% of plants belong to MNEs. The corresponding figures for the Tees Valley LEP are 26% and 31.9%.

Chapter 4 shows that the North East is relatively exposed to international trade. Moreover, the North East is only behind Northern Ireland and Eastern England in terms of its reliance on the EU as a trading partner. The total percentage of trade (exports and imports of goods and services) with the EU was 55.2% in the North East. There was a significant difference between the NE LEP and TVCA, with the former having nearly 56% of its trade with the EU and the latter only 49.5%. Trade in goods was particularly reliant on the EU in the NE LEP. The North East's most important export was road vehicles, which accounted for 32% of goods exported, and these are very dependent on the EU. Road vehicles was also the North East's largest import, which most coming from the EU, which indicates the importance of trade (supply-chains) with the EU to this sector.

The figures presented in Chapter 5 indicate that, while trade in services is not as large as trade in goods, it is substantial and growing. Nearly 33% of service exports from the North East was from the financial and insurance activities sector, of which over 38% went to the EU. The manufacturing sector was the second largest source of service exports from the North East, accounting for 12.5% of the total, of which 76% was to the EU. The largest 'import' was tourism, most of which was from the EU.

To give some indication of the effect of the introduction of WTO tariffs on the export of goods, Chapter 6 presents the results from a simple exercise using recent (and relative conservative) estimates of tariff elasticities. The results suggest that the effect would be to reduce the value of goods exports to the EU by 2.8%, which is equivalent to a fall of 1.67% in the value of all goods exported from the North East. The largest impact is on

sales of road vehicles to the EU, because of the importance of this product in EU trade involving the North East. Organic chemicals would suffer the next largest fall in exports. Given the relative importance of road vehicles to the NE LEP and organic chemicals to the Tees Valley LEP (Figure 4.11), it seems likely that both LEPs would have suffered substantial negative shocks from a no-trade deal Brexit outcome. While the UK has avoided a no-deal Brexit (avoiding tariffs and quotas on goods exports and imports with the EU), the leaving of the EU Single Market and Customs Union and still unresolved issues about trade affecting services will place considerable costs on businesses with some commentators predicting that a 'thin' deal will permanently lower UK GDP by about 1.3% below its 2016-19 trajectory going forward while others calculate that a Free-trade agreement Brexit will lower GDP by $-3.7\%$.

# 1. Introduction and Overview

In the last 20 years, except for a period during 2010-14 where 'austerity' dominated the policy landscape, improving productivity has been a central objective of the United Kingdom (UK) Government's industrial policy (Cook et al., 2020). Whilst the exact policy practice has varied between different governments, the role and importance of productivity has been recognised and emphasised throughout. In more recent years, there has been greater attention to the need for spatial 'rebalancing' (cf. Martin et al., 2016; UK2070 Commission), and the return of a regions and cities agenda for stimulating growth in less well-off areas (in contrast to the decline of regional industrial development assistance beginning in 1979 – cf. Broadberry and Leunig, 2013; Wren, 2005). Indeed, since coming to power in 2019, the current Conservative government has made 'levelling-up' a policy priority (HM Treasury, 2020), although to date there has been little detail on where, how and in what time frame this will be achieved (Davenport and Zaranko, 2020), other than though the continued pursuit of the industrial strategy set out in 2017.

This joint focus on productivity and spatial rebalancing is embodied in the creation of 'Local Industrial Strategies (LIS)' (BEIS, 2017) to complement the national strategy introduced in 2017. Evolving from such LISs is a consideration of how best to improve productivity in the local economic partnerships (LEPs), and one obvious approach is to consider the role and importance of international trade and external investment. Firms that export are known to have higher productivity although it is unclear whether this is because higher productivity is a prerequisite for exporting or whether firms 'learn-by-exporting' (see Harris and Moffat, 2015a, for some evidence). Plants that belong to firms that engage in overseas production (multinational enterprises – MNEs) have also been shown in the literature to experience superior efficiency and technological progress (see Harris and Moffat, 2015b, for some UK evidence).

It is important therefore to know the extent to which firms operating in the North East are engaged in trade and external investment to gauge whether there are unrealised opportunities to increase involvement. With respect to trade, it is also useful to have information on the markets that plants in the North East export to (and import from), and consequently whether there is excessive dependence on one particular market (e.g., the EU given Brexit) and/or opportunities to export to other markets. Whether aggregate productivity in the North East (and especially the NE LEP) will be increased through raising trade (and external investment) is contingent upon whether these activities enhance productivity. Evidence is provided on this question and also whether regional differences in the propensity to trade and engage in external investment explain a substantial proportion of differences in productivity across different areas and regions in Britain.

This report looks to provide evidence on all of these issues: what is the size of the spatial productivity gap in Britain, and are those engaged in trade and external owned more productive (Chapter 2); what is the extent of the North East's exposure to trade and external investment (Chapter 3); and what are the current patterns of trade for plants located in the North East (Chapters 4 and 5). The final (short) chapter is an evaluation of the possible short-run implications to trade of a no-deal Brexit.

*[this page is blank to allow double-sided printing* 🌲 *Save Paper]*

## 2. Productivity in the North East

In order to consider spatial differentials in total factor productivity (TFP), we require estimates of (natural logged) plant-level TFP. These are obtained using plant-level data covering 1997-2018 from the Annual Business Survey (ABS) conducted by the Office for National Statistics (ONS).[1] and the methodology used by Harris and Moffat (2012, 2015a,b, 2017). An appendix to this chapter provides full details and results.

Using the estimates of *ln* TFP, calculated for each plant, Table 2.1 shows the mean, 80th percentile and 90th percentile of *ln* TFP for plants operating in the administrative regions of Great Britain during 2011-2018. Regions are ranked from highest (London) to lowest (Wales), on the basis of the mean data provided for all sectors (column 1). The correlation between the mean and the 80th percentile and 90th percentile in all three sectoral groupings is above 0.97, while the correlation between the means for manufacturing and services is 0.90; this indicates that regional rankings are very consistent across mean values, the top percentiles, and sectors. The gap between the highest and lowest regions when all sectors are considered (column 1) is 0.34, and this increases to 0.45 and 0.69, respectively, when looking at the 80th and 90th percentiles (columns 2 and 3), showing that the largest differences across regions are between plants at the top end of the TFP distribution. The penultimate row in Table 2.1 shows the gap between London and the next highest region, the South East (services) and Scotland (manufacturing), indicating that (with respect to highs and lows in columns 4 and 6) some 52-54 per cent of the top-to-bottom gap is accounted for by the gap between London and the next highest region; that is, productivity differences between London and other regions are far greater than differences between other regions. Table 2.1 also shows that, aside from Scotland, productivity levels generally fall when moving towards the north and periphery of Great Britain (cf. McCann, 2016).

The final row in Table 2.1 indicates the size of the gap between the North East and London when all sectors are considered (0.28, and this increases to 0.38 and 0.62, respectively, when looking at the 80th and 90th percentiles). These figures are heavily influenced by the service sector, so when manufacturing is considered it can be seen that the gap with London is much less at 0.15 (or 0.29 and 0.44, respectively, for the 80th and 90th percentiles). Overall, the North East is ranked 8th out of 11 regions when all sectors are considered, rising to 6th when just manufacturing is looked at.

---

[1] Note, variables on importing and exporting of goods and services is not available in the ABS until 2011. Hence these variables only are available below when estimating TFP differences across areas using 2011-2018 micro-data. The variable available for estimating the production functions are presented in Table A2.1 in the online appendix.

Table 2.1: (weighted) means and 80th and 90th percentiles of *ln* TFP 2011-18 by administrative region and broad sector

| Region | All sectors | | | manufacturing | | | services | | |
|---|---|---|---|---|---|---|---|---|---|
| | Mean[a] | p80 | p90 | Mean[a] | p80 | p90 | Mean[a] | p80 | p90 |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| London | 0.322 | 0.831 | 1.425 | 0.294 | 0.732 | 1.171 | 0.323 | 0.836 | 1.434 |
| South East | 0.141 | 0.583 | 1.062 | 0.172 | 0.533 | 0.870 | 0.139 | 0.588 | 1.075 |
| Eastern | 0.096 | 0.518 | 0.939 | 0.149 | 0.500 | 0.858 | 0.091 | 0.520 | 0.948 |
| Scotland | 0.089 | 0.559 | 1.019 | 0.187 | 0.519 | 0.842 | 0.082 | 0.563 | 1.031 |
| West Midlands | 0.072 | 0.471 | 0.876 | 0.096 | 0.403 | 0.717 | 0.069 | 0.478 | 0.896 |
| North West | 0.065 | 0.494 | 0.859 | 0.146 | 0.476 | 0.811 | 0.058 | 0.496 | 0.863 |
| East Midlands | 0.049 | 0.452 | 0.846 | 0.106 | 0.432 | 0.719 | 0.043 | 0.455 | 0.860 |
| North East | 0.044 | 0.446 | 0.805 | 0.141 | 0.446 | 0.730 | 0.034 | 0.446 | 0.813 |
| Yorkshire-Humberside | 0.033 | 0.443 | 0.796 | 0.103 | 0.421 | 0.720 | 0.026 | 0.447 | 0.806 |
| South West | 0.007 | 0.402 | 0.780 | 0.105 | 0.435 | 0.742 | -0.001 | 0.399 | 0.785 |
| Wales | -0.018 | 0.377 | 0.738 | 0.126 | 0.448 | 0.756 | -0.030 | 0.364 | 0.734 |
| | | | | | | | | | |
| Gap (highest-to-lowest) | 0.340 | 0.454 | 0.687 | 0.198 | 0.329 | 0.454 | 0.353 | 0.472 | 0.700 |
| Gap (London with second highest) | 0.181 | 0.248 | 0.363 | 0.107 | 0.213 | 0.329 | 0.184 | 0.248 | 0.359 |
| Gap (London with North East) | 0.278 | 0.385 | 0.620 | 0.153 | 0.286 | 0.441 | 0.289 | 0.390 | 0.621 |

[a] mean values are all significantly less (at the 1% level) than that of London                    Source: own calculations based on ABS data

Table 2.2: (weighted) Relative mean *ln* TFP 2011-18 by city and broad sector

| City | All sectors | | | manufacturing | | | services | | |
|---|---|---|---|---|---|---|---|---|---|
| | Mean[a] | p80 | p90 | Mean[a] | p80 | p90 | Mean[a] | p80 | p90 |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| London | 0.322 | 0.831 | 1.425 | 0.294 | 0.732 | 1.171 | 0.323 | 0.836 | 1.434 |
| Edinburgh | 0.172 | 0.648 | 1.129 | 0.190 | 0.591 | 1.122 | 0.171 | 0.650 | 1.130 |
| Manchester | 0.172 | 0.600 | 1.015 | 0.164 | 0.607 | 0.970 | 0.172 | 0.596 | 1.015 |
| Glasgow | 0.134 | 0.577 | 0.987 | 0.199 | 0.530 | 0.877 | 0.131 | 0.580 | 0.991 |
| Bristol | 0.125 | 0.514 | 0.939 | 0.170 | 0.555 | 0.851 | 0.122 | 0.512 | 0.939 |
| Birmingham | 0.115 | 0.516 | 0.941 | 0.120 | 0.416 | 0.744 | 0.115 | 0.529 | 0.957 |
| Coventry | 0.107 | 0.548 | 0.952 | 0.164 | 0.478 | 0.779 | 0.101 | 0.555 | 0.976 |
| Cardiff | 0.106 | 0.537 | 0.950 | 0.283 | 0.693 | 0.991 | 0.098 | 0.532 | 0.948 |
| Liverpool | 0.093 | 0.520 | 0.801 | 0.153 | 0.511 | 0.803 | 0.090 | 0.520 | 0.801 |
| Nottingham | 0.083 | 0.445 | 0.805 | 0.088 | 0.348 | 0.632 | 0.083 | 0.452 | 0.821 |
| Leicester | 0.083 | 0.418 | 0.859 | 0.136 | 0.405 | 0.920 | 0.074 | 0.421 | 0.854 |
| Tyneside | 0.072 | 0.440 | 0.834 | 0.214 | 0.465 | 0.863 | 0.062 | 0.439 | 0.832 |
| | | | | | | | | | |
| Gap (highest-to-lowest) | 0.250 | 0.391 | 0.591 | 0.206 | 0.384 | 0.539 | 0.261 | 0.397 | 0.602 |
| Gap (London with second highest) | 0.150 | 0.231 | 0.410 | 0.011 | 0.039 | 0.180 | 0.152 | 0.186 | 0.304 |
| Gap (London with Tyneside) | 0.250 | 0.391 | 0.591 | 0.080 | 0.267 | 0.308 | 0.261 | 0.397 | 0.602 |

[a] mean values are all significantly less (at the 1% level) than that of London          Source: own calculations based on ABS data

Table 2.2 presents the mean, 80th percentile and 90th percentile of *ln* TFP for plants operating in 12 urban areas. London again is ranked highest with Tyneside lowest (lower than Leicester because of lower productivity in the larger service sector). The correlation between the mean and the 80th percentile and 90th percentile is above 0.96 for all sectors and services, but for manufacturing it falls from 0.87 to 0.76 for the 80th and 90th percentiles, respectively. The correlation between the mean for all sectors and manufacturing is also much lower, at 0.57, indicating that city rankings for the manufacturing sector are less aligned to services than was the case at the regional level. The gap between highest and lowest ranked city (Tyneside) for all sectors (column 1) is not as large as for regions, but increases from 0.25 to 0.39 and 0.59, respectively, when considering the 80th and 90th percentiles (columns 2 and 3). The gap in manufacturing (column 4) between London and the lowest ranked city (Nottingham) is similar in size to the highest-to-lowest gap for services and thus both sectors, but the penultimate row in Table 2.2 shows that the gap between London and the next highest ranked city (Edinburgh for services and Cardiff for manufacturing) is relatively small in manufacturing; for services, the London-Edinburgh gap accounts for some 58 per cent of the top-to-bottom gap, but in manufacturing the London-Cardiff gap only accounts for just over 5 per cent of the top-to-bottom gap.

The last row in Table 2.2 indicates how large the gap is between the Tyneside and London; this has already been discussed when all sectors are considered; when manufacturing is considered it can be seen that the gap with London is much less at 0.08 (or 0.27 and 0.31, respectively, for the 80th and 90th percentiles). Overall, the North East is ranked last out of 11 cities when all sectors are considered, rising to 3rd when just manufacturing is looked at.

Data for the LEPs and local authorities is presented in Figure 2.1, showing significantly higher TFP for the London and adjacent LEPs mostly north-west and south-west of Pan London LEP (viz., Thames Valley, Enterprise M3, Hertfordshire and Coast-to-Capital). Nine of the top 12 areas with the highest productivity (ranging from 0.111 to 0.332) are within 100 miles of Central London (the other three areas being Greater Aberdeen, ranked 1st;[2] Edinburgh, 7th; and Glasgow, 12th). The gap between the highest and lowest ranked LEP (Cornwall & the Isles of Scilly) was 0.453. As with larger administrative regions (Table 2.1), aside from Scotland, productivity levels generally fall when moving towards the north and periphery of Great Britain. Figure 2.1(b), which presents results for local authorities, confirms the general concentration of higher productivity surrounding London (25 London Boroughs out of 33 are in the highest tier in Figure 2.1b, with only Aberdeen and Aberdeenshire belonging to this tier and lying outside 30 miles of Central London). Lastly, Figure 2.1(c) presents the coefficients obtained for the LEPs from regressing plant-level *ln* TFP on dummy variables comprising the areas covered in Figure 2.1(a),[3] plus controls for plant size, 8 technology sectors (see Table A.1), foreign-owned and MNE sub-groups, whether engaged in exporting and/or importing, R&D, multi-plant status and year dummies (2012-2018). The diagram shows that the distribution of average *ln* TFP in Figure 2.1(a) is therefore not unduly influenced by certain areas having a different 'mix' of productivity enhancing characteristics, suggesting that where the 'average' plant is located explains a large part of its likely productivity level.

---

[2] Pan London's (weighted) mean ln TFP was 0.325 (slightly higher than London, at 0.322, when Croydon is omitted), while Greater Aberdeen was 0.332.

[3] With Pan London as the benchmark, hence all the values in Figure 2.1(c) represent deviations from the benchmark (i.e., all except Greater Aberdeen are negative scores).

Figure 2.1: (weighted) mean *ln* TFP 2011-18 by English LEPS (including Scotland and Wales) and local authorities

(a) LEPs (see Table A2.2 for definitions)

(b) local authorities

(c) LEPs (marginal effects)
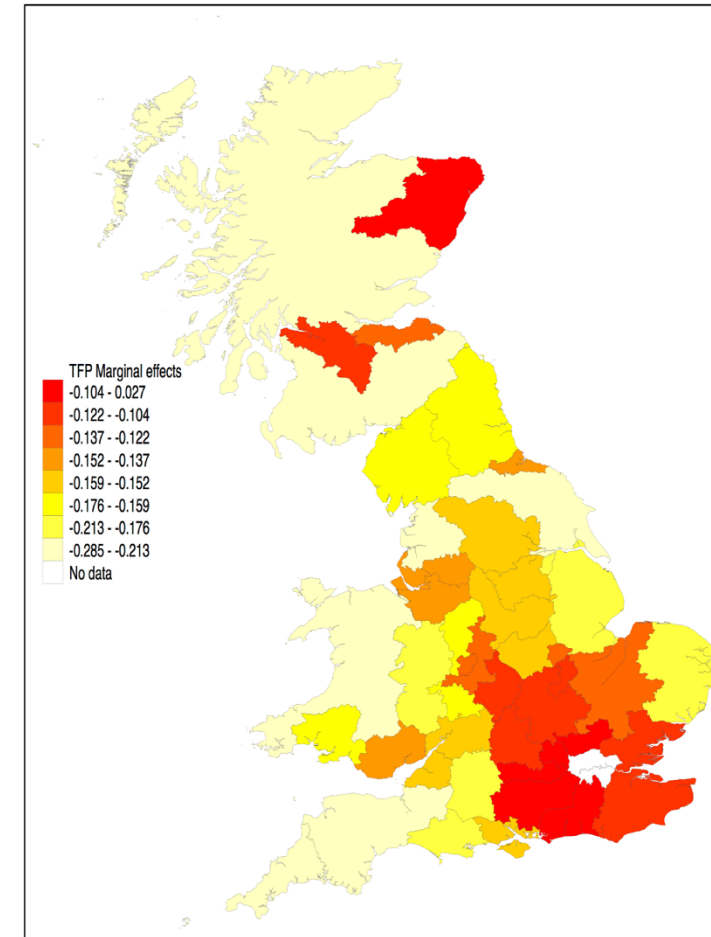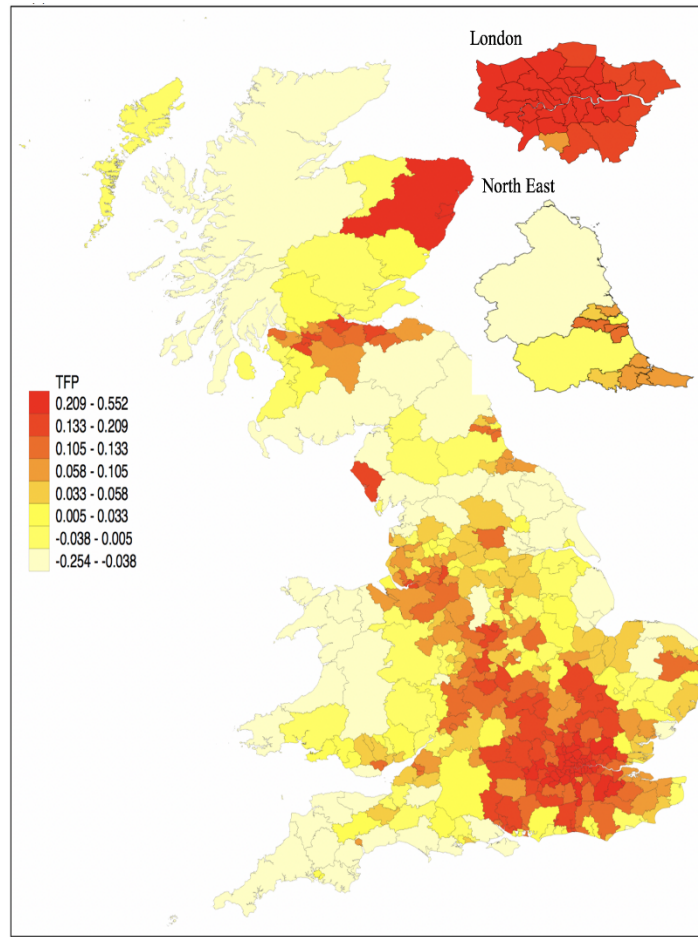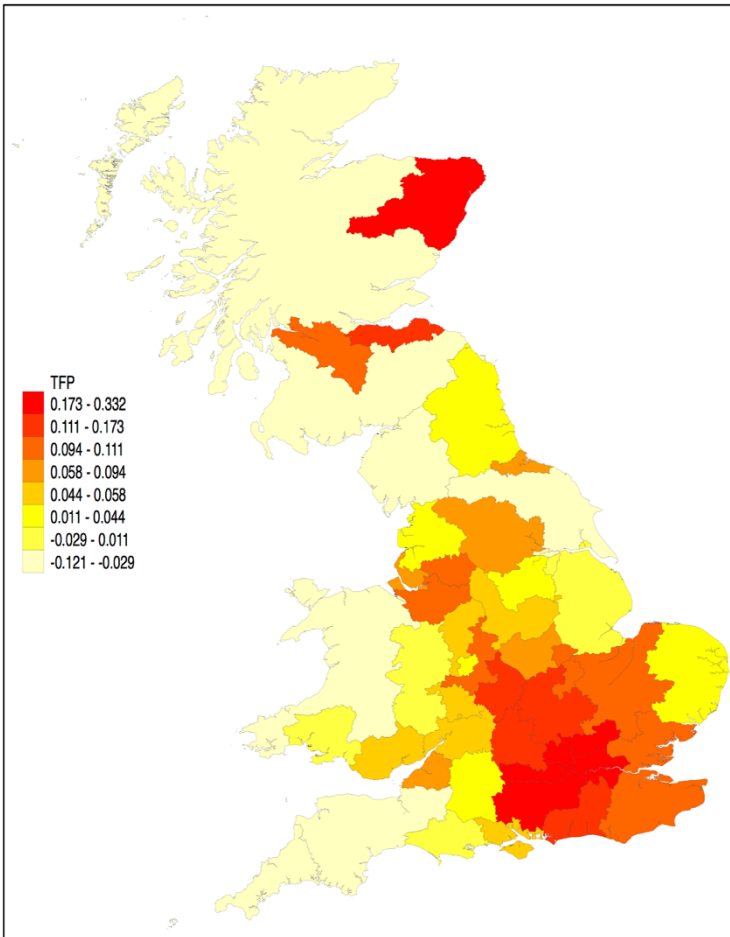


Source: Tables A2.3 and A2.4

Figure 2.2: (weighted) mean *ln* TFP 2011-18 in North East (compared to 1st ranked LA)
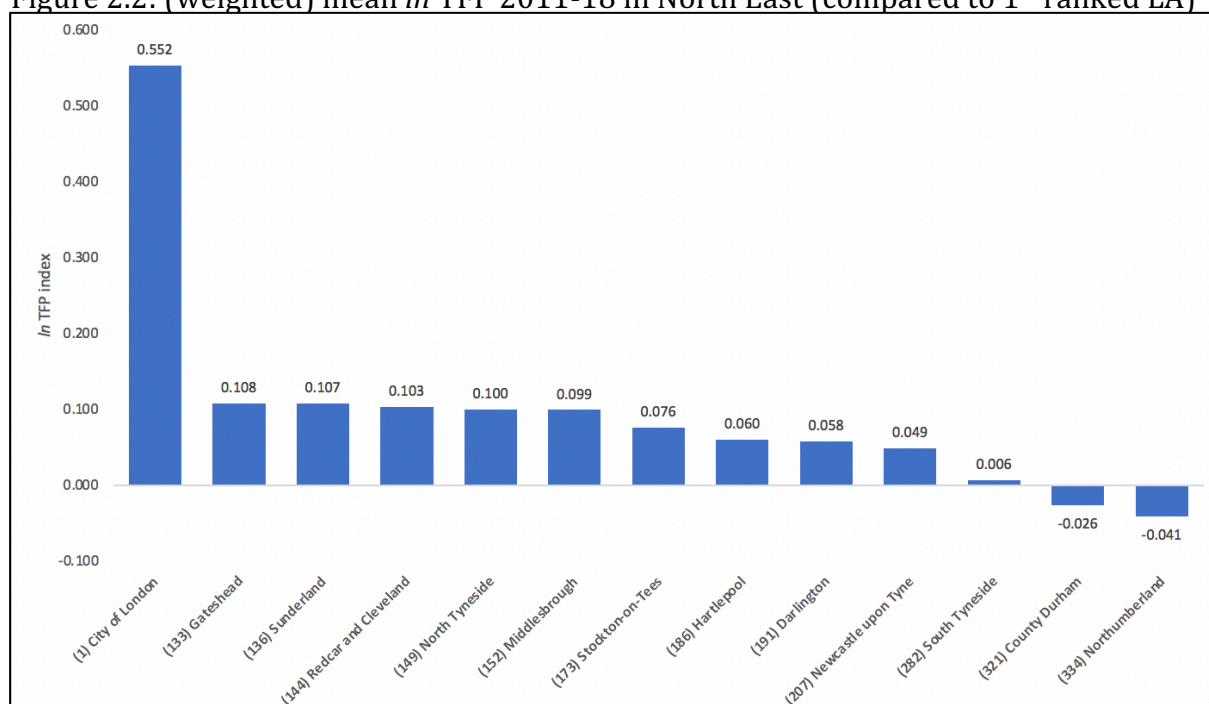
With regard to the ranking of the North East LEPs and local authorities, out of the 46 areas depicted in Figure 2.1(a), of which 39 are English LEPs, the Tees Valley LEP is ranked 20th and the NE LEP 33rd, with average *ln* TFP of 0.080 and 0.031, respectively (Greater Aberdeen was ranked 1st with 0.332). Of the 379 local authorities, Figure 2.2 presents the rankings and productivity scores for the local authorities representing the North East, with Gateshead ranked 133rd and Northumberland ranked 314th.

Table 2.3: (weighted) means of *ln* TFP, 2011-18, TVCA and NE LEP

| Sector[a] | Tees Valley LEP | NE LEP | Absolute difference (%) |
|---|---|---|---|
| Hi-tech manufacturing | 0.518 | 0.208 | 59.8 |
| Med-hi-tech manufacturing | 0.400 | 0.200 | 50.0 |
| Med-low-tech manufacturing | 0.242 | 0.120 | 50.4 |
| Low-tech manufacturing | 0.142 | 0.067 | 52.8 |
| Hi-tech KI services | 0.138 | 0.000 | 100.0 |
| KI services | 0.426 | 0.386 | 9.4 |
| Low KI services | 0.015 | 0.004 | 73.3 |
| Other low KI services | -0.080 | -0.104 | 30.0 |

[a]Industries allocated to technology groups are set out in appendix (Table A.1)          Source: own calculations

The North East rankings for LEPs overall conflates differences across sectors, and therefore Table 2.3 presents information on productivity for 8 technology groups covering manufacturing and services. This shows that the productivity advantage of the Tees Valley LEP over that of the NE LEP extends across each sector (in manufacturing,

TVCA is on average about 50% more productive, but with a smaller advantage in services). More detailed information (by 2-digit industry) on productivity in the two LEPs is available in Table A2.5 in the appendix.

Figure 2.3: Distribution of *ln* TFP 2011-2018 by certain geographies (all sectors)
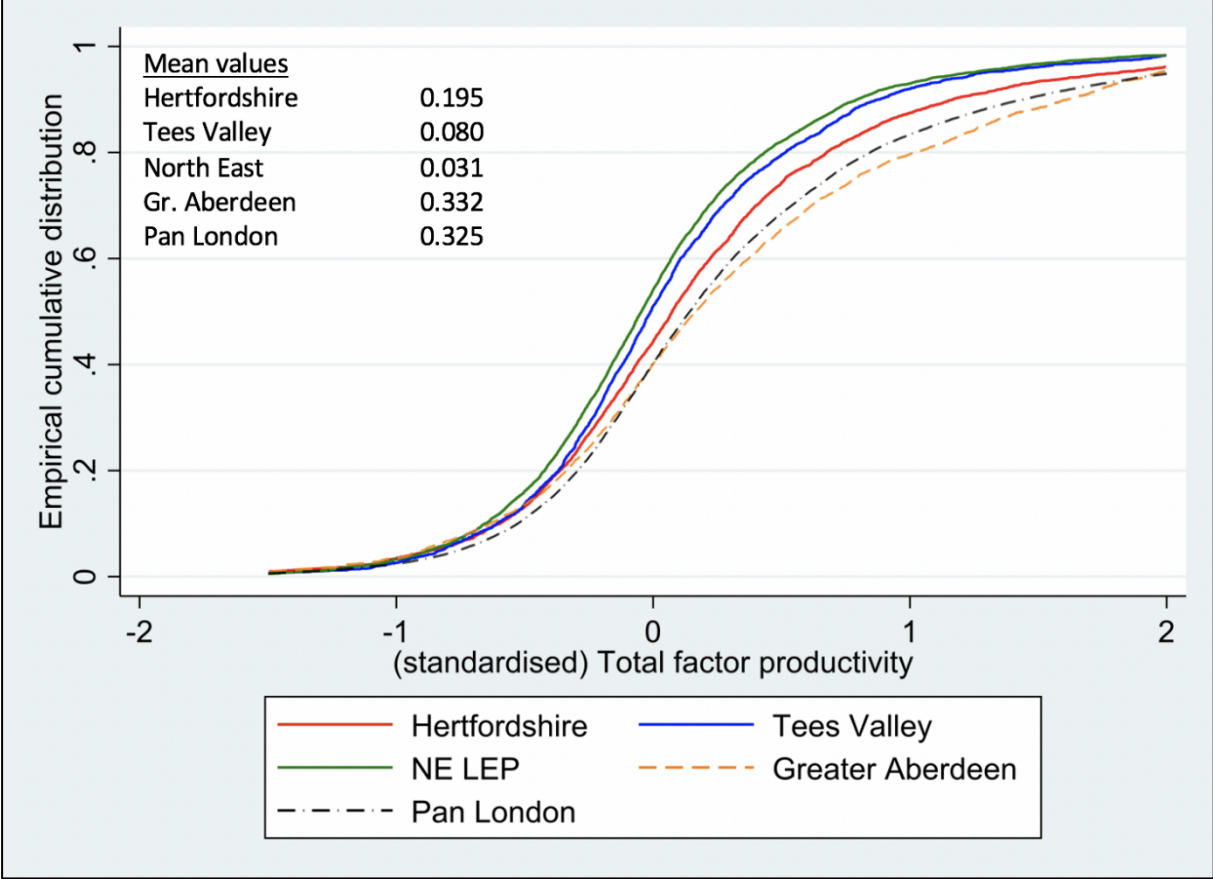


Mean (average) values of productivity aggregate across plants for the sub-groups being considered (cf. Table 2.1), as shown in Figure 2.3. That is, all regions (sectors, etc.) have both 'frontier' and 'laggard' plants and firms (see Harris, 2021 and Haldane 2018), and it is the proportion of plants in different parts of the distribution that determines overall mean values. Thus in Figure 2.3, while the Tees Valley and NE LEPs have their share of 'frontier' plants, generally the proportion of such plants is smaller (in the diagram, the TFP distribution for Pan London and Greater Aberdeen lies to the right of the distribution for the North East LEPs, indicating their larger proportions of plants with higher TFP).

Defining the 'frontier' as those plants in each industry which have *ln* TFP in the top 5% of the distribution,[4] Figure 2.4 shows the percentage each region had of such 'frontier' plants in 2018 (Table A2.6 provides a longer series covering 2011-18). The North East had only 2.9% of its plants in the 'frontier' compared to London, which had 7.4%. All other regions had less than 5% of their plants in the 'frontier' (it would be expected that if each region

---

[4] That is, the top 5% for each of the 66 industries covered are selected as 'frontier' plants (not the top 5% of all plants across all sectors).

Figure 2.4: Percentage of plants at the 'frontier' (defined as top 5%) in 2018 by region
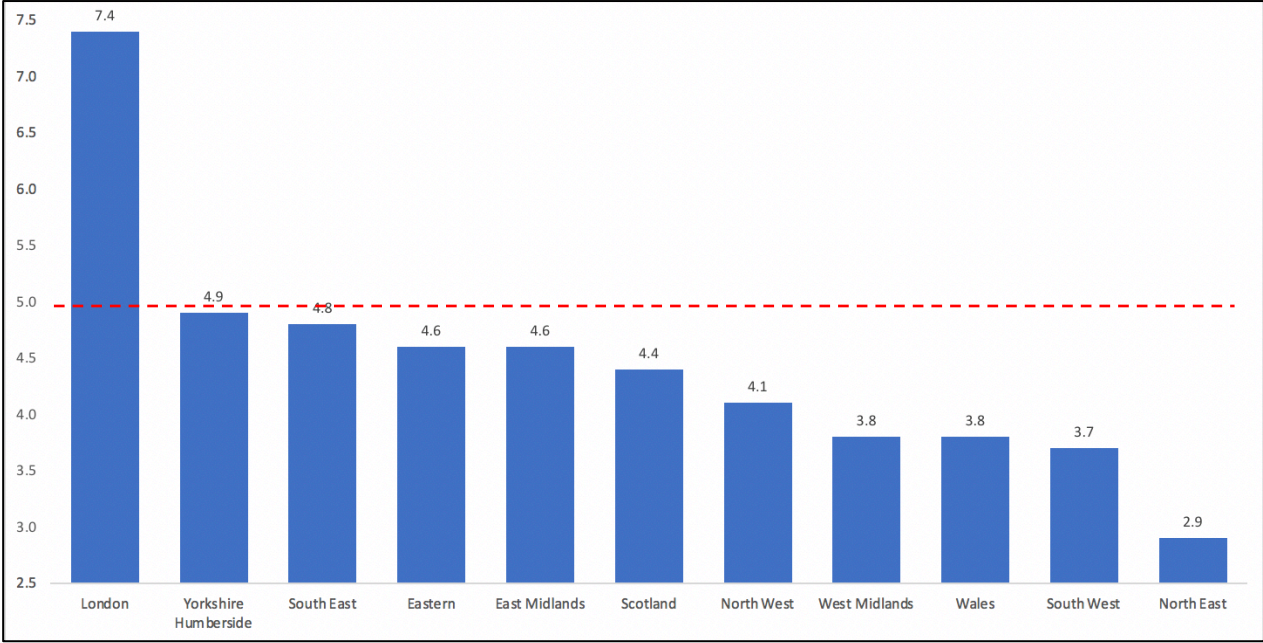
had an equal share of frontier plants, the bars in Figure 2.4 would all have the same height as the dotted line shown).

Disaggregating the data on 'frontier' plants by industry (at 2-digit SIC level), and only including those industries where the region had 5% or more plants in the frontier, shows in which sectors each region has over-representation in the 'frontier' sub-group. Table 2.4 shows that whereas London had more than 5% of 'frontier' plants in 36 out of 38 sectors, the North East was only represented in 7 sectors (Manufacture of Chemicals and Chemical Products – SIC24; Manufacture of Basic Metals – SIC27; Manufacture of Medical, Precision and Optical Instruments, Watches and Clocks – SIC33; Manufacture of Other Transport Equipment – SIC35; Manufacture Of Furniture; Manufacturing Not Elsewhere Classified – SIC36; Sewage and Refuse Disposal, Sanitation and Similar Activities – SIC90; and Other Service Activities – SIC93).

Comparable information to that provided in Figure 2.4 (and Table A2.6) and Table 2.4 for the LEPs within the North East is more problematic given the same numbers of firms involved (and thus the need to meet the ONS disclosure rule that any statistic must be based on 10+ enterprises – not plants). This has meant extending the definition of the 'frontier' to the top 10% rather than 5%. Using this broader definition, Figure 2.5 (and Table A2.7) shows that on average the percentage of plants in the 'frontier' was 8% for both LEPs over 2011-18 (although with year-on-year variations across the period). The comparable figure for the Pan London LEP was around 14% of plants in the top 10% sub-group, some 75% higher than the North East.

Lastly, Table 2.5 lists those industries where the North East LEPs had at least 10% of plants in the top 10% of the productivity distribution by industry (the full range of industries is covered in Table A2.8). This shows (in conjunction with Table 2.4) that Tees Valley LEP represented the 'frontier' for chemicals while the NE LEP had the advantage in basic metals; both supplied frontier plants to medical & precision instruments (although

Table 2.4: (weighted) Proportion of plants in top 5% frontier* 1997-2018: by industry and region

| 1992 SIC | North East | Yorkshire Humberside | North West | West Midlands | East Midlands | South West | South East | Eastern | London | Scotland | Wales |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 15 | – | – | – | 0.053 | – | – | 0.070 | 0.056 | 0.083 | – | – |
| 17 | – | 0.065 | – | – | – | 0.058 | – | – | 0.122 | – | – |
| 18 | – | 0.062 | – | – | – | – | – | – | 0.098 | – | – |
| 19 | – | – | – | 0.067 | – | – | – | – | – | – | – |
| 20 | – | – | – | 0.054 | – | – | 0.061 | 0.057 | – | 0.057 | – |
| 21 | – | 0.068 | – | – | 0.054 | – | 0.051 | – | 0.067 | – | – |
| 22 | – | – | – | – | – | – | 0.050 | – | 0.111 | – | – |
| 24 | 0.078 | – | 0.058 | – | – | – | 0.054 | 0.069 | 0.060 | – | – |
| 25 | – | – | – | 0.059 | – | – | – | – | 0.079 | – | – |
| 26 | – | – | – | – | – | – | 0.053 | – | 0.080 | – | – |
| 27 | 0.063 | – | – | – | – | – | 0.057 | 0.060 | 0.136 | 0.053 | – |
| 28 | – | – | – | – | – | – | 0.058 | 0.050 | 0.073 | 0.072 | 0.051 |
| 29 | – | – | – | – | 0.053 | – | 0.054 | 0.054 | 0.067 | 0.063 | – |
| 30 | – | – | 0.055 | – | – | – | – | – | – | 0.068 | – |
| 31 | – | – | – | – | 0.053 | – | 0.066 | 0.055 | 0.065 | – | – |
| 32 | – | – | – | – | – | – | 0.054 | – | 0.107 | – | – |
| 33 | 0.079 | – | – | – | – | 0.063 | – | – | 0.058 | – | – |
| 34 | – | – | – | 0.053 | – | 0.051 | – | 0.068 | 0.124 | 0.058 | – |
| 35 | 0.067 | – | – | – | 0.073 | – | – | – | 0.114 | – | – |
| 36 | 0.058 | – | – | – | – | – | – | 0.057 | 0.085 | 0.054 | – |
| 50 | – | – | – | – | 0.058 | – | 0.054 | 0.054 | 0.062 | – | – |
| 51 | – | – | – | – | – | – | 0.052 | – | 0.103 | – | – |
| 52 | – | – | – | – | – | – | – | – | 0.084 | – | – |
| 55 | – | – | – | – | – | – | – | – | 0.059 | 0.062 | – |
| 60 | – | 0.053 | – | – | 0.051 | – | – | 0.061 | 0.065 | – | – |
| 61 | – | – | – | – | – | – | 0.053 | – | 0.068 | – | – |
| 62 | – | – | – | – | – | – | – | – | 0.107 | – | – |
| 63 | – | – | – | – | – | – | 0.053 | 0.053 | 0.072 | – | – |
| 64 | – | – | – | 0.057 | – | – | 0.063 | – | 0.084 | – | – |
| 70 | – | – | – | – | – | – | – | – | 0.086 | – | – |
| 71 | – | – | – | – | – | – | 0.057 | – | 0.062 | – | – |
| 72 | – | – | – | – | – | – | – | – | 0.073 | – | – |
| 73 | – | – | – | – | – | – | 0.064 | – | 0.064 | – | – |
| 74 | – | – | – | – | – | – | 0.052 | – | 0.062 | 0.059 | – |
| 90 | 0.095 | – | – | – | – | – | – | – | 0.088 | 0.084 | – |
| 91 | – | – | – | – | – | – | – | – | 0.095 | – | – |
| 92 | – | – | – | – | – | 0.052 | 0.058 | – | 0.073 | – | – |
| 93 | 0.050 | – | – | – | – | – | 0.055 | – | 0.075 | 0.063 | – |

* only includes those where proportion is 0.05 or higher.

Figure 2.4: Proportion of plants at the 'frontier' (defined as top 10%) 2011-18 by LEP
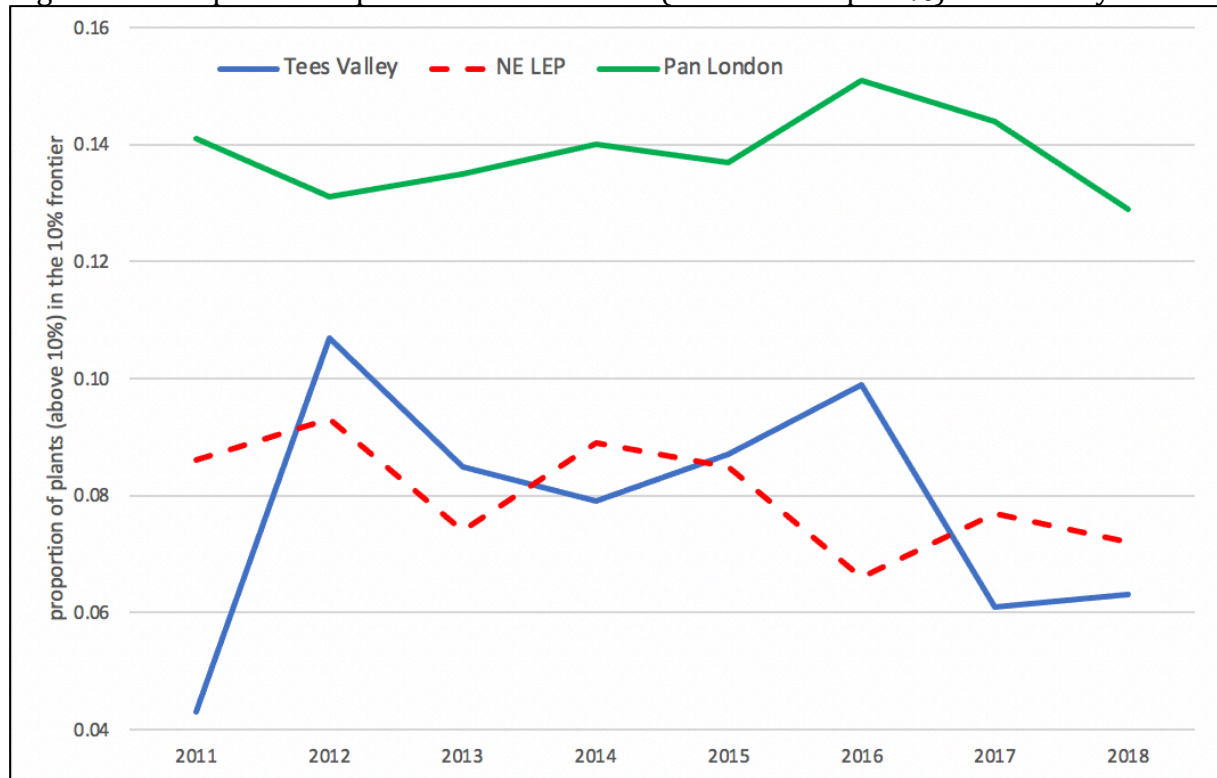


Source: Table A2.7

Table 2.5: (weighted) Proportion of plants in top 10% frontier* for North East LEPs, 1997-2018: by industry

| 1992 SIC | Tees Valley | NE LEP | Pan London |
|---|---|---|---|
| {24} Manufacture of Chemicals And Chemical Products | 0.221 | – | 0.119 |
| {25} Manufacture of Rubber And Plastic Products | 0.105 | – | 0.156 |
| {27} Manufacture of Basic Metals | – | 0.105 | 0.238 |
| {28} Manufacture of Fabricated Metal Products, Except Machinery And Equipment | 0.112 | – | 0.144 |
| {29} Manufacture of Machinery And Equipment Not Elsewhere Classified | 0.112 | – | 0.126 |
| {33} Manufacture of Medical, Precision And Optical Instruments, Watches And Clocks | 0.265 | 0.153 | 0.134 |
| {60} Land Transport; Transport Via Pipelines | 0.103 | – | 0.128 |
| {70} Property Development | 0.122 | – | 0.160 |
| {73} Research and Development Activities | – | 0.132 | 0.115 |
| {90} Sewage and Refuse Disposal, Sanitation And Similar Activities | – | 0.155 | 0.156 |
| {93} Other Service Activities | – | 0.108 | 0.140 |

* only includes those where proportion is 0.1 or higher.

more so in Tees Valley), and the NE LEP accounted for Table 2.4 'frontier' plants in the sewerage and other service activities industries. There are also other industries that feature in Table 2.5 that did not in Table 2.4: rubber & plastics, fabricated metal products,

# Figure 2.5: Distribution of *ln* TFP 2011-2018 in Great Britain by whether engaged in trade or a multinational enterprise (MNE)

**(a) all sectors**



Mean values
Exporters & importers 0.197
Export/not import 0.276
Import/not export -0.003
Neither export/import 0.102

Legend: Exporters & importers, Export and not import, Import and not export, Neither export or import

**(b) manufacturing**



Mean values
Exporters & importers 0.237
Export/not import 0.142
Import/not export 0.146
Neither export/import 0.125

Legend: Exporters & importers, Export and not import, Import and not export, Neither export or import

**(c) services**



Mean values
Exporters & importers 0.190
Export/not import 0.293
Import/not export -0.015
Neither export/import 0.101

Legend: Exporters & importers, Export and not import, Import and not export, Neither export or import

**(d) all sectors**



Mean values
US-owned 0.213
EU-owned 0.168
Other FO 0.146
GB-owned with outward FDI 0.137
GB-owned domestic only 0.110

Legend: US-owned, Other Foreign-owned, GB-owned with OFDI, EU-owned, GB-owned domestic only

**(e) manufacturing**



Mean values
US-owned 0.375
EU-owned 0.292
Other FO 0.306
GB-owned with outward FDI 0.267
GB-owned domestic only 0.139

Legend: US-owned, Other Foreign-owned, GB-owned with OFDI, EU-owned, GB-owned domestic only

**(f) services**



Mean values
US-owned 0.195
EU-owned 0.155
Other FO 0.132
GB-owned with outward FDI 0.131
GB-owned domestic only 0.108

Legend: US-owned, Other Foreign-owned, GB-owned with OFDI, EU-owned, GB-owned domestic only

13

machinery & equipment n.e.c., land transport, and property development (in the Tees Valley) and R&D activities (in the NE LEP).

The above analysis indicates that there is a significant productivity gap between the North East (and its LEPs) and especially the southern part of Britain (and large parts of Scotland). One way to improve the productivity average in an area is to have a larger proportion of plants engaged in trade and external investment (i.e. foreign-owned or belonging to a GB-owned firm with overseas branches). This is now shown to be the case, with regard to the estimates of plant-level TFP used here. Firstly, Figure 2.5 shows the distribution of *ln* TFP across plants for various sub-groups of those engaged in trade or part of MNEs. Figure 2.5(a) shows that plants that generally engage in exporting (but not importing) have the highest levels of productivity in the top two-thirds of the distribution but that plants not engaged in trade also have relatively high TFP in the top one-third (but the lowest TFP in the bottom one-third)of the distribution. Generally, plants that just engage in importing have the lowest levels of productivity. This suggests that being involved in trade is not, *eo ipso*, a panacea to improving productivity; there are at least two factors that also need to be considered. The first (shown in Figure 2.5b) is that it matters which sector the plant is in – manufacturing is more likely to be engaged in trade (see next chapter) and more generally those manufacturers that export and import or export/import only have higher TFP, joined at the top of the productivity distribution by plants that do not engage in trade. The second factor that needs to be considered is that other plant level characteristics (e.g., size, detailed sector, ownership whether engaged in R&D) also co-vary with TFP, and these have not been 'controlled for' (taken into account) in Figure 2.5. Later on, a full range of factors are considered together when 'explaining' plant-level TFP differences, and the importance of trade being associated with higher productivity is confirmed.

Figure 2.5(d) shows that in general US-owned plants had the highest levels of TFP, followed by EU-owned (especially because of relatively higher productivity in the lower half of the distribution) and then other foreign-owned and GB-owned firms involved in outward FDI. GB-owned plants not engaged in MNE activities had on average much lower TFP (although doing well at the top end of the distribution). In manufacturing (Figure 2.5.e) plants belonging to GB-owned non-MNE firms do not perform well at the top end of the distribution, and in this sector US-owned plants more clearly had the highest levels of TFP.

The regional breakdown of average *ln* TFP for all plants (cf. Table 2.1, column 1) and those engaged in exporting or belonging to a MNE is presented in Figure 2.6. In all regions, except London, mean productivity levels were higher in plants that exported or were part of a MNE. Only in London was productivity lower in MNEs (and in the South East there was little advantage to MNEs). Generally, the productivity advantage for exporters was the largest, and substantial; followed by relatively higher TFP in MNEs. In the North East, MNEs had on average productivity levels 120% higher than the average for all plants (for exporters, the comparable figure was 148%).

Figure 2.7 provides more detailed information on trade, with average *ln* TFP shown for the different categories of plants based on whether they exported/imported or not. In all regions mean productivity was highest in plants that only exported, followed by exporters and importers, and then those that did not engage in trade. Those that just imported had generally negative average TFP levels (except in London).

Figure 2.6: (weighted) mean *ln* TFP differential between exporters and non-exporters/foreign-owned and GB owned, 2011-18



Legend: ■ All ▨ Multi-national company ▨ Exporter

Y-axis: (weighted) mean *ln* TFP 02011-18

| Region | All | Multi-national company | Exporter |
|---|---|---|---|
| London | 0.32 | 0.27 | 0.42 |
| South East | 0.14 | 0.15 | 0.21 |
| Eastern | 0.10 | 0.14 | 0.18 |
| Scotland | 0.09 | 0.15 | 0.17 |
| West Midlands | 0.07 | 0.13 | 0.15 |
| North West | 0.07 | 0.10 | 0.15 |
| East Midlands | 0.05 | 0.12 | 0.15 |
| North East | 0.04 | 0.10 | 0.11 |
| Yorkshire-Humberside | 0.03 | 0.09 | 0.11 |
| South West | 0.01 | 0.09 | 0.12 |
| Wales | -0.02 | 0.08 | 0.09 |

Source: Table A2.9

Figure 2.7: (weighted) mean *ln* TFP differential between trade sub-groups, 2011-18, by region



**(weighted) mean *ln* TFP**

| Region | export & import | import only | export only | neither export or import |
|---|---|---|---|---|
| London | 0.41 | 0.10 | 0.49 | 0.32 |
| South East | 0.21 | -0.01 | 0.26 | 0.14 |
| Eastern | 0.17 | -0.01 | 0.22 | 0.09 |
| West Midlands | 0.16 | -0.02 | 0.17 | 0.06 |
| East Midlands | 0.15 | -0.03 | 0.18 | 0.03 |
| North West | 0.14 | 0.00 | 0.23 | 0.06 |
| Scotland | 0.14 | -0.03 | 0.29 | 0.09 |
| Yorkshire Humberside | 0.12 | -0.02 | 0.12 | 0.02 |
| South West | 0.11 | -0.06 | 0.21 | -0.01 |
| North East | 0.10 | -0.06 | 0.18 | 0.05 |
| Wales | 0.09 | -0.02 | 0.14 | -0.04 |

Source: Table A2.10

As outlined above, to more fully understand if trade and/or being part of a MNE is correlated with productivity, it is necessary to take into account the plant-level characteristics that are known to determine with TFP. This can be done by modelling (using simple regression analysis) the relationship between *ln* TFP and characteristics measured in the dataset such as size, detailed sector, ownership and whether engaged in R&D. This also allows consideration of the extent to which productivity differences between plants in different areas is due to them either having a greater 'endowment' of productivity enhancing characteristics, and/or if (given the observed characteristics of a plant) being located in one area has an additional benefit that conveys higher TFP. That is, productivity enhancement can be associated with certain characteristics such as the age of the plant, multinational ownership, R&D, trade, and the industrial sector to which a plant belongs, while 'place' factors include higher productivity associated with the spatial location of the plant, and can include such factors as (hard to measure) potential spatial spillovers due to agglomerations, better quality infrastructure, and access to (larger) markets. Indeed, certain regions can have both a higher concentration (endowment) of plant-level productivity enhancing factors (e.g., more multinational companies) and stronger 'place' effects (e.g., multinational companies are even more productive in some locations compared to others), indicating that the level of endowment of productivity enhancing factors can also be in part due to 'place' effects.[5]

To begin with, Table 2.6 sets out the variables to be used in the modelling of plant-level productivity. What is most apparent is that the average level of 'endowments' (the proportion of plants with various characteristics) does not vary much across the areas shown; e.g., the proportion of plants owned by USA firms varies from 0.026 (in the rest of Great Britain) to 0.036 (in the NE LEP) but mean *ln* TFP varies from 0.040 to 0.331. This is an early indication (alongside Figure 2.1c) that 'place' is probably more important than 'non-place' effects in explaining productivity differences. In terms of any major differences in endowments between the North East LEPs and the rest of Great Britain (i.e. leaving aside London), the Tees Valley LEP had a relatively higher proportion of EU-owned plants, both LEPs had relatively more plants owned by GB multinational firms, and both had a higher proportion of plants belonging to firms operating in more than one region. Linked to the latter, both LEPs had relatively fewer single plant enterprises, and plants tend to be on average older in Tees Valley LEP.

As to other differences, both LEPs had fewer plants belonging to the high-tech knowledge intensive services sector (which covers such service industries as Telecoms; Computer & related; R&D; Photographic activities; Motion pictures; Radio & TV activities; and Artistic & literary creation). And in terms of plant size, relative to the rest of Great Britain average, both LEPs had fewer plants employing less than 5 employees and more in the 5 – 14 size-band group.

The first stage in the modelling of productivity is to estimate the relationship between plant-level *ln* TFP and the variables in Table 2.6, separately for the areas (e.g., regions,

---

[5] Thus it is not possible to fully separate out 'place' versus 'non-place' effects, because they are likely endogenous to each other (e.g., if there are stronger spillover effects in one region, this can lead to plants with better productivity enhancing characteristics moving to such regions to benefit from the spillovers). Moreover, 'place' effects will also capture the effect of unobserved 'non-place' effects such as human capital if these are unequally distributed across regions.

