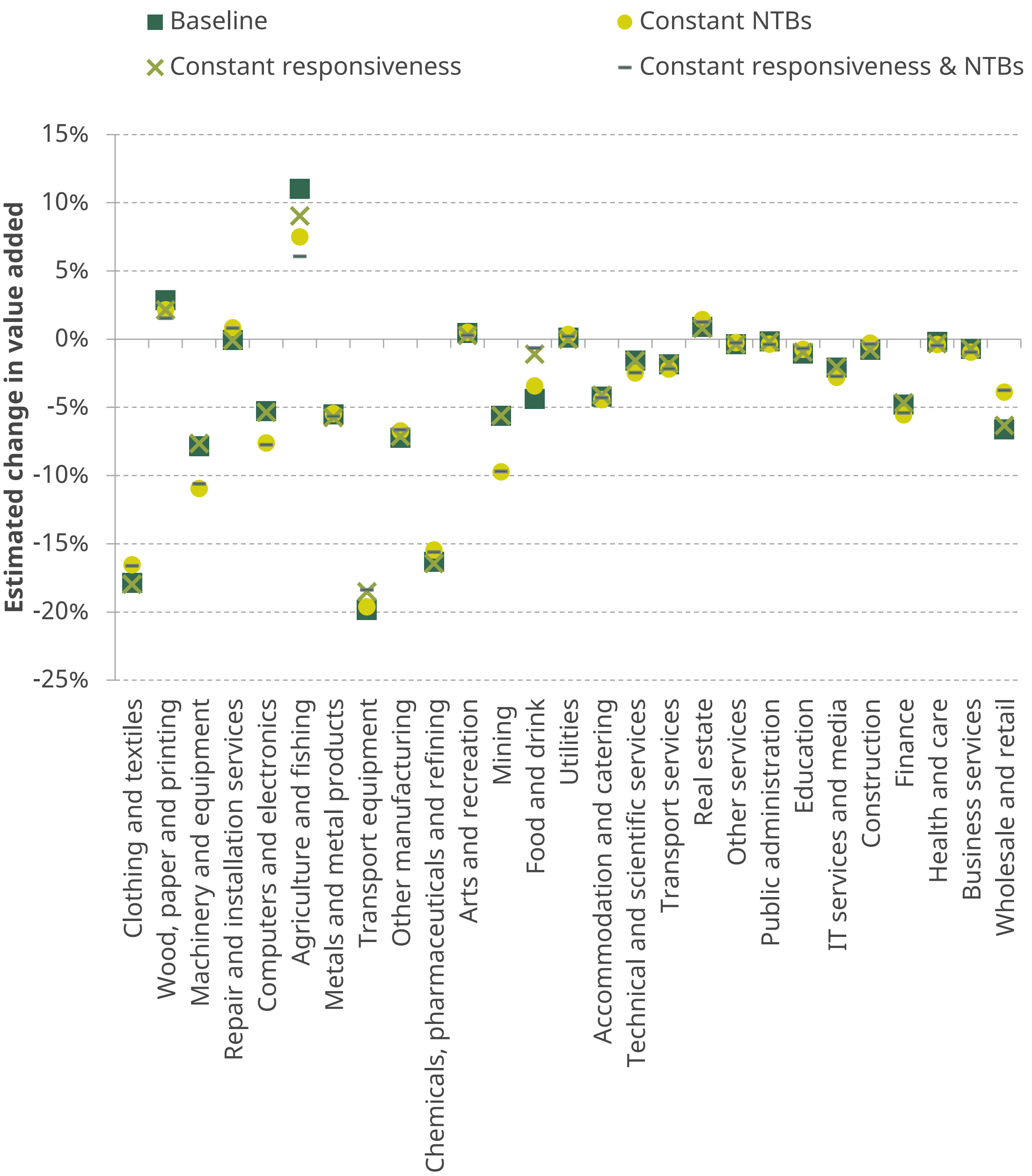
A. Online supplementary material

This appendix contains various figures and tables with additional results that are referred to in the main text.

