Interregional trade and Exposure to Brexit: Results for the Midlands Engine Economic Observatory (MEEO)

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Introduction

In this document, we present a comprehensive illustration of the regional and sectoral trade flows into and out of the Midlands regions as well as an overview of the Brexit-related regional and sectoral exposure of the West Midlands and East Midlands regions and sectors.

Our analysis draws upon the most detailed regional-national and international trade and competition datasets currently available anywhere in the world, allowing us to examine the impact of Brexit on the UK sectors and regions. Part of the analysis presented in this report is based on results obtained in the ESRC- UK in a changing Europe project – The economic impacts of Brexit on the UK, its regions, its cities and its sectors.

As an outline, the document presented here provides the following information:

Section 1 presents evidence of the **interregional bilateral trade flows between West and East Midlands**. The document provides information of the sectors that are responsible for the most important bilateral trade flows between these two regions.

Section 2 focuses on the main interregional trade relationships of East Midlands and West Midlands with the **rest of the UK.** It provides a disaggregation of the imports and exports' sectoral distribution in both regions as well as the distribution of the regions of origin and destination within the UK.

In section 3, we analyse the main **trading partners** for the West Midlands and East Midlands **outside of the UK.** We present evidence of the EU and non-EU trade dependency in terms of imports and exports of the West and East Midlands regions by sector and compare them with the UK regional average.

Finally, section 4 provides evidence of the **sectoral Brexit exposure** in these two regions. In particular, our evidence provides the quantification of the shares of regional and sectoral GDP and Labour Income that are at risk due to the negative trade-related consequences of Brexit. Our analysis shows evidence of the sectoral exposure levels in these two regions.

The main conclusion that can be extracted from this report is that East Midlands and West Midlands regions are heavily dependent on trade in a series of non-services sectors such as manufactured goods. Their trade flows are heavily dependent on geography. For the trade within the UK, both regions tend to have stronger trade relationships with regions geographically closer; as an example, 12% of the total exports to the rest of the UK in West Midlands go to East Wales. With respect to the trade outside the UK, both regions are heavily dependent on the EU markets, in particular for imports. In the case of exports outside the UK, both regions have a very similar sectoral distribution with more than 60% of the exports having a EU country as the country of destination. Finally, the Brexit exposure results show high levels of GDP and Local Labour Income exposure in both regions (on average around 13% of the regional GDP or Labour Income is exposed to Brexit negative trade-related consequences). In terms of sectors, the manufacturing sector is the sector which is the most exposed to Brexit in these two regions.

1. Interregional Trade between East Midlands and West Midlands

This section presents evidence of the bilateral interregional trade flows between East Midlands and West Midlands.

Trade surplus and trade deficits between East Midlands and West Midlands

Table 1 presents the trade surplus and deficit between the sectoral trade-flows combinations in these two regions. Positive values present a trade surplus for West Midlands while negative values present a trade deficit for West Midlands. In these cases, West Midlands exports to East Midlands are higher than East Midlands exports to West Midlands for the selected sectors. The cells in red colour represent the bilateral interregional trade flows with the higher (top) trade surplus for West Midlands, while the negative values represent the bilateral trade flows deficits for the West Midlands. In these cells (sector combinations) the West Midlands exports to East Midlands are lower than East Midlands exports to West Midlands. The cells in yellow colour show the more severe bilateral trade flows deficits for the West Midlands.

Overall, the East Midlands region exports more to West Midlands than the other way around.

Table 1. Interregional Trade between East Midlands and West Midlands (year 2010, millions of £)

	East Midlands														
West Midlands	**ss1**	**ss2**	**ss3**	**ss4**	**ss5**	**ss6**	**ss8**	**ss9**	**ss10**	**ss11**	**ss12**	**ss13**	**ss14**	**ss15**	**Total**
ss1	1.015	-0.001	5.364	-0.009	-0.259	0.008	-0.045	-0.723	-1.140	-1.841	0.068	0.079	0.015	-1.075	*1.458*
ss2	-1.590	17.431	-3.499	-0.748	-11.194	-0.901	-15.063	-1.417	-6.900	-1.269	-4.147	-3.701	-5.463	-19.101	*-57.563*
ss3	-5.544	-0.016	-13.465	-0.401	-0.294	-0.061	-0.153	-0.042	-23.762	-65.054	-0.128	-0.206	-0.437	-29.113	*-138.677*
ss4	-0.012	-0.002	-0.034	-1.565	-0.001	-0.045	-0.098	-0.052	-0.048	-0.035	-0.015	-0.018	-0.028	-0.088	*-2.042*
ss5	-0.667	-0.936	3.089	-0.687	-0.258	-5.202	-5.344	-4.705	-9.612	-1.074	-2.742	-2.206	-4.766	-13.850	*-48.961*
ss6	0.020	0.023	0.134	-0.048	-0.081	9.331	0.111	0.154	1.576	0.035	-0.042	0.118	-0.101	0.884	*12.115*
ss8	-0.240	0.864	1.631	-1.077	-1.891	8.949	-0.983	-2.989	-6.855	-0.110	-1.305	-0.270	-4.109	-6.643	*-15.027*
ss9	0.390	0.030	-0.002	-0.074	-0.300	0.034	-0.043	-36.868	-0.028	-0.017	4.973	6.499	34.989	16.470	*26.053*
ss10	-0.217	0.094	4.063	-0.386	5.655	5.941	-1.631	2.069	1.600	-3.359	2.337	0.898	0.676	6.346	*24.085*
ss11	-0.003	-0.006	0.008	-0.006	-0.050	0.016	-0.008	0.058	0.095	-0.004	0.099	0.024	-0.095	-0.016	*0.111*
ss12	-1.066	-0.262	1.541	-1.324	-1.314	1.378	-2.853	-0.539	-16.388	-2.440	-25.597	-20.657	-13.935	-18.608	*-102.063*
ss13	1.142	1.170	0.583	-0.805	-0.624	4.978	-1.416	0.876	-2.753	0.883	-2.281	4.568	27.848	-5.101	*29.067*
ss14	-1.981	-1.231	1.936	-0.542	-4.816	3.612	-4.661	9.094	22.610	0.200	8.050	10.986	15.330	4.937	*63.524*
ss15	-0.137	-0.084	0.034	-0.112	-0.927	0.163	-0.327	-0.335	-0.520	-0.225	-0.386	-0.684	-1.203	-28.845	*-33.589*
Total	*-8.890*	*17.074*	*1.383*	*-7.785*	*-16.353*	*28.200*	*-32.513*	*-35.418*	*-42.125*	*-74.310*	*-21.117*	*-4.571*	*48.722*	*-93.805*	**-241.509**

Notes:

(1) Data sources: EUREGIO http://papers.tinbergen.nl/18084.pdf

(2) Sector classification: (ss1) Agriculture; (ss2) Mining quarrying and energy supply; (ss3) Food beverages and tobacco; (ss4) Textiles, leather and similar; (ss5) Coke refined petroleum nuclear fuel and chemicals etc; (ss6) Electrical and optical equipment and Transport equipment; (ss8) Other Manufacturing; (ss9) Construction; (ss10) Distribution; (ss11) Hotels and restaurants; (ss12) Transport storage and communication; (ss13) Financial intermediation; (ss14) Real state renting and business activities; (ss15) Non-market services

(2) **UKF - East Midlands**: UKF1 Derbyshire and Nottinghamshire; UKF2 Leicestershire Rutland and Northants; UKF3 Lincolnshire; **UKG- West Midlands**: UKG1 Herefordshire Worcestershire and Warwickshire; UKG2 Shropshire and Staffordshire; UKG3 West Midlands

Top bilateral trade relationships between East Midlands and West Midlands

Table 2 shows the top ten bilateral trade relationships between West Midlands and East Midlands in the year 2010 in monetary value (millions of £).

For example, the top 1 bilateral trading activity is the exporting of real estate, renting and business activities from West Midlands to East Midlands real state, renting and business activities sector.

For example, the top 4 bilateral trading activity is the exporting from real estate, renting and business activities West Midlands sector to the non-market services sector in East Midlands. Public sector activities in East Midlands demand of West Midlands real estate, renting and business activities.