Table 2.6: (weighted) means of variables used in 2011-2018 plant-level modelling

| Variable | Definition | London | Rest of GB | NE England | Tees Valley LEP | NE LEP |
|---|---|---|---|---|---|---|
| *ln* TFP | Index of (natural) logged TFP | 0.331 | 0.081 | 0.053 | 0.089 | 0.040 |
| USA-owned | Dummy coded 1 if plant is US-owned during 2011-2018 | 0.032 | 0.026 | 0.035 | 0.032 | 0.036 |
| EU-owned | Dummy coded 1 if plant is EU-owned during 2011-2018 | 0.053 | 0.053 | 0.073 | 0.087 | 0.068 |
| Other foreign-owned | Dummy coded 1 if plant is other country foreign-owned during 2011-2018 | 0.028 | 0.022 | 0.030 | 0.031 | 0.030 |
| GB outward FDI[a] | Dummy coded 1 if plant belongs to a GB-owned firm involved in outward FDI | 0.111 | 0.118 | 0.156 | 0.170 | 0.151 |
| GB owned no outward FDI[a] | Dummy coded 1 if plant belongs to a GB-owned firm not involved in outward FDI | 0.775 | 0.780 | 0.706 | 0.681 | 0.714 |
| Single-plant enterprise | Dummy coded 1 if plant and enterprise are the same | 0.668 | 0.644 | 0.533 | 0.502 | 0.543 |
| Multi-plant enterprise operating in only 1 region | Dummy coded 1 if plant belongs to an enterprise operating plants in only one UK region | 0.020 | 0.029 | 0.033 | 0.027 | 0.035 |
| Multi-Region Enterprise | Dummy coded 1 if plant belongs to an enterprise operating plants in more than one UK region | 0.312 | 0.327 | 0.434 | 0.471 | 0.422 |
| *ln* age | *ln* number of years since year of opening | 1.811 | 1.992 | 1.981 | 1.941 | 1.995 |
| R&D[b] | Dummy coded 1 if plant has positive R&D stock[a] | 0.017 | 0.026 | 0.027 | 0.025 | 0.028 |
| No R&D[b] | Dummy coded 1 if plant has zero R&D stock | 0.983 | 0.974 | 0.973 | 0.975 | 0.972 |
| Exporter only | Dummy coded 1 if plant is engaged in the exporting of goods and/or services but does not import | 0.076 | 0.052 | 0.050 | 0.054 | 0.049 |
| Importer only | Dummy coded 1 if plant is engaged in the importing of goods and/or services but does not export | 0.087 | 0.092 | 0.109 | 0.122 | 0.105 |
| Exporter and importer | Dummy coded 1 if plant is engaged in the exporting and importing of goods and/or services | 0.211 | 0.186 | 0.203 | 0.206 | 0.202 |
| Neither exporter and importer (coded 1) | Dummy coded 1 if plant is not engaged in the trading of goods and/or services | 0.625 | 0.670 | 0.637 | 0.618 | 0.644 |
| *Sector* (Table A.1 for definitions) | | | | | | |
| Hi-tech manufacturing | e.g., Pharmaceuticals; aircraft & spacecraft | 0.002 | 0.006 | 0.005 | 0.004 | 0.005 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Medium hi-tech manufacturing | e.g., Chemicals; electrical machinery | 0.003 | 0.014 | 0.017 | 0.017 | 0.017 |
| Medium low-tech manufacturing | e.g., Basic metals; rubber & plastics | 0.006 | 0.026 | 0.034 | 0.035 | 0.034 |
| Low-tech manufacturing | e.g., Food & beverages; textiles, clothing. | 0.025 | 0.034 | 0.035 | 0.028 | 0.037 |
| Hi-tech knowledge intensive (KI) services | e.g., Telecoms; R&D; radio & TV | 0.123 | 0.069 | 0.042 | 0.039 | 0.043 |
| KI services | e.g., Architecture & engineering; technical testing | 0.164 | 0.116 | 0.106 | 0.140 | 0.093 |
| Low KI services | e.g., Land transport; real estate; renting machinery | 0.596 | 0.645 | 0.670 | 0.648 | 0.678 |
| Other low KI services | e.g., Wholesale; Retail; hotels & restaurants | 0.079 | 0.091 | 0.092 | 0.089 | 0.093 |
| *Employment size-band* | | | | | | |
| <5 employees | Plants with < 5 employees | 0.485 | 0.454 | 0.392 | 0.396 | 0.391 |
| 5 – 14 employees | Plants with 5 – 14 employees | 0.261 | 0.286 | 0.322 | 0.325 | 0.321 |
| 15 – 31 employees | Plants with 15 – 31 employees | 0.155 | 0.161 | 0.169 | 0.171 | 0.168 |
| 32 – 47 employees | Plants with 32 – 47 employees | 0.049 | 0.050 | 0.056 | 0.049 | 0.059 |
| 48 – 223 employees | Plants with 48 – 223 employees | 0.038 | 0.040 | 0.048 | 0.048 | 0.048 |
| 224+ employees | Plants with 224+ employees | 0.012 | 0.010 | 0.012 | 0.011 | 0.012 |
| N (unweighted) | | 280,540 | 1,629,332 | 73,811 | 20,121 | 53,688 |

Source of the data is ONS (2018a) except (a) which ONS (2018b) and (b) which is ONS (2018c)
[b] R&D stocks are computed using the perpetual inventory method comprising adding together 1/3rd gross stock (assuming length of life of an R&D investment is 5 years) and 2/3rd net stock (assuming 20 straight-line depreciation rate)

LEPs) of interest. This shows which variables have a positive and statistically significant relationship with productivity. Table 2.7 reports the result from OLS regressions for all sectors in London, the North East, the rest of the North of England,[6] the NE LEP and Tees Valley LEP. These show that plants that were US-owned were significantly more likely to have higher productivity vis-à-vis the omitted[7] baseline sub-group (GB-owned plants not engaged in outward FDI); in the case of London such plants had, *ceteris paribus*, 36.3% higher *ln* TFP.[8] In comparison, the higher productivity of plants that were US-owned in the North East, the rest of the North, the NE LEP and Tees Valley LEP, was 14.6%, 14.9%, 14.9% and 13%, respectively. That is, while US-owned plants had, having controlled for all other variables in the model, higher productivity, the relationship was strongest in London (over twice the value of US-owned plants operating in the north). This suggests that if a plant located in the north were to be relocated to London, the productivity enhancing effect of being US-owned would be increased because of the 'better' spatial location of being in London (noted above as agglomerations effects such as spillovers, better quality infrastructure, and external scale effects due to access to a larger 'home' market).

EU-owned plants also have higher productivity: 16.6% higher in London, 14.1% in the Tees Valley LEP and 9.1% in the NE LEP. The TFP advantage of being other foreign-owned is very much higher in London (38.8%), and only just higher in the north (indeed not statistically above 0 in Tees Valley). Lastly, GB-owned plants that were part of MNEs had (cet. par.) 27.6% higher productivity in London, and closer to 14-17% higher TFP in the north. With respect to this variable, Table 2.6 showed that the North East had a higher proportion of such plants (a bigger 'endowment'), thus while it had more plants with this productivity enhancing characteristic, the bigger productivity enhancing effect of being part of British MNE was location when a London-versus-North East comparison is made.

Plants engaged in exporting experienced higher productivity, while those engaged in only importing had lower productivity, relative to the benchmark sub-group (plants not engaged in trade). The largest TFP benefit of exporting only was in Tees Valley (19.2% higher), while the largest benefit of engaging in both exporting and importing was in London (17.6% higher) – indeed, exporter and importers in the North East region appeared to have no statistically significant benefit , but this is because the benefits were all in Tees Valley (7.4% higher) while such plants in the NE LEP experienced on average lower TFP (-1.5%).

In general, the benefits of productivity enhancing plant characteristics were stronger in London vis-à-vis the other areas, across the other variables included in the model. Other major examples include plants in high-tech manufacturing had 23.7% higher productivity (versus the omitted benchmark medium high-tech manufacturing sub-group) in London, although such plants also experienced 16.2% higher TFP in Tees Valley (but much lower in the rest of the north). Hi-tech knowledge intensive services had

---

[6] Defined as comprising the following LEPs: Cumbria; Greater Manchester; Liverpool City Region; Cheshire & Warrington; Leeds City Region; Sheffield City Region; York, North Yorkshire & East Riding; Lancashire; and Humber.

[7] The benchmark sub-group is omitted in the sense that it does not enter as a separate variable (because of what is technically known as the 'dummy variable trap'); but plants belonging to this sub-group are included in the model and their effect is picked-up in the overall regression constant (the intercept term).

[8] Because the dependent variable is logged, and the USA-owned variable is binary, the effect of USA ownership is not 0.310 (the regression coefficient) but $e^{\widehat{\beta}} - 1$, which here is 0.363.

Table 2.7: (weighted) OLS regression of plant-level *ln* TFP on determinants, 2011-2018: various areas (all sectors)

| Dependent variable: *ln* TFP | (1) London | (2) North East | (3) Rest of North | (4) NE LEP | (5) Tees Valley |
|---|---|---|---|---|---|
| USA-owned | 0.310*** | 0.136*** | 0.139*** | 0.139*** | 0.122*** |
| EU-owned | 0.154*** | 0.101*** | 0.111*** | 0.087*** | 0.132*** |
| Other foreign-owned | 0.328*** | 0.067*** | 0.079*** | 0.073*** | 0.044 |
| GB outward FDI | 0.244*** | 0.133*** | 0.154*** | 0.131*** | 0.137*** |
| Exporter only | 0.155*** | 0.108*** | 0.121*** | 0.082*** | 0.176*** |
| Importer only | -0.071*** | -0.117*** | -0.017*** | -0.117*** | -0.121*** |
| Exporter & importer | 0.162*** | 0.009 | 0.090*** | -0.015* | 0.071*** |
| Hi-tech manufacturing | 0.213*** | 0.061 | 0.089*** | 0.039 | 0.150* |
| Medium low-tech manufacturing | -0.082** | -0.054** | -0.071*** | -0.042 | -0.097** |
| Low-tech manufacturing | -0.014 | -0.120*** | -0.095*** | -0.096*** | -0.161*** |
| Hi-tech knowledge intensive (KI) services | 0.009 | -0.282*** | -0.154*** | -0.260*** | -0.350*** |
| KI services | 0.241*** | 0.109*** | 0.111*** | 0.134*** | 0.016 |
| Low KI services | -0.078*** | -0.249*** | -0.227*** | -0.221*** | -0.344*** |
| Other low KI services | -0.153*** | -0.367*** | -0.360*** | -0.345*** | -0.450*** |
| *ln* age | -0.278*** | -0.214*** | -0.231*** | -0.221*** | -0.192*** |
| 5 – 14 employees | 0.047*** | 0.053*** | 0.014*** | 0.062*** | 0.030*** |
| 15 – 31 employees | -0.062*** | -0.013* | -0.019*** | -0.025*** | 0.020 |
| 32 – 47 employees | -0.012 | -0.003 | 0.045*** | -0.002 | 0.009 |
| 48 – 223 employees | 0.002 | 0.020* | 0.067*** | 0.035** | -0.017 |
| 224+ employees | 0.079*** | 0.050** | 0.127*** | 0.065** | 0.007 |
| Multi-plant enterprise operating in only 1 region | -0.051*** | 0.076*** | -0.034*** | 0.094*** | 0.023 |
| Multi-Region Enterprise | -0.336*** | 0.037*** | -0.068*** | 0.064*** | -0.040*** |
| R&D | 0.193*** | 0.151*** | 0.049*** | 0.142*** | 0.194*** |
| Constant | 0.847*** | 0.611*** | 0.666*** | 0.588*** | 0.693*** |
| R&D | | | | | |
| | | | | | |
| Observations | 280,540 | 73,811 | 363,134 | 53,688 | 20,121 |
| R² | 0.141 | 0.137 | 0.122 | 0.139 | 0.137 |

***/**/* significant at 1/5/10 per cent level

Table 2.8: (weighted) OLS regression of plant-level *ln* TFP on determinants, 2011-2018: various areas (manufacturing)

| Dependent variable: *ln* TFP | (1) London | (2) North East | (3) Rest of North | (4) NE LEP | (5) Tees Valley |
|---|---|---|---|---|---|
| USA-owned | 0.274*** | 0.207*** | 0.192*** | 0.203*** | 0.170 |
| EU-owned | -0.004 | 0.144*** | 0.195*** | 0.131*** | 0.120 |
| Other foreign-owned | 0.286*** | 0.071 | 0.119*** | 0.051 | 0.130 |
| GB outward FDI | 0.097* | 0.175*** | 0.126*** | 0.122*** | 0.302*** |
| Exporter only | 0.044 | -0.037 | 0.013 | -0.042 | 0.086 |
| Importer only | -0.065* | -0.083*** | 0.014 | -0.068** | -0.065 |
| Exporter & importer | 0.259*** | 0.009 | 0.059*** | 0.001 | 0.072 |
| Hi-tech manufacturing | 0.206*** | 0.058 | 0.091*** | 0.039 | 0.174* |
| Medium low-tech manufacturing | -0.037 | -0.062** | -0.077*** | -0.036 | -0.191*** |
| Low-tech manufacturing | 0.022 | -0.125*** | -0.101*** | -0.084*** | -0.248*** |
| *ln* age | -0.328*** | -0.218*** | -0.256*** | -0.201*** | -0.257*** |
| 5 – 14 employees | -0.074*** | 0.114*** | -0.031*** | 0.036 | 0.342*** |
| 15 – 31 employees | 0.060* | 0.103*** | 0.046*** | 0.107*** | 0.068 |
| 32 – 47 employees | -0.070 | 0.076** | 0.050*** | 0.055 | 0.232** |
| 48 – 223 employees | 0.081 | 0.095*** | 0.073*** | 0.104*** | 0.055 |
| 224+ employees | 0.146* | 0.137*** | 0.125*** | 0.134** | 0.171 |
| Multi-plant enterprise operating in only 1 region | -0.165*** | -0.128*** | -0.087*** | -0.105*** | -0.206** |
| Multi-Region Enterprise | -0.121*** | -0.069*** | -0.087*** | -0.021 | -0.248*** |
| R&D | 0.057 | 0.049* | -0.017 | 0.052* | -0.000 |
| Constant | 0.916*** | 0.620*** | 0.754*** | 0.539*** | 0.871*** |
| | | | | | |
| Observations | 7,437 | 104,049 | 24,913 | 3,754 | 1,376 |
| $R^2$ | 0.128 | 0.127 | 0.132 | 0.121 | 0.186 |

***/**/* significant at 1/5/10 per cent level

relatively higher productivity versus the north, as did plants the largest plants (in employment terms). Plants engaged in R&D had, cet. par., 21.3% higher productivity if they were London based, which was matched in Tees Valley LEP, but the effect was much lower in the rest of the north. Conversely, plants in London that were older experienced lower productivity than in the north, as did multi-plant enterprises (especially those that operated in more than one region). However, the latter is counterbalanced by the impact of the omitted benchmark sub-group (single-plant enterprises) which did much better in London as will be shown later.

Table 2.8 presents the results when only manufacturing plants are included (note, results for services are effectively the same as those in Table 2.7 as plants in services dominate the all sector figures – see the observation counts in Tables 2.7 and 2.8). In manufacturing, the dominance of London as a location is either much smaller (e.g., being US-owned, other foreign-owned, and engagement in R&D), similar (high-tech manufacturing, and age), or disappears with the north doing better (e.g., EU-owned had between 13-22% higher TFP in the north but they had no advantage over GB-owned non-MNE plants in London). The north does (overall) relatively better in manufacturing with regard to plants that were: EU-owned; GB-owned and engaged in outward FDI (Tees Valley LEP saw 35.3% higher TFP vis-à-vis London, at 10.2%); exporting only (Tees Valley does better than London, although the rest of the north does worse); small plants (those employing 5-14 employees vis-à-vis smaller plants had 40.8% higher TFP in Tees Valley); and the largest plants (Tees Valley does better than London and the other areas in the north are just below the London effect).

Overall, the results in Tables 2.7 and 2.8 show that trade and external investment is associated with higher productivity, after controlling for other (covarying) factors that impact on TFP. It also shows that across all sectors (dominated by services), London has a large 'place' advantage in that plants in London with productivity-enhancing characteristics do even better from their location than do plants located in the north. In manufacturing, there is a much smaller 'place' effect as shown in differences in the relationships (as represented in the regression model coefficients) between the variables and the dependent variable (*ln* TFP).

As stated above, overall (average) productivity can be higher in one area compared to another because of a better 'endowment' of productivity enhancing characteristics (the difference in mean values in Table 2.6) and/or because of a stronger relationship between TFP and these characteristics (shown by comparing the regression coefficients reported in Tables 2.7 and 2.8). It is possible to bring together these two effects (labelled 'endowments' and 'coefficients', with the latter also referred to as 'place' in this study) using the Blinder-Oaxaca approach (Blinder, 1973, Oaxaca, 1973). This approach is explained in more detail in the appendix to this chapter.

Table 2.9 sets out the results from applying the Blinder-Oaxaca approach to the results obtained in Tables 2.7 and 2.8. Starting with the results for all sectors comparing London with the North East of England (column 1 of data). As already stated, Table 2.6 showed that the difference in the means across the variables included in the model ('endowments') were generally not large; in contrast Table 2.7 indicates that the difference in the coefficients (columns 1 and 2) are generally large; this is reflected (column 1 in Table 2.9) in the decomposition of the 0.278 (predicted) difference between London and the North East comprises 0.040 due to 'endowments' and 0.170 due to 'coefficients', with the interaction effect picking up the balance of 0.068. Thus 'coefficients'

Table 2.9: Oaxaca-Blinder decomposition of productivity differences, 2011-2018: various areas

| Dependent variable: *ln* TFP | All sectors | | | Manufacturing | | |
|---|---|---|---|---|---|---|
| | London vs. NE | NE vs. Rest of North | NE LEP vs Tees Valley | London vs. NE | NE vs. Rest of North | NE LEP vs Tees Valley |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| *Overall* | | | | | | |
| First named region | 0.331*** | 0.053*** | 0.040*** | 0.303*** | 0.151*** | 0.118*** |
| Second named region | 0.053*** | 0.061*** | 0.089*** | 0.151*** | 0.134*** | 0.252*** |
| difference | 0.278*** | -0.008*** | -0.049*** | 0.152*** | 0.016 | -0.134*** |
| endowments | 0.040*** | 0.005*** | -0.027*** | -0.005 | 0.037*** | 0.001 |
| coefficients | 0.170*** | -0.018*** | -0.017*** | 0.129*** | -0.018* | -0.118*** |
| interaction | 0.068*** | 0.005*** | -0.005*** | 0.028** | -0.003 | -0.017 |
| | | | | | | |
| *Endowments* | | | | | | |
| MNE | -0.009*** | 0.007*** | -0.004*** | -0.010*** | 0.009*** | -0.008* |
| Trade | 0.005*** | 0.001*** | 0.001 | 0.001 | 0.000 | 0.007 |
| Technology | 0.009*** | -0.000 | -0.015*** | -0.024*** | 0.002** | -0.003 |
| *ln* age | 0.036*** | 0.002*** | -0.010*** | 0.018*** | 0.032*** | -0.026*** |
| Size | 0.005*** | -0.000 | -0.000 | -0.001 | 0.002*** | 0.005 |
| Single-plant enterprise | -0.005*** | -0.003*** | 0.000 | 0.011*** | -0.006*** | 0.015*** |
| Multi-plant enterprise operating in only 1 region | -0.000*** | 0.000 | 0.000 | 0.001** | 0.000 | -0.001 |
| Multi-Region Enterprise | 0.000 | -0.003*** | 0.002*** | 0.000 | -0.003*** | 0.012** |
| R&D | -0.002*** | 0.000** | 0.001** | -0.003* | 0.000 | -0.000 |
| | | | | | | |
| *Coefficients* | | | | | | |
| MNE | -0.084*** | 0.005 | -0.002 | -0.017 | 0.005 | 0.027 |
| Trade | -0.023*** | 0.023*** | 0.022*** | 0.016 | 0.015* | 0.017 |
| Technology | 0.034*** | 0.001 | 0.057*** | -0.007 | 0.003 | 0.068*** |
| *ln* age | -0.127*** | 0.034*** | -0.056*** | -0.245*** | 0.090*** | 0.120** |
| Size | -0.003 | 0.033*** | -0.007 | -0.010 | 0.013 | -0.008 |
| Single-plant enterprise | 0.089*** | -0.044*** | -0.029*** | 0.018 | 0.005 | -0.056** |
| Multi-plant enterprise operating in only 1 region | 0.001*** | 0.001*** | 0.000 | -0.001 | -0.002 | -0.000 |
| Multi-Region Enterprise | -0.090*** | 0.012*** | 0.021*** | -0.008 | 0.006 | 0.052** |
| R&D | -0.020** | -0.048*** | 0.025 | -0.003 | -0.023** | -0.021 |
| Constant | 0.393*** | -0.036** | -0.048* | 0.384*** | -0.130*** | -0.317*** |

| *Interaction* | | | | | | |
|---|---|---|---|---|---|---|
| MNE | -0.007*** | -0.001* | 0.001 | 0.000 | -0.001 | 0.003 |
| Trade | 0.001*** | -0.002*** | 0.001 | -0.009*** | -0.001 | -0.004 |
| Technology | 0.015*** | 0.002*** | -0.001 | 0.040*** | 0.002* | 0.000 |
| *In* age | 0.011*** | -0.000** | -0.002*** | 0.009*** | -0.005*** | 0.006* |
| Size | 0.000 | -0.002*** | -0.000 | -0.021*** | 0.000 | -0.000 |
| Single-plant enterprise | 0.023*** | 0.006*** | -0.002*** | 0.005 | -0.001 | -0.011** |
| Multi-plant enterprise operating in only 1 region | -0.001*** | 0.000*** | 0.000 | 0.000 | 0.000 | -0.000 |
| Multi-Region Enterprise | 0.025*** | 0.002*** | -0.002*** | 0.003 | 0.003 | -0.015** |
| R&D | -0.000** | 0.000** | -0.000 | -0.001 | -0.001 | 0.004 |
| Observations | 354,351 | 436,945 | 73,809 | 111,486 | 30,043 | 5,130 |

effects on their own explain over 61% of London's productivity advantage (and if half of the interaction effect is treated as due to coefficients, then the total 'place' effect is over 73%). Note also, and as explained in the appendix, for presentation purposes several of the regressors used have been aggregated into sub-groups labelled MNE, trade, technology size, and R&D. The full set of disaggregated results that show the individual effects for each regressor are available on request and will be referred to below when relevant.

The values in Table 2.9 (column 1) that break down the 0.040 endowments explanation for the differential show that the most important productivity-enhancing characteristic of plants (explaining most of the endowments component) is that London has younger plants. None of the other characteristics (variables) place an important role.

The 0.170 coefficients advantage of London is dominated by the impact on *ln* TFP differences of the intercept (accounting for 0.393 of the 0.278 differential). Other less important influences, that work against London's advantage, are: the negative effect of plant age is larger in London (−0.127); the larger negative impact on TFP differences of plants belonging to GB-owned firms not engaged in outward FDI (the full set of results available on request makes this clearer as it shows that of the −0.084 MNE coefficients differential shown in column 1 in Table 2.9, −0.084 is due to this particular sub-group of GB-owned plants, with the other ownership components having values that cancel out to 0); and the negative relationship between *ln* TFP and multi-regional enterprises is much stronger in London. Countering the latter is that single-plant enterprises perform better in London compared to the rest of Great Britain (this is enhanced when adding the interaction effect of this variable).

Note, the intercept, which dominates the explanation of the positive coefficients ('locational') advantage that London has, does not contain the impact of the baseline sub-group as the methods used (see footnote 19 in the appendix to this chapter, and especially Jann, 2008, for an explanation) allow these to be 'retrieved' from the underlying model (equation A2.3). Thus, the intercept term in the decomposition is measuring the average productivity difference between London and the North East having controlled for all the other variables included in the model, and thus is a measure of the underlying productivity advantage to London. We interpret this here as the underlying advantage of location (as stated above due to, for example, the spillovers from being located in the vicinity of large concentrations of other firms and more general, 'place effects' attributed to the quality of the infrastructure). Of course, it would be preferable to have time-varying measures of these location impacts, rather than to subsume them into a time-invariant intercept term, but micro-level data is not available here to do this.[9]

The results for manufacturing are also presented in Table 2.9 (column 4);[10] the (weighted) mean difference between productivity in London and the North East was 0.152 in manufacturing, and this is again dominated by the coefficients (spatial) effect (which explains between 85-94% of the overall London advantage, depending on whether

_____

[9] For example, employee data is not readily available to be merged into the plant level data, allowing factors such as the impact on productivity of different levels of human capital or labour market sorting to be assessed. Similarly, data does not exist that shows actual buyer-seller relationships between specific plants, or knowledge diffusion patterns, thus previous studies have had to assume that the presence of other plants in a locality are correlated with potential spillovers, without knowing the actual spatial source of plant interactions.

[10] Results for services are not presented as they are very similar to those for all the sectors covered (given that manufacturing accounts for less than 8% of all plants).

50% of the interaction term is counted as attributable to location effects). As with the results for all sectors, London benefits from having a larger proportion of younger plants in explaining the 'endowments' component of the differential, but there is also the counterbalancing negative effect of 'technology', with −0.027 of the −0.024 effect being specifically linked to low-tech manufacturing being more prevalent in the North East which reduces TFP). Overall, the 'endowments' effect explains practically none of the productivity differential between London and the North East in manufacturing.

In terms of coefficient (spatial) differences, the importance of the intercept, *cet. par.*, is even more important for manufacturing (accounting for 0.384 of the 0.152 advantage to London). The other major influence is that older plants in London have a much larger negative impact on productivity (over twice the negative effect when compared to all sectors – column 1).

Table 2.9 (column 2) indicates that across all sectors average productivity in the North East is little different to that prevailing in the rest of the north (covering the administrative regions of the North West and Yorkshire-Humberside); the productivity difference was −0.008. The major areas of advantage to the North East were all associated with 'coefficients' effects – in trade (the negative effect on productivity of plants that were not engaged in trade was smaller in the North East); younger plants in the North East had a bigger positive impact on productivity; and the very smallest plants had a larger positive impact. Factors that lowered productivity in the North East relative to the rest of the north were: single-enterprises and those involved in R&D had a smaller positive impact on TFP. There was also a negative impact (−0.036) linked to the constant (intercept) term which is picking up other 'place' effects being less beneficial in the North East.

The difference between productivity levels in the North East and the rest of the north in manufacturing was not statistically different from zero, although there was a positive 'endowments' advantage to the North East of 0.037 (principally due to have relatively younger plants), counterbalanced by a negative 'coefficients' effect (−0.018). The 'coefficients' effect is made up of additional benefits attached to the age of plants in operation (younger plants in the North East also have a stronger impact on TFP) counterbalanced principally by a negative intercept term picking up other 'place' effects that are less conducive to productivity in the North East.

Next, column (3) indicates that the lower productivity across all sectors in the NE LEP versus the Tees Valley LEP of −0.049 was due 55% to differences in 'endowments' and 34.7% due to differences in 'coefficients' (the remaining 10% due to the interaction between 'endowments' and 'coefficients'). The most important two factors explaining 'endowments' was technology (mainly due to the NE LEP have a higher proportion of plants in knowledge intensive and low knowledge intensive services, both of which are associated with lower levels of TFP); and plants being on average older in the NE LEP (cf. Table 2.6). Differences due to 'coefficients' associated with technology benefited the NE LEP (adding 0.057 to the predicted productivity difference – principally because low KI services lowered TFP by less in the NE LEP); but working in favour of Tees Valley LEP was the older age of plants having a smaller negative (−0.056), while the impact of the negative intercept term (−0.048) shows that 'place' effects benefited the TVCA.

Lastly, comparing the NE LEP to the Tees Valley LEP in manufacturing, the (predicted) differential in favour of the Tees Valley was −0.134 (or some 136% higher productivity). This was between 88% to 94% due to the 'coefficients' effect (depending on how the interaction terms is treated). Mostly this was due to the large constant (intercept) term

(−0.317), indicating how 'place' effects overwhelmingly benefited the TVCA. Countering this was a 0.068 contribution in favour of the NE LEP associated with technology (medium low- and low-tech manufacturing both had smaller negative effects on TFP in the NE LEP), and older plants in the NE LEP had a lower negative impact (a contribution of 0.12). Plants belonging to multi-region enterprises also lowered TFP by less in the NE LEP (0.052), but this was counted by almost an equally sized opposite effect from single-plant enterprises having a lower positive impact on productivity in the NE LEP (contributing −0.056).

Overall, the North East had significantly lower TFP than London (across all sectors and in manufacturing) that was due most of all to a 'place' effect associated with the underlying advantage of London's location (due to, for example, the spillovers from being located in the vicinity of large concentrations of other firms and more general, 'place effects' attributed to the quality of the infrastructure). The underlying locational advantage of the Tees Valley LEP versus the NE LEP is also the single most important reason for differences in productivity in the manufacturing sector, between the two LEPs (and such general 'place' effects also are important negative impact on the North East versus the rest of the north productivity differential, especially in the manufacturing sector).

A major conclusion to be drawn from this is that while it has been shown that plants that engage in trade and external investment increase average levels of productivity (in all areas, including the NE LEP), increasing such activities (i.e., improving 'endowments') is unlikely to lead to an substantial 'levelling up' of the North East with London (and other regions in the south of England), and will have only a minor impact on moving the NE LEP up the rankings towards the higher TFP enjoyed in the Tees Valley LEP.

## Appendix to Chapter 2

### (i) Plant-level estimates of total factor productivity

Using plant-level panel data covering 1997-2018 from the Annual Business Survey (ABS) conducted by the Office for National Statistics (ONS),[11] and the methodology used by Harris and Moffat (2012, 2015a,b, 2017), estimates of TFP are obtained from estimation of log-linear Cobb-Douglas production functions (including fixed-effects)[12] using system-GMM (Blundell and Bond, 1998) to address the issues of endogeneity inherent to production function estimation.[13] The model is based on the approach used in Ehrl (2013):

$$\tilde{r}_{it} \equiv y_{it} + p_{it} - p_{It}$$

$$= \left(\frac{\sigma-1}{\sigma}\right)(\alpha_i + \alpha_E e_{it} + \alpha_M m_{it} + \alpha_K k_{it} + \alpha_X X_{it} + \alpha_T t) + \frac{1}{\sigma}(r_{It} - p_{It}) + \varepsilon_{it} \quad (A2.1)$$

where $\tilde{r}_{it}$ is revenue, $y_{it}$ is output, $p_{it}$ is price, $e_{it}$ is employment, $m_{it}$ is intermediate inputs,[14] $k_{it}$ is the capital stock in plant $i$ at time $t$. $X_{it}$ is a vector of variables determining TFP (as set out in Table A2.1 below). Since individual firm level prices ($p_{it}$) are not observed, and firm's nominal gross output is therefore deflated by *industry* price ($p_{It}$) to obtain output in constant prices, then if firm prices depart systematically from the average industry price level, estimating the production function results in biased parameter estimates because of the omitted firm price variable; hence, ($r_{It} - p_{It}$) (the natural logarithm of real industry output) is included to address any omitted price bias (Ehrl, 2013, sets out the full model), with $\sigma$ being the elasticity of demand obtained from the firm's demand function (hence, ($\sigma/\sigma - 1$) measures the mark-up or mark-down – see Caselli et. al., 2018 – of price over marginal cost, and thus the extent to which firms exploit market power). $\varepsilon_{it}$ is an error term capturing both demand and production shocks (i.e., $\varepsilon_{it} = \varepsilon_{it}^d + \varepsilon_{it}^s$); and $e_{it}$, $m_{it}$ and $k_{it}$ are treated as endogenous.

---

[11] Note, variables on importing and exporting of goods and services is not available in the ABS until 2011. Hence these variables only are available below when estimating TFP differences across areas using 2011-2018 micro-data.

[12] The inclusion of fixed effects is necessary as empirical evidence using plant- and firm-level panel data (Baily *et al.,* 1992; Bartelsman and Dhrymes, 1998; Haskel, 2000; Martin, 2008) shows that the distribution of productivity is persistent. Such persistence suggests that plants have 'fixed' characteristics (associated with access to different path dependent resources, managerial and other capabilities) that change little through time.

[13] Estimators (such as Olley and Pakes, 1996; Levinsohn and Petrin, 2003) that purport to overcome these endogeneity issues are based on assumptions we believe are more restrictive than those implied by system-GMM (Ackerberg *et al.*, 2015). In particular, these estimators do not allow for fixed effects, which are important (see previous footnote). Del Gatto *et al.* (2011) and Van Beveren (2012) provide useful surveys on these different approaches to measuring TFP. Note, equation (A2.1) is estimated in dynamic form (providing short-run estimates), and these are converted to long-run (equilibrium) values to obtain the long-run relationship between output and factor inputs.

[14] Intermediate inputs cover materials, fuels, semi- and finished-goods and (especially business) services used in the production of new goods and services. We do not estimate a gross valued-added function to avoid the imposition of weak separability (capital and labour are separable from intermediate inputs in production) and thus homogeneity with respect to $\alpha_M$ - see Gandhi *et al.* (2012) for a discussion.

Logged TFP can be calculated as the level of (logged) output that is not attributable to factor inputs– i.e., TFP is due to efficiency levels and technical progress – having corrected for omitted price bias:[15]

$$ln\widehat{TFP}_{it} = \tilde{r}_{it} - \frac{1}{\hat{\sigma}}(r_{It} - p_{It}) - \left(\frac{\hat{\sigma}-1}{\hat{\sigma}}\right)(\hat{\alpha}_E e_{it} + \hat{\alpha}_M m_{it} + \hat{\alpha}_K k_{it}) \qquad \text{(A2.2a)}$$

$$= \left(\frac{\hat{\sigma}-1}{\hat{\sigma}}\right)(\hat{\alpha}_i + \hat{\alpha}_X X_{it} + \hat{\alpha}_T t) + \hat{\varepsilon}_{it} \qquad \text{(A2.2b)}$$

Equation (A2.1) was estimated separately for 66 industry sub-groups (mostly at the two-digit SIC level). All data were weighted to ensure that the samples are representative of the population of GB plants.

The detailed results from estimating equation (A2.1) are available on request. The elasticities of output with respect to the factor inputs that are used to calculate $ln\widehat{TFP}_{it}$ (along with the diagnostic tests associated with each of the equations estimated) are economically sensible and pass tests of the validity of the instruments used (the Hansen test) and tests of second-order autocorrelation. Estimates of $ln$ TFP, calculated for each plant for 1997-2018 using equation (A2.2a), are based on the output-weighted averages of the elasticities,[16] rather than the individual industry estimates of the $\hat{\alpha}_{E,M,K}$. This is necessary because of the need for a multi-lateral index of TFP (see Craig et. al., 1995; and in particular Bartelsman and Wolf, 2018, section 18.3.3, who point to the need to make comparisons across industries using a reference technology).[17]

---

[15] TFP here comprises those factors contained in $X_{it}$ that influence efficiency and technological progress. It also comprises an error term ($\hat{\varepsilon}_{it}^s$), which will pick up any unobserved inputs (e.g., intangibles not captured by the R&D variable, the use of outsourcing, increased quality of labour inputs, etc.), and changes in the level of utilisation of factor inputs. Since the current approach estimates a reduced-form model (equation A2.1) it is not possible to separate $\hat{\varepsilon}_{it}$ into the separate components $\hat{\varepsilon}_{it}^d$ and $\hat{\varepsilon}_{it}^s$.

[16] If in equation (A2.1) the elasticity of $\tilde{r}_{it}$ *wrt* factor inputs is denoted by $\hat{\beta}_{E,M,K}$, where for example $\hat{\beta}_k = \frac{\hat{\sigma}-1}{\hat{\sigma}}\hat{\alpha}_k$, then output elasticities can be recovered from the estimated revenue and demand elasticities using $\hat{\alpha}_k = \frac{\hat{\sigma}}{\hat{\sigma}-1}\hat{\beta}_k$. The results were obtained using this approach.

[17] The output-weighted averages for $\frac{1}{\hat{\sigma}}, \hat{\alpha}_E, \hat{\alpha}_M,$ and $\hat{\alpha}_K$ were 0.005, 0.609, 0.325, and 0.181, respectively. Therefore, in aggregate, plants operated with technology exhibiting increasing returns-to-scale. To insure the TFP index is a proper TFP index, where the measure of input growth ($\hat{\alpha}_E e_{it} + \hat{\alpha}_M m_{it} + \hat{\alpha}_K k_{it}$) satisfies axiom X5 (proportionality) in O'Donnell (2016), a special case of the Färe-Primont (1995) input index is calculated by modifying equation (A2.2a) to become:
$$ln\widehat{TFP}_{it} = \tilde{r}_{it} - \frac{1}{\hat{\sigma}}(r_{It} - p_{It}) - (\frac{1}{\hat{\alpha}_E + \hat{\alpha}_M + \hat{\alpha}_K})\left(\frac{\hat{\sigma}-1}{\hat{\sigma}}\right)(\hat{\alpha}_E e_{it} + \hat{\alpha}_M m_{it} + \hat{\alpha}_K k_{it}) \qquad \text{(A2.2c)}$$

Table A2.1 Definitions of variables used (weighted) all sectors, 1997-2018

| Variable | Definition | Mean | Std. Dev. | Source |
|---|---|---|---|---|
| *ln* gross output | *ln* real gross output (£m 2000 prices) | 5.666 | 1.829 | ABS |
| *ln* Intermediate Inputs | *ln* intermediate inputs (gross output - GVA) (£m 2000 prices) | 4.711 | 2.281 | ABS |
| *ln* Employment | *ln* numbers employed in plant | 1.765 | 1.336 | ABS |
| *ln* Capital | *ln* plant and machinery capital stock (£m 1995 prices) plus real value of plant & machinery hires. Source Harris and Drinkwater (2000, updated) | -3.391 | 3.695 | ABS |
| *ln* Age | *ln* number of years since year of opening | 1.754 | 0.964 | ABS |
| Single-Plant Enterprise | Dummy coded 1 if plant comprises a single-plant enterprise | 0.629 | 0.483 | ABS |
| Multi-Region Enterprise | Dummy coded 1 if plant belongs to an enterprise operating plants in more than one UK region | 0.336 | 0.472 | ABS |
| Outward FDI | Dummy coded 1 if plant belongs to a GB or GB-registered foreign-owned firm involved in outward FDI | 0.132 | 0.339 | AFDI |
| GB outward FDI | Dummy coded 1 if plant belongs to a GB foreign-owned firm involved in outward FDI | 0.108 | 0.310 | AFDI |
| USA | Dummy coded 1 if plant is US-owned | 0.024 | 0.154 | ABS |
| EU | Dummy coded 1 if plant is EU-owned | 0.044 | 0.204 | ABS |
| OFO | Dummy coded 1 if plant is other country foreign-owned | 0.016 | 0.124 | ABS |
| R&D | Dummy coded 1 if plant has positive R&D stock[a] | 0.017 | 0.129 | BERD |
| R&D rest enterprise | Dummy coded 1 for rest of enterprise which owns a plant with positive R&D stock | 0.112 | 0.315 | BERD |
| Subsidy | Dummy coded 1 if plant received a subsidy - see Harris and Moffat (2020) for definitions | 0.180 | 0.384 | ABS |
| Diversity | Percentage of 5-digit industries located in travel-to-work (TTWA) area in which plant is located – Jacobian spillovers | -0.392 | 0.260 | ABS |
| Agglomeration | Percentage of industry output (at 5-digit SIC level) located in TTWA in which plant is located – MAR spillovers | -0.144 | 2.128 | ABS |
| Herfindahl Index | Herfindahl index of industry concentration (3-digit level) | -3.046 | 0.980 | ABS |
| Cities | Dummy coded 1 if plant is located in major city (defined by NUTS3 code)[b] | 0.240 | 0.427 | ABS |
| Unweighted N | | 4,791,959 | | |

[a] R&D stocks are computed using the perpetual inventory method comprising adding together 1/3rd gross stock (assuming length of life of an R&D investment is 5 years) and 2/3rd net stock (assuming 20% straight-line depreciation rate)
[b] These are London, Manchester, Birmingham, Glasgow, Edinburgh, Cardiff, Tyneside, Liverpool, Bristol, Nottingham, Leicester and Coventry. Note in estimated model, separate dummies were entered for each city.

Source: Office for National Statistics (2018a, b, c)

Table A2.2 Definitions of Local Economic Partnerships.

| LEP | LA (District/ Unitary) covered (spatially) | Post-2009 ONS LA (District/ Unitary) Code |
|---|---|---|
| Black Country | Dudley | 00CR |
| Black Country | Sandwell | 00CS |
| Black Country | Walsall | 00CU |
| Black Country | Wolverhampton | 00CW |
| Buckinghamshire Thames Valley | Aylesbury Vale | 11UB |
| Buckinghamshire Thames Valley | Chilten | 11UC |
| Buckinghamshire Thames Valley | South Buckinghamshire | 11UE |
| Buckinghamshire Thames Valley | Wycombe | 11UF |
| Cheshire and Warrington | Cheshire East | 00EQ |
| Cheshire and Warrington | Warrington | 00EU |
| Cheshire and Warrington | Cheshire West and Chester | 00EW |
| Coast to Capital | Croydon | 00AH |
| Coast to Capital | Brighton and Hove | 00ML |
| Coast to Capital | Mole Valley | 43UE |
| Coast to Capital | Reigate and Banstead | 43UF |
| Coast to Capital | Tandridge | 43UK |
| Coast to Capital | Adur | 45UB |
| Coast to Capital | Arun | 45UC |
| Coast to Capital | Chichester | 45UD |
| Coast to Capital | Crawley | 45UE |
| Coast to Capital | Horsham | 45UF |
| Coast to Capital | Mid Sussex | 45UG |
| Coast to Capital | Worthing | 45UH |
| Cornwall and the Isles of Scilly | Cornwall | 00HE |
| Cornwall and the Isles of Scilly | Isles of Scilly | 00HF |
| Coventry and Warwickshire | Coventry | 00CQ |
| Coventry and Warwickshire | North Warwickshire | 44UB |
| Coventry and Warwickshire | Nuneaton and Bedworth | 44UC |
| Coventry and Warwickshire | Rugby | 44UD |
| Coventry and Warwickshire | Stratford-on-Avon | 44UE |
| Coventry and Warwickshire | Warwick | 44UF |
| Cumbria | Allerdale | 16UB |
| Cumbria | Barrow-in-Furness | 16UC |
| Cumbria | Carlisle | 16UD |
| Cumbria | Copeland | 16UE |
| Cumbria | Eden | 16UF |
| Cumbria | South Lakeland | 16UG |
| Derby & Nottingham | Derby | 00FK |
| Derby & Nottingham | Nottingham | 00FY |
| Derby & Nottingham | Amber Valley | 17UB |
| Derby & Nottingham | Bolsover | 17UC |
| Derby & Nottingham | Chesterfield | 17UD |
| Derby & Nottingham | Derbyshire Dales | 17UF |
| Derby & Nottingham | Erewash | 17UG |
| Derby & Nottingham | High Peak | 17UH |
| Derby & Nottingham | North East Derbyshire | 17UJ |
| Derby & Nottingham | South Derbyshire | 17UK |
| Derby & Nottingham | Ashfield | 37UB |
| Derby & Nottingham | Bassetlaw | 37UC |
| Derby & Nottingham | Broxtowe | 37UD |
| Derby & Nottingham | Gedling | 37UE |
| Derby & Nottingham | Mansfield | 37UF |

| | | |
|---|---|---|
| Derby & Nottingham | Newark and Sherwood | 37UG |
| Derby & Nottingham | Rushcliffe | 37UJ |
| Dorset | Bournemouth | 00HN |
| Dorset | Poole | 00HP |
| Dorset | Christchurch | 19UC |
| Dorset | East Dorset | 19UD |
| Dorset | North Dorset | 19UE |
| Dorset | Purbeck | 19UG |
| Dorset | West Dorset | 19UH |
| Dorset | Weymouth and Portland | 19UJ |
| Enterprise M3 | Basingstoke and Deane | 24UB |
| <span style="color:red">Enterprise M3</span> | <span style="color:red">East Hampshire</span> | <span style="color:red">24UC</span> |
| Enterprise M3 | Hart | 24UG |
| Enterprise M3 | Rushmoor | 24UL |
| <span style="color:red">Enterprise M3</span> | <span style="color:red">Test Valley</span> | <span style="color:red">24UN</span> |
| <span style="color:red">Enterprise M3</span> | <span style="color:red">Winchester</span> | <span style="color:red">24UP</span> |
| Enterprise M3 | Guildford | 43UD |
| Enterprise M3 | Surrey Heath | 43UJ |
| Enterprise M3 | Waverley | 43UL |
| Enterprise M3 | Woking | 43UM |
| Gloucestershire | Cheltenham | 23UB |
| Gloucestershire | Cotswold | 23UC |
| Gloucestershire | Forest of Dean | 23UD |
| Gloucestershire | Gloucester | 23UE |
| Gloucestershire | Stroud | 23UF |
| Gloucestershire | Tewkesbury | 23UG |
| Greater Birmingham and Solihull | Birmingham | 00CN |
| Greater Birmingham and Solihull | Solihull | 00CT |
| <span style="color:red">Greater Birmingham and Solihull</span> | <span style="color:red">Cannock Chase</span> | <span style="color:red">41UB</span> |
| Greater Birmingham and Solihull | East Staffordshire | 41UC |
| <span style="color:red">Greater Birmingham and Solihull</span> | <span style="color:red">Lichfield</span> | <span style="color:red">41UD</span> |
| <span style="color:red">Greater Birmingham and Solihull</span> | <span style="color:red">Tamworth</span> | <span style="color:red">41UK</span> |
| <span style="color:red">Greater Birmingham and Solihull</span> | <span style="color:red">Bromsgrove</span> | <span style="color:red">47UB</span> |
| <span style="color:red">Greater Birmingham and Solihull</span> | <span style="color:red">Redditch</span> | <span style="color:red">47UD</span> |
| Greater Birmingham and Solihull | Wyre Forest | 47UG |
| Greater Cambridge & Greater Peterborough | Rutland | 00FP |
| Greater Cambridge & Greater Peterborough | Peterborough | 00JA |
| Greater Cambridge & Greater Peterborough | Cambridge | 12UB |
| Greater Cambridge & Greater Peterborough | East Cambridgeshire | 12UC |
| Greater Cambridge & Greater Peterborough | Fenland | 12UD |
| Greater Cambridge & Greater Peterborough | Huntingdonshire | 12UE |
| Greater Cambridge & Greater Peterborough | South Cambridgeshire | 12UG |
| <span style="color:red">Greater Cambridge & Greater Peterborough</span> | <span style="color:red">Uttlesford</span> | <span style="color:red">22UQ</span> |
| Greater Cambridge & Greater Peterborough | North Hertfordshire | 26UF |
| Greater Cambridge & Greater Peterborough | King's Lynn and West Norfolk | 33UE |
| Greater Manchester | Bolton | 00BL |
| Greater Manchester | Bury | 00BM |
| Greater Manchester | Manchester | 00BN |

| | | |
|---|---|---|
| Greater Manchester | Oldham | 00BP |
| Greater Manchester | Rochdale | 00BQ |
| Greater Manchester | Salford | 00BR |
| Greater Manchester | Stockport | 00BS |
| Greater Manchester | Tameside | 00BT |
| Greater Manchester | Trafford | 00BU |
| Greater Manchester | Wigan | 00BW |
| Heart of the South West | Plymouth | 00HG |
| Heart of the South West | Torbay | 00HH |
| Heart of the South West | East Devon | 18UB |
| Heart of the South West | Exeter | 18UC |
| Heart of the South West | Mid Devon | 18UD |
| Heart of the South West | North Devon | 18UE |
| Heart of the South West | South Hams | 18UG |
| Heart of the South West | Teignbridge | 18UH |
| Heart of the South West | Torridge | 18UK |
| Heart of the South West | West Devon | 18UL |
| Heart of the South West | Mendip | 40UB |
| Heart of the South West | Sedgemoor | 40UC |
| Heart of the South West | South Somerset | 40UD |
| Heart of the South West | Taunton Deane | 40UE |
| Heart of the South West | West Somerset | 40UF |
| Hertfordshire | Broxbourne | 26UB |
| <span style="color:red">Hertfordshire</span> | <span style="color:red">Dacorum</span> | <span style="color:red">26UC</span> |
| Hertfordshire | East Hertfordshire | 26UD |
| Hertfordshire | Hertsmere | 26UE |
| Hertfordshire | St Albans | 26UG |
| Hertfordshire | Stevenage | 26UH |
| Hertfordshire | Three Rivers | 26UJ |
| Hertfordshire | Watford | 26UK |
| Hertfordshire | Welwyn Hatfield | 26UL |
| Humber | Kingston upon Hull, city of | 00FA |
| Humber | East Riding of Yorkshire | 00FB |
| Humber | North East Lincolnshire | 00FC |
| <span style="color:red">Humber</span> | <span style="color:red">North Lincolnshire</span> | <span style="color:red">00FD</span> |
| Lancashire | Blackburn with Darwen | 00EX |
| Lancashire | Blackpool | 00EY |
| Lancashire | Burnley | 30UD |
| Lancashire | Chorley | 30UE |
| Lancashire | Fylde | 30UF |
| Lancashire | Hyndburn | 30UG |
| Lancashire | Lancaster | 30UH |
| Lancashire | Pendle | 30UJ |
| Lancashire | Preston | 30UK |
| Lancashire | Ribble Valley | 30UL |
| Lancashire | Rossendale | 30UM |
| Lancashire | South Ribble | 30UN |
| Lancashire | West Lancashire | 30UP |
| Lancashire | Wyre | 30UQ |
| Leeds City Region | Barnsley | 00CC |
| Leeds City Region | Bradford | 00CX |
| Leeds City Region | Calderdale | 00CY |
| Leeds City Region | Kirklees | 00CZ |
| Leeds City Region | Leeds | 00DA |
| Leeds City Region | Wakefield | 00DB |
| Leeds City Region | York | 00FF |

| | | |
|---|---|---|
| Leeds City Region | Craven | 36UB |
| Leeds City Region | Harrogate | 36UD |
| Leeds City Region | Selby | 36UH |
| Leicester and Leicestershire | Leicester | 00FN |
| Leicester and Leicestershire | Blaby | 31UB |
| Leicester and Leicestershire | Charnwood | 31UC |
| Leicester and Leicestershire | Harborough | 31UD |
| Leicester and Leicestershire | Hinckley and Bosworth | 31UE |
| Leicester and Leicestershire | Melton | 31UG |
| Leicester and Leicestershire | North West Leicestershire | 31UH |
| Leicester and Leicestershire | Oadby and Wigston | 31UJ |
| Lincolnshire | Boston | 32UB |
| Lincolnshire | East Lindsey | 32UC |
| Lincolnshire | Lincoln | 32UD |
| Lincolnshire | North Kesteven | 32UE |
| Lincolnshire | South Holland | 32UF |
| Lincolnshire | South Kesteven | 32UG |
| Lincolnshire | West Lindsey | 32UH |
| Liverpool City Region | Knowsley | 00BX |
| Liverpool City Region | Liverpool | 00BY |
| Liverpool City Region | St. Helens | 00BZ |
| Liverpool City Region | Sefton | 00CA |
| Liverpool City Region | Wirral | 00CB |
| Liverpool City Region | Halton | 00ET |
| London | City of London | 00AA |
| London | Barking and Dagenham | 00AB |
| London | Barnet | 00AC |
| London | Bexley | 00AD |
| London | Brent | 00AE |
| London | Bromley | 00AF |
| London | Camden | 00AG |
| London | Ealing | 00AJ |
| London | Enfield | 00AK |
| London | Greenwich | 00AL |
| London | Hackney | 00AM |
| London | Hammersmith and Fulham | 00AN |
| London | Haringey | 00AP |
| London | Harrow | 00AQ |
| London | Havering | 00AR |
| London | Hillingdon | 00AS |
| London | Hounslow | 00AT |
| London | Islington | 00AU |
| London | Kensington and Chelsea | 00AW |
| London | Kingston upon Thames | 00AX |
| London | Lambeth | 00AY |
| London | Lewisham | 00AZ |
| London | Merton | 00BA |
| London | Newham | 00BB |
| London | Redbridge | 00BC |
| London | Richmond upon Thames | 00BD |
| London | Southwark | 00BE |
| London | Sutton | 00BF |
| London | Tower Hamlets | 00BG |
| London | Waltham Forest | 00BH |
| London | Wandsworth | 00BJ |
| London | Westminster | 00BK |

| | | |
|---|---|---|
| New Anglia | Breckland | 33UB |
| New Anglia | Broadland | 33UC |
| New Anglia | Great Yarmouth | 33UD |
| New Anglia | North Norfolk | 33UF |
| New Anglia | Norwich | 33UG |
| New Anglia | South Norfolk | 33UH |
| New Anglia | Babergh | 42UB |
| New Anglia | Forest Heath | 42UC |
| New Anglia | Ipswich | 42UD |
| New Anglia | Mid Suffolk | 42UE |
| New Anglia | St Edmundsbury | 42UF |
| New Anglia | Suffolk Coastal | 42UG |
| New Anglia | Waveney | 42UH |
| North East | Gateshead | 00CH |
| North East | Newcastle upon Tyne | 00CJ |
| North East | North Tyneside | 00CK |
| North East | South Tyneside | 00CL |
| North East | Sunderland | 00CM |
| North East | County Durham | 00EJ |
| North East | Northumberland | 00EM |
| Northamptonshire | Corby | 34UB |
| Northamptonshire | Daventry | 34UC |
| Northamptonshire | East Northamptonshire | 34UD |
| Northamptonshire | Kettering | 34UE |
| Northamptonshire | Northampton | 34UF |
| Northamptonshire | South Northamptonshire | 34UG |
| Northamptonshire | Wellingborough | 34UH |
| Oxfordshire | Cherwell | 38UB |
| Oxfordshire | Oxford | 38UC |
| Oxfordshire | South Oxfordshire | 38UD |
| Oxfordshire | Vale of White Horse | 38UE |
| Oxfordshire | West Oxfordshire | 38UF |
| Sheffield City Region | Doncaster | 00CE |
| Sheffield City Region | Rotherham | 00CF |
| Sheffield City Region | Sheffield | 00CG |
| Sheffield City Region | Bolsover | 17UC |
| Solent | Portsmouth | 00MR |
| Solent | Southampton | 00MS |
| Solent | Isle of Wight | 00MW |
| Solent | East Hampshire | 24UC |
| Solent | Eastleigh | 24UD |
| Solent | Fareham | 24UE |
| Solent | Gosport | 24UF |
| Solent | Havant | 24UH |
| Solent | New Forest | 24UJ |
| Solent | Test Valley | 24UN |
| Solent | Winchester | 24UP |
| South East Midlands | Luton | 00KA |
| South East Midlands | Bedford | 00KB |
| South East Midlands | Central Bedfordshire | 00KC |
| South East Midlands | Milton Keynes | 00MG |
| South Eastern | Southend-on-Sea | 00KF |
| South Eastern | Thurrock | 00KG |
| South Eastern | Medway | 00LC |
| South Eastern | Eastbourne | 21UC |
| South Eastern | Hastings | 21UD |

| South Eastern | Lewes | 21UF |
|---|---|---|
| South Eastern | Rother | 21UG |
| South Eastern | Wealden | 21UH |
| South Eastern | Basildon | 22UB |
| South Eastern | Braintree | 22UC |
| South Eastern | Brentwood | 22UD |
| South Eastern | Castle Point | 22UE |
| South Eastern | Chelmsford | 22UF |
| South Eastern | Colchester | 22UG |
| South Eastern | Epping Forest | 22UH |
| South Eastern | Harlow | 22UJ |
| South Eastern | Maldon | 22UK |
| South Eastern | Rochford | 22UL |
| South Eastern | Tendring | 22UN |
| South Eastern | Ashford | 29UB |
| South Eastern | Canterbury | 29UC |
| South Eastern | Dartford | 29UD |
| South Eastern | Dover | 29UE |
| South Eastern | Gravesham | 29UG |
| South Eastern | Maidstone | 29UH |
| South Eastern | Sevenoaks | 29UK |
| South Eastern | Shepway | 29UL |
| South Eastern | Swale | 29UM |
| South Eastern | Thanet | 29UN |
| South Eastern | Tonbridge and Malling | 29UP |
| South Eastern | Tunbridge Wells | 29UQ |
| Stoke and Staffordshire | Stoke-on-trent | 00GL |
| Stoke and Staffordshire | Newcastle-under-Lyme | 41UE |
| Stoke and Staffordshire | South Staffordshire | 41UF |
| Stoke and Staffordshire | Stafford | 41UG |
| Stoke and Staffordshire | Staffordshire Moorlands | 41UH |
| Swindon and Wiltshire | Swindon | 00HX |
| Swindon and Wiltshire | Wiltshire | 00HY |
| Tees Valley | Hartlepool | 00EB |
| Tees Valley | Middlesbrough | 00EC |
| Tees Valley | Redcar and Cleveland | 00EE |
| Tees Valley | Stockton-on-Tees | 00EF |
| Tees Valley | Darlington | 00EH |
| Thames Valley Berkshire | Bracknell Forest | 00MA |
| Thames Valley Berkshire | West Berkshire | 00MB |
| Thames Valley Berkshire | Reading | 00MC |
| Thames Valley Berkshire | Slough | 00MD |
| Thames Valley Berkshire | Windsor and Maidenhead | 00ME |
| Thames Valley Berkshire | Wokingham | 00MF |
| The Marches Enterprise Partnership | Herefordshire, County of | 00GA |
| The Marches Enterprise Partnership | Telford and Wrekin | 00GF |
| The Marches Enterprise Partnership | Shropshire | 00GG |
| West of England | Bath and North East Somerset | 00HA |
| West of England | Bristol, City of | 00HB |
| West of England | North Somerset | 00HC |
| West of England | South Gloucestershire | 00HD |
| Worcestershire | Malvern Hills | 47UC |
| Worcestershire | Worcester | 47UE |
| Worcestershire | Wychavon | 47UF |
| York and North Yorkshire | Hambleton | 36UC |
| York and North Yorkshire | Richmondshire | 36UE |

| | | |
|---|---|---|
| York and North Yorkshire | Ryedale | 36UF |
| York and North Yorkshire | Scarborough | 36UG |
| Greater Aberdeen | Aberdeen City | 00QA |
| Greater Aberdeen | Aberdeenshire | 00QB |
| Greater Glasgow | West Dunbartonshire | 00QG |
| Greater Glasgow | East Dunbartonshire | 00QL |
| Greater Glasgow | East Renfrewshire | 00QN |
| Greater Glasgow | Glasgow City | 00QS |
| Greater Glasgow | Inverclyde | 00QU |
| Greater Glasgow | North Ayrshire | 00QY |
| Greater Glasgow | North Lanarkshire | 00QZ |
| Greater Glasgow | Renfrewshire | 00RC |
| Greater Glasgow | South Lanarkshire | 00RF |
| Greater Edinburgh | East Lothian | 00QM |
| Greater Edinburgh | Edinburgh City | 00QP |
| Greater Edinburgh | Midlothian | 00QW |
| Greater Edinburgh | West Lothian | 00RH |
| Greater Cardiff | Bridgend | 00PB |
| Greater Cardiff | Vale of Glamorgan | 00PD |
| Greater Cardiff | Rhondda Cynon Taff | 00PF |
| Greater Cardiff | Merthyr Tydfil | 00PH |
| Greater Cardiff | Caerphilly | 00PK |
| Greater Cardiff | Blaenau Gwent | 00PL |
| Greater Cardiff | Torfaen | 00PM |
| Greater Cardiff | Monmouthshire | 00PP |
| Greater Cardiff | Newport | 00PR |
| Greater Cardiff | Cardiff | 00PT |
| Swansea Bay | Carmarthenshire | 00NU |
| Swansea Bay | Swansea | 00NX |
| Swansea Bay | Neath Port Talbot | 00NZ |

Note, local authorities in red belong to more than one LEP. We have assigned them uniquely to the single LEP (shown in red), based on locations, and other information (e.g., which travel-to-work area they belong to)

Figure A2.1: Definitions of LEPs



1. Black Country
2. Buckinghamshire Thames Valley
3. Cambridgeshire & Peterborough
4. Cheshire & Warrington
5. Coast to Capital
6. Cornwall and Isles of Scilly
7. Coventry and Warwickshire
8. Cumbria
9. Derby, Derbyshire, Nottingham, Nottinghamshire
10. Dorset
11. Enterprise M3
12. GFirst
13. Greater Birmingham & Solihull
14. Greater Lincolnshire
15. Greater Manchester
16. Heart of the South West
17. Hertfordshire
18. Humber
19. Lancashire
20. Leeds City Region
21. Leicester & Leicestershire
22. Liverpool City Region
23. London
24. New Anglia
25. North East
26. Oxfordshire
27. Sheffield City Region
28. Solent
29. South East
30. South East Midlands
31. Stoke-on-Trent and Staffordshire
32. Swindon and Wiltshire
33. Tees Valley
34. Thames Valley Berkshire
35. The Marches
36. West of England
37. Worcestershire
38. York, North Yorkshire and East Riding

Source: lepnetwork.net

Note, the Northamptonshire and South East Midlands LEPs merged in 2016 (hence, area 30 in the above diagram covers both, although separate data is provided in this paper on the two LEPs). The Greater Cambridgeshire and Peterborough LEP was replaced by a business board on 1 April 2018.

