North West Labour Force:

A review of the North West's labour force in the light of Brexit

December 2017

Executive Summary

- The UK's decision to leave the EU has raised many questions and concerns for employees, employers and policymakers about the impact of Brexit on working life and the economy. This paper summarises analysis by the North West Regional Research Collaboration on risks to the labour force, migration and skills. Given the potential scope of such as study, the focus of the analysis is to attempt to quantify impacts, where possible by area, sector, occupation, and skills. It is, however, important to state that a lack of detailed statistics at city-region level in the UK does place limits on the analysis detail. The report is therefore intended to highlight broad areas of risk which localities face, which can be explored further through research with local firms.
- The UK's decision to leave the EU has come at a time when the UK labour market is undergoing significant change: while the UK has had a positive record on job quantity in recent times, it has a poor record on job quality. As such, there is now an increasing focus on ensuring 'good' work for all, as underscored by the Taylor Review, which – in conjunction with the UK's decision to leave the EU – has thrown the spotlight back on ensuring that local residents are equipped to take advantage of the changing labour market opportunities. An ageing resident population also brings additional potential labour market shortages.
- This research has identified five sectors that are particularly likely to be exposed in the North West to any potential changes in migration policy. *Distribution, Hotels, and Restaurants*, parts of *Manufacturing* (textiles and food and drink), parts *of Banking, Finance, and Insurance* (shared services), parts of *Public Admin, Education, and* Healthcare (in particular social care), and *Agriculture, Forestry and Fishing* appear to be more exposed due to the proportion of migrant workers within these sectors. Further, some sectors, such as Agriculture, Forestry and Fishing may be more exposed than the official figures reveal. Anecdotal evidence suggests that they may be under reporting the numbers of migrant workers operating within.
- Evidently the impact of Brexit will play out differently in different parts of the UK, and to different degrees across the NW. The composition of different local economies matters, in terms of both industry sectors and local workforce. While the LEP economies share a number of commonalities, there are also a number of important differences between them making each LEP area distinct from the others.
- Manufacturing; Distribution, hotels, and restaurants; Banking, finance, and insurance; and Public admin, education, and health are all significant employers in each of the five LEPS, while Agriculture and fishing and Energy and water are additionally key employment sectors in Cumbria and Transport and communication is significant for Greater Manchester. These differences are important as the number and share of EU migrants differ significantly by industry.
- The analysis also reveals that low-skilled jobs are likely to be most vulnerable to potential changes in migration as a result of the UK leaving the EU and therefore sectors with a higher proportion of low skilled jobs and an over-representation of EU8 workers who are overrepresented in low skilled jobs are more vulnerable to future changes in migration, in particular this is the case within Distribution, Hotels, and Restaurants and Manufacturing.
- To further explore the potential impact that the decision to leave the EU may have on the migrant workforce operating within the NW, the research team has developed a series of indicative scenarios. These scenarios seek to assess the potential impact that the introduction of work visas may have on migrant workers. It is important to note that this scenario work does not seek in any way to replace existing national population projections produced by the Office of National Statistics, nor local population projections, rather it aims to provide further

intelligence to inform labour force planning within local areas. The research looks at both changes to rejection rates and restriction levels around visas and suggests that the impact of any changes is more dependent on how restrictive conditions on movement of people are, i.e. what skill levels visa applications are open to, rather than the level of rejection rates of applications.

- Due to data restrictions, the scenarios in this report have only been run for Greater Manchester. The full methodology has however been provided to LEPs to undertake this analysis. Within the context of Greater Manchester it is important to note that the population forecasts within the Greater Manchester Forecasting Model (GMFM), developed by Oxford Economics still represents the central scenario for Greater Manchester in terms of population change over the next twenty years. The scenario outcomes from this research are however valuable and will inform, alongside a range of other datasets, the next iteration of the GMFM due in 2018.
- In terms of recommendations from the analysis, it is evident that a significant shift in immigration policy could lead to acute shortages particularly in the industries identified. Working closely with Government, local areas need to consider the impact this may have and how they can adapt to changes in both migration controls and the UK's international trading relationships as they evolve.
- There is also a need for Government, local authorities, and partner agencies to ensure that local residents have the skills that they need to take advantage of emerging opportunities including in cross cutting sectors such as digital and to ensure that training provision meets local employer needs.
- It will be important nationally to provide certainty on the residence rights of firms' EU workforce and EU workers who arrive up until the point of triggering Article 50; and clarity on hiring from EU countries during any transition period. Norway, Switzerland and Canada offer 'models' for UK immigration policy. Lessons from these countries show that even with freedom of movement in place, the introduction of labour market regulations and managed controls can help minimise tensions surrounding the perceived negative effects of immigration, whilst meeting employers' genuine recruitment needs.
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1 Introduction

Aims

1.1 This paper reviews the North West's labour market in the context of a potentially significant shift in migration policy as a result of the UK's decision to leave the EU. It looks at current labour market conditions in the North West, including analysis of the labour force by nationality and at the industry and skills levels, and explores some potential implications of Brexit on both population projections and the labour force by scenario testing some possible changes to immigration policy. Additionally, it considers the wider context of ongoing structural labour market challenges across the North West, such as the need to improve productivity, upskill local residents, and create good quality and well-paid jobs.

Context

1.2 The North West had just over 3.2 million residents in employment as of March 2017. Of these 3.2 million residents, approximately 151,000 (5%) were EU nationals. As such, the UK's decision to leave the EU has the potential to pose a significant risk to the labour market in the North West.

1.3 While it is currently uncertain exactly what the impacts of Brexit will be on migration and the labour force, it is likely that any potential impacts will vary both across and within sectors, as well as across local authorities. It is therefore important to understand both the nature of any potential risks posed to the labour market by Brexit, and what the impact of these might be.

1.4 Moreover, the UK's decision to leave the EU has come at a time when the UK labour market is undergoing significant change: while the UK has had a positive record on job quantity in recent times, it has a poor record on job quality. As such, potential changes in migration patterns as a result of the UK's decision to leave the EU should be seen as an additional challenge to the labour market in the North West.

Structure of the report

1.5 The report has the following sections:

- **Section 2:** Gives a summary of current labour market conditions in the North West of England, including analysis of the scale of UK, EU and Non-EU migrant workers, by area, sector, level of skill, and home country or workers.
- **Section 3:** Explores the potential implications of Brexit on the labour market, and resident population within the North West, and uses a series of scenario test to understand the scale of risk from the introduction of controls on migration, in particular the use of specific visas.
- **Section 4:** Sets out the wider context for the labour market, looking at medium and short term trends in the economy, and how these headlines drivers of change such as flexible working, technological change can also influence the nature of impacts on the workforce.
- **Section 5:** Provides the overall conclusions and implications arising from this report.

2 Labour Market: Current Conditions

Key messages

- The North West had just over 3.2 million residents in employment as of March 2017. Of the 3.2 million residents in employment, approximately 151,000 (5%) are EU nationals.
- *Public Administration, Education, and Health* is the largest employer in the North West, employing just over 1 million people or 31% of those in work (UK: 30%). This is followed by *Distribution, Hotels, and Restaurants*, which employs 664,100 people, or 20% (UK: 19%), *Banking, Finance, and Insurance* (491,400 people, or 15%; UK: 17%), and *Manufacturing* (349,700 people, or 11%; UK: 9%).
- In terms of occupation, approximately 1.4 million people (42%) in the North West are employed in high-skilled jobs[1], while 895,100 (27%) are employed in low-skilled jobs. Since the financial crisis the proportion of people in high-skilled jobs has risen while the proportion of people in low-skilled jobs has fallen. However, the North West remains below the UK average for high-skilled jobs and above the UK average for low-skilled jobs.
- More than 1.5 million residents (34%) in the North West aged 16 to 64 have a qualification at level 4 or above, while 425,500 people (10%) have no qualifications. The proportion of the population with a level 4+ qualification has risen since the financial crisis, but the gap between the North West and the UK average has widened over this time period. However, the North West has successfully narrowed the gap between the proportion of the population with no qualifications in North West and the UK average over this period.
- The nature of employment across the North West has changed post-recession, mirroring national trends. There is increasing flexibility emerging within the workforce with growing numbers of self-employed and part time workers.
- The industries within the North West which currently appear to be most vulnerable to potential changes in migration policy as a result of the UK's decision to leave the EU are:
  - Distribution, Hotels, and Restaurants (7%, or 46,400 workers);
  - Banking, Finance, and Insurance, (5%, or 22,900 workers);
  - Public Admin, Education, and Health (2%, or 22,600 workers);
  - Manufacturing (9%, or 12,900 workers); and
  - Agriculture, Forestry, and Fishing[2] (8%, or 2,100 workers)
- Anecdotal evidence suggests that employment data for *Agriculture, Forestry, and Fishing* suffers from a number of reporting issues due to the often seasonal and temporary nature of the work. This means that employment figures for the sector are potentially underreported, and the 2,100 figure should therefore be viewed as minimum estimate for the number of EU jobs. Similar reporting issues may also arise across other sectors such as hospitality and leisure.
- The impact of Brexit on the labour market is likely to vary within sectors, and therefore between LEP areas too, as a result of the differing industrial structures of LEP economies. In general, it would appear that low-skilled jobs are likely to be most vulnerable to potential changes in migration as a result of the UK leaving the EU, as it is migration from EU8 countries which appears to be most affected by the Referendum result, and the majority of EU8 workers appear to be employed in low-skilled jobs.

