Housekeeping

Twitter: #brexitregionalimpact

Presenters: 10 minutes presentations

Audience: Introduce yourself when asking questions

Don’t forget to fill in the: Feedback assessment form!!
Welcome Address

Professor Raquel Ortega-Argilés, University of Birmingham
Professor Daniel Wincott, The UK in a Changing Europe
Lloyd Broad, Birmingham City Council
The Economic Impacts of Brexit on the UK, its Regions, its Cities and its Sectors

Welcome Address

Professor Raquel Ortega-Argilés, University of Birmingham
The Economic Impacts of Brexit on the UK, its Regions, its Cities and its Sectors

The research team

Raquel Ortega-Argilés (Project leader, City-REDI Institute, University of Birmingham), Chloe Billing and Deniz Sevinc (City-REDI Institute, University of Birmingham), Philip McCann (University of Sheffield), Wen Chen, Pieter IJtsma and Bart Los (Groningen University), Nicola Cortinovis and Frank van Oort (Erasmus University Rotterdam), Mark Thissen (PBL Dutch Government Environmental Agency)
The Economic Impacts of Brexit on the UK, its Regions, its Cities and its Sectors

The partners

CITYREDI

UNIVERSITY OF BIRMINGHAM

centreforcities

Department for Business, Energy & Industrial Strategy

Scottish Government

Policy Scotland

ResPublica

sheffield University Management School.

university of groningen

PBL Netherlands Environmental Assessment Agency

ERASMUS UNIVERSITEIT ROTTERDAM
Significance of the research

Funded by the Economic and Social Research Council, “The Economic Impacts of Brexit on the UK, its Regions, its Cities and its Sectors” project started in April 2017 and is part of a series of 25 projects funded by ESRC to support the initiative [The UK in a Changing Europe](#) coordinated by Professor Anand Menon at King’s College London.

The project aims to examine in detail the likely impacts of Brexit on the UK’s sectors, regions and cities by using the most detailed regional-national-international trade and competition datasets.
Interest and engagement at this stage

- Annual Northern Ireland Economic Conference 2017
- Regional Studies Association
- Houses of Parliament
- HM Treasury
- BEIS Department
- Foreign Commonwealth Office
- West Midlands All Party Parliamentary Group
- EU Committee of the Regions
- Birmingham Post-Brexit Commission
- Managing Partners’ Forum – Professional and Business Services lobbying group
- European Parliament
How the recommendations have been taken up and by whom until now

Report contributions and mentions:

- [Brexit: Local and Devolved Government](#), UKICE
- [EU Referendum: One year on](#), UKICE
- [Article 50 one year on](#), UKICE
- [State of the North 2017: The Millennial Powerhouse](#), IPPR North
- [Will the unit of the 27 crack?](#), Centre for European Reform
- [Preparing for Brexit](#), Cambridge Econometrics
- [Brexit - What We Know Now](#), Tony Blair’s Institute for Global Change
- [Wikipedia inclusion: Brexit](#)
- [UK Parliament](#)
- [Assessing the exposure of EU27 regions and cities to the UK's withdrawal from the European Union](#), CoR Committee of the Regions
The analysis

- **Trade related effects**: Input-Output analysis; intermediate and final goods; global fragmentation of the value chains – local GDP, regional labour income

- **Competitiveness**: FDI, Trade and Knowledge

- **Governance**: regional stakeholder workshops and regional and sectoral case studies

- **Extent**: EU countries, UK and EU regions, sectors, jobs, occupations

- **New indicators and data**
# Regional Stakeholder Participatory Workshops

<table>
<thead>
<tr>
<th>Devolved Administrations</th>
<th>Scotland, Edinburg, 4\textsuperscript{th} May 2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>West Midlands</td>
<td>Birmingham, 11\textsuperscript{th} May 2018</td>
</tr>
<tr>
<td>Greater London</td>
<td>London, 18\textsuperscript{th} May 2018</td>
</tr>
<tr>
<td>North of England</td>
<td>Leeds, 21\textsuperscript{st} May 2018</td>
</tr>
</tbody>
</table>
The Economic Impacts of Brexit on the UK, its Regions, its Cities and its Sectors

Welcome Address

Professor Daniel Wincott, The UK in a Changing Europe
Welcome Address

Lloyd Broad, Birmingham City Council
Regional Impacts of Brexit: West Midlands

Professor Philip McCann, University of Sheffield
Charlie Hopkirk, Black Country Consortium
Nicola Hewitt, West Midlands Growth Company
David Hearne, BCU, Centre for Brexit Studies
Regional Impacts of Brexit: West Midlands

Professor Philip McCann, University of Sheffield
The Continental Divide?
Economic Exposure to Brexit in Regions and Countries on Both Sides of the Channel

Wen Chen, Bart Los, Philip McCann, Raquel Ortega-Argilés, Mark Thissen and Frank van Oort

*Papers in Regional Science*, 97.1, 25-54

“Exposure to Brexit in Regions on Both Sides of the Channel”, 2017, VoxEU, 19 December, See:
http://voxeu.org/article/exposure-brexit-regions-both-sides-channel
How?