With regard to the LEPs that 'overlap' more than one local authority, the following Table A2.2 sets out which overlapping LAs where assigned to each LEP (shown in red).

Table A2.3: (weighted) means of *ln* TFP, and proportion engaged in exporting/MNEs, and share of gross output attributable to MNEs, 2011-18 (LEPs)

| LEP[a] | (Weighted) mean *ln* TFP | | | | Proportion of plants: | | MNE % Share of output |
|---|---|---|---|---|---|---|---|
| | All plants | Single plants | Multi-plant single region | Multi-region firm | exporters | MNEs | |
| Cumbria | -0.049 | -0.076 | -0.117 | 0.036 | 0.201 | 0.209 | 84.1 |
| Greater Manchester | 0.097 | 0.125 | -0.007 | 0.088 | 0.254 | 0.256 | 82.0 |
| Liverpool City Region | 0.069 | 0.096 | -0.092 | 0.069 | 0.229 | 0.297 | 86.2 |
| Cheshire and Warrington | 0.105 | 0.153 | 0.104 | 0.047 | 0.247 | 0.250 | 84.6 |
| Leeds City Region | 0.059 | 0.073 | 0.057 | 0.059 | 0.242 | 0.225 | 80.1 |
| Sheffield City Region | 0.042 | 0.054 | 0.024 | 0.048 | 0.261 | 0.274 | 82.1 |
| Derby, Derbyshire, Nottingham and Nottinghamshire | 0.049 | 0.061 | 0.040 | 0.053 | 0.247 | 0.221 | 82.2 |
| Leicester and Leicestershire | 0.061 | 0.072 | 0.077 | 0.068 | 0.257 | 0.195 | 81.4 |
| Greater Birmingham and Solihull | 0.096 | 0.116 | 0.107 | 0.088 | 0.253 | 0.249 | 87.3 |
| Coventry and Warwickshire | 0.138 | 0.175 | 0.040 | 0.100 | 0.277 | 0.232 | 84.3 |
| The Marches Enterprise Partnership | -0.001 | -0.006 | 0.079 | 0.033 | 0.240 | 0.188 | 85.4 |
| Greater Cambridge & Greater Peterborough | 0.108 | 0.129 | 0.168 | 0.090 | 0.279 | 0.211 | 88.0 |
| Hertfordshire | 0.195 | 0.262 | 0.122 | 0.086 | 0.247 | 0.208 | 87.1 |
| Oxfordshire LEP | 0.113 | 0.141 | 0.116 | 0.084 | 0.285 | 0.215 | 84.2 |
| Solent | 0.046 | 0.060 | -0.010 | 0.054 | 0.239 | 0.245 | 90.7 |
| West of England | 0.092 | 0.116 | -0.021 | 0.082 | 0.254 | 0.246 | 84.6 |
| Cornwall and the Isles of Scilly | -0.121 | -0.167 | -0.120 | 0.027 | 0.195 | 0.195 | 78.2 |
| Tees Valley | 0.080 | 0.117 | 0.091 | 0.059 | 0.260 | 0.319 | 82.4 |
| Lincolnshire | -0.020 | -0.028 | -0.013 | 0.023 | 0.224 | 0.193 | 80.6 |
| South East Midlands | 0.133 | 0.160 | 0.117 | 0.112 | 0.278 | 0.256 | 94.9 |
| Thames Valley Berkshire | 0.243 | 0.325 | 0.237 | 0.113 | 0.294 | 0.258 | 89.7 |
| Buckinghamshire Thames Valley | 0.173 | 0.217 | 0.281 | 0.069 | 0.268 | 0.169 | 85.5 |
| South Eastern | 0.094 | 0.130 | 0.044 | 0.056 | 0.230 | 0.215 | 79.8 |
| Stoke and Staffordshire | 0.044 | 0.034 | 0.171 | 0.081 | 0.231 | 0.219 | 76.6 |
| Coast to Capital | 0.141 | 0.192 | 0.043 | 0.070 | 0.236 | 0.208 | 88.6 |
| New Anglia | 0.011 | 0.009 | 0.027 | 0.043 | 0.249 | 0.194 | 78.8 |
| Black Country | 0.038 | 0.035 | 0.023 | 0.069 | 0.271 | 0.234 | 80.7 |
| Worcestershire | 0.057 | 0.066 | 0.051 | 0.066 | 0.245 | 0.187 | 82.3 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| (The) North Eastern Local Enterprise Partnership | 0.031 | 0.011 | 0.047 | 0.077 | 0.251 | 0.286 | 87.4 |
| York and North Yorkshire | -0.084 | -0.102 | 0.013 | -0.012 | 0.172 | 0.164 | 76.5 |
| Enterprise M3 | 0.185 | 0.246 | 0.170 | 0.078 | 0.273 | 0.210 | 87.5 |
| Pan London | 0.325 | 0.428 | 0.324 | 0.134 | 0.289 | 0.224 | 87.1 |
| Heart of the South West | -0.029 | -0.047 | -0.072 | 0.042 | 0.231 | 0.216 | 81.8 |
| Lancashire | 0.020 | 0.023 | -0.034 | 0.048 | 0.220 | 0.212 | 83.8 |
| Gloucestershire | 0.049 | 0.061 | 0.038 | 0.054 | 0.264 | 0.196 | 86.7 |
| Humber | -0.009 | -0.024 | 0.030 | 0.035 | 0.228 | 0.241 | 74.9 |
| Dorset | -0.012 | -0.019 | 0.098 | 0.024 | 0.221 | 0.199 | 81.3 |
| Swindon and Wiltshire | 0.041 | 0.049 | 0.003 | 0.054 | 0.244 | 0.244 | 82.7 |
| Northamptonshire | 0.100 | 0.112 | 0.033 | 0.106 | 0.251 | 0.229 | 88.3 |
| Greater Aberdeen | 0.332 | 0.414 | 0.042 | 0.119 | 0.225 | 0.161 | 91.0 |
| Gr. Glasgow | 0.111 | 0.138 | -0.108 | 0.110 | 0.198 | 0.200 | 88.5 |
| Gr. Edinburgh | 0.148 | 0.192 | -0.039 | 0.086 | 0.215 | 0.175 | 84.3 |
| South East Wales | 0.046 | 0.054 | -0.051 | 0.063 | 0.237 | 0.288 | 87.3 |
| Swansea Bay | 0.000 | 0.004 | -0.065 | 0.024 | 0.213 | 0.264 | 84.0 |
| Rest of Scotland | -0.029 | -0.036 | -0.099 | 0.061 | 0.164 | 0.146 | 87.1 |
| Rest of Wales | -0.100 | -0.140 | 0.026 | 0.001 | 0.192 | 0.208 | 85.3 |

[a] See Table A2.1

Table A2.4: (weighted) means of *ln* TFP, and proportion engaged in exporting/MNEs, and share of gross output attributable to MNEs, 2011-18 (LAs)

| Local authority (LA) | (Weighted) mean *ln* TFP | | | | Proportion of plants: | | MNE % Share of output |
|---|---|---|---|---|---|---|---|
| | All plants | Single plants | Multi-plant single region | Multi-region firm | exporters | MNEs | |
| 00AA City of London | 0.552 | 0.811 | 0.389 | 0.224 | 0.419 | 0.318 | 77.9 |
| 00AB Barking and Dagenham | 0.149 | 0.151 | 0.087 | 0.172 | 0.214 | 0.275 | 94.3 |
| 00AC Barnet | 0.242 | 0.316 | 0.255 | 0.028 | 0.206 | 0.152 | 75.4 |
| 00AD Bexley | 0.171 | 0.231 | 0.274 | 0.097 | 0.189 | 0.236 | 85.6 |
| 00AE Brent | 0.252 | 0.295 | 0.340 | 0.159 | 0.236 | 0.176 | 80.2 |
| 00AF Bromley | 0.188 | 0.278 | 0.108 | 0.047 | 0.207 | 0.219 | 88.3 |
| 00AG Camden | 0.383 | 0.494 | 0.303 | 0.120 | 0.346 | 0.201 | 85.1 |
| 00AH Croydon | 0.189 | 0.252 | 0.198 | 0.106 | 0.227 | 0.244 | 85.9 |
| 00AJ Ealing | 0.273 | 0.327 | 0.410 | 0.158 | 0.250 | 0.184 | 80.6 |
| 00AK Enfield | 0.208 | 0.252 | 0.329 | 0.136 | 0.202 | 0.210 | 77.6 |
| 00AL Greenwich | 0.253 | 0.396 | 0.211 | 0.064 | 0.179 | 0.211 | 86.7 |
| 00AM Hackney | 0.338 | 0.375 | 0.199 | 0.224 | 0.294 | 0.124 | 76.3 |
| 00AN Hammersmith and Fulham | 0.342 | 0.467 | 0.382 | 0.110 | 0.342 | 0.253 | 90.4 |
| 00AP Haringey | 0.285 | 0.347 | 0.058 | 0.174 | 0.217 | 0.185 | 85.6 |
| 00AQ Harrow | 0.285 | 0.353 | 0.164 | 0.101 | 0.228 | 0.160 | 81.9 |
| 00AR Havering | 0.151 | 0.217 | 0.243 | 0.063 | 0.196 | 0.240 | 68.8 |
| 00AS Hillingdon | 0.299 | 0.277 | 0.466 | 0.342 | 0.268 | 0.365 | 93.3 |
| 00AT Hounslow | 0.330 | 0.446 | 0.299 | 0.147 | 0.307 | 0.266 | 93.8 |
| 00AU Islington | 0.380 | 0.486 | 0.348 | 0.152 | 0.374 | 0.221 | 84.2 |
| 00AW Kensington and Chelsea | 0.306 | 0.462 | 0.321 | 0.056 | 0.356 | 0.238 | 83.0 |
| 00AX Kingston upon Thames | 0.246 | 0.382 | 0.136 | 0.036 | 0.270 | 0.247 | 89.2 |
| 00AY Lambeth | 0.293 | 0.360 | 0.448 | 0.116 | 0.206 | 0.147 | 97.4 |
| 00AZ Lewisham | 0.253 | 0.342 | 0.120 | 0.124 | 0.173 | 0.236 | 83.7 |
| 00BA Merton | 0.268 | 0.383 | 0.152 | 0.088 | 0.272 | 0.215 | 76.6 |
| 00BB Newham | 0.272 | 0.343 | 0.533 | 0.190 | 0.214 | 0.298 | 82.4 |
| 00BC Redbridge | 0.205 | 0.276 | -0.374 | 0.061 | 0.136 | 0.158 | 76.1 |
| 00BD Richmond upon Thames | 0.283 | 0.363 | 0.222 | 0.047 | 0.263 | 0.155 | 93.6 |
| 00BE Southwark | 0.343 | 0.434 | 0.339 | 0.167 | 0.315 | 0.224 | 81.7 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 00BF Sutton | 0.099 | 0.138 | 0.041 | 0.051 | 0.204 | 0.217 | 89.0 |
| 00BG Tower Hamlets | 0.350 | 0.438 | 0.512 | 0.204 | 0.322 | 0.274 | 94.8 |
| 00BH Waltham Forest | 0.237 | 0.306 | 0.137 | 0.107 | 0.183 | 0.177 | 78.7 |
| 00BJ Wandsworth | 0.308 | 0.414 | 0.204 | 0.077 | 0.253 | 0.182 | 76.2 |
| 00BK Westminster | 0.474 | 0.666 | 0.418 | 0.130 | 0.398 | 0.259 | 81.7 |
| 00BL Bolton | 0.068 | 0.086 | 0.014 | 0.071 | 0.228 | 0.230 | 77.7 |
| 00BM Bury | 0.102 | 0.145 | -0.059 | 0.045 | 0.211 | 0.201 | 86.0 |
| 00BN Manchester | 0.172 | 0.226 | 0.075 | 0.138 | 0.291 | 0.297 | 79.7 |
| 00BP Oldham | 0.011 | -0.006 | -0.103 | 0.093 | 0.223 | 0.208 | 85.8 |
| 00BQ Rochdale | 0.075 | 0.096 | 0.091 | 0.060 | 0.258 | 0.233 | 79.9 |
| 00BR Salford | 0.133 | 0.195 | -0.201 | 0.101 | 0.256 | 0.295 | 81.5 |
| 00BS Stockport | 0.090 | 0.122 | -0.096 | 0.067 | 0.235 | 0.214 | 83.1 |
| 00BT Tameside | 0.006 | -0.012 | -0.156 | 0.083 | 0.249 | 0.238 | 88.8 |
| 00BU Trafford | 0.127 | 0.167 | 0.153 | 0.091 | 0.288 | 0.280 | 82.0 |
| 00BW Wigan | 0.009 | 0.032 | 0.020 | -0.001 | 0.216 | 0.256 | 82.0 |
| 00BX Knowsley | 0.115 | 0.165 | -0.169 | 0.110 | 0.251 | 0.323 | 94.4 |
| 00BY Liverpool | 0.093 | 0.134 | -0.090 | 0.081 | 0.236 | 0.324 | 82.5 |
| 00BZ St. Helens | 0.045 | 0.056 | -0.063 | 0.065 | 0.204 | 0.267 | 83.3 |
| 00CA Sefton | 0.051 | 0.086 | -0.096 | 0.036 | 0.227 | 0.273 | 80.2 |
| 00CB Wirral | 0.007 | 0.013 | -0.080 | 0.028 | 0.188 | 0.241 | 85.3 |
| 00CC Barnsley | 0.019 | -0.005 | 0.245 | 0.070 | 0.204 | 0.222 | 83.8 |
| 00CE Doncaster | 0.034 | 0.037 | 0.000 | 0.053 | 0.239 | 0.292 | 81.3 |
| 00CF Rotherham | 0.039 | 0.048 | 0.107 | 0.045 | 0.231 | 0.248 | 85.3 |
| 00CG Sheffield | 0.046 | 0.064 | 0.010 | 0.047 | 0.282 | 0.277 | 81.4 |
| 00CH Gateshead | 0.108 | 0.171 | 0.000 | 0.080 | 0.294 | 0.349 | 79.1 |
| 00CJ Newcastle upon Tyne | 0.049 | -0.005 | 0.276 | 0.100 | 0.274 | 0.320 | 84.5 |
| 00CK North Tyneside | 0.100 | 0.134 | -0.119 | 0.098 | 0.264 | 0.300 | 86.5 |
| 00CL South Tyneside | 0.006 | -0.053 | 0.017 | 0.115 | 0.258 | 0.263 | 83.8 |
| 00CM Sunderland | 0.107 | 0.141 | 0.011 | 0.099 | 0.247 | 0.318 | 94.7 |
| 00CN Birmingham | 0.115 | 0.149 | 0.086 | 0.092 | 0.269 | 0.264 | 82.5 |
| 00CQ Coventry | 0.107 | 0.113 | 0.110 | 0.121 | 0.269 | 0.290 | 93.1 |
| 00CR Dudley | 0.025 | 0.033 | -0.001 | 0.039 | 0.280 | 0.214 | 79.1 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 00CS Sandwell | 0.051 | 0.045 | -0.057 | 0.100 | 0.295 | 0.254 | 83.0 |
| 00CT Solihull | 0.122 | 0.154 | 0.177 | 0.099 | 0.248 | 0.298 | 95.0 |
| 00CU Walsall | 0.040 | 0.024 | 0.089 | 0.089 | 0.255 | 0.223 | 79.6 |
| 00CW Wolverhampton | 0.039 | 0.036 | 0.143 | 0.057 | 0.249 | 0.247 | 80.7 |
| 00CX Bradford | 0.058 | 0.074 | -0.035 | 0.061 | 0.268 | 0.208 | 84.1 |
| 00CY Calderdale | 0.056 | 0.064 | -0.023 | 0.078 | 0.237 | 0.167 | 78.0 |
| 00CZ Kirklees | 0.043 | 0.063 | -0.059 | 0.033 | 0.232 | 0.164 | 78.5 |
| 00DA Leeds | 0.110 | 0.147 | 0.050 | 0.084 | 0.263 | 0.260 | 77.8 |
| 00DB Wakefield | 0.055 | 0.038 | 0.312 | 0.071 | 0.222 | 0.282 | 82.1 |
| 00EB Hartlepool | 0.060 | 0.051 | 0.203 | 0.077 | 0.213 | 0.301 | 85.3 |
| 00EC Middlesbrough | 0.099 | 0.189 | 0.018 | 0.054 | 0.290 | 0.367 | 76.2 |
| 00EE Redcar and Cleveland | 0.103 | 0.162 | 0.298 | 0.046 | 0.249 | 0.305 | 75.7 |
| 00EF Stockton-on-Tees | 0.076 | 0.093 | 0.021 | 0.078 | 0.275 | 0.306 | 85.5 |
| 00EH Darlington | 0.058 | 0.099 | -0.024 | 0.035 | 0.240 | 0.316 | 85.9 |
| 00EJ County Durham | -0.026 | -0.068 | 0.006 | 0.059 | 0.228 | 0.262 | 88.3 |
| 00EM Northumberland | -0.041 | -0.056 | -0.093 | 0.021 | 0.224 | 0.218 | 78.2 |
| 00EQ Cheshire East | 0.111 | 0.160 | 0.151 | 0.018 | 0.234 | 0.199 | 86.1 |
| 00ET Halton | 0.141 | 0.192 | -0.065 | 0.119 | 0.313 | 0.375 | 87.8 |
| 00EU Warrington | 0.131 | 0.166 | 0.004 | 0.119 | 0.273 | 0.340 | 80.6 |
| 00EW Cheshire West & Chester | 0.081 | 0.134 | 0.139 | 0.019 | 0.246 | 0.256 | 85.5 |
| 00EX Blackburn with Darwen | 0.022 | -0.005 | 0.091 | 0.086 | 0.299 | 0.252 | 80.7 |
| 00EY Blackpool | 0.066 | 0.135 | -0.179 | 0.002 | 0.202 | 0.248 | 58.5 |
| 00FA Kingston upon Hull City of | 0.024 | 0.037 | -0.015 | 0.032 | 0.279 | 0.304 | 74.1 |
| 00FB East Riding of Yorkshire | -0.038 | -0.047 | 0.041 | 0.008 | 0.205 | 0.182 | 70.2 |
| 00FC North East Lincolnshire | 0.011 | -0.008 | 0.053 | 0.058 | 0.214 | 0.279 | 85.2 |
| 00FD North Lincolnshire | -0.016 | -0.052 | 0.090 | 0.060 | 0.216 | 0.238 | 73.5 |
| 00FF York | 0.021 | 0.047 | 0.072 | 0.009 | 0.251 | 0.298 | 75.1 |
| 00FK Derby | 0.148 | 0.219 | 0.013 | 0.093 | 0.274 | 0.290 | 69.4 |
| 00FN Leicester | 0.083 | 0.111 | 0.011 | 0.067 | 0.261 | 0.231 | 66.9 |
| 00FP Rutland | -0.010 | -0.011 | -0.053 | 0.041 | 0.221 | 0.145 | 78.7 |
| 00FY Nottingham | 0.083 | 0.089 | 0.088 | 0.096 | 0.304 | 0.317 | 80.6 |
| 00GA Herefordshire County of | -0.030 | -0.037 | 0.018 | 0.017 | 0.227 | 0.169 | 83.5 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 00GF Telford and Wrekin | 0.079 | 0.104 | 0.155 | 0.057 | 0.305 | 0.282 | 85.1 |
| 00GG Shropshire | -0.020 | -0.026 | 0.036 | 0.027 | 0.217 | 0.157 | 82.7 |
| 00GL Stoke-on-Trent | 0.061 | 0.082 | 0.202 | 0.047 | 0.273 | 0.292 | 61.2 |
| 00HA Bath and North East Somerset | 0.042 | 0.078 | -0.084 | 0.001 | 0.243 | 0.193 | 80.4 |
| 00HB Bristol City of | 0.125 | 0.154 | -0.019 | 0.112 | 0.278 | 0.264 | 82.5 |
| 00HC North Somerset | 0.053 | 0.068 | 0.055 | 0.052 | 0.204 | 0.210 | 87.6 |
| 00HD South Gloucestershire | 0.097 | 0.120 | -0.045 | 0.092 | 0.255 | 0.279 | 86.5 |
| 00HE Cornwall | -0.121 | -0.167 | -0.120 | 0.027 | 0.195 | 0.195 | 78.2 |
| 00HF Isles of Scilly | -0.092 | -0.086 | * | 0.027 | * | * | 61.7 |
| 00HG Plymouth | 0.028 | 0.006 | -0.067 | 0.084 | 0.256 | 0.343 | 81.4 |
| 00HH Torbay | -0.049 | -0.083 | -0.142 | 0.041 | 0.194 | 0.245 | 82.3 |
| 00HN Bournemouth | 0.036 | 0.080 | -0.128 | -0.003 | 0.208 | 0.227 | 75.6 |
| 00HP Poole | 0.030 | 0.028 | 0.077 | 0.057 | 0.284 | 0.234 | 83.2 |
| 00HX Swindon | 0.101 | 0.131 | -0.077 | 0.095 | 0.290 | 0.353 | 93.2 |
| 00HY Wiltshire | 0.017 | 0.027 | 0.017 | 0.026 | 0.227 | 0.202 | 64.8 |
| 00JA Peterborough | 0.069 | 0.068 | -0.183 | 0.105 | 0.267 | 0.278 | 88.8 |
| 00KA Luton | 0.154 | 0.202 | -0.364 | 0.136 | 0.341 | 0.330 | 93.0 |
| 00KB Bedford | 0.073 | 0.084 | 0.355 | 0.064 | 0.241 | 0.228 | 87.4 |
| 00KC Central Bedfordshire | 0.062 | 0.067 | 0.138 | 0.081 | 0.242 | 0.168 | 90.8 |
| 00KF Southend-on-Sea | -0.011 | -0.022 | 0.011 | 0.037 | 0.200 | 0.205 | 87.3 |
| 00KG Thurrock | 0.112 | 0.138 | 0.179 | 0.100 | 0.256 | 0.316 | 89.6 |
| 00LC Medway | 0.100 | 0.141 | 0.182 | 0.063 | 0.234 | 0.284 | 81.3 |
| 00MA Bracknell Forest | 0.188 | 0.234 | 0.269 | 0.129 | 0.250 | 0.272 | 95.5 |
| 00MB West Berkshire | 0.197 | 0.244 | 0.180 | 0.127 | 0.302 | 0.231 | 87.6 |
| 00MC Reading | 0.261 | 0.412 | 0.239 | 0.105 | 0.309 | 0.325 | 87.3 |
| 00MD Slough | 0.284 | 0.375 | 0.349 | 0.181 | 0.332 | 0.341 | 77.8 |
| 00ME Windsor and Maidenhead | 0.275 | 0.372 | 0.236 | 0.069 | 0.283 | 0.218 | 94.9 |
| 00MF Wokingham | 0.242 | 0.312 | 0.188 | 0.070 | 0.275 | 0.189 | 92.8 |
| 00MG Milton Keynes | 0.209 | 0.275 | 0.292 | 0.137 | 0.296 | 0.304 | 96.0 |
| 00ML Brighton and Hove | 0.122 | 0.190 | 0.024 | 0.023 | 0.235 | 0.187 | 81.9 |
| 00MR Portsmouth | 0.021 | 0.041 | -0.126 | 0.027 | 0.263 | 0.322 | 88.8 |
| 00MS Southampton | 0.131 | 0.186 | 0.292 | 0.089 | 0.264 | 0.323 | 92.8 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 00MW Isle of Wight | -0.110 | -0.138 | -0.057 | -0.051 | 0.159 | 0.179 | 82.6 |
| 00NA Isle of Anglesey | -0.210 | -0.331 | 0.027 | 0.016 | 0.130 | 0.217 | 84.1 |
| 00NC Gwynedd | -0.114 | -0.137 | -0.071 | -0.040 | 0.168 | 0.186 | 68.2 |
| 00NE Conwy | -0.102 | -0.129 | 0.024 | -0.037 | 0.195 | 0.248 | 80.9 |
| 00NG Denbighshire | -0.057 | -0.075 | -0.038 | -0.001 | 0.205 | 0.222 | 82.9 |
| 00NJ Flintshire | 0.080 | 0.112 | 0.066 | 0.055 | 0.242 | 0.262 | 90.8 |
| 00NL Wrexham | -0.018 | -0.037 | 0.168 | 0.019 | 0.269 | 0.283 | 86.9 |
| 00NN Powys | -0.190 | -0.246 | -0.119 | 0.010 | 0.179 | 0.131 | 76.9 |
| 00NQ Ceredigion | -0.148 | -0.192 | 0.072 | -0.030 | 0.198 | 0.170 | 73.2 |
| 00NS Pembrokeshire | -0.172 | -0.238 | 0.100 | -0.003 | 0.134 | 0.177 | 82.7 |
| 00NU Carmarthenshire | -0.013 | 0.002 | -0.112 | -0.004 | 0.200 | 0.239 | 76.2 |
| 00NX Swansea | 0.006 | 0.009 | 0.006 | 0.023 | 0.222 | 0.284 | 83.6 |
| 00NZ Neath Port Talbot | 0.013 | 0.000 | -0.110 | 0.077 | 0.216 | 0.268 | 89.9 |
| 00PB Bridgend | 0.013 | -0.002 | 0.154 | 0.045 | 0.249 | 0.277 | 92.9 |
| 00PD The Vale of Glamorgan | -0.053 | -0.086 | -0.144 | 0.046 | 0.182 | 0.230 | 93.2 |
| 00PF Rhondda Cynon Taff | 0.042 | 0.046 | 0.019 | 0.061 | 0.212 | 0.292 | 84.6 |
| 00PH Merthyr Tydfil | 0.058 | 0.068 | 0.115 | 0.065 | 0.212 | 0.314 | 89.4 |
| 00PK Caerphilly | 0.046 | 0.063 | -0.147 | 0.064 | 0.203 | 0.267 | 91.1 |
| 00PL Blaenau Gwent | 0.016 | 0.027 | 0.049 | 0.021 | 0.227 | 0.312 | 79.3 |
| 00PM Torfaen | -0.011 | 0.012 | -0.144 | -0.008 | 0.270 | 0.323 | 85.0 |
| 00PP Monmouthshire | 0.005 | 0.025 | -0.254 | 0.007 | 0.243 | 0.199 | 88.9 |
| 00PR Newport | 0.038 | 0.009 | -0.108 | 0.105 | 0.232 | 0.312 | 83.5 |
| 00PT Cardiff | 0.106 | 0.159 | -0.033 | 0.079 | 0.267 | 0.315 | 84.7 |
| 0001 Aberdeen City | 0.359 | 0.492 | 0.048 | 0.123 | 0.285 | 0.238 | 92.2 |
| 0002 Aberdeenshire | 0.305 | 0.350 | 0.035 | 0.108 | 0.163 | 0.081 | 87.4 |
| 0003 Angus | 0.011 | 0.017 | 0.012 | 0.040 | 0.160 | 0.115 | 81.8 |
| 0004 Argyll & Bute | -0.154 | -0.201 | 0.111 | 0.022 | 0.154 | 0.127 | 83.5 |
| 0005 Scottish Borders The | -0.110 | -0.115 | -0.274 | 0.033 | 0.165 | 0.098 | 82.7 |
| 0006 Clackmannanshire | -0.012 | -0.014 | -0.130 | 0.074 | 0.144 | 0.136 | 92.6 |
| 0007 West Dunbartonshire | 0.025 | 0.034 | -0.250 | 0.077 | 0.142 | 0.200 | 92.4 |
| 0008 Dumfries & Galloway | -0.129 | -0.173 | -0.053 | 0.066 | 0.153 | 0.131 | 81.8 |
| 0009 Dundee City | 0.018 | 0.052 | -0.289 | 0.058 | 0.227 | 0.221 | 86.3 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 0010 East Ayrshire | 0.019 | 0.034 | -0.228 | 0.057 | 0.161 | 0.139 | 84.9 |
| 0011 East Dunbartonshire | 0.093 | 0.132 | -0.238 | 0.034 | 0.134 | 0.145 | 91.0 |
| 0012 East Lothian | 0.081 | 0.104 | -0.149 | 0.052 | 0.144 | 0.090 | 79.8 |
| 0013 East Renfrewshire | 0.158 | 0.189 | 0.006 | 0.054 | 0.091 | 0.094 | 87.0 |
| 0014 Edinburgh City of | 0.172 | 0.227 | -0.060 | 0.092 | 0.226 | 0.181 | 84.1 |
| 0015 Falkirk | 0.194 | 0.240 | 0.058 | 0.128 | 0.169 | 0.208 | 92.5 |
| 0016 Fife | -0.012 | -0.009 | -0.132 | 0.050 | 0.164 | 0.148 | 87.8 |
| 0017 Glasgow City | 0.134 | 0.161 | 0.036 | 0.122 | 0.234 | 0.221 | 87.0 |
| 0018 Highland | -0.038 | -0.047 | -0.120 | 0.063 | 0.165 | 0.147 | 86.3 |
| 0019 Inverclyde | 0.127 | 0.179 | -0.296 | 0.121 | 0.184 | 0.205 | 88.1 |
| 0020 Midlothian | 0.109 | 0.136 | 0.137 | 0.046 | 0.197 | 0.148 | 71.1 |
| 0021 Moray | -0.018 | -0.061 | 0.131 | 0.146 | 0.157 | 0.155 | 85.7 |
| 0022 North Ayrshire | -0.028 | -0.046 | -0.107 | 0.087 | 0.160 | 0.174 | 91.9 |
| 0023 North Lanarkshire | 0.114 | 0.126 | -0.093 | 0.141 | 0.188 | 0.220 | 90.6 |
| 0024 Orkney Islands | -0.189 | -0.219 | * | 0.077 | * | * | 79.3 |
| 0025 Perth & Kinross | -0.034 | -0.026 | -0.156 | 0.019 | 0.139 | 0.117 | 88.3 |
| 0026 Renfrewshire | 0.081 | 0.095 | -0.037 | 0.098 | 0.218 | 0.217 | 90.3 |
| 0027 Shetland Islands | -0.166 | -0.197 | -0.201 | 0.181 | 0.146 | 0.084 | 87.5 |
| 0028 South Ayrshire | -0.019 | -0.029 | -0.060 | 0.058 | 0.161 | 0.178 | 91.8 |
| 0029 South Lanarkshire | 0.081 | 0.126 | -0.402 | 0.080 | 0.171 | 0.167 | 85.6 |
| 0030 Stirling | 0.010 | 0.028 | -0.051 | 0.005 | 0.172 | 0.142 | 75.5 |
| 0031 West Lothian | 0.107 | 0.136 | 0.017 | 0.087 | 0.225 | 0.218 | 87.8 |
| 0032 Eilean Siar | -0.026 | -0.049 | 0.062 | 0.087 | 0.215 | 0.146 | 86.2 |
| 11UB Aylesbury Vale | 0.182 | 0.229 | 0.352 | 0.065 | 0.260 | 0.175 | 80.5 |
| 11UC Chiltern | 0.133 | 0.164 | -0.058 | 0.054 | 0.247 | 0.117 | 87.4 |
| 11UE South Bucks | 0.130 | 0.155 | 0.156 | 0.084 | 0.214 | 0.161 | 95.8 |
| 11UF Wycombe | 0.207 | 0.270 | 0.372 | 0.071 | 0.313 | 0.196 | 80.9 |
| 12UB Cambridge | 0.105 | 0.134 | 0.137 | 0.090 | 0.363 | 0.300 | 88.6 |
| 12UC East Cambridgeshire | 0.021 | 0.006 | 0.274 | 0.073 | 0.242 | 0.141 | 85.9 |
| 12UD Fenland | 0.039 | 0.012 | 0.307 | 0.092 | 0.221 | 0.189 | 83.1 |
| 12UE Huntingdonshire | 0.146 | 0.186 | 0.291 | 0.075 | 0.269 | 0.201 | 79.2 |
| 12UG South Cambridgeshire | 0.191 | 0.204 | 0.324 | 0.170 | 0.347 | 0.179 | 82.8 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 16UB Allerdale | -0.116 | -0.167 | -0.109 | 0.028 | 0.161 | 0.182 | 88.6 |
| 16UC Barrow-in-Furness | -0.029 | -0.099 | -0.039 | 0.077 | 0.240 | 0.324 | 94.5 |
| 16UD Carlisle | 0.002 | -0.014 | -0.142 | 0.049 | 0.248 | 0.289 | 84.2 |
| 16UE Copeland | 0.155 | 0.208 | -0.045 | 0.111 | 0.204 | 0.280 | 79.3 |
| 16UF Eden | -0.017 | -0.025 | -0.121 | 0.059 | 0.189 | 0.131 | 68.1 |
| 16UG South Lakeland | -0.151 | -0.165 | -0.133 | -0.068 | 0.182 | 0.132 | 73.5 |
| 17UB Amber Valley | -0.003 | 0.000 | -0.032 | 0.025 | 0.209 | 0.180 | 88.0 |
| 17UC Bolsover | 0.131 | 0.184 | 0.019 | 0.060 | 0.257 | 0.225 | 73.0 |
| 17UD Chesterfield | 0.045 | 0.047 | 0.102 | 0.062 | 0.283 | 0.249 | 80.0 |
| 17UF Derbyshire Dales | -0.177 | -0.193 | -0.099 | -0.082 | 0.214 | 0.114 | 81.3 |
| 17UG Erewash | 0.076 | 0.109 | 0.047 | 0.030 | 0.272 | 0.178 | 76.0 |
| 17UH High Peak | 0.057 | 0.090 | 0.064 | -0.011 | 0.187 | 0.154 | 84.1 |
| 17UJ North East Derbyshire | -0.005 | -0.016 | -0.077 | 0.105 | 0.212 | 0.091 | 75.3 |
| 17UK South Derbyshire | 0.145 | 0.188 | 0.364 | 0.031 | 0.194 | 0.165 | 92.9 |
| 18UB East Devon | -0.096 | -0.107 | -0.222 | -0.005 | 0.218 | 0.173 | 74.9 |
| 18UC Exeter | 0.083 | 0.089 | 0.160 | 0.090 | 0.299 | 0.320 | 79.6 |
| 18UD Mid Devon | 0.009 | 0.013 | 0.038 | 0.033 | 0.211 | 0.148 | 78.1 |
| 18UE North Devon | -0.070 | -0.096 | -0.127 | 0.016 | 0.238 | 0.220 | 81.6 |
| 18UG South Hams | -0.046 | -0.033 | -0.236 | -0.016 | 0.216 | 0.143 | 75.2 |
| 18UH Teignbridge | -0.065 | -0.088 | 0.009 | 0.022 | 0.186 | 0.173 | 75.6 |
| 18UK Torridge | -0.166 | -0.197 | -0.205 | -0.011 | 0.211 | 0.133 | 67.1 |
| 18UL West Devon | -0.254 | -0.297 | -0.107 | -0.067 | 0.154 | 0.128 | 81.8 |
| 19UC Christchurch | -0.019 | -0.078 | 0.228 | 0.105 | 0.234 | 0.222 | 83.4 |
| 19UD East Dorset | -0.018 | -0.024 | 0.155 | 0.031 | 0.211 | 0.121 | 86.8 |
| 19UE North Dorset | 0.018 | 0.025 | 0.015 | 0.036 | 0.205 | 0.143 | 70.9 |
| 19UG Purbeck | -0.075 | -0.090 | 0.039 | -0.014 | 0.205 | 0.191 | 83.1 |
| 19UH West Dorset | -0.098 | -0.144 | 0.186 | 0.008 | 0.178 | 0.177 | 76.9 |
| 19UJ Weymouth and Portland | -0.084 | -0.111 | 0.022 | -0.023 | 0.205 | 0.250 | 88.0 |
| 21UC Eastbourne | 0.048 | 0.077 | 0.233 | 0.014 | 0.234 | 0.271 | 67.7 |
| 21UD Hastings | -0.059 | -0.116 | 0.065 | 0.062 | 0.217 | 0.228 | 87.5 |
| 21UF Lewes | 0.028 | 0.036 | -0.058 | 0.056 | 0.204 | 0.161 | 86.9 |
| 21UG Rother | -0.020 | -0.027 | -0.013 | 0.032 | 0.179 | 0.167 | 82.1 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 21UH Wealden | 0.113 | 0.142 | -0.083 | 0.078 | 0.205 | 0.149 | 72.3 |
| 22UB Basildon | 0.139 | 0.227 | 0.209 | 0.025 | 0.253 | 0.262 | 84.7 |
| 22UC Braintree | 0.087 | 0.130 | -0.010 | 0.024 | 0.246 | 0.174 | 81.9 |
| 22UD Brentwood | 0.274 | 0.361 | 0.144 | 0.137 | 0.192 | 0.198 | 73.1 |
| 22UE Castle Point | 0.038 | 0.058 | -0.066 | 0.024 | 0.124 | 0.125 | 84.8 |
| 22UF Chelmsford | 0.031 | 0.018 | 0.139 | 0.068 | 0.243 | 0.230 | 81.5 |
| 22UG Colchester | 0.091 | 0.137 | -0.076 | 0.053 | 0.236 | 0.235 | 86.1 |
| 22UH Epping Forest | 0.349 | 0.443 | -0.078 | 0.054 | 0.175 | 0.125 | 63.5 |
| 22UJ Harlow | 0.050 | 0.059 | 0.191 | 0.054 | 0.286 | 0.300 | 87.6 |
| 22UK Maldon | 0.033 | 0.051 | -0.180 | 0.029 | 0.162 | 0.079 | 56.8 |
| 22UL Rochford | 0.051 | 0.085 | 0.083 | -0.023 | 0.210 | 0.136 | 74.9 |
| 22UN Tendring | -0.070 | -0.100 | -0.174 | 0.040 | 0.218 | 0.185 | 85.9 |
| 22UQ Uttlesford | 0.140 | 0.177 | 0.011 | 0.070 | 0.275 | 0.185 | 80.7 |
| 23UB Cheltenham | 0.122 | 0.204 | -0.005 | 0.036 | 0.291 | 0.234 | 76.9 |
| 23UC Cotswold | 0.038 | 0.057 | 0.107 | 0.014 | 0.243 | 0.163 | 91.4 |
| 23UD Forest of Dean | -0.018 | -0.033 | 0.212 | 0.080 | 0.208 | 0.107 | 77.3 |
| 23UE Gloucester | 0.042 | 0.031 | 0.023 | 0.072 | 0.269 | 0.303 | 74.9 |
| 23UF Stroud | -0.017 | -0.018 | -0.054 | 0.030 | 0.239 | 0.137 | 86.5 |
| 23UG Tewkesbury | 0.108 | 0.119 | 0.117 | 0.114 | 0.326 | 0.205 | 91.1 |
| 24UB Basingstoke and Deane | 0.103 | 0.124 | 0.212 | 0.089 | 0.287 | 0.263 | 94.1 |
| 24UC East Hampshire | 0.106 | 0.131 | 0.228 | 0.037 | 0.237 | 0.127 | 65.7 |
| 24UD Eastleigh | 0.171 | 0.207 | 0.020 | 0.150 | 0.256 | 0.259 | 89.7 |
| 24UE Fareham | 0.145 | 0.205 | -0.104 | 0.069 | 0.273 | 0.223 | 86.5 |
| 24UF Gosport | 0.029 | 0.055 | -0.211 | 0.034 | 0.188 | 0.261 | 88.1 |
| 24UG Hart | 0.167 | 0.204 | 0.054 | 0.102 | 0.231 | 0.188 | 92.7 |
| 24UH Havant | 0.122 | 0.179 | 0.004 | 0.052 | 0.260 | 0.221 | 96.9 |
| 24UJ New Forest | -0.085 | -0.124 | -0.124 | 0.052 | 0.215 | 0.158 | 84.8 |
| 24UL Rushmoor | 0.140 | 0.189 | 0.306 | 0.086 | 0.313 | 0.307 | 81.9 |
| 24UN Test Valley | 0.139 | 0.183 | 0.091 | 0.077 | 0.293 | 0.212 | 78.5 |
| 24UP Winchester | 0.168 | 0.236 | 0.019 | 0.041 | 0.235 | 0.172 | 76.8 |
| 26UB Broxbourne | 0.142 | 0.170 | 0.175 | 0.118 | 0.251 | 0.249 | 89.2 |
| 26UC Dacorum | 0.139 | 0.174 | -0.113 | 0.101 | 0.216 | 0.206 | 92.8 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 26UD East Hertfordshire | 0.120 | 0.159 | 0.137 | 0.042 | 0.223 | 0.146 | 77.9 |
| 26UE Hertsmere | 0.237 | 0.293 | 0.492 | 0.092 | 0.220 | 0.162 | 93.1 |
| 26UF North Hertfordshire | 0.184 | 0.229 | 0.261 | 0.078 | 0.239 | 0.154 | 97.1 |
| 26UG St. Albans | 0.198 | 0.255 | 0.182 | 0.074 | 0.226 | 0.168 | 82.0 |
| 26UH Stevenage | 0.144 | 0.262 | 0.095 | 0.049 | 0.295 | 0.347 | 89.5 |
| 26UJ Three Rivers | 0.386 | 0.478 | 0.248 | 0.115 | 0.254 | 0.139 | 82.0 |
| 26UK Watford | 0.237 | 0.379 | 0.184 | 0.079 | 0.313 | 0.292 | 79.7 |
| 26UL Welwyn Hatfield | 0.215 | 0.294 | -0.035 | 0.119 | 0.276 | 0.260 | 93.5 |
| 29UB Ashford | 0.099 | 0.140 | 0.161 | 0.059 | 0.244 | 0.247 | 86.3 |
| 29UC Canterbury | 0.061 | 0.085 | 0.289 | 0.028 | 0.246 | 0.227 | 77.5 |
| 29UD Dartford | 0.121 | 0.193 | -0.005 | 0.083 | 0.299 | 0.353 | 86.7 |
| 29UE Dover | 0.002 | -0.011 | -0.184 | 0.071 | 0.201 | 0.203 | 87.9 |
| 29UG Gravesham | 0.148 | 0.206 | -0.149 | 0.058 | 0.169 | 0.187 | 84.2 |
| 29UH Maidstone | 0.113 | 0.172 | 0.080 | 0.038 | 0.243 | 0.225 | 75.1 |
| 29UK Sevenoaks | 0.306 | 0.403 | 0.032 | 0.046 | 0.244 | 0.157 | 61.3 |
| 29UL Shepway | 0.037 | 0.036 | 0.004 | 0.064 | 0.238 | 0.251 | 94.5 |
| 29UM Swale | 0.082 | 0.107 | -0.002 | 0.073 | 0.232 | 0.213 | 80.5 |
| 29UN Thanet | -0.013 | -0.026 | -0.213 | 0.048 | 0.237 | 0.241 | 87.9 |
| 29UP Tonbridge and Malling | 0.221 | 0.291 | 0.174 | 0.101 | 0.254 | 0.202 | 51.6 |
| 29UQ Tunbridge Wells | 0.107 | 0.146 | 0.220 | 0.042 | 0.293 | 0.193 | 78.1 |
| 30UD Burnley | 0.001 | -0.034 | 0.193 | 0.070 | 0.253 | 0.237 | 73.7 |
| 30UE Chorley | 0.055 | 0.090 | -0.155 | 0.022 | 0.189 | 0.171 | 83.4 |
| 30UF Fylde | 0.051 | 0.059 | 0.004 | 0.067 | 0.193 | 0.229 | 88.3 |
| 30UG Hyndburn | 0.029 | 0.027 | -0.079 | 0.074 | 0.226 | 0.204 | 90.7 |
| 30UH Lancaster | -0.041 | -0.049 | -0.024 | -0.003 | 0.205 | 0.232 | 74.1 |
| 30UJ Pendle | -0.008 | 0.003 | -0.260 | 0.044 | 0.256 | 0.170 | 79.8 |
| 30UK Preston | 0.003 | -0.015 | -0.032 | 0.048 | 0.233 | 0.300 | 79.6 |
| 30UL Ribble Valley | 0.055 | 0.080 | -0.089 | 0.019 | 0.171 | 0.128 | 98.0 |
| 30UM Rossendale | 0.029 | 0.025 | 0.092 | 0.075 | 0.268 | 0.124 | 81.3 |
| 30UN South Ribble | 0.061 | 0.048 | -0.067 | 0.145 | 0.213 | 0.171 | 89.5 |
| 30UP West Lancashire | 0.060 | 0.081 | -0.065 | 0.052 | 0.213 | 0.186 | 79.8 |
| 30UQ Wyre | -0.077 | -0.098 | 0.066 | 0.003 | 0.154 | 0.163 | 84.3 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 31UB Blaby | 0.118 | 0.133 | 0.085 | 0.120 | 0.282 | 0.222 | 84.5 |
| 31UC Charnwood | -0.004 | -0.024 | 0.110 | 0.069 | 0.269 | 0.176 | 82.2 |
| 31UD Harborough | 0.020 | 0.020 | 0.130 | 0.053 | 0.207 | 0.140 | 88.7 |
| 31UE Hinckley and Bosworth | 0.042 | 0.064 | -0.049 | 0.018 | 0.230 | 0.149 | 88.5 |
| 31UG Melton | 0.122 | 0.179 | 0.057 | -0.007 | 0.221 | 0.155 | 85.3 |
| 31UH North West Leicestershire | 0.125 | 0.139 | 0.296 | 0.115 | 0.312 | 0.231 | 87.4 |
| 31UJ Oadby and Wigston | -0.039 | -0.048 | 0.020 | 0.012 | 0.238 | 0.180 | 85.7 |
| 32UB Boston | -0.045 | -0.100 | -0.009 | 0.058 | 0.252 | 0.241 | 73.7 |
| 32UC East Lindsey | -0.140 | -0.167 | -0.095 | -0.039 | 0.197 | 0.140 | 76.1 |
| 32UD Lincoln | -0.016 | -0.026 | -0.058 | 0.011 | 0.234 | 0.319 | 83.1 |
| 32UE North Kesteven | 0.020 | -0.010 | 0.015 | 0.124 | 0.205 | 0.165 | 81.5 |
| 32UF South Holland | 0.033 | 0.039 | 0.125 | 0.046 | 0.200 | 0.166 | 85.8 |
| 32UG South Kesteven | 0.030 | 0.051 | 0.004 | 0.017 | 0.259 | 0.190 | 79.1 |
| 32UH West Lindsey | -0.001 | 0.018 | 0.050 | -0.025 | 0.217 | 0.139 | 78.5 |
| 33UB Breckland | -0.055 | -0.100 | 0.034 | 0.057 | 0.237 | 0.194 | 77.6 |
| 33UC Broadland | 0.040 | 0.038 | -0.110 | 0.100 | 0.195 | 0.152 | 85.5 |
| 33UD Great Yarmouth | 0.009 | 0.016 | -0.124 | 0.033 | 0.267 | 0.233 | 58.5 |
| 33UE King's Lynn and West Norfolk | 0.033 | 0.043 | 0.071 | 0.040 | 0.235 | 0.207 | 88.0 |
| 33UF North Norfolk | -0.113 | -0.138 | -0.187 | 0.032 | 0.202 | 0.122 | 75.8 |
| 33UG Norwich | 0.037 | 0.059 | -0.033 | 0.040 | 0.320 | 0.294 | 81.2 |
| 33UH South Norfolk | 0.105 | 0.128 | 0.121 | 0.064 | 0.216 | 0.127 | 63.2 |
| 34UB Corby | 0.059 | -0.001 | 0.252 | 0.145 | 0.353 | 0.328 | 87.0 |
| 34UC Daventry | 0.120 | 0.143 | 0.130 | 0.088 | 0.306 | 0.193 | 94.7 |
| 34UD East Northamptonshire | 0.030 | 0.039 | -0.153 | 0.057 | 0.187 | 0.110 | 87.1 |
| 34UE Kettering | 0.041 | 0.031 | 0.184 | 0.080 | 0.233 | 0.216 | 86.4 |
| 34UF Northampton | 0.119 | 0.159 | -0.071 | 0.098 | 0.243 | 0.318 | 83.1 |
| 34UG South Northamptonshire | 0.172 | 0.170 | 0.002 | 0.236 | 0.230 | 0.112 | 86.7 |
| 34UH Wellingborough | 0.109 | 0.134 | 0.059 | 0.092 | 0.240 | 0.237 | 85.5 |
| 36UB Craven | -0.054 | -0.055 | -0.179 | -0.002 | 0.189 | 0.146 | 82.5 |
| 36UC Hambleton | -0.066 | -0.098 | 0.035 | 0.038 | 0.195 | 0.165 | 67.1 |
| 36UD Harrogate | 0.053 | 0.078 | -0.023 | 0.031 | 0.228 | 0.185 | 77.1 |
| 36UE Richmondshire | -0.045 | -0.032 | -0.187 | -0.041 | 0.113 | 0.182 | 74.7 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 36UF Ryedale | -0.143 | -0.178 | 0.034 | -0.005 | 0.203 | 0.127 | 73.5 |
| 36UG Scarborough | -0.086 | -0.095 | 0.008 | -0.044 | 0.163 | 0.178 | 85.2 |
| 36UH Selby | -0.050 | -0.078 | 0.012 | 0.040 | 0.170 | 0.190 | 86.1 |
| 37UB Ashfield | 0.085 | 0.108 | 0.097 | 0.072 | 0.271 | 0.263 | 80.1 |
| 37UC Bassetlaw | 0.041 | 0.063 | 0.015 | 0.031 | 0.243 | 0.227 | 80.1 |
| 37UD Broxtowe | -0.009 | -0.012 | -0.008 | 0.022 | 0.260 | 0.236 | 93.5 |
| 37UE Gedling | -0.021 | -0.020 | 0.034 | 0.000 | 0.229 | 0.191 | 82.5 |
| 37UF Mansfield | -0.037 | -0.060 | 0.012 | 0.007 | 0.231 | 0.295 | 78.5 |
| 37UG Newark and Sherwood | -0.030 | -0.030 | -0.056 | 0.006 | 0.214 | 0.172 | 86.7 |
| 37UJ Rushcliffe | 0.096 | 0.112 | 0.178 | 0.067 | 0.187 | 0.129 | 88.1 |
| 38UB Cherwell | 0.083 | 0.085 | 0.115 | 0.103 | 0.273 | 0.254 | 84.3 |
| 38UC Oxford | 0.125 | 0.193 | 0.081 | 0.075 | 0.334 | 0.319 | 90.5 |
| 38UD South Oxfordshire | 0.166 | 0.212 | 0.175 | 0.052 | 0.263 | 0.148 | 77.6 |
| 38UE Vale of White Horse | 0.150 | 0.176 | 0.098 | 0.124 | 0.307 | 0.205 | 86.8 |
| 38UF West Oxfordshire | 0.031 | 0.036 | 0.108 | 0.050 | 0.247 | 0.130 | 73.5 |
| 40UB Mendip | -0.040 | -0.034 | -0.157 | -0.001 | 0.211 | 0.147 | 82.9 |
| 40UC Sedgemoor | 0.003 | -0.006 | -0.027 | 0.066 | 0.246 | 0.186 | 84.3 |
| 40UD South Somerset | -0.009 | -0.022 | 0.052 | 0.048 | 0.240 | 0.196 | 87.2 |
| 40UE Taunton Deane | 0.053 | 0.088 | -0.137 | 0.043 | 0.258 | 0.253 | 80.1 |
| 40UF West Somerset | -0.247 | -0.328 | -0.128 | -0.036 | 0.229 | 0.190 | 86.7 |
| 41UB Cannock Chase | 0.033 | 0.001 | 0.092 | 0.097 | 0.249 | 0.257 | 87.8 |
| 41UC East Staffordshire | 0.108 | 0.111 | 0.207 | 0.125 | 0.234 | 0.270 | 91.6 |
| 41UD Lichfield | 0.103 | 0.113 | 0.073 | 0.111 | 0.218 | 0.168 | 85.5 |
| 41UE Newcastle-under-Lyme | 0.035 | 0.011 | 0.356 | 0.091 | 0.257 | 0.220 | 89.0 |
| 41UF South Staffordshire | -0.029 | -0.060 | 0.212 | 0.092 | 0.169 | 0.123 | 80.7 |
| 41UG Stafford | 0.059 | 0.035 | 0.001 | 0.129 | 0.227 | 0.220 | 84.5 |
| 41UH Staffordshire Moorlands | 0.076 | 0.090 | -0.077 | 0.077 | 0.171 | 0.147 | 91.8 |
| 41UK Tamworth | 0.043 | 0.023 | 0.181 | 0.089 | 0.270 | 0.247 | 84.4 |
| 42UB Babergh | 0.015 | 0.016 | 0.079 | 0.029 | 0.259 | 0.168 | 85.5 |
| 42UC Forest Heath | -0.005 | -0.074 | 0.020 | 0.135 | 0.266 | 0.221 | 90.5 |
| 42UD Ipswich | 0.030 | 0.029 | 0.052 | 0.049 | 0.272 | 0.272 | 81.8 |
| 42UE Mid Suffolk | -0.019 | -0.024 | 0.109 | -0.003 | 0.205 | 0.111 | 76.3 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 42UF St. Edmundsbury | -0.008 | -0.027 | 0.075 | 0.031 | 0.289 | 0.220 | 81.4 |
| 42UG Suffolk Coastal | 0.035 | 0.049 | 0.057 | 0.028 | 0.230 | 0.149 | 82.9 |
| 42UH Waveney | 0.028 | 0.061 | 0.009 | -0.004 | 0.224 | 0.174 | 76.1 |
| 43UB Elmbridge | 0.343 | 0.437 | 0.327 | 0.108 | 0.256 | 0.189 | 93.3 |
| 43UC Epsom and Ewell | 0.365 | 0.551 | 0.126 | 0.051 | 0.235 | 0.236 | 54.5 |
| 43UD Guildford | 0.130 | 0.176 | 0.031 | 0.076 | 0.318 | 0.224 | 79.2 |
| 43UE Mole Valley | 0.125 | 0.168 | 0.057 | 0.045 | 0.275 | 0.176 | 94.4 |
| 43UF Reigate and Banstead | 0.271 | 0.350 | 0.273 | 0.103 | 0.265 | 0.200 | 96.4 |
| 43UG Runnymede | 0.356 | 0.440 | 0.302 | 0.180 | 0.313 | 0.247 | 93.6 |
| 43UH Spelthorne | 0.217 | 0.292 | 0.295 | 0.105 | 0.239 | 0.253 | 93.2 |
| 43UJ Surrey Heath | 0.216 | 0.289 | 0.370 | 0.083 | 0.282 | 0.229 | 88.9 |
| 43UK Tandridge | 0.111 | 0.137 | 0.006 | 0.055 | 0.139 | 0.115 | 80.5 |
| 43UL Waverley | 0.136 | 0.184 | 0.138 | 0.006 | 0.252 | 0.138 | 70.6 |
| 43UM Woking | 0.266 | 0.399 | 0.040 | 0.047 | 0.307 | 0.250 | 82.1 |
| 44UB North Warwickshire | 0.141 | 0.116 | 0.077 | 0.231 | 0.247 | 0.219 | 88.3 |
| 44UC Nuneaton and Bedworth | 0.052 | 0.080 | -0.031 | 0.035 | 0.250 | 0.240 | 85.1 |
| 44UD Rugby | 0.186 | 0.238 | 0.308 | 0.103 | 0.257 | 0.223 | 76.3 |
| 44UE Stratford-on-Avon | 0.121 | 0.165 | -0.172 | 0.037 | 0.253 | 0.140 | 93.9 |
| 44UF Warwick | 0.198 | 0.273 | 0.030 | 0.097 | 0.341 | 0.248 | 72.6 |
| 45UB Adur | 0.135 | 0.169 | 0.032 | 0.080 | 0.242 | 0.175 | 80.5 |
| 45UC Arun | -0.006 | -0.013 | -0.058 | 0.049 | 0.182 | 0.176 | 84.0 |
| 45UD Chichester | 0.024 | 0.042 | -0.110 | 0.025 | 0.215 | 0.171 | 74.5 |
| 45UE Crawley | 0.233 | 0.419 | 0.165 | 0.121 | 0.373 | 0.435 | 86.8 |
| 45UF Horsham | 0.150 | 0.189 | 0.157 | 0.072 | 0.244 | 0.163 | 82.2 |
| 45UG Mid Sussex | 0.125 | 0.163 | -0.136 | 0.080 | 0.224 | 0.180 | 90.8 |
| 45UH Worthing | 0.023 | -0.001 | 0.086 | 0.074 | 0.191 | 0.236 | 86.0 |
| 47UB Bromsgrove | 0.072 | 0.106 | 0.185 | -0.005 | 0.158 | 0.153 | 80.2 |
| 47UC Malvern Hills | 0.016 | 0.032 | -0.087 | 0.011 | 0.216 | 0.105 | 80.7 |
| 47UD Redditch | 0.117 | 0.160 | 0.093 | 0.067 | 0.331 | 0.255 | 87.9 |
| 47UE Worcester | 0.012 | -0.017 | 0.146 | 0.062 | 0.278 | 0.294 | 87.9 |
| 47UF Wychavon | 0.112 | 0.130 | 0.058 | 0.095 | 0.235 | 0.150 | 74.8 |
| 47UG Wyre Forest | -0.044 | -0.060 | 0.076 | 0.006 | 0.201 | 0.163 | 77.8 |