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[1] Defined as SOC2010 group 1-3: Managers, directors and senior officials; Professional occupations; and Associate professional & technical occupations

[2] Agriculture, Forestry, and Fishing comprises: Crop and animal production, hunting and related service activities; Forestry and logging; and Fishing and aquaculture. While these activities predominantly take place in rural areas, they are present – to varying degrees – across all LEPs across the North West.

North West labour market

2.1 The North West had just over 3.2 million residents in employment as of March 2017. This was equivalent to an employment rate of 71.8%, and although this remains below the national average of 74.0%, the employment rate in the North West has risen notably over the past five years, from a low of 66.0% in March 2012. Of the 3.2 million residents in employment, approximately 151,000 (5%) are EU nationals.

2.2 *Public Administration, Education, and Health* is the largest employer in the North West, employing just over 1 million people or 31% of those in work (UK: 30%). This is followed by *Distribution, Hotels, and Restaurants*, which employs 664,100 people, or 20% (UK: 19%), *Banking, Finance, and Insurance* (491,400 people, or 15%; UK: 17%), and *Manufacturing* (349,700 people, or 11%; UK: 9%).

2.3 In terms of occupation, approximately 1.4 million people (42%) in the North West are employed in high-skilled jobs,[3] while 895,100 (27%) are employed in low-skilled jobs.[4] However, while the proportion of people in high-skilled jobs has risen since the financial crisis, from 39% in December 2008, and the proportion of people in low-skilled jobs has fallen, from 28%, the North West remain below the UK average of 45% for high-skilled jobs and above the UK average of 25% for low-skilled jobs. Moreover, the median wage for the North West is £21,600, 6% lower than the UK average (£23,100).

2.4 More than 1.5 million residents (34%) in the North West aged 16 to 64 have a qualification at level 4 or above. However, while the proportion of the population with a level 4+ qualification rose by 8.7 percentage points between 2008 and 2016 in the North West, the UK average rose by 9.5 percentage points over the same time frame, to 38%. The gap between the North West and the UK average has therefore widened since the recession.

2.5 The North West has been more successful, however, at the lower end of the skills spectrum, with the proportion of residents with no qualifications falling to 425,500 (10%) between 2008 and 2016, a decline of 6.4 percentage points. This fall outpaced the UK average of 5.4 percentage points over the same period, successfully moving to closing the gap with the UK average, which stood at 8% in 2016.

2.6 The nature of employment across the North West has changed post-recession, mirroring national trends. There is increasing flexibility emerging within the workforce with growing numbers of self-employed and part time workers. Post-recession, full-time employment has increased by 2.5%[5] (currently standing at around 2.4 million[6]), whereas part-time employment has grown by 6.4% (to 795,500), self-employment by 18.9% (now at around 412,700), and flexible employment by 32.7% (currently around 185,900).[7]

LEP Employment Profiles

2.7 While the LEP economies share a number of commonalities (e.g. Manufacturing; Distribution, hotels, and restaurants; Banking, finance, and insurance; and Public admin, education, and health are all significant employers in each of the five LEPS), there are also a number of important differences between them making each LEP area distinct from the others.

2.8 These differences are important as the number and share of EU migrants differ significantly by industry. Key employment sectors for each LEP are highlighted in the table below.

[3] Defined: SOC2010 groups 1-3: Managers, directors, senior officials; Professionals; Associate professional & technical occupations
[4] Defined: SOC2010 groups 7-9: Sales, customer service occupations; Process, plant and machine operatives; Elementary occupations
[5] Annual Population Survey, March 2008 to June 2015
[6] Annual Population Survey January to December 2014
[7] Flexible working defined those employed in non-permanent employment, as defined by ONS

Figure 1: North West LEP Employment Profiles, 2017

		Cheshire & Warrington	Cumbria	Greater Manchester	Lancashire	Liverpool City Region
A: Agriculture and fishing	Number	4,700	10,000	2,900	7,500	1,700
	Share	1.1%	4.2%	0.2%	1.1%	0.3%
	LQ	1.0	3.8	0.2	1.0	0.2
B,D,E: Energy and water	Number	7,500	14,100	15,600	16,900	9,800
	Share	1.7%	6.0%	1.2%	2.4%	1.4%
	LQ	1.0	3.5	0.7	1.4	0.9
C: Manufacturing	Number	52,700	32,200	116,500	90,200	58,100
	Share	12.0%	13.6%	9.1%	13.0%	8.6%
	LQ	1.3	1.5	1.0	1.4	0.9
F: Construction	Number	29,600	17,500	85,800	52,300	42,300
	Share	6.7%	7.4%	6.7%	7.5%	6.3%
	LQ	0.9	1.0	0.9	1.1	0.9
G,I: Distribution, hotels and restaurants	Number	82,600	52,400	258,000	136,100	135,000
	Share	18.7%	22.1%	20.1%	19.6%	20.0%
	LQ	1.0	1.2	1.1	1.1	1.1
H,J: Transport and communications	Number	38,500	11,500	124,400	44,800	56,300
	Share	8.7%	4.9%	9.7%	6.4%	8.3%
	LQ	1.0	0.5	1.1	0.7	0.9
K-N: Banking, finance and insurance	Number	73,300	24,200	211,000	82,300	100,600
	Share	16.6%	10.2%	16.4%	11.8%	14.9%
	LQ	1.0	0.6	1.0	0.7	0.9
O-Q: Public admin. education and health	Number	123,300	58,500	391,500	222,200	233,500
	Share	28.0%	24.7%	30.5%	32.0%	34.5%
	LQ	0.9	0.8	1.0	1.1	1.2
R-U: Other services	Number	26,700	15,800	68,400	38,700	35,300
	Share	6.1%	6.7%	5.3%	5.6%	5.2%
	LQ	1.0	1.1	0.9	0.9	0.9

Source: ONS Annual Population Survey, Apr 2016-Mar 2017

EU Migrant employment by industry

2.9 Regional level data from the Migration Observatory at Oxford University (2015) reveals that across the North West, the industry with the highest proportion of EU workers is *Manufacturing*, with 9% of the total workforce born in the EU. This is closely followed by *Agriculture, Forestry, and Fishing*[8], which has 8% of its workforce born in the EU; and *Distribution, Hotels, and Restaurants*, with 7%.[9]

[8] Agriculture, Forestry, and Fishing comprises: Crop and animal production, hunting and related service activities; Forestry and logging; and Fishing and aquaculture. While these activities predominantly take place in rural areas, they are present – to varying degrees – across all LEPs across the North West

[9] Based on Labour Force Survey (all quarters). Sample is based on individuals living in the relevant geography, in the labour force (aged 16-65), who are employed. Statistics use weights

Figure 2: Employment by Country of Birth, North West, 2015

SIC code	Industry	UK	EU	Non-EU
A	Agriculture, Forestry, and Fishing	89%	8%	3%
B,D,E	Energy and Water	91%	5%	4%
C	Manufacturing	87%	9%	4%
F	Construction	96%	3%	2%
G,I	Distribution, Hotels, and Restaurants	86%	7%	7%
H,J	Transport and Communication	87%	5%	8%
K,L,M,N	Banking and Finance	90%	5%	5%
O,P,Q	Public Admin, Education, and Health	91%	2%	7%
R,S,T,U	Other Services	91%	3%	7%
Total	Average for all economy	89%	5%	6%

Source: The Migration Observatory, Oxford University

2.10 Applying these proportions to the current size of the workforce in the North West[10] suggests:

- 46,400 jobs in Distribution, Hotels, and Restaurants are held by EU nationals;
- 30,900 jobs in Manufacturing;
- 22,900 jobs in Banking, Finance, and Insurance; and
- 22,600 jobs in Public Admin, Education, and Health.

2.11 Despite having a high proportion of EU workers, in absolute terms the number of EU workers employed in *Agriculture, Forestry, and Fishing* (2,100) are relatively low. That said, anecdotal evidence suggests that employment data for *Agriculture, Forestry, and Fishing* suffers from a number of reporting issues due to the often seasonal and temporary nature of the work. This means that employment figures for the sector are potentially underreported, and the 2,100 figure should therefore be viewed as minimum estimate for the number of EU jobs. It should further be noted that similar reporting issues may also arise across other sectors such as hospitality and leisure (which would fall under *Distribution, Hotels, and Restaurants* in this report).

