

# City-REDI

## Policy Briefing Series

CITY  
REDI



December  
2017

### **An Assessment of Brexit Risks for 54 Industries: Most Services Industries are also Exposed**

By Bart Los, Wen Chen, Philip McCann and Raquel Ortega-Argilés

#### Summary

- In the UK as a whole, more than 2.5 million jobs are exposed to the trade effects of Brexit
- Annually, almost £140 billion pounds of UK economic activity is directly at risk because of Brexit
- Many important manufacturing and primary industries are highly exposed to Brexit, but so are many services industries (and not just the financial services industry)
- These services are not only exported directly to EU countries, but also sell intensively within domestic supply chains to UK manufacturing firms exporting to the EU
- Workers in the jobs at risk are on average slightly more productive than the average British worker – Brexit is likely to exacerbate the UK's productivity problems
- The data on which this report is based are publicly available

## Introduction

This research is part of a project subsidized by the UK's Economic and Social Research Council looking at the [Economic Consequences of Brexit on the UK, its Regions, its Sectors and its Cities](#). This project is part of the umbrella initiative [The UK in a Changing Europe](#). The project is coordinated by City-REDI Institute at the University of Birmingham with research partners at the University of Sheffield, the Groningen Growth and Development Centre at the University of Groningen, Erasmus University of Rotterdam and the PBL Netherlands Environmental Assessment Agency in the Hague.

## Policy Context

On Wednesday 6 December the Minister for Exiting the European Union David Davis admitted that the UK government had not undertaken any detailed impact assessments of the potential effects of Brexit on individual UK industries.

The argument offered by the Minister against undertaking such exercises was that there are so many unknowns regarding

- (i) the nature of the final trade deal and
- (ii) the potential responses of firms and consumers to any major shock like Brexit that accurately modelling such outcomes is almost impossible.

A partial, but still very wide-ranging and impact assessment can be undertaken even without such specific knowledge of the final trade deal and the associated responses.

It is perfectly possible to model the level of Brexit-exposure of UK industries, by examining the extent to which they depend on trade with the EU. Such an analysis should include the role that some industries play in global supply chains, rather than focus exclusively on EU-exports by the industry itself.

Materials, components and also business services tend to cross several borders, 'embodied' in the output of more downstream industries. Many of the trade links in such supply chains are domestic, but some of these transactions entail trade between the UK and the EU (which will be hampered by Brexit). Other trade flows (between the UK and non-EU countries) will not directly be affected by Brexit.

We define an industry's exposure to Brexit as its employment (or value added) that currently crosses a UK-EU border at least once, embodied in a product. This exposure level also indicates how much the industry has to restructure its role in supply chains (via re-shoring stages of production and exploiting non-EU markets, etc.) to mitigate the value added and employment losses due to reduced trade with the EU. Such exposure levels clearly indicate which industries will be hit hardest by any type of Brexit and which ones will most likely remain virtually unaffected.

# Data and Methods

We employ the most recent data (for 2014) in the 2016-release of WIOD, the World Input-Output Database ([www.wiod.org](http://www.wiod.org), see Timmer et al., 2016). These data link global trade flows between 54 industries in 44 countries to the internal industrial structure of the economies, plus domestic and international transactions regarding purchases of consumer goods and capital goods. The techniques involved in calculating our two Brexit-related indices are mathematically complex. Readers are referred to Los et al. (2016) and Chen et al. (2017), but we give intuitive explanations:

First, the ‘jobs at risk’ index assumes that UK exports to the EU cease (UKICE 2017) and that all activities connected to these broken value chains (via internal UK transactions) disappear. We consider the difference between the actual and reduced employment levels as ‘jobs at risk’. Second, the ‘hyper-competitiveness’ (HC) index maintains the idea that exports to the EU cease. It assumes, however, that the UK is able to produce all products previously imported from the rest of the EU domestically, at the same quality and level of technology and at no greater costs. The ‘HC jobs index’ is computed as the difference between this hypothetical employment and actual employment levels.

The indices can be computed at industry level, for employment and for value added. Neither of the indices considers impacts as a consequence of Brexit-induced changes in foreign direct investment or changes in consumer behaviour, but exclusively focuses on trade effects.