Table A2.5: (Weighted) *ln* TFP in North East, 2011-18, by LEP and 2-digit sector

| SIC 92 | TVCA | NE LEP |
|---|---|---|
| {15} Manufacturing of Food Products and Beverages | -0.216 | -0.092 |
| {17} Manufacture of Textiles | * | 0.094 |
| {18} Manufacture of Wearing Apparel | * | * |
| {19} Manufacture of Leather, Leather Products and Footwear | * | * |
| {20} Manufacture of Pulp, Paper and Paper Products | * | -0.123 |
| {21} Manufacture of Pulp, Paper and Paper Products | * | 0.004 |
| {22} Publishing, Printing and Reproduction of Recorded Media | * | 0.160 |
| {24} Manufacture of Chemicals and Chemical Products | 0.323 | 0.194 |
| {25} Manufacture of Rubber and Plastic Products | 0.137 | 0.133 |
| {26} Manufacture of Other Non-Metallic Mineral Products | 0.013 | -0.017 |
| {27} Manufacture of Basic Metals | 0.264 | 0.038 |
| {28} Manufacture of Fabricated Metal Products | 0.290 | 0.153 |
| {29} Manufacture of Machinery and Equipment n.e.c. | 0.477 | 0.166 |
| {30} Manufacture of Office Machinery & Computers | n/a | * |
| 31} Manufacture of Electrical Machinery and Apparatus n.e.c. | * | 0.219 |
| {32} Manufacture of Radio and Telecoms Equipment | * | 0.339 |
| {33} Manufacture of Medical, Precision and Optical Instruments | 0.678 | 0.075 |
| {34} Manufacture of Motor Vehicles, Trailers and Semi-Trailers | * | 0.265 |
| {35} Manufacture of Other Transport Equipment | 0.497 | 0.123 |
| {36} Manufacture of Furniture; Manufacturing n.e.c. | * | 0.094 |
| (37) Recycling | * | * |
| {50} Sale, Maintenance etc of Motor Vehicles; Sale of Fuel | 0.223 | 0.226 |
| {51} Wholesale Trade and Commission Trade, | 0.161 | 0.061 |
| {52} Retail Trade, | -0.130 | -0.117 |
| {55} Hotels and Restaurants | -0.305 | -0.257 |
| {60} Land Transport; Transport Via Pipelines | -0.085 | -0.094 |
| {61} Water Transport | * | * |
| {62} Air Transport | * | 0.117 |
| {63} Supporting and Auxiliary Transport Activities; | 0.384 | 0.446 |
| {64} Post and Courier Activities and Telecommunications | 0.073 | 0.074 |
| {70} Property Development | 0.260 | 0.308 |
| (71) Renting of Machinery & Equipment | 0.229 | 0.191 |
| {72} Computer and Related Activities | 0.403 | 0.096 |
| {73} Research and Development Activities | 0.127 | 0.421 |
| {74} Other Business Activities | 0.331 | 0.291 |
| {90} Sewage and Refuse Disposal, Sanitation and Similar Activities | 0.197 | -0.110 |
| {91} Activities of Membership Organisations n.e.c. | * | -0.503 |
| {92} Recreational, Cultural and Sporting Activities | 0.092 | -0.005 |
| {93} Other Service Activities | * | -0.151 |

* Data supressed to avoid disclosure issue (<10 enterprises)                    Source: ABS dataset

Table A2.6: (weighted) Proportion of plants in top 5% frontier by region, 2011-18: all sectors

| Region | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | Average |
|---|---|---|---|---|---|---|---|---|---|
| London | 0.074 | 0.066 | 0.071 | 0.068 | 0.077 | 0.086 | 0.072 | 0.074 | 0.074 |
| Scotland | 0.053 | 0.053 | 0.054 | 0.055 | 0.048 | 0.046 | 0.042 | 0.044 | 0.049 |
| South East | 0.051 | 0.048 | 0.048 | 0.052 | 0.046 | 0.046 | 0.046 | 0.048 | 0.048 |
| Eastern | 0.043 | 0.039 | 0.048 | 0.045 | 0.045 | 0.042 | 0.051 | 0.046 | 0.045 |
| West Midlands | 0.038 | 0.046 | 0.037 | 0.038 | 0.042 | 0.047 | 0.048 | 0.038 | 0.042 |
| North West | 0.035 | 0.038 | 0.04 | 0.045 | 0.037 | 0.044 | 0.041 | 0.041 | 0.040 |
| Yorkshire Humberside | 0.036 | 0.044 | 0.041 | 0.038 | 0.04 | 0.032 | 0.039 | 0.049 | 0.040 |
| East Midlands | 0.042 | 0.037 | 0.036 | 0.036 | 0.038 | 0.034 | 0.036 | 0.046 | 0.038 |
| North East | 0.032 | 0.049 | 0.041 | 0.03 | 0.043 | 0.041 | 0.033 | 0.029 | 0.037 |
| South West | 0.036 | 0.038 | 0.035 | 0.039 | 0.037 | 0.032 | 0.043 | 0.037 | 0.037 |
| Wales | 0.035 | 0.041 | 0.04 | 0.025 | 0.028 | 0.033 | 0.042 | 0.038 | 0.035 |

Table A2.7: (weighted) Proportion of plants in 90 frontier by selected LEPs, 2011-18: all sectors

| LEP | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | Average |
|---|---|---|---|---|---|---|---|---|---|
| Tees Valley | 0.043 | 0.107 | 0.085 | 0.079 | 0.087 | 0.099 | 0.061 | 0.063 | 0.078 |
| NE LEP | 0.086 | 0.093 | 0.074 | 0.089 | 0.085 | 0.066 | 0.077 | 0.072 | 0.080 |
| Pan London | 0.141 | 0.131 | 0.135 | 0.140 | 0.137 | 0.151 | 0.144 | 0.129 | 0.139 |

Table A2.8: (weighted) Proportion of plants in top 10% frontier* for selected LEPs, 1997-2018: by industry

| 1992 SIC | Tees Valley | NE LEP | Pan London |
|---|---|---|---|
| {15} Manufacturing Of Food Products And Beverages | – | – | 0.140 |
| {17} Manufacture Of Textiles | – | – | 0.224 |
| {18} Manufacture Of Wearing Apparel | – | – | 0.223 |
| {19} Manufacture Of Leather, Leather Products And Footwear Of Any Material | – | – | 0.185 |
| {21} Manufacture Of Pulp, Paper And Paper Products | – | – | 0.110 |
| {22} Publishing, Printing And Reproduction Of Recorded Media | – | – | 0.210 |
| {24} Manufacture Of Chemicals And Chemical Products | 0.221 | – | 0.119 |
| {25} Manufacture Of Rubber And Plastic Products | 0.105 | – | 0.156 |
| {26} Manufacture Of Other Non-Metallic Mineral Products | – | – | 0.163 |
| {27} Manufacture Of Basic Metals | – | 0.105 | 0.238 |
| {28} Manufacture Of Fabricated Metal Products, Except Machinery And Equipment | 0.112 | – | 0.144 |
| {29} Manufacture Of Machinery And Equipment Not Elsewhere Classified | 0.112 | – | 0.126 |
| {31} Manufacture Of Electrical Machinery And Apparatus Not Elsewhere Classified | – | – | 0.119 |
| {32} Manufacture Of Radio, Television And Communication Equipment And Apparatus | – | – | 0.167 |
| {33} Manufacture Of Medical, Precision And Optical Instruments, Watches And Clocks | 0.265 | 0.153 | 0.134 |
| {34} Manufacture Of Motor Vehicles, Trailers And Semi-Trailers | – | – | 0.206 |
| {35} Manufacture Of Other Transport Equipment | – | – | 0.220 |
| {36} Manufacture Of Furniture; Manufacturing Not Elsewhere Classified | – | – | 0.172 |
| {50} Sale, Maintenance etc Of Motor Vehicles And Motorcycles; Retail Sale Of Automotive Fuel | – | – | 0.141 |
| {51} Wholesale Trade And Commission Trade, Except Of Motor Vehicles And Motorcycles | – | – | 0.179 |
| {52} Retail Trade, Except Of Motor Vehicles And Motorcycles; and Repair | – | – | 0.155 |
| {55} Hotels And Restaurants | – | – | 0.117 |
| {60} Land Transport; Transport Via Pipelines | 0.103 | – | 0.128 |
| {61} Water Transport | – | – | 0.168 |
| {62} Air Transport | – | – | 0.188 |
| {63} Supporting And Auxiliary Transport Activities; Activities Of Travel Agencies | – | – | 0.128 |
| {64} Post And Courier Activities And Telecommunications | – | – | 0.151 |
| {70} Property Development | 0.122 | – | 0.160 |
| {72} Computer And Related Activities | – | – | 0.136 |
| {73} Research And Development Activities | – | 0.132 | 0.115 |
| {74} Other Business Activities | – | – | 0.125 |
| {90} Sewage And Refuse Disposal, Sanitation And Similar Activities | – | 0.155 | 0.156 |
| {91} Activities Of Membership Organisations Not Elsewhere Classified | – | – | 0.176 |
| {92} Recreational, Cultural And Sporting Activities | – | – | 0.153 |
| {93} Other Service Activities | – | 0.108 | 0.140 |

* only includes those where proportion is 0.1 or higher

Table A2.9: (weighted) mean *ln* TFP 2011-2018 by region and whether MNE or exporter – all sectors

| Region | All plants | Multi-national company | Exporter |
|---|---|---|---|
| London | 0.322 | 0.274 | 0.422 |
| South East | 0.141 | 0.151 | 0.214 |
| Eastern | 0.096 | 0.144 | 0.175 |
| Scotland | 0.089 | 0.145 | 0.168 |
| West Midlands | 0.072 | 0.129 | 0.150 |
| North West | 0.065 | 0.104 | 0.149 |
| East Midlands | 0.049 | 0.120 | 0.150 |
| North East | 0.044 | 0.097 | 0.109 |
| Yorkshire-Humberside | 0.033 | 0.092 | 0.110 |
| South West | 0.007 | 0.093 | 0.119 |
| Wales | -0.018 | 0.082 | 0.090 |

Table A2.10: (weighted) *ln* TFP by region by trade status, 2011-2018: all sectors

| | export & import | import only | export only | neither export or import |
|---|---|---|---|---|
| North East | 0.103 | -0.063 | 0.177 | 0.047 |
| Yorkshire Humberside | 0.118 | -0.016 | 0.123 | 0.024 |
| North West | 0.140 | 0.000 | 0.226 | 0.056 |
| West Midlands | 0.157 | -0.018 | 0.170 | 0.064 |
| East Midlands | 0.152 | -0.032 | 0.184 | 0.034 |
| South West | 0.106 | -0.061 | 0.212 | -0.013 |
| South East | 0.212 | -0.009 | 0.261 | 0.142 |
| Eastern | 0.174 | -0.005 | 0.222 | 0.090 |
| London | 0.411 | 0.104 | 0.488 | 0.316 |
| Scotland | 0.138 | -0.033 | 0.292 | 0.091 |
| Wales | 0.091 | -0.020 | 0.136 | -0.041 |

*(ii) Oaxaca-Blinder decomposition of productivity differences*

Decomposition of the difference in (weighted) mean *ln* TFP is undertaken using the Oaxaca-Blinder approach. For the two spatial areas being compared (illustrated and labelled here as *L* for London and *rGB* the rest of Great Britain), separate OLS regressions are undertaken:

$$\ln \widehat{TFP}^r = \boldsymbol{x^{r}}'\beta^r + \varepsilon^r \qquad\qquad r = L, rGB \qquad\qquad (A2.3)$$

where $\ln \widehat{TFP}^r$ is predicted total factor productivity for the *i* plants in the area $r$, $\boldsymbol{x^r}$ is a vector of variables measuring plant characteristics and a constant and $\beta^r$ is the associated vector of slope coefficients and an intercept. The difference in the mean of $\ln \widehat{TFP}$ across the two areas can be written as:

$$E\left(\ln \widehat{TFP}^L\right) - E\left(\ln \widehat{TFP}^{rGB}\right) = E(\boldsymbol{x^L})'\beta^L - E(\boldsymbol{x^{rGB}})'\beta^{rGB} \qquad\qquad (A2.4)$$

Rearranging equation (A2.4) gives:

$$E\left(\ln \widehat{TFP}^L\right) - E\left(\ln \widehat{TFP}^{rGB}\right) =$$
$$[E(\boldsymbol{x^L}) - E(\boldsymbol{x^{rGB}})]'\beta^{rGB} + E(\boldsymbol{x^{rGB}})'(\beta^L - \beta^{rGB}) + [E(\boldsymbol{x^L}) - E(\boldsymbol{x^{rGB}})]'(\beta^L - \beta^{rGB})$$
$$(A2.5)$$

The first term (after the equals sign) shows that part of the difference in mean *ln* TFP between London and the rest of Great Britain that is predicted by differences in observed plant characteristics. This is referred to as the 'endowments' component. The second term in equation (A2.5) measures that part of the difference in mean *ln* TFP that is attributable to differences in coefficients. This is the 'unexplained' component which shows what the difference in mean *ln* TFP would be if plants in London had the same characteristics as those in the rest of Great Britain. The third component in equation (A2.5) is an interaction term that allows for the effect of a coincidence of differences in plant characteristics and coefficients across the two areas. In the results presented below, this term was usually small. Estimates of $\beta^r$ are obtained by ordinary least squares estimation of Equation (A2.3) using a sample of plants in region $r$ and $E(\boldsymbol{x^r})$ is estimated by the sample mean of the regressors in group area $r$.

The decomposition shown in equation (3) is formulated from the viewpoint of the second sub-group, the rest of Great Britain, where $\beta^{rGB}$ is used to calculate the endowments effect and $E(\boldsymbol{x^{rGB}})$ is used to calculate the coefficients effect. The difference in means (equation 2) can also be expressed from London's viewpoint:

$$E\left(\ln \widehat{TFP}^L\right) - E\left(\ln \widehat{TFP}^{rGB}\right) =$$
$$[E(\boldsymbol{x^L}) - E(\boldsymbol{x^{rGB}})]'\beta^L + E(\boldsymbol{x^L})'(\beta^L - \beta^{rGB}) + [E(\boldsymbol{x^L}) - E(\boldsymbol{x^{rGB}})]'(\beta^L - \beta^{rGB}) \qquad (A2.6)$$

In terms of which might be preferred, the results obtained in this study were generally very similar when either equation A2.5 or A2.6 was used.

The 'endowments, 'coefficients' and 'interaction' term can be decomposed to show the contribution from individual regressors. In what is presented below, we chose to aggregate some regressors into sub-groups; hence 'MNE' (covering USA-, EU- and other foreign-owned, GB outward FDI, and GB-owned plants belonging to enterprises not engaged in outward FDI); 'trade' (aggregating exporting, importing, and plants not involved in trade); technology (bringing together the impact of belonging to different

technology sub-groups); size of plants; and R&D (bringing together plants involved in R&D and those not).[18] It was then possible to disaggregate the overall 'endowments', 'coefficients' and the 'interaction' term to see what are the major factors driving average productivity differences between regions and LEPs.

---

[18] Note, the choice of the 'baseline' sub-group when estimating equation A2.3 (here non-MNE GB-owned, not engaged in trade, high-tech manufacturing, <5 employees, single-plant enterprises, and zero R&D stock plants) will generally impact on the results produced. To avoid this problem, the coefficients of the estimated dummy variables are (centred) modified by adding or subtracting a constant from each estimated coefficient where this constant is the mean of the estimated coefficients. Jann (2008) explains how the procedure is applied in a Stata setting. The results produced below when decomposing the overall productivity differential show the separate contribution of each member of the 'baseline' (i.e., they are not subsumed into the intercept term in the model as they are in the initial estimation of equation A2.3); this is discussed and explained in the main text below.

*[this page is blank to allow double-sided printing* 🌲 *Save Paper]*

# 3. Proportion of Plants with Multinational Status and/or Engaged in Trade

Section 2 showed that generally plants engaged in exporting and/or are part of a multinational enterprise (MNE) have on average relatively higher total factor productivity (TFP). In this section, data from the ONS's Annual Business Survey is used to provide further information on the extent to which plants operating in the North East were exporters, importers and/or belonged to MNEs.

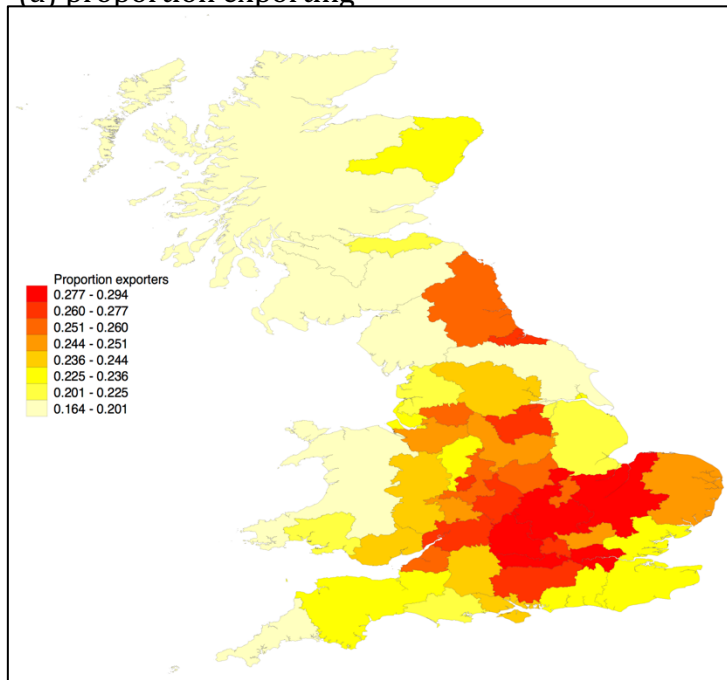Figure 3.1: (Weighted) Proportion of plants involved in trade/external investment, 2011-18, selected regions
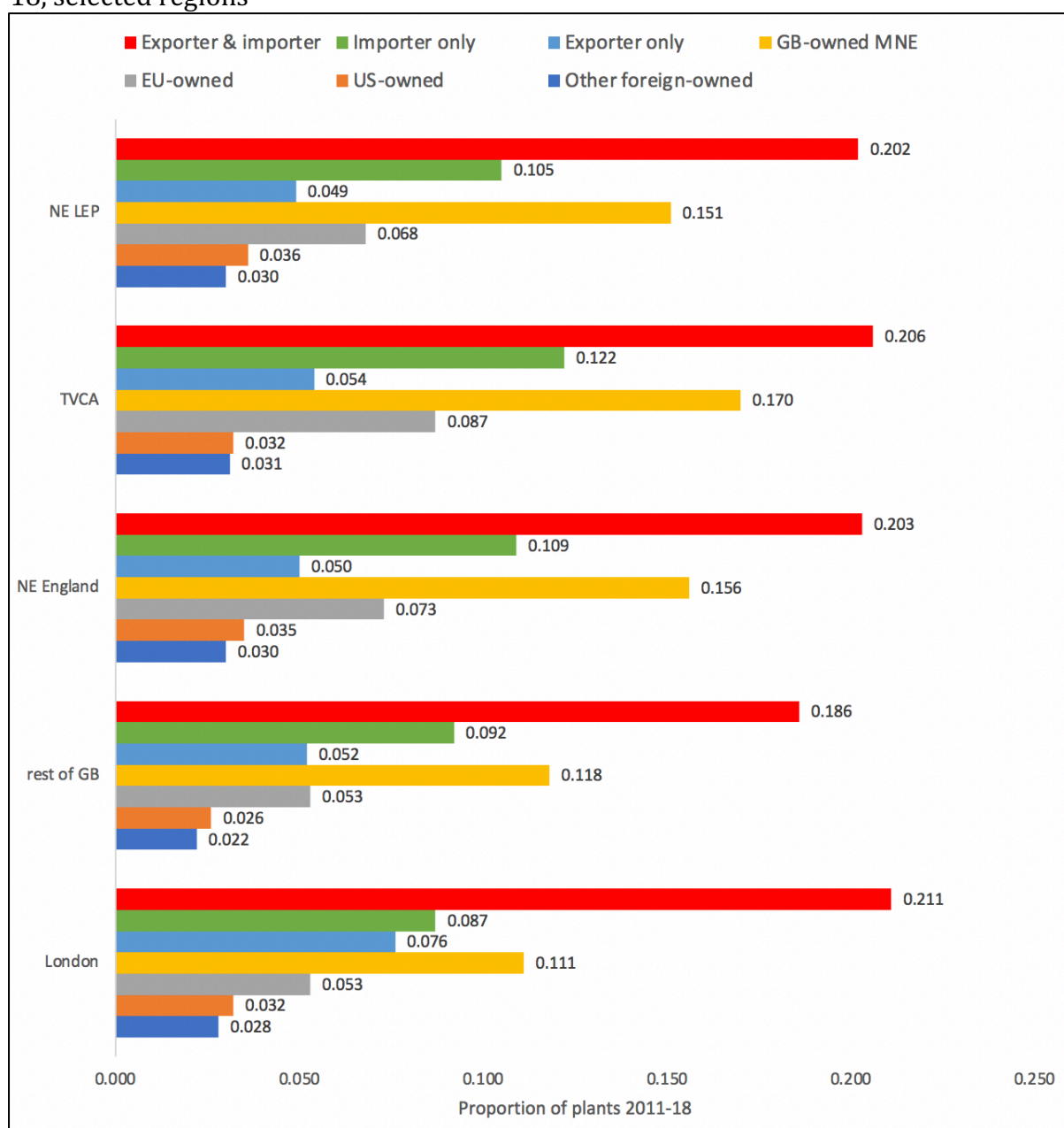


Source: calculations based on ABS plant-level data

61

Figure 3.2: (Weighted) Proportion of plants involved in exporting or belonged to MNE, 2011-18, LEPs and local authorities (source: Tables A2.3 and A2.4)

(a) proportion exporting

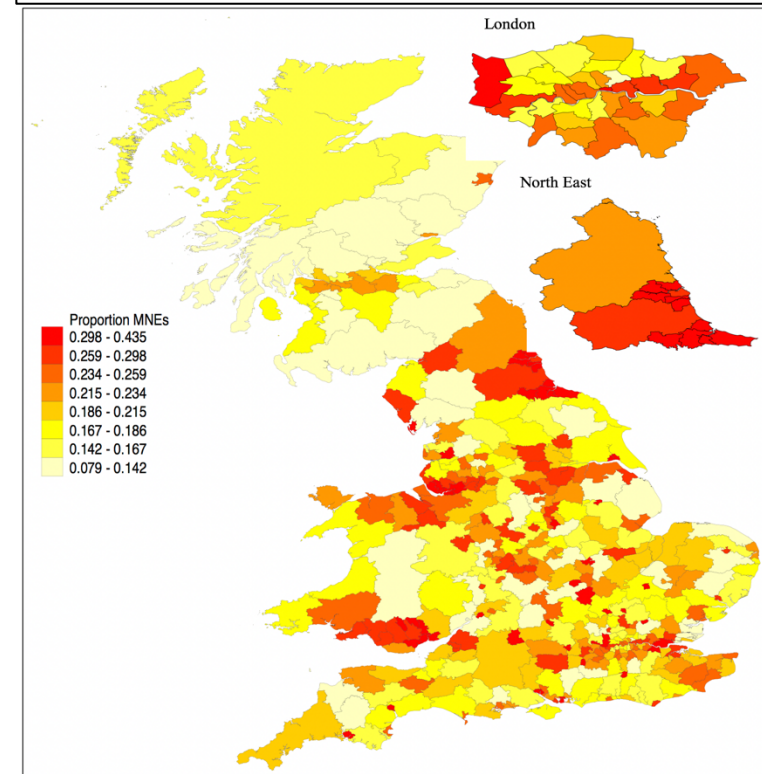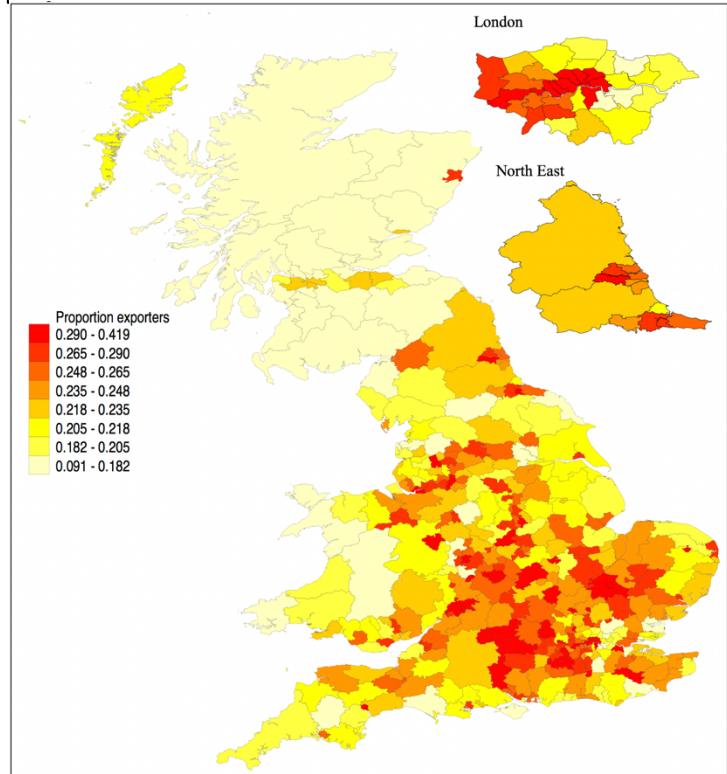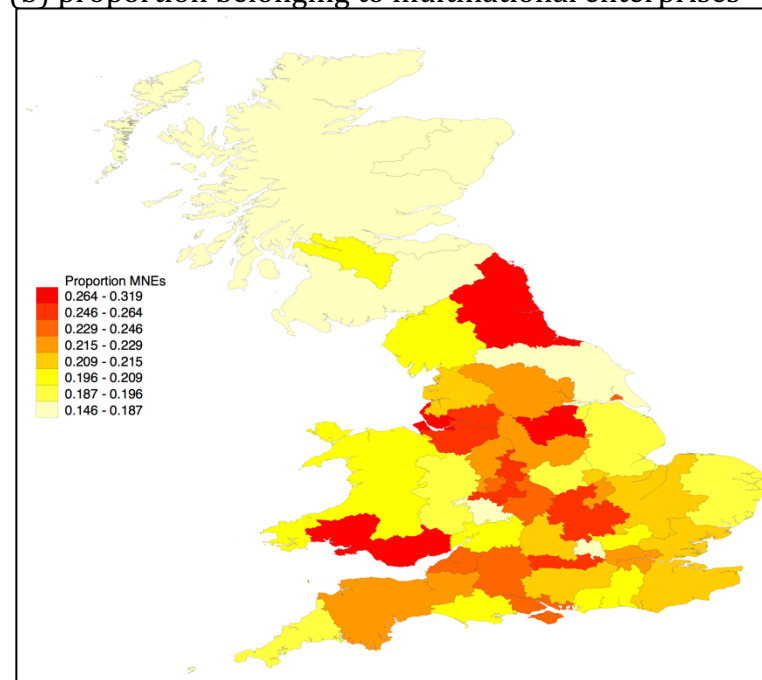(b) proportion belonging to multinational enterprises

Figure 3.1 presents information on the proportion of plants in the North East and its two LEPs that were engaged in trade and external investment. The propensity to export was similar across Great Britain, with around 25% of plants engaged in exporting, although London had a slightly higher propensity at nearly 29%. A higher proportion of plant belonged to MNEs the North East compared to the rest of Great Britain (nearly 33% compared to 24.5%, respectively), with Tees Valley highest at just over 35%. This higher MNE presence extended to all sub-groups (foreign-ownership and especially plants belonging to GB-owned enterprises that operated overseas subsidiaries). In summary, engagement in trade and external investment is relatively high in the North East of England.

Table 3.1: (weighted) Proportion of plants exporting or belonging to MNEs, 2011-18, in North East (and leading local authority)

| | Exporters | Rank | MNEs | Rank |
|---|---|---|---|---|
| City of London | 0.419 | 1 | 0.318 | 25 |
| Crawley | 0.373 | 4 | 0.435 | 1 |
| Gateshead | 0.294 | 42 | 0.349 | 7 |
| Middlesbrough | 0.290 | 48 | 0.367 | 3 |
| Stockton-on-Tees | 0.275 | 68 | 0.306 | 36 |
| Newcastle upon Tyne | 0.274 | 70 | 0.320 | 22 |
| North Tyneside | 0.264 | 97 | 0.300 | 44 |
| South Tyneside | 0.258 | 110 | 0.263 | 88 |
| Redcar and Cleveland | 0.249 | 136 | 0.305 | 37 |
| Sunderland | 0.247 | 145 | 0.318 | 26 |
| Darlington | 0.240 | 167 | 0.316 | 30 |
| County Durham | 0.228 | 213 | 0.262 | 91 |
| Northumberland | 0.224 | 227 | 0.218 | 184 |
| Hartlepool | 0.213 | 261 | 0.301 | 41 |

Source: Tables A2.3 and A2.4

Information at a more disaggregated spatial level is provided in Figure 3.2. In terms of exporting, out of 39 English LEPs (and the 46 areas represented), Tees Valley was ranked 12th and the NE LEP ranked 18th while, in terms of the proportion of plants belonging to NMEs, Tees Valley was ranked 1st and the NE LEP 4th. At local authority level, Table 3.1 shows that out of 378 municipalities Gateshead was ranked 42nd for the proportion of plants exporting (0.294 or 29.4%), while Hartlepool was ranked 261st with 21.3% of plants exporting. Middlesbrough was ranked 3rd in terms of the proportion of plants belonging to MNEs and Northumberland was ranked 184th (the latter is in the top half of the rankings by local authorities).

These aggregate figures, covering all the market-based sectors included in the ABS survey, conceal significant differences across manufacturing and services. Table 3.2 provides this detail for the regions of Great Britain. In terms of exporting (covering those that engage in both exporting and importing or just exporting), this is generally higher in manufacturing (especially high-tech and medium hi-tech where generally over 65% of

Table 3.2: (Weighted) Proportion of plants involved in exporting (goods and services) or belonging to multinational enterprises, 2011-18, by region and technology[a]

| | North East | Yorkshire Humberside | North West | West Midlands | East Midlands | South West | South East | Eastern | London | Scotland | Wales |
|---|---|---|---|---|---|---|---|---|---|---|---|
| *Exporting* | | | | | | | | | | | |
| Hi-tech manufacturing | 0.647[7th] | 0.655 | 0.595 | 0.645 | 0.693 | 0.687 | 0.731 | 0.745 | 0.580 | 0.624 | 0.666 |
| Med-hi-tech manufacturing | 0.662[3rd] | 0.651 | 0.633 | 0.667 | 0.644 | 0.665 | 0.636 | 0.633 | 0.519 | 0.590 | 0.639 |
| Med-low-tech manufacturing | 0.443[5th] | 0.443 | 0.450 | 0.494 | 0.434 | 0.434 | 0.397 | 0.407 | 0.312 | 0.359 | 0.444 |
| Low-tech manufacturing | 0.338[11th] | 0.389 | 0.382 | 0.360 | 0.432 | 0.395 | 0.378 | 0.408 | 0.443 | 0.391 | 0.397 |
| Hi-tech KI services | 0.430[1st] | 0.324 | 0.313 | 0.314 | 0.341 | 0.333 | 0.348 | 0.328 | 0.353 | 0.307 | 0.370 |
| KI services | 0.217[5th] | 0.200 | 0.206 | 0.208 | 0.202 | 0.235 | 0.251 | 0.241 | 0.346 | 0.188 | 0.171 |
| Low KI services | 0.227[4th] | 0.211 | 0.218 | 0.229 | 0.215 | 0.209 | 0.236 | 0.224 | 0.255 | 0.163 | 0.187 |
| Other low KI services | 0.208[2nd] | 0.165 | 0.173 | 0.175 | 0.164 | 0.171 | 0.187 | 0.188 | 0.245 | 0.135 | 0.178 |
| *MNE* | | | | | | | | | | | |
| Hi-tech manufacturing | 0.360[3rd] | 0.281 | 0.312 | 0.288 | 0.284 | 0.374 | 0.357 | 0.297 | 0.297 | 0.354 | 0.364 |
| Med-hi-tech manufacturing | 0.447[1st] | 0.276 | 0.306 | 0.280 | 0.205 | 0.287 | 0.277 | 0.235 | 0.288 | 0.288 | 0.360 |
| Med-low-tech manufacturing | 0.234[2nd] | 0.186 | 0.213 | 0.171 | 0.214 | 0.192 | 0.189 | 0.171 | 0.207 | 0.197 | 0.302 |
| Low-tech manufacturing | 0.153[3rd] | 0.138 | 0.142 | 0.105 | 0.130 | 0.122 | 0.110 | 0.124 | 0.153 | 0.172 | 0.176 |
| Hi-tech KI services | 0.335[1st] | 0.201 | 0.245 | 0.191 | 0.190 | 0.169 | 0.156 | 0.174 | 0.145 | 0.155 | 0.265 |
| KI services | 0.094[1st] | 0.075 | 0.083 | 0.064 | 0.060 | 0.080 | 0.068 | 0.064 | 0.094 | 0.057 | 0.088 |
| Low KI services | 0.316[1st] | 0.257 | 0.276 | 0.262 | 0.242 | 0.251 | 0.273 | 0.241 | 0.269 | 0.188 | 0.269 |
| Other low KI services | 0.396[1st] | 0.286 | 0.296 | 0.247 | 0.208 | 0.196 | 0.188 | 0.212 | 0.309 | 0.193 | 0.262 |

[a] Industries allocated to technology groups are set out in appendix (Table A.1)

Source: ABS dataset

Table 3.3: (Weighted) Proportion of plants involved in exporting (goods and services) or belonging to multinational enterprises in North East, 2011-18, by LEP and technology[a]

|  | North East | NE LEP | Tees Valley LEP |
|---|---|---|---|
| *Exporting* | | | |
| Hi-tech manufacturing | 0.647 | 0.631 | 0.707 |
| Med-hi-tech manufacturing | 0.662 | 0.653 | 0.687 |
| Med-low-tech manufacturing | 0.443 | 0.453 | 0.413 |
| Low-tech manufacturing | 0.338 | 0.360 | 0.256 |
| Hi-tech KI services | 0.430 | 0.427 | 0.439 |
| KI services | 0.217 | 0.232 | 0.188 |
| Low KI services | 0.227 | 0.220 | 0.248 |
| Other low KI services | 0.208 | 0.203 | 0.225 |
| | | | |
| *MNE* | | | |
| Hi-tech manufacturing | 0.360 | 0.328 | 0.481 |
| Med-hi-tech manufacturing | 0.447 | 0.428 | 0.500 |
| Med-low-tech manufacturing | 0.234 | 0.232 | 0.242 |
| Low-tech manufacturing | 0.153 | 0.145 | 0.179 |
| Hi-tech KI services | 0.335 | 0.316 | 0.397 |
| KI services | 0.094 | 0.089 | 0.103 |
| Low KI services | 0.316 | 0.305 | 0.348 |
| Other low KI services | 0.396 | 0.378 | 0.450 |

[a] Industries allocated to technology groups are set out in appendix (Table A.1)  Source: ABS dataset

plants export) and relatively low (on average around three times lower) in most services. Compared to other regions, the North East has a relatively high proportion of plants engaged in exporting in the service sector (the region is ranked from 1st to 5th) as well as in medium hi-tech manufacturing (which includes chemicals and motor vehicles), but less so in high-tech manufacturing (which includes pharmaceuticals, office machinery, communications equipment, and precision instruments). In terms of belonging to MNEs, differences across sectors are less apparent compared to exporting, with the North East ranked in the top three regions (most often 1st) across all sectors.

Table 3.3 breaks-down the data for the North East presented in Table 3.2 for the two LEPs in the region. The patterns across sectors for both exporting and belonging to MNEs is broadly similar in both LEPs (the correlation between the two LEPs for both exporting and MNE status is 0.97). However, there are some important differences, with TVCA having more plants exporting in especially the high- and medium high-tech manufacturing sectors; and overall greater proportions of plants belonging to MNEs (especially in high- and medium high-tech manufacturing, hi-tech KI services, and other low KI services).

Lastly, Table 3.4 provides information on the proportion of plants exporting and belonging to MNEs at two-digit industry level. To comply with ONS disclosure rules, a number of data cells have had to be supressed as the statistic was calculated using fewer

Table 3.4: (Weighted) Proportion of plants involved in exporting (goods and services) or belonging to multinational enterprises in North East, 2011-18, by LEP and 2-digit sector

| SIC 92 | TVCA | | NE LEP | |
|---|---|---|---|---|
| | exporting | MNE | exporting | MNE |
| {15} Manufacturing of Food Products and Beverages | 0.159 | 0.078 | 0.303 | 0.144 |
| {17} Manufacture of Textiles | * | * | 0.470 | * |
| {18} Manufacture of Wearing Apparel | * | * | * | * |
| {19} Manufacture of Leather, Leather Products and Footwear | * | * | * | * |
| {20} Manufacture of Pulp, Paper and Paper Products | * | * | 0.223 | * |
| {21} Manufacture of Pulp, Paper and Paper Products | * | * | 0.628 | 0.386 |
| {22} Publishing, Printing and Reproduction of Recorded Media | * | * | 0.306 | 0.152 |
| {24} Manufacture of Chemicals and Chemical Products | 0.805 | 0.643 | 0.776 | 0.577 |
| {25} Manufacture of Rubber and Plastic Products | 0.519 | * | 0.656 | 0.279 |
| {26} Manufacture of Other Non-Metallic Mineral Products | 0.557 | 0.649 | 0.510 | 0.535 |
| {27} Manufacture of Basic Metals | 0.711 | * | 0.612 | 0.264 |
| {28} Manufacture of Fabricated Metal Products | 0.335 | 0.144 | 0.361 | 0.145 |
| {29} Manufacture of Machinery and Equipment n.e.c. | 0.583 | 0.417 | 0.616 | 0.353 |
| {30} Manufacture of Office Machinery & Computers | 0 | 0 | * | * |
| 31} Manufacture of Electrical Machinery and Apparatus n.e.c. | * | * | 0.738 | 0.361 |
| {32} Manufacture of Radio and Telecoms Equipment | * | * | 0.580 | * |
| {33} Manufacture of Medical, Precision and Optical Instruments | 0.734 | * | 0.614 | 0.271 |
| {34} Manufacture of Motor Vehicles, Trailers and Semi-Trailers | * | * | 0.602 | 0.583 |
| {35} Manufacture of Other Transport Equipment | 0.740 | * | 0.534 | 0.427 |
| {36} Manufacture of Furniture; Manufacturing n.e.c. | * | * | 0.345 | 0.067 |
| (37) Recycling | * | * | * | * |
| {50} Sale, Maintenance etc of Motor Vehicles; Sale of Fuel | 0.129 | 0.227 | 0.151 | 0.215 |
| {51} Wholesale Trade and Commission Trade, | 0.564 | 0.458 | 0.503 | 0.444 |
| {52} Retail Trade, | 0.283 | 0.371 | 0.286 | 0.333 |
| {55} Hotels and Restaurants | 0.062 | 0.269 | 0.068 | 0.240 |
| {60} Land Transport; Transport Via Pipelines | 0.201 | 0.313 | 0.086 | 0.114 |
| {61} Water Transport | * | * | * | * |
| {62} Air Transport | * | * | 0.512 | 0.751 |
| {63} Supporting and Auxiliary Transport Activities; | 0.245 | 0.502 | 0.263 | 0.466 |
| {64} Post and Courier Activities and Telecommunications | 0.560 | 0.577 | 0.522 | 0.533 |
| {70} Property Development | 0.088 | 0.196 | 0.057 | 0.181 |
| (71) Renting of Machinery & Equipment | 0.389 | 0.520 | 0.293 | 0.401 |
| {72} Computer and Related Activities | 0.451 | 0.312 | 0.408 | 0.273 |
| {73} Research and Development Activities | 0.813 | * | 0.625 | 0.305 |
| {74} Other Business Activities | 0.220 | 0.219 | 0.216 | 0.205 |
| {90} Sewage and Refuse Disposal, Sanitation and Similar Activities | 0.443 | * | 0.565 | 0.605 |
| {91} Activities of Membership Organisations n.e.c. | * | * | 0.103 | * |
| {92} Recreational, Cultural and Sporting Activities | 0.288 | 0.563 | 0.263 | 0.468 |
| {93} Other Service Activities | * | * | 0.128 | 0.294 |

\* Data supressed to avoid disclosure issue (<10 enterprises)                    Source: ABS dataset

than 10 firms. In terms of exporting, the sectors in manufacturing with over 70% of plants engaged in exporting were: chemicals, basic metals, medical & precision instruments, and other transport equipment (principally aircraft) – in all cases the propensity to export was higher in the TVCA. In the NE LEP electrical machinery also had a high exporting intensity (the figure for TVCA is supressed). In services, higher propensity export sectors were wholesale trade, post & telecoms, computer & related services, R&D, and sewerage & refuse disposal; only in the last sector did the NE LEP have a higher proportion of plants exporting (the NE LEP also had a high exporting intensity in air transport, with the figure for TVCA suppressed).

With regard to the proportion of plants belonging to MNEs (foreign-owned and GB-owned firms with plants operating overseas), the sectors with the highest levels of such

ownership were chemicals, other non-metallic minerals, wholesale trade, support to transport services, post & telecoms, renting machinery and recreational, cultural & sporting activities – in all sectors, TVCA had higher propensities then the NE LEP (although the latter did have high proportions of MNE plants in motor vehicles, and air transport, with the TVCA figures suppressed).

In conclusion, the ONS Annual Business Survey data indicates that in terms of the propensity to engage in trade and external investment across various sectors of the economy, the North East already has relatively high levels of involvement, most particularly in the Tees Valley LEP. However, if any LEP intends to engage in a strategy of increasing firm- and plant-level involvement in these areas then it will need to decide on whether to pursue: (i) on the trade side an increase in the extensive and/or intensive margins of trade (i.e., more exporters versus current exporters selling more into international markets); and (ii) inward FDI that is also high in value-added activities (e.g., brings R&D and post-fabrication service activities, rather than just production capabilities often associated with creating jobs but also associated with more limited 'branch plants' activities. Whatever the strategy chosen, it will need plants that (aspire to be) involved in trade and external investment to have sufficient absorptive capacity that provides them with the productivity capabilities needed in order to increase exporting and/or engage in higher value-added roles within (global) supply-chains. Harris and Yan (2019) discuss the concept of absorptive capacity and provide evidence of how increases in such capacity increases exporting, innovation and R&D.

*[this page is blank to allow double-sided printing* 🌲 *Save Paper]*

# 4. Value of Trade in Goods

This section begins by looking at trends in trade at the UK level,. This is followed by an overview of the relative importance of trade in goods and services in the North East (and other regions) for 2018/19, before presenting detailed information on the trade in goods (Chapter 5 presents detailed information on trade in services for the North East).

Figure 4.1 shows recent trends, indicating that trade in goods (the solid lines) exceeds trade in services, but that the UK has a substantial deficit (surplus) in goods (services) traded. The overall deficit in goods traded in 2019 (nearly £132 billion in 2018 prices) was offset by a surplus in services (just over £102 billion, 2018 prices), such that the overall balance of trade deficit was just £29.6 billion in 2019.

Trade across the UK regions is set out in Figure 4.2; note, trade intensities are provided (value of trade in current prices divided by a region's Gross Value Added) to prevent regional comparisons being distorted by differences in size. In terms of exports (Figure 4.2a), the North East has an overall export intensity of 0.37 (total value of exports in 2018 divided by GVA in 2018[19]) placing it 4th across the UK regions. Exports of goods has an intensity of 0.24, while services are less important at 0.13. Breaking the North East down to LEP level, Tees Valley (which accounted for around 25% of GDP in 2018) was more export intensive in both goods and services. The two regions that stand out as the main outliers in Figure 4.2(a) are London – which was export intensive but principally because of services not goods – and Northern Ireland which was much more reliant on the export of goods rather than services.

Figure 4.2(b) shows that the North East is again relatively import intensive (with a value of 0.36, placing it 4th in regional rankings), while the main differences between the LEPs was a relatively larger dependence on the import of services rather than goods in Tees Valley (the intensity was 0.14 versus 0.09 in favour of Tees Valley). In comparison to other UK regions, the South East was significantly more import intensive (especially in the import of goods), while Northern Ireland was the least import intensive region (the gap with the South East was large overall, with only half the import intensity in the Province, which was particularly deficient in terms of the import of goods).

Overall, and taking account of the propensity of plants to engage in trade (Chapter 3), the North East is relatively 'open' in terms of its exposure to international trade. To the extent that such competition engenders advantages for the region ultimately depends on underlying productivity levels, which were reviewed in Chapter 2.

---

[19] At the time of writing, data on gross value for added at the sub-national level is only available up to 2018 with the next release of data not scheduled until May 2021. Also data on services at sub-national level is only available to 2018.
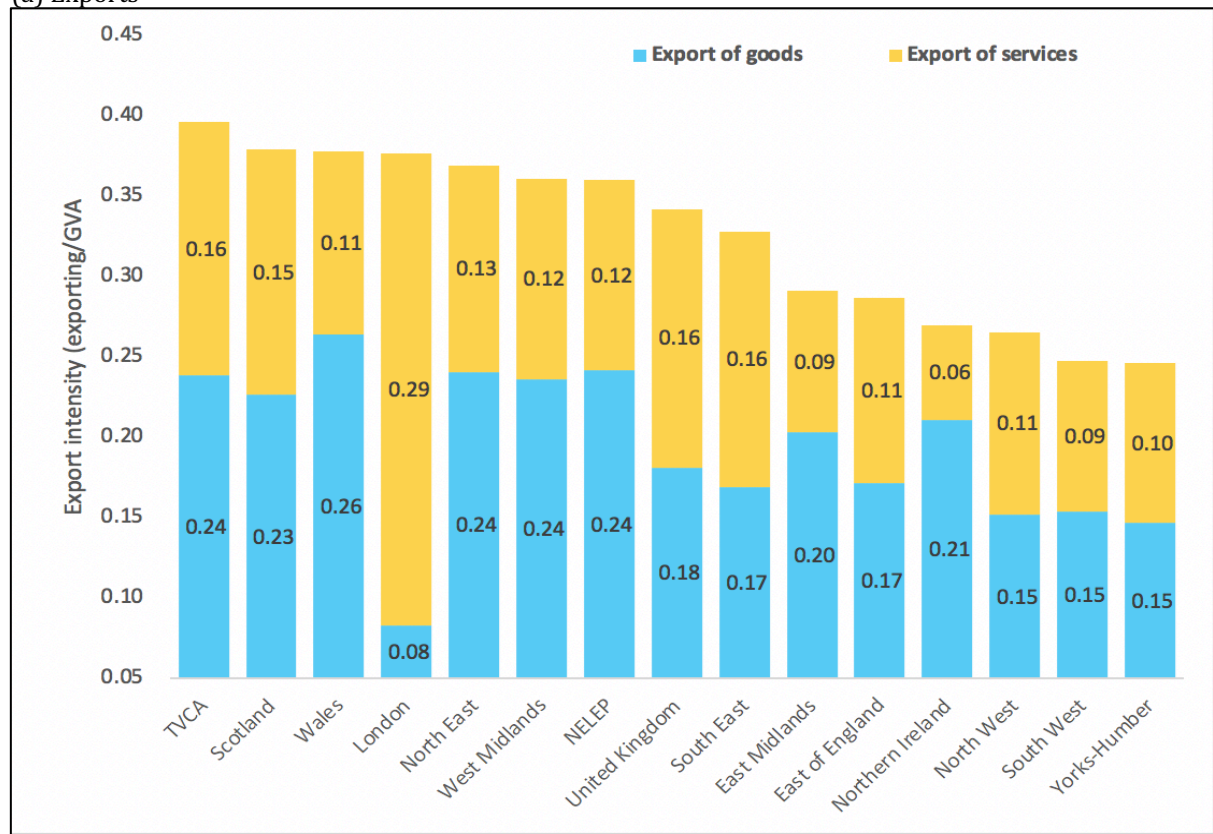
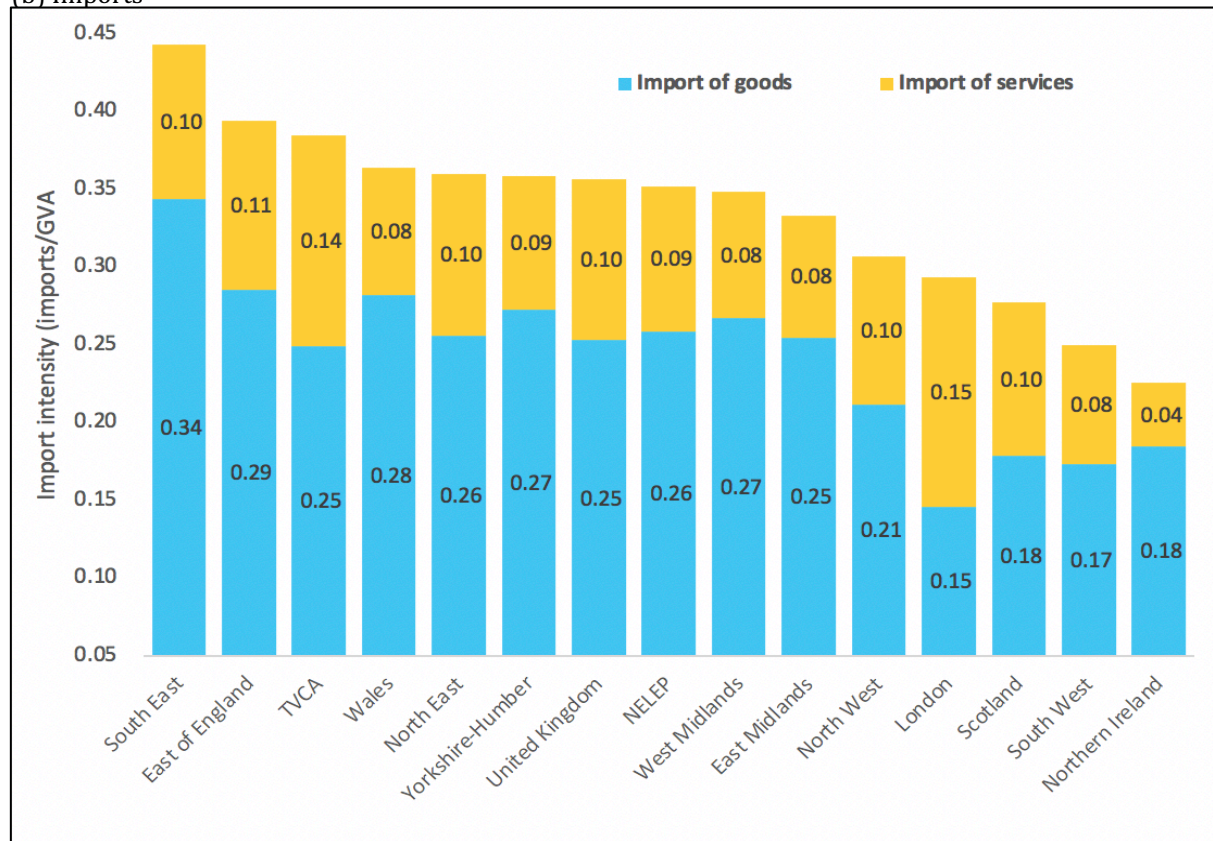Figure 4.1: UK trade in goods and services, 1997-2019
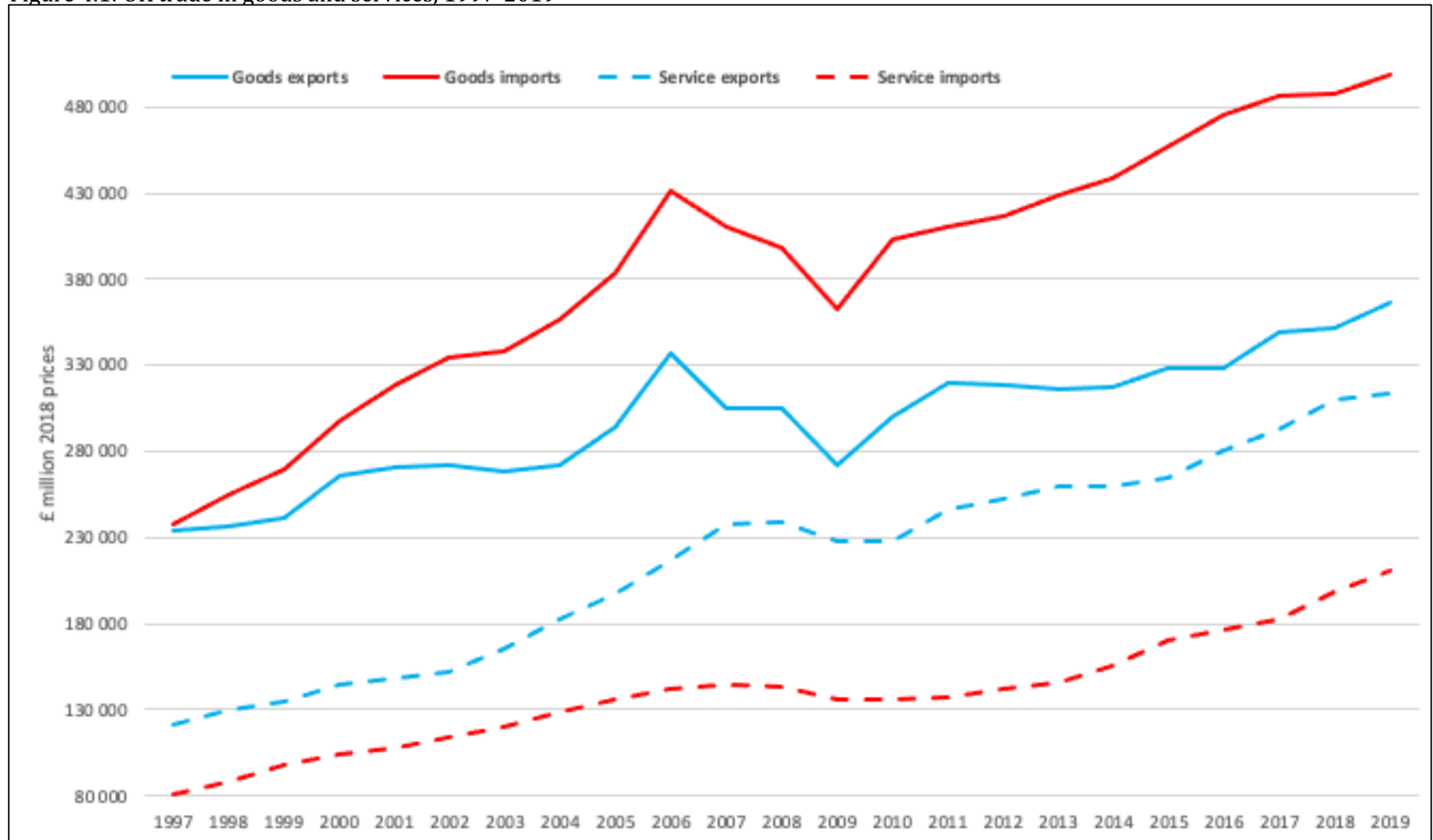


Source: ONS UK trade: goods and services publication tables

Figure 4.2: Trade intensities across UK regions, 2018
(a) Exports



(b) Imports



Source: Table A4.1

Lastly, it is possible to disaggregate exports and imports (of both goods and services) to show the relative importance of the EU as a destination/source trading partner. This has obvious importance with regard to the changing nature of trading arrangements as the UK leaves the Single Market and Customs Union with the EU27. Figure 4.3 (which has been ordered from highest-to-lowest in terms of the percentage of total trade with the EU – the final column of figures in the chart) shows that the North East is only behind Northern Ireland and Eastern England in terms of its reliance on the EU as a trading partner. The total percentage of trade with the EU (exports and imports of goods and services) was 55.2% in the North East, while it was 61.9% in Northern Ireland (principally because of the Province's reliance on imports from the EU).[20] In terms of the LEPs in the North East, there was a significant difference between the NE LEP and TVCA, with the former having nearly 56% of its trade with the EU and the latter some 49.5%. Trade in goods was particularly centred on the EU in the NE LEP, and imports of services from the EU, but the NE LEP was much less dependent on exporting services to the EU than was TVCA (35.9% and 61.5%, respectively). Figure 4.3 also shows that London was the least reliant on the EU as a trading partner, with only 41.5% of trade involving the EU (exports of services – which as Figure 4.2 shows dominates London's international trade – were mostly to countries outside the EU).