Table 2. Top ten bilateral trade relationships (year 2010)

Rank	Exporter	Importer	Sector Exporting	Sector Importing	Value (Millions of £)
1	West Midlands	East Midlands	Real estate, renting and business activities	Real estate, renting and business activities	201.419
2	East Midlands	West Midlands	Real estate, renting and business activities	Real estate, renting and business activities	186.090
3	East Midlands	West Midlands	Construction	Construction	182.739
4	West Midlands	East Midlands	Real estate, renting and business activities	Non-Market Services	173.072
5	East Midlands	West Midlands	Real estate, renting and business activities	Non-Market Services	168.136
6	West Midlands	East Midlands	Real estate, renting and business activities	Retail Trade and Distribution	165.417
7	West Midlands	East Midlands	Construction	Construction	145.871
8	East Midlands	West Midlands	Real estate, renting and business activities	Retail Trade and Distribution	142.808
9	West Midlands	East Midlands	Real estate, renting and business activities	Financial intermediation	139.292
10	East Midlands	West Midlands	Transport, storage and communication	Transport, storage and communication	130.590

Notes: (1) Data sources: EUREGIO http://papers.tinbergen.nl/18084.pdf
(2) **UKF - East Midlands**: UKF1 Derbyshire and Nottinghamshire; UKF2 Leicestershire Rutland and Northants; UKF3 Lincolnshire; **UKG- West Midlands**: UKG1 Herefordshire Worcestershire and Warwickshire; UKG2 Shropshire and Staffordshire; UKG3 West Midlands

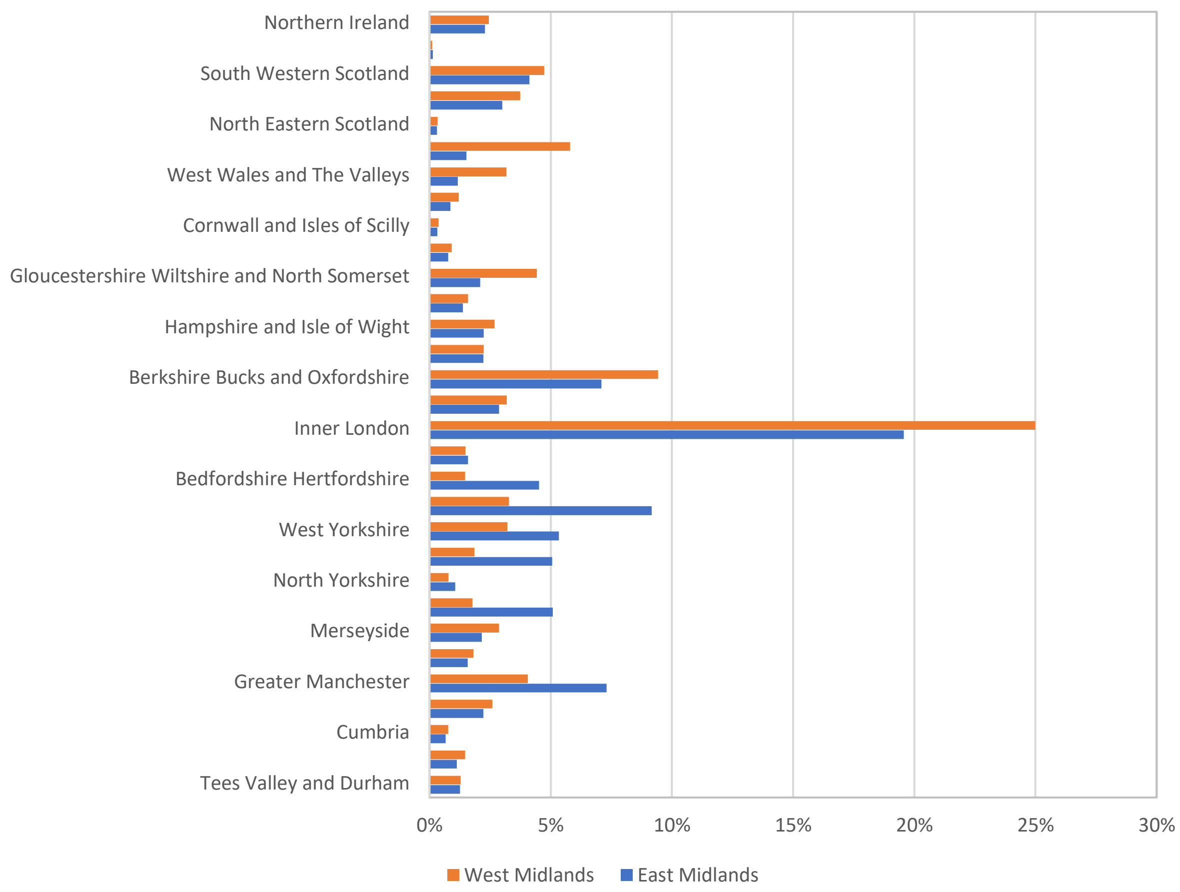
2. Main trade relationships with the rest of the UK regions

This section focuses on the main interregional trade relationships of East Midlands and West Midlands and the rest of the UK regions in terms of imports and exports.

Imports

Figure 1 illustrates the main trade relationships in terms of imports of both the East Midlands (in blue) and the West Midlands (in orange) with the rest of the UK regions (see table A2 in the appendix for a better detail). The main conclusions that can be extracted from this figure is that inside the UK the top trading partner in terms of imports is Inner London. Around 25% of West Midlands imports are from Inner London, in East Midlands this figure is around 20%. The top three regions that provide imports to the East Midlands are Inner London (19.56%), Greater Manchester (7.31%) and Berkshire Bucks and Oxfordshire (7.09%). In the case of the West Midlands, the top UK partners in terms of West Midlands imports are Inner London (24.99%), followed by Berkshire Bucks and Oxfordshire (9.43%) and East Wales (5.80%).

Figure 1. Main trade relationships with the rest of UK regions. Import activities (year 2010 – regional detail)



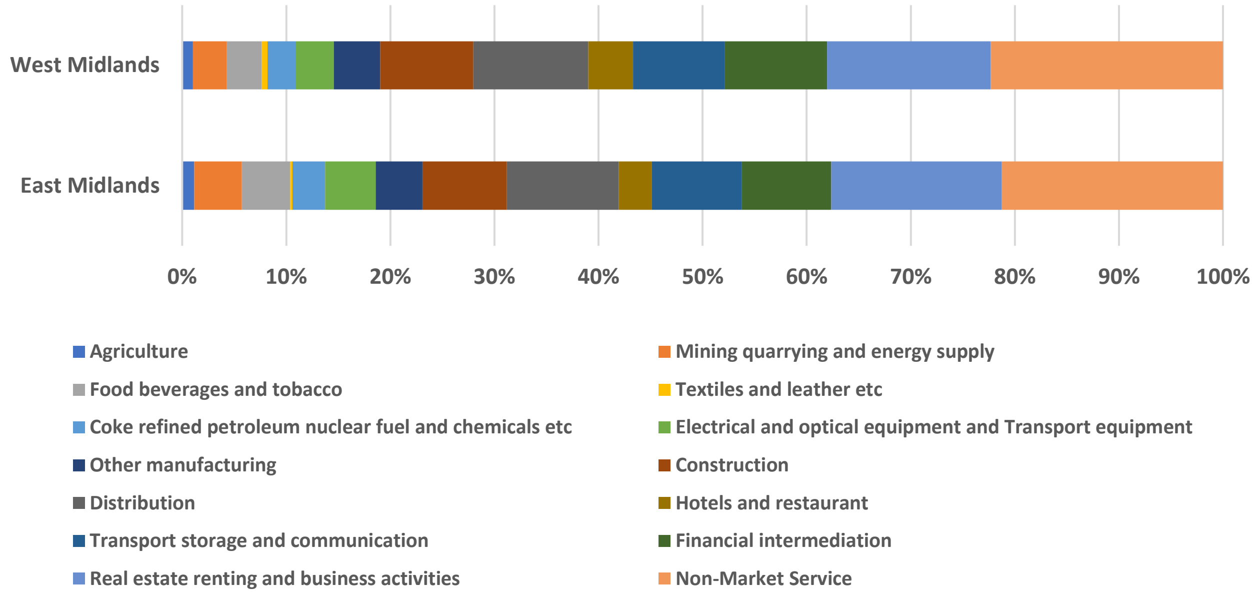
Notes: (1) Data sources: EUREGIO http://papers.tinbergen.nl/18084.pdf

(2) **UKF - East Midlands**: UKF1 Derbyshire and Nottinghamshire; UKF2 Leicestershire Rutland and Northants; UKF3 Lincolnshire; **UKG- West Midlands**: UKG1 Herefordshire Worcestershire and Warwickshire; UKG2 Shropshire and Staffordshire; UKG3 West Midlands

Figure 2 gives an illustration of the sectoral composition of the import structure of these two regions. The West Midlands region imports more service activities from the rest of the UK than the East Midlands region (see table A3 in the appendix for details). Both regions present similar distributions in terms of their sectoral composition of its imports. The East Midlands imports more in Electrical and Optical Equipment and Transport Equipment (light green) from the rest of the UK than West Midlands.