## Jobs at Risk



Top 20 industries; Numbers for 2014, in thousands, including self-employed.  
 Primary industries in light blue, manufacturing industries in dark blue.  
 Source: Authors' computations based on WIOD (Timmer et al. 2016)

The figure reports the numbers of jobs exposed to Brexit in the 20 industries for which these numbers are largest. In administrative and support services activities, almost 0.5 million jobs are at risk. In wholesale trade, this number amounts to almost 275,000 workers, and in legal and accounting services another 172,000 jobs are at risk. **In the UK economy as a whole, slightly more than 2.5 million jobs are exposed to the trade effects of Brexit.**

This is about 8.2% of total employment. This is somewhat lower than the share of UK GDP at risk (8.5%, see the next page), which reveals that the **workers in the jobs at risk are on average slightly more productive than the average British worker.**

# Value Added at Risk, by Industry

Industry	Share of value added at risk	Share in GDP	Contribution to GDP at risk
<b>Primary Industries</b>			
Crop and animal production	12%	0.64%	0.08%
Forestry and logging	9%	0.01%	0.00%
Fishing and aquaculture	32%	0.03%	0.01%
Mining and quarrying	22%	1.59%	0.35%
<b>Manufacturing</b>			
Food products, beverages and tobacco	14%	1.73%	0.24%
Textiles, wearing apparel and leather	24%	0.38%	0.09%
Wood and of products of wood and cork	10%	0.15%	0.01%
Paper and paper products	18%	0.27%	0.05%
Printing and reproduction of recorded media	9%	0.30%	0.03%
Coke and refined petroleum products	18%	0.15%	0.03%
Chemicals and chemical products	33%	0.57%	0.19%
Pharmaceutical products	28%	0.81%	0.23%
Rubber and plastic products	22%	0.61%	0.14%
Other non-metallic mineral products	12%	0.30%	0.04%
Basic metals	26%	0.24%	0.06%
Fabricated metal products, except machinery	15%	1.03%	0.15%
Computer, electronic and optical products	26%	0.70%	0.18%
Electrical equipment	27%	0.32%	0.08%
Other machinery and equipment	24%	0.79%	0.19%
Motor vehicles, trailers and semi-trailers	21%	0.72%	0.15%
Other transport equipment	14%	0.60%	0.08%
Furniture; other manufacturing	20%	0.59%	0.12%
<b>Services</b>			
Repair and installation of machinery etc.	14%	0.37%	0.05%
Electricity, gas, steam and airco supply	7%	1.50%	0.11%
Water collection, treatment and supply	3%	0.33%	0.01%
Sewerage; waste collection and disposal	15%	0.71%	0.11%
Construction	2%	6.22%	0.13%
Wholesale/retail trade and repair of vehicles	11%	1.94%	0.21%
Wholesale trade, except of motor vehicles	24%	3.21%	0.76%
Retail trade, except of motor vehicles	2%	5.58%	0.11%
Land transport and transport via pipelines	9%	1.86%	0.17%
Water transport	5%	0.41%	0.02%
Air transport	8%	0.49%	0.04%
Warehousing and activities for transportation	16%	1.14%	0.19%
Postal and courier	14%	0.64%	0.09%
Accommodation and food	2%	2.91%	0.05%
Publishing activities	11%	0.66%	0.07%
Motion picture, video and television production	9%	0.87%	0.08%
Telecommunications	13%	1.73%	0.23%
Computer programming, consultancy	10%	2.91%	0.30%
Financial services	8%	4.38%	0.33%
Insurance, reinsurance and pension funding	4%	2.52%	0.10%
Activities auxiliary to financial services	31%	1.27%	0.39%
Real estate activities	1%	11.23%	0.08%
Legal, accounting and consultancy	14%	3.61%	0.51%
Architectural and engineering	11%	1.77%	0.20%
Scientific research and development	9%	0.57%	0.05%
Advertising and market research	16%	0.65%	0.10%
Professional/scientific/technical services	36%	0.84%	0.30%
Administrative and support	19%	4.75%	0.91%
Public administration and defence	1%	5.15%	0.05%
Education	1%	6.18%	0.09%
Human health and social work	0%	6.77%	0.02%
Other services	4%	3.91%	0.17%