The rest of this chapter provides more disaggregated data on trade in goods by region, which as Figure 4.2 shows tends to dominate overall trade in most regions (London being the major exception). Most of the (HMRC) information that is available is analysed for 2019 (data for 2020 is available but highly skewed by the impact of the COVID-19 pandemic), but, to begin with, Figure 4.4 shows the trends over 1996-2019 period for the export of goods by the North East to regions of the world. As Figure 4.3 shows, in 2019 the exports of goods to the EU comprised 59.5% of all goods exports; Figure 4.4 shows that the Netherlands was the single most important destination, followed by Germany and then France.[21] However, the reliance on trade with the EU has fallen over time from 72.9% in 1996 to 59.5% in 2019. The largest (relative) growth areas over this period were Asia and Oceania (which increased by 61%), which is dominated by Japan and China, followed by the USA (42% growth), while goods exports to the EU fell (in relative terms) by over 18%.

The data for 2019 on the destination of exports of goods from UK regions for broadly defined overseas destinations are presented in Figure 4.5. These are ranked highest-to-lowest on the basis of trade with the EU, so that Wales followed by the North East and then Northern Ireland are presented first (and London last). After the EU, the North East is particularly dependent on selling goods to Asia and Oceania (which accounts for 14% of exports), followed by North America (10.4% of exports). Together these three blocs accounted for nearly 84% of the destination of goods exports in 2019. For other UK regions, there is generally much more reliance on selling to North America (e.g., around twice the proportion of goods exports go here for Northern Ireland, the South East, West

---

[20] While Northern Ireland was particularly reliant on trade with the EU, especially imports, Figure 4.2 showed that it was the least reliant on imports given overall GVA in the region. The information in Figures 4.2 and 4.3 need to be considered when discussing the overall reliance of a region on trade with the EA2.

[21] Note, Table 4.1 below shows that France was in fact behind Spain and Belgium in terms of importance, but France was chosen for inclusion in Figure 4.4 given its size and importance within the EA2.

Figure 4.3: Relative importance of trade with the EU, 2018 (services) or 2019 (goods)



**Legend:** ■ % service imports from EU  ■ % service exports to EU  ■ % goods imports from EU  ■ % goods exports to EU

| Region | % service imports from EU | % service exports to EU | % goods imports from EU | % goods exports to EU | Total |
|---|---|---|---|---|---|
| Northern Ireland | 65.0 | 59.2 | 65.9 | 58.7 | **61.9** |
| NELEP | 49.4 | 35.9 | 61.4 | 62.1 | **55.9** |
| East | 54.7 | 47.6 | 64.1 | 48.6 | **55.7** |
| North East | 45.0 | 49.1 | 58.1 | 59.5 | **55.2** |
| South East | 49.4 | 48.7 | 62.0 | 46.9 | **54.5** |
| East Midlands | 56.8 | 57.9 | 55.0 | 49.5 | **53.7** |
| Yorks-Humber | 53.3 | 45.4 | 51.7 | 57.6 | **52.3** |
| North West | 51.4 | 40.9 | 56.1 | 52.1 | **51.2** |
| West Midlands | 54.1 | 33.0 | 61.9 | 45.9 | **50.5** |
| TVCA | 36.0 | 61.5 | 47.2 | 51.5 | **49.5** |
| United Kingdom | 49.2 | 40.6 | 54.3 | 48.2 | **48.8** |
| Wales | 56.9 | 41.3 | 37.6 | 60.4 | **48.6** |
| South West | 54.5 | 45.3 | 43.3 | 43.9 | **45.6** |
| Scotland | 42.5 | 36.6 | 41.8 | 49.1 | **43.3** |
| London | 44.3 | 35.5 | 48.2 | 44.0 | **41.5** |

% of trade to/from EU (goods in 2019; services in 2018)

Source: Table A4.2

Figure 4.4: Destination of exports of goods from the North East, 1996-2019
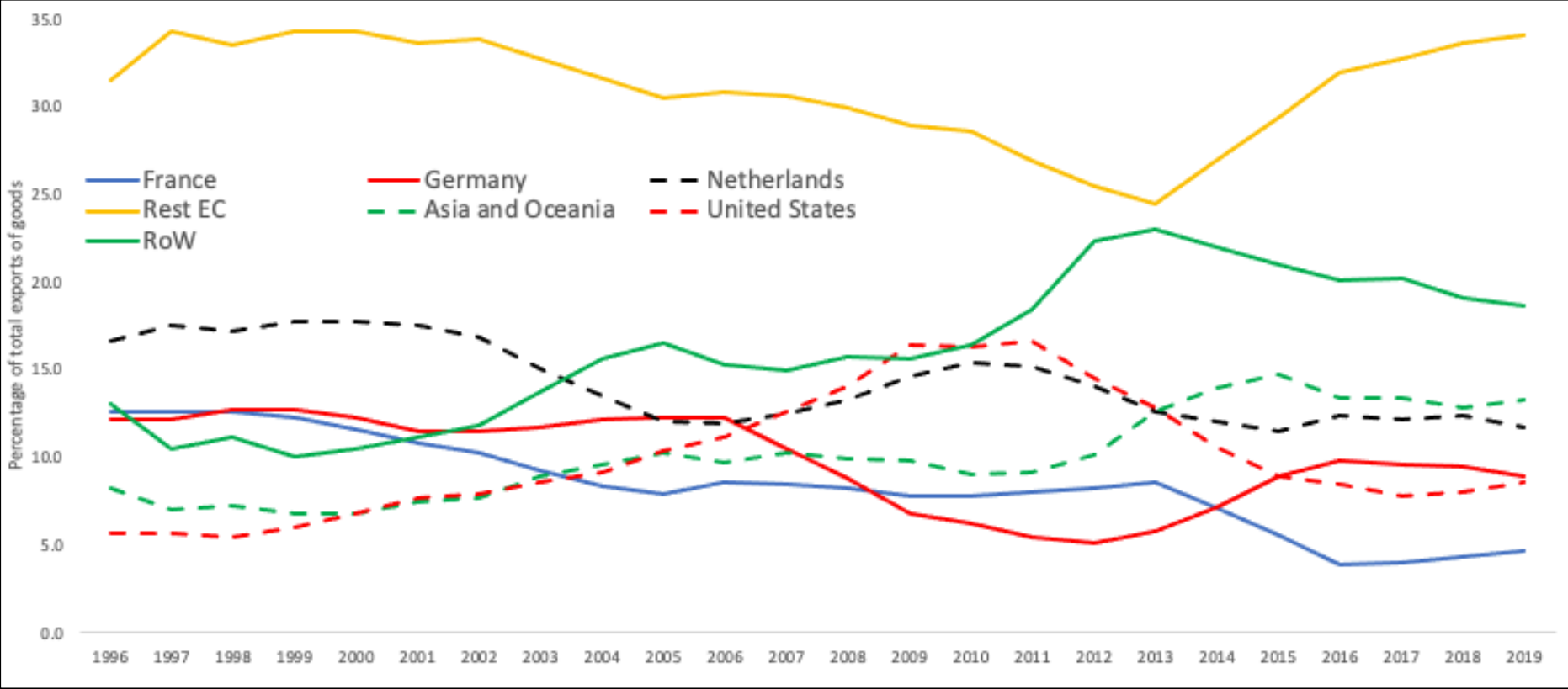
Figure 4.5: Percentage of goods exported by areas of world, 2019



Source: HMRC Regional Trade Data

Midlands, the South West and London). Other regions were also relatively more likely to sell goods to Asia and Oceania – the exceptions being Wales and Northern Ireland.

While Figure 4.5 shows the exports of goods, Figure 4.6 shows imports of goods, and these are often related via supply-chains, especially those involving large MNE companies involved in global value-chains (GVCs).[22] While the North East was ranked 2nd for exports, it was ranked 5th for imports (with 58.2% of imports from the EU), since Northern Ireland, Eastern England, the South East and West Midlands were relatively more dependent on importing goods from the EA2. After the EU, Asia and Oceania was the most important source of imports into the North East (accounting for 24.4% of goods imports) and this was also the case for the other regions of the UK (except Wales which relied marginally more on North America). This suggests, and further information is provided below on which countries and/or goods comprised the most important trading relationships, that supply-chains in the North East were centred more on the EU and Asia and Oceania, when compared to certain other regions which had stronger trade links with North America (e.g., Northern Ireland, the West Midlands, South East, Wales, and South West, all of which had 15% or more of the average of exports and imports with North America, compared to 9.6% in the North East).

More detailed information on the export and imports of goods by country is provided in Tables 4.1 and 4.2 (these cover those countries that accounted for at least 1% of trade; for completeness, Tables A4.3 and A4.4 provide the full breakdown by country). For the North East, the major destination for exports of goods in 2019 were the Netherlands (12.3%), the USA, and then 6 other EU countries. The EU has eight countries in the top 10 listed, with only the USA and Japan also featuring in this list. The correlation between the percentage value of exports by country in the North East and other regions was high (see last row of data);[23] this shows that generally the same set of countries are important as trading partners in all UK regions (the major exception being Northern Ireland because of its land border and strong trading links with the Republic of Ireland). However, there are significant differences across regions for the similar sets of countries listed in Table 4.1; while the Netherlands is ranked 1st in the North East, Scotland and Yorkshire-Humberside, in other regions it is usually the USA that dominates (or France in the case of Wales and the rest of Ireland for Northern Ireland). Japan is more important to the North East as an importer of goods, when compared to most other regions, while China is less important (only Wales and Northern Ireland are less dependent on China as an export destination). Interestingly the Former Yugoslavian Republic of Macedonia (now called the 'Republic of North Macedonia') had relatively strong export links with the North East (as does Eastern England); as shown below, the North East sent over 25% of its non-ferrous metals exports to FYR of Macedonia in 2019 (the largest market for this particular product).

---

[22] As discussed in Harris (2021), some 50% of world trade is due to GVCs in more recent years, with a small number of countries driving this global GVA expansion (both through scale effects – e.g., China, South Korea and Singapore, through their increasing share of world trade – and intensification effects – e.g., Germany, USA Japan, Italy, France, and the UK, who through fragmentation and off-shoring began using more imported inputs in their exports).

[23] It is even higher when all countries are included in the calculation, but this reflects a lot of countries having little or no goods imported from the UK.

Figure 4.6: Percentage of goods imported by areas of world, 2019
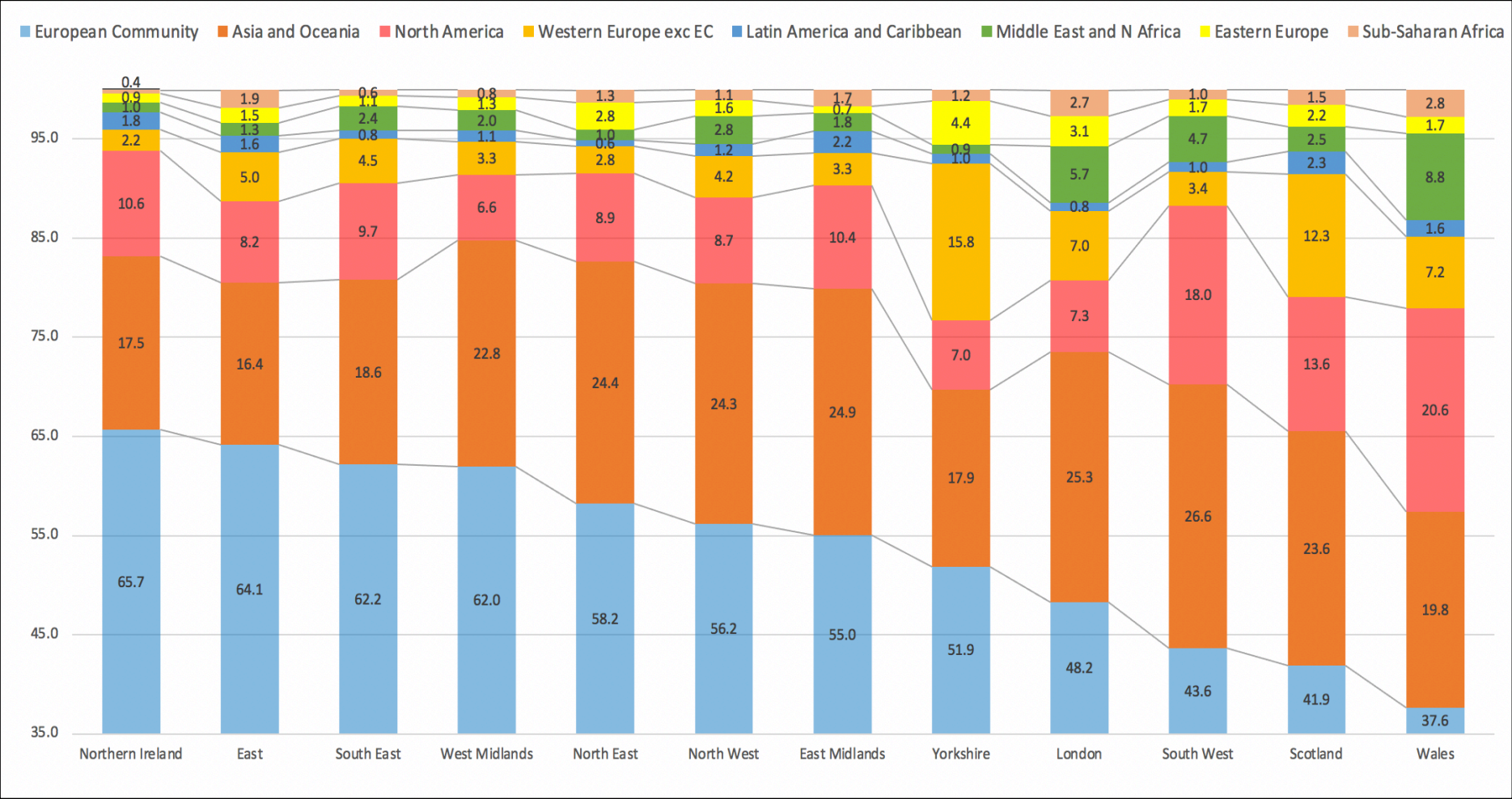
Source: HMRC Regional Trade Data

Table 4.1: Percentage of goods exports by country (top destinations)[a], 2019

| Country | North East | North West | Yorks-Humber | East Midlands | West Midlands | East | London | South East | South West | Wales | Scotland | Northern Ireland |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Netherlands | 12.3 | 6.8 | 10.7 | 4.1 | 3.9 | 6.0 | 5.8 | 6.1 | 3.0 | 5.5 | 17.4 | 3.1 |
| United States | 9.2 | 14.8 | 10.0 | 11.8 | 22.2 | 15.0 | 18.6 | 20.1 | 18.7 | 15.5 | 11.8 | 12.9 |
| Germany | 8.8 | 11.3 | 8.4 | 11.2 | 10.3 | 11.0 | 9.6 | 10.6 | 12.4 | 16.2 | 10.4 | 5.1 |
| Spain | 7.8 | 3.5 | 2.8 | 3.8 | 2.6 | 3.7 | 2.7 | 2.7 | 2.3 | 2.7 | 2.5 | 1.9 |
| Belgium | 5.9 | 4.0 | 6.3 | 6.1 | 2.5 | 4.8 | 2.1 | 4.4 | 2.2 | 3.1 | 1.7 | 2.2 |
| France | 4.7 | 6.6 | 7.1 | 7.5 | 6.9 | 5.8 | 8.0 | 5.9 | 10.9 | 15.9 | 5.5 | 4.4 |
| Italy | 4.5 | 3.3 | 3.6 | 3.2 | 3.9 | 3.4 | 2.8 | 2.9 | 2.5 | 1.5 | 2.1 | 1.2 |
| Irish Republic | 3.4 | 6.6 | 7.0 | 5.5 | 5.6 | 5.7 | 5.4 | 5.2 | 3.8 | 9.5 | 3.7 | 34.8 |
| Japan | 2.8 | 1.4 | 1.0 | 2.3 | 1.5 | 3.0 | 1.4 | 2.9 | 2.9 | 1.7 | 1.5 | 0.7 |
| Poland | 2.8 | 2.0 | 2.0 | 1.4 | 1.7 | 1.4 | 1.9 | 1.5 | 1.0 | 0.8 | 1.4 | 1.1 |
| Sweden | 2.7 | 1.4 | 2.9 | 2.3 | 1.4 | 1.3 | 1.3 | 1.3 | 1.2 | 1.7 | 1.1 | 0.6 |
| China | 2.5 | 5.6 | 4.9 | 3.1 | 7.1 | 6.0 | 2.9 | 4.0 | 2.8 | 2.3 | 13.4 | 1.9 |
| Norway | 2.3 | 0.7 | 1.1 | 0.8 | 0.6 | 1.1 | 0.6 | 0.8 | 1.0 | 0.6 | 2.7 | 0.4 |
| Australia | 1.8 | 1.5 | 1.5 | 0.9 | 1.7 | 1.6 | 0.9 | 1.2 | 1.4 | 0.7 | 1.0 | 2.1 |
| Turkey | 1.8 | 1.2 | 1.3 | 2.2 | 0.9 | 2.0 | 1.0 | 0.9 | 1.5 | 1.9 | 0.5 | 0.6 |
| Fyr Macedonia | 1.6 | 0.3 | 0.0 | 0.0 | 0.0 | 2.0 | 0.2 | 0.2 | 0.2 | 0.0 | 0.3 | 0.0 |
| Hong Kong | 1.6 | 1.4 | 1.0 | 7.3 | 0.8 | 2.0 | 6.6 | 1.3 | 3.2 | 1.1 | 1.2 | 1.0 |
| Russia | 1.6 | 0.8 | 0.7 | 0.3 | 1.6 | 0.8 | 0.5 | 0.8 | 0.4 | 0.5 | 0.6 | 0.7 |
| Denmark | 1.5 | 0.9 | 1.3 | 0.6 | 0.7 | 0.7 | 0.5 | 1.3 | 0.8 | 0.3 | 0.7 | 0.6 |
| India | 1.3 | 1.2 | 1.5 | 0.8 | 1.0 | 1.6 | 2.3 | 1.3 | 1.7 | 0.7 | 1.2 | 0.3 |
| South Korea | 1.0 | 1.1 | 0.8 | 0.6 | 1.3 | 0.9 | 1.1 | 1.2 | 1.7 | 1.2 | 0.8 | 0.3 |
| Total | 81.9 | 76.4 | 75.9 | 75.8 | 78.2 | 79.8 | 76.2 | 76.6 | 75.6 | 83.4 | 81.4 | 75.9 |
| | | | | | | | | | | | | |
| Correlation with NE | | 0.76 | 0.85 | 0.66 | 0.59 | 0.74 | 0.64 | 0.70 | 0.58 | 0.62 | 0.75 | 0.21 |

[a] Based on North East 1%+ share of export sales

Source: HMRC Regional Trade Data

Table 4.2: Percentage of goods imports by country (top destinations)[a], 2019

| | North East | North West | Yorks-Humber | East Midlands | West Midlands | East | London | South East | South West | Scotland | Wales | Northern Ireland |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Germany | 13.6 | 14.7 | 9.6 | 14.4 | 17.1 | 13.8 | 7.9 | 23.2 | 10.2 | 7.9 | 10.2 | 6.8 |
| France | 9.9 | 5.5 | 4.3 | 4.5 | 5.9 | 6.1 | 9.8 | 4.9 | 5.6 | 4.0 | 4.1 | 4.0 |
| China | 8.4 | 12.2 | 10.1 | 9.9 | 11.0 | 7.3 | 15.1 | 6.7 | 10.0 | 12.1 | 6.4 | 9.3 |
| USA | 7.3 | 7.2 | 6.0 | 9.3 | 5.7 | 7.3 | 6.6 | 8.8 | 16.2 | 12.4 | 17.6 | 10.0 |
| Netherlands | 7.1 | 8.7 | 16.7 | 9.3 | 6.1 | 13.1 | 7.5 | 8.1 | 7.2 | 9.0 | 5.4 | 8.4 |
| Japan | 7.0 | 0.8 | 0.5 | 4.4 | 2.0 | 1.8 | 0.8 | 1.9 | 3.1 | 1.4 | 3.5 | 1.8 |
| Spain | 6.3 | 2.8 | 2.1 | 3.0 | 3.6 | 5.2 | 3.3 | 2.7 | 2.5 | 1.9 | 2.4 | 2.4 |
| Belgium | 4.0 | 5.2 | 4.3 | 6.6 | 4.9 | 6.7 | 4.3 | 6.6 | 2.7 | 3.1 | 3.5 | 4.3 |
| Italy | 3.5 | 4.8 | 3.3 | 4.6 | 4.6 | 5.9 | 5.0 | 3.3 | 3.9 | 3.1 | 2.3 | 3.9 |
| Poland | 2.8 | 2.3 | 1.4 | 2.4 | 3.2 | 2.8 | 2.1 | 1.6 | 1.8 | 3.7 | 1.4 | 1.4 |
| Vietnam | 1.6 | 1.0 | 0.6 | 0.7 | 0.7 | 0.5 | 0.6 | 2.1 | 0.9 | 0.6 | 0.3 | 0.3 |
| Turkey | 1.6 | 2.2 | 2.1 | 2.5 | 2.3 | 2.7 | 1.8 | 1.4 | 1.7 | 1.1 | 3.3 | 1.8 |
| Russia | 1.6 | 1.4 | 3.9 | 0.5 | 0.9 | 1.2 | 2.6 | 1.0 | 0.9 | 1.6 | 1.4 | 0.6 |
| Czech Rep | 1.6 | 1.1 | 0.7 | 1.6 | 2.2 | 0.9 | 0.8 | 1.8 | 1.2 | 1.2 | 0.8 | 0.8 |
| Irish Rep | 1.4 | 2.4 | 2.2 | 1.6 | 2.8 | 3.3 | 2.6 | 1.3 | 2.3 | 2.3 | 1.6 | 29.3 |
| India | 1.4 | 1.8 | 1.7 | 2.1 | 2.2 | 1.6 | 2.1 | 1.1 | 2.0 | 1.6 | 2.0 | 1.3 |
| Portugal | 1.2 | 0.7 | 0.4 | 0.5 | 1.6 | 0.5 | 0.5 | 0.8 | 0.4 | 0.4 | 0.6 | 0.4 |
| Denmark | 1.1 | 2.2 | 1.3 | 1.6 | 1.0 | 0.7 | 0.9 | 2.5 | 1.5 | 1.4 | 0.6 | 0.6 |
| Austria | 1.1 | 1.1 | 0.7 | 0.8 | 2.4 | 0.5 | 0.4 | 0.8 | 0.7 | 0.5 | 0.6 | 0.7 |
| Canada | 1.1 | 1.3 | 1.0 | 0.8 | 0.7 | 0.7 | 0.5 | 0.7 | 1.4 | 1.0 | 2.6 | 0.4 |
| South Africa | 1.1 | 0.5 | 0.7 | 0.8 | 0.6 | 1.4 | 1.2 | 0.3 | 0.5 | 0.7 | 1.0 | 0.3 |
| Sweden | 1.0 | 1.4 | 1.9 | 1.7 | 1.7 | 1.1 | 1.0 | 1.4 | 1.3 | 1.4 | 1.8 | 1.1 |
| Ukraine | 1.0 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.3 | 0.2 | 0.2 |
| Total | 86.5 | 81.4 | 75.4 | 83.5 | 83.1 | 85.2 | 77.1 | 83.0 | 77.9 | 72.5 | 73.5 | 89.9 |
| Correlation with NE | | 0.85 | 0.67 | 0.88 | 0.87 | 0.84 | 0.78 | 0.83 | 0.77 | 0.72 | 0.69 | 0.24 |

[a] All countries that the North East where 1%+ share of import purchases                    Source: HMRC Regional Trade Data

Table 4.2 shows the major source of imported goods by country; of the 23 countries listed as having supplied at least 1% of the North East's imports of goods in 2019, only 7 did not also appear in the list for exports in Table 4.1 (i.e., Vietnam, the Czech Republic, Portugal, Austria, Canada, South Africa and the Ukraine did not feature in the list of top export locations). In addition, there were five countries that appeared on the list of top export destinations but not in Table 4.2 (South Korea, Norway, Hong Kong, Australia, and FYR Macedonia). That leaves 15 major trading partners for both imports and exports (with Germany, followed by the Netherlands, the USA, and Spain heading the list), suggesting that important supply-chains underlie these bilateral links. This supposition is strengthened by the strong correlation (0.79) between the percentage of goods imported and exported by country (i.e., the correlation between column 1 in both Tables 4.1 and 4.2, with missing countries from either table added). Information below on the most import type of goods involved in trade by country will also help to understand the importance of these supply-chains.

Table 4.3: Percentage of goods exports and imports by country (top destinations)[a], Northumberland and Tyne & Wear (N & TW), Tees Valley & Durham (TV & D), 2019

| | Exports (N & TW) | Exports (TV & D) | Imports (N & TW) | Imports (TV & D) |
|---|---|---|---|---|
| Netherlands | 14.3 | 9.6 | 5.3 | 9.6 |
| Spain | 10.8 | 3.4 | 8.7 | 2.6 |
| Belgium | 8.3 | 2.5 | 3.1 | 5.3 |
| USA | 6.3 | 13.7 | 6.6 | 9.0 |
| Italy | 5.5 | 3.0 | 2.9 | 3.9 |
| Germany | 5.4 | 13.7 | 13.3 | 13.4 |
| Norway | 3.6 | 0.4 | 0.3 | 1.5 |
| Irish Republic | 3.6 | 3.0 | 0.9 | 2.1 |
| France | 3.5 | 6.5 | 13.5 | 3.9 |
| Poland | 3.5 | 1.9 | 3.1 | 2.1 |
| Sweden | 2.8 | 2.6 | 0.7 | 1.6 |
| Japan | 2.7 | 3.0 | 8.7 | 4.7 |
| Australia | 2.3 | 1.0 | 0.1 | 1.3 |
| Russia | 2.3 | 0.7 | 0.2 | 4.1 |
| Denmark | 2.1 | 0.5 | 1.5 | 0.4 |
| China | 1.7 | 3.6 | 8.5 | 8.7 |
| Turkey | 1.3 | 2.6 | 1.3 | 2.3 |
| Israel | 1.1 | 0.2 | 0.1 | 0.3 |
| India | 1.1 | 1.7 | 1.0 | 2.1 |
| Finland | 1.0 | 0.3 | 0.1 | 1.4 |
| Total | 83.0 | 74.2 | 79.6 | 80.3 |
| | | | | |
| Correlation with Exports (N & TW) | | 0.51 | 0.35 | 0.48 |

[a] Based on first data column 1%+ share of export sales.

Source: ONS Regional trade in goods statistics disaggregated by smaller geographical areas: 2019

Information on which countries are most involved with trade with the LEPs in the North East is not publicly available, and the best that can be done is presented in Table 4.3 based on NUTS2 areas which combines Durham with Tees Valley (when ideally it should be reallocated to the NE LEP). The list of countries in the table is confined to those that were top destinations (i.e., 1%+ share of export sales) for Northumberland and Tyne & Wear (Table A4.5 in the appendix provides the full list of countries), and 18 of these also feature in the same list as in Table 4.1. Those missing from Table 4.3 are FYR Macedonia, Hong Kong and South Korea; those included but missing from Table 4.1 are Israel and Finland (for both of these countries, exports to Tees Valley and Durham were significantly less important than to Northumberland and Tyne & Wear, so make it to the list for the latter NUTS2 area). There are some major differences in the importance of the countries listed in Table 4.3 when considering the different areas and the relative importance of exports and imports. This is shown by the correlation coefficient between column 1 of data and the other three columns; the distribution of exports across the two NUTS2 regions has a correlation of only 0.51, indicating that each area has somewhat different markets for goods exports (and as will be shown below, much of this difference relates to product specialisms of each area – machinery and transport equipment in Northumberland and Tyne & Wear versus chemicals in Tees Valley & Durham). The Netherlands and Spain dominate as export destinations for Northumberland and Tyne & Wear; the USA and Germany are most important to Tees Valley & Durham.

With regard to imports of goods, the correlation between exports and imports in Northumberland and Tyne & Wear was only 0.35 (export destinations are dominated by the Netherlands, Spain, Belgium and then the USA, while import sources are dominated by France, Germany, Spain, Japan and then China). This in part will reflect the location of factories within supply chains, as much of exporting consists of intermediate inputs into the production process.[24] However, the correlation (not shown in Table 4.3) between exports and imports in Tees Valley & Durham was 0.86, given that Germany is the dominant trading partner, followed by the USA, the Netherlands and to a lesser extent France and China.

Turning now to which products dominated trade, Tables 4.4 and 4.5 show those commodities that accounted for 5% or more of sales/purchases by region. Each table has been ordered with the North East first, with the most important products listed at the top, followed by regions which also had the same most important product as the North East. Thus, for exports, 32% of goods exported were in the road vehicles category, and the West Midlands, North West, South East and, to a lesser extent, the East Midlands and Eastern England, were also dominated by this product (although for the East Midlands power generating equipment dominated, and in Eastern England medical & pharmaceuticals dominated). Below, more detailed information is provided to look at whether the countries receiving road vehicles exports were the same, or similar.

Table 4.4 indicates that certain regions particularly specialised in certain exported goods –this was road vehicles in the North East, West Midlands, North West and South East; power generating equipment in the East Midlands and the South West; medical & pharmaceutical products in Eastern England; miscellaneous manufactured articles in London; other transport equipment in Northern Ireland and Wales; and petroleum based

---

[24] This is an area – mapping out supply-chains – that is work needing to be undertaken in order to understand much better trade patterns (and opportunities).

Table 4.4: Percentage of goods exports that were 5%+ of total exports by industry, 2019

| SITC Industry (level 2 groups) | North East | West Midlands | North West | South East | East Midlands | East | London | Northern Ireland | Scotland | South West | Wales | Yorks-Humber |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 78 - Road vehicles | 32.0 | 43.5 | 17.4 | 15.4 | 12.6 | 5.3 | | | | | | |
| 71 - Power generating machinery & equip | 6.2 | | | 5.9 | 36.5 | 6.1 | | | | 7.3 | 23.6 | 12.6 |
| 68 - Non-ferrous metals | 5.9 | | | | | 7.2 | 5.2 | | | | | |
| 77 - Elect machinery, app & appliances | 5.6 | | | 7.2 | 4.9 | | | | | | 5.5 | |
| 74 - General industrial machinery & eqp. | 5.4 | 6.8 | | 6.1 | 5.1 | | | | 5.4 | | 7.4 | 6.9 |
| 51 - Organic chemicals | 5.3 | | | | | | | | | | | |
| 02 - Dairy products & birds' eggs | | | | | | | | 6.0 | | | | |
| 11 - Beverages | | | | | | | | | 13.2 | | | |
| 33 - Petroleum, petroleum products & related materials | | | | | | | 12.4 | | 39.6 | | 13.4 | 12.9 |
| 54 - Medicinal & pharmaceutical products | | | 6.6 | 10.2 | | | 20.2 | | 8.0 | | | 5.6 |
| 67 - Iron & steel | | | | | | | | | | | 5.4 | 7.8 |
| 72 - Machinery specialized for particular industries | | | | | | | 5.3 | | 9.4 | | | |
| 76 - Telecoms & sound recording & reproducing equip | | | | 5.5 | | | | | | | | |
| 79 - Other transport equipment | | | | | | | | | 9.8 | | 17.8 | 23.7 |
| 82 - Furniture & parts thereof | | | | | | | | | 7.1 | | | |
| 84 - Articles of apparel & clothing accessories | | | | | | | 5.7 | | | | | |
| 87 - Professional, scientific & control | | | | 5.2 | | | | | | | 7.6 | |
| 89 - Miscellaneous manufactured articles | | | | 6.2 | | 5.6 | 32.2 | | | | | |
| Other Industries | 39.7 | 49.7 | 76.0 | 38.2 | 40.9 | 50.3 | 44.5 | 54.3 | 39.8 | 38.1 | 45.0 | 66.7 |

Source: HMRC Regional Trade Data

Table 4.5: Percentage of goods imports that were 5%+ of total imports by industry, 2019

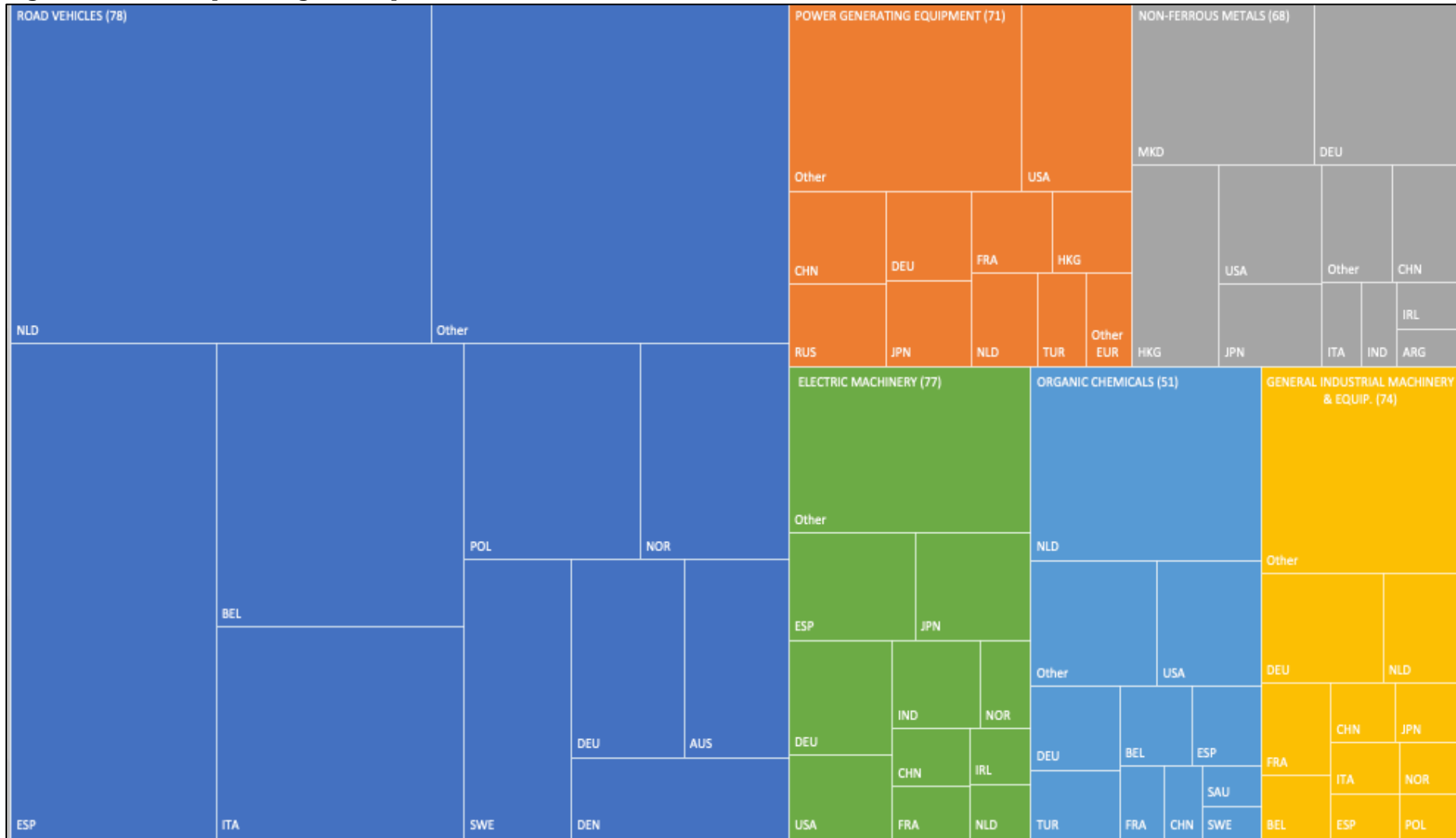| SITC Industry (level 2 groups) | North East | South East | West Midlands | East | East Midlands | North West | Wales | London | South West | Northern Ireland | Scotland | Yorks-Humber |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 78 - Road vehicles | 16.4 | 25.8 | 15.0 | 13.1 | 9.9 | 9.6 | 7.6 | 6.3 | 6.0 | | | |
| 77 - Elect machinery, app & appliances | 9.9 | 5.5 | 8.3 | 6.3 | 5.5 | 5.3 | 5.3 | | 5.9 | | | |
| 01 - Meat & meat preparations | | | | | | | | | | 6.1 | | |
| 33 - Petroleum, petroleum products & related materials | | 6.8 | | | | 7.3 | 21.2 | 13.2 | | | 5.4 | 12.6 |
| 34 - Gas, natural & manufactured | | | | | | | | | | | 6.7 | 7.3 |
| 54 - Medicinal & pharmaceutical products | | 6.6 | | 8.5 | | | | | | | | 10.2 |
| 71 - Power generating machinery & equip | | | | | 17.1 | | 11.7 | | 18.7 | | 9.3 | |
| 74 - General industrial machinery & eqp. | | | 7.1 | | 5.3 | | | | 5.8 | | | |
| 75 - Office machines | | | | | | | | 5.2 | | | 12.2 | |
| 76 - Telecoms & sound recording & reproducing equip | | 8.6 | | | | | | 10.4 | | | | |
| 84 - Articles of apparel & clothing accessories | | | | | 5.4 | 7.1 | | | 7.6 | 5.0 | | |
| 89 - Miscellaneous manufactured articles | | | | | | | | 9.5 | 5.0 | | | |
| Other Industries | 73.7 | 46.7 | 69.6 | 72.1 | 56.8 | 70.7 | 54.2 | 47.8 | 58.6 | 88.9 | 66.4 | 69.9 |

Source: HMRC Regional Trade Data

products in Scotland and Yorkshire-Humberside. In terms of imports, most regions purchased a wider range of goods which did not exceed the 5% threshold needed to feature in Table 4.5 – hence the 'other industries' row has higher percentages than the equivalent row in Table 4.4. For the North East, road vehicles dominate as the most important product imported (16.4%), with only electrical machinery also above the 5% threshold. Both products featured as significant exports, suggesting supply-chain linkages. For South East England, there is also a similar correspondence between exports and imports of goods, although imported road vehicles were much more important to overall imports compared to road vehicle exports as a percentage of all goods exports.

Combining the information contained in Tables 4.1 and 4.4, Figure 4.7 shows which countries received the products that had a share of 5% or more of total exports. Just over half of exports in this category were road vehicles, and it can be seen that the major destinations were EU countries led by the Netherlands, then Spain, Belgium, Italy, etc. (the 'other' sub-group is exports of road vehicles to all other countries which had less than 1% of total exports of road vehicles from the North East). The other products shown in Figure 4.7 are those listed in Table 4.1, with now details of the main countries that imported these products. To be able to see if there are any differences in the patterns exported in the North East vis-à-vis other regions, Figure 4.8 produces comparable (tree map) diagrams for those regions listed in Table 4.4 where road vehicles dominated (or were second most important in terms of) the export of goods. What stands out is that in the North East road vehicles exports went predominantly to EU countries, while in the North West the most single important destination was the USA, with China ranked 3rd and Japan 7th. In the East Midlands, the USA and Israel feature in the top destinations; in the West Midlands, the USA is by far the largest customer for road vehicles, and then China; and in the South East the USA is ranked 1st, China 3rd and Japan 4th. Thus overall, the North East's most important export product is very dependent on the EU, implying that any form of trade barriers (tariff and non-tariff) resulting from the UK exiting the EU will impact disproportionately on the costs of exporting from the region.

It is also apparent from comparing Figures 4.7 and 4.8 that while the North West is dependent on road vehicle exports, not only are these to markets with a lower exposure to Brexit, but the second most import product exported belongs to the high-tech manufacturing sector (road vehicles are deemed to be medium high-tech), and the USA, China, Canada and Japan are major markets. The East Midlands is more dependent on power generating machinery & equipment, and the dominant markets are Hong Kong, the USA, and then Singapore. For the West Midlands, the road vehicles market is again less exposed to Brexit issues, while products from the general industrial machinery & equipment sector have the USA as their largest market, and China and Australia feature prominently. Lastly, in the South East region, again road vehicles are less dependent on the EU, and the second most important sector (medicine & pharmaceutical products) has the USA as its largest export market (and China, Switzerland, Japan, Saudi Arabia and Australia are also important markets).

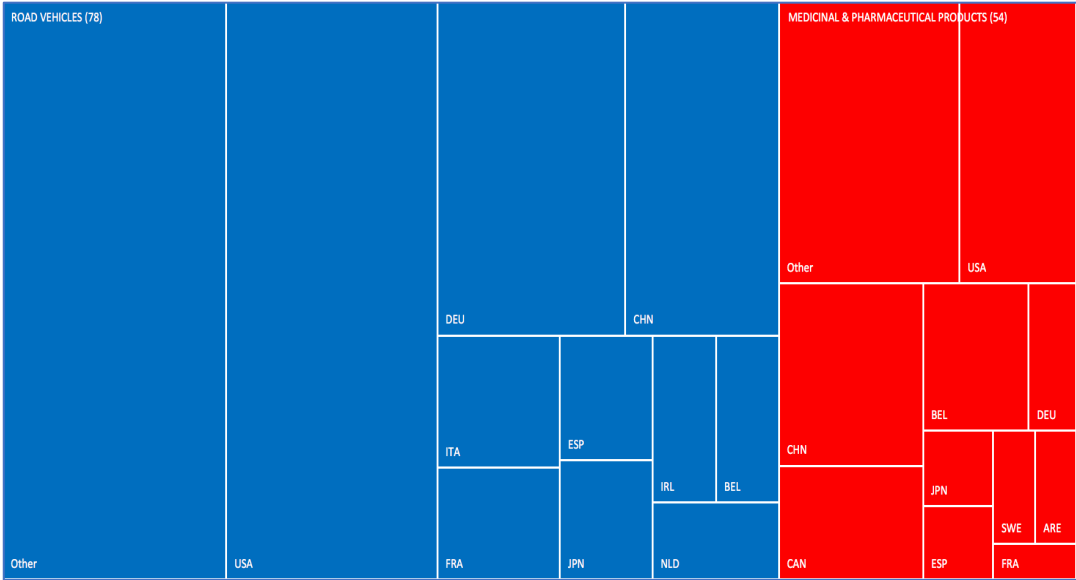Figure 4.7: Most important goods exported and market, North East, 2019[a]
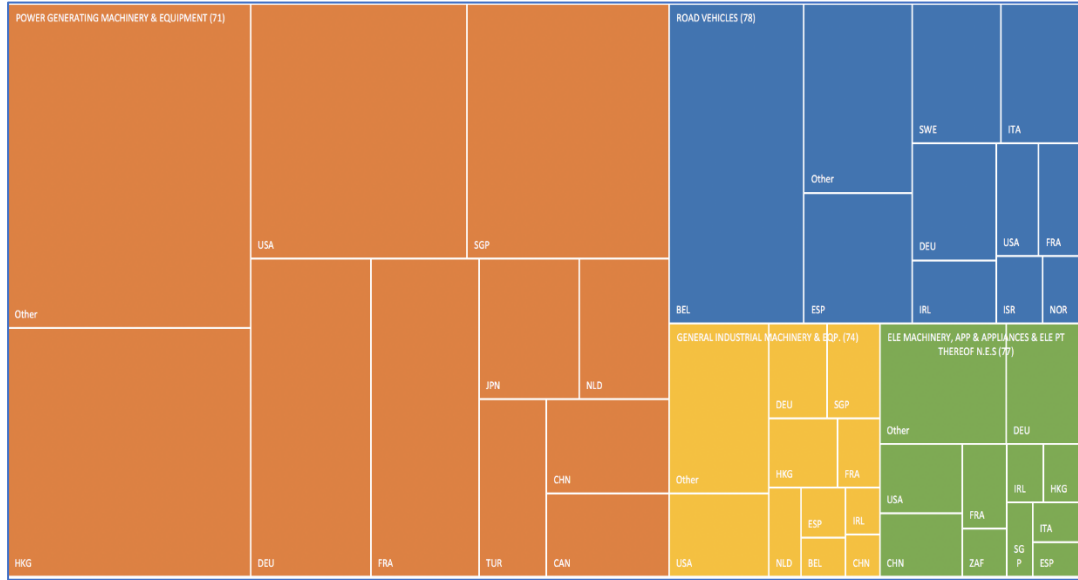
Figure 4.8: Most important goods exported and market, North West, East Midlands, West Midlands and South East 2019[a]
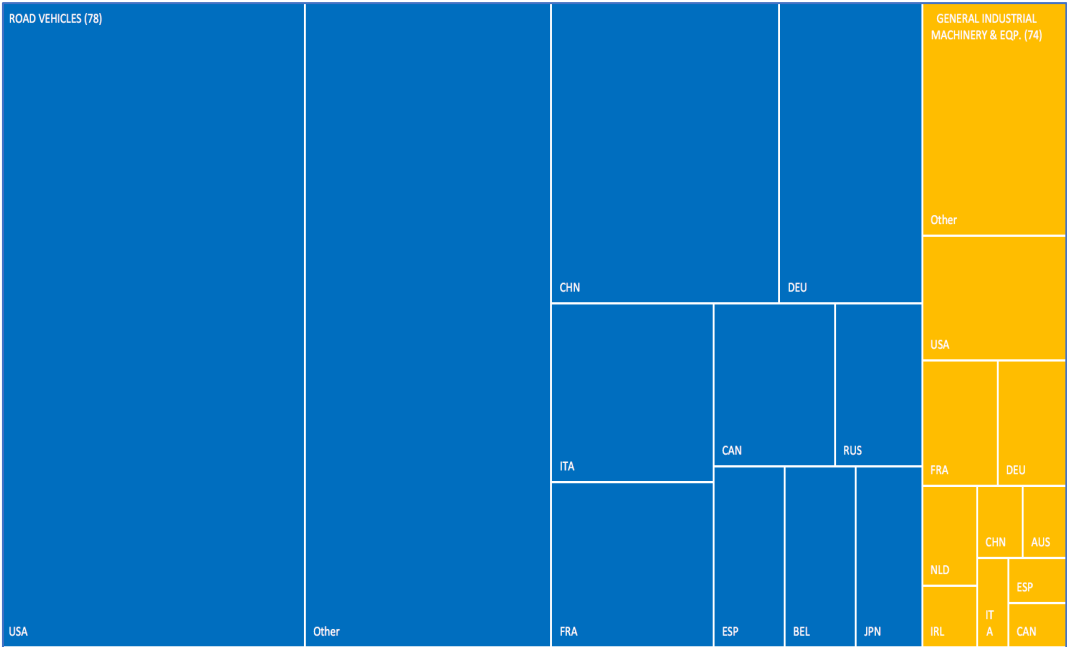
(a) North West



(b) East Midlands



(c) West Midlands



(d) South East



86
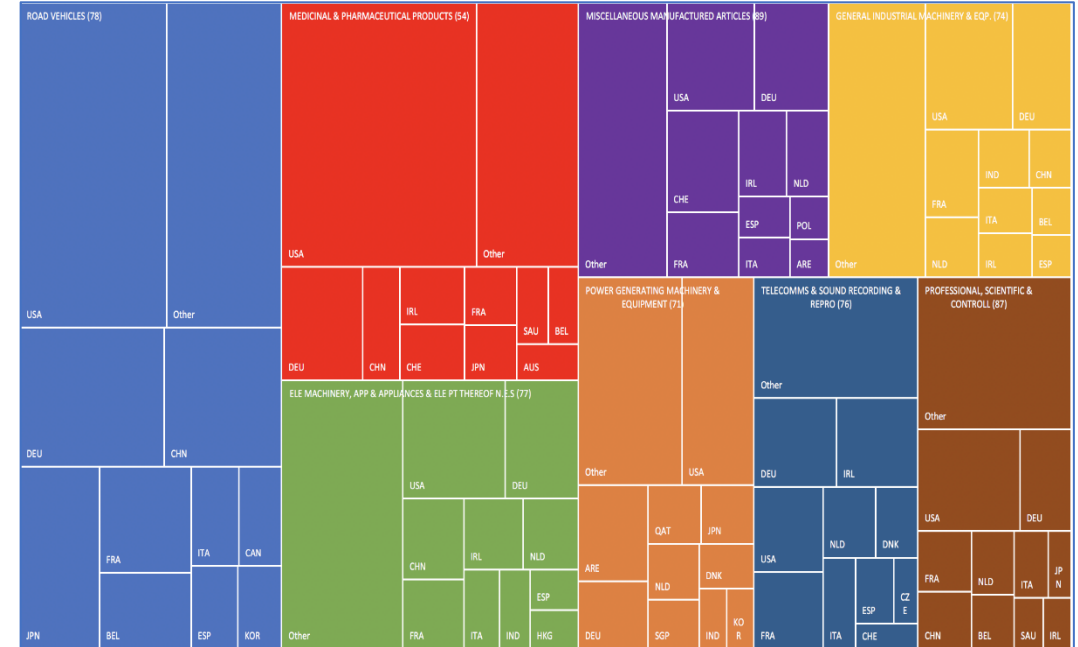
As to imported goods, Figures 4.9 and 4.10 provide the relevant information. With respect to road vehicle imports into the North East (the most important sector), these were (like exports) very EU centred although Japan is ranked 4th as the most important source country and China 10th. This was also the case in the other regions where road vehicle imports were particularly important (Figure 4.10), suggesting that for the motor vehicle industry most regions which specialised in this sector were dependent on backward EU supply-chains (but as the discussion above notes, the forward supply-chain was generally much more USA and China focused except in the North East).

The North East's second largest sector for imports was electrical machinery & appliances, with Japan as the largest supplier, followed by Germany, the USA and China. This same industry in the regions shown in Figure 4.10 also imported from a similar set of countries. In addition, the North West was a major importer of petroleum-based products, especially from the USA, Russia and Algeria.; apparel & clothing products, principally from China and Bangladesh; and electrical machinery imported mainly from China, Germany and the USA.

Imports into the East Midlands were similar in product types to exports, with power generating machinery & equipment the largest sector for imports, and many of the same countries being both major exporters and importers of goods from/to the East Midlands (e.g., USA, Japan, Netherlands, Germany, and China). For the West Midlands, the general industrial machinery sector was both a major source of imports (and exports, with similar countries featuring in the supply-chain). Lastly for the South East, most of the same industries and countries are included in both Figures 4.8 and 4.10 (the main exception being the importing of petroleum products which is not a major export sector for the South East).

Overall, Figures 4.7 – 4.10 tend to confirm that in terms of the major products exported and imported, and associated major purchasers and suppliers, the North East is more linked into EU supply chains than other regions where road vehicles is the principle good traded. As already alluded to, this exposes the region more to the consequences for trade of Britain's exit from the EU, irrespective of the type of deal done with regards to a Customs Union between the EU and the UK.

Lastly, on the export and import of goods, as has already been stated disaggregated data is not available at the LEP level, and Figure 4.11 is the best sub-regional breakdown available. Principally, the data shows that Northumberland and Tyne & Wear (the closest approximation here to the NE LEP) is dominated by machinery & transport equipment exports (especially to the EU), which Figure 4.7 shows is mostly driven by road vehicle exports; while the Tees Valley and Durham NUTS2 region is more dependent on the export of chemicals (principally organic chemicals – see Figure 4.9) where the EU is concerned, but in the case of non-EU exports miscellaneous manufactured goods and goods classified by material are relatively more important. Overall, exports from Tees Valley and Durham are more diversified in terms of goods exported and significantly less linked to EU markets compared to Northumberland and Tyne & Wear (the correlation between the first two data columns in Figure 4.11 is 0.99, showing the close correspondence between what is exported to EU and non-EU markets from Northumberland and Tyne & Wear; the correlation between columns 3 and 4 is 0.32, indicating much greater diversity of products sold to the EU and non-EU from Tees Valley and Durham).