As we can see in table A3, Hotels and restaurants in the West Midlands imports more from the rest of the UK than Hotels and Restaurants in East Midlands.

Figure 2. Main trade relationships with the rest of UK regions. Import activities (year 2010 – sectoral detail)



Notes: (1) Data sources: EUREGIO http://papers.tinbergen.nl/18084.pdf

(2) **UKF - East Midlands**: UKF1 Derbyshire and Nottinghamshire; UKF2 Leicestershire Rutland and Northants; UKF3 Lincolnshire; **UKG- West Midlands**: UKG1 Herefordshire Worcestershire and Warwickshire; UKG2 Shropshire and Staffordshire; UKG3 West Midlands

Exports

Figure 3 illustrates the regional composition of the exports to the rest of the UK for both regions. In particular, figure 3 shows the direct effects of the total exporting activity from West Midlands and East Midlands to the rest of the UK (see table A4 in the appendix for details).

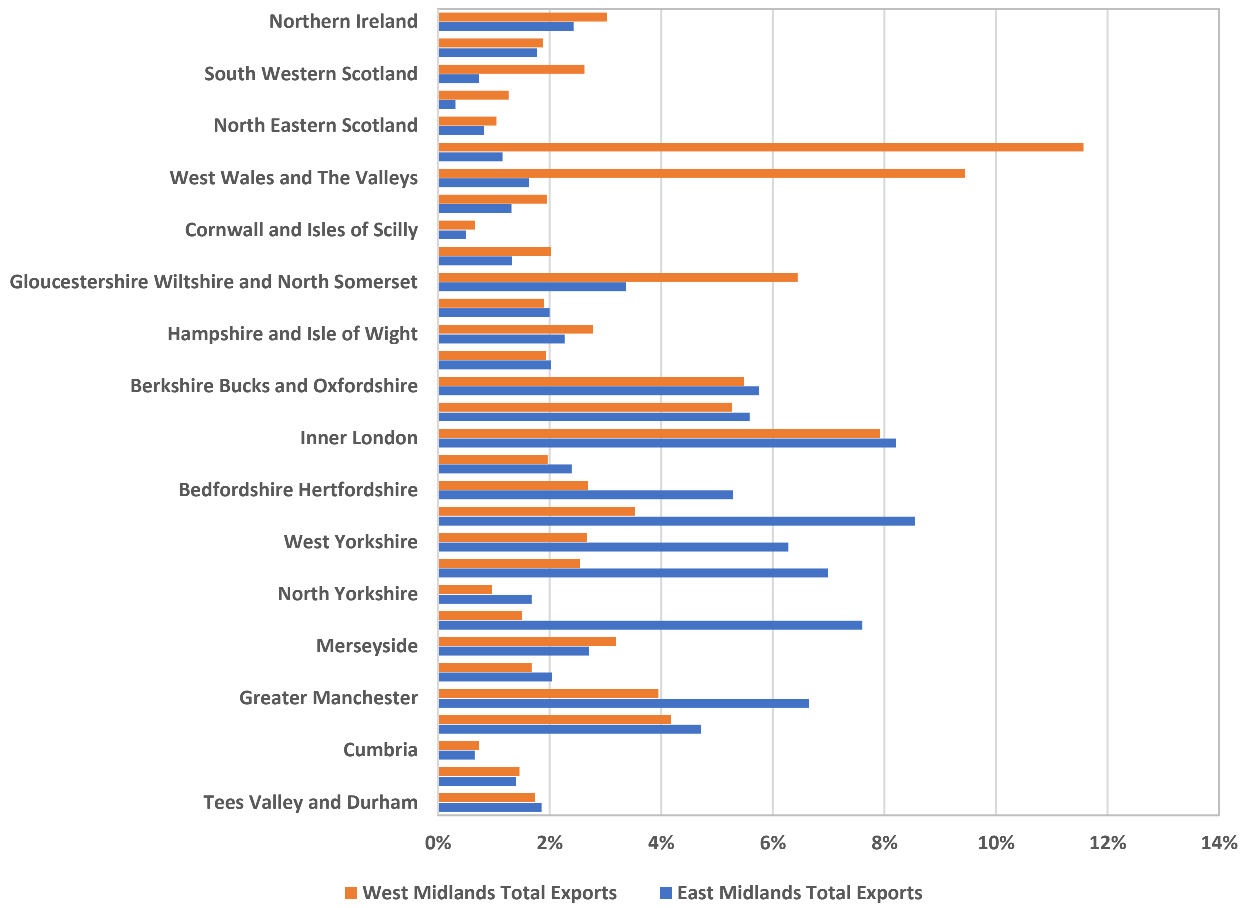
Looking at the composition of exports shown in figure 3, we can conclude that geography plays an important role. Both regions seem to export more to border or geographically closer areas than remote areas in the UK.

For example, in the case of West Midlands and Wales, around 12% of the total exports to the rest of the UK from West Midlands go to East Wales.

For example, in the case of East Midlands and East Anglia, around 9% of the total exports to the rest of the UK from East Midlands go to East Anglia.

For example, in the case of Inner London, around 8% of the total exports to the rest of the UK from both regions go to Inner London.

Figure 3. Main trade relationships with the rest of UK regions. Total exports direct effects (year 2010 – regional detail)



Notes: (1) Data sources: EUREGIO http://papers.tinbergen.nl/18084.pdf

(2) **UKF - East Midlands**: UKF1 Derbyshire and Nottinghamshire; UKF2 Leicestershire Rutland and Northants; UKF3 Lincolnshire; **UKG- West Midlands**: UKG1 Herefordshire Worcestershire and Warwickshire; UKG2 Shropshire and Staffordshire; UKG3 West Midlands

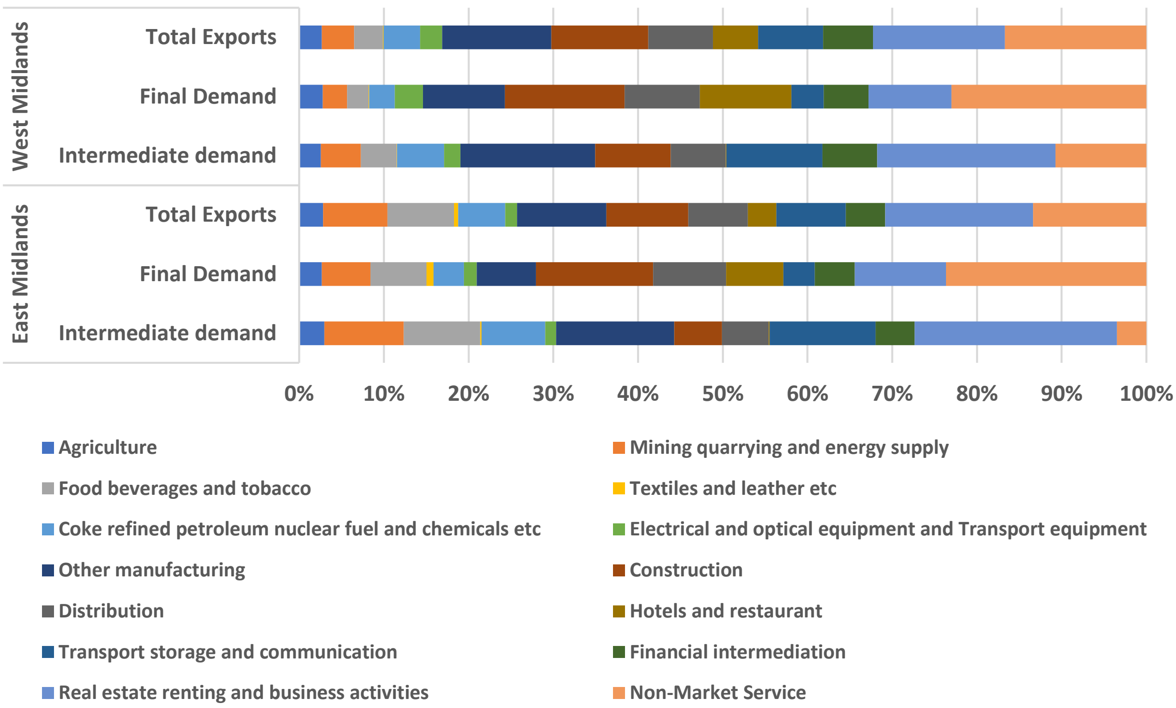
Figure 4 shows the sectoral detail of the main trade relationships of West Midlands and East Midlands with the rest of UK regions, in terms of total exports in the year 2010 (see table A5 at the appendix for greater detail).