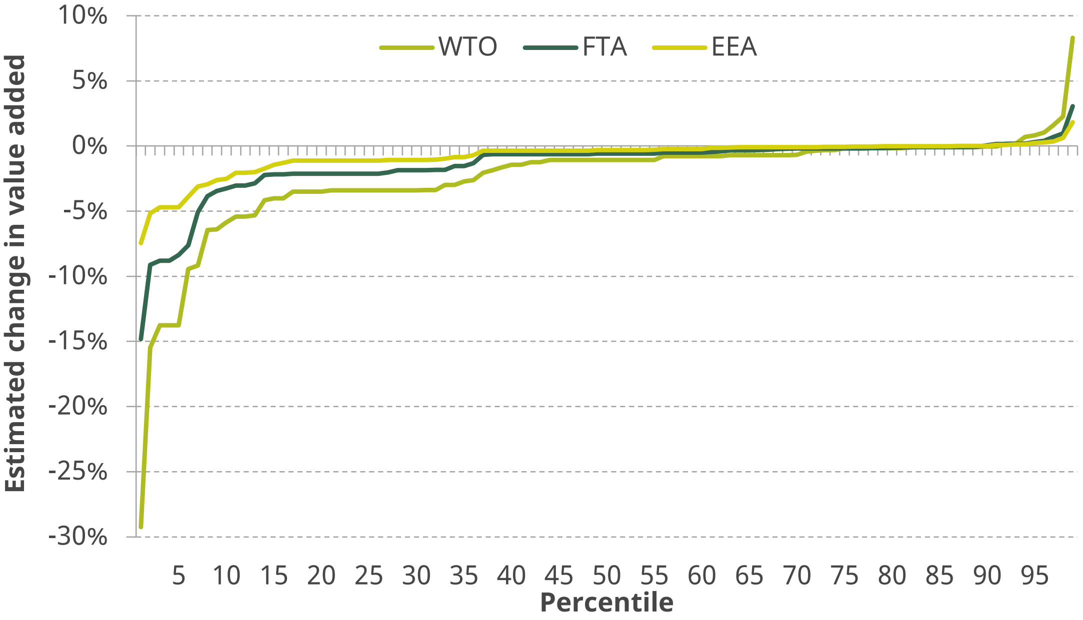
Figure A.1. Sensitivity of estimated change in value added due to WTO trade barriers, by industry



Note: Industries are ranked according to their contributions to the UK's gross value added.

Source: Authors' calculations using ONS analytical input–output tables 2014.

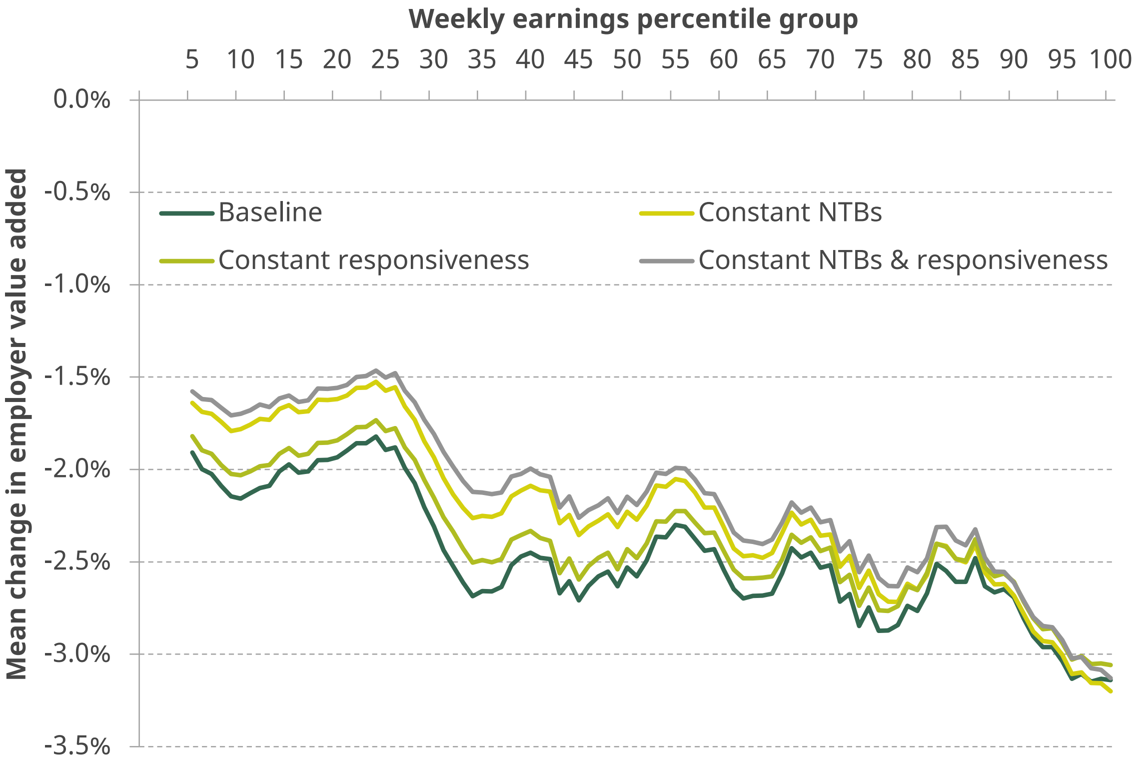
Figure A.2. Distribution of estimated change in employer value added under different trade policy scenarios among UK employees



Note: Employees are assigned an estimated change in value added based on their main industry of employment.