- Simple measures of gross exports and imports tell us very little about the potential impacts of Brexit on a nation or region, because both the back-and-forth trade in raw materials, parts and components and business services (often within the boundaries of multinational enterprises) typical of global value-chains obscures the links between local value-added and trade (Baldwin, 2016).
Data construction

• Two types of sources:
• The World Input-Output tables of the WIOD 2013 release containing 40 countries (accounting for about 85% of world GDP, including all EU27) plus a composite ‘super-country’ labelled 'Rest of the World' are represented (Timmer et al., 2015).
• Second type of data, from regional sources: Eurostat’s regional economic accounts, a number of survey-based regional supply and use tables or input-output tables produced in a subset of countries, and estimates of interregional goods and services trade based on freight and airline business passenger statistics (Thissen et al., 2013).
• The merging of the information contained in these data sources allows us to:
  • Incorporate regional details regarding production structure and trade at the NUTS2-level for all major EU-countries in global input-output tables for 2000-2010.
  • 245 NUTS2 European regions are represented and 14 industries can be identified for all regions and countries.
How?

• We develop a measure of regional exposure to Brexit building upon a flourishing strand of literature using global input-output tables to link trade to value-added (Johnson and Noguera, 2012; Timmer et al., 2013; Koopman et al., 2014).

• We use a bilateral version of the Domestic Value Added in Exports (DVAiX) indicator proposed by Koopman et al. (2014).
IO-tables allow for mapping of trade to labor income and value added.

“Regional GDP exposed to Brexit”: Difference between actual GDP and GDP without EU-UK trade.
Research Question

• “Which shares of regional Labor Income and regional GDP are at risk as a consequence of future Brexit-related trade barriers?”

• (which is not identical to:

• “Which shares of regional LI and GDP will be lost as a consequence of Brexit?”)

• How big are the required structural and economic adjustments?
Brexit Exposure Risk

• For UK regions:
  • direct trade linkages (export, import, re-export, re-import)
  • indirect trade linkages via other UK regions
  • third country demand mediated via EU value-chains

• For EU regions:
  • direct trade linkages (export, import, re-export, re-import)
  • indirect trade linkages via other EU regions
  • third country demand mediated via UK value-chains

• Exclude UK-EU and EU-UK demand linkages mediated via third countries
Regional Shares of Local GDP Exposed to Brexit

Regional Shares of Local GDP Exposed to Brexit (Excluding the UK)
Map 2. Regional Shares of Local Labour Income Exposed to Brexit

Map 4. Regional Shares of Local GDP Exposed to Brexit (Excluding UK)

Share of Regional Labour Income exposed to Brexit

Share of Regional Labour Income exposed to Brexit (UK regions omitted)
National Brexit Exposure Risk

- UK regions → 10%-17% of regional GDP
- Irish regions → 10% of regional GDP
- German regions → 4.5%-6.4% of regional GDP
- Dutch regions → 3.5%-5% of regional GDP
- Belgian regions → 2.8%-4% of regional GDP
- French regions → 1.8%-2.7% of regional GDP
- Italian, Spanish, Greek → < 1% of GDP
- UK Brexit risk exposure = 12.2% of UK GDP
- EU Brexit risk exposure = 2.64% of EU GDP
- UK Brexit exposure risk is 4.6 times higher than the EU
Sectoral Brexit Exposure Risk

• City-REDI Policy Briefing Series, December 2017

• “An Assessment of Brexit Risks for 54 Industries: Most Services Industries are also Exposed”
• Bart Los, Wen Chen, Philip McCann and Raquel Ortega-Argilés

UK Sectoral Risk Exposure

- Administrative and support services
- Wholesale trade, except motor vehicles
- Legal and accounting activities
- Activities auxiliary to financial services
- Professional and technical activities
- Computer programming, consultancy
- Other service activities
- Architectural and engineering activities
- Trade and repair of motor vehicles
- Land transport services
- Retail trade, except of motor vehicles
- Warehousing
- Food products, beverages and tobacco
- Crop and animal production
- Machinery and equipment
- Fabricated metal products
- Construction
- Financial service activities
- Education
- Postal and courier activities
UK Sectoral Risk Exposure

- 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
- Professional, scientific and technical activities, activities auxiliary to financial services and wholesale trade.
- Financial services are only exposed to 8% of the sector’s GDP - consistent with the estimates for City job relocation to rest of the EU – and the aggregate effect on the UK economy of their exposure is only 0.33% of UK GDP
UK Sectoral Risk Exposure

• 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 Economic Impacts of Brexit on the UK, its Regions, its Cities and its Sectors

Regional Impacts of Brexit: West Midlands

Charlie Hopkirk, Black Country Consortium
Black Country LEP Brexit Activity & Findings

May 2018
• Black Country LEP
• Context
• LEP Brexit Group Approach
• Findings from business engagement, themes of:
  - trade
  - labour
  - funding
• Black Country ‘Asks’ on Brexit
• Next Steps and Conclusion
% of EU export by LEP (2015)