The figure shows that in terms of total exports both regions share the same top sector exporters: Non-Market services; Real estate, renting and Business Activities; Construction; and Other Manufacturing. These sectors represent more than 50% of their total exports to the rest of the UK.

In terms of intermediate demand, exports to the private business sector, the sectoral distribution of exports to the rest of the UK, Real estate, renting, and Business Activities; Other Manufacturing; and Transport Storage and Communication are the most important sectors for both regions.

In the case of final demand, exports to household, government or investment, the top exporter sectors in these regions appear to be Non-market services and Construction.

Figure 4. Main trade relationships with the rest of UK regions. Total Exports (year 2010 – sectoral detail)



Notes: (1) Data sources: EUREGIO http://papers.tinbergen.nl/18084.pdf

(2) **UKF - East Midlands**: UKF1 Derbyshire and Nottinghamshire; UKF2 Leicestershire Rutland and Northants; UKF3 Lincolnshire; **UKG- West Midlands**: UKG1 Herefordshire Worcestershire and Warwickshire; UKG2 Shropshire and Staffordshire; UKG3 West Midlands

3. Main trade relationships outside the UK.

In section 3, we analyse the main trading partners for these two regions **outside the UK** in terms of imports and exports.

Imports

The results of this section illustrate the import structure of the East and West Midlands regions in terms of imports coming from the EU and from other countries.

The results presented in table 3 show that the imports trade dependency in West Midlands and East Midlands regions from European countries is similar to the regional UK average. Between 60% and 68% of the regional imports in these regions come from the EU countries. The region that has the highest European trade dependency in imports is West Midlands.

Table 3. Share of imports from the EU and from other countries– West Midlands and East Midlands. Imports, year 2010, regional detail

	UK UK regional average	**UKF1** Derbyshire and Nottinghamshire	**UKF2** Leicestershire Rutland and Northants	**UKF3** Lincolnshire	**UKG1** Herefordshire Worcestershire and Warwickshire	**UKG2** Shropshire and Staffordshire	**UKG3** West Midlands
From EU	*63.7%*	65.7%	60.4%	64.3%	62.5%	63.4%	67.8%
From other countries	*36.3%*	34.3%	39.6%	35.7%	37.5%	36.6%	32.2%

Note: Data sources: EUREGIO http://papers.tinbergen.nl/18084.pdf

European trade dependency in imports

Figure 5 illustrates with more detail the imports trade composition by EU country of origin in the West Midlands and the East Midlands regions with respect to the UK regional average (see table A6 in the appendix for detail).

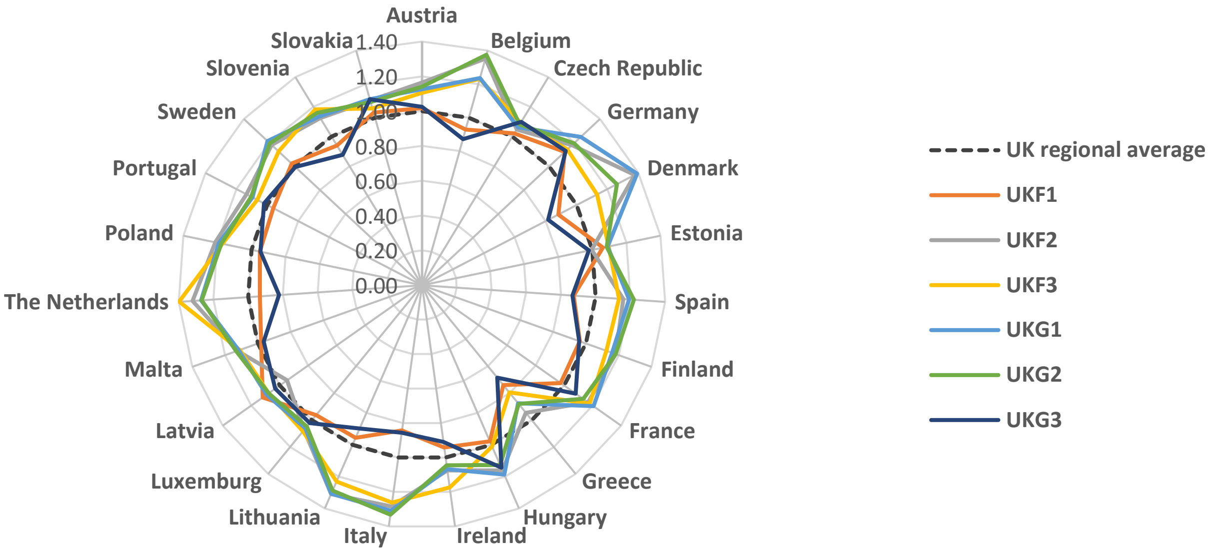
The spider diagrams compare the intensity of the trade dependency in imports from a set of European countries between these six regions and the UK regional average.

The results show that in many cases the East and West Midlands regions display a higher import trade dependency than the UK regional average.

The countries that export more to West Midlands and East Midlands regions are Belgium, Denmark, The Netherlands, Lithuania and Italy for particular regions. All of the regions are dependent on German imports.

For example, Shropshire and Staffordshire display higher levels of trade dependency with Belgium than the rest of regions, in comparison with the West Midlands or Derbyshire and Nottinghamshire.

Figure 5. Main trade relationships with the EU countries – West Midlands and East Midlands. Imports, year 2010



Note: (1) Data sources: EUREGIO http://papers.tinbergen.nl/18084.pdf

(2) **UKF - East Midlands**: UKF1 Derbyshire and Nottinghamshire; UKF2 Leicestershire Rutland and Northants; UKF3 Lincolnshire; **UKG- West Midlands**: UKG1 Herefordshire Worcestershire and Warwickshire; UKG2 Shropshire and Staffordshire; UKG3 West Midlands

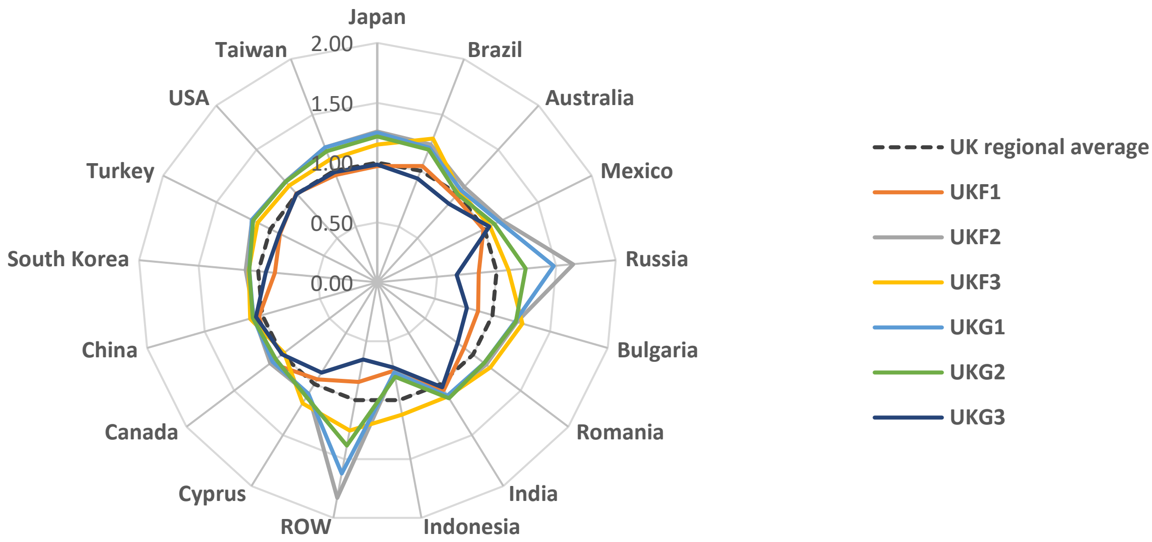
Trade dependency in imports with non-European countries

Figure 6 illustrates the non-European regional trade dependency in imports in the West Midlands and East Midlands regions with respect to the UK regional average (see table A7 in the appendix for detail).

The spider diagrams compare the intensity of the regional trade dependency in imports in the six West Midlands and East Midlands regions for a set of non-European countries and compares them with the UK regional average.

Derbyshire and Nottinghamshire display values close to the UK regional average while Leicestershire Rutland and Northants differs from the UK regional average by having a very high strong import trade dependency with Russia and the Rest of the World.