Figure 4.9 Most important goods imported and market, North East, 2019[a]



| ROAD VEHICLES (78) | | | ELECTRIC MACHINERY, APP & APPLIANCES (77) | |
| --- | --- | --- | --- | --- |

ROAD VEHICLES (78)

ESP

FRA

Other — DEU

JPN

POL — NLD

CZE — BEL — ITA — CHN

ELECTRIC MACHINERY, APP & APPLIANCES (77)

JPN — Other

DEU — CHN — FRA

USA — TUR — AUT — NLD — EGY — ESP

# Figure 4.10: Most important goods imported and market, North West, East Midlands, West Midlands and South East 2019[a]

### (a) North West



### (b) East Midlands



### (c) West Midlands



### (d) South East



89
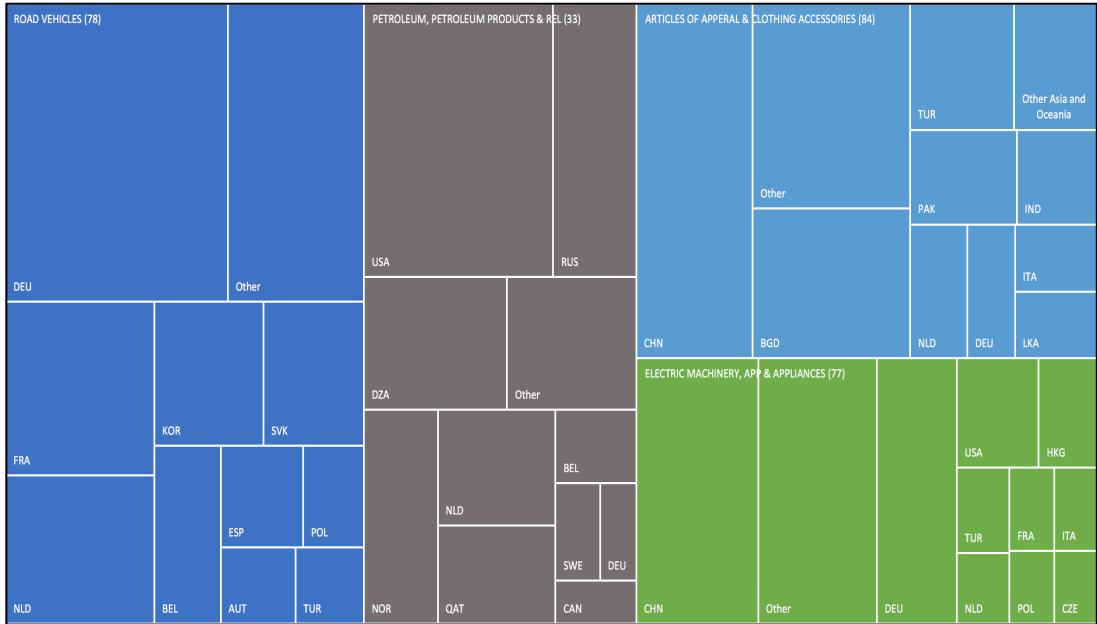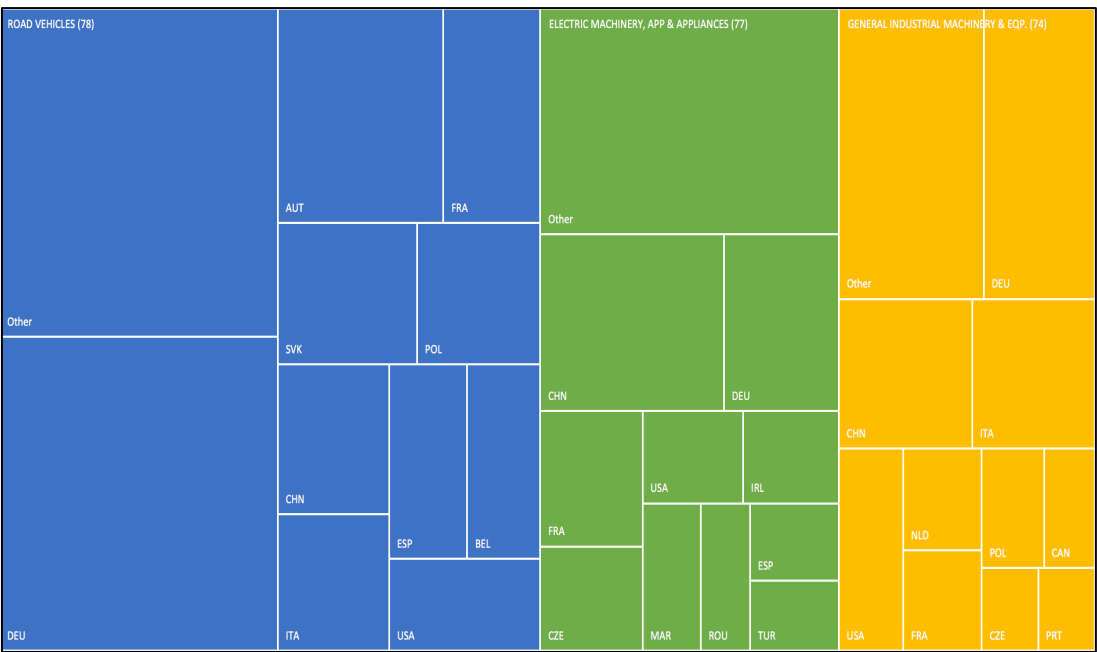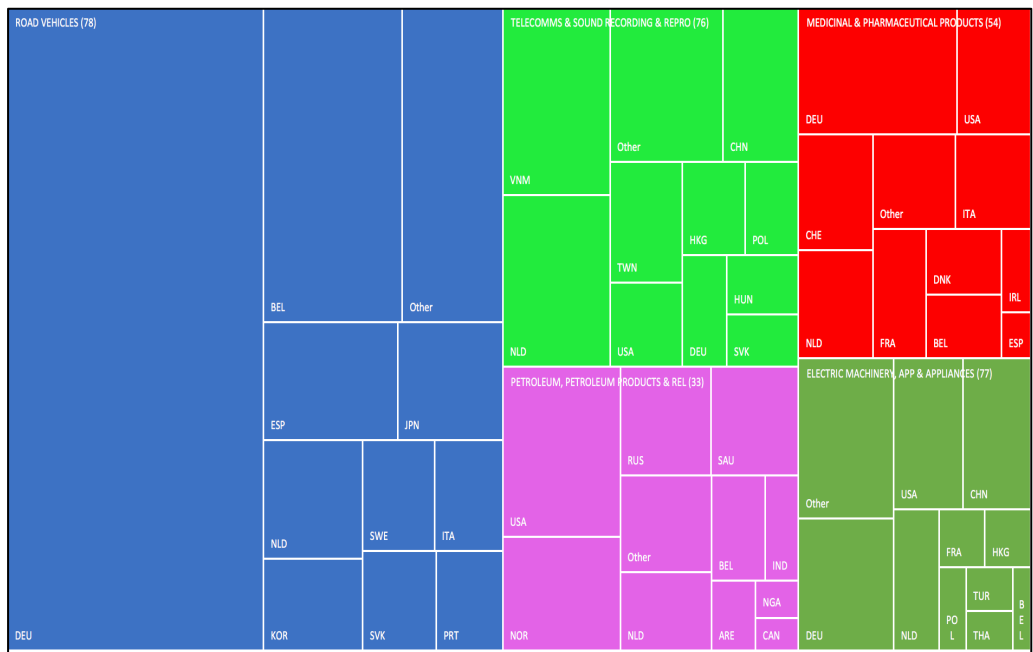
Figure 4.11: Goods exported and imported by Northumberland and Tyne & Wear (N & TW), Tees Valley & Durham (TV & D), 2019, by SITC level 1 groups



Legend:
- Machinery & transport equipment
- Chemicals & related products
- Miscellaneous manufactured articles
- Manufactured goods classified chiefly by material
- Food & live animals
- Crude materials, inedible, except fuels
- Beverages & tobacco
- miscell.
- Mineral fuels, lubricants & related materials

Y-axis: £m 2019, scale 0 to 6,000

Exports to EU (N & T&W): Machinery 72.0%, Chemicals 12.5%, Miscellaneous 8.1%, Manufactured goods 4.7%, 1.9%
Exports to Non-EU (N & T&W): Machinery 65.7%, Chemicals 10.1%, Miscellaneous 12.2%, Manufactured goods 9.2%, 1.4%
Exports to EU (TV & D): Machinery 32.6%, Chemicals 39.3%, Miscellaneous 8.5%, Manufactured goods 16.0%, 2.3%
Exports to Non-EU (TV & D): Machinery 26.9%, 0.4%, Miscellaneous 32.8%, Manufactured goods 30.7%, 1.2%, 2.8%, 4.8%
Imports from EU (N & T&W): Machinery 50.8%, Chemicals 20.8%, Miscellaneous 8.7%, Manufactured goods 13.3%, 4.2%, 1.2%
Imports from Non-EU (N & T&W): Machinery 46.2%, Chemicals 5.0%, Miscellaneous 29.1%, Manufactured goods 12.5%, 1.4%, 5.2%
Imports from EU (TV & D): Machinery 26.7%, Chemicals 22.7%, Miscellaneous 7.7%, Manufactured goods 19.7%, 10.1, 5.1%, 6.3%
Imports from Non-EU (TV & D): Machinery 30.6%, Chemicals 16.7%, Miscellaneous 13.0%, Manufactured goods 18.0%, 2.1%, 8.6%, 9.8%

ONS Regional trade in goods statistics disaggregated by smaller geographical areas: 2019

For imports, those arriving from the EU in 2019 into Northumberland and Tyne & Wear mirrored to a large extent the composition of exports to the EU (the correlation between these two sets of figures is 0.96). Imports from non-EU countries into Northumberland and Tyne & Wear were also similar to the composition of exports to non-EU countries (correlation is 0.90), and goods exports and imports to/from the EU for Tees Valley and Durham were also similar in make-up (correlation 0.92). However, the type of goods exported and imported to/from non-EU countries for Tees Valley and Durham were far less similar (correlation of 0.64).

In addition to showing the greater concentration on road vehicles in Northumberland and Tyne & Wear, and the relatively greater concentration on chemicals in Tees Valley and Durham, Figure 4.11 also shows that Tees Valley and Durham had a more diverse international trading pattern with respect to goods (although this conclusion is, to some extent, caveated by the aggregate nature of the data).

Appendix to Chapter 4

Table A4.1: GVA and trade data, current prices £m, 2018

| | GVA | Export of goods | Export of services | Import of goods | Import of services |
|---|---|---|---|---|---|
| North East | 54,631 | 13,169 | 7,009 | 13,999 | 5,678 |
| TVCA | 13,735 | 3,278 | 2,165 | 3,423 | 1,861 |
| NELEP | 40,896 | 9,891 | 4,845 | 10,576 | 3,819 |
| North West | 183,162 | 27,862 | 20,772 | 38,809 | 17,468 |
| Yorkshire and The Humber | 123,612 | 18,174 | 12,251 | 33,701 | 10,595 |
| East Midlands | 108,966 | 22,170 | 9,565 | 27,759 | 8,566 |
| West Midlands | 141,405 | 33,439 | 17,609 | 37,786 | 11,486 |
| East of England | 164,580 | 28,279 | 18,904 | 46,987 | 17,850 |
| London | 450,278 | 37,466 | 132,159 | 65,757 | 66,381 |
| South East | 277,256 | 46,995 | 43,986 | 95,410 | 27,473 |
| South West | 139,381 | 21,457 | 13,031 | 24,175 | 10,674 |
| Wales | 65,089 | 17,190 | 7,432 | 18,354 | 5,317 |
| Scotland | 142,121 | 32,233 | 21,651 | 25,371 | 14,076 |
| Northern Ireland | 42,201 | 8,895 | 2,502 | 7,798 | 1,729 |
| United Kingdom | 1,908,608 | 346,499 | 306,870 | 483,255 | 197,292 |

Source: ONS Regional trade in goods statistics disaggregated by smaller geographical areas: 2019; ONS International trade in services by subnational areas of the UK: 2018; and ONS Regional gross domestic product all NUTS level regions

Table A4.2: Value of trade[a] in UK regions, 2018/19 (£m current prices)

| | Goods (2019) | | | | Services (2018) | | | | Total | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | EU exports | Non-EU exports | EU imports | Non-EU imports | EU exports | Non-EU exports | EU imports | Non-EU imports | Goods exports | Service exports | Goods imports | Service imports |
| North East | 7,883 | 5,373 | 8,389 | 6,047 | 3,442 | 3,566 | 2,557 | 3,121 | 13,256 | 7,008 | 14,436 | 5,678 |
| TVCA | 1,705 | 1,604 | 1,578 | 1,763 | 1,334 | 834 | 668 | 1,189 | 3,309 | 2,168 | 3,342 | 1,858 |
| NELEP | 6,178 | 3,769 | 6,811 | 4,284 | 1,741 | 3,103 | 1,888 | 1,932 | 9,947 | 4,844 | 11,094 | 3,820 |
| North West | 14,202 | 13,047 | 21,280 | 16,634 | 8,502 | 12,270 | 8,982 | 8,486 | 27,249 | 20,772 | 37,914 | 17,468 |
| Yorks-Humber | 9,813 | 7,221 | 16,582 | 15,489 | 5,557 | 6,694 | 5,651 | 4,944 | 17,034 | 12,251 | 32,071 | 10,595 |
| East Midlands | 12,032 | 12,291 | 15,960 | 13,083 | 5,535 | 4,030 | 4,866 | 3,699 | 24,323 | 9,565 | 29,043 | 8,565 |
| West Midlands | 14,507 | 17,101 | 22,527 | 13,869 | 5,804 | 11,805 | 6,211 | 5,275 | 31,608 | 17,609 | 36,396 | 11,486 |
| East | 14,065 | 14,890 | 28,826 | 16,164 | 8,994 | 9,909 | 9,758 | 8,092 | 28,955 | 18,903 | 44,990 | 17,850 |
| London | 19,335 | 24,569 | 35,372 | 38,068 | 46,909 | 85,250 | 29,431 | 36,950 | 43,904 | 132,159 | 73,440 | 66,381 |
| South East | 21,828 | 24,665 | 60,991 | 37,400 | 21,424 | 22,562 | 13,571 | 13,902 | 46,493 | 43,986 | 98,391 | 27,473 |
| South West | 9,310 | 11,904 | 10,562 | 13,819 | 5,907 | 7,124 | 5,822 | 4,852 | 21,214 | 13,031 | 24,381 | 10,674 |
| Wales | 10,693 | 7,012 | 6,810 | 11,312 | 3,072 | 4,360 | 3,023 | 2,294 | 17,705 | 7,432 | 18,122 | 5,317 |
| Scotland | 16,506 | 17,130 | 9,833 | 13,666 | 7,925 | 13,726 | 5,979 | 8,097 | 33,636 | 21,651 | 23,499 | 14,076 |
| Northern Ireland | 5,338 | 3,756 | 5,191 | 2,691 | 1,480 | 1,022 | 1,123 | 605 | 9,094 | 2,502 | 7,882 | 1,728 |
| United Kingdom | 167,153 | 179,347 | 262,382 | 220,873 | 124,552 | 182,318 | 96,976 | 100,316 | 346,500 | 306,870 | 483,255 | 197,292 |

[a] Only trade that can be allocated to regions is included.    Source:    as Table A4.1

93

Table A4.3: Percentage of goods exports by country, 2019

| Country | North East | North West | Yorks-Humber | East Midlands | West Midlands | East | London | South East | South West | Wales | Scotland | Northern Ireland |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Netherlands | 12.3 | 6.8 | 10.7 | 4.1 | 3.9 | 6.0 | 5.8 | 6.1 | 3.0 | 5.5 | 17.4 | 3.1 |
| United States | 9.2 | 14.8 | 10.0 | 11.8 | 22.2 | 15.0 | 18.6 | 20.1 | 18.7 | 15.5 | 11.8 | 12.9 |
| Germany | 8.8 | 11.3 | 8.4 | 11.2 | 10.3 | 11.0 | 9.6 | 10.6 | 12.4 | 16.2 | 10.4 | 5.1 |
| Spain | 7.8 | 3.5 | 2.8 | 3.8 | 2.6 | 3.7 | 2.7 | 2.7 | 2.3 | 2.7 | 2.5 | 1.9 |
| Belgium | 5.9 | 4.0 | 6.3 | 6.1 | 2.5 | 4.8 | 2.1 | 4.4 | 2.2 | 3.1 | 1.7 | 2.2 |
| France | 4.7 | 6.6 | 7.1 | 7.5 | 6.9 | 5.8 | 8.0 | 5.9 | 10.9 | 15.9 | 5.5 | 4.4 |
| Italy | 4.5 | 3.3 | 3.6 | 3.2 | 3.9 | 3.4 | 2.8 | 2.9 | 2.5 | 1.5 | 2.1 | 1.2 |
| Irish Republic | 3.4 | 6.6 | 7.0 | 5.5 | 5.6 | 5.7 | 5.4 | 5.2 | 3.8 | 9.5 | 3.7 | 34.8 |
| Japan | 2.8 | 1.4 | 1.0 | 2.3 | 1.5 | 3.0 | 1.4 | 2.9 | 2.9 | 1.7 | 1.5 | 0.7 |
| Poland | 2.8 | 2.0 | 2.0 | 1.4 | 1.7 | 1.4 | 1.9 | 1.5 | 1.0 | 0.8 | 1.4 | 1.1 |
| Sweden | 2.7 | 1.4 | 2.9 | 2.3 | 1.4 | 1.3 | 1.3 | 1.3 | 1.2 | 1.7 | 1.1 | 0.6 |
| China | 2.5 | 5.6 | 4.9 | 3.1 | 7.1 | 6.0 | 2.9 | 4.0 | 2.8 | 2.3 | 13.4 | 1.9 |
| Norway | 2.3 | 0.7 | 1.1 | 0.8 | 0.6 | 1.1 | 0.6 | 0.8 | 1.0 | 0.6 | 2.7 | 0.4 |
| Australia | 1.8 | 1.5 | 1.5 | 0.9 | 1.7 | 1.6 | 0.9 | 1.2 | 1.4 | 0.7 | 1.0 | 2.1 |
| Turkey | 1.8 | 1.2 | 1.3 | 2.2 | 0.9 | 2.0 | 1.0 | 0.9 | 1.5 | 1.9 | 0.5 | 0.6 |
| FYR Macedonia | 1.6 | 0.3 | 0.0 | 0.0 | 0.0 | 2.0 | 0.2 | 0.2 | 0.2 | 0.0 | 0.3 | 0.0 |
| Hong Kong | 1.6 | 1.4 | 1.0 | 7.3 | 0.8 | 2.0 | 6.6 | 1.3 | 3.2 | 1.1 | 1.2 | 1.0 |
| Russia | 1.6 | 0.8 | 0.7 | 0.3 | 1.6 | 0.8 | 0.5 | 0.8 | 0.4 | 0.5 | 0.6 | 0.7 |
| Denmark | 1.5 | 0.9 | 1.3 | 0.6 | 0.7 | 0.7 | 0.5 | 1.3 | 0.8 | 0.3 | 0.7 | 0.6 |
| India | 1.3 | 1.2 | 1.5 | 0.8 | 1.0 | 1.6 | 2.3 | 1.3 | 1.7 | 0.7 | 1.2 | 0.3 |
| South Korea | 1.0 | 1.1 | 0.8 | 0.6 | 1.3 | 0.9 | 1.1 | 1.2 | 1.7 | 1.2 | 0.8 | 0.3 |
| Austria | 0.8 | 0.8 | 0.7 | 0.4 | 1.3 | 0.6 | 0.4 | 0.6 | 0.4 | 0.3 | 0.2 | 0.3 |
| Czech Republic | 0.8 | 0.7 | 0.7 | 0.6 | 0.7 | 0.5 | 0.6 | 1.0 | 0.7 | 0.5 | 0.4 | 0.8 |
| Finland | 0.8 | 0.5 | 0.7 | 0.4 | 0.5 | 0.4 | 0.2 | 0.3 | 0.3 | 0.3 | 0.4 | 0.7 |
| Israel | 0.8 | 0.3 | 0.3 | 0.8 | 0.3 | 0.4 | 0.5 | 0.4 | 0.4 | 0.3 | 0.3 | 0.3 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| UAE | 0.8 | 1.4 | 1.2 | 1.7 | 1.4 | 1.2 | 1.9 | 1.8 | 4.3 | 2.6 | 1.6 | 0.8 |
| Mexico | 0.7 | 0.3 | 0.4 | 0.2 | 0.4 | 0.6 | 0.3 | 0.5 | 0.3 | 0.4 | 0.4 | 0.8 |
| Saudi Arabia | 0.7 | 2.4 | 0.7 | 0.7 | 0.8 | 1.0 | 0.9 | 1.3 | 0.9 | 0.6 | 0.7 | 0.7 |
| Singapore | 0.7 | 1.1 | 1.0 | 6.3 | 0.8 | 0.7 | 1.2 | 1.1 | 2.7 | 1.3 | 1.8 | 1.2 |
| South Africa | 0.7 | 0.6 | 0.6 | 0.7 | 0.6 | 0.8 | 0.4 | 0.7 | 0.4 | 0.4 | 0.5 | 0.6 |
| Egypt | 0.6 | 0.8 | 0.4 | 0.2 | 0.3 | 0.5 | 0.2 | 0.4 | 0.4 | 0.2 | 0.4 | 0.3 |
| Brazil | 0.5 | 0.5 | 0.8 | 0.4 | 0.6 | 0.8 | 0.4 | 0.6 | 0.5 | 0.5 | 0.9 | 0.2 |
| Canada | 0.5 | 1.8 | 2.3 | 1.7 | 2.3 | 1.4 | 0.6 | 1.3 | 1.7 | 1.3 | 1.2 | 6.6 |
| Hungary | 0.5 | 0.5 | 0.5 | 0.3 | 0.7 | 0.6 | 0.2 | 0.5 | 0.5 | 0.2 | 0.2 | 0.2 |
| Portugal | 0.5 | 0.5 | 0.6 | 0.6 | 0.4 | 0.7 | 0.5 | 0.5 | 0.3 | 0.4 | 0.3 | 0.4 |
| Switzerland | 0.5 | 1.5 | 2.3 | 0.6 | 1.3 | 1.1 | 6.3 | 2.6 | 1.0 | 0.7 | 0.5 | 0.8 |
| Chile | 0.4 | 0.2 | 0.2 | 0.8 | 0.2 | 0.2 | 0.1 | 0.1 | 0.2 | 0.1 | 0.2 | 0.2 |
| Romania | 0.4 | 0.7 | 0.5 | 0.3 | 0.5 | 0.4 | 0.3 | 0.4 | 0.3 | 0.2 | 0.3 | 0.3 |
| Slovakia | 0.4 | 0.5 | 0.2 | 0.3 | 1.3 | 0.3 | 0.1 | 0.2 | 0.1 | 0.5 | 0.1 | 0.1 |
| Indonesia | 0.3 | 0.2 | 0.2 | 0.1 | 0.2 | 0.3 | 0.1 | 0.2 | 0.3 | 0.1 | 0.2 | 0.1 |
| Malaysia | 0.3 | 0.4 | 0.4 | 0.3 | 0.3 | 0.4 | 0.4 | 0.4 | 0.5 | 0.2 | 0.7 | 0.3 |
| Morocco | 0.3 | 0.3 | 0.1 | 0.1 | 0.3 | 0.2 | 0.2 | 0.2 | 0.1 | 0.1 | 0.2 | 0.6 |
| New Zealand | 0.3 | 0.3 | 0.3 | 0.3 | 0.4 | 0.3 | 0.2 | 0.2 | 0.3 | 0.2 | 0.1 | 0.3 |
| Sri Lanka | 0.3 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 | 0.1 | 0.1 |
| Taiwan | 0.3 | 0.4 | 0.4 | 0.2 | 0.3 | 0.5 | 0.4 | 0.5 | 0.3 | 0.6 | 0.7 | 0.2 |
| Other Eastern Europe | 0.3 | 0.1 | 0.2 | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 | 0.1 | 0.1 |
| Other Sub-Saharan Africa | 0.3 | 0.2 | 0.3 | 0.2 | 0.1 | 0.2 | 0.2 | 0.2 | 0.3 | 0.1 | 0.4 | 0.3 |
| Argentina | 0.2 | 0.2 | 0.1 | 0.1 | 0.1 | 0.3 | 0.1 | 0.2 | 0.1 | 0.0 | 0.1 | 0.2 |
| Colombia | 0.2 | 0.1 | 0.2 | 0.4 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.5 | 0.2 | 0.1 |
| Ecuador | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 |
| Greece | 0.2 | 0.3 | 0.3 | 0.4 | 0.3 | 0.3 | 0.4 | 0.4 | 0.2 | 0.2 | 0.2 | 0.2 |
| Kazakhstan | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 0.1 | 0.0 | 0.2 | 0.1 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Luxembourg | 0.2 | 0.1 | 0.1 | 0.0 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 | 0.0 |
| Malta | 0.2 | 0.2 | 0.2 | 0.2 | 0.1 | 0.2 | 0.2 | 0.3 | 0.2 | 0.1 | 0.1 | 0.1 |
| Nigeria | 0.2 | 0.2 | 2.4 | 0.1 | 0.1 | 0.2 | 0.6 | 0.2 | 0.1 | 0.1 | 0.2 | 0.3 |
| Qatar | 0.2 | 0.4 | 0.3 | 0.8 | 0.4 | 0.6 | 1.4 | 0.7 | 2.1 | 1.1 | 0.5 | 0.6 |
| Thailand | 0.2 | 0.3 | 0.3 | 0.4 | 0.2 | 0.4 | 0.4 | 0.4 | 0.3 | 0.2 | 0.2 | 2.2 |
| Vietnam | 0.2 | 0.3 | 0.3 | 0.1 | 0.1 | 0.3 | 0.1 | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 |
| Other Asia and Oceania | 0.2 | 0.7 | 0.2 | 0.2 | 0.4 | 0.4 | 0.3 | 0.3 | 0.4 | 0.2 | 0.2 | 0.3 |
| Other Latin America and the Caribbean | 0.1 | 0.1 | 0.2 | 0.1 | 0.1 | 0.1 | 0.2 | 0.1 | 0.1 | 0.1 | 0.2 | 0.3 |
| Algeria | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 | 0.1 | 0.0 | 0.2 | 0.2 | 0.0 | 0.1 | 0.0 |
| Angola | 0.1 | 0.1 | 0.0 | 0.1 | 0.0 | 0.1 | 0.0 | 0.1 | 0.1 | 0.1 | 0.2 | 0.1 |
| Azerbaijan | 0.1 | 0.1 | 0.1 | 0.0 | 0.1 | 0.0 | 0.1 | 0.1 | 0.2 | 0.1 | 0.2 | 0.0 |
| Bangladesh | 0.1 | 0.1 | 0.2 | 0.1 | 0.1 | 0.2 | 0.1 | 0.1 | 0.1 | 0.0 | 0.0 | 0.1 |
| Bulgaria | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| Estonia | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 | 0.1 | 0.1 |
| Ghana | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 | 0.2 | 0.1 |
| Guatemala | 0.1 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Iceland | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 | 0.1 | 0.1 |
| Jordan | 0.1 | 0.1 | 0.1 | 0.0 | 0.1 | 0.1 | 0.1 | 0.2 | 0.0 | 0.1 | 0.0 | 0.1 |
| Kenya | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| Kuwait | 0.1 | 0.2 | 0.2 | 0.1 | 0.4 | 0.1 | 0.2 | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 |
| Latvia | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 | 0.4 | 0.1 |
| Lebanon | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 | 0.1 | 0.1 | 0.1 |
| Lithuania | 0.1 | 0.2 | 0.3 | 0.1 | 0.1 | 0.1 | 0.3 | 0.2 | 0.1 | 0.1 | 0.2 | 0.1 |
| Oman | 0.1 | 0.2 | 0.1 | 0.1 | 0.2 | 0.1 | 0.2 | 0.2 | 0.2 | 0.1 | 0.2 | 0.1 |
| Pakistan | 0.1 | 0.2 | 0.1 | 0.3 | 0.1 | 0.2 | 0.2 | 0.1 | 0.2 | 0.1 | 0.1 | 0.1 |
| Panama | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 |
| Peru | 0.1 | 0.1 | 0.1 | 0.0 | 0.1 | 0.1 | 0.0 | 0.1 | 0.0 | 0.0 | 0.1 | 0.0 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Slovenia | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 | 0.1 | 0.1 |
| Trinidad &Tobago | 0.1 | 0.0 | 0.1 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 |
| Ukraine | 0.1 | 0.1 | 0.2 | 0.1 | 0.2 | 0.2 | 0.2 | 0.2 | 0.1 | 0.1 | 0.1 | 0.2 |
| Other Middle East and North Africa | 0.1 | 0.2 | 0.2 | 0.1 | 0.2 | 0.2 | 0.2 | 0.3 | 0.1 | 0.1 | 0.1 | 0.2 |
| Bahrain | 0.0 | 0.1 | 0.1 | 0.4 | 0.1 | 0.1 | 0.3 | 0.1 | 0.2 | 0.1 | 0.1 | 0.0 |
| Cameroon | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Congo (Republic) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Costa Rica | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Croatia | 0.0 | 0.1 | 0.1 | 0.1 | 0.0 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| Cyprus | 0.0 | 0.2 | 0.1 | 0.1 | 0.1 | 0.2 | 0.2 | 0.1 | 0.2 | 0.0 | 0.1 | 0.1 |
| Dominican Rep | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | 0.0 |
| Equatorial Guinea | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Ethiopia | 0.0 | 0.0 | 0.0 | 0.7 | 0.0 | 0.1 | 0.0 | 0.3 | 0.3 | 0.1 | 0.1 | 0.0 |
| Falkland Islands | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Georgia | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Gibraltar | 0.0 | 0.1 | 0.1 | 0.1 | 0.5 | 0.1 | 0.1 | 0.1 | 0.1 | 0.3 | 0.1 | 0.0 |
| Honduras | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Iraq | 0.0 | 0.2 | 0.1 | 0.1 | 0.2 | 0.2 | 0.1 | 0.1 | 0.1 | 0.0 | 0.1 | 0.1 |
| Ivory Coast | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 |
| Mauritius | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Senegal | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.3 | 0.0 | 0.0 | 0.1 | 0.0 |
| Serbia | 0.0 | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 |
| Tanzania | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 |
| Uruguay | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 |
| Venezuela | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Other North America | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Other Western Europe | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 |
| Correlation with NE | | 0.859 | 0.911 | 0.790 | 0.734 | 0.863 | 0.754 | 0.806 | 0.723 | 0.747 | 0.833 | 0.399 |

Table A4.4: Percentage of goods imports by country, 2019

| | North East | North West | Yorks-Humber | East Midlands | West Midlands | East | London | South East | South West | Scotland | Wales | Northern Ireland |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Germany | 13.6 | 14.7 | 9.6 | 14.4 | 17.1 | 13.8 | 7.9 | 23.2 | 10.2 | 7.9 | 10.2 | 6.8 |
| France | 9.9 | 5.5 | 4.3 | 4.5 | 5.9 | 6.1 | 9.8 | 4.9 | 5.6 | 4.0 | 4.1 | 4.0 |
| China | 8.4 | 12.2 | 10.1 | 9.9 | 11.0 | 7.3 | 15.1 | 6.7 | 10.0 | 12.1 | 6.4 | 9.3 |
| United States | 7.3 | 7.2 | 6.0 | 9.3 | 5.7 | 7.3 | 6.6 | 8.8 | 16.2 | 12.4 | 17.6 | 10.0 |
| Netherlands | 7.1 | 8.7 | 16.7 | 9.3 | 6.1 | 13.1 | 7.5 | 8.1 | 7.2 | 9.0 | 5.4 | 8.4 |
| Japan | 7.0 | 0.8 | 0.5 | 4.4 | 2.0 | 1.8 | 0.8 | 1.9 | 3.1 | 1.4 | 3.5 | 1.8 |
| Spain | 6.3 | 2.8 | 2.1 | 3.0 | 3.6 | 5.2 | 3.3 | 2.7 | 2.5 | 1.9 | 2.4 | 2.4 |
| Belgium | 4.0 | 5.2 | 4.3 | 6.6 | 4.9 | 6.7 | 4.3 | 6.6 | 2.7 | 3.1 | 3.5 | 4.3 |
| Italy | 3.5 | 4.8 | 3.3 | 4.6 | 4.6 | 5.9 | 5.0 | 3.3 | 3.9 | 3.1 | 2.3 | 3.9 |
| Poland | 2.8 | 2.3 | 1.4 | 2.4 | 3.2 | 2.8 | 2.1 | 1.6 | 1.8 | 3.7 | 1.4 | 1.4 |
| Vietnam | 1.6 | 1.0 | 0.6 | 0.7 | 0.7 | 0.5 | 0.6 | 2.1 | 0.9 | 0.6 | 0.3 | 0.3 |
| Turkey | 1.6 | 2.2 | 2.1 | 2.5 | 2.3 | 2.7 | 1.8 | 1.4 | 1.7 | 1.1 | 3.3 | 1.8 |
| Russia | 1.6 | 1.4 | 3.9 | 0.5 | 0.9 | 1.2 | 2.6 | 1.0 | 0.9 | 1.6 | 1.4 | 0.6 |
| Czech Republic | 1.6 | 1.1 | 0.7 | 1.6 | 2.2 | 0.9 | 0.8 | 1.8 | 1.2 | 1.2 | 0.8 | 0.8 |
| Irish Republic | 1.4 | 2.4 | 2.2 | 1.6 | 2.8 | 3.3 | 2.6 | 1.3 | 2.3 | 2.3 | 1.6 | 29.3 |
| India | 1.4 | 1.8 | 1.7 | 2.1 | 2.2 | 1.6 | 2.1 | 1.1 | 2.0 | 1.6 | 2.0 | 1.3 |
| Portugal | 1.2 | 0.7 | 0.4 | 0.5 | 1.6 | 0.5 | 0.5 | 0.8 | 0.4 | 0.4 | 0.6 | 0.4 |
| Denmark | 1.1 | 2.2 | 1.3 | 1.6 | 1.0 | 0.7 | 0.9 | 2.5 | 1.5 | 1.4 | 0.6 | 0.6 |
| Austria | 1.1 | 1.1 | 0.7 | 0.8 | 2.4 | 0.5 | 0.4 | 0.8 | 0.7 | 0.5 | 0.6 | 0.7 |
| Canada | 1.1 | 1.3 | 1.0 | 0.8 | 0.7 | 0.7 | 0.5 | 0.7 | 1.4 | 1.0 | 2.6 | 0.4 |
| South Africa | 1.1 | 0.5 | 0.7 | 0.8 | 0.6 | 1.4 | 1.2 | 0.3 | 0.5 | 0.7 | 1.0 | 0.3 |
| Sweden | 1.0 | 1.4 | 1.9 | 1.7 | 1.7 | 1.1 | 1.0 | 1.4 | 1.3 | 1.4 | 1.8 | 1.1 |
| Ukraine | 1.0 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.3 | 0.2 | 0.2 |
| South Korea | 0.9 | 1.1 | 0.3 | 0.8 | 0.9 | 0.7 | 0.5 | 1.3 | 1.3 | 0.5 | 2.0 | 0.4 |
| Norway | 0.8 | 1.2 | 12.8 | 0.3 | 0.3 | 0.7 | 3.2 | 1.3 | 0.6 | 10.3 | 3.5 | 0.1 |

| Country | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Indonesia | 0.7 | 0.4 | 0.4 | 0.3 | 0.3 | 0.3 | 0.2 | 0.1 | 0.2 | 0.1 | 0.2 | 0.2 |
| Hungary | 0.7 | 0.5 | 0.4 | 0.6 | 1.0 | 0.9 | 0.3 | 1.0 | 0.4 | 0.5 | 0.2 | 0.1 |
| Hong Kong | 0.7 | 1.2 | 0.8 | 1.5 | 1.1 | 0.8 | 2.5 | 1.4 | 1.7 | 0.9 | 0.8 | 0.7 |
| Bangladesh | 0.7 | 1.1 | 0.8 | 0.8 | 0.7 | 0.5 | 0.6 | 0.3 | 0.8 | 0.9 | 0.7 | 0.9 |
| Romania | 0.7 | 0.6 | 0.2 | 0.4 | 1.0 | 0.7 | 0.5 | 0.2 | 0.3 | 0.2 | 0.4 | 0.1 |
| Finland | 0.6 | 0.5 | 0.8 | 0.3 | 0.8 | 0.5 | 0.5 | 0.2 | 0.4 | 0.5 | 0.3 | 0.4 |
| Luxembourg | 0.6 | 0.2 | 0.2 | 0.1 | 0.3 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 0.3 |
| Australia | 0.5 | 0.2 | 0.4 | 0.3 | 0.2 | 0.3 | 0.4 | 0.6 | 0.5 | 0.3 | 0.4 | 0.3 |
| Mexico | 0.5 | 0.2 | 0.1 | 0.4 | 0.3 | 0.3 | 0.1 | 0.2 | 0.4 | 0.2 | 0.4 | 0.2 |
| Other Asia and Oceania | 0.5 | 1.0 | 0.3 | 0.4 | 0.3 | 0.3 | 0.3 | 0.2 | 0.7 | 0.4 | 0.4 | 0.5 |
| Taiwan | 0.4 | 0.6 | 0.7 | 0.8 | 1.1 | 0.5 | 0.3 | 1.3 | 0.9 | 0.4 | 1.0 | 0.4 |
| Thailand | 0.4 | 0.5 | 0.3 | 0.8 | 0.8 | 0.5 | 0.5 | 0.6 | 1.3 | 0.6 | 0.5 | 0.3 |
| Switzerland | 0.4 | 0.7 | 0.4 | 0.5 | 0.7 | 1.5 | 1.9 | 1.8 | 1.0 | 0.7 | 0.5 | 0.3 |
| Brazil | 0.4 | 0.4 | 0.4 | 0.6 | 0.4 | 0.7 | 0.2 | 0.2 | 0.4 | 0.8 | 1.3 | 0.4 |
| Singapore | 0.4 | 0.4 | 0.2 | 1.1 | 0.6 | 0.4 | 0.5 | 0.4 | 1.5 | 1.5 | 1.0 | 0.1 |
| Slovakia | 0.3 | 0.9 | 0.1 | 0.4 | 1.2 | 0.3 | 0.2 | 1.0 | 0.3 | 0.1 | 0.5 | 0.1 |
| Egypt | 0.3 | 0.2 | 0.1 | 0.2 | 0.4 | 0.2 | 0.2 | 0.1 | 0.2 | 0.2 | 0.2 | 0.1 |
| Malaysia | 0.3 | 0.3 | 0.3 | 0.4 | 0.4 | 0.4 | 0.2 | 0.4 | 1.0 | 1.5 | 0.2 | 0.4 |
| Estonia | 0.3 | 0.1 | 0.1 | 0.0 | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Pakistan | 0.2 | 1.1 | 0.3 | 0.3 | 0.3 | 0.2 | 0.2 | 0.1 | 0.3 | 0.4 | 0.2 | 0.3 |
| Slovenia | 0.2 | 0.1 | 0.1 | 0.1 | 0.2 | 0.2 | 0.1 | 0.1 | 0.1 | 0.0 | 0.1 | 0.1 |
| Sri Lanka | 0.2 | 0.3 | 0.2 | 0.3 | 0.2 | 0.1 | 0.2 | 0.1 | 0.2 | 0.2 | 0.2 | 0.2 |
| Saudi Arabia | 0.2 | 0.5 | 0.1 | 0.2 | 0.2 | 0.1 | 0.9 | 0.9 | 0.4 | 0.4 | 1.4 | 0.1 |
| Bulgaria | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 | 0.0 |
| Lithuania | 0.2 | 0.2 | 0.3 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 0.1 | 0.2 | 0.3 |
| UAE | 0.2 | 0.2 | 0.1 | 0.3 | 0.5 | 0.2 | 0.5 | 0.6 | 2.2 | 0.9 | 2.6 | 0.4 |
| Israel | 0.1 | 0.2 | 0.2 | 0.5 | 0.2 | 0.3 | 0.5 | 0.1 | 0.3 | 0.2 | 0.1 | 0.2 |
| Kenya | 0.1 | 0.0 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 | 0.1 | 0.0 | 0.1 | 0.0 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| New Zealand | 0.1 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.3 | 0.2 | 0.2 | 0.1 | 0.1 | 0.1 |
| Chile | 0.1 | 0.2 | 0.1 | 0.9 | 0.1 | 0.1 | 0.1 | 0.2 | 0.2 | 0.2 | 0.1 | 0.1 |
| Colombia | 0.1 | 0.0 | 0.2 | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 | 0.8 |
| FYR Macedonia | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Greece | 0.1 | 0.2 | 0.2 | 0.2 | 0.1 | 0.2 | 0.4 | 0.3 | 0.2 | 0.1 | 0.1 | 0.1 |
| Morocco | 0.1 | 0.2 | 0.0 | 0.2 | 0.5 | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 | 0.1 | 0.2 |
| Other Eastern Europe | 0.1 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.1 | 0.0 | 0.1 | 0.1 | 0.0 | 0.0 |
| Other Sub-Saharan Africa | 0.1 | 0.2 | 0.1 | 0.1 | 0.1 | 0.2 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 |
| Latvia | 0.0 | 0.2 | 0.5 | 0.1 | 0.1 | 0.3 | 0.1 | 0.1 | 0.2 | 0.2 | 0.2 | 0.2 |
| Oman | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.1 | 0.1 | 0.1 | 0.0 |
| Qatar | 0.0 | 0.5 | 0.0 | 0.1 | 0.2 | 0.1 | 1.4 | 0.3 | 1.0 | 0.4 | 0.7 | 0.0 |
| Algeria | 0.0 | 0.8 | 0.2 | 0.0 | 0.0 | 0.1 | 1.3 | 0.1 | 0.1 | 0.1 | 2.5 | 0.0 |
| Argentina | 0.0 | 0.2 | 0.1 | 0.1 | 0.1 | 0.2 | 0.1 | 0.1 | 0.2 | 0.4 | 0.0 | 0.2 |
| Iceland | 0.0 | 0.1 | 0.5 | 0.1 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.2 | 0.0 | 0.0 |
| Other Latin America and the Caribbean | 0.0 | 0.0 | 0.1 | 0.0 | 0.1 | 0.1 | 0.1 | 0.0 | 0.1 | 0.2 | 0.0 | 0.0 |
| Other Middle East and North Africa | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.1 | 0.1 | 0.1 | 0.0 | 0.8 | 0.0 |
| Bahrain | 0.0 | 0.0 | 0.0 | 0.2 | 0.0 | 0.0 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 |
| Costa Rica | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | 0.1 | 0.0 | 0.1 | 0.0 | 0.1 | 0.0 | 0.0 |
| Ethiopia | 0.0 | 0.0 | 0.0 | 0.5 | 0.0 | 0.0 | 0.0 | 0.0 | 0.3 | 0.1 | 0.1 | 0.0 |
| Malta | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 |
| Peru | 0.0 | 0.1 | 0.0 | 0.3 | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 | 0.1 | 0.0 | 0.0 |
| Serbia | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 0.1 | 0.0 | 0.0 | 0.2 | 0.1 | 0.0 | 0.0 |
| Tanzania | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Angola | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Azerbaijan | 0.0 | 0.0 | 0.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | 0.1 | 0.0 |
| Cyprus | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 |
| Guatemala | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Honduras | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Jordan | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Lebanon | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Mauritius | 0.0 | 0.1 | 0.1 | 0.1 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Nigeria | 0.0 | 0.1 | 0.2 | 0.1 | 0.0 | 0.0 | 1.1 | 0.1 | 0.1 | 0.5 | 1.1 | 0.0 |
| Trinidad & Tobago | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | 0.0 |
| Cameroon | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Congo (Republic) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Croatia | 0.0 | 0.0 | 0.1 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Dominican Rep | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Ecuador | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Equatorial Guinea | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 |
| Falkland Islands | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Georgia | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Ghana | 0.0 | 0.1 | 0.0 | 0.1 | 0.0 | 0.1 | 0.1 | 0.0 | 0.0 | 0.1 | 0.4 | 0.0 |
| Gibraltar | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Iraq | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Ivory Coast | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Kazakhstan | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.3 | 0.0 | 0.2 | 0.2 | 0.0 | 0.0 |
| Kuwait | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.5 | 0.1 | 0.1 | 0.1 | 0.2 | 0.0 |
| Panama | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Senegal | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Uruguay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Venezuela | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.2 |
| Other North America | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Other Western Europe | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 |
| Correlation with NE | | 0.905 | 0.698 | 0.928 | 0.919 | 0.904 | 0.848 | 0.874 | 0.848 | 0.749 | 0.781 | 0.475 |

Table A4.5: Value (£m) of goods exports and imports by country, Northumberland and Tyne & Wear (N & TW), Tees Valley & Durham (TV & D), 2019

| | Exports (N & TW) | Exports (TV & D) | Imports (N & TW) | Imports (TV & D) |
|---|---|---|---|---|
| Netherlands | 1,121 | 506 | 469 | 504 |
| Spain | 848 | 180 | 772 | 134 |
| Belgium | 649 | 133 | 275 | 278 |
| USA | 494 | 719 | 580 | 472 |
| Italy | 429 | 160 | 253 | 204 |
| Germany | 422 | 723 | 1,177 | 704 |
| Norway | 285 | 22 | 30 | 81 |
| Irish Republic | 280 | 157 | 78 | 109 |
| France | 275 | 344 | 1,191 | 206 |
| Poland | 272 | 102 | 273 | 108 |
| Sweden | 217 | 137 | 59 | 82 |
| Japan | 210 | 158 | 766 | 249 |
| Australia | 180 | 53 | 10 | 67 |
| Russia | 177 | 37 | 14 | 215 |
| Denmark | 162 | 28 | 130 | 20 |
| China | 136 | 191 | 750 | 458 |
| Turkey | 100 | 137 | 112 | 122 |
| Israel | 86 | 13 | 5 | 15 |
| India | 86 | 87 | 85 | 108 |
| Finland | 80 | 17 | 11 | 75 |
| Mexico | 71 | 15 | 34 | 40 |
| Singapore | 63 | 30 | 18 | 32 |
| Hong Kong | 57 | 151 | 57 | 42 |
| South Africa | 56 | 30 | 23 | 128 |
| Czech Republic | 55 | 41 | 179 | 37 |
| South Korea | 51 | 75 | 38 | 88 |
| UAE | 50 | 52 | 16 | 6 |
| Egypt | 49 | 25 | 21 | 27 |
| Chile | 46 | 9 | 6 | 4 |
| Saudi Arabia | 45 | 37 | 14 | 9 |
| Brazil | 40 | 28 | 17 | 33 |
| Morocco | 35 | 5 | 5 | 5 |
| Romania | 34 | 20 | 70 | 24 |
| Austria | 33 | 66 | 54 | 88 |
| New Zealand | 33 | 7 | 6 | 11 |
| Other Sub-Saharan Africa | 33 | 3 | 2 | 7 |
| Canada | 32 | 39 | 89 | 64 |
| Hungary | 30 | 37 | 83 | 15 |
| Colombia | 28 | 3 | 1 | 8 |
| Malaysia | 27 | 18 | 23 | 24 |
| Switzerland | 26 | 42 | 19 | 34 |
| Taiwan | 23 | 22 | 27 | 34 |
| Luxembourg | 21 | 6 | 75 | 4 |
| Malta | 21 | 3 | 2 | 1 |
| Ecuador | 21 | 1 | | |
| Greece | 18 | 13 | 5 | 5 |
| Portugal | 18 | 41 | 138 | 25 |
| Qatar | 18 | 10 | 6 | |
| Nigeria | 17 | 12 | 2 | |
| Other Asia and Oceania | 16 | 12 | 60 | 14 |
| Indonesia | 14 | 17 | 91 | 16 |
| Other Latin America and Caribbean | 14 | 3 | 3 | 1 |
| Iceland | 13 | 1 | 1 | 3 |
| Thailand | 13 | 15 | 48 | 10 |
| Kenya | 12 | 2 | 5 | 14 |
| Other Middle East and N Africa (excl EU) | 11 | 2 | 3 | 1 |
| Slovakia | 10 | 35 | 39 | 9 |
| Guatemala | 10 | | 1 | 1 |
| Kazakhstan | 9 | 18 | | |
| Angola | 9 | 1 | 1 | |
| Trinidad & Tobago | 8 | 1 | | 1 |
| Kuwait | 8 | 5 | | 1 |
| Panama | 7 | 4 | | |
| Bangladesh | 7 | 8 | 61 | 35 |
| Azerbaijan | 6 | 2 | 2 | |
| Ghana | 6 | 4 | | |
| Sri Lanka | 6 | 31 | 20 | 8 |
| Estonia | 5 | 2 | 35 | |
| Latvia | 5 | 2 | 4 | 2 |

| | | | | |
|---|---|---|---|---|
| Bulgaria | 5 | 4 | 16 | 3 |
| Algeria | 5 | 7 | | 4 |
| Argentina | 5 | 20 | 2 | 2 |
| Jordan | 5 | 2 | 1 | |
| Pakistan | 5 | 9 | 19 | 8 |
| Lithuania | 4 | 4 | 1 | 19 |
| Slovenia | 4 | 3 | 7 | 19 |
| Costa Rica | 4 | | 1 | 1 |
| Peru | 4 | 4 | 1 | 2 |
| Bahrain | 4 | 1 | 1 | 1 |
| Oman | 4 | 4 | 2 | 4 |
| Vietnam | 4 | 19 | 214 | 23 |
| Other Eastern Europe (excl EU) | 4 | 29 | 7 | 1 |
| Croatia | 3 | 1 | | |
| Cyprus | 3 | 2 | | |
| Ukraine | 3 | 6 | 126 | 21 |
| Serbia | 3 | 2 | 1 | 1 |
| Ivory Coast | 3 | 1 | | |
| Ethiopia | 3 | | 2 | |
| Venezuela | 3 | | | |
| Gibraltar | 2 | 1 | | |
| Uruguay | 2 | 1 | | |
| Lebanon | 2 | 15 | | 1 |
| Iraq | 2 | 3 | | |
| FYR Macedonia | 1 | 209 | 1 | 9 |
| Senegal | 1 | 1 | | 1 |
| Cameroon | 1 | | | |
| Equatorial Guinea | 1 | | | |
| Tanzania | 1 | 1 | | |
| Dominican Rep | 1 | 4 | | |
| Falkland Islands | 1 | | | |
| Georgia | | 1 | | 1 |
| Mauritius | | 1 | 1 | |
| Honduras | | | 1 | |
| Total | 7,842 | 5,265 | 8,848 | 5,243 |
| Correlation with exports (N & TW) | | 0.699 | 0.608 | 0.718 |

*[this page is blank to allow double-sided printing Save Paper]*

## 5. Value of Trade in Services

Figure 4.2 showed the export and import intensities of goods and services across the regions in 2018. Figure 5.1 reorganises the underlying data to show more clearly the relative importance of trade, along with the overall value of the balance of trade (on goods and services) expressed above each region in £ billions (Figure A5.1 provides more information on the balance of trade). Exports are shown using broad bars while imports are represented using narrow bars.

Figure 5.1: Exports and imports in 2018, goods and services, by region (and LEP for North East)
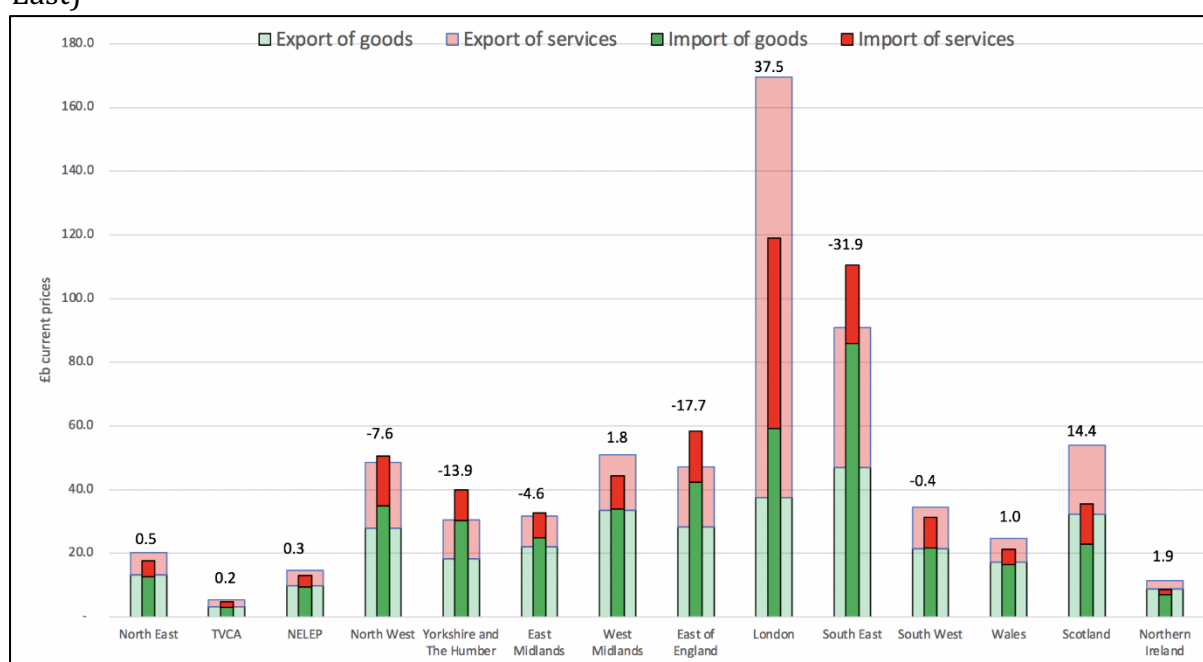


Figures above bars are balance of trade                                    Source: Table A4.1

In nearly every region, the value of exports and imports of goods is larger than the value of exports and imports of services (Figure 5.1 shows that the export of goods far exceeds the export of services in all regions except London and the South East while the import of goods is even larger than the import of services, except in London where this is almost parity). The figures above the bars show the aggregate trade balance (obtained by subtracting the value represented by the narrow bar from the wide bar). Lastly, the diagram shows that all regions in 2018, except Scotland and Northern Ireland, had a trade deficit in goods (the solid green bars exceed the light green bars, especially in London and the South East), while all regions had a trade surplus in services (cf. the red bars, especially London and the South East). Figure A5.1 makes clearer the contribution of different regions to the UK's overall negative balance of trade.