Source: HMRC
Sectoral Groups and Brexit: Impact on Exports

<table>
<thead>
<tr>
<th>Sectors</th>
<th>Scenario 1: EEA</th>
<th>Scenario 2: FTAs with EU and FTA67</th>
<th>Scenario 3: FTA with EU</th>
<th>Scenario 4: No Deals</th>
<th>Scenario 5: FTAs with FTA67 and ROW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food processing</td>
<td>-0.5</td>
<td>-24.7</td>
<td>-16.1</td>
<td>-36.4</td>
<td>-31.7</td>
</tr>
<tr>
<td>Textiles, apparel and footwear</td>
<td>-8.4</td>
<td>-16.5</td>
<td>-17.6</td>
<td>-33.5</td>
<td>-26.7</td>
</tr>
<tr>
<td>Wood, paper and printing</td>
<td>-9.2</td>
<td>-14.8</td>
<td>-17.1</td>
<td>-20.2</td>
<td>-13.0</td>
</tr>
<tr>
<td>Chemicals and pharmaceuticals</td>
<td>-6.6</td>
<td>-14.4</td>
<td>-15.8</td>
<td>-23.3</td>
<td>-14.6</td>
</tr>
<tr>
<td>Rubber and plastic</td>
<td>-4.4</td>
<td>-9.9</td>
<td>-10.8</td>
<td>-17.8</td>
<td>-13.4</td>
</tr>
<tr>
<td>Metals and non-metallic minerals</td>
<td>-6.7</td>
<td>-12.5</td>
<td>-21.2</td>
<td>-25.5</td>
<td>-7.1</td>
</tr>
<tr>
<td>Electronic and scientific</td>
<td>-4.0</td>
<td>-9.2</td>
<td>-9.8</td>
<td>-11.9</td>
<td>-9.1</td>
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<tr>
<td>Electrical</td>
<td>-5.3</td>
<td>-11.6</td>
<td>-12.6</td>
<td>-16.3</td>
<td>-11.0</td>
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<tr>
<td>Machinery</td>
<td>-3.3</td>
<td>-7.3</td>
<td>-8.3</td>
<td>-10.7</td>
<td>-6.0</td>
</tr>
<tr>
<td>Transport</td>
<td>-3.0</td>
<td>-8.7</td>
<td>-9.8</td>
<td>-14.2</td>
<td>-9.1</td>
</tr>
<tr>
<td>Other</td>
<td>-3.7</td>
<td>-8.3</td>
<td>-9.0</td>
<td>-11.1</td>
<td>-8.2</td>
</tr>
</tbody>
</table>

Source: University of Sussex

Sectors most exposed to post-Brexit trade

<table>
<thead>
<tr>
<th>Sector</th>
<th>Impact</th>
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</thead>
<tbody>
<tr>
<td>Metals</td>
<td>74</td>
</tr>
<tr>
<td>Oil and Gas</td>
<td>72</td>
</tr>
<tr>
<td>Automotive manufacturing</td>
<td>71</td>
</tr>
<tr>
<td>Industrial products</td>
<td>66</td>
</tr>
<tr>
<td>Pharmaceuticals and Biotech</td>
<td>63</td>
</tr>
<tr>
<td>Food and drink manufacturing</td>
<td>62</td>
</tr>
<tr>
<td>Non-food consumer goods manufacturing</td>
<td>61</td>
</tr>
<tr>
<td>Banking</td>
<td>52</td>
</tr>
<tr>
<td>Business services</td>
<td>49</td>
</tr>
<tr>
<td>Agriculture</td>
<td>49</td>
</tr>
<tr>
<td>Transport and storage services</td>
<td>48</td>
</tr>
<tr>
<td>Extraction industries</td>
<td>45</td>
</tr>
<tr>
<td>IT, media and telecoms</td>
<td>44</td>
</tr>
<tr>
<td>Insurance</td>
<td>41</td>
</tr>
<tr>
<td>Hotels and restaurants</td>
<td>39</td>
</tr>
<tr>
<td>Wholesale and retail trade</td>
<td>37</td>
</tr>
<tr>
<td>Leisure services</td>
<td>35</td>
</tr>
<tr>
<td>Utilities</td>
<td>30</td>
</tr>
<tr>
<td>Construction</td>
<td>13</td>
</tr>
</tbody>
</table>

Source: KPMG
Average manufacturing workforce:

Source: LDF (2017) Your Workforce & Brexit

Source: KPMG
• Initial roundtable with local businesses in August 2017

• Objective to understand business concern on Brexit

• Selection was cross-sectoral & with a focus on a high share of exports

• Supplemented by ‘Potential Impacts’ document
• Further discussions followed

• Group evolved to be in partnership with Black Country Chamber & attended by BEIS

• Ambition of the group became more strategic

• Letter and key ‘asks’ document sent to Greg Clark in January 2018
• Trade

• Labour

• Funding
• Lack of certainty affecting confidence
• Some hostility reported from EU customers
• Smooth customs arrangement seen as vitally important, particularly for component manufacturing
• Not enough DIT advisers working locally
• Concern for smaller firms, and ease of UK-EU trade taken for granted
• Low pound has been useful in the short-term

“Since the referendum, some EU customers have discontinued their interest in doing business”

Medium-sized Black Country component manufacturer
Reduction of EU workers identified, with a “trickle” leaving the UK
More assurances need to be made on the status of EU workers here
Huge concern over loss of labour
UK skills system not producing enough quality candidates
Immigration processes seem to be getting harder over time
Not doing enough to make EU citizens welcome
Opportunity for focused skills system for the long-term

“Without EU labour we wouldn’t have grown as much as we have in the past decade”

Medium-sized Black Country manufacturer
• Many projects locally have been heavily reliant on EU funding in the past, particularly through structural funds
• WM received €400m and €372m from the ERDF and ESF respectively in 2007-13
• Concerns over the detail of the UK Prosperity Fund
• Criticism of the accessibility of EU funding to SMEs
• Need for more innovative funding models for small business lending
1. Clarify your expectations of future trading relationships and trading conditions.