Figure 6. Main trade relationships with the non- EU countries – West Midlands and East Midlands. Imports, year 2010



Notes: (1) Data sources: EUREGIO http://papers.tinbergen.nl/18084.pdf

(2) **UKF - East Midlands**: UKF1 Derbyshire and Nottinghamshire; UKF2 Leicestershire Rutland and Northants; UKF3 Lincolnshire; **UKG- West Midlands**: UKG1 Herefordshire Worcestershire and Warwickshire; UKG2 Shropshire and Staffordshire; UKG3 West Midlands

Exports

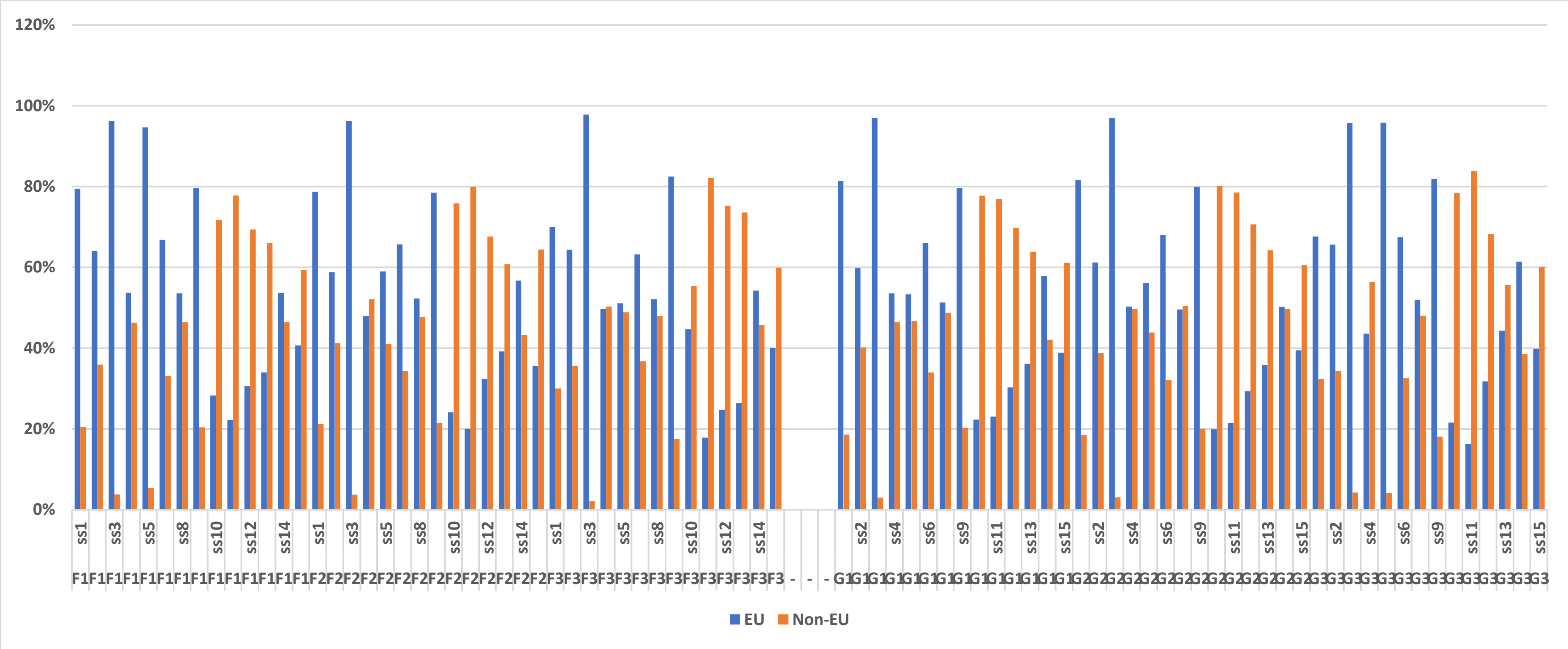
From the side of the export activity, we present an illustration of the distribution of the destination of the exports (EU and non-EU destination) by sector for the six regions in the West and East Midlands (see table A8 at the appendix for greater detail).

The main conclusions that can be extracted looking at figure 7 and table A8 are the following:

In the case of East Midlands all the three regions display a very similar sectoral export structure in terms of EU vs. non-EU trade dependency. Agriculture; Mining-quarrying and energy supply; Food beverage and tobacco; Textiles and Leather; Coke, petroleum, fuels and chemicals; Elec. Optical equipment and Transport equipment; Construction; Real estate, renting and business activity are all characterized by more than 60% of the exports leaving to the EU countries (higher EU export trade dependency). The West Midlands regions mirror the East Midlands case in terms of their EU trade dependency in the same sectors.

The sectors that have lower export trade dependency with the EU are Hotels and restaurants and Financial intermediation, still with values or around 20% of their exports for the case of East Midlands and higher at around 35% in the case of West Midlands.

Figure 7. East Midlands and West Midlands regional exports by destination (EU vs. non-EU markets), year 2010



Notes: (1) Data sources: EUREGIO http://papers.tinbergen.nl/18084.pdf

(2) **UKF - East Midlands**: UKF1 Derbyshire and Nottinghamshire; UKF2 Leicestershire Rutland and Northants; UKF3 Lincolnshire; **UKG- West Midlands**: UKG1 Herefordshire Worcestershire and Warwickshire; UKG2 Shropshire and Staffordshire; UKG3 West Midlands

(3) Sector classification: (ss1) Agriculture; (ss2) Mining quarrying and energy supply; (ss3) Food beverages and tobacco; (ss4) Textiles, leather and similar; (ss5) Coke refined petroleum nuclear fuel and chemicals etc; (ss6) Electrical and optical equipment and Transport equipment; (ss8) Other Manufacturing; (ss9) Construction; (ss10) Distribution; (ss11) Hotels and restaurants; (ss12) Transport storage and communication; (ss13) Financial intermediation; (ss14) Real state renting and business activities; (ss15) Non-market services

4. West Midlands and East Midlands Brexit exposure

This section presents evidence found in Chen et al. (2018)[1] as part of the ESRC project: The economic impacts of Brexit on the UK, its regions, its cities and its sectors[2].

Table 4 shows the regional shares of regional GDP and Local Labour Income at risk in the West Midlands and East Midlands regions as a result of Brexit trade-related consequences. As an example, in Leicestershire Rutland and Northants, the Brexit trade related consequences account for 15.4% of the region's GDP and 14.8% of its Local Labour Income. Industrial structure and the import and export activity composition play an important role here, as we have seen before (see table 3 and figures 5 and 7) this region is heavily dependent on EU trade flows.

Table 4. Regional shares of GDP and Local Labour Income exposed to Brexit

Region	GDP	Local Labour Income
Derbyshire_and_Nottinghamshire	11.4	10.6
Leicestershire_Rutland_and_Northants	15.4	14.8
Lincolnshire	13.1	13.0
Herefordshire_Worcestershire_and_Warks	14.3	14.4
Shropshire_and_Staffordshire	13.9	13.7
West_Midlands	12.2	11.3

Notes: (1) Data sources: EUREGIO http://papers.tinbergen.nl/18084.pdf

(2) Results from ESRC- The economic impacts of Brexit on the UK, its regions, its cities and its sectors.

(3) Methodological detail see: Chen et al. (2018)

Tables 5 and 6 show the regional shares of sectoral GDP and Local Labour Income at risk in the West Midlands and East Midlands regions due to Brexit trade related consequences. The tables show the direct and total effects of the Brexit exposure. The direct effect of Brexit captures the effect of the disruption of the regional trade relationships with Europe, while the Total effect accounts for both the direct effect of trade disruption with Europe in the region and the indirect effect caused by trade disruption with other regions in the UK as a result of Brexit. As expected the Total effects are higher in both tables.

The higher effects can be found in the manufacturing sectors, accounting for values higher than 30% for sectoral GDP and Local Labour Income. Primary Industries (including Agriculture and Mining-quarrying and energy supply) account for values between the 20% and the 26% depending on the region being West Midlands the most affected region.

[1] Chen, W., Los, B., McCann, P., Ortega-Argiles, R., Thissen, M., van Oort, F (2018) The Continental Divide? Economic Exposure to Brexit in Regions and Countries on both Sides of the Channel, *Papers in Regional Science,* 97(1), 25-54,DOI: 10.1111/pirs.12334

[2] Follow this link for detail: The economic impacts of Brexit on the UK, its regions, its cities and its sectors.