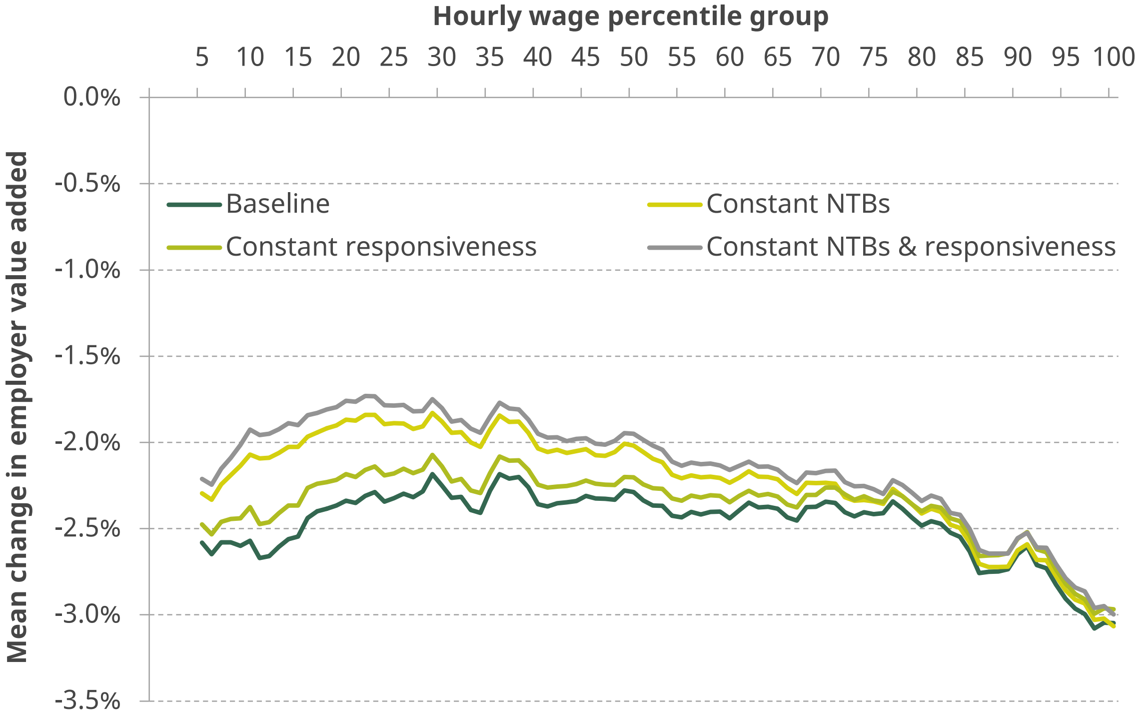
Source: Authors' calculations using ONS analytical input–output tables 2014 and the Quarterly Labour Force Survey 2017 quarters 1–4.

Figure A.3a. Mean predicted change in employer value added under WTO rules trade policy scenario, by weekly earnings percentile group (Great Britain)