2. Give greater practical support from government resources (e.g. BEIS personnel) to the Black Country.

3. Minimise the impact of non-tariff barriers and logistical delays via a smooth customs arrangement with the EU.

4. Revamp and expand the role of DIT within local economies to reverse a lack of confidence in exporting worldwide.
5. Provide guarantees on the equal rights of EU labour in the UK.

6. For when the supply of a permanent vacancy clearly meets the demand of a non-UK worker, develop a more seamless system for employers to recruit from overseas.

7. Announce further detail on the replacement of EU funds post-Brexit.

8. Develop a strategic focus on building a stronger domestic workforce and on driving the growth of re-shoring.
Westminster Roundtable Session
- With Chamber (June/July)
- Will provide a unified BC business voice

Add to Evidence Base
- To strengthen our messaging
- More quantitative evidence

Continue to Represent BC Business
- Working in partnership
- Seamless as possible transition
• The LEP is working with partners to understand concerns among businesses on Brexit

• Group discussions have revealed concerns within major themes of trade, labour and funding

• Combination of qualitative and quantitative data aiding our understanding, but this to be extended

• LEP/Chamber have voiced the ‘asks’ of Black Country businesses, and plans to extend this with Westminster trip

• We’ll continue to work to provide the voice of business and ensure a successful post-Brexit transition
Regional Impacts of Brexit: West Midlands

Nicola Hewitt, West Midlands Growth Company
Future Perspectives

Current Strengths

- West Midlands Combined Authority banking and finance sector is worth £4.5bn a year
- 61% of investments were FDI and created 34,129 new jobs for the region
- West Midlands is the 3rd highest exporter in the UK providing 40% of UK’s car exports
- GBSLEP and Coventry and Warwickshire LEP are ranked #1 and #2 for automotive employment in the UK
Future Perspectives

- A drop in performance for transport equipment, industrial equipment and business services in 2016
- Manufacturing footprints are changing globally
- More complex value chains with production activities likely to become scattered over geographies
- Uncertainty surrounding cross-border supply chains
- Trade agreements are critical for the automotive and manufacturing sectors
Internet of Things
The Fourth Industrial Revolution

Data and digital skills are becoming intrinsically important to all sectors.

This new revolution gives the WMCA a chance to highlight its strengths in:
- Innovation
- Research
- Development
- Talent Pool
- Manufacturing

West Midlands Growth Company
# Internet of Things

## The Fourth Industrial Revolution

<table>
<thead>
<tr>
<th>From</th>
<th>To</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Economies of Scale</strong>&lt;br&gt;Standard parts re-used across multiple products driving low unit costs</td>
<td><strong>Lower Minimum Economic Scale</strong>&lt;br&gt;Lower barriers to entry for new competition</td>
</tr>
<tr>
<td><strong>Multi-tier Supply Chains</strong>&lt;br&gt;Complex supply chains with many tiers of suppliers and sub-contractors</td>
<td><strong>Fewer Tiered Supply Chains</strong>&lt;br&gt;Simpler supply chains with fewer intermediate tiers of sub-contractors</td>
</tr>
<tr>
<td><strong>Global Supply Chains</strong>&lt;br&gt;Combining global demand while pursuing opportunities for cost efficiencies and arbitrage</td>
<td><strong>Localised Manufacturing</strong>&lt;br&gt;Re-distribution of world’s manufacturing to be more regional and local</td>
</tr>
</tbody>
</table>
Impact of Brexit

Immediate effects

- The fall in the value of GBP increased investment interest
- High levels of uncertainty surrounding trade conditions
- Investment in core sectors slowed by 30% from 2015 to 2016
- Companies delaying or cancelling investment decisions
Industrial Manufacturing

Consumer Manufacturing

City of London

Further Implications
Opportunities
Regional Impacts of Brexit: West Midlands

David Hearne, Centre for Brexit Studies, Birmingham City University
Regional Disparities: The Need For New Measures

David Hearne

Birmingham City University, Centre for Brexit Studies
Estimated Regional Consumer Price Levels

- North East
- North West
- Yorks and the Humber
- East Midlands
- West Midlands
- East
- London
- South East
- South West
- Wales
- Scotland

- Consumer Price Level (lower bound)
- Consumer Price Level (upper bound)
Living Standards in Great Britain (2016)

- GVA per capita
- Nominal GDHI per capita
- Real GDHI per Capita (using lower bound)

Regions:
- North East
- North West
- Yorkshire & Humber
- East Midlands
- West Midlands
- East
- London
- South East
- South West
- Wales
- Scotland

GB = 100
Estimated Regional PPPs - EXPERIMENTAL DO NOT CITE

Lower Bound  Present Estimate
Productivity in the Great Britain (*Experimental - Do not Cite*)

- Nominal Productivity
- Real Productivity (Lower Bound)
- Real Productivity (Central Scenario)
The Economic Impacts of Brexit on the UK, its Regions, its Cities and its Sectors

West Midlands and Advanced Manufacturing: competitiveness challenges

Professor Frank van Oort, Erasmus University Rotterdam
Professor David Bailey, Aston University
Justin Benson, KPMG Automotive
Professor Nigel Driffield, Warwick University
The Economic Impacts of Brexit on the UK, its Regions, its Cities and its Sectors

West Midlands and Advanced Manufacturing: competitiveness challenges

Professor Frank van Oort, Erasmus University Rotterdam
Competitiveness challenges of Brexit

Brexit West Midlands

Frank van Oort, Mark Thissen & Nicola Cortinovis
Exposure analysis versus Regional and sectoral production cost analysis of Brexit

Scenario Exposure analysis:
No trade flows crossing the red line, as long as EU countries are involved

Interregional Value chain IO-model for mapping of trade changes to labor income and value added:

\[ x = Ax + F \rightarrow x = (I - A)^{-1} F \]

Scenario production costs analysis:
Barriers (non tariff and tariff) to trade following the red line and based on Dhingra et al. (2017).