Table 5. Regional shares of sectoral GDP exposed to Brexit

	Primary Industries	Manufacturing	Construction	Services
Direct Effect				
Derbyshire_and_Nottinghamshire	12.6%	25.1%	1.5%	5.8%
Leicestershire_Rutland_and_Northants	17.1%	33.2%	2.0%	7.5%
Lincolnshire	12.6%	26.0%	1.1%	5.7%
Herefordshire_Worcestershire_and_Warks	14.2%	30.0%	1.5%	6.5%
Shropshire_and_Staffordshire	17.2%	30.2%	1.6%	6.2%
West_Midlands	17.7%	28.3%	2.0%	6.6%
Both Direct and Indirect Effects				
Derbyshire_and_Nottinghamshire	20.7%	29.5%	2.4%	8.0%
Leicestershire_Rutland_and_Northants	23.1%	36.8%	2.9%	10.0%
Lincolnshire	20.2%	31.8%	1.6%	8.4%
Herefordshire_Worcestershire_and_Warks	20.7%	34.3%	2.3%	9.2%
Shropshire_and_Staffordshire	22.4%	34.5%	2.6%	9.0%
West_Midlands	25.5%	32.3%	4.0%	8.9%

Notes: (1) Data sources: EUREGIO http://papers.tinbergen.nl/18084.pdf
(2) Results from ESRC- The economic impacts of Brexit on the UK, its regions, its cities and its sectors.
(3) Methodological detail see: Chen et al. (2018)

Table 6. Regional shares of sectoral Labour Income exposed to Brexit

	Primary Industries	Manufacturing	Construction	Services
Direct Effect				
Derbyshire_and_Nottinghamshire	12.6%	25.6%	1.5%	4.6%
Leicestershire_Rutland_and_Northants	16.8%	33.2%	2.0%	6.6%
Lincolnshire	12.7%	26.3%	1.1%	4.6%
Herefordshire_Worcestershire_and_Warks	13.1%	30.0%	1.5%	5.6%
Shropshire_and_Staffordshire	15.7%	30.2%	1.6%	5.2%
West_Midlands	17.8%	28.7%	2.0%	5.2%
Both Direct and Indirect Effects				
Derbyshire_and_Nottinghamshire	20.6%	30.0%	2.4%	6.5%
Leicestershire_Rutland_and_Northants	22.8%	36.8%	2.9%	8.8%
Lincolnshire	20.3%	32.1%	1.6%	7.0%
Herefordshire_Worcestershire_and_Warks	19.7%	34.3%	2.3%	8.0%
Shropshire_and_Staffordshire	21.2%	34.5%	2.6%	7.6%
West_Midlands	25.5%	32.7%	4.0%	7.2%

Notes: (1) Data sources: EUREGIO http://papers.tinbergen.nl/18084.pdf
(2) Results from ESRC- The economic impacts of Brexit on the UK, its regions, its cities and its sectors.
(3) Methodological detail see: Chen et al. (2018)

Table 7. Sectoral GDP exposed to Brexit

	Derbyshire_and_Nottinghamshire	Leicestershire_Rutland_and_Northants	Lincolnshire	Herefordshire_Worcestershire_and_Warks	Shropshire_and_Staffordshire	West_Midlands
Agriculture	17.9%	17.8%	14.4%	13.6%	15.5%	53.4%
Mining-quarrying and energy supply	21.1%	24.2%	27.9%	24.4%	27.7%	24.7%
Food beverages and tobacco	23.8%	22.4%	15.5%	26.5%	23.6%	32.1%
Textiles and leather	34.2%	33.7%	42.0%	47.4%	44.2%	41.5%
Coke, petroleum, fuels and chemicals	93.2%	43.4%	39.8%	40.1%	42.2%	102.2%
Elec._optical_equip_and_Transport_equip	56.2%	51.6%	48.8%	48.0%	54.0%	50.5%
Other_manufacturing	24.1%	27.0%	29.2%	23.7%	23.7%	24.1%
Construction	2.4%	2.9%	1.6%	2.3%	2.6%	4.0%
Distribution	7.8%	11.8%	10.8%	10.3%	10.4%	8.6%
Hotels and Restaurants	2.0%	2.3%	1.6%	2.0%	2.0%	1.7%
Transport_storage_and_communication	11.7%	13.1%	14.0%	12.5%	12.2%	12.4%
Financial Intermediation	16.5%	17.4%	14.6%	16.9%	16.8%	16.6%
Real_estate_renting_and_business_activity	12.0%	13.4%	12.2%	12.7%	12.5%	13.4%
Non-market services	1.5%	1.8%	1.6%	1.7%	1.7%	2.0%

Notes: (1) Data sources: EUREGIO http://papers.tinbergen.nl/18084.pdf

(2) Results from ESRC- The economic impacts of Brexit on the UK, its regions, its cities and its sectors.

(3) Methodological detail see: Chen et al. (2018)

Appendix.

A1. Regional and Sectoral Classifications

Code	Region	Code	Sector
UKC1	Tees Valley and Durham	ss1	Agriculture
UKC2	Northumberland Tyne and Wear	ss2	Mining quarrying and energy supply
UKD1	Cumbria	ss3	Food beverages and tobacco
UKD2	Cheshire	ss4	Textiles and leather etc
UKD3	Greater Manchester	ss5	Coke refined petroleum nuclear fuel and chemicals etc
UKD4	Lancashire	ss6	Electrical and optical equipment and Transport equipment
UKD5	Merseyside	ss8	Other manufacturing
UKE1	East Riding and North Lincolnshire	ss9	Construction
UKE2	North Yorkshire	ss10	Distribution
UKE3	South Yorkshire	ss11	Hotels and restaurant
UKE4	West Yorkshire	ss12	Transport storage and communication
UKF	East Midlands	ss13	Financial intermediation
UKG	West Midlands	ss14	Real estate renting and business activities
UKH1	East Anglia	ss15	Non-Market Service
UKH2	Bedfordshire Hertfordshire		
UKH3	Essex		
UKI1	Inner London		
UKI2	Outer London		
UKJ1	Berkshire Bucks and Oxfordshire		
UKJ2	Surrey East and West Sussex		
UKJ3	Hampshire and Isle of Wight		
UKJ4	Kent		
UKK1	Gloucestershire Wiltshire and North Somerset		
UKK2	Dorset and Somerset		
UKK3	Cornwall and Isles of Scilly		
UKK4	Devon		
UKL1	West Wales and The Valleys		
UKL2	East Wales		
UKM2	North Eastern Scotland		
UKM3	Eastern Scotland		
UKM5	South Western Scotland		
UKM6	Highlands and Islands		
UKN0	Northern Ireland		

A2. Imports from other UK regions (over the total imports from the rest of the UK). Main UK partners

		East Midlands	West Midlands
UKC1	Tees Valley and Durham	1.25%	1.28%
UKC2	Northumberland Tyne and Wear	1.12%	1.46%
UKD1	Cumbria	0.67%	0.77%
UKD2	Cheshire	2.22%	2.60%
UKD3	Greater Manchester	7.31%	4.06%
UKD4	Lancashire	1.57%	1.81%
UKD5	Merseyside	2.16%	2.87%
UKE1	East Riding and North Lincolnshire	5.08%	1.77%
UKE2	North Yorkshire	1.06%	0.78%
UKE3	South Yorkshire	5.06%	1.85%
UKE4	West Yorkshire	5.34%	3.21%
UKH1	East Anglia	9.16%	3.28%
UKH2	Bedfordshire Hertfordshire	4.52%	1.46%
UKH3	Essex	1.59%	1.49%
UKI1	Inner London	19.56%	24.99%
UKI2	Outer London	2.86%	3.18%
UKJ1	Berkshire Bucks and Oxfordshire	7.09%	9.43%
UKJ2	Surrey East and West Sussex	2.22%	2.24%
UKJ3	Hampshire and Isle of Wight	2.23%	2.68%
UKJ4	Kent	1.38%	1.59%
UKK1	Gloucestershire Wiltshire and North Somerset	2.09%	4.42%
UKK2	Dorset and Somerset	0.76%	0.91%
UKK3	Cornwall and Isles of Scilly	0.32%	0.37%
UKK4	Devon	0.86%	1.20%
UKL1	West Wales and The Valleys	1.16%	3.17%
UKL2	East Wales	1.51%	5.80%
UKM2	North Eastern Scotland	0.31%	0.34%
UKM3	Eastern Scotland	3.00%	3.74%
UKM5	South Western Scotland	4.12%	4.72%
UKM6	Highlands and Islands	0.13%	0.11%
UKN0	Northern Ireland	2.28%	2.45%

Notes: Data sources: EUREGIO http://papers.tinbergen.nl/18084.pdf

A3. Share of imports by sector. Main sectors importing from the rest of the UK

	East Midlands	West Midlands
Agriculture	1.17%	1.04%
Mining quarrying and energy supply	4.53%	3.26%
Food beverages and tobacco	4.67%	3.34%
Textiles and leather etc	0.23%	0.55%
Coke refined petroleum nuclear fuel and chemicals etc	3.14%	2.76%
Electrical and optical equipment and Transport equipment	4.84%	3.62%
Other manufacturing	4.49%	4.45%
Construction	8.11%	8.96%
Distribution	10.74%	11.06%
Hotels and restaurant	3.21%	4.28%
Transport storage and communication	8.63%	8.85%
Financial intermediation	8.60%	9.80%
Real estate renting and business activities	16.37%	15.73%
Non-Market Service	21.27%	22.31%