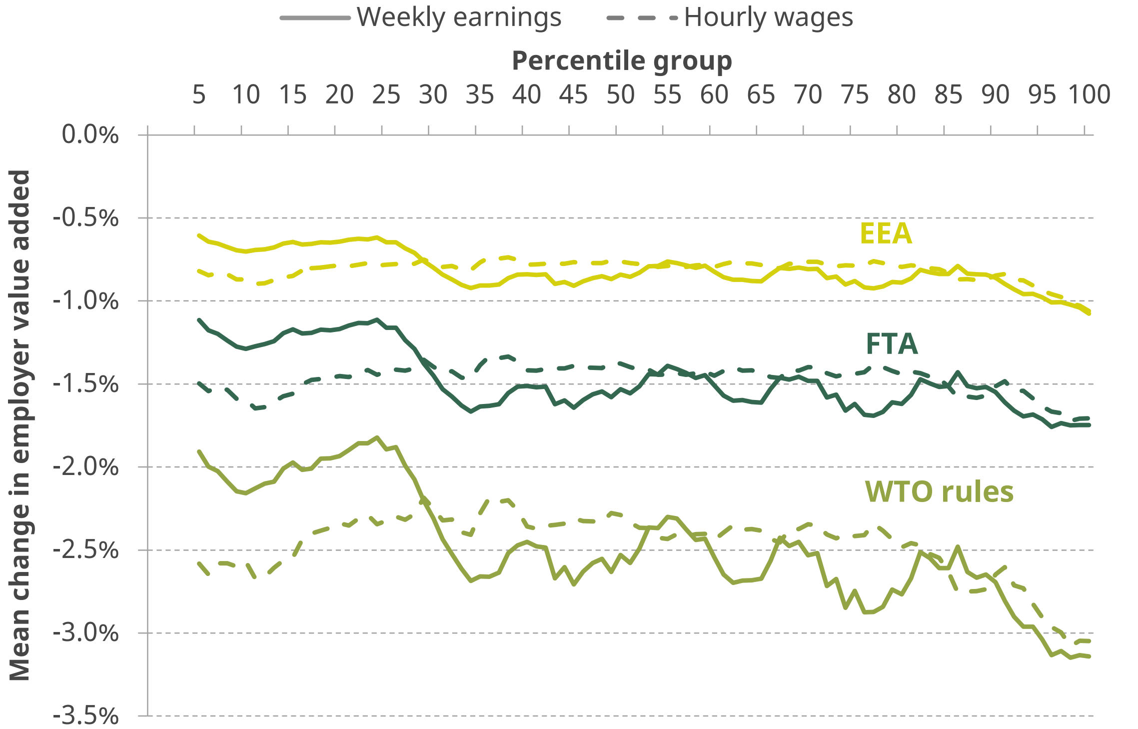
Note and source: See Figure 10.10.

Figure A.3b. Mean predicted change in employer value added under WTO rules trade policy scenario, by hourly wage percentile group (Great Britain)



Note and source: See Figure 10.10.

Figure A.4. Mean estimated change in employer value added under different trade policy scenarios, by percentile group (Great Britain)



Note and source: See Figure 10.10.

Table A.1. Non-tariff barriers and estimated change in value added under the WTO rules, FTA and EEA scenarios by industry

	Non-tariff barrier (tariff equivalent)			Estimated change in value added		
	WTO	**FTA**	**EEA**	**WTO**	**FTA**	**EEA**
All	11%	7%	4%	−2.6%	−1.5%	−0.9%
Accommodation & catering	9%	5%	3%	−4.2%	−2.2%	−1.3%
Agriculture & fishing	18%	15%	8%	11.0%	6.1%	3.3%
Arts & recreation	9%	5%	3%	0.5%	0.3%	0.2%
Business services	6%	1%	0%	−0.7%	−0.2%	−0.1%
Chemicals, pharma & refining	11%	10%	6%	−16.3%	−12.5%	−7.2%
Clothing & textiles	12%	10%	5%	−17.9%	−8.7%	−4.4%
Computers & electronics	6%	4%	2%	−5.3%	−2.9%	−1.5%
Construction	0%	0%	0%	−0.8%	−0.5%	−0.2%
Education	17%	10%	6%	−1.1%	−0.6%	−0.4%
Finance	9%	5%	3%	−4.8%	−2.6%	−2.5%
Food & drink	16%	14%	8%	−4.4%	−3.0%	−1.6%
Health & care	17%	10%	6%	−0.2%	−0.3%	−0.1%
IT services & media	8%	4%	2%	−2.1%	−0.9%	−0.4%
Machinery & equipment	6%	4%	2%	−7.9%	−4.3%	−2.1%
Metals & metal products	12%	10%	5%	−5.5%	−3.9%	−2.0%
Mining	6%	4%	2%	−5.6%	−3.7%	−1.8%
Other manufacturing	12%	11%	6%	−7.2%	−4.9%	−2.7%
Other services	7%	2%	1%	−0.4%	−0.3%	−0.2%
Public administration	17%	10%	6%	−0.2%	−0.1%	0.0%
Real estate	6%	1%	0%	0.9%	0.2%	0.1%
Repair & installation services	12%	10%	5%	−0.1%	0.1%	0.1%
Technical & scientific services	6%	1%	0%	−1.6%	−0.3%	−0.1%
Transport equipment	11%	8%	4%	−19.9%	−10.3%	−5.1%
Transport services	9%	5%	3%	−1.8%	−1.0%	−0.5%
Utilities	9%	5%	3%	0.1%	0.2%	0.1%
Wholesale & retail	20%	13%	7%	−6.6%	−4.2%	−2.2%
Wood, paper & printing	12%	10%	5%	2.8%	2.7%	1.3%

Note: Non-tariff barriers represent the average NTB among goods and services produced by each industry weighted by exports to the EU.