2.12 Within the North West, comparable data is available for Greater Manchester, Liverpool City Region (Merseyside), and the Rest of the North West (see Annex A). The main findings are summarised below.

Greater Manchester

2.13 The indutries with the highest proportion of EU workers in Greater Manchester are *Agriculture, Forestry, and Fishing* (14%), *Manufacturing* (11%) and *Distribution, Hotels, and Restaurants* (10%), which largely mirrors the North West, albeit with a slightly greater reliance on workers from the EU.

2.14 In terms of job numbers, there are an estimated 25,400 jobs in *Distribution, Hotels, and Restaurants* held by EU nationals in Greater Manchester, 14,000 jobs in *Banking, Finance, and Insurance*, 12,900 jobs in *Manufacturing*, and 11,500 jobs in *Public Admin, Education, and Health*.

Liverpool City Region (Merseyside)

2.15 Merseyside, however, has a very different industry profile of employees by nationality. Migration Observatory data reveals that the *Agriculture, Forestry, and Fishing* industry in Merseyside has a significant reliance on migrant workers, with 56% of workers in the industry born in the EU. Meanwhile, 9% of the total workforce within the *Energy and Water* industry, and 5% in the *Construction* were born in the EU, while only 4% of the *Manufacturing* and *Distribution, Hotels, and Restaurants* workforces are born in the EU.

[10] ONS Annual Population Survey, April 2016-March 2017

2.16 In terms of job numbers, there are an estimated 5,200 jobs in *Distribution, Hotels, and Restaurants* held by EU nationals in Merseyside, 3,100 jobs in *Banking, Finance, and Insurance*, 2,300 jobs in *Public Admin, Education, and Health*, 2,200 jobs in *Manufacturing*, and 2,100 jobs in *Construction*. Despite having a high proportion of EU workers, in absolute terms the number of EU workers employed in *Agriculture, Forestry, and Fishing* (600) and *Energy and Water* (900) are relatively low.

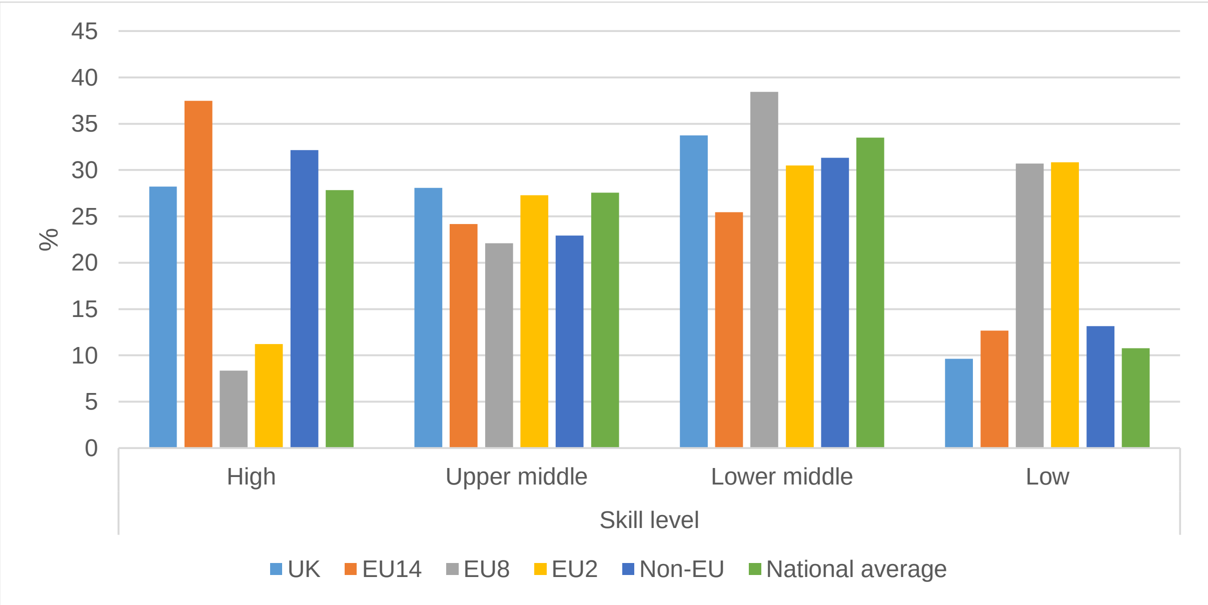
Other parts of the North West

2.17 Outside of Greater Manchester and The Liverpool City Region, *Manufacturing* (10%) and *Distribution, Hotels, and Restaurants* (6%) both feature highly among industries with significant proportion of EU-born workers, as does *Transport and Communication* (7%). In terms of job numbers, there are an estimated 17,600 jobs in *Manufacturing* held by EU nationals outside of Greater Manchester and Merseyside, 15,300 jobs in *Distribution, Hotels, and Restaurants*, and 10,700 jobs in *Public Admin, Education, and Health*. There are an estimated 6,400 EU-born workers employed in *Transport and Communication*.

EU Migrant employment by skills

2.18 While the number of migrants employed within various industries clearly differs across different regions, it could reasonably be assumed that the *types* of jobs these migrant workers do within these industries does not differ significantly. A breakdown of workers by nationality group and skill level of occupation is only available at the national level, but latest data from ONS suggest that skill level varies depending on where in the EU migrant workers are from.

Figure 3: Distribution of workers by nationality and skill level of occupation, 2016



Source: ONS

2.19 ONS data for 2016 show that workers in lower skill jobs were more likely to come from the EU8: Eastern European countries that acceded to the EU in 2004 (31%); and EU2: Bulgaria and Romania, who joined in 2007 (31%) - compared to those born in the UK (10%); EU14: Countries which were members of the EU before 2004 excluding the UK (13%); and Workers born outside the EU (13%).[11,12] The same data highlights that workers in higher skills jobs were more likely to come from EU14 countries (37%); and those born outside the EU (32%) - compared to those born in the UK (28%); EU2 coutnries (11%); and EU8 countries (8%).

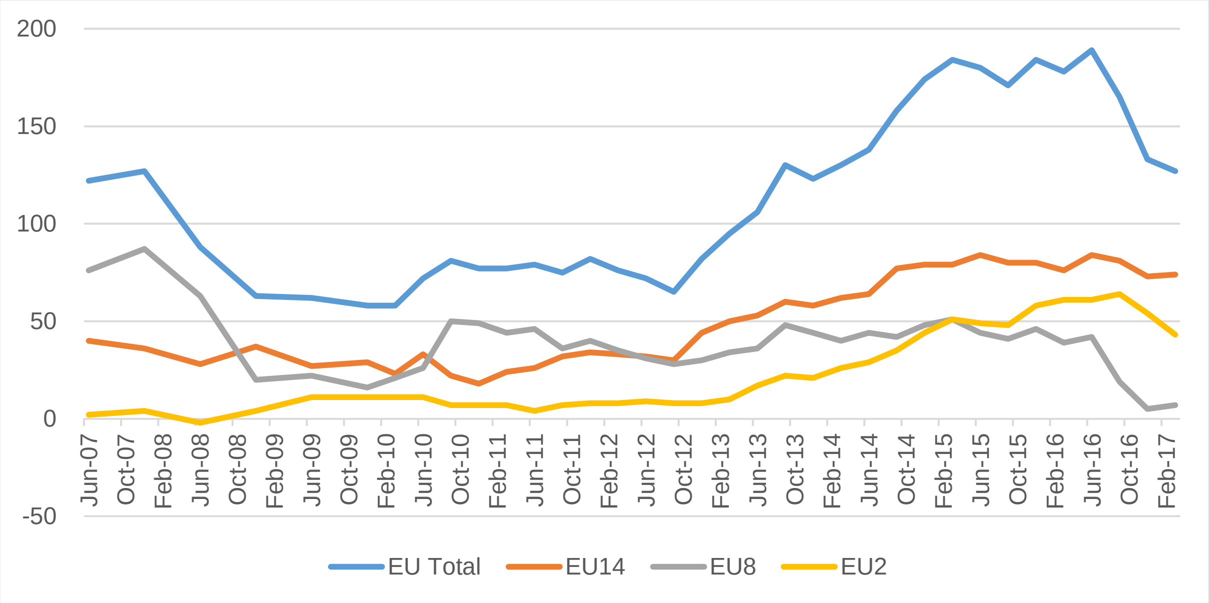
2.20 This distinction among EU workers is an important one to make since while the recent falls in net migration to the UK has been driven by a reversal in net migration from the EU, within the EU, the decline in net migration has been most prominent among the EU8 countries. Net migration from the EU fell by 33% between June 2016 and March 2017, while within this figure,

[11] The EU8 countries are Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia, and Slovenia

[12] The EU14 countries are Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain and Sweden

net migration from EU8 countries has fallen by 83%, from 42,000 in June 2016 to just 7,000 in March 2016. This suggests that in general, low-skilled jobs are likely to be most vulnerable to potential changes in migration as a result of the UK leaving the EU, as it is migration from EU8 countries which appears to be most affected by the Referendum result, and the majority of EU8 workers appear to be employed in low-skilled jobs. Further, although great uncertainty remains surrounding the government's post-Brexit immigration policy, based on current policy towards non-EU migrants, it might be reasonable to assume that low-skilled jobs would be most vulnerable should visa restrictions be introduced.