Notes: Data sources: EUREGIO http://papers.tinbergen.nl/18084.pdf

A4. Exports to other UK regions (over the total exports to the rest of the UK). Main UK partners. Intermediate demand: to other sectors, Final demand: to households, government or investment

		East Midlands				West Midlands		
		Intermediate demand	Final Demand	Total Exports		Intermediate demand	Final Demand	Total Exports
UKC1	Tees Valley and Durham	2.14%	1.55%	1.86%		1.81%	1.67%	1.74%
UKC2	Northumberland Tyne and Wear	1.60%	1.18%	1.40%		1.43%	1.49%	1.46%
UKD1	Cumbria	0.77%	0.53%	0.65%		0.76%	0.70%	0.73%
UKD2	Cheshire	4.75%	4.67%	4.71%		3.89%	4.48%	4.18%
UKD3	Greater Manchester	6.63%	6.67%	6.65%		3.63%	4.29%	3.95%
UKD4	Lancashire	2.38%	1.68%	2.04%		1.86%	1.48%	1.68%
UKD5	Merseyside	2.96%	2.44%	2.70%		3.05%	3.32%	3.18%
UKE1	East Riding and North Lincolnshire	6.25%	9.02%	7.61%		1.52%	1.49%	1.51%
UKE2	North Yorkshire	1.91%	1.43%	1.68%		1.10%	0.82%	0.97%
UKE3	South Yorkshire	6.44%	7.55%	6.98%		2.23%	2.87%	2.55%
UKE4	West Yorkshire	5.83%	6.75%	6.28%		2.55%	2.78%	2.66%
UKH1	East Anglia	6.89%	10.28%	8.55%		2.77%	4.32%	3.52%
UKH2	Bedfordshire Hertfordshire	4.44%	6.17%	5.29%		2.19%	3.22%	2.69%
UKH3	Essex	2.86%	1.91%	2.40%		2.10%	1.82%	1.96%
UKI1	Inner London	7.94%	8.49%	8.21%		6.75%	9.15%	7.92%
UKI2	Outer London	4.49%	6.72%	5.58%		3.67%	6.95%	5.27%
UKJ1	Berkshire Bucks and Oxfordshire	5.35%	6.18%	5.76%		4.56%	6.45%	5.48%
UKJ2	Surrey East and West Sussex	1.70%	2.37%	2.03%		1.41%	2.48%	1.93%
UKJ3	Hampshire and Isle of Wight	2.96%	1.55%	2.27%		2.97%	2.57%	2.78%
UKJ4	Kent	2.38%	1.60%	2.00%		1.88%	1.92%	1.90%
UKK1	Gloucestershire Wiltshire and North Somerset	4.18%	2.52%	3.37%		6.69%	6.19%	6.45%
UKK2	Dorset and Somerset	1.63%	1.01%	1.33%		1.95%	2.10%	2.03%
UKK3	Cornwall and Isles of Scilly	0.65%	0.33%	0.49%		0.70%	0.62%	0.66%
UKK4	Devon	1.78%	0.83%	1.32%		2.06%	1.83%	1.95%
UKL1	West Wales and The Valleys	1.21%	2.06%	1.63%		7.70%	11.29%	9.45%
UKL2	East Wales	1.70%	0.59%	1.16%		16.52%	6.34%	11.57%
UKM2	North Eastern Scotland	1.17%	0.46%	0.82%		1.39%	0.69%	1.05%
UKM3	Eastern Scotland	0.19%	0.44%	0.31%		0.52%	2.06%	1.27%
UKM5	South Western Scotland	1.09%	0.37%	0.74%		4.71%	0.43%	2.63%
UKM6	Highlands and Islands	2.99%	0.50%	1.77%		3.16%	0.53%	1.88%
UKN0	Northern Ireland	2.71%	2.14%	2.43%		2.46%	3.63%	3.03%

Notes: (1) Data sources: EUREGIO http://papers.tinbergen.nl/18084.pdf

(2) **UKF - East Midlands**: UKF1 Derbyshire and Nottinghamshire; UKF2 Leicestershire Rutland and Northants; UKF3 Lincolnshire; **UKG- West Midlands**: UKG1 Herefordshire Worcestershire and Warwickshire; UKG2 Shropshire and Staffordshire; UKG3 West Midlands

A5. Main sectors exporting to other UK regions. Intermediate demand: to other sectors, Final demand: to households, government or investment

	East Midlands			West Midlands		
	Intermediate demand	Final Demand	Total Exports	Intermediate demand	Final Demand	Total Exports
Agriculture	2.98%	2.69%	2.84%	2.55%	2.77%	2.66%
Mining quarrying and energy supply	9.38%	5.71%	7.58%	4.74%	2.90%	3.85%
Food beverages and tobacco	9.00%	6.64%	7.84%	4.21%	2.53%	3.39%
Textiles and leather etc	0.16%	0.84%	0.49%	0.07%	0.06%	0.06%
Coke refined petroleum nuclear fuel and chemicals etc	7.53%	3.56%	5.58%	5.53%	3.02%	4.31%
Electrical and optical equipment and Transport equipment	1.26%	1.54%	1.40%	1.95%	3.32%	2.62%
Other manufacturing	13.97%	6.97%	10.54%	15.89%	9.68%	12.87%
Construction	5.64%	13.83%	9.65%	8.93%	14.14%	11.46%
Distribution	5.51%	8.63%	7.04%	6.47%	8.88%	7.64%
Hotels and restaurant	0.10%	6.75%	3.36%	0.11%	10.82%	5.32%
Transport storage and communication	12.49%	3.70%	8.18%	11.32%	3.81%	7.67%
Financial intermediation	4.63%	4.74%	4.68%	6.45%	5.30%	5.89%
Real estate renting and business activities	23.88%	10.74%	17.44%	21.06%	9.76%	15.57%
Non-Market Service	3.47%	23.66%	13.37%	10.72%	23.01%	16.70%

Notes: (1) Data sources: EUREGIO http://papers.tinbergen.nl/18084.pdf
(2) UKF - East Midlands**: UKF1 Derbyshire and Nottinghamshire; UKF2 Leicestershire Rutland and Northants; UKF3 Lincolnshire;** UKG-West Midlands**: UKG1 Herefordshire Worcestershire and Warwickshire; UKG2 Shropshire and Staffordshire; UKG3 West Midlands**

A6. Intensity of the dependency from the EU countries in imports (relative to UK regional average)

	UK regional average	UKF1	UKF2	UKF3	UKG1	UKG2	UKG3
Austria	1.0000	1.0177	1.1645	1.1055	1.1252	1.1414	1.0253
Belgium	1.0000	0.9293	1.3523	1.2315	1.2361	1.3751	0.8719
Czech Republic	1.0000	1.0212	1.0474	1.0925	1.0613	1.0804	1.0993
Germany	1.0000	1.1222	1.1793	1.1422	1.2482	1.1944	1.1298
Denmark	1.0000	0.8829	1.3769	1.1332	1.3918	1.2625	0.8168
Estonia	1.0000	1.0619	0.9959	1.0951	1.0893	1.0832	0.9795
Spain	1.0000	0.8733	1.1603	1.1346	1.1933	1.2204	0.8669
Finland	1.0000	0.9618	1.1813	1.1249	1.1587	1.1817	0.9591
France	1.0000	0.9751	1.1674	1.1797	1.2069	1.1337	1.0815
Greece	1.0000	0.7412	0.9460	0.7953	0.8753	0.8795	0.6854
Hungary	1.0000	0.9779	1.1617	1.0113	1.1870	1.1263	1.1438
Ireland	1.0000	0.9419	1.0753	1.1742	1.0681	1.0456	0.9107
Italy	1.0000	0.8430	1.2841	1.2618	1.3090	1.3319	0.8558
Lithuania	1.0000	0.9566	1.3093	1.2310	1.3076	1.2877	0.8992
Luxemburg	1.0000	0.9624	1.0742	1.0828	1.0604	1.0474	1.0212
Latvia	1.0000	1.1193	0.9478	1.0772	1.0924	1.0770	1.0312
Malta	1.0000	0.9801	1.1256	1.1117	1.1161	1.1331	0.9654
The Netherlands	1.0000	0.9331	1.3206	1.3978	1.2715	1.2682	0.8230
Poland	1.0000	0.9507	1.2124	1.1703	1.1905	1.1756	0.9472
Portugal	1.0000	0.9611	1.1346	1.0658	1.0953	1.1041	1.0227
Sweden	1.0000	1.0236	1.1800	1.1260	1.2146	1.1953	0.9946
Slovenia	1.0000	0.9385	1.1247	1.1816	1.1346	1.1594	0.8761
Slovakia	1.0000	1.0290	1.1016	1.0547	1.1103	1.0933	1.1094