Source: Authors' calculations using ONS analytical input–output tables 2014; House of Commons Exiting the European Union Committee, 'EU exit analysis cross Whitehall briefing', 2018, https://www.parliament.uk/documents/commons-committees/Exiting-the-European-Union/17-19/Cross-Whitehall-briefing/EU-Exit-Analysis-Cross-Whitehall-Briefing.pdf.

Table A.2. Value added, fraction of output exported to the EU and estimated change in value added under the WTO rules, FTA and EEA scenarios by industry

Aggregate industry	Industry	Value added (2018 £bn)	Fraction of output exported to the EU	Estimated change in value added		
				WTO	FTA	EEA
	All	1,545	7%	−2.6%	−1.5%	−0.9%
Agriculture & fishing	Products of agriculture, hunting and related services	13	5%	13.3%	7.5%	4.0%
	Products of forestry, logging and related services	-	11%	−14.0%	−10.0%	−5.2%
	Fishing and aquaculture products and services	1	27%	−29.9%	−18.6%	−9.8%
Mining	Coal and lignite	-	7%	−2.7%	−1.5%	−0.6%
	Petroleum, gas and metal ore extraction	18	60%	−6.4%	−4.3%	−2.1%
	Other mining and quarrying products	3	11%	−3.2%	−2.0%	−1.0%
	Mining support services	3	5%	−2.4%	−1.6%	−0.8%
Food & drink	Preserved meat and meat products	4	11%	−2.7%	−2.8%	−1.4%
	Other processed and preserved food products	3	9%	−6.8%	−3.2%	−1.7%
	Vegetable and animal oils and fats	-	25%	−37.9%	−20.8%	−11.6%
	Dairy products	1	12%	8.7%	−6.5%	−3.2%
	Grain mill products, starches and starch products	1	10%	−24.5%	−10.2%	−5.5%
	Bakery and farinaceous products	4	6%	8.8%	3.1%	1.8%
	Other food products	5	14%	−16.8%	−8.2%	−4.5%
	Prepared animal feeds	1	11%	−34.7%	−16.7%	−9.2%
	Alcoholic beverages and tobacco products	5	11%	4.4%	2.0%	1.2%
	Soft drinks	1	9%	6.7%	4.0%	2.4%
Clothing & textiles	Textiles	3	27%	−14.0%	−7.6%	−3.9%
	Wearing apparel	3	49%	−22.4%	−9.8%	−4.9%
	Leather and related products	1	39%	−15.9%	−8.9%	−4.5%
Wood, paper & printing	Non-furniture products made of wood etc.	2	4%	8.3%	6.3%	3.1%

Aggregate industry	Industry	Value added (2018 £bn)	Fraction of output exported to the EU	Estimated change in value added		
				WTO	FTA	EEA
	Paper and paper products	5	11%	−0.3%	0.4%	0.1%
	Printing and recording services	4	0%	3.1%	3.0%	1.5%
Chemicals, pharmaceuticals & refining	Coke and refined petroleum products	2	23%	−13.5%	−7.8%	−4.0%
	Chemicals	4	41%	−35.0%	−24.3%	−14.0%
	Paints and varnishes	1	8%	−0.7%	−0.5%	−0.2%
	Soap and cleaning substances	3	36%	−15.5%	−13.6%	−7.9%
	Other chemical products	2	58%	−46.3%	−30.6%	−17.7%
	Basic pharmaceutical products	11	38%	−8.9%	−8.4%	−4.8%
Other manufacturing	Rubber and plastic products	9	22%	−13.4%	−9.1%	−5.2%
	Glass and stone abrasives	3	17%	−6.0%	−3.8%	−2.0%
	Cement, lime and plaster	2	2%	4.3%	3.2%	1.6%
	Furniture	4	8%	0.8%	0.7%	0.4%
	Other manufactured goods	5	30%	−8.2%	−5.8%	−2.9%
Metals & metal products	Basic iron and steel	2	30%	−31.2%	−23.9%	−12.2%
	Other basic metals and casting	2	24%	−28.7%	−19.3%	−9.7%
	Metal products excl. machinery	14	8%	0.8%	0.7%	0.4%
Machinery & equipment	Weapons and ammunition	2	2%	−0.3%	−0.4%	−0.2%
	Machinery and equipment n.e.c.	9	32%	−9.4%	−5.1%	−2.5%
Computers & electronics	Computer, electronic and optical products	8	29%	−5.3%	−3.0%	−1.5%
	Electrical equipment	5	21%	−5.2%	−2.9%	−1.4%
Transport equipment	Motor vehicles, trailers and semi-trailers	12	32%	−29.3%	−14.8%	−7.5%
	Ships and boats	2	11%	−2.6%	−1.5%	−0.7%
	Air and spacecraft and related machinery	6	21%	−9.2%	−5.3%	−2.6%
	Other transport equipment	1	10%	−1.0%	−0.5%	−0.2%
Repair & installation services	Ships repair and maintenance	1	0%	9.1%	6.2%	3.1%
	Aircraft and spacecraft repair and maintenance	2	0%	8.1%	5.5%	2.8%