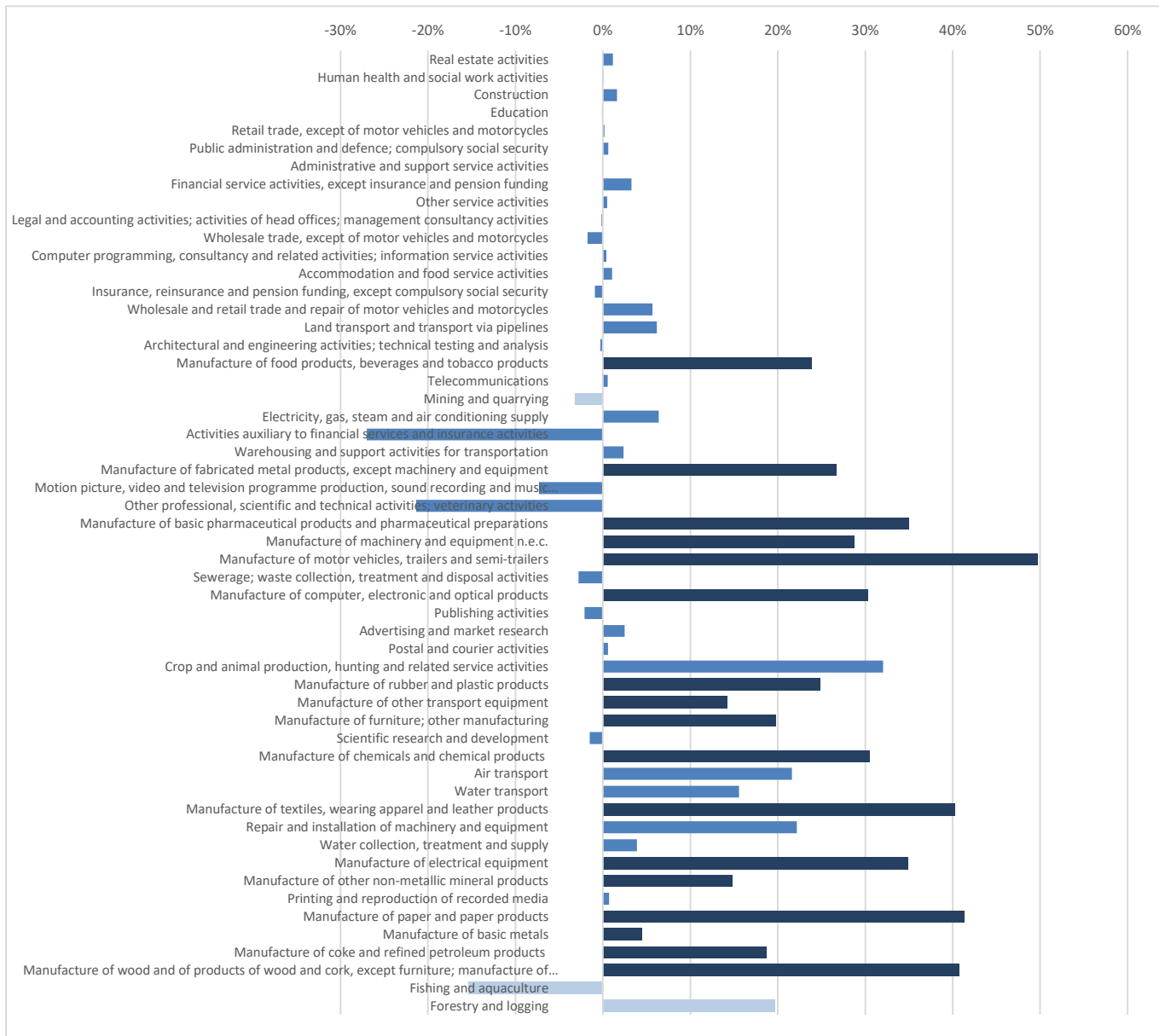
Source: Authors' computations based on WIOD (Timmer et al. 2016)

For as many as 15 out of 54 industries, more than 20% (up to 36%) of value added is at risk. For some of these industries, such as the fisheries, chemicals manufacturing and motor vehicles manufacturing, these findings are as expected. **Alarm should also be sounded, however, regarding a number of services industries.** The most prominent examples are professional, scientific and technical activities, activities auxiliary to financial services and wholesale trade. **These services are not only exported directly to EU countries, but also sell intensively to UK manufacturing firms exporting to the EU.** Many of these services are far more exposed than financial services, the focus of much media debate.

Among the industries that are most exposed, we find a few with clearly above-average labour productivity levels, such as pharmaceuticals manufacturing and mining and quarrying. Still, there is no clear link between productivity and value added at risk shares, since other high-productivity industries like insurance services and real estate services are among the industries with (very) low exposure levels.