Figure 5.2: Most important services exported and market, North East, 2018
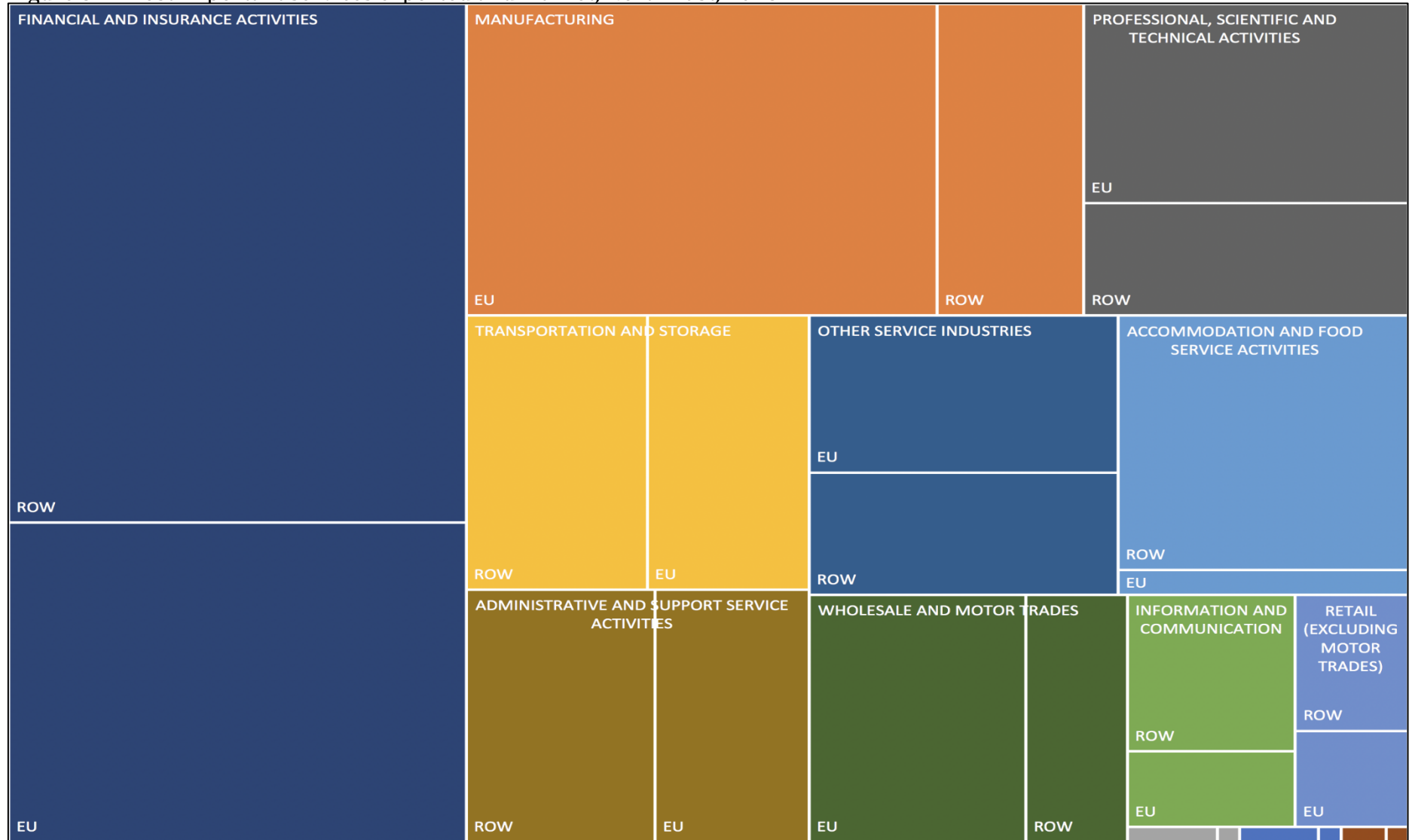


Source: Table A5.2

Thus, while trade in services is not as large as trade in goods, it is still significant and important (and as Figure 4.1 shows, exports of services have been catching-up with the export of goods in the UK over the last few decades).

Information on trade in services comes from several sources (unlike the data on goods trade which is reported to HMRC for custom tax purposes). These are explained and discussed (in terms of their accuracy, especially when obtaining sub-national estimates) in ONS (2016). The most recent 2018 data available by sub-national areas is provided in ONS (2020). This provides information on exports and imports, to the EU and non-EU countries, for a set of sectors and for administrative regions and city-region areas (which here allows the data for the North East to be disaggregated into its two LEP areas). A significant proportion of the data is suppressed by the ONS, but this suppressed information has been estimated by calculating the unallocated totals across regions and then reallocating this back to suppressed cells.

The full set of data is provided in Tables A5.1 and A5.2. Based on this, Figure 5.2 shows those sectors (disaggregated into EU- and non-EU destinations) that accounted for 1% or more of the export of services from the North East. Nearly 33% of service exports was in financial and insurance activities, of which nearly 62% of this total went to the rest of the world, rather than the EA2. The sale of services from manufacturing to the EU was next most important,[25] accounting for 12.5% of total service exports (sales to the rest of the world accounted for a 3.9% of total exports). Sales of professional, scientific and technical services was third largest (principally to the EU), followed by transportation and storage services (fairly evenly split between exports to the EU and those to the rest of the world). The next two most important export sectors were other service industries and accommodation and food service activities.

This pattern of exporting of services is compared with four other regions in Figure 5.3; the North West and Yorkshire-Humberside had a similar distribution (Table A5.3 shows the correlation with the North East exceeded 0.8 for these two regions), while London and Wales were more dissimilar (here the correlation with the North East was 0.6).[26] In all five regions, financial and insurance activities were the leading export sector. The main differences between the North East and the North West and Yorkshire-Humberside was the latter exported little by way of services linked to manufacturing (5.9% of total exports in the North West and 4.4% in Yorkshire-Humberside). The major difference with London was the very small weight placed on manufacturing exports in London, with instead heavy reliance on ICT services exported from London (22.8% overall in 2018, especially the rest of the world) and professional, scientific and technical services (19.9% of the total, of which some two-thirds went to the rest of the world). The major difference between the North East and Wales was a similar reliance on selling manu-services, but for Wales this was overwhelmingly to the rest of the world rather than the EU (the other major difference was the greater reliance in Wales on sales of administrative & support services to the EU, and sale from other service industries to the rest of the world).

---

[25] These have become known as manu-services, and generally relate to bundling service activities around the after-care activities associated with manufacturing goods (here presumably linked especially to road vehicle production), undertaken to extract value from the (global) value chain.

[26] Northern Ireland was the outlier region for service exports; principally because of the relative unimportance of financial and insurance services exports (the correlation between Northern Ireland and the North East in Table A5.3 was -0.07).

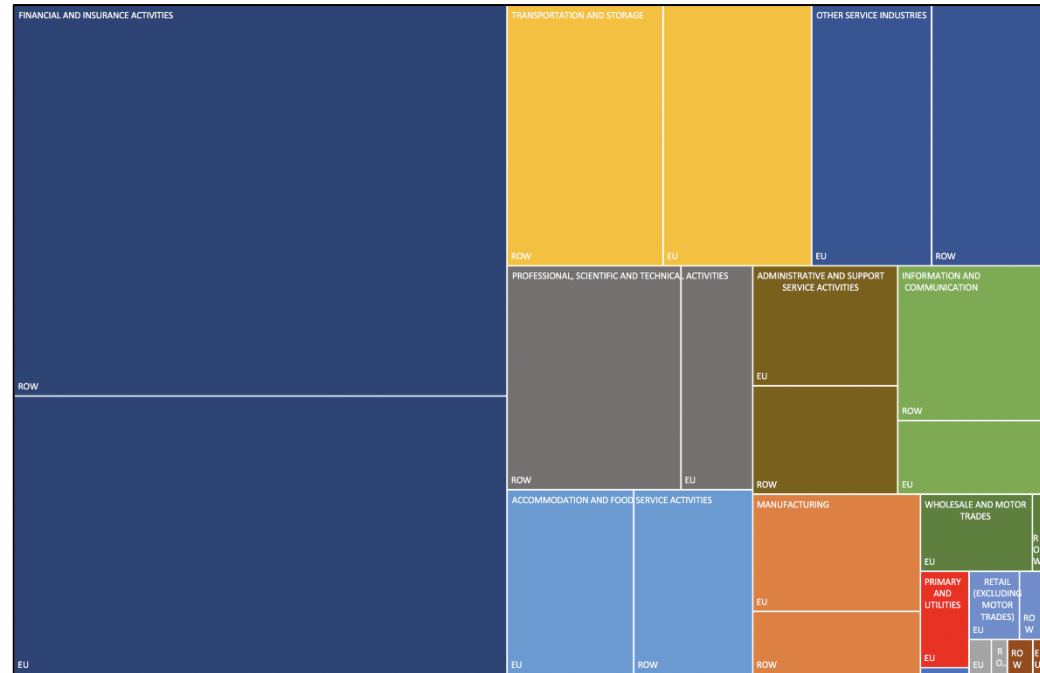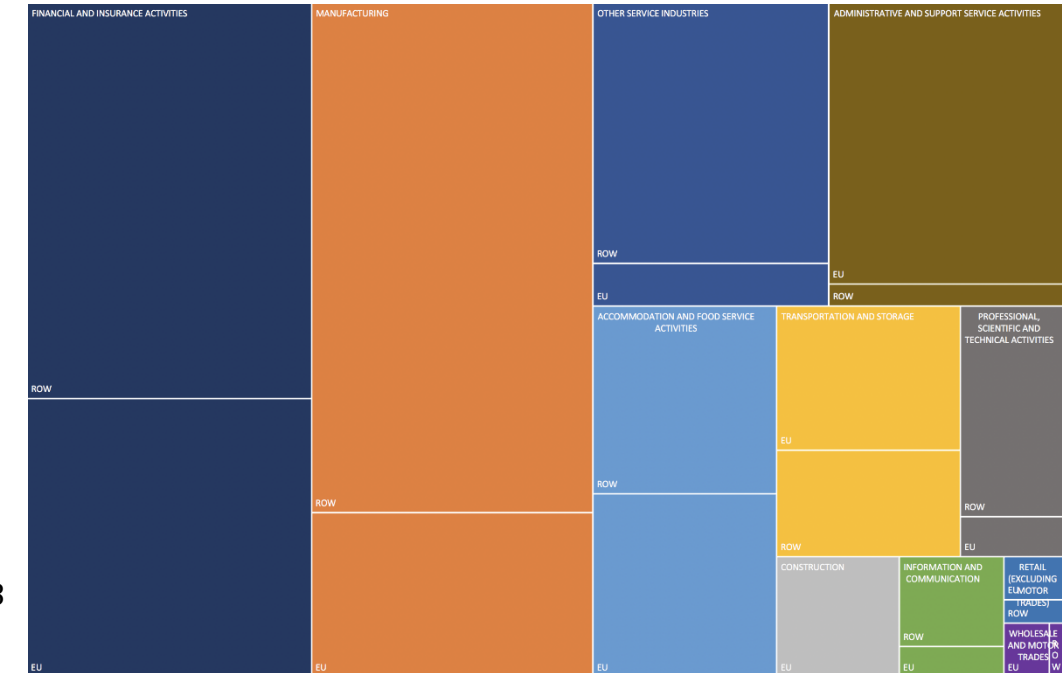Figure 5.3 Most important services exported and market, various regions, 2018

(a) North West



(b) London



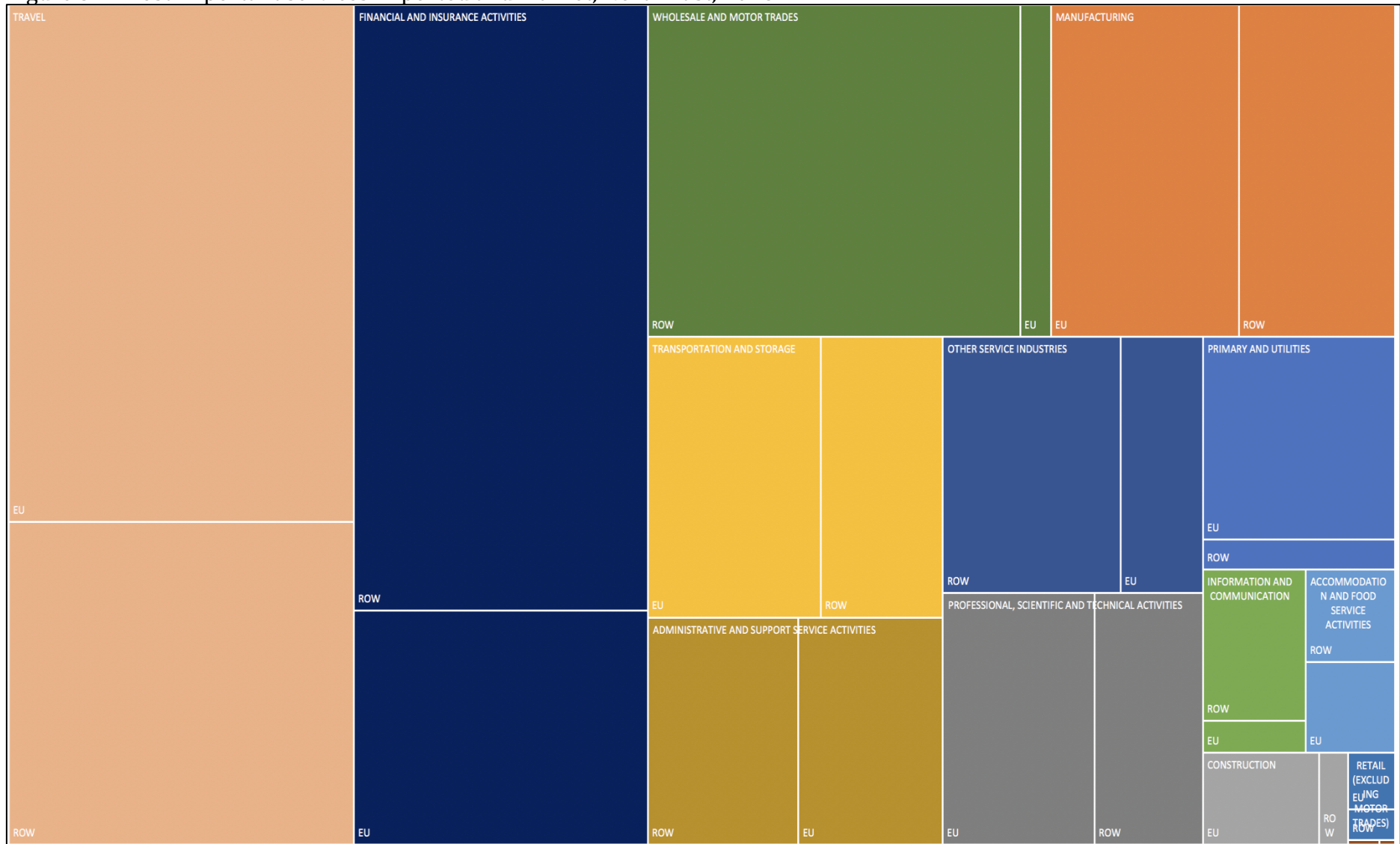(c) Yorkshire-Humberside



(d) Wales



108
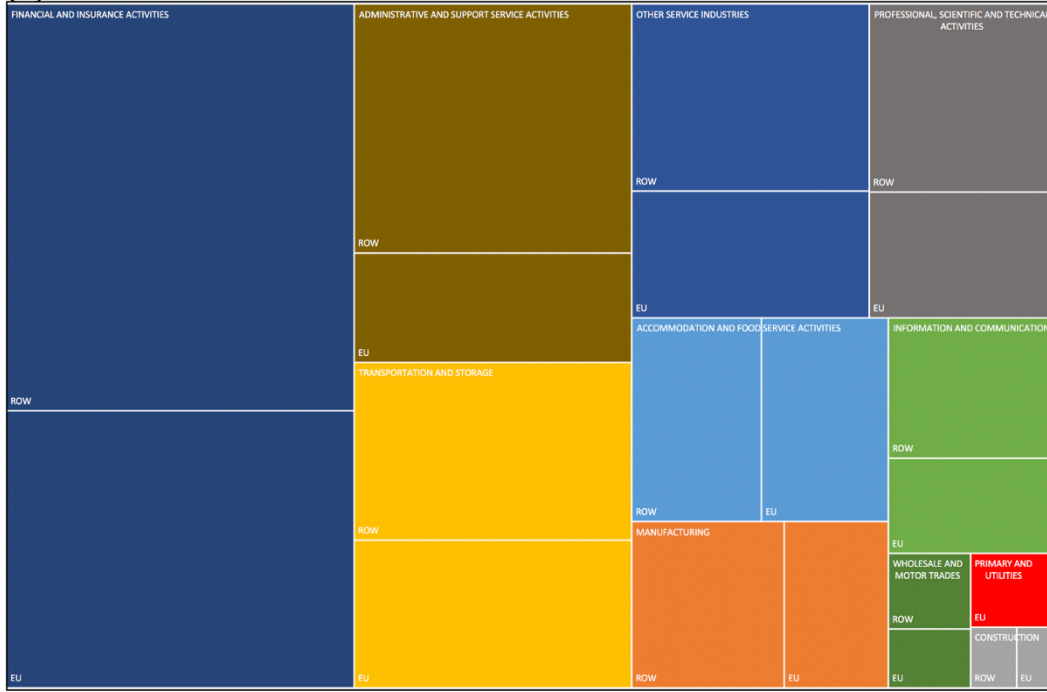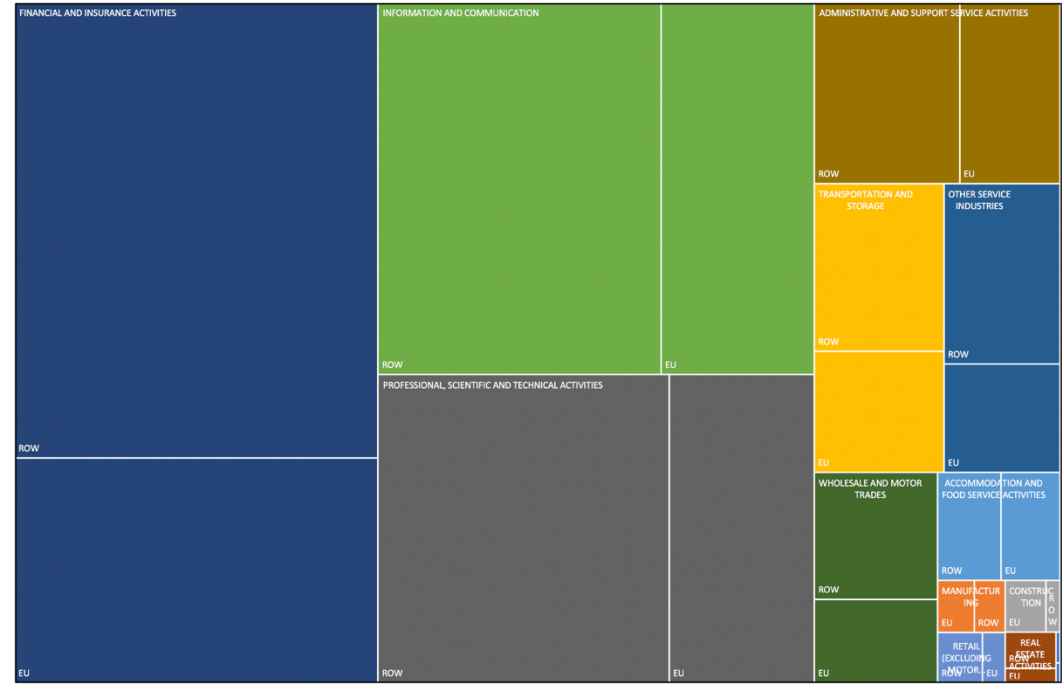
Turning to the most important services imported in the North East (Figure 5.4), travel (overseas visitors' spending)[27] 'imported' from the EU is the largest item accounting for 15.3% of total service imports (9.6% of travel imports additionally comes from the rest of the world). After this comes financial & insurance activities, representing over 21% of total imports (nearly three-quarters of which are from the rest of the world). The next largest is wholesale and motor trade service imports (almost all from the rest of the world), following by the import of manu-services. Aside from travel, the type of services imported into the North East is similar to the services exported (the correlation between the two is 0.75, when travel is excluded, with the greatest similarity being financial & insurance services and manu-services; the largest differences are in accommodation exports to the rest of the world not mirrored by imports, and whole & motor trades imported services from the rest of the world not reciprocated by exports in this category).

Comparing service imports into the North East with those in the North West (Figure 5.5), the distribution across sectors and markets is similar (the correlation between the two regions is 0.82), but with travel being slightly more important to the North West (29.9% of total imports, compared to 24.9% in the North East) and financial & insurance activities slightly less important (16.3% of total imports, compared to 21.2%). Yorkshire-Humberside had a slightly closer 'fit' with the North East (the correlation is 0.85) but with nearly 36% of imports from travel, and 23.5% from financial & insurance activities, and the largest difference being the relative unimportance of wholesale & motor trade imports in Yorkshire-Humberside. The distribution of service imports in Wales was also similar to the North East (with a correlation of 0.76), with major differences being a greater reliance on travel (34.2% versus 24.9% in the North East), less imports of financial & insurance activities (14.9% versus 21.2%), and most significantly Wales imported more manu-services (16.8% of total imports versus 9.8% in the North East). The largest difference in Figure 5.5 with the North East was London (with a correlation of 0.60); the biggest difference was the import of ICT services (over 23% of London's total compared to 1.6% in the North East), while professional, scientific & technical service imports were also more important to London (11.4% of the total, versus 5.6% in the North East), and manu-service imports were only 1.1% of London's total (9.8% in the North East). This indicates that London, of all the regions of the UK, most specialises (both in terms of exports and imports of services) on ICT and professional, scientific & technical services.

Finally, Table A5.5 sets out the ONS data available for the two LEPs in the North East (with the interpolated data needing to be treated with some caution regarding its accuracy). Figures 5.6 and 5.7 present the information in chart format. With regard to exports of services, there are some important differences across the two LEPs (the correlation between the two is only 0.46); while in both areas financial & insurance activities are the most important service export the NE LEP sells 28% of total exports in this category to the EU while TVCA sells 14.3%, with the NE LEP selling 4% to the rest of the world while TVCA sells 19.9% of its total exports as financial & insurance services to the rest of the world. Another major difference between the two LEPs is that TVCA sells nearly 25% of total exports as manu-services (nearly all to the EU) while the NE LEP sells only 12.6% of its total exports as manu-services (of which just over 61% of manu-services go to the EU). Lastly, the NE LEP sells 8.4% of total exports as accommodation & food service activities

[27] In principle, 'travel' is also an export of services, but no data is available to measure the amount spent overseas by UK visitors.

Figure 5.4: Most important services imported and market, North East, 2018



TRAVEL
EU
ROW

FINANCIAL AND INSURANCE ACTIVITIES
ROW
EU

WHOLESALE AND MOTOR TRADES
ROW
EU
EU

MANUFACTURING
ROW
EU

TRANSPORTATION AND STORAGE
EU
ROW

ADMINISTRATIVE AND SUPPORT SERVICE ACTIVITIES
ROW
EU

OTHER SERVICE INDUSTRIES
ROW
EU

PROFESSIONAL, SCIENTIFIC AND TECHNICAL ACTIVITIES
EU
ROW

PRIMARY AND UTILITIES
EU
ROW

INFORMATION AND COMMUNICATION
ROW
EU

ACCOMMODATION AND FOOD SERVICE ACTIVITIES
ROW
EU

CONSTRUCTION
EU
ROW

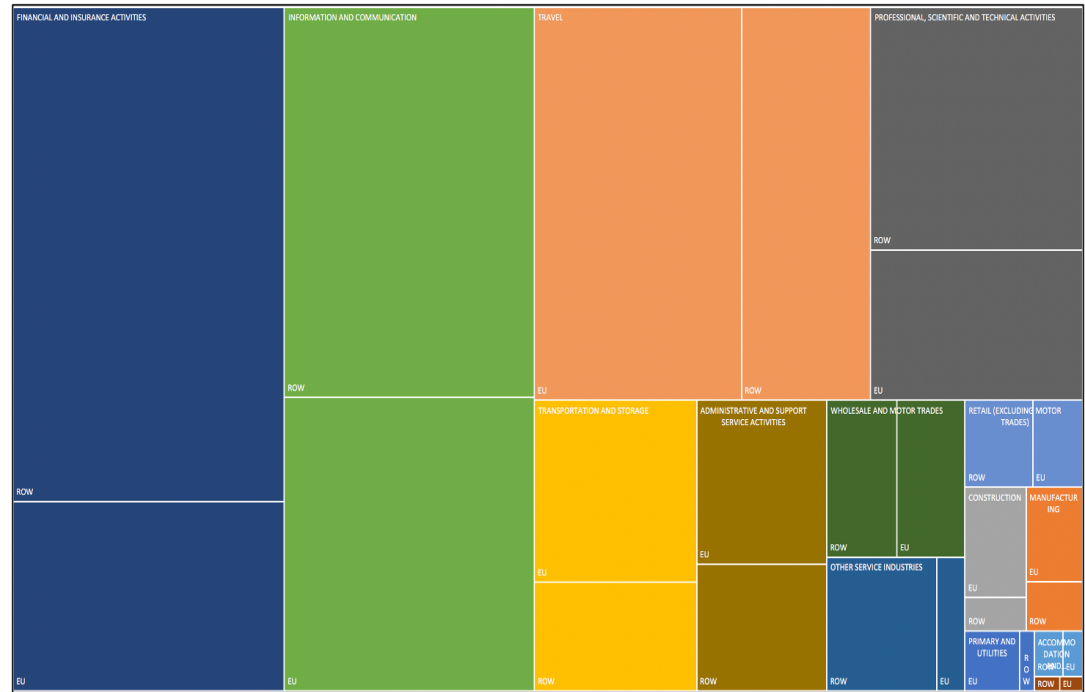RETAIL (EXCLUDING MOTOR TRADES)
EU
ROW

Source: Table A5.2

110

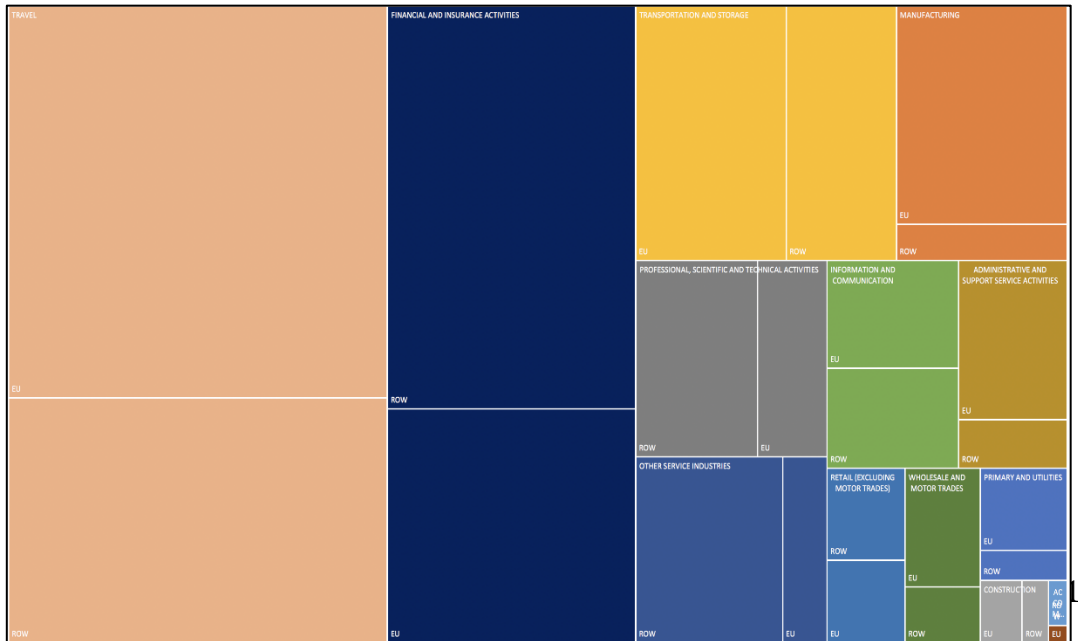Figure 5.5 Most important services imported and market, various regions, 2018

(a) North West
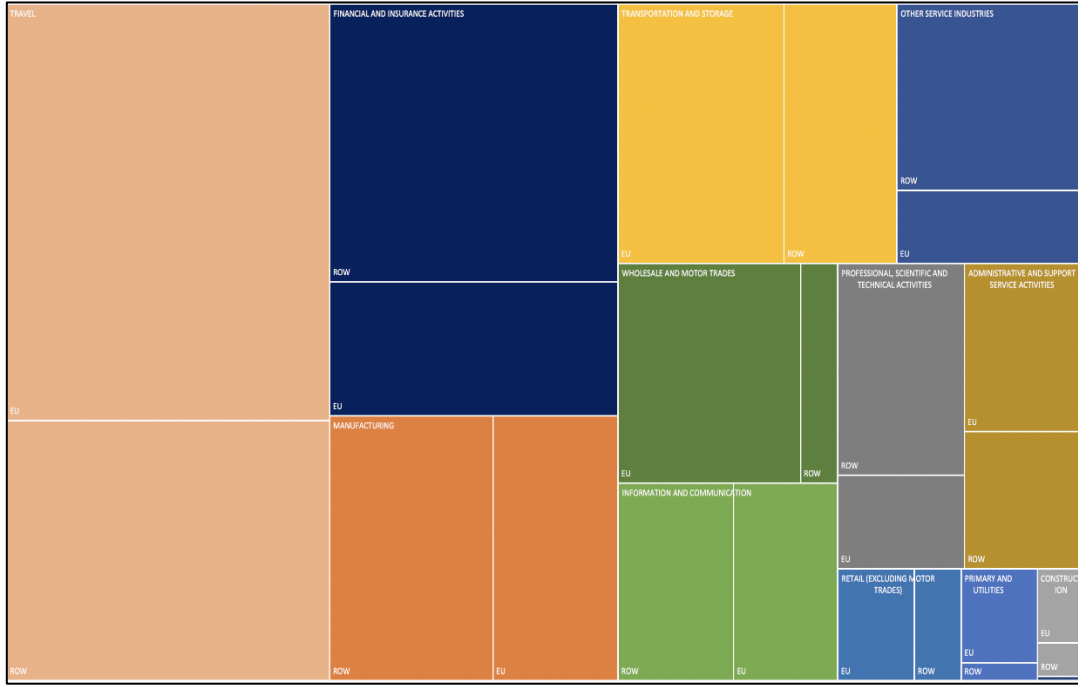


(b) London



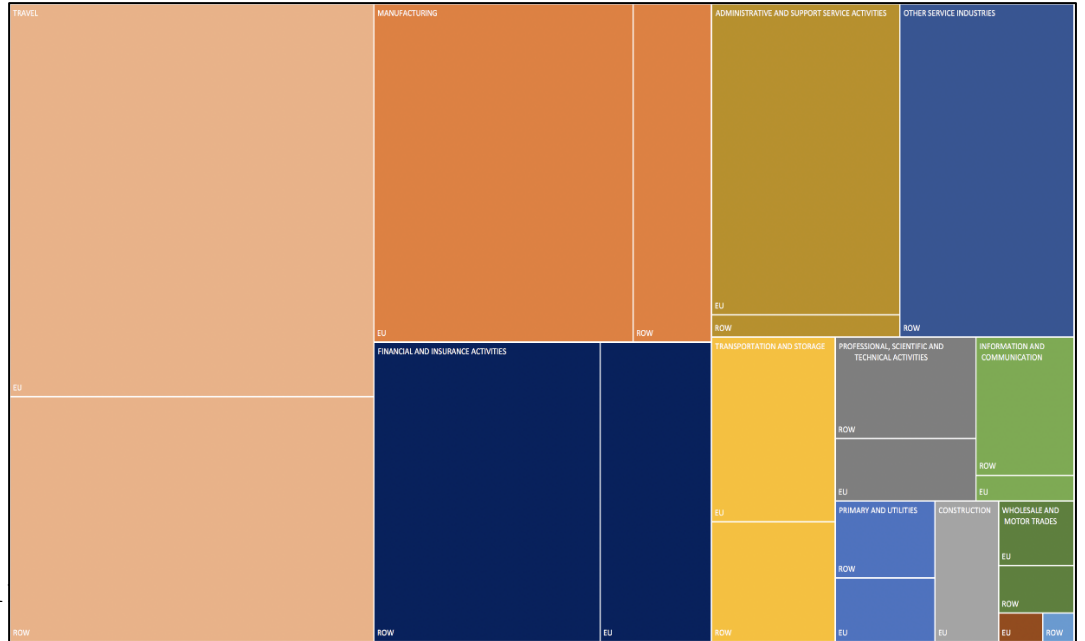(c) Yorkshire-Humberside



(d) Wales

Figure 5.6 Most important services exported by broad market, North East, 2018, by LEP



NE LEP

FINANCIAL AND INSURANCE ACTIVITIES

ROW

EU

MANUFACTURING

EU

ROW

TRANSPORTATION AND STORAGE

ROW

EU

ADMINISTRATIVE AND SUPPORT SERVICE ACTIVITIES

ROW

EU

PROFESSIONAL, SCIENTIFIC AND TECHNICAL ACTIVITIES

EU

ROW

ACCOMMODATION AND FOOD SERVICE ACTIVITIES

ROW

WHOLESALE AND MOTOR TRADES

ROW

EU

OTHER SERVICE INDUSTRIES

EU

ROW

INFORMATION AND COMMUNICATION

ROW

EU

RETAIL (EX MOTOR TRADES)

ROW

EU

R

TVCA

FINANCIAL AND INSURANCE ACTIVITIES

ROW

EU

MANUFACTURING

EU

ROW

WHOLESALE AND MOTOR TRADES

EU

ROW

PROFESSIONAL, SCIENTIFIC AND TECHNICAL ACTIVITIES

ROW

EU

TRANSPORTATION AND STORAGE

EU

ROW

OTHER SERVICE INDUSTRIES

EU

ROW

ADMINISTRATIVE AND SUPPORT SERVICE ACTIVITIES

EU

ROW

RETAIL (EX MOTOR TRADES)

ROW

EU

ACCOMMODATION AND FOOD SERVICE ACTIVITIES

EU

ROW

INFORMATION AND COMMUNICATION

EU

ROW

Source: Table A5.5

Figure 5.7: Most important services imported by broad market, North East, 2018, by LEP
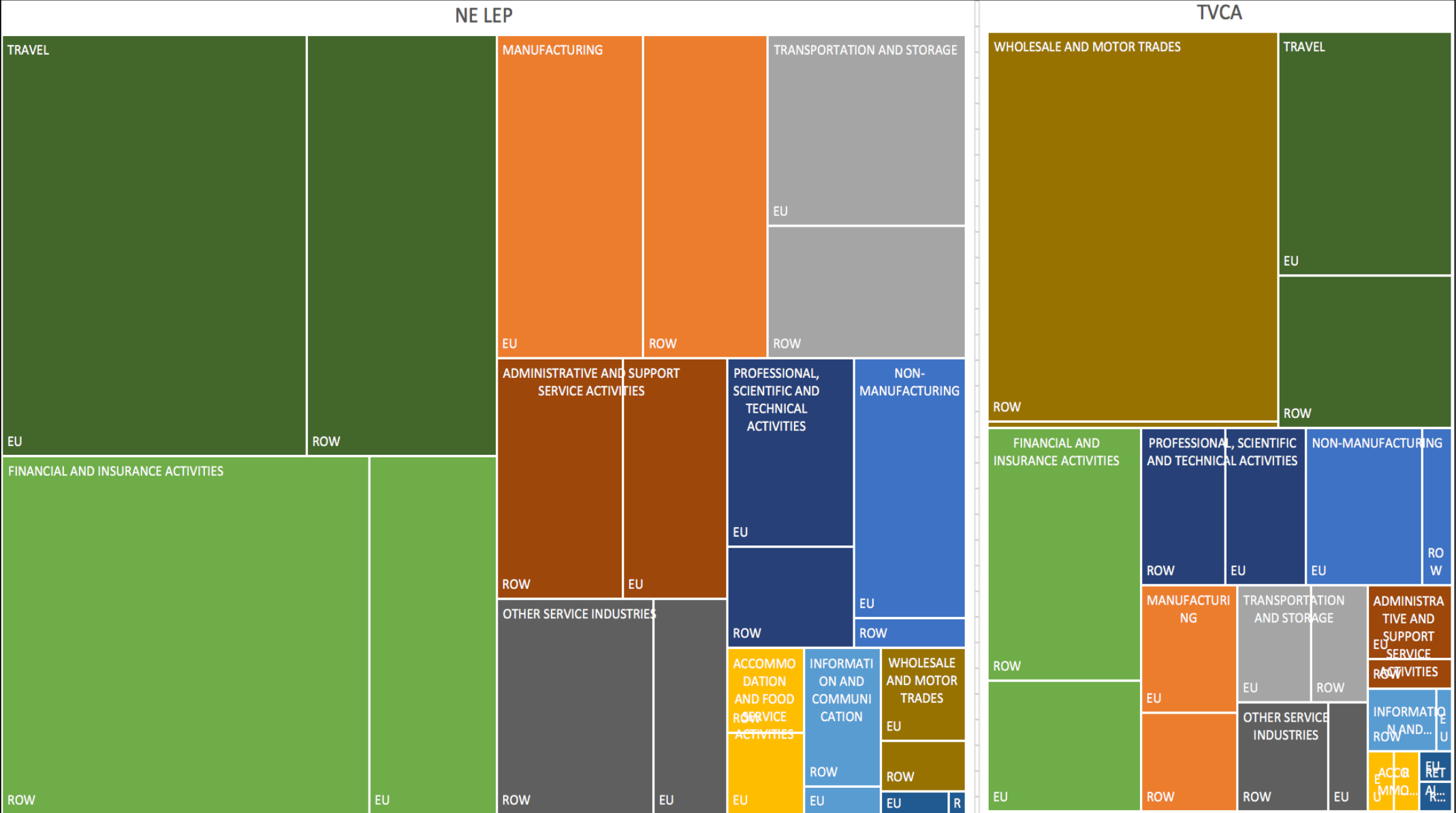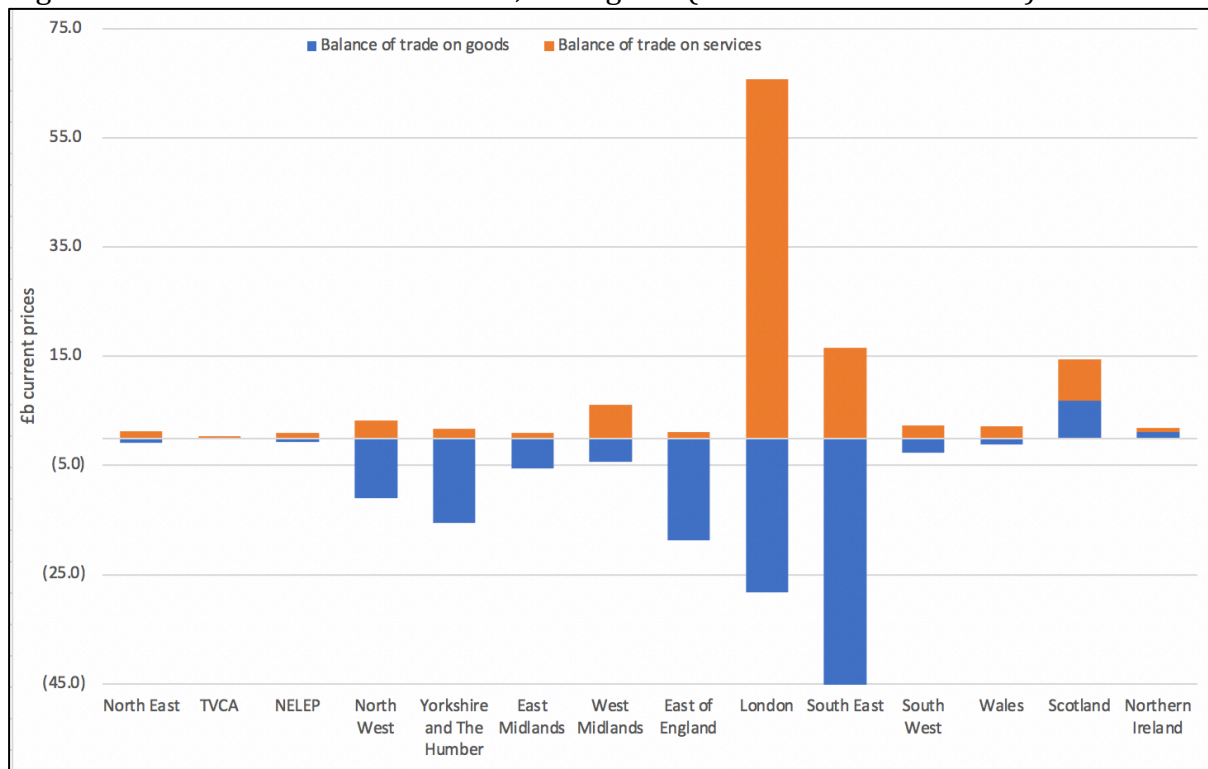


Source: Table A5.5

to the rest of the world (TVCA only 1.6%); and TVCA sells 9.9% of total exports as wholesale& motor trade services to the EU (the NE LEP only 2.2%).

As to the imports of services, there are even larger differences in the distribution across sectors in the two LEPs (the correlation between the two is only 0.30). Travel was more important in the NE LEP (accounting for 27.7% of total imports in 2018, compared to 19% in TVCA), while the import of wholesale & motor trade services accounted for nearly 32% of imports in TVCA, mostly from the rest of the world (and only 1.6% in the NE LEP). Manu-services were more important to the NE LEP (11.6% of the total, compared to 6% in TVCA). The major similarity was that imports of financial & insurance services were relatively important (mostly from the rest of the world) in both LEPs (accounting for 16.2% of total imports in TVCA and 23.6% in the NE LEP).

Overall, while the North East has a similar distribution of exports and imports of services to many other regions, there are important differences at the LEP level (this is also likely to be true concerning LEPs in other administrative regions – similarities across regions are diminished when looking at sub-regional geographies).

Appendix to chapter 5

Figure A5.1: Balance of trade in 2018, UK regions (and LEPs for North East)

Table A5.1: Total value of exported services in the UK by NUTS1 area, industry and destination, 2018 (£ millions)

| NUTS1 area | Primary and utilities | | | Manufacturing | | | Construction | | | Transportation and storage | | | Accommodation and food service activities | | | Information and communication | | | Financial and insurance activities | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | EU | Rest of world | Total | EU | Rest of world | Total | EU | Rest of world | Total | EU | Rest of world | Total | EU | Rest of world | Total | EU | Rest of world | Total | EU | Rest of world | Total |
| North East | 7 | 2 | 9 | 877 | 273 | 1,149 | 8 | 2 | 10 | 265 | 297 | 561 | 43 | 442 | 485 | 76 | 157 | 233 | 873 | 1,419 | 2,292 |
| North West | 176 | 6 | 183 | 501 | 734 | 1,235 | 69 | 81 | 149 | 1,189 | 1,429 | 2,619 | 749 | 766 | 1,515 | 461 | 680 | 1,141 | 2,791 | 4,092 | 6,883 |
| Yorks-Humber | 83 | 6 | 89 | 350 | 188 | 538 | 14 | 10 | 24 | 689 | 724 | 1,412 | 416 | 391 | 807 | 190 | 398 | 588 | 2,444 | 3,431 | 5,875 |
| East Midlands | 11 | 10 | 21 | 227 | 218 | 445 | 20 | 36 | 56 | 429 | 535 | 964 | 250 | 129 | 379 | 278 | 246 | 524 | 1,115 | 1,552 | 2,667 |
| West Midlands | 0 | 0 | 0 | 244 | 634 | 878 | 0 | 0 | 0 | 670 | 786 | 1,456 | 357 | 363 | 720 | 679 | 1,742 | 2,421 | 1,976 | 2,869 | 4,845 |
| East of England | 0 | 122 | 122 | 1,391 | 606 | 1,997 | 0 | 88 | 88 | 1,016 | 1,206 | 2,222 | 540 | 521 | 1,061 | 1,457 | 1,197 | 2,654 | 1,079 | 1,969 | 3,048 |
| London | 15 | 23 | 38 | 355 | 297 | 652 | 390 | 135 | 525 | 2,918 | 4,041 | 6,960 | 1,180 | 1,274 | 2,454 | 10,574 | 19,564 | 30,138 | 15,184 | 30,767 | 45,951 |
| South East | 306 | 0 | 306 | 885 | 1,554 | 2,439 | 114 | 197 | 311 | 1,922 | 3,120 | 5,042 | 952 | 862 | 1,814 | 3,954 | 3,911 | 7,865 | 2,481 | 4,473 | 6,954 |
| South West | 37 | 17 | 54 | 427 | 550 | 977 | 9 | 7 | 17 | 526 | 746 | 1,272 | 887 | 913 | 1,801 | 425 | 418 | 843 | 1,941 | 2,805 | 4,746 |
| Wales | 0 | 0 | 0 | 492 | 1,526 | 2,018 | 157 | 0 | 157 | 282 | 208 | 490 | 359 | 367 | 726 | 34 | 100 | 134 | 844 | 1,197 | 2,041 |
| Scotland | 155 | 487 | 641 | 333 | 1,353 | 1,686 | 34 | 200 | 234 | 856 | 1,281 | 2,137 | 682 | 722 | 1,405 | 965 | 565 | 1,530 | 2,779 | 4,821 | 7,600 |
| Northern Ireland | 0 | 10 | 10 | 129 | 316 | 445 | 353 | 22 | 375 | 222 | 99 | 321 | 250 | 0 | 250 | 189 | 478 | 667 | 134 | 0 | 134 |
| UK | 790 | 683 | 1,473 | 6,211 | 8,247 | 14,458 | 1,157 | 778 | 1,935 | 10,985 | 14,472 | 25,457 | 6,674 | 6,750 | 13,424 | 19,281 | 29,456 | 48,737 | 33,641 | 59,395 | 93,036 |

Figures in red are interpolated based on allocating back to regions the unallocated total. They are therefore subject to unknown margins of error.

Table A.5.1: (cont.)

| NUTS1 area | Real estate activities | | | Professional, scientific and technical activities | | | Administrative and support service activities | | | Other service industries | | | Wholesale and motor trades | | | Retail (excluding motor trades) | | | All industries | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | EU | Rest of world | Total | EU | Rest of world | Total | EU | Rest of world | Total | EU | Rest of world | Total | EU | Rest of world | Total | EU | Rest of world | Total | EU | Rest of world | Total |
| North East | 2 | 4 | 6 | 387 | 218 | 605 | 232 | 285 | 517 | 290 | 226 | 516 | 320 | 150 | 470 | 65 | 92 | 157 | 3,445 | 3,567 | 7,010 |
| North West | 0 | 0 | 0 | 678 | 1,013 | 1,691 | 879 | 2,000 | 2,879 | 869 | 1,288 | 2,157 | 140 | 181 | 321 | 0 | 0 | 0 | 8,502 | 12,270 | 20,772 |
| Yorks- Humber | 6 | 16 | 23 | 286 | 693 | 978 | 311 | 280 | 591 | 555 | 515 | 1,070 | 154 | 14 | 168 | 61 | 28 | 88 | 5,557 | 6,694 | 12,251 |
| East Midlands | 127 | 0 | 127 | 1,958 | 317 | 2,275 | 338 | 300 | 638 | 546 | 606 | 1,152 | 150 | 45 | 194 | 86 | 9 | 95 | 5,535 | 4,030 | 9,565 |
| West Midlands | 11 | 14 | 26 | 325 | 992 | 1,316 | 555 | 470 | 1,025 | 735 | 2,644 | 3,379 | 157 | 1,263 | 1,420 | 95 | 28 | 123 | 5,804 | 11,805 | 17,609 |
| East of England | 0 | 0 | 0 | 1,331 | 2,133 | 3,464 | 1,071 | 1,500 | 2,571 | 684 | 483 | 1,167 | 354 | 33 | 387 | 71 | 53 | 124 | 8,994 | 9,909 | 18,904 |
| London | 139 | 342 | 513 | 8,319 | 16,677 | 24,996 | 3,369 | 4,897 | 8,266 | 2,339 | 3,879 | 6,218 | 1,914 | 2,901 | 4,816 | 212 | 421 | 633 | 46,909 | 85,250 | 132,159 |
| South East | 153 | 0 | 153 | 2,845 | 5,723 | 8,568 | 3,524 | 600 | 4,124 | 1,699 | 1,707 | 3,406 | 2,440 | 338 | 2,778 | 149 | 77 | 227 | 21,424 | 22,562 | 43,986 |
| South West | 6 | 49 | 55 | 370 | 634 | 1,004 | 463 | 506 | 969 | 479 | 382 | 861 | 282 | 60 | 342 | 54 | 36 | 91 | 5,907 | 7,124 | 13,031 |
| Wales | 0 | 0 | 0 | 44 | 230 | 274 | 700 | 55 | 755 | 107 | 654 | 761 | 26 | 8 | 34 | 27 | 15 | 42 | 3,072 | 4,360 | 7,432 |
| Scotland | 0 | 32 | 32 | 587 | 2,564 | 3,151 | 742 | 866 | 1,608 | 586 | 760 | 1,346 | 101 | 35 | 137 | 105 | 40 | 145 | 7,925 | 13,726 | 21,651 |
| Northern Ireland | 0 | 0 | 0 | 171 | 129 | 300 | 0 | 0 | 0 | 32 | 0 | 32 | 0 | 28 | 28 | 0 | 1 | 1 | 1,480 | 1,022 | 2,502 |
| UK | 444 | 457 | 901 | 17,301 | 31,322 | 48,623 | 12,184 | 11,759 | 23,943 | 8,921 | 13,144 | 22,065 | 6,038 | 5,056 | 11,094 | 925 | 799 | 1,724 | 124,552 | 182,318 | 306,870 |

Table A5.2: Total value of imported services in the UK by NUTS1 area, industry and destination, 2018 (£ millions)

| NUTS1 area | Primary and utilities | | | Manufacturing | | | Constructionb | | | Transportation and storage | | | Accommodation and food service activities | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | EU | Rest of world | Total | EU | Rest of world | Total | EU | Rest of world | Total | EU | Rest of world | Total | EU | Rest of world | Total |
| North East | 190 | 28 | 218 | 304 | 253 | 558 | 52 | 13 | 65 | 237 | 167 | 404 | 40 | 41 | 80 |
| North West | 171 | 33 | 204 | 794 | 1,036 | 1,829 | 84 | 38 | 122 | 1,031 | 702 | 1,732 | 0 | 0 | 0 |
| Yorks-Humber | 112 | 41 | 153 | 586 | 97 | 683 | 41 | 26 | 66 | 603 | 441 | 1,044 | 0 | 13 | 13 |
| East Midlands | 93 | 95 | 189 | 502 | 327 | 829 | 77 | 21 | 98 | 389 | 345 | 735 | 0 | 0 | 0 |
| West Midlands | 158 | 75 | 233 | 841 | 367 | 1,208 | 0 | 0 | 0 | 599 | 681 | 1,280 | 0 | 0 | 0 |
| East of England | 7 | 0 | 7 | 793 | 426 | 1,219 | 85 | 125 | 210 | 867 | 624 | 1,491 | 0 | 0 | 0 |
| London | 296 | 80 | 376 | 482 | 255 | 737 | 610 | 187 | 797 | 2,676 | 1,604 | 4,281 | 82 | 117 | 198 |
| South East | 173 | 39 | 212 | 642 | 969 | 1,611 | 149 | 71 | 219 | 1,393 | 1,099 | 2,492 | 1 | 23 | 24 |
| South West | 344 | 44 | 388 | 371 | 293 | 664 | 48 | 30 | 78 | 430 | 377 | 807 | 0 | 13 | 13 |
| Wales | 50 | 60 | 110 | 687 | 208 | 894 | 70 | 0 | 70 | 179 | 116 | 295 | 0 | 7 | 7 |
| Scotland | 511 | 706 | 1,217 | 306 | 550 | 857 | 90 | 90 | 180 | 635 | 525 | 1,160 | 3 | 16 | 20 |
| Northern Ireland | 52 | 0 | 52 | 150 | 144 | 294 | 51 | 0 | 51 | 98 | 49 | 147 | 1 | 0 | 2 |
| UK | 2,157 | 1,201 | 3,358 | 6,458 | 4,925 | 11,383 | 1,390 | 601 | 1,991 | 9,137 | 6,730 | 15,867 | 126 | 231 | 357 |

Figures in red are interpolated based on allocating back to regions the unallocated total. They are therefore subject to unknown margins of error.                    Source: ONS (2020)

Table A5.2: (cont.)

| NUTS1 area | Information and communication | | | Financial and insurance activities | | | Real estate activities | | | Professional, scientific and technical activities | | | Administrative and support service activities | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | EU | Rest of world | Total | EU | Rest of world | Total | EU | Rest of world | Total | EU | Rest of world | Total | EU | Rest of world | Total |
| North East | 16 | 76 | 92 | 335 | 868 | 1,203 | 0 | 1 | 1 | 186 | 133 | 319 | 160 | 167 | 327 |
| North West | 493 | 547 | 1,040 | 922 | 1,921 | 2,843 | 5 | 0 | 5 | 285 | 642 | 926 | 484 | 395 | 879 |
| Yorks-Humber | 223 | 207 | 430 | 912 | 1,573 | 2,485 | 5 | 0 | 5 | 214 | 376 | 590 | 271 | 83 | 354 |
| East Midlands | 62 | 208 | 271 | 444 | 703 | 1,147 | 0 | 0 | 0 | 758 | 115 | 872 | 100 | 120 | 220 |
| West Midlands | 216 | 279 | 495 | 665 | 1,295 | 1,960 | 5 | 0 | 5 | 160 | 255 | 414 | 288 | 405 | 693 |
| East of England | 497 | 579 | 1,076 | 414 | 918 | 1,332 | 8 | 0 | 8 | 2,633 | 2,120 | 4,753 | 671 | 500 | 1,171 |
| London | 6,669 | 8,853 | 15,521 | 4,667 | 12,178 | 16,845 | 30 | 33 | 63 | 2,899 | 4,669 | 7,568 | 1,932 | 1,499 | 3,431 |
| South East | 2,182 | 1,877 | 4,059 | 891 | 2,343 | 3,234 | 17 | 3 | 21 | 953 | 2,536 | 3,488 | 1,080 | 447 | 1,527 |
| South West | 344 | 246 | 589 | 643 | 1,452 | 2,095 | 9 | 0 | 9 | 214 | 237 | 452 | 303 | 170 | 473 |
| Wales | 20 | 106 | 126 | 262 | 531 | 793 | 10 | 0 | 10 | 69 | 112 | 181 | 459 | 33 | 492 |
| Scotland | 80 | 395 | 475 | 941 | 2,023 | 2,964 | 4 | 0 | 4 | 288 | 1,435 | 1,724 | 538 | 289 | 827 |
| Northern Ireland | 19 | 66 | 85 | 20 | 0 | 20 | 0 | 0 | 4 | 37 | 28 | 65 | 179 | 34 | 213 |
| UK | 10,822 | 13,437 | 24,259 | 11,116 | 25,805 | 36,921 | 93 | 37 | 130 | 8,696 | 12,656 | 21,352 | 6,465 | 4,142 | 10,607 |

Table A5.2: (cont.)

| NUTS1 area | Other service industries | | | Wholesale and motor trades | | | Retail (excluding motor trades) | | | Travel | | | All industries | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | EU | Rest of world | Total | EU | Rest of world | Total | EU | Rest of world | Total | EU | Rest of world | Total | EU | Rest of world | Total |
| North East | 103 | 222 | 325 | 50 | 603 | 653 | 13 | 7 | 20 | 871 | 543 | 1,414 | 2,557 | 3,121 | 5,679 |
| North West | 328 | 840 | 1,168 | 958 | 196 | 1,154 | 205 | 125 | 330 | 3,222 | 2,009 | 5,232 | 8,982 | 8,486 | 17,468 |
| Yorks-Humber | 130 | 430 | 560 | 140 | 66 | 206 | 101 | 113 | 214 | 2,336 | 1,457 | 3,794 | 5,651 | 4,944 | 10,595 |
| East Midlands | 105 | 289 | 394 | 220 | 192 | 412 | 194 | 86 | 280 | 1,922 | 1,198 | 3,120 | 4,866 | 3,699 | 8,566 |
| West Midlands | 221 | 284 | 505 | 620 | 97 | 716 | 116 | 89 | 205 | 2,322 | 1,448 | 3,770 | 6,211 | 5,275 | 11,486 |
| East of England | 103 | 386 | 489 | 744 | 321 | 1,065 | 0 | 234 | 234 | 2,936 | 1,831 | 4,768 | 9,758 | 8,092 | 17,850 |
| London | 343 | 1,337 | 1,679 | 970 | 998 | 1,967 | 393 | 536 | 929 | 7,382 | 4,606 | 11,988 | 29,431 | 36,950 | 66,381 |
| South East | 247 | 720 | 966 | 748 | 525 | 1,274 | 167 | 178 | 345 | 4,927 | 3,073 | 8,001 | 13,571 | 13,902 | 27,473 |
| South West | 133 | 291 | 424 | 613 | 177 | 790 | 100 | 99 | 199 | 2,274 | 1,418 | 3,692 | 5,822 | 4,852 | 10,674 |
| Wales | 0 | 454 | 454 | 38 | 28 | 65 | 0 | 0 | 0 | 1,121 | 699 | 1,820 | 3,023 | 2,294 | 5,317 |
| Scotland | 177 | 544 | 721 | 117 | 80 | 197 | 120 | 89 | 209 | 2,169 | 1,352 | 3,521 | 5,979 | 8,097 | 14,076 |
| Northern Ireland | 21 | 0 | 21 | 49 | 12 | 61 | 11 | 0 | 11 | 436 | 272 | 707 | 1,123 | 605 | 1,729 |
| UK | 1,911 | 5,797 | 7,708 | 5,267 | 3,293 | 8,560 | 1,420 | 1,554 | 2,974 | 31,918 | 19,907 | 51,825 | 96,976 | 100,316 | 197,292 |