Aggregate industry	Industry	Value added (2018 £bn)	Fraction of output exported to the EU	Estimated change in value added		
				WTO	FTA	EEA
	Other repair and installation	6	3%	−3.3%	−2.0%	−1.0%
	Computer and personal goods repair	4	0%	0.3%	0.3%	0.2%
Utilities	Electricity transmission and distribution	14	0%	1.6%	1.0%	0.6%
	Gas distribution	11	0%	−0.3%	0.0%	0.0%
	Water treatment and supply	5	0%	0.8%	0.4%	0.3%
	Sewerage services	5	0%	−0.1%	0.0%	0.0%
	Waste collection and treatment	7	8%	−2.7%	−1.3%	−0.7%
	Other waste management services	-	0%	1.6%	1.0%	0.6%
Construction	Construction	110	0%	−0.8%	−0.5%	−0.2%
Wholesale & retail	Motor vehicle wholesale and retail trade and repair	30	1%	−0.8%	−0.3%	−0.1%
	Wholesale trade services	59	19%	−13.8%	−8.8%	−4.7%
	Retail trade services	78	2%	−3.4%	−2.1%	−1.1%
Transport services	Rail transport services	5	2%	0.1%	0.2%	0.1%
	Land transport services	26	2%	0.2%	0.1%	0.1%
	Water transport services	7	15%	−5.3%	−3.0%	−1.7%
	Air transport services	9	11%	−5.5%	−3.1%	−1.8%
	Warehousing and transport support services	13	6%	−3.4%	−1.8%	−1.1%
	Postal and courier services	10	3%	−0.4%	−0.2%	−0.1%
Accommodation & catering	Accommodation services	14	12%	−6.4%	−3.4%	−2.0%
	Food and beverage serving services	44	3%	−3.5%	−1.9%	−1.1%
IT services & media	Publishing services	9	11%	−2.9%	−1.7%	−1.0%
	Audiovisual media production and distribution	15	9%	−5.3%	−2.4%	−1.4%
	Telecommunications services	28	6%	−1.2%	−0.7%	−0.3%
	Computer programming, consultancy and related services	44	4%	−1.4%	−0.3%	0.0%
	Information services	6	10%	−2.2%	−0.5%	0.0%

Aggregate industry	Industry	Value added (2018 £bn)	Fraction of output exported to the EU	Estimated change in value added		
				WTO	FTA	EEA
Finance	Financial services, except insurance and pension funding	62	9%	−4.0%	−2.2%	−2.0%
	Insurance and pension funding	34	11%	−5.9%	−3.3%	−3.1%
	Auxiliary finance and pension services	21	25%	−5.4%	−3.0%	−2.9%
Real estate	Real estate services and imputed rent	71	0%	1.0%	0.2%	0.1%
	Real estate services on a fee or contract basis	6	3%	−0.7%	−0.1%	0.1%
Business services	Legal services	24	5%	−0.8%	−0.1%	0.0%
	Accounting and auditing services	14	3%	−0.6%	−0.1%	0.0%
	Head office and management consulting services	26	5%	−1.9%	−0.4%	−0.1%
	Advertising and market research services	18	5%	−0.7%	−0.3%	−0.1%
	Employment services	21	2%	2.3%	0.3%	0.0%
	Office admin and support services	24	19%	−2.1%	−0.7%	−0.3%
Technical & scientific services	Architecture and engineering services	25	5%	−1.2%	−0.2%	0.0%
	Scientific research and development services	22	6%	−1.6%	−0.5%	−0.1%
	Other professional, scientific and technical services	12	17%	−2.6%	−0.4%	0.0%
	Veterinary services	3	0%	−0.3%	0.0%	0.0%
Other services	Rental and leasing services	20	2%	1.2%	0.1%	0.0%
	Travel agency and related services	10	0%	0.0%	0.0%	0.1%
	Security and investigation services	4	1%	−4.2%	−2.2%	−1.3%
	Services to buildings and landscape	9	1%	−3.0%	−1.5%	−0.9%
	Services furnished by membership organisations	16	0%	−0.3%	−0.2%	−0.1%
	Other personal services	17	0%	−0.4%	−0.2%	−0.1%