In aggregate, about 8.5% of UK GDP – in 2014 **almost £140 billion per annum - is at risk due to Brexit.** The contributions of industries to this figure do not only depend on their exposure levels, but also on their relative size in terms of value added. Administrative and support services (including renting and leasing services) contribute most, followed by wholesale trade and legal and accounting services. Again, supply chain effects play a major role.

# “Hyper-Competitiveness” Index



Industries ranked by share in UK GDP (2014), in decreasing order. Primary and manufacturing industries in light and dark blue, respectively. Source: Authors’ computations based on WIOD (Timmer et al. 2016)

According to our HC index 40 industries would grow if all products previously imported from the EU would be purchased at identical costs from domestic sources. There are 14 industries that would still contract. For four of these the changes are sizable: activities auxiliary to financial services, the film, TV and music industry, professional, scientific and technical services, and fisheries. With the exception of transportation services, services industries will not grow much. In many manufacturing industries and in agriculture, the positive impacts reach double-digit levels. As a consequence of the UK’s specialization in services, the total positive effect is only just over 3% of GDP. The positive impact on economy-wide employment amounts to 2.5%.

We have presented results for two indicators, ‘jobs/value added at risk’ and the ‘hyper-competitiveness index’. These indicators can be computed without having to fix hundreds of elasticities describing how producers and consumers react to price- and non-price changes. Most probably, the actual sectoral impacts of Brexit will be in between both. Although the ‘at risk’ index corresponds to a very pessimistic scenario, it is important to note that this only incorporates trade-related risks. This index does not include the probable negative effects of Brexit on human capital flows, flows of inward or outward foreign direct investment (FDI), or the additional uncertainty associated with the UK having to negotiate numerous other trade agreements (Financial Times 2017). Meanwhile, regarding the HC index, the current UK productivity performance (Haldane 2017) suggests that we are nowhere near such a scenario and the literature in industrial economics, international economics, economic geography and economic history suggests that the UK’s ability to domestically substitute for EU imports is likely to be rather limited. Switching to more imports from other non-EU parts of the world (e.g. China) is likely to be widespread. This observation is particularly true for the manufacturing sector, for which the HC index is high. The differences between both indices suggest that sizable contractions are much more likely than growth, for most industries. Due to the emergence of global value chains, **services industries are much more exposed to the trade-related consequences of Brexit than many observers might have thought.** In general **higher productivity workers are slightly more vulnerable to Brexit, an observation which means that Brexit is likely to make the UK’s productivity problems even more severe (Haldane, 2017).**

A final observation is that the data on which this study is based are publicly available to analysts all over the world.

## Sources

Chen, W., Los, B., McCann, P., Ortega-Argilés, R., Thissen, M., and van Oort, F., “The Continental Divide? Economic Exposure to Brexit in Regions and Countries on Both Sides of the Channel”, 2017, Papers in Regional Science, forthcoming, DOI: 10.1111/pirs.12334

Financial Times, 2017, “After Brexit: the UK will need to renegotiate 759 trade treaties”, 30 May, <https://www.ft.com/content/f1435a8e-372b-11e7-bce4-9023f8c0fd2e>

Haldane, A., 2017, “Productivity Puzzles”, 20 March, <http://www.bankofengland.co.uk/publications/Documents/speeches/2017/speech968.pdf>

Los, B., Timmer, M.P., and de Vries, G.J., 2016, “Tracing Value-Added and Double Counting in Gross Exports: Comment”, American Economic Review, 106.7, 1958-1966.

Timmer, M.P., Los, B., Stehrer, R. and de Vries, G.J., 2016, “An Anatomy of the Global Trade Slowdown based on the WIOD 2016 Release”, GGDC Research Memorandum 162, University of Groningen.

UKICE, 2017, Cost of No Deal, UK in a Changing Europe, See: <http://ukandeu.ac.uk/research-papers/cost-of-no-deal/>

**Bart Los** is Professor of the Economics of Technological Progress and Structural Change and  
**Wen Chen** is Post-Doctoral Researcher in Economics, both working at the Faculty of Economics and Business and the Groningen Growth and Development Centre at the University of Groningen  
**Philip McCann** is Professor in Urban and Regional Economics in The University of Sheffield Management School  
**Raquel Ortega-Argilés** is Chair in Regional Economic Development at City-REDI in Birmingham Business School