Table A5.3: Percentage of services exported by sector (figures are column percentages), 2018

| | | North East | North West | Yorks-Humber | East Midlands | West Midlands | East of England | London | South East | South West | Wales | Scotland | Northern Ireland | UK |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Financial and insurance activities | ROW | 20.2 | 19.7 | 28.0 | 16.3 | 16.3 | 10.4 | 23.3 | 10.2 | 21.5 | 16.1 | 22.3 | 0.0 | 19.4 |
| Manufacturing | EU | 12.5 | 2.4 | 2.9 | 2.4 | 1.4 | 7.4 | 0.3 | 2.0 | 3.3 | 6.6 | 1.5 | 5.0 | 2.0 |
| Financial and insurance activities | EU | 12.5 | 13.4 | 19.9 | 11.7 | 11.2 | 5.7 | 11.5 | 5.6 | 14.9 | 11.4 | 12.8 | 5.2 | 11.0 |
| Accommodation and food service activities | ROW | 6.3 | 3.7 | 3.2 | 1.4 | 2.1 | 2.8 | 1.0 | 2.0 | 7.0 | 4.9 | 3.3 | 0.0 | 2.2 |
| Professional, scientific and technical activities | EU | 5.5 | 3.3 | 2.3 | 20.5 | 1.8 | 7.0 | 6.3 | 6.5 | 2.8 | 0.6 | 2.7 | 6.7 | 5.6 |
| Wholesale and motor trades | EU | 4.6 | 0.7 | 1.3 | 1.6 | 0.9 | 1.9 | 1.4 | 5.5 | 2.2 | 0.3 | 0.5 | 0.0 | 2.0 |
| Transportation and storage | ROW | 4.2 | 6.9 | 5.9 | 5.6 | 4.5 | 6.4 | 3.1 | 7.1 | 5.7 | 2.8 | 5.9 | 3.9 | 4.7 |
| Other service industries | EU | 4.1 | 4.2 | 4.5 | 5.7 | 4.2 | 3.6 | 1.8 | 3.9 | 3.7 | 1.4 | 2.7 | 1.2 | 2.9 |
| Administrative and support service activities | ROW | 4.1 | 9.6 | 2.3 | 3.1 | 2.7 | 7.9 | 3.7 | 1.4 | 3.9 | 0.7 | 4.0 | 0.0 | 3.8 |
| Manufacturing | ROW | 3.9 | 3.5 | 1.5 | 2.3 | 3.6 | 3.2 | 0.2 | 3.5 | 4.2 | 20.5 | 6.2 | 12.3 | 2.7 |
| Transportation and storage | EU | 3.8 | 5.7 | 5.6 | 4.5 | 3.8 | 5.4 | 2.2 | 4.4 | 4.0 | 3.8 | 4.0 | 8.7 | 3.6 |
| Administrative and support service activities | EU | 3.3 | 4.2 | 2.5 | 3.5 | 3.2 | 5.7 | 2.5 | 8.0 | 3.6 | 9.4 | 3.4 | 0.0 | 4.0 |
| Other service industries | ROW | 3.2 | 6.2 | 4.2 | 6.4 | 15.0 | 2.6 | 2.9 | 3.9 | 2.9 | 8.8 | 3.5 | 0.0 | 4.3 |
| Professional, scientific and technical activities | ROW | 3.1 | 4.9 | 5.7 | 3.3 | 5.6 | 11.3 | 12.6 | 13.0 | 4.9 | 3.1 | 11.8 | 5.0 | 10.2 |
| Information and communication | ROW | 2.2 | 3.3 | 3.2 | 2.6 | 9.9 | 6.3 | 14.8 | 8.9 | 3.2 | 1.3 | 2.6 | 18.7 | 9.6 |
| Wholesale and motor trades | ROW | 2.1 | 0.9 | 0.1 | 0.5 | 7.2 | 0.2 | 2.2 | 0.8 | 0.5 | 0.1 | 0.2 | 1.1 | 1.6 |
| Retail (excluding motor trades) | ROW | 1.3 | 0.0 | 0.2 | 0.1 | 0.2 | 0.3 | 0.3 | 0.2 | 0.3 | 0.2 | 0.2 | 0.0 | 0.3 |
| Information and communication | EU | 1.1 | 2.2 | 1.6 | 2.9 | 3.9 | 7.7 | 8.0 | 9.0 | 3.3 | 0.5 | 4.5 | 7.4 | 6.3 |
| Retail (excluding motor trades) | EU | 0.9 | 0.0 | 0.5 | 0.9 | 0.5 | 0.4 | 0.2 | 0.3 | 0.4 | 0.4 | 0.5 | 0.0 | 0.3 |
| Accommodation & food activities | EU | 0.6 | 3.6 | 3.4 | 2.6 | 2.0 | 2.9 | 0.9 | 2.2 | 6.8 | 4.8 | 3.1 | 9.8 | 2.2 |
| Construction | EU | 0.1 | 0.3 | 0.1 | 0.2 | 0.0 | 0.0 | 0.3 | 0.3 | 0.1 | 2.1 | 0.2 | 13.8 | 0.4 |
| Primary and utilities | EU | 0.1 | 0.8 | 0.7 | 0.1 | 0.0 | 0.0 | 0.0 | 0.7 | 0.3 | 0.0 | 0.7 | 0.0 | 0.3 |
| Real estate activities | ROW | 0.1 | 0.0 | 0.1 | 0.0 | 0.1 | 0.0 | 0.3 | 0.0 | 0.4 | 0.0 | 0.1 | 0.0 | 0.1 |
| Primary and utilities | ROW | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.6 | 0.0 | 0.0 | 0.1 | 0.0 | 2.2 | 0.4 | 0.2 |
| Construction | ROW | 0.0 | 0.4 | 0.1 | 0.4 | 0.0 | 0.5 | 0.1 | 0.4 | 0.1 | 0.0 | 0.9 | 0.9 | 0.3 |
| Real estate activities | EU | 0.0 | 0.0 | 0.0 | 1.3 | 0.1 | 0.0 | 0.1 | 0.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 |
| Correlation with NE | | | 0.81 | 0.86 | 0.66 | 0.60 | 0.61 | 0.64 | 0.42 | 0.86 | 0.62 | 0.77 | -0.07 | 0.74 |

Source: Table A5.1

Table A5.4: Percentage of services imported by sector (figures are column percentages), 2018

| | | North East | North West | Yorks-Humber | East Midlands | West Midlands | East of England | London | South East | South West | Wales | Scotland | Northern Ireland | UK |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Travel | EU | 15.3 | 18.4 | 22.0 | 22.4 | 20.2 | 16.5 | 11.1 | 17.9 | 21.3 | 21.1 | 15.4 | 25.2 | 16.2 |
| Financial and insurance activities | ROW | 15.3 | 11.0 | 14.8 | 8.2 | 11.3 | 5.2 | 18.3 | 8.5 | 13.6 | 10.0 | 14.4 | 0.0 | 13.1 |
| Wholesale and motor trades | ROW | 10.6 | 1.1 | 0.6 | 2.2 | 0.8 | 1.8 | 1.5 | 1.9 | 1.7 | 0.5 | 0.6 | 0.7 | 1.7 |
| Travel | ROW | 9.6 | 11.5 | 13.7 | 14.0 | 12.6 | 10.3 | 6.9 | 11.2 | 13.3 | 13.1 | 9.6 | 15.7 | 10.1 |
| Financial and insurance activities | EU | 5.9 | 5.3 | 8.6 | 5.2 | 5.8 | 2.3 | 7.0 | 3.2 | 6.0 | 4.9 | 6.7 | 1.2 | 5.6 |
| Manufacturing | EU | 5.4 | 4.5 | 5.5 | 5.9 | 7.3 | 4.4 | 0.7 | 2.3 | 3.5 | 12.9 | 2.2 | 8.7 | 3.3 |
| Manufacturing | ROW | 4.5 | 5.9 | 0.9 | 3.8 | 3.2 | 2.4 | 0.4 | 3.5 | 2.7 | 3.9 | 3.9 | 8.3 | 2.5 |
| Transportation and storage | EU | 4.2 | 5.9 | 5.7 | 4.5 | 5.2 | 4.9 | 4.0 | 5.1 | 4.0 | 3.4 | 4.5 | 5.7 | 4.6 |
| Other service industries | ROW | 3.9 | 4.8 | 4.1 | 3.4 | 2.5 | 2.2 | 2.0 | 2.6 | 2.7 | 8.5 | 3.9 | 0.0 | 2.9 |
| Primary and utilities | EU | 3.3 | 1.0 | 1.1 | 1.1 | 1.4 | 0.0 | 0.4 | 0.6 | 3.2 | 0.9 | 3.6 | 3.0 | 1.1 |
| Professional, scientific and technical activities | EU | 3.3 | 1.6 | 2.0 | 8.8 | 1.4 | 14.8 | 4.4 | 3.5 | 2.0 | 1.3 | 2.0 | 2.1 | 4.4 |
| Transportation and storage | ROW | 2.9 | 4.0 | 4.2 | 4.0 | 5.9 | 3.5 | 2.4 | 4.0 | 3.5 | 2.2 | 3.7 | 2.8 | 3.4 |
| Administrative and support service activities | ROW | 2.9 | 2.3 | 0.8 | 1.4 | 3.5 | 2.8 | 2.3 | 1.6 | 1.6 | 0.6 | 2.1 | 2.0 | 2.1 |
| Administrative and support service activities | EU | 2.8 | 2.8 | 2.6 | 1.2 | 2.5 | 3.8 | 2.9 | 3.9 | 2.8 | 8.6 | 3.8 | 10.4 | 3.3 |
| Professional, scientific and technical activities | ROW | 2.3 | 3.7 | 3.5 | 1.3 | 2.2 | 11.9 | 7.0 | 9.2 | 2.2 | 2.1 | 10.2 | 1.6 | 6.4 |
| Other service industries | EU | 1.8 | 1.9 | 1.2 | 1.2 | 1.9 | 0.6 | 0.5 | 0.9 | 1.2 | 0.0 | 1.3 | 1.2 | 1.0 |
| Information and communication | ROW | 1.3 | 3.1 | 2.0 | 2.4 | 2.4 | 3.2 | 13.3 | 6.8 | 2.3 | 2.0 | 2.8 | 3.8 | 6.8 |
| Construction | EU | 0.9 | 0.5 | 0.4 | 0.9 | 0.0 | 0.5 | 0.9 | 0.5 | 0.4 | 1.3 | 0.6 | 2.9 | 0.7 |
| Wholesale and motor trades | EU | 0.9 | 5.5 | 1.3 | 2.6 | 5.4 | 4.2 | 1.5 | 2.7 | 5.7 | 0.7 | 0.8 | 2.8 | 2.7 |
| Accommodation and food service activities | ROW | 0.7 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 | 0.1 |
| Accommodation and food service activities | EU | 0.7 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 |
| Primary and utilities | ROW | 0.5 | 0.2 | 0.4 | 1.1 | 0.7 | 0.0 | 0.1 | 0.1 | 0.4 | 1.1 | 5.0 | 0.0 | 0.6 |
| Information and communication | EU | 0.3 | 2.8 | 2.1 | 0.7 | 1.9 | 2.8 | 10.0 | 7.9 | 3.2 | 0.4 | 0.6 | 1.1 | 5.5 |
| Construction | ROW | 0.2 | 0.2 | 0.2 | 0.2 | 0.0 | 0.7 | 0.3 | 0.3 | 0.3 | 0.0 | 0.6 | 0.0 | 0.3 |
| Retail (excluding motor trades) | EU | 0.2 | 1.2 | 1.0 | 2.3 | 1.0 | 0.0 | 0.6 | 0.6 | 0.9 | 0.0 | 0.9 | 0.6 | 0.7 |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Retail (excluding motor trades) | ROW | 0.1 | 0.7 | 1.1 | 1.0 | 0.8 | 1.3 | 0.8 | 0.6 | 0.9 | 0.0 | 0.6 | 0.0 | 0.8 |
| Real estate activities | ROW | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Real estate activities | EU | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | 0.2 | 0.0 | 0.0 | 0.0 |
| Correlation with NE | | 0.82 | 0.85 | 0.79 | 0.82 | 0.55 | 0.60 | 0.69 | 0.85 | 0.76 | 0.79 | 0.58 | 0.81 | 0.82 |

Source: Table A5.2

Table A5.5: Total value of exported and imported services in the UK North East of England, industry and destination, 2018 (£ millions)

| Sector | | Tees Valley Combined Authority | | NE LEP | | North East | |
|---|---|---|---|---|---|---|---|
| | | Imports | Exports | Imports | Exports | Imports | Exports |
| Non-manufacturing | EU | 94 | 4 | 148 | 11 | 242 | 15 |
| | Rest of world | 24 | 1 | 17 | 3 | 41 | 4 |
| | Total | 118 | 5 | 165 | 14 | 283 | 19 |
| Manufacturing | EU | 63 | 502 | 241 | 375 | 304 | 877 |
| | Rest of world | 49 | 37 | 204 | 236 | 253 | 273 |
| | Total | 112 | 539 | 446 | 610 | 558 | 1,149 |
| Transportation and storage | EU | 44 | 57 | 193 | 208 | 237 | 265 |
| | Rest of world | 34 | 55 | 133 | 242 | 167 | 297 |
| | Total | 78 | 111 | 326 | 450 | 404 | 561 |
| Accommodation and food service activities | EU | 8 | 34 | 32 | 9 | 40 | 43 |
| | Rest of world | 8 | 34 | 33 | 408 | 41 | 442 |
| | Total | 15 | 68 | 65 | 417 | 80 | 485 |
| Information and communication | EU | 5 | 36 | 11 | 40 | 16 | 76 |
| | Rest of world | 22 | 11 | 54 | 146 | 76 | 157 |
| | Total | 27 | 47 | 65 | 186 | 92 | 233 |
| Financial and insurance activities | EU | 103 | 311 | 232 | 192 | 335 | 873 |
| | Rest of world | 199 | 432 | 669 | 1,357 | 868 | 1,419 |
| | Total | 302 | 744 | 901 | 1,548 | 1,203 | 2,292 |
| Professional, scientific and technical activities | EU | 65 | 56 | 121 | 331 | 186 | 387 |
| | Rest of world | 68 | 93 | 65 | 125 | 133 | 218 |
| | Total | 133 | 148 | 186 | 457 | 319 | 605 |
| Administrative and support service activities | EU | 32 | 41 | 128 | 191 | 160 | 232 |
| | Rest of world | 13 | 41 | 154 | 244 | 167 | 285 |
| | Total | 46 | 82 | 281 | 435 | 327 | 517 |
| Other service industries | EU | 22 | 59 | 81 | 233 | 103 | 292 |
| | Rest of world | 51 | 48 | 172 | 182 | 223 | 230 |
| | Total | 74 | 105 | 252 | 417 | 326 | 522 |
| Wholesale and motor trades | EU | 10 | 214 | 40 | 106 | 50 | 320 |
| | Rest of world | 581 | 40 | 22 | 110 | 603 | 150 |
| | Total | 592 | 254 | 61 | 216 | 653 | 470 |
| Retail (excluding motor trades) | EU | 5 | 20 | 8 | 45 | 13 | 65 |
| | Rest of world | 5 | 42 | 2 | 50 | 7 | 92 |
| | Total | 10 | 62 | 10 | 95 | 20 | 157 |
| Travel | EU | 218 | 0 | 653 | 0 | 871 | 0 |
| | Rest of world | 136 | 0 | 407 | 0 | 543 | 0 |
| | Total | 354 | 0 | 1,061 | 0 | 1,414 | 0 |
| All industries | EU | 668 | 1,334 | 1,888 | 1,741 | 2,557 | 3,445 |
| | Rest of world | 1,189 | 834 | 1,932 | 3,103 | 3,121 | 3,567 |
| | Total | 1,861 | 2,165 | 3,819 | 4,845 | 5,679 | 7,010 |

Figures in red are interpolated. They are therefore subject to unknown margins of error.          Source: ONS (2020)

## 6. Short-run Impact of No-trade Deal Brexit on Trade in the North East

At the time of writing (10 December 2020), it looked increasingly likely that there was to be no trade agreement between the UK Government and the EU, leading to trading on WTO rules, which means the introduction of tariffs on trade in goods. By the end of December, this outcome had been avoided. Thus, this chapter now should be considered in terms of what might have been the outcome of a no-deal Brexit.

To provide some indication of how this will likely impact on trade in goods, the trade elasticities[28] estimated by Boehm et al. (2020) were used alongside (most favoured nation status) tariffs that the EU applied to goods in 2019, to estimate the likely increase in the price of UK exports, and the consequential decline in their demand. Thus, a three stage process was followed: (i) obtaining the tariffs that would be applied to goods at the two-digit SITC level; (ii) assuming that these lead directly to price increases, applying the trade elasticities to calculate the percentage change in exports demanded by the EU; and (iii) multiplying this percentage change by the quantity of goods exported (by UK region). This process provides a crude estimate of the fall in exports to the EU that would occur because of the tariff-induced price rise, and consequently the overall predicated decline in the value of goods exported to the EU. The assumption in part (ii) implies that tariffs are passed onto the purchasers of export goods (not internalised by the exporters themselves through offering goods at lower prices). Whether the intended purchasers of goods (i.e., those importing) switch to other suppliers or reduce consumption themselves is not relevant, as the impact of the tariff is to reduce the EU demand for UK goods. Thus, it is also being assumed that UK exporters cannot find alternative overseas markets for their goods.

Table 6.1 shows the effect of applying the above three-stage process to exports in 2019 from the North East to the EU. The effect would have been to reduce exports by £219.5m (equivalent to a fall of 2.8% on the value of exports of goods to the EU in 2019, which given the share of goods exported to the EU is equivalent to a fall of 1.67% on the value of all goods exported from the North East). The largest impact is on sales of road vehicles to the EU, because of the importance of this product in EU trade involving the North East. Organic chemicals would suffer the next largest fall in exports; these two products account for some 50% of the overall decline in exports to the EU, reflecting the importance of these products in overall exports (cf. Table 4.4). Given the relative importance of road vehicles to the NE LEP and organic chemicals to the Tees Valley LEP (Figure 4.11), it seems likely that both LEPs would suffer substantial negative shocks from a no-trade deal Brexit outcome.

The above calculations do not include an additional likely costs that will be due to delays in moving goods across supply chains, or costs due to increased regulations needing to be met. They also ignore the impact of leaving the EU on the export of services which will need to have 'passport' rights that meet regulatory standards set by the EU. Initially, such passport rights may be relatively automatic as on the 1st January 2021, the UK will have paperwork to ensure standards are acceptable to the EU after 2020 is unclear, nor often

---

[28] A trade elasticity for any exported good measures the change in the quantity of the good demanded due to a rise in its cost (the latter here due to the application of a tariff).

## Table 6.1: Impact of WTO tariffs applied to goods exported to EU by North East, 2019

| SITC2 Code | Tariff | % change in exports | Change in 2019 value (£'000) |
|---|---|---|---|
| 78 - Road vehicles (including air cushions) | 4.26 | -2.56 | (83,957) |
| 51 - Organic chemicals | 8.76 | -5.25 | (25,892) |
| 55 - Essential oils & perfume materials; | 4.22 | -2.53 | (8,800) |
| 77 - Elec machinery, app & appliances | 3.96 | -2.37 | (8,044) |
| 74 - General industrial machinery & eqp. | 3.89 | -2.34 | (8,035) |
| 53 - Dyeing, tanning & colouring materials | 5.81 | -3.49 | (7,846) |
| 72 - Machinery specialized | 4.01 | -2.40 | (6,748) |
| 57 - Plastics in primary forms | 6.35 | -3.81 | (6,654) |
| 59 - Chemical materials & products n.e.s | 5.55 | -3.33 | (5,989) |
| 58 - Plastics in non-primary forms | 5.88 | -3.53 | (5,433) |
| 89 - Miscellaneous manufactured articles | 3.36 | -2.02 | (5,261) |
| 68 - Non-ferrous metals | 3.41 | -2.04 | (4,557) |
| 87 - Professional, scientific & controlled | 3.67 | -2.20 | (4,178) |
| 84 - Articles of apparel & clothing accessories | 6.63 | -3.98 | (3,946) |
| 67 - Iron & steel | 3.75 | -2.25 | (3,854) |
| 71 - Power generating machinery & equip. | 2.56 | -1.53 | (3,204) |
| 07 - Coffee, tea, cocoa, spices & manufacturing | 8.60 | -5.16 | (2,525) |
| 85 - Footwear | 11.05 | -6.63 | (2,316) |
| 69 - Manufactures of metal n.e.s. | 3.99 | -2.39 | (2,181) |
| 03 - Fish,crustaceans,molluscs & aq.inve | 14.49 | -8.69 | (1,745) |
| 54 - Medicinal & pharmaceutical products | 2.79 | -1.67 | (1,676) |
| 52 - Inorganic chemicals | 5.50 | -3.30 | (1,554) |
| 09 - Miscellaneous edible products & pre | 10.62 | -6.37 | (1,533) |
| 04 - Cereals & cereal preparations | 10.02 | -6.01 | (1,518) |
| 65 - Textile yarn, fabrics, made up arti | 5.71 | -3.43 | (1,457) |
| 11 - Beverages | 15.20 | -9.12 | (1,383) |
| 81 - P/fab buildings;sanit.,plumbing,hea | 3.70 | -2.22 | (1,180) |
| 66 - Non-metallic mineral manufactures n | 3.21 | -1.92 | (886) |
| 05 - Vegetables & fruit | 10.25 | -6.15 | (871) |
| 64 - Paper, paperboard & manufactures th | 1.42 | -0.85 | (808) |
| 28 - Metalliferous ores & metal scrap | 3.16 | -1.89 | (486) |
| 79 - Other transport equipment | 2.17 | -1.30 | (420) |
| 76 - Telecoms & sound recording & repro | 2.84 | -1.70 | (397) |
| 08 - Feeding stuff for animals (not inc. | 5.40 | -3.24 | (397) |
| 75 - Office machines & adp machines | 2.82 | -1.69 | (374) |
| 01 - Meat & meat preparations | 11.82 | -7.09 | (370) |
| 62 - Rubber manufactures n.e.s. | 4.91 | -2.95 | (366) |
| 02 - Dairy products & birds' eggs | 9.62 | -5.77 | (348) |
| 06 - Sugar, sugar preparations & honey | 10.51 | -6.31 | (321) |
| 63 - Cork & wood manufactures (excluding | 3.44 | -2.06 | (284) |
| 73 - Metalworking machinery | 2.56 | -1.53 | (276) |
| 82 - Furniture & parts thereof; bedding, | 3.93 | -2.36 | (266) |
| 29 - Crude animal & vegetable materials | 3.54 | -2.13 | (156) |

| | | | |
|---|---|---|---|
| 26 - Textile fibres not manufactured & t | 6.14 | -3.68 | (155) |
| 83 - Travel goods, handbags & similar co | 3.55 | -2.13 | (152) |
| 43 - Animal or vegetable fats & oils, pr | 5.82 | -3.49 | (122) |
| 88 - Photographic & optical goods, n.e.s | 3.66 | -2.19 | (110) |
| 33 - Petroleum, petroleum products & related | 3.07 | -1.84 | (101) |
| 56 - Fertilizers (other than those of gr | 3.67 | -2.20 | (89) |
| 12 - Tobacco & tobacco manufactures | 44.70 | -26.82 | (65) |
| 27 - Crude fertilizers & crude minerals | 1.97 | -1.18 | (64) |
| 61 - Leather, leather manufactures n.e.s | 4.13 | -2.48 | (62) |
| 25 - Pulp & waste paper | 2.96 | -1.78 | (55) |
| 00 - Live animals other than animals of | 5.44 | -3.27 | (29) |
| 24 - Cork & wood | 3.44 | -2.06 | (26) |
| 22 - Oil seeds & oleaginous fruits | 3.82 | -2.29 | (23) |
| 32 - Coal, coke & briquettes | 2.05 | -1.23 | (15) |
| 23 - Crude rubber (including synthetic & | 5.99 | -3.59 | (14) |
| 41 - Animal oils & fats | 7.14 | -4.28 | (8) |
| 42 - Fixed vegetable fats & oils, crude, | 6.04 | -3.62 | (6) |
| 34 - Gas, natural & manufactured | 2.05 | -1.23 | (5) |
| 21 - Hides, skins & fur skins, raw | 4.30 | -2.58 | - |
| 35 - Electric current | 2.05 | -1.23 | - |
| 93 - Special transactions and commodities | 0.00 | 0.00 | - |
| 96 - Coin (other than gold coin) | 2.84 | -1.70 | - |
| Total | | | (219,593) |

Figure 6.1: Impact on trade in goods due to applying WTO tariffs on exports to EU, 2019



127
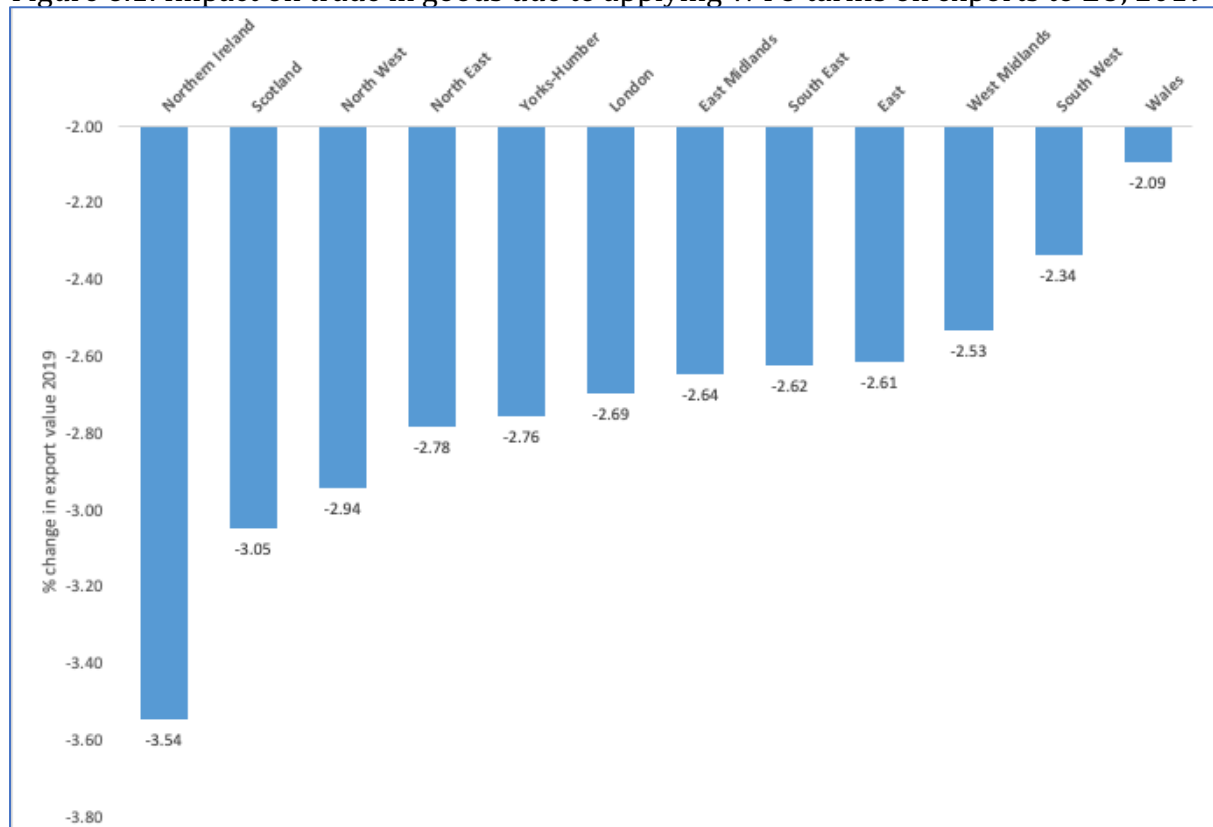
standards in line with EU requirements. But what will be needed in terms of new or likely the EU will require checks to be made on whether going forward standards are maintained.

The impact on other regions is shown in Figure 6.1; they reflect the relative importance of the different value of goods exported to the EU from each region, the level of tariff applied, and the trade elasticity for each good. Northern Ireland is likely to face the largest negative shock to trade, particularly because of its reliance on sales of office machines, and products related to the agricultural sector (eg. dyeing and tanning). Scotland is also adversely affected by products traded that are related to the agricultural sector (e.g., fixed vegetable fats & oils; dyeing, tanning & colouring; and hides, skins & fur skins). The third most affected region would be the North West (predominantly due to exports of general industrial machinery & equipment; animal or vegetable fats & oils; and metalliferous ores & scrap metal).

As well as impacting in the short-term on exports, the introduction of WTO tariffs would have a reciprocal impact on imports from the EU (raising firms costs if they internalised import tariffs or reducing the use of imports if they cut back demand due to the price rise). Table 6.2 shows the effect of applying WTO tariffs to imports in 2019 into the North East from the EU. The effect would have been to reduce imports by £241.8m (equivalent to a fall of 2.9% on the value of imports of goods from the EU in 2019); the comparable data on exports from Table 6.1 are also included (exports fall by £219.5m, equivalent to a fall of 2.8% on the value of exports of goods to the EU in 2019). The largest impact for both imports and exports is on sales of road vehicles from/to the EU, because of the importance of this product in EU trade involving the North East. Organic chemicals would suffer the next largest fall in trade; these two products account for some 30.7% (50%) of the overall decline in imports (exports) from (to) the EU. Given the relative importance of road vehicles to the NE LEP and organic chemicals to the Tees Valley LEP (Figure 4.11), it seems likely that both LEPs would suffer substantial negative shocks on both the importing and exporting side from a no-trade deal Brexit outcome.

The impact of import tariffs on other regions is shown in Figure 6.2; Northern Ireland is likely to face the largest negative shock to trade, on both the import and export side. In terms of imports, the worse affected regions are then the North West, South West, London and Scotland. The North East is 9th worse affected in terms of imports, but Figure 6.2 (and the data from Figure 6.1 which is included) shows that it would experience a bigger relative negative shock with regard to exports. For some regions, the import shock is much larger than the export shock (cf. South West and London) and in others they are fairly similar (cf. South East, Scotland, the North East, and Northern Ireland). This may suggest that goods supply-chains are more integrated in those regions with similar compositions of exports and imports.

Finally, Figure 6.3 shows for the North East which of its EU trading partners would potentially suffer the most from tariffs on imports into the UK. Those countries involved in especially motor vehicle, but also chemicals, supply chains are worse affected. Thus Germany, France, the Netherlands, and Spain would be most likely to face significant increases in their costs of supply goods to the North East, which would result in either passing on these costs to North East firms and/or a reduction in sales to the North East.

# Table 6.2: Impact of WTO tariffs applied to goods imported from EU by North East, 2019

| SITC2 Code | % change in imports | Change in 2019 value imports (£'000) | Change in 2019 value exports (£'000) |
|---|---|---|---|
| 78 - Road vehicles (including air cushions) | -2.6 | (52,950) | (83,957) |
| 51 - Organic chemicals | -5.3 | (21,310) | (25,892) |
| 55 - Essential oils & perfume materials; | -2.5 | (15,426) | (8,800) |
| 77 - Ele machinery, app & appliances & e | -2.4 | (13,450) | (8,044) |
| 05 - Vegetables & fruit | -6.1 | (10,863) | (871) |
| 74 - General industrial machinery & eqp. | -2.3 | (7,290) | (8,035) |
| 57 - Plastics in primary forms | -3.8 | (6,809) | (6,654) |
| 58 - Plastics in non-primary forms | -3.5 | (6,709) | (5,433) |
| 69 - Manufactures of metal n.e.s. | -2.4 | (6,665) | (2,181) |
| 59 - Chemical materials & products n.e.s | -3.3 | (6,225) | (5,989) |
| 85 - Footwear | -6.6 | (6,062) | (2,316) |
| 11 - Beverages | -9.1 | (6,054) | (1,383) |
| 67 - Iron & steel | -2.2 | (5,040) | (3,854) |
| 68 - Non-ferrous metals | -2.0 | (4,856) | (4,557) |
| 01 - Meat & meat preparations | -7.1 | (4,509) | (370) |
| 82 - Furniture & parts thereof; bedding, | -2.4 | (4,337) | (266) |
| 84 - Articles of apparel & clothing acce | -4.0 | (4,274) | (3,946) |
| 02 - Dairy products & birds' eggs | -5.8 | (3,998) | (348) |
| 09 - Miscellaneous edible products & pre | -6.4 | (3,588) | (1,533) |
| 04 - Cereals & cereal preparations | -6.0 | (3,429) | (1,518) |
| 72 - Machinery specialized for particula | -2.4 | (3,382) | (6,748) |
| 89 - Miscellaneous manufactured articles | -2.0 | (3,338) | (5,261) |
| 65 - Textile yarn, fabrics, made up arti | -3.4 | (3,330) | (1,457) |
| 71 - Power generating machinery & equipm | -1.5 | (3,242) | (3,204) |
| 33 - Petroleum, petroleum products & rel | -1.8 | (3,153) | (101) |
| 53 - Dyeing, tanning & colouring materia | -3.5 | (2,640) | (7,846) |
| 07 - Coffee, tea, cocoa, spices & manufa | -5.2 | (2,604) | (2,525) |
| 64 - Paper, paperboard & manufactures | -0.8 | (2,467) | (808) |
| 87 - Professional, scientific & controll | -2.2 | (2,201) | (4,178) |
| 28 - Metalliferous ores & metal scrap | -1.9 | (2,180) | (486) |
| 76 - Telecomms & sound recording & repro | -1.7 | (2,114) | (397) |
| 66 - Non-metallic mineral manufactures n | -1.9 | (1,986) | (886) |
| 52 - Inorganic chemicals | -3.3 | (1,486) | (1,554) |
| 03 - Fish,crustaceans,molluscs & aq.inve | -8.7 | (1,387) | (1,745) |
| 63 - Cork & wood manufactures (excluding | -2.1 | (1,254) | (284) |
| 62 - Rubber manufactures n.e.s. | -2.9 | (1,193) | (366) |
| 54 - Medicinal & pharmaceutical products | -1.7 | (1,169) | (1,676) |
| 81 - P/fab buildings;sanit.,plumbing,hea | -2.2 | (1,112) | (1,180) |
| 79 - Other transport equipment | -1.3 | (1,091) | (420) |
| 24 - Cork & wood | -2.1 | (1,018) | (26) |
| 56 - Fertilizers (other than those of gr | -2.2 | (967) | (89) |
| 08 - Feeding stuff for animals (not inc. | -3.2 | (928) | (397) |

| | | | |
|---|---|---|---|
| 06 - Sugar, sugar preparations & honey | -6.3 | (693) | (321) |
| 75 - Office machines & adp machines | -1.7 | (487) | (374) |
| 12 - Tobacco & tobacco manufactures | -26.8 | (401) | (65) |
| 29 - Crude animal & vegetable materials | -2.1 | (361) | (156) |
| 42 - Fixed vegetable fats & oils, crude, | -3.6 | (323) | (6) |
| 43 - Animal or vegetable fats & oils, pr | -3.5 | (306) | (122) |
| 83 - Travel goods, handbags & similar co | -2.1 | (219) | (152) |
| 73 - Metalworking machinery | -1.5 | (211) | (276) |
| 27 - Crude fertilizers & crude minerals | -1.2 | (172) | (64) |
| 88 - Photographic & optical goods, n.e.s | -2.2 | (167) | (110) |
| 22 - Oil seeds & oleaginous fruits | -2.3 | (103) | (23) |
| 23 - Crude rubber (including synthetic & | -3.6 | (91) | (14) |
| 25 - Pulp & waste paper | -1.8 | (53) | (55) |
| 26 - Textile fibres not manufactured & t | -3.7 | (41) | (155) |
| 61 - Leather, leather manufactures n.e.s | -2.5 | (30) | (62) |
| 41 - Animal oils & fats | -4.3 | (26) | (8) |
| 32 - Coal, coke & briquettes | -1.2 | (22) | (15) |
| 34 - Gas, natural & manufactured | -1.2 | (20) | (5) |
| 00 - Live animals other than animals of | -3.3 | (1) | (29) |
| 21 - Hides, skins & furskins, raw | 0.0 | - | - |
| 93 - Special transactions and commodities | 0.0 | - | - |
| 96 - Coin (other than gold coin), not be | 0.0 | - | - |
| 35 - Electric current | 0.0 | - | - |
| Total | | (241,815) | (219,593) |

Figure 6.2: Impact on trade in goods due to applying WTO tariffs to EU, 2019
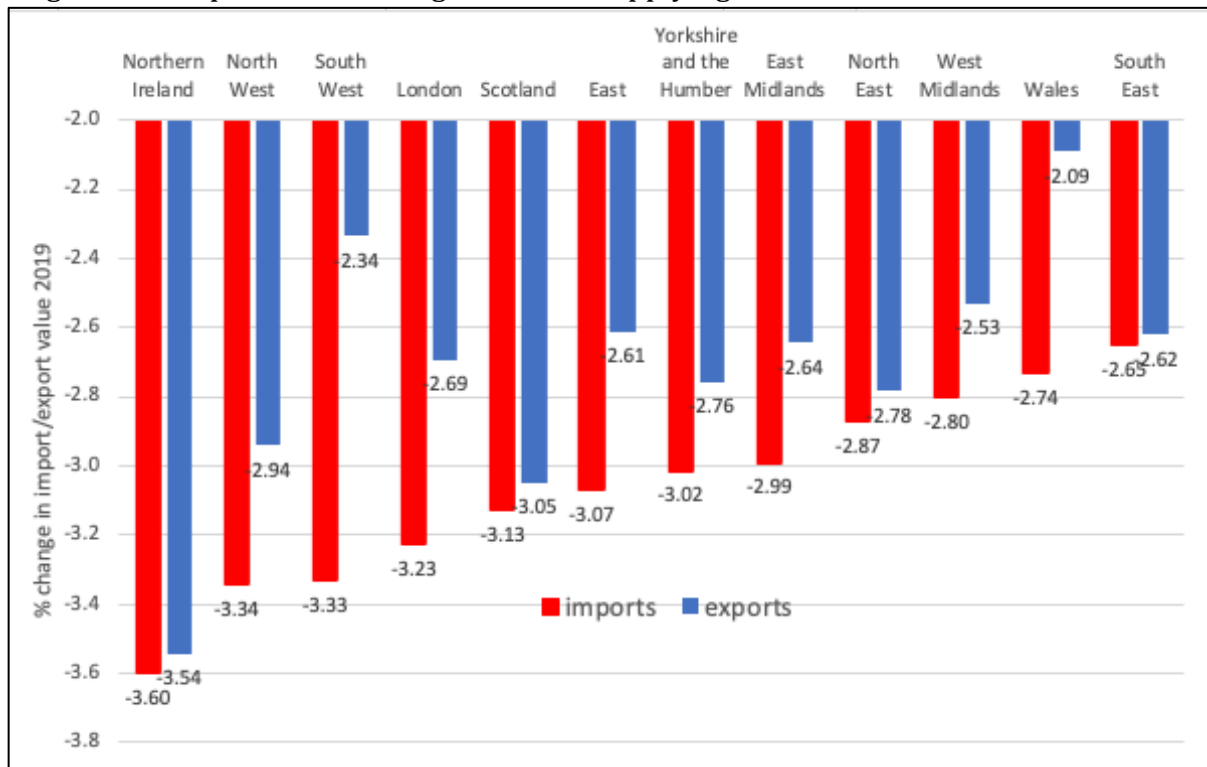
Figure 6.3: Decline in imports to North East due to applying WTO tariffs by country, 2019
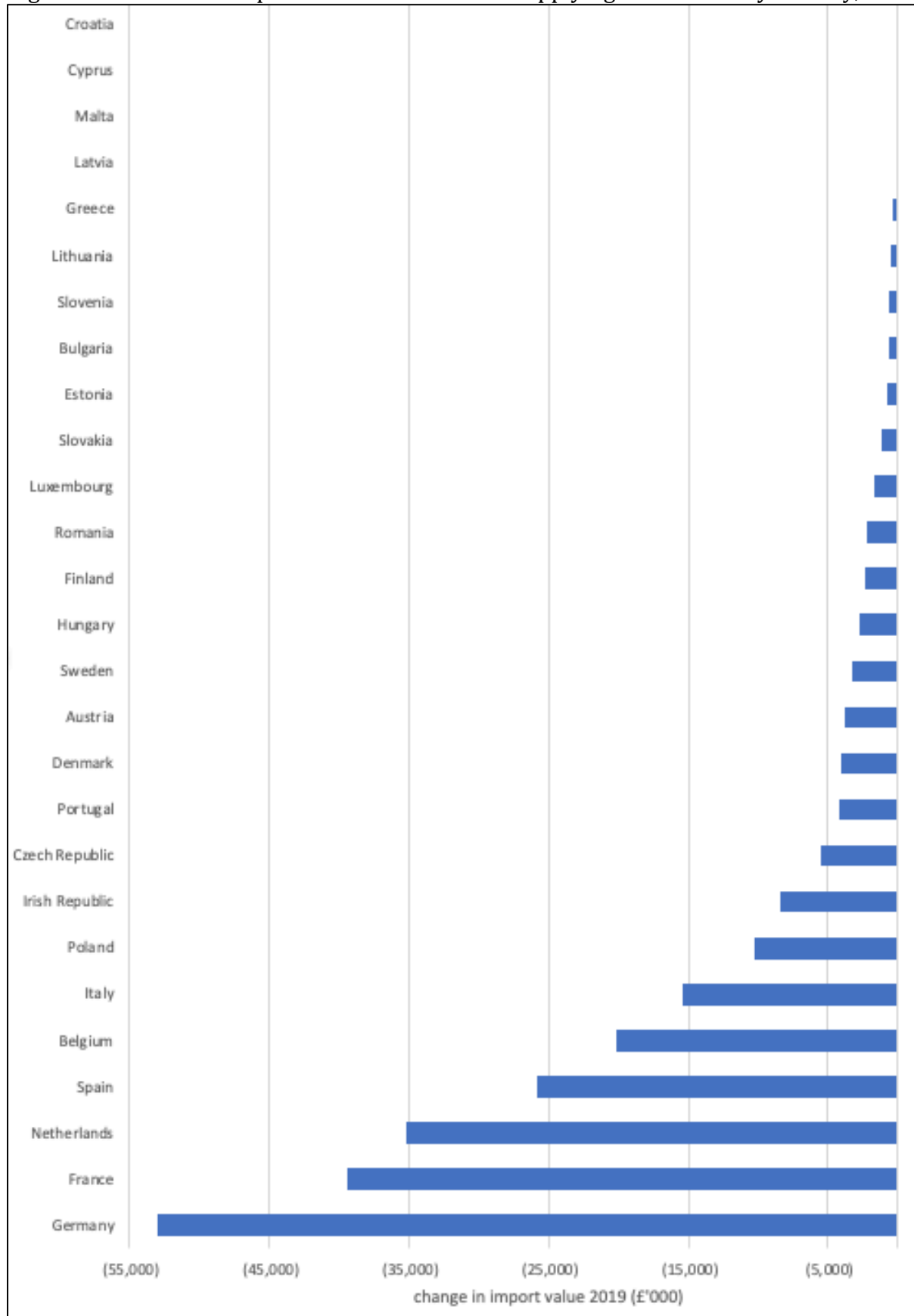
Lastly, it is important to note that the above calculations are based on applying WTO tariffs to goods exported to the EU (and as explained above ignore the impact of Brexit on the export of services). However, this is likely to reflect only the initial negative shock of tariffs. The negative impact on goods and services in other industries (which tends to be in the medium to longer term and much larger in size) is usually estimated using a Computable General Equilibrium Model (CGE) that requires extensive information of the flow of goods and services between trading nations, as well as the input-output links between domestic sectors (and other equations depicting underlying economic relationships within the economy). The type of model used by the UK Department of International Trade to estimate the impact of the UK-Japan trade deal (see DIT, 2020) provides some insights into what is needed.[29]

---

[29] Nabarrro (2020) has looked at the potential cost of both COVID-19 and Brexit (assuming a 'thin' deal is achieved rather than no deal). His results suggest that the UK economy from 2020 onwards will experience a permanent 4.5-5.0% below its 2016-19 trajectory going forward, of which one-third will be due to permanent "reconfiguration and additional write-offs associated with the UK's exit from the EU Single Market and Customs Union" (p. 134). Others take a more pessimistic view; for example, Sampson (2020) estimates that the long-run implications on UK GDP are as follows: COVID-19 alone results in a $-2.1\%$ impact; a Free-trade agreement Brexit adds another $-3.7\%$; and a no-deal Brexit adds $-5.7\%$ to GDP (hence overall C19 plus 'hard' Brexit is $-7.8\%$). Finally, the calculation presented by McGrattan and Waddle (2020) suggest that long-run inward FDI into the UK may fall by 16% due to Brexit.

References

Ackerberg, D., Caves, K. and Frazer, G. (2015) Identification Properties of Recent Production Function Estimators, *Econometrica,* 83, 2411-51.

Baily, M.N., Hulten, C. and D. Campbell (1992) Productivity Dynamics in Manufacturing Plants, *Brookings Papers on Economic Activity,* 1992, 187-249

Bartelsman, E. and Dhrymes, P. (1998) Productivity Dynamics: US Manufacturing Plants, 1972-1986, *Journal of Productivity Analysis*, 9**,** 5-34.

Bartelsman, E. J., and Wolf, Z. (2018). Measuring Productivity Dispersion. In *The Oxford Handbook of Productivity Analysis* (Grifell-Tatjé, E., Knox Lovell, C.A. and R.C. Sickles, eds.), 593-624, Oxford University Press, Oxford. https://doi.org/10.1093/oxfordhb/9780190226718.013.18

BEIS (2017) Industrial Strategy: Building a Britain Fit for the Future, Government White Paper (Cm 9528), Department for Business, Energy and Industrial Strategy, London. Available from: https://www.gov.uk/government/publications/industrial-strategy-building-a-britain-fit-for-the-future.

Blinder, A.S. (1973) Wage discrimination: Reduced-form and structural estimates. *Journal of Human Resources*, 8, 436-455.

Blundell, R. and Bond, S. (1998) Initial Conditions and Moment Restrictions in Dynamic Panel Data Models, *Journal of Econometrics,* 87, 115-43.

Boehm, C.E., Levenhenko, A.A., and N. Pandalai-Nayar (2020) The Long and Short (Run) of Trade Elasticities, NBER Working paper 27064, April 2020.

Broadberry, S. and T. Leunig (2013) The impact of Government policies on UK manufacturing since 1945. Future of Manufacturing Project: Evidence Paper 2, Foresight, Government Office for Science, Available from: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/277158/ep2-government-policy-since-1945.pdf

Caselli, M., Schiavo, S. and Nesta, L. (2018) Markups and markdowns, *Economics Letters* **173,** 104-7.

Cook, J., Hardy, D., and I. Sprackling (2020) Productivity Policy Review, in *Productivity Perspectives* by P. McCann and T. Vorley, (eds), Edward Elgar, pp. 293-323.

Craig, B., Pencavel, J., Farber, H., and A. Krueger (1995). Participation and Productivity: A Comparison of Worker Cooperatives and Conventional Firms in the Plywood

Industry. *Brookings Papers on Economic Activity. Microeconomics* 121-74. doi:10.2307/2534773.

Davenport, A. and B. Zaranko (2020) Levelling up: where and how? IFS Green Budget 2020, Chapter 7. Available from https://www.ifs.org.uk/publications/15055.

Del Gatto, M., Liberto, A. D. and Petraglia, C. (2011) Measuring Productivity, *Journal of Economic Surveys* **25,** 952-1008.

DIT (2020) [Final Impact Assessment of the Agreement between the United Kingdom of Great Britain and Northern Ireland and Japan for a Comprehensive Economic Partnership](), Department of International Trade, October 2020.

Ehrl P. (2013) Agglomeration economies with consistent productivity estimates, *Regional Science and Urban Economics* **43,** 751-63.

Färe, R. and Primont, D. (1995) *Multi-output production and duality: theory and applications*. Kluwer Academic Publishers, Boston.

Gandhi, A., Navarro, S. and Rivers, D. (2012) On the identification of production functions: how heterogenous is productivity, *Collegio Carlos Alberto Working Paper*, Collegio Carlos Alberto, Moncalieri.

Haldane, A.G. (2018) The UK's productivity problem: hub no spokes. Speech given 28 June 2018. Available from: [https://www.bankofengland.co.uk/speech/2018/andy-haldane-academy-of-social-sciences-annual-lecture-2018]()

Harris, R. (2021) Frontier and 'laggard' firms: will there be significant changes to the distribution of productivity post-COVID-19? In *Productivity and the Pandemic* (eds. P. McCann and T. Vorley), Edward Elgar, Cheltenham.

Harris, R. & Drinkwater, S. (2000) UK Plant and Machinery Capital Stocks and Plant Closures, *Oxford Bulletin of Economics and Statistics,* 62**,** 243-265.

Harris, R. and Moffat, J. (2012) Is Productivity Higher in British cities? *Journal of Regional Science*, 52(5), 762-786.

Harris, R. and Moffat, J. (2015a) The Impact of Exporting and Importing Goods and Services on Productivity in the UK, *World Economy*, 38, 1781-1794. Available from: [http://onlinelibrary.wiley.com/doi/10.1111/twec.12292/pdf]()

Harris, R. and Moffat, J. (2015b) Plant-level Determinants of Total Factor Productivity in Great Britain, 1997-2008, *Journal of Productivity Analysis*, vol. 44(1), August 2015, pp. 1-20. Available from: [http://link.springer.com/article/10.1007/s11123-015-0442-2]().

Harris, R. and Moffat, J. (2017). The UK productivity puzzle, 2008-2012: evidence using plant level estimates of total factor productivity, *Oxford Economic Papers*, 69(3), 529-549

Harris, R. and Moffat, J. (2020) The Impact of Product Subsidies on Plant-level Total Factor Productivity in Britain, 1997-2014, *Scottish Journal of Political Economy*, September 2020, vol. 67, pp. 387-403.

Harris, R. and Yan, J. (2019) The Measurement of Absorptive Capacity from an Economics Perspective: Definition, Measurement and Importance, *Journal of Economic Surveys*, June 2019, vol. 33(3), pp. 729-756

Haskel, J. (2000) What raises productivity? The microeconomics of UK productivity growth, *Working Paper*, Queen Mary, University of London, London.

HM Treasury (2020) 'Chancellor launches Comprehensive Spending Review', https://www.gov.uk/government/news/chancellor-launches-comprehensive-spending-review.

Jann, B. (2008) The Blinder-Oaxaca decomposition for linear regregression models. *The Stata Journal*, 8, 453-479.

Levinsohn, J. and Petrin, A. (2003) Estimating Production Functions Using Inputs to Control for Unobservables, *The Review of Economic Studies* **70,** 317-41.

Martin, R. (2008) Productivity dispersion, competition and productivity measurement, *CEP Discussion Paper*, Centre for Economic Performance, London.

Martin, R., Pike, A., Tyler, P., and B. Gardiner (2016) Spatially Rebalancing the UK Economy: Towards a New Policy Model, *Regional Studies,* 50(2), 342-357.

McCann, P. (2016) *The UK Regional-National Economic Problem: Geography, Globalisation and Governance,* Routledge, London.

McGrattan, E.R. and A. Waddle (2020) The impact of Brexit on foreign investment and production. *American Economic Journal: Macroeconomics*, 12, 76-103.

Nabarro, B. (2020) The cost of adjustment: emerging challenges for the UK economy. In IFS Green Budget 2020 (Chapter 3).

O'Donnell, C.J. (2016) Using information about technologies, markets and firm behaviour to. decompose a proper productivity index, Journal of Econometrics, 190, 328-340.

Oaxaca, R. (1973) Male-female wage differentials in urban labor markets. *International Economic Review*, 14, 693-709.

Olley, G. S. and Pakes, A. (1996) The Dynamics of Productivity in the Telecommunications Equipment Industry, *Econometrica* **64,** 1263-97.

ONS (2018a) Annual Business Survey, 2008-16: Secure Access. [data collection]. 9th Edition. UK Data Service. SN: 7451 http://doi.org/10.5255/UKDA-SN-7451-9

ONS (2018b) Annual Inquiry into Foreign Direct Investment 1996-2016: Secure Access. [data collection]. 6th edition. . UK Data Service. SN: 6664 http://doi.org/10.5255/UKDA-SN-6664-6

ONS (2018c). Business Expenditure on Research and Development, 1994-2016: Secure Access. [data collection]. 7th Edition. UK Data Service. SN: 6690 http://doi.org/10.5255/UKDA-SN-6690-7

ONS(2016) ONS (2016) Estimating the value of service exports abroad from different parts of the UK: 2011 to 2014

ONS(2020) International trade in services by subnational areas of the UK: 2018

Sampson, T. (2020) A no-deal Brexit may still be more costly than COVID-19. LSE blog.

UK2070 Commission (2019) Fairer and Stronger: Rebalancing the UK Economy. First Report of the UK2070 Commission, available from:

https://drive.google.com/file/d/1DaPlONpLXwxS1lE2kLu3aQVkOQEmFLwB/view.

Van Beveren, I. (2012) Total Factor Productivity Estimation: A Practical Review, *Journal of Economic Surveys* **26,** 98-128.

Wren, C. (2005), Regional grants: are they worth it?, *Fiscal Studies*, **26** (2), 245-75

Appendix

Table A.1: Technology definitions (1992 SIC codes):

| Sector | SIC code |
|---|---|
| Hi-tech manufacturing | Pharmaceuticals (SIC244); Office machinery & computers (SIC30); Radio, TV & communications equipment (SIC32); Medical & precision instruments (SIC33); Aircraft & spacecraft (SIC353). |
| Medium high-tech manufacturing | Chemicals (SIC24 exc. Pharmaceuticals, SIC244); Machinery & equipment (SIC29); Electrical machinery (SIC31); Motor vehicles (SIC34); Other transport equipment (SIC 35 exc. Ships & boats, SIC351, and Aircraft & spacecraft, SIC353) |
| Medium low-tech manufacturing | Coke & petroleum (SIC23); Rubber & plastics (SIC25); Other non-metallic (SIC26); Basic metals (SIC 27); Fabricated metals (SIC28); Ships & boats (SIC351) |
| Low-tech manufacturing | Food & beverages (SIC15); Tobacco (SIC16); Textiles (SIC17); Clothing (SIC18); Leather goods (SIC 19); Wood products (SIC 20); Paper products (SIC21); Publishing, printing (SIC22); Furniture and other manufacturing (SIC36); recycling (SIC37) |
| Hi-tech knowledge intensive (KI) services | Telecoms (SIC642); Computer & related (SIC72 exc. Maintenance & repair, SIC725); R&D (SIC73); Photographic activities (SIC7481); Motion pictures (SIC 921); Radio & TV activities (SIC922); Artistic & literary creation (SIC9231) |
| KI services | Water transport (SIC61); Air transport (SIC62); Legal, accountancy & consultancy (SIC741 exc. Management activities of holding companies, SIC7415); Architecture & engineering (SIC742); Technical testing (SIC 743); Advertising (SIC744) |
| Low KI services | Repairs (SIC50); Wholesale (SIC51); Retail (SIC52); Hotels & restaurants (SIC55); Land transport (SIC60); Support for transport (SIC63); real estate (SIC70); Renting machinery (SIC 71); Maintenance & repair of office machines (SIC725); Management activities of holding companies (SIC7415); Labour recruitment (SIC745); Investigation services (SIC746); Industrial cleaning (SIC747); Packaging (SIC7482); Secretarial services (SIC7483); Other business services (SIC7484); Sewage & refuse (SIC90) |
| Other low KI services | Postal services (SIC641); Membership organisations (SIC91); Other entertainment services (SIC923 exc. Artistic & literary creation, SIC9231); News agencies (SIC924); Sporting activities (SIC926); Other recreational activities (SIC927); Other services (SIC93). |