Aggregate industry	Industry	Value added (2018 £bn)	Fraction of output exported to the EU	Estimated change in value added		
				WTO	FTA	EEA
	Services of households as employers of domestic personnel	7	0%	0.0%	0.0%	0.0%
Public administration	Public administration and defence services	83	0%	−0.2%	−0.1%	0.0%
Education	Education services	101	1%	−1.1%	−0.6%	−0.4%
Health & care	Human health services	94	0%	−0.1%	−0.2%	−0.1%
	Residential care and social work services	32	0%	−0.7%	−0.6%	−0.3%
Arts & recreation	Creative, arts and entertainment services	5	1%	−0.2%	−0.1%	0.0%
	Libraries, archives, museums and other cultural services	5	0%	0.7%	0.4%	0.3%
	Gambling and betting services	9	0%	1.0%	0.6%	0.4%
	Sports services and amusement and recreation services	4	0%	0.0%	0.2%	0.2%

Note: Value added figures are taken from the 2014 ONS input–output tables and are expressed in 2018 prices using the GDP deflator taken from the Office for Budget Responsibility’s March 2018 Economic and Fiscal Outlook. ‘-’ indicates value added of less than £0.5 billion.

Source: Authors’ calculations using ONS analytical input–output tables 2014.

Table A.3a. Exposure of workers to new trade barriers under the FTA scenario

	Number employed ('000s)	Mean change in employer value added	Fraction of group employed in …			
			Low-exposure industries	Mid-exposure industries	High-exposure industries	Very-high-exposure industries
All	26,500	−1.5%	64%	24%	4%	8%
Women: All	13,100	−1.2%	69%	23%	4%	5%
Low-educated	4,400	−1.5%	55%	33%	5%	6%
Mid-educated	3,800	−1.1%	69%	23%	4%	4%
High-educated	4,900	−1.0%	80%	13%	3%	4%
Men: All	13,400	−1.7%	59%	25%	5%	11%
Low-educated	5,100	−2.0%	52%	30%	4%	14%
Mid-educated	3,700	−1.8%	57%	27%	5%	12%
High-educated	4,600	−1.4%	70%	18%	5%	7%

Note and source: See Table 10.1. Totals do not equal those in Table A.4 as not all individuals in the Quarterly Labour Force Survey report their education or occupation.

Table A.3b. Exposure of workers to new trade barriers under the EEA scenario

	Number employed ('000s)	Mean change in employer value added	Fraction of group employed in …			
			Low-exposure industries	Mid-exposure industries	High-exposure industries	Very-high-exposure industries
All	26,500	−0.8%	68%	25%	5%	2%
Women: All	13,100	−0.7%	71%	24%	4%	1%
Low-educated	4,400	−0.8%	60%	34%	5%	1%
Mid-educated	3,800	−0.6%	71%	25%	3%	1%
High-educated	4,900	−0.6%	82%	14%	3%	1%
Men: All	13,400	−1.0%	64%	27%	6%	3%
Low-educated	5,100	−1.1%	58%	30%	7%	4%
Mid-educated	3,700	−1.0%	62%	29%	6%	3%
High-educated	4,600	−0.8%	73%	21%	5%	2%

Note and source: See Table 10.1. Totals do not equal those in Table A.4 as not all individuals in the Quarterly Labour Force Survey report their education or occupation.

Table A.4. Employment by occupation and industry exposure across different trade policy scenarios ('000s)

Occupation	WTO				FTA				EEA			
	Industry exposure:				Industry exposure:				Industry exposure:			
	Low	Mid	High	Very high	Low	Mid	High	Very high	Low	Mid	High	Very high
Caring, leisure & other service occupations	1,778	709	51	87	2,446	94	77	8	2,487	130	4	4
Professional occupations	2,481	2,445	252	458	4,822	441	123	248	4,943	497	139	55
Administrative & secretarial occupations	1,739	490	426	459	2,175	513	206	221	2,234	641	196	44
Associate professional & technical occupations	1,863	806	392	731	2,571	578	293	351	2,687	761	280	65
Managers, directors & senior officials	1,144	423	539	457	1,482	671	140	271	1,573	744	183	64
Skilled trades occupations	1,063	229	448	362	1,194	576	62	270	1,356	561	80	104
Elementary occupations	836	549	1,284	400	1,088	1,598	149	234	1,376	1,488	145	60
Sales & customer service occupations	397	185	1,550	209	562	1,587	69	123	582	1,620	121	18
Process, plant & machine operatives	798	126	249	479	838	359	53	402	923	406	189	134
All	12,099	5,961	5,191	3,642	17,178	6,416	1,171	2,129	18,160	6,848	1,338	548