Figure 4: Net EU migration to the UK, 2007 to 2017

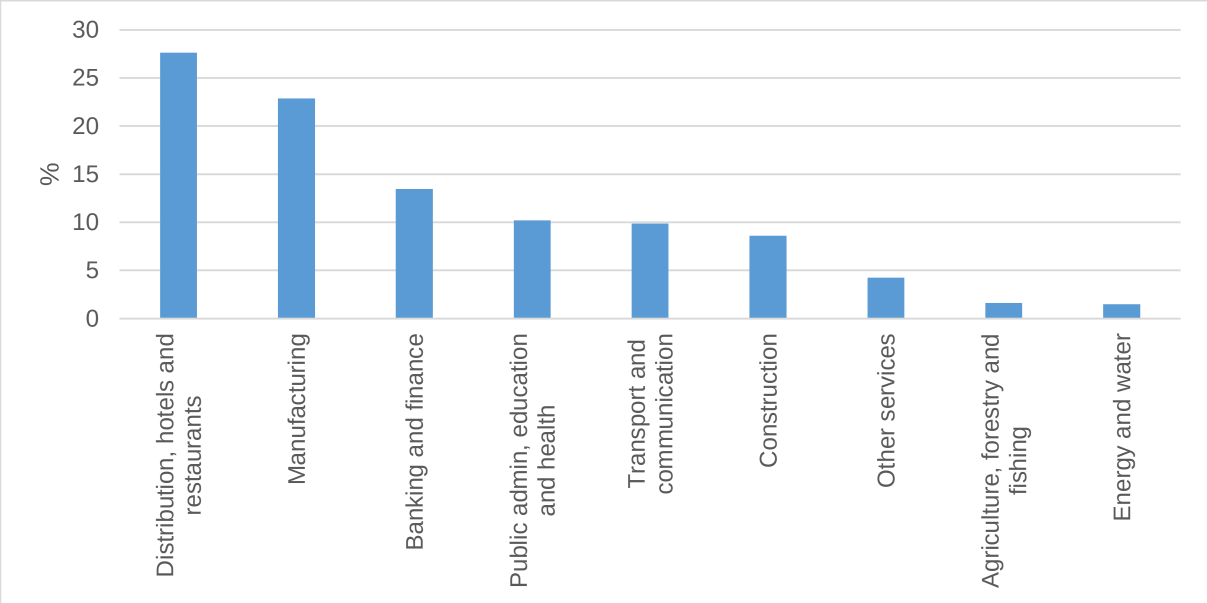


Source: ONS

2.21 Similarly, those sectors with an overrepresentation of EU8 workers appear to be more vulnerable to potential changes in migration. According to ONS, distribution, hotels, and restaurants is the most common employer for EU8 migrants, with 28% of EU8 workers employed in this industry. Manufacturing is the second most common employer, employing 23% of the EU8 workforce. As a result, EU8 migrants account for an estimated 208,000 (4% of total) distribution, hotels, and restaurants jobs; and 186,500 (6% of total) manufacturing jobs in the UK. However, this figure rises to 24% for the manufacturing of food products.[13]

[13] https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/internationalmigration/articles/livingabroad/migrationbetweenbritainandtheeu8#what-are-eu8-citizens-living-in-the-uk-doing

Figure 5: Proportion of working EU8 citizens by industry, 2013 to 2015 pooled data



Source: ONS

2.22 Given that the impact of Brexit on the labour market is likely to vary within and between sectors, it is likely to vary therefore within and between LEP areas too, as a result of the differing industrial structures of LEP economies.

2.23 Generally, LEP areas with a reliance on Distribution, hotels, and restaurants and Manufacturing appear to face greater exposure to any potential changes in immigration policy resulting from the UK leaving the EU. However, any exposure is likely to vary within these sectors, with sub-sectors with a greater reliance on low-skilled workers (e.g. manufacture of basic metals, paper products, wood products, etc.) and EU8 workers (e.g. manufacture of food products, for which EU8 citizens make up 24% of the workforce nationwide) appearing to be more vulnerable.

2.24 Annex B contains details of each LEP economy broken down by employment shares (at the 2-digit SIC code level) with accompanying location quotients quotient – a measure of employment concentration within the local economy compared with the national average. This highlights the following industries which are of particular importance across the North West LEPs:

Figure 6: Key employment industries within North West LEPs

LEP	Industry	LQ
Cheshire & Warrington	Manufacture of chemicals and chemical products	2.3
	Manufacture of basic pharmaceutical products and pharmaceutical preparations	6.0
	Manufacture of motor vehicles, trailers and semi-trailers	3.2
Cumbria	Accommodation	4.2
	Manufacture of other transport equipment	6.3
	Manufacture of basic metals	21.0
	Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials	3.0
	Manufacture of paper and paper products	3.5
	Manufacture of food products	2.1
Greater Manchester	Manufacture of textiles	2.5
	Programming and broadcasting activities	3.0
Lancashire	Civil engineering	2.9
	Manufacture of other transport equipment	5.5
	Manufacture of furniture	2.7
	Manufacture of paper and paper products	2.5
	Manufacture of textiles	2.5
Liverpool City Region	Manufacture of chemicals and chemical products	2.3
	Manufacture of basic pharmaceutical products and pharmaceutical preparations	4.0
	Manufacture of motor vehicles, trailers and semi-trailers	2.2

3 Exploring potential implications of Brexit on labour market and population

Key messages

- The North West was home to a population of approximately 7.1 million in 2016. Of this, 6.6 million, or 94%, were British, while 256,000 (4%) were EU nationals and 203,000 (3%) were non-EU nationals. This was smaller than the UK average of 6% and 4%, respectively, for EU and non-EU nationals.
- Although in general the North West has a lower proportion of EU migrants than the UK as a whole, it does in fact have a higher share of EU8 migrants, as a proportion of total EU nationals, which latest ONS data have shown to be driving recent falls in net migration. That said, EU8 migrants still make up only 2% of the total North West population.
- Given the uncertainty in the Brexit negotiations it is difficult to assess the impact of the UK leaving the EU on migration. The analysis covers a number of scenarios using POPGROUP for Greater Manchester (GM) to illustrate the potential impact of the decision. Note that GM was selected as a case study due to the limited access to POPGROUP data, but the findings are likely to be indicative of potential dynamics in other areas.
- The scale of the impact of any potential changes will vary dependent on how restrictive conditions on movement of people are and evidently the demographic make-up of any local authority will determine how big this impact will be at the local level. The research suggests that areas which have a higher proportion of EU nationals performing low-skills jobs likely to be affected to a greater extent.
- The impacts of these scenarios on population in Greater Manchester range from a decline of approximately 59,800 people (2%) by 2039 under a scenario where post-referendum trends persist (i.e. no additional fall in migration as a result of changes in migration policy) to a decline of 182,600 people (6%) under a scenario where visas are introduced for EU workers and only high-skilled workers are eligible to apply for visas and restrictive conditions on granting visas is assumed. Meanwhile, the impacts of these scenarios on the labour force range from a decline of approximately 35,200 people (2%) by 2039 to a decline of 106,900 people (7%). The impact of any changes in migration policy are likely to vary widely at the local authority level.
- Scenario testing suggests that the driving factor of any population changes as a result of tighter immigration controls for EU nationals under would be how restrictive any prospective visa policy is (i.e. what skill levels visa applications are open to) rather than the rate of rejection of these applications. However, there are wider implications of the UK's decision to the leave the EU beyond the labour market and population. These are explored in more detail in Section 4.

Population trends

3.1 Non-UK nationals currently living and/or working in the North West represent an important component of the local and regional economies. Not only do they represent key employees in terms of skills or sectors in which they work, but they are also consumers, generating demand for local businesses to fulfil.

3.2 According to ONS data, the North West was home to a population of approximately 7.1 million in 2016. Of this, 6.6 million, or 94%, were British, while 256,000 (4%) were EU nationals and 203,000 (3%) were non-EU nationals. This was smaller than the UK average of 6% and 4%, respectively, for EU and non-EU nationals. Within the North West, Greater Manchester has the highest proportion of residents born in the EU at 5%, but this is still below the national average.

3.3 Greater Manchester also has the highest proportion of residents born outside of the EU in the North West, also at 5%, which is slightly higher than the UK average. This makes Greater Manchester the only area within the North West with a higher proportion of residents from outside the EU than the UK average. At the other end of the scale, only 2% of Cumbria's population are EU nationals, while only 1% are from outside the EU.