Interregional Cost chain price-model to determine the effect on the costs:

\[ p' = p'A + v' \rightarrow p = (I - A')^{-1} v \]

\( v \) are prices for labor and capital; tariffs on the A matrix.
Competitiveness loss: Production cost increase

Production cost increase:
Large regional variation with:
- Minimum of 0.46% (Inner London)
- Maximum of 1.33% (Highlands and Islands)

Reason for regional variation:
- Production structure (indirect dependence/exposure to trade with the continent)
- Sector composition (higher impact on agriculture and manufacturing than on services)

- We use measure of interregional dependence introduced by Johnson and Noguera (JIntE, 2012)
- Data: Regionally disaggregated global input-output tables for 2013
Competitiveness loss: Production cost increase
## Region and sector specific production cost increases (preliminary results)

<table>
<thead>
<tr>
<th>Average regional cost Increase</th>
<th>UKG2</th>
<th>UKG3</th>
<th>UKH1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crop and animal production, hunting and related service activities</td>
<td>0,70%</td>
<td>0,66%</td>
<td>0,93%</td>
</tr>
<tr>
<td>Forestry and logging</td>
<td>3,7%</td>
<td>4,0%</td>
<td>5,5%</td>
</tr>
<tr>
<td>Mining of coal and lignite</td>
<td>3,4%</td>
<td>3,5%</td>
<td>4,6%</td>
</tr>
<tr>
<td>Fishing and aquaculture</td>
<td>2,2%</td>
<td>3,4%</td>
<td>3,3%</td>
</tr>
<tr>
<td>Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials</td>
<td>2,8%</td>
<td>2,8%</td>
<td>3,8%</td>
</tr>
<tr>
<td>Manufacture of furniture</td>
<td>1,8%</td>
<td>2,7%</td>
<td>2,4%</td>
</tr>
<tr>
<td>Printing and reproduction of recorded media</td>
<td>1,7%</td>
<td>2,5%</td>
<td>3,0%</td>
</tr>
<tr>
<td>Manufacture of paper and paper products</td>
<td>2,5%</td>
<td>2,2%</td>
<td>2,9%</td>
</tr>
<tr>
<td>Manufacture of chemicals and chemical products</td>
<td>2,1%</td>
<td>2,0%</td>
<td>2,8%</td>
</tr>
<tr>
<td>Manufacture of coke and refined petroleum products</td>
<td>2,0%</td>
<td>2,0%</td>
<td>2,7%</td>
</tr>
<tr>
<td>Manufacture of basic metals</td>
<td>1,8%</td>
<td>1,9%</td>
<td>1,8%</td>
</tr>
<tr>
<td>Manufacture of rubber and plastic products</td>
<td>1,3%</td>
<td>1,4%</td>
<td>1,8%</td>
</tr>
<tr>
<td>Manufacture of other non-metallic mineral products</td>
<td>1,5%</td>
<td>1,4%</td>
<td>1,5%</td>
</tr>
<tr>
<td>Manufacture of fabricated metal products, except machinery and equipment</td>
<td>1,5%</td>
<td>1,4%</td>
<td>2,0%</td>
</tr>
<tr>
<td>Manufacture of machinery and equipment n.e.c.</td>
<td>1,1%</td>
<td>1,3%</td>
<td>1,7%</td>
</tr>
<tr>
<td>Manufacture of electrical equipment</td>
<td>1,3%</td>
<td>1,2%</td>
<td>1,6%</td>
</tr>
<tr>
<td>Manufacture of basic pharmaceutical products and pharmaceutical preparations</td>
<td>1,2%</td>
<td>1,2%</td>
<td>1,7%</td>
</tr>
<tr>
<td>Manufacture of motor vehicles, trailers and semi-trailers</td>
<td>1,2%</td>
<td>1,2%</td>
<td>1,6%</td>
</tr>
<tr>
<td>Manufacture of computer, electronic and optical products</td>
<td>1,4%</td>
<td>1,2%</td>
<td>1,6%</td>
</tr>
<tr>
<td>Wholesale and retail trade and repair of motor vehicles and motorcycles</td>
<td>1,1%</td>
<td>1,1%</td>
<td>1,3%</td>
</tr>
<tr>
<td>Manufacture of furniture</td>
<td>1,0%</td>
<td>1,1%</td>
<td>1,3%</td>
</tr>
<tr>
<td>Repair and installation of machinery and equipment</td>
<td>0,4%</td>
<td>1,0%</td>
<td>1,2%</td>
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<tr>
<td>Manufacture of other transport equipment</td>
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<td>0,9%</td>
<td>1,7%</td>
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<td>Electricity, gas, steam and air conditioning supply</td>
<td>0,7%</td>
<td>0,9%</td>
<td>1,7%</td>
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<tr>
<td>Sewerage</td>
<td>0,9%</td>
<td>0,9%</td>
<td>1,3%</td>
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<tr>
<td>Water collection, treatment and supply</td>
<td>0,9%</td>
<td>0,8%</td>
<td>0,9%</td>
</tr>
</tbody>
</table>
The competitiveness challenge:

- From exposure to cost increase of +2% on average (given scenario’s on tariffs in Brexit); arguably more in agricultural and industrial regions; region and sector specific; focused policies seem expedient.