Note: Employees are assigned an estimated change in value added based on their main industry of employment. 'Very high', 'high', 'mid' and 'low' exposure industries are those that are estimated to experience a reduction in value added of more than 5%, more than 3% but less than or equal to 5%, more than 1% but less than or equal to 3%, and less than or equal to 1% respectively. Totals do not equal those in Tables A.3a and A.3b as not all individuals in the Quarterly Labour Force Survey report their education or occupation.

Source: Authors' calculations using ONS analytical input–output tables 2014 and the Quarterly Labour Force Survey 2017 quarters 1–4.

Table A.5. Characteristics of workers by occupation group

	Proportion with degree	Proportion male	Average age
Caring, leisure and other service occupations	18%	19%	40
Professional occupations	75%	48%	41
Administrative and secretarial occupations	26%	25%	42
Associate professional and technical occupations	47%	57%	39
Managers, directors and senior officials	47%	65%	44
Skilled trades occupations	9%	89%	39
Elementary occupations	9%	53%	38
Sales and customer service occupations	17%	38%	36
Process, plant and machine operatives	7%	88%	44
All	35%	51%	40

Source: Authors' calculations using the Quarterly Labour Force Survey 2017 quarters 1–4.

Table A.6. Average estimated change in employer value added under different trade policy scenarios, and median employee earnings, by region and nation of the UK

	Mean change in employer value added			Median gross employee earnings
	WTO rules	FTA	EEA	
UK	−2.3%	−1.4%	−0.8%	£24,100
West Midlands	−2.7%	−1.6%	−0.9%	£22,800
North West	−2.5%	−1.5%	−0.8%	£22,700
East Midlands	−2.5%	−1.5%	−0.8%	£21,800
North East	−2.4%	−1.4%	−0.8%	£22,300
Yorkshire and Humber	−2.4%	−1.4%	−0.8%	£21,800
London	−2.3%	−1.3%	−0.8%	£33,000
South East	−2.3%	−1.3%	−0.7%	£25,300
Wales	−2.3%	−1.4%	−0.8%	£21,800
East of England	−2.1%	−1.3%	−0.7%	£23,300
South West	−2.0%	−1.2%	−0.7%	£22,300
Scotland	−2.0%	−1.2%	−0.7%	£23,800
Northern Ireland	−1.7%	−1.1%	−0.6%	£21,800

Note and source: See Table 10.2.

Table A.7a. Fraction employed in very highly exposed industries under the FTA scenario, by region, education and gender

	Men			Women		
	Low education	Mid education	High education	Low education	Mid education	High education
UK	14%	12%	7%	6%	4%	4%
West Midlands	20%	15%	12%	7%	5%	4%
North West	15%	15%	9%	6%	4%	4%
East Midlands	18%	15%	13%	11%	6%	5%
North East	14%	11%	9%	6%	3%	5%
Yorkshire and Humber	18%	16%	9%	8%	6%	4%
London	8%	5%	3%	3%	3%	3%
South East	11%	10%	8%	5%	3%	5%
Wales	16%	12%	8%	6%	5%	4%
East of England	12%	10%	9%	8%	4%	4%
South West	14%	12%	6%	5%	3%	3%
Scotland	12%	8%	6%	5%	3%	3%
Northern Ireland	20%	13%	8%	7%	3%	4%

Table A.7b. Fraction employed in very highly exposed industries under the EEA scenario, by region, education and gender

	Men			Women		
	Low education	Mid education	High education	Low education	Mid education	High education
UK	4%	3%	2%	1%	1%	1%
West Midlands	9%	7%	5%	1%	1%	1%
North West	5%	4%	2%	1%	1%	1%
East Midlands	5%	3%	1%	2%	1%	0%
North East	6%	5%	4%	2%	1%	1%
Yorkshire and Humber	6%	6%	2%	2%	1%	1%
London	1%	0%	0%	0%	0%	0%
South East	3%	3%	2%	1%	1%	1%
Wales	6%	4%	2%	2%	1%	0%
East of England	4%	2%	2%	1%	1%	0%
South West	3%	3%	1%	0%	1%	0%
Scotland	5%	2%	2%	1%	1%	1%
Northern Ireland	6%	4%	1%	2%	1%	1%

Note and source to Tables A.7a and A.7b: See Table 10.3.