Figure 7: Population by country of birth, 2011

District	UK	EU	Non-EU
Cheshire & Warrington	94%	4%	2%
Cumbria	98%	2%	1%
Greater Manchester	91%	5%	5%
Lancashire	95%	3%	2%
Liverpool City Region	95%	3%	2%
North West	**94%**	**4%**	**3%**
UK	**91%**	**6%**	**4%**

Source: 2011 Census; Note: Data my not sum due to rounding

3.4 Although in general the North West has a lower proportion of EU migrants than the UK as a whole, it does have a higher share of EU8 migrants as a proportion of total EU nationals, which the latest ONS data have shown to be driving recent falls in net migration.

3.5 Lancashire has the highest share of EU8 migrants with 65% of EU nationals from the EU8 group of countries, followed by Cumbria (63%) and Cheshire & Warrington (62%). However, as a proportion of the total population, only 2% of Lancashire residents are EU8 nationals, in line with the UK average, while 1% of Cumbria residents are EU8 nationals and 3% of Cheshire & Warrington residents are EU8 nationals. Within the North West, only Cheshire & Warrington has a higher share of EU8 nationals than the UK average. Meanwhile, Greater Manchester has the lowest share of EU nationals, as a proportion of total EU nationals.

Figure 8: Breakdown of EU population by nationality, 2016

District	Total Population 000s	EU Total 000s	EU8 Total 000s	EU8 % of EU Total	EU8 % of Total Population
Cheshire & Warrington	908	37	23	62%	3%
Cumbria	487	8	5	63%	1%
Greater Manchester	2,745	132	59	45%	2%
Lancashire	1,456	37	24	65%	2%
Liverpool City Region	1,507	42	23	55%	2%
North West	**7,103**	**256**	**134**	**52%**	**2%**
UK	**64,707**	**3,572**	**1,569**	**44%**	**2%**

Source: ONS

3.6 The impact on migration will depend on the relationship between the UK and the EU after Brexit; at present, this is highly uncertain. Although tentative early steps have been made towards agreeing upon the terms of the UK's exit from the EU, little detail is available as to what post-Brexit arrangements are likely to be in place making it difficult to assess what the impact might be for NW. That said, whatever arrangements are agreed upon, it can be assumed that migration will fall, and that this will have an impact on population, which in turn will likely have an impact on the labour market.

Scenarios of changing population

3.7 To further explore the potential impact that the decision to leave the EU may have on the migrant workforce operating within the NW, the research team has developed a series of indicative scenarios. These scenarios seek to assess the potential impact that the introduction of work visas may have on migrant workers. It is important to note that this scenario work does not seek in any way to replace existing national population projections produced by the Office of National Statistics, nor local population projections, rather it aims to provide further intelligence to inform labour force planning within local areas. The research looks at both changes to rejection rates and restriction levels around visas and suggests that the impact of any changes is more dependent on how restrictive conditions on movement of people are, i.e. what skill levels visa applications are open to, rather than the level of rejection rates of applications.

3.8 Due to data restrictions, the scenarios in this report have only been run for Greater Manchester. The full methodology has however been provided to LEPs to undertake this analysis. Within the context of Greater Manchester it is important to note that the population forecasts within the Greater Manchester Forecasting Model (GMFM), developed by Oxford Economics still represent the central scenario for Greater Manchester in terms of population change over the next twenty years. The scenario outcomes are however valuable and will inform, alongside a range of other datasets, the next iteration of the GMFM due in 2018.

3.9 POPGROUP – a suite of demographic software has been used for this analysis to generate population, household, labour force and other derived projections for specified geographical areas and/or population groups.

3.10 The scenarios have been selected based on the research team’s assessment of what migration policies might logically be introduced post-Brexit, based on reports on current negotiations with the EU and available data. These, however, represent only a few potential scenarios for illustrative purposes, with many other scenarios possible at this early stage of negotiations.

3.11 Greater Manchester was selected as a case study due to the limited access to POPGROUP data, but the findings are likely to be indicative of potential dynamics in other areas. The scale of the impact of any potential changes will vary dependent on how restrictive any conditions on movement of people are, while the demographic make-up of any local authority will determine how big this impact will be at the local level, with areas which have a higher proportion of EU nationals performing low-skills jobs likely to be affected to a greater extent.

3.12 The scenarios covered include the following (additional details contained in Annex C):

- **Scenario 1: Recent trends, or Post-referendum Baseline** (change in migration not driven by policy other than the decision to leave the EU)
- **Scenario 2: EU migration is subject to visa restrictions**
  - **Scenario 2a: Less restrictive visa conditions, lower rejection rate**
    - Only high- and upper medium-skilled workers are eligible, and therefore only high- and upper medium-skilled workers apply for visas.
    - A rejection rate based on historic data for non-EU visa applications, calculated from Home Office immigration statistics[14], is applied.
  - **Scenario 2b: More restrictive visa conditions, lower rejection rate**
    - Only high-skilled workers are eligible, and therefore only high-skilled workers apply for visas.
    - A rejection rate based on historic data for non-EU visa applications, calculated from Home Office immigration statistics, is applied.[15]
  - **Scenario 2c: Less restrictive visa conditions, higher rejection rate**
    - Only high- and upper medium-skilled workers are eligible, and therefore only high- and upper medium-skilled workers apply for visas.
    - A rejection rate based on historic data for Accession Worker Card applications from Bulgarian and Romanian nationals, calculated from Home Office immigration statistics, is applied.[16]

[14] https://www.gov.uk/government/publications/immigration-statistics-april-to-ne-2017/list-of-tables#visas
[15] https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/internationalmigration/articles/livingabroad/migrationbetweenbritainandtheeu8#what-are-eu8-citizens-living-in-the-uk-doing
[16] https://www.gov.uk/government/publications/immigration-statistics-april-to-june-2017/list-of-tables#european-economic-area-eea

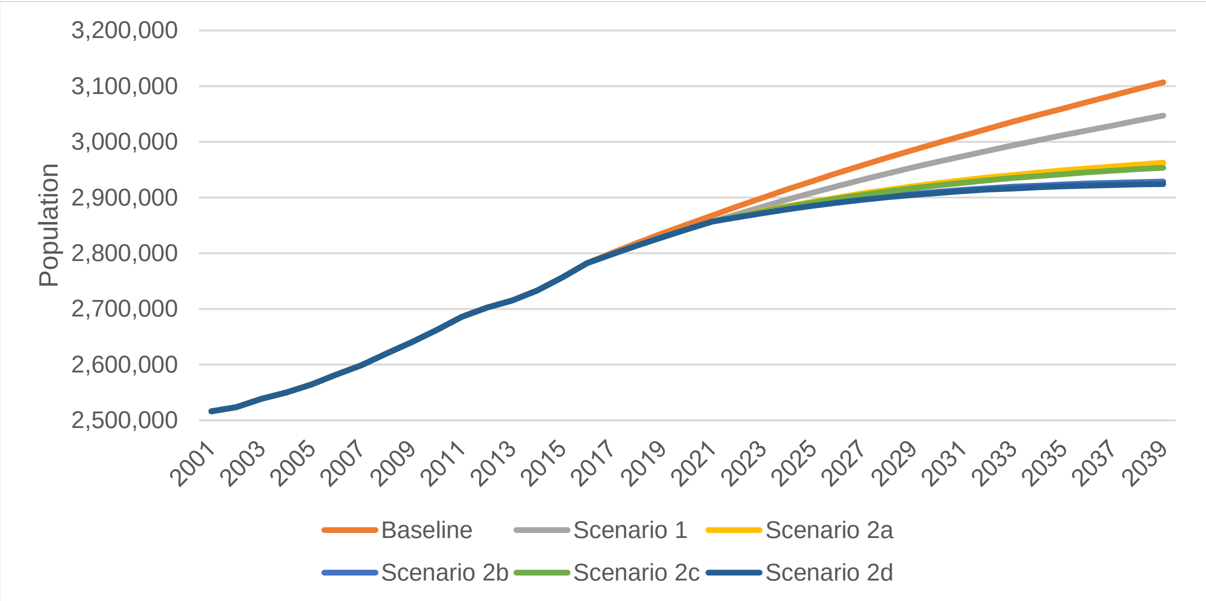
- **Scenario 2d: More restrictive visa conditions, higher rejection rate**
    - Only high-skilled workers are eligible, and therefore only high-skilled workers apply for visas.
    - A rejection rate based on historic data for Accession Worker Card applications from Bulgarian and Romanian nationals, calculated from Home Office immigration statistics, is applied.[17]

Case Study: Greater Manchester – Impacts on population

3.13 The impacts of these indicative scenarios on population range from a decline of approximately 59,800 people (2%) by 2039 under Scenario 1 to a decline of 182,600 people (6%) under Scenario 2d. Note that these scenarios currently assume that no interventions are taken to address the shortages and therefore is only indicative for labour force planning.