- Can productivity be impacted locally more than +2%, outperforming competitive advantages vis-à-vis other regions?
### West-Midlands (Birmingham)

<table>
<thead>
<tr>
<th>EU Competitors are:</th>
<th>Potential</th>
<th>Winning</th>
<th>Winning</th>
<th>Winning</th>
<th>Winning</th>
<th>Winning</th>
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<td>Munich</td>
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<td>Eindhoven</td>
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<tr>
<td>MW Ireland</td>
<td>Reading</td>
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<td>Copenhagen</td>
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<td>Düsseldorf</td>
<td>Manchester</td>
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</tr>
</tbody>
</table>

**Location factors compared to competitors:**
Competing locally on what?

- Productivity (TFP)
- Agglomeration (density, clusters)
- Connectivity (physical, networked)
- Knowledge infrastructure (R&D, patents, educated)
- Labour market (matching, skills, education)
- Structural change opportunities (relatedness, adaptation, resilience)
- Institutions (housing)
- Amenities (living environment, fun)
Prioritising how?

- Productivity (TFP)
- Agglomeration (density, clusters)
- Connectivity (physical, networked)
- Knowledge infrastructure (R&D, patents, educated)
- Labour market (matching, skills, education)
- Structural change opportunities (relatedness, crossovers, adaptation, resilience)
- Institutions (housing)
- Amenities (living environment, fun)
Diagnostics:

Not an easy job, as crucial local factors do not impact favourably at the moment already compared to competing regions…
Besides, not all growth fosters competitiveness

Growth of region i: more products sold in region j

Growth of region i due to demand-led growth in market j

Marketshare of region i in market j

Growth of region i due to structural growth (gain in market share in market j)

Growth of region j (the Market)
“Good growth, bad growth”

1. **Demand-led** growth *(External factors)*: Growth by increased demand from sales markets

2. Structural growth *(regional policy)*: Growth by increased competitiveness and gaining market share
Urgency of local policy responses West-Midlands to mitigate Brexit impacts:

• Exposure to Brexit large
  • Asymmetrical cost-increases for firms due to Brexit
  • Competitiveness impacts of crucial factors weak
• Crucial factors depend on complex variety of stakeholders
• Time needed for materialising structural change potentials
  • Much demand-led growth (larger pie)
  • Less structural growth (smaller pieces of pie)
• Competition for FDI & knowledge (also) fierce
West Midlands and Advanced Manufacturing: competitiveness challenges

Professor David Bailey, Aston University
Beyond Industry 4.0 & Implications for Industrial Policy
West Midlands and Advanced Manufacturing: Competitiveness challenges

David Bailey
Aston Business School

Lisa De Propris
Birmingham Business School
Today:

Definitions of I4.0
MAKERS: a broader interpretation (I4.0+)
Brexit
Auto case: ICE to ACE
Implications for Industrial Policy?
Kondratieff’s Long Waves

Indices of economic activity

- Steam
- Cotton
- Iron
- Railways
- Iron
- Steel
- Electricity
- Chemicals
- Autos
- Electronics
- Synthetics
- Petrochemicals

K1 K2 K3 K4 K5

1800 1850 1900 1950 2000s

now

Technological change
4th Industrial revolution

Biotech, nanotech, neurotech, green & renewables, ICT & mobile tech, 3D, AI, Robotics, sensing & space tech, drones
MAKERS

Revolution or evolution?
Industry 4.0 describes the organisation of production processes based on technology and devices autonomously communicating with each other along the value chain in virtual computer models.

Industry 4.0 involves a series of disruptive innovations in production and leaps in industrial processes resulting in significantly higher productivity.

**Efficiency driven arguments**

- **Smart** and webbed factories
- Large plants
- Large firms or multinational firms
- Mass customisation

**Efficiency driven arguments**

- AI- IoT – robotics- automation
- Cyber-physical systems (smart ordering, scheduling, control and delivery systems, ‘big data’.
- New combination capital & labour
- lower inventory upstream, in process and downstream.
- Max productivity
MAKERS - Smart Manufacturing for EU growth and prosperity is a project funded by the Horizon 2020-MSCA-RISE - Grant agreement number 691192.
MAKERS - Smart Manufacturing for EU growth and prosperity is a project funded by the Horizon 2020-MSCA-RISE - Grant agreement number 691192.

Industry 4.0+

- New markets
- Personalised flexible Artisan customisation
- New business models (gig economy & Servinomics)
- Local supply chains
- Sustainability core
- New technologies
- New production spaces (Connected factory)
‘I4.0+’ & Auto:
• Connected devices and sensors;
• Predictive analytics, cognitive computing & AI; decisions and predictions based on real time data
• Widespread adoption of mobile, touchscreen and virtual reality;
• New flexible systems of production, technologies such as 3D printing and intelligent robotics;
• Connected factories
AND....
Source: PA Consulting, 2016. Brexit: the impact on auto manufacturing in the UK
ICE to ACE
Key issues

• Co-creation
• New ways of consuming, using, accessing...
• Servitising consumption and sourcing
• Downscaling: Q: economies of scale?
• Shorter value chains?
• Rethinking products and processes from an ecological perspective
Pinch points?