Notes: (1) Data sources: EUREGIO http://papers.tinbergen.nl/18084.pdf

(2) **UKF - East Midlands**: UKF1 Derbyshire and Nottinghamshire; UKF2 Leicestershire Rutland and Northants; UKF3 Lincolnshire; **UKG- West Midlands**: UKG1 Herefordshire Worcestershire and Warwickshire; UKG2 Shropshire and Staffordshire; UKG3 West Midlands

A7. Intensity of the dependency from non-EU countries in imports (relative to UK regional average)

	UK regional average	UKF1	UKF2	UKF3	UKG1	UKG2	UKG3
Japan	1.0000	0.9714	1.2600	1.1508	1.2501	1.2188	0.9840
Brazil	1.0000	1.0416	1.2350	1.2879	1.2049	1.1884	0.9303
Australia	1.0000	0.9665	1.0778	1.0261	1.0402	0.9968	0.8895
Mexico	1.0000	0.9903	1.1615	1.0511	1.1374	1.0932	1.0442
Russia	1.0000	0.8507	1.6427	1.1003	1.4795	1.2443	0.6650
Bulgaria	1.0000	0.8745	1.2101	1.2599	1.1959	1.2025	0.7775
Romania	1.0000	0.9083	1.1374	1.1808	1.1182	1.1184	0.8385
India	1.0000	1.0556	1.1224	1.1197	1.1110	1.1382	1.0301
Indonesia	1.0000	0.7489	0.7582	1.1233	0.7668	0.8019	0.7219
ROW	1.0000	0.8466	1.8303	1.2585	1.6234	1.3859	0.6536
Cyprus	1.0000	0.9535	1.0972	1.1880	1.0924	1.1242	0.8871
Canada	1.0000	1.1186	1.1219	0.9758	1.0976	1.0656	0.9982
China	1.0000	1.0276	1.0701	1.1061	1.0782	1.0830	1.0548
South Korea	1.0000	0.8609	1.1054	1.0806	1.0751	1.0753	0.9367
Turkey	1.0000	0.9108	1.1707	1.1202	1.1731	1.1613	0.9164
USA	1.0000	1.0046	1.1431	1.0951	1.1387	1.1370	1.0010
Taiwan	1.0000	0.9624	1.2080	1.0999	1.2084	1.1732	0.9865

Notes: (1) Data sources: EUREGIO http://papers.tinbergen.nl/18084.pdf

(2) **UKF - East Midlands**: UKF1 Derbyshire and Nottinghamshire; UKF2 Leicestershire Rutland and Northants; UKF3 Lincolnshire; **UKG- West Midlands**: UKG1 Herefordshire Worcestershire and Warwickshire; UKG2 Shropshire and Staffordshire; UKG3 West Midlands

A8. East Midlands Exports activity by destination of sources, year 2010

Region	EU	Non-EU	Sector
Derbyshire and Nottinghamshire	79.5%	20.5%	Agriculture
	64.1%	35.9%	Mining_quarrying_and_energy_supply
	96.2%	3.8%	Food_beverages_and_tobacco
	53.7%	46.3%	Textiles_and_leather_etc
	94.6%	5.4%	Coke_refined_petroleum_nuclear_fuel_and_chemicals_etc
	66.8%	33.2%	Electrical_and_optical_equipment_and_Transport_equipment
	53.6%	46.4%	Other_manufacturing
	79.6%	20.4%	Construction
	28.3%	71.7%	Distribution
	22.2%	77.8%	Hotels_and_restaurant
	30.6%	69.4%	Transport_storage_and_communication
	34.0%	66.0%	Financial_intermediation
	53.6%	46.4%	Real_estate_renting_and_busine_activitie
	40.7%	59.3%	Non-Market_Service
Leicestershire Rutland and Northants	78.7%	21.3%	Agriculture
	58.8%	41.2%	Mining_quarrying_and_energy_supply
	96.3%	3.7%	Food_beverages_and_tobacco
	47.9%	52.1%	Textiles_and_leather_etc
	59.0%	41.0%	Coke_refined_petroleum_nuclear_fuel_and_chemicals_etc
	65.7%	34.3%	Electrical_and_optical_equipment_and_Transport_equipment
	52.3%	47.7%	Other_manufacturing
	78.5%	21.5%	Construction
	24.2%	75.8%	Distribution
	20.0%	80.0%	Hotels_and_restaurant
	32.4%	67.6%	Transport_storage_and_communication
	39.2%	60.8%	Financial_intermediation
	56.7%	43.3%	Real_estate_renting_and_busine_activitie
	35.6%	64.4%	Non-Market_Service
Lincolnshire	70.0%	30.0%	Agriculture
	64.3%	35.7%	Mining_quarrying_and_energy_supply
	97.8%	2.2%	Food_beverages_and_tobacco
	49.7%	50.3%	Textiles_and_leather_etc
	51.1%	48.9%	Coke_refined_petroleum_nuclear_fuel_and_chemicals_etc
	63.2%	36.8%	Electrical_and_optical_equipment_and_Transport_equipment
	52.1%	47.9%	Other_manufacturing
	82.5%	17.5%	Construction
	44.7%	55.3%	Distribution
	17.8%	82.2%	Hotels_and_restaurant
	24.8%	75.2%	Transport_storage_and_communication
	26.4%	73.6%	Financial_intermediation
	54.3%	45.7%	Real_estate_renting_and_busine_activitie
	40.0%	60.0%	Non-Market_Service

Notes: Data sources: EUREGIO http://papers.tinbergen.nl/18084.pdf

A9. West Midlands Exports activity by destination of sources, year 2010

Region	EU	Non-EU	Sector
Herefordshire Worcestershire and Warwickshire	81.4%	18.6%	Agriculture
	59.8%	40.2%	Mining_quarrying_and_energy_supply
	97.0%	3.0%	Food_beverages_and_tobacco
	53.6%	46.4%	Textiles_and_leather_etc
	53.3%	46.7%	Coke_refined_petroleum_nuclear_fuel_and_chemicals_etc
	66.0%	34.0%	Electrical_and_optical_equipment_and_Transport_equipment
	51.3%	48.7%	Other_manufacturing
	79.7%	20.3%	Construction
	22.3%	77.7%	Distribution
	23.0%	77.0%	Hotels_and_restaurant
	30.3%	69.7%	Transport_storage_and_communication
	36.1%	63.9%	Financial_intermediation
	57.9%	42.1%	Real_estate_renting_and_busine_activitie
	38.9%	61.1%	Non-Market_Service
Shropshire and Staffordshire	81.6%	18.4%	Agriculture
	61.2%	38.8%	Mining_quarrying_and_energy_supply
	97.0%	3.0%	Food_beverages_and_tobacco
	50.3%	49.7%	Textiles_and_leather_etc
	56.1%	43.9%	Coke_refined_petroleum_nuclear_fuel_and_chemicals_etc
	67.9%	32.1%	Electrical_and_optical_equipment_and_Transport_equipment
	49.6%	50.4%	Other_manufacturing
	79.9%	20.1%	Construction
	19.9%	80.1%	Distribution
	21.5%	78.5%	Hotels_and_restaurant
	29.4%	70.6%	Transport_storage_and_communication
	35.8%	64.2%	Financial_intermediation
	50.2%	49.8%	Real_estate_renting_and_busine_activitie
	39.5%	60.5%	Non-Market_Service
	67.6%	32.4%	Agriculture
West Midlands	65.6%	34.4%	Mining_quarrying_and_energy_supply
	95.7%	4.3%	Food_beverages_and_tobacco
	43.6%	56.4%	Textiles_and_leather_etc
	95.8%	4.2%	Coke_refined_petroleum_nuclear_fuel_and_chemicals_etc
	67.4%	32.6%	Electrical_and_optical_equipment_and_Transport_equipment
	52.0%	48.0%	Other_manufacturing
	81.9%	18.1%	Construction
	21.6%	78.4%	Distribution
	16.2%	83.8%	Hotels_and_restaurant
	31.8%	68.2%	Transport_storage_and_communication
	44.3%	55.7%	Financial_intermediation
	61.4%	38.6%	Real_estate_renting_and_busine_activitie
	39.9%	60.1%	Non-Market_Service

Notes: Data sources: EUREGIO http://papers.tinbergen.nl/18084.pdf