3.14 Scenarios 2a and 2c and scenarios 2b and 2d produce similar results, suggesting that the driving factor of any population changes as a result of tighter immigration controls for EU nationals under would be how restrictive any prospective visa policy is (i.e. what skill levels visa applications are open to) rather than the rate of rejection of these applications.

Figure 9: Scenario testing: population forecasts, GM, 2001 to 2039

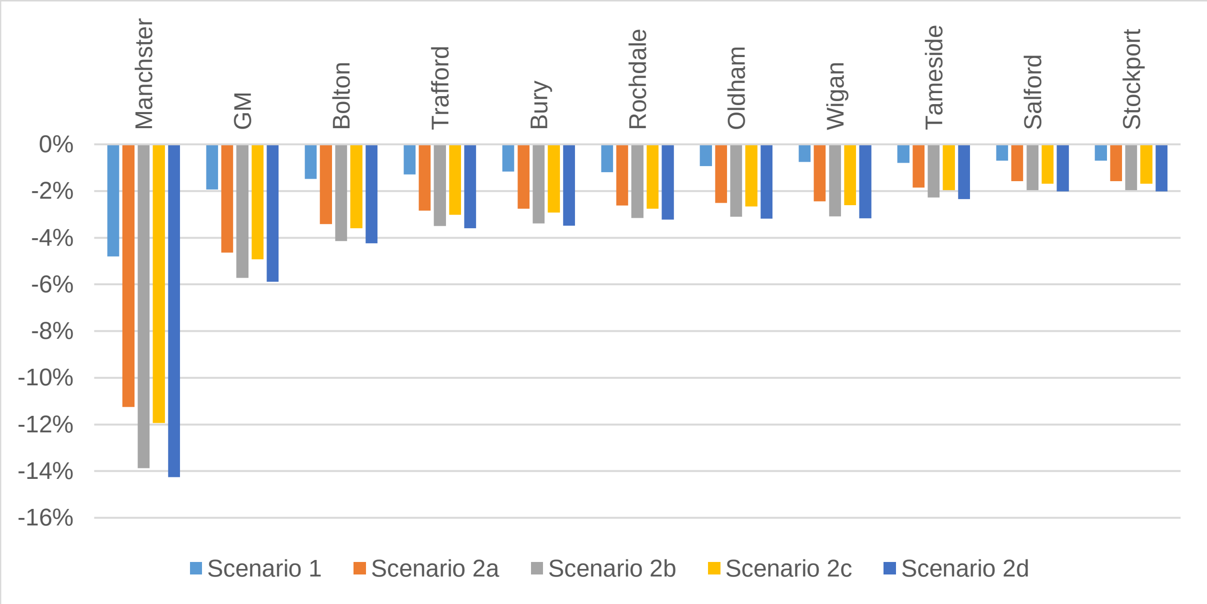


Source: GMCA analysis using POPGROUP

3.15 At the local authority level, Manchester would likely be the most affected by changes in migration policy, with a projected population decline of between 5% (under Scenario 1) and 14% (under Scenario 2d) by 2039, far in excess of the GM average of 2% and 6%, respectively, and the local authority projected to be second most impacted by changes in migration policy – Bolton (1% and 4%, respectively). This is a result of both the high proportion and absolute number of EU migrants in Manchester.

[17] ibid

Figure 10: Scenario testing: Population forecasts, Local Authorities in GM



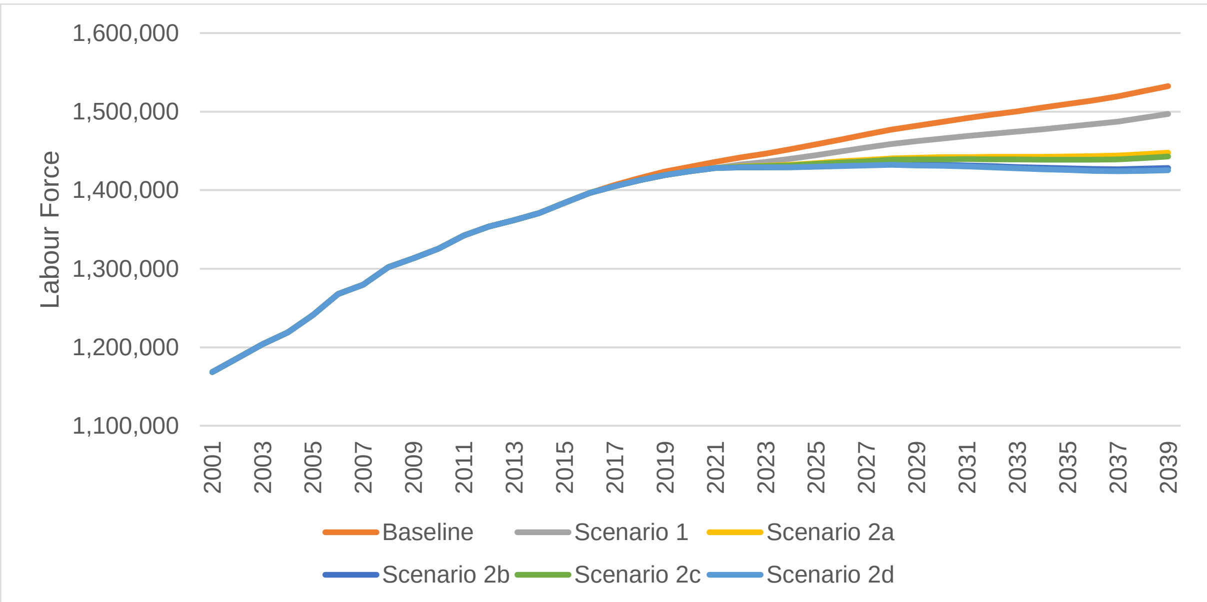
Source: GMCA analysis using POPGROUP

Case Study: Greater Manchester – Impacts on the labour force

3.16 The impacts of these scenarios on the labour force range from a decline of approximately 35,200 people (2%) by 2039 under Scenario 1 to a decline of 106,900 people (7%) under Scenario 2d. Once again, scenarios 2a and 2c and scenarios 2b and 2d produce similar results, suggesting that the driving factor of any population changes as a result of tighter immigration controls for EU nationals under would be how restrictive the visa policy is (i.e. what skill levels visa applications are open to) rather than the rate of rejection of these applications.

3.17 The impacts on the labour force are relatively larger than on the population (a 7% decline in the labour force by 2039 compared to a 6% decline in the population under scenario 2d) due to the fact that the majority of EU migrants are expected to be of working age, and thus their departure magnifies the impact of an ageing population. This is further emphasized by the generational effect of children of EU migrants no longer coming to the UK and subsequently entering the labour force once they reach the age of 16.

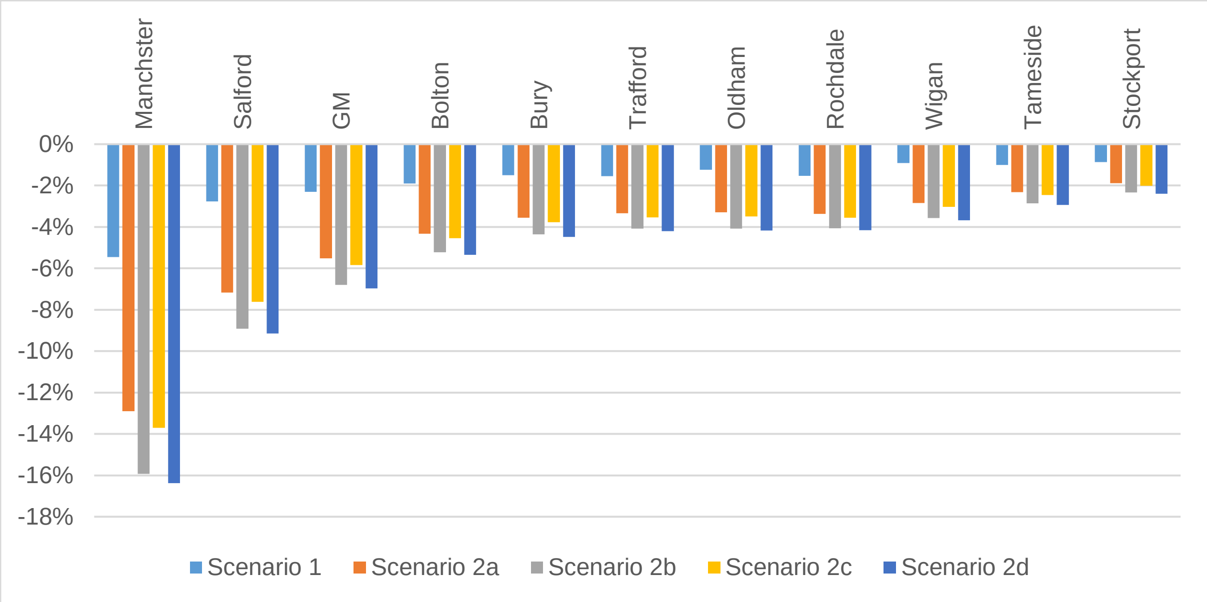
Figure 11: Scenario Testing: Labour Market Forecasts, GM



Source: GMCA analysis using POPGROUP

3.18 At the local authority level, Manchester and Salford would likely be the most affected by changes in migration policy, with a projected population decline for Manchester of between 5% (under Scenario 1) and 16% (under Scenario 2d) by 2039, and 3% and 9%, respectively, for Salford. This are both above the GM average of 2% and 7%, respectively, and the local authority projected to be third most impacted by changes in migration policy – Bolton (1% and 5%, respectively).

Figure 12: Scenario Testing: Labour Market Forecasts, Local Authorities in GM



Source: GMCA analysis using POPGROUP

4 Wider Context

Key messages

- The UK's decision to leave the EU has come at a time when the UK labour market is undergoing significant change: while the UK has had a positive record on job quantity in recent times, it has a poor record on job quality. As such, there is now an increasing focus on ensuring 'good' work for all, as underscored by the Taylor Review[18], which – in conjunction with the UK's decision to leave the EU – has thrown the spotlight back onto ensuring local residents are equipped to take advantage of changing labour market opportunities.
- Employment growth has rebounded strongly in the UK since the 2008 financial crisis, but this has been accompanied by weak wage growth, reflecting stagnant productivity growth.
- There has been a significant increase in 'atypical' work post-2008, which has contributed strongly to rising employment levels, and provided people with greater flexibility, but has also heralded a period of increased insecurity.
- The UK is faced with an increasingly ageing population, and longer life expectancy necessitates longer working lives in order for individuals to be able to afford retirement. Employers will be expected to respond to this demographic shift by making work more attractive and feasible for older workers.
- These changes have all taken place against a backdrop of rapidly changing technology; while this increase in automation is expected to boost productivity, it also carries the threat of job losses.
- There is some evidence that these medium-term trends appear to be changing, with suggestions that the labour market is now beginning to tighten.
- Pay has grown strongly at low-paid levels, largely driven by policy initiatives such as the introduction of the National Living Wage (NLW) and automatic pension enrolment, which has seen an increase in the relative cost of low-wage labour.
- This rise in the cost of low-paid labour is happening at a time when the availability of labour appears to be showing signs of contracting, as net migration falls in the wake of the UK's decision to leave the EU.
- How firms react to these ongoing changes is likely to play an important role in future labour market developments. Low wage growth has thus far helped to temper the rise of automation, but if wages start to increase, this could potentially herald a renewed intensification of automation.
- That said, technological changes will not impact all sectors equally, and actually have the potential to create jobs. Moreover, firms may opt to invest in training rather than technology. This decision will be dependent on how cost effective it is for firms to invest in training versus employing new technologies, which will be determined by how easily certain jobs can be automated.
- While it is uncertain to what degree the UK's decision to leave the EU will have on migration levels, it can be assumed that migration will fall, and that this will have an impact on population, which in turn will likely have an impact on the wider economy. This may be through a number of different channels, and may be positive or negative. Analysis of the wider impacts of reduced migration beyond those on the labour market is, however, beyond the scope of this paper.

[18] https://www.gov.uk/government/publications/good-work-the-taylor-review-of-modern-working-practices

Labour Market: Medium-term trends

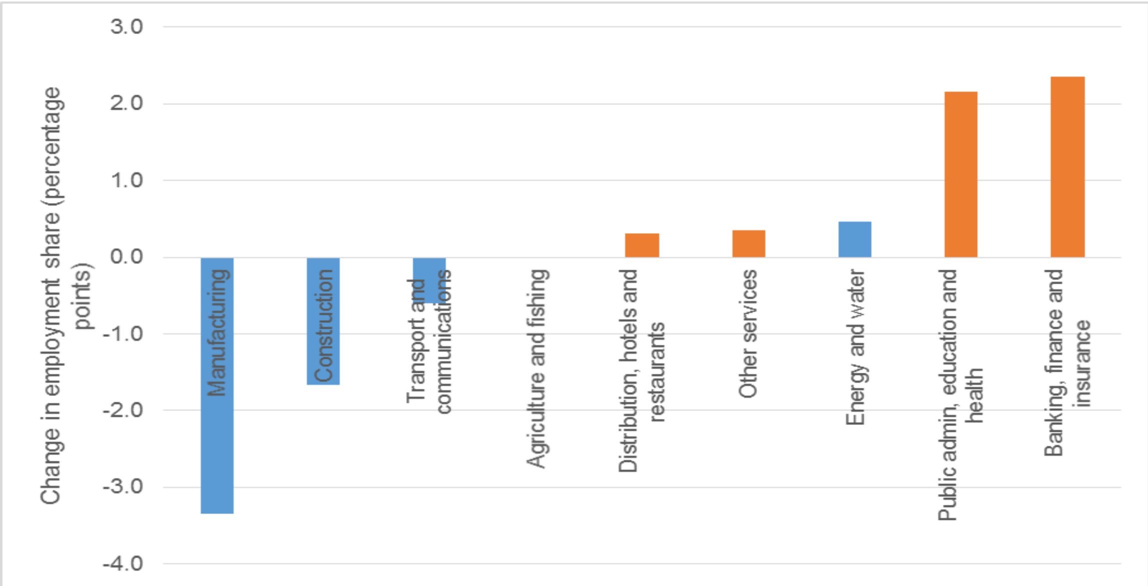
4.1 The UK's decision to leave the EU has come at a time when the UK labour market is undergoing significant change: while the UK has had a positive record on job quantity in recent times, it has a poor record on job quality.

4.2 The UK employment rate (the proportion of people aged from 16 to 64 in work) has risen from a post-financial crisis low of 70.1% in Jul-Sep 2011 to 75.3% in May-Jul 2017 – the highest level since comparable records began in 1971. However, strong growth in employment has been accompanied by weak growth in wages, reflecting poor productivity growth. Indeed, productivity in the UK fell back to below the level it was at in 2007 in the first quarter of 2017, confirming a "lost decade" of zero productivity growth[19]. Part of this productivity story has been the high employment growth in low-productivity sectors relative to high-productivity industries. The *Low Pay & Productivity in Greater Manchester* report[20], published by New Economy in August 2016, defined low-productivity industries as those with GVA per job below £30,000, identifying the following as low-productivity industries:

- Administrative and support services (part of the *Banking, finance, insurance* sector);
- Human health and social work (part of the *Public Admin, education, and health* sector);
- Arts, entertainment and recreation (part of the *Other services* sector); and
- Accommodation and food services (part of the *Distribution, hotels, restaurants* sector).

4.3 These sectors are highlighted in orange in Figure 2, which shows that since the financial crisis, low-productivity industries have seen their employment share increase, while the employment shares of high- and medium-productivity sectors have broadly declined.

Figure 13: Post-financial crisis change in employment by industry, North West, 2008 to 2017

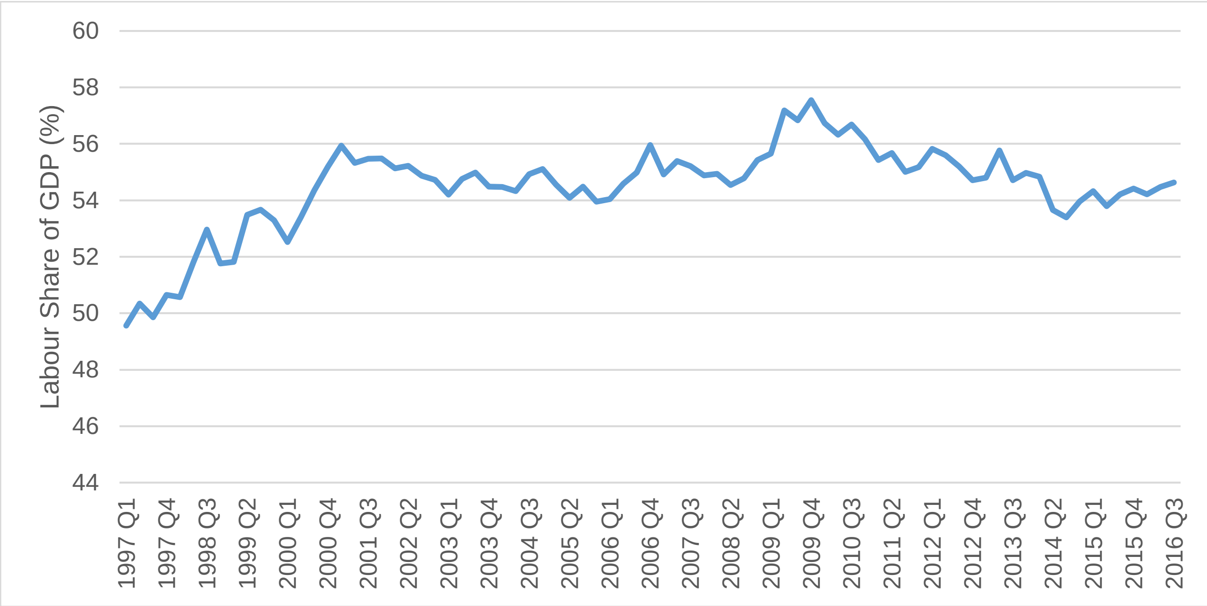


Source: ONS

4.4 In addition to the rapid recovery in employment and stagnant productivity and wage growth, there has been a significant increase in 'atypical' work post-2008, with a notable rise in agency workers, self-employed, and workers on zero-hours contracts (ZHCs). This rise in atypical work has contributed strongly to rising employment levels in the UK, and provided people with greater flexibility, but has also heralded a period of increased insecurity. These changes have all taken place against a backdrop of rapidly changing technology, with increasing automation being facilitated by advances in robotics and artificial intelligence. While this increase in automation is expected to boost productivity, it also carries the threat of job losses as labour is replaced by capital. As Figure 3 highlights, since peaking at 57.6% in Q409, the labour share of GDP has gradually been trending downwards.

[19] https://www.ft.com/content/3e72f20e-6163-11e7-91a7-502f7ee26895
[20] http://www.neweconomymanchester.com/media/1703/low-pay-and-productivity-in-greater-manchester-main-report.pdf

Figure 14: UK Labour share of GDP



Source: ONS

Labour Market: Short-Term Trends

4.5 There is some evidence that these medium-term trends appear to be changing, with suggestions that the labour market is now beginning to tighten.

4.6 Although the Resolution Foundation – an independent think tank conducting analytical research on living standards in the UK – suggest that there is no sign of an end to the UK's overall pay squeeze, it does provide evidence that pay has grown strongly at low-paid levels (see Figure 4)

4.7 This has largely been driven by policy initiatives such as the introduction of the National Living Wage (NLW) and automatic pension enrolment, which has seen an increase in the relative cost of low-wage labour. This rise in the cost of low-paid labour is happening at a time when the availability of labour appears to be showing signs of contracting, as net migration falls.

Figure 15: Increase in real gross weekly pay (CPIH adjusted), 2015-16

Source: Resolution Foundation

Anticipated Trends

4.8 While it is far too early to draw any firm conclusions from any emerging trends, and it is likely that the full impact of the Brexit vote on immigration will not be felt for many years, further reductions in net migration could reasonably be expected, even ahead of any major migration policy changes. If the wider European economy continues to perform strongly, the pound remains relatively weak, and uncertainty persists about EU migrants' long-term ability to stay in the UK, this could encourage more migrants to return home. This will coincide with rising costs at the bottom end of the pay spectrum as government policies such as the NLW, automatic pension enrolment, and the apprenticeship levy shape the landscape of low-paid work.

4.9 The Resolution Foundation has suggested that the trend towards atypical or insecure work appears to have reached a peak, noting that the number of people on ZHCs has remained flat since early 2016, while the number of agency workers has fallen slightly, and the share of all workers accounted for by self-employment has also started to fall[21]. This too appears to be a result of the rising costs of low-paid labour, with the Resolution Foundation reporting[22] that firms are lowering their use of ZHCs in response to higher labour costs, as this "necessitate[s] the establishment of more permanent – and higher quality – relationships with their workers".

4.10 How firms react to these ongoing changes is likely to play an important role in future labour market developments. Resolution Foundation research[23] has found that, focusing solely on the cost increases associated with the initial introduction of the NLW, around a third of firms raised prices, with around one in seven firms investing more in training and around one in eight investing more in technology. Low wage growth has thus far helped to temper the rise of automation, but if wages start to increase, this could potentially herald a renewed intensification of automation, which in turn may precipitate a further fall in the labour share.

4.11 However, technological changes will not impact all sectors equally (e.g. telemarketing jobs are more vulnerable to automation than healthcare social workers[24]), and actually have the potential to create jobs (e.g. social media managers, app developers, etc.). Moreover, as the Resolution Foundation research highlights, firms may opt to invest in training rather than technology. This decision will be dependent on how cost effective it is for firms to invest in training versus employing new technologies, which will be determined by how easily jobs can be automated.

Beyond the Labour Market

4.12 The movement of people is just one of the four freedoms guaranteed under the single market, alongside freedom of movement of goods, capital, and services. All of these are likely to be impacted – either positively or negatively – by the UK's decision to leave the EU. Analysis of the wider impacts of reduced migration – or Brexit more generally – beyond those on the labour market is beyond the scope of this paper, but the Migration Advisory Committee (MAC) has published a series of reports analysing the impacts of migration, including on; consumption of education and children's services; social cohesion and integration; public services; access to housing and the housing market; and transport and congestion. [25] Meanwhile, The House of Commons notes that existing research on the impact of immigration on public finances generally suggests the overall effect is small. [26]

4.13 The MAC, however, underscores both the conceptual and data difficulties associated with defining the impacts of migration. Issues include a lack of data, interdependencies between the impacts (e.g. the link between crime and social cohesion), a lack of a counterfactual, a lack of clear methods for dealing with unequal distribution of impacts across the UK population, and the fact that past impacts are not necessarily a good guide to the future: the characteristics of migrants will vary from case to case, as will the geographical or economic context, while there is evidence to suggest that migration impacts tend to converge towards the average for UK nationals as migrants remain in the UK over time.

[21] http://www.resolutionfoundation.org/app/uploads/2017/07/RF-Brexit-ebook.pdf, p14
[22] http://www.resolutionfoundation.org/app/uploads/2017/07/RF-Brexit-ebook.pdf, p15
[23] http://www.resolutionfoundation.org/app/uploads/2017/07/RF-Brexit-ebook.pdf, p16
[24] http://www.oxfordmartin.ox.ac.uk/downloads/academic/The_Future_of_Employment.pdf
[25] https://www.gov.uk/government/collections/migration-advisory-committee-reports-analysis-of-the-impacts-of-migration
[26] http://researchbriefings.files.parliament.uk/documents/CBP-7659/CBP-7659.pdf

5 Conclusions and implications

5.1 The UK's decision to leave the EU has raised many questions and concerns for employees, employers and policymakers about the impact of Brexit on working life and the economy. With the UK's relationship with the EU now set to be recast following the June 2016 referendum, it is likely that the four freedoms guaranteed under the single market will all be affected, these include the movement of goods, capital, services, and people.

5.2 The overall impact of Brexit will be dependent upon on broader economic factors, such as trade patterns and business location decisions. However, given the potential scope of work, this report focusses upon the main risks on the labour force, migration and skills.

5.3 More specifically, the analysis looks at the available data on the number of EU migrants by nationality, industry of occupation, and skill level to attempt to quantify these impacts, where possible by area, sector, occupation, and where possible, skills. It is important to note that a lack of detailed statistics at city-region level in the UK does place limits on the analysis detail.

5.4 **The report is therefore intended to highlight broad areas of risk which localities face, which can be explored further through research with local firms.**

5.5 The main implications emerging from the work are two-fold. The first set of issues relate to the economic and labour market context in which Brexit will take place. Whilst rising employment has been a major source of growth across the UK, productivity performance remains weak. Whatever outcome from Brexit, this is a first order risk requiring investment in local skills, innovation, attracting new investment, promoting enterprise and trade.

5.6 Linked to this, the overall nature of the labour market is changing. New technology and work practices have led to an ever more 'flexible workforce', including rising use of agency work and growing self-employment forecast to continue at all skill levels. Furthermore, any forms of entry controls on labour migration, for example through visas, are unlikely to provide a permanent solution to the restriction and loss of skills which could emerge after Brexit. As with the productivity challenge, this will require greater investment in the local workforce, and ensuring 'good' work for all, underscored by the Taylor Review.[27]

5.7 The second important set of implications relate to the fat that the risks will play out differently in different parts of the UK, and to different degrees across the region. The composition of different local economies, in terms of both industry sectors and local workforce, means that different areas may wish to focus future programmes of support on different local priorities.

5.8 The headline analysis shows with a predominance of employment within *Distribution, Hotels, and Restaurants*, parts of *Manufacturing* (textiles and food and drink), parts of *Banking, Finance, and Insurance* (shared services), *parts of Public Admin, Education*, and *Healthcare* (in particular social care), and Agriculture, Forestry and Fishing, appear to be more exposed in the North West to any potential changes in migration policy. However, anecdotal evidence also suggests that the risks of Brexit on the workforce vary as much within an industry than between different sectors, requiring a more nuanced view of employer skills requirements.[28]

5.9 Our analysis suggests that low-skilled jobs are likely to be most vulnerable to potential changes in migration as a result of the UK leaving the EU. Here, migration from EU8 countries appears to be most affected by the Referendum result. The data suggests that the majority of EU8 workers are in lower-skilled jobs; and whilst great uncertainty remains surrounding the government's post-Brexit immigration policy, based on current policy towards non-EU migrants, it is reasonable to assume that low-skilled jobs