• Lack of information
• Vested interests
• Resistance to change
• Risk and uncertainty
• Delusion about the inevitable supremacy of services
• Belief that businesses & market know better
Implications for industrial policy

- Political understanding of scale of change → information and education
- Design clear and communicated vision → shared vision, commitment
- Promote technology adoption and application → join tech with sectors
- Join national with regional scales → multi-level

→ regional industrial policy
Impact on industrial policy

- Skills, training and retraining (lessons? Devo!)
- Infrastructure; eg 5G, charging infrastructure...
- Firm access to I4.0+ technologies (finance, funding, support)
- ‘Platform sharing’: enabling technologies. join technology, sector, place (Eg digital innovation hubs)
- Open innovation approaches? (implications for eg challenge funding)
Implications for industrial policy 3

• GVC Repositioning? reshoring? Recoupling innovation and manufacturing?
• New GVCs: servitisation opportunities
• Place-based dimension of niche development (transitions lit: MLP): role of place!
• Modern forms of IP: process of discovery of tacit knowledge, identify opps, challenges and how to overcome → National & regional.

MAKERS - Smart Manufacturing for EU growth and prosperity is a project funded by the Horizon 2020-MSCA-RISE - Grant agreement number 691192.
Brexit: some priorities to consider:

- Impact of Brexit on UK industry could be felt via: economic growth, investment delays, shifting cost bases, export disruption (and policy measures).

Need?:

- Prioritise Single Market in negotiating position with the EU or at least Customs Union +;
- Being able to hire skilled workers from EU;
- Exploiting opportunities on reshoring and the technological revolution underway: needs a much stronger industrial policy for auto & manufacturing.
What’s to be done?

- Eliminate uncertainty over trade position as soon as possible
- Make the most of opportunities to export and reshore components supply
- Boost capital allowances rather than general cut to corporation tax?
- ‘Re-boot’ industrial policy and funding:
  - More to rebuild supply chain – reverse previous mistakes
  - Skills and finance – devolution to regions.
- Support for exporters
- Attracting tier 1 suppliers? Segments of supply chain.
- Innovation eg ‘phoenix industry’ linked to open innovation
- More holistic approach to encouraging the shift to EVs

Need to join up sectoral industrial policy and technology policies with place based approaches at regional level.
Thank you

d.bailey@aston.ac.uk
l.depropries@bham.ac.uk
www.makers-rise.org

Q&A
West Midlands and Advanced Manufacturing: competitiveness challenges

Justin Benson, KPMG Automotive
Brexit impacts for Automotive

11th May 2018
The UK automotive market - Brexit is a big deal

Why will Brexit have a large impact on the automotive market?

- Over 2,400 companies in UK Auto sector
- 37% (£33Bn) components sourced in UK, circa 35% from EU, remaining from ROW
- Employs >800,000 people (Circa 170,000 directly in manufacturing)
- Nissan and JLR account for >1.1m vehicles
- Manufactured >1.7m vehicles (2016) and >2.6m engines
- Over 75% of vehicles manufactured in the UK are exported
- 15 NSC's in UK of which 8 manufacture in UK
- 8 of the 10 F1 teams are based in UK

4% of GDP (Circa £70Bn)
But…. Brexit is killing investment

UK Auto investment
£2.6bn in 2015;
£1.1Bn in 2017
Impact on other side of channel: Consider Germany

- The majority of the >1.7 million cars produced in the UK contain parts from German suppliers
- 44% of the vehicles fitted with German parts are exported to EU
- German suppliers located in the UK generate circa Euros2.7 billion
- Germany is largest exporter of car parts to the UK at Euros4.6 billion
... but there is more going on in automotive than Brexit....Three main disruptive forces will fundamentally transform how people and goods move in the future.

- Electric vehicles & alternative powertrains
- Connected and Autonomous Vehicles
- Mobility as a Service ("MaaS")
- Changing consumer and societal demands
  - Moving people
  - Moving goods

Mobility Value Chain

Collaboration in the future Mobility Ecosystem
Brexit will drive decisions in two key areas:

- Model investment
- Supply chain
Consider new model investment decisions....

<table>
<thead>
<tr>
<th>FACTORY LOCATION CHOICES LIKELY TO HAVE BEEN MADE</th>
<th>DECISIONS YET TO BE MADE</th>
</tr>
</thead>
<tbody>
<tr>
<td>HONDA CIVIC/CR-V</td>
<td></td>
</tr>
<tr>
<td>VAUXHALL</td>
<td>Astra MPV</td>
</tr>
<tr>
<td>MINI COUNTRY MAN</td>
<td>Clubman Mini</td>
</tr>
<tr>
<td>TOYOTA AURIS/AVENSIS</td>
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<tr>
<td>NISSAN LEAF/JUKE</td>
<td>Qashqai Infinity Q30</td>
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<tr>
<td>JAGUAR XJ</td>
<td>F-Type XF/XE F-PACE XJ/XJR</td>
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<tr>
<td>LAND ROVER EVOQUE NEW DEFENDER RANGE ROVER SPORT</td>
<td>DISCOVERY SPORT EVOQUE/DISCOVERY</td>
</tr>
</tbody>
</table>
...and the new model investment process...(up to 4 + 7 years)

Step 1: Model design sign-off

Step 2: EU sales forecast

Step 3: EU plant capacity options

Step 4: Plant business case submissions

Criteria: NPV of total landed cost

Step 5: Plant award made
OEM Case study – supply chain investment decisions

Manufacturing and Product Development Facilities

- HALEWOOD
- ENGINE MANUFACTURING CENTRE WOLVERHAMPTON
- CASTLE BROMWICH
- SOLIHULL
- WMG AT WARWICK UNIVERSITY
- WHITLEY
- GAYDON

Supply chain investment UK V EU
OEM Case study – supply chain investment decisions

GLOBAL INVESTMENT IN INFRASTRUCTURE
Supply chain risk

**Network optimisation**
- Warehousing strategy - location
- Logistics planning
- Manufacturing locations

**Distressed supply chain**

**Cash and working capital**

**Customs (WTO?)**
Annual lorry traffic and EU share of trade for selected major UK ports in 2015

Source: Department for Transport: Maritime and Shipping Statistics
Customs

UK:

— 180,000 new importers/exporters
— From 55m to 300m declarations
— £4bn - admin costs
— Over 4m lorries pa
— 3,000-5,000 additional staff
— 5 to 8 years implementation
OEM Case study – impact of WTO

**Potential increase in COG**

£66.50M

**Current customs duty paid**

£1.65M

**Average customs duty**

3.41%

**FTA imports potential duty**

£0.92M

**FTA exports potential duty**

£15.33M
OEM Case study – starting to mitigate impact

Analysis of potential increase in cost of goods (COG)

<table>
<thead>
<tr>
<th>Type of trade</th>
<th>Country name</th>
<th>Commodity code</th>
<th>Category</th>
<th>Customs value</th>
<th>Current customs duty</th>
<th>Potential duty rate</th>
<th>Potential duty increase</th>
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<td>Dispatches</td>
<td>ITALY</td>
<td>87033219</td>
<td>Motor cars and other motor vehicles principally designed for the transport of</td>
<td>£55,515,354.88</td>
<td>£0.00</td>
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<td>£66,225,549.00</td>
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</table>
OEM example: Plants in Europe

Legends:  
- ◆ Transmission  
- ◆ Assembly  
- ◆ Forging  
- ◆ Stamping  
- ◆ Engine

- **Germany**  
  Engine plant  
  Transmission Plant: JV 50%; 50%  
  Forging - Tool and Die x2  
  Assembly  
  Body and Assembly plant x2

- **Slovakia**  
  Transmission plant  
  Transmission Plant: JV 50%; 50%  

- **UK**  
  Engine plant x2  
  Transmission Plant: JV 50%; 50%

- **France**  
  Automatic Transmission Plant  
  Transmission Plant: JV 50%; 50%

- **Spain**  
  Body and Assembly plant  
  Engine plant

- **Turkey**  
  Engine and Transmission plant  
  Assembly  
  JV 40%; 40%; Government: 20%
Impact of tariffs on integrated supply chain – Tier 1

Case study
GKN Driveline – Illustration of an integrated supply chain

A typical driveline system produced by GKN incorporates specialist parts largely from the rest of the EU. GKN sources specialist forged parts from Spain, Italy, France and Germany which are then assembled at GKN Driveline’s factory in the UK and supplied to UK and EU OEMs.
West Midlands and Advanced Manufacturing: competitiveness challenges

Professor Nigel Driffield, Warwick University
Brexit, inward investment and the local economy

Nigel Driffield, Warwick Business School
Employment implications of inward investment

- inward investment is going to fall post brexit
  Most (but not all!) inward investment is linked to EU membership
  Ease of movement, supply chains etc.
  We therefore need a different value proposition for inward investors both locally and nationally.
What can we do about this?

1. Focus inward investment efforts on sectors where free trade with the EU is less important. Eg seeking to maximise the benefits of HS2, and other infrastructure projects.

2. Developing our inward investment strategy through greater understanding of why firms seek to invest in our region.

3. In order to understand how policy levers in this space can be applied, one has to understand the strategic decisions that lead to FDI, its motivation, and importantly financing. (look to maximise benefits of inward investment not volume of it).

4. Single market / customs union?
Importance of inward investment by sector
## Linking inward investment, productivity and employment

<table>
<thead>
<tr>
<th>Sectors that generate employment</th>
<th>Sectors that generate productivity growth</th>
<th>Sectors that generate both</th>
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</thead>
<tbody>
<tr>
<td>Transportation and storage</td>
<td>Information and communication</td>
<td>Financial and insurance activities</td>
</tr>
<tr>
<td>Construction</td>
<td>Computer, electronic and optical products</td>
<td>Transport equipment</td>
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<tr>
<td>Arts, entertainment and recreation</td>
<td>Electricity, gas, steam and air-conditioning supply</td>
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<tr>
<td>Food products, beverages and tobacco</td>
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</table>
Build supply chains that are robust

fix the blockages:

Skills
Transport
Access to finance
Innovation
Exporting
Higher skills – eg commercialisation
This has to be done at a local level

If firms have local accountability and people near to them, they can solve this.

If its vertical policy in Whitehall then they cant
The Economic Impacts of Brexit on the UK, its Regions, its Cities and its Sectors

Policy round table: Brexit challenges

Lloyd Broad, Birmingham City Council
Professor Simon Collinson, City-REDI – University of Birmingham
Professor Paul Forrest, West Midlands Economic Forum
The Economic Impacts of Brexit on the UK, its Regions, its Cities and its Sectors

Closing Speech

Professor Raquel Ortega-Argiles, City-REDI – University of Birmingham

R.Ortega-Argiles@bham.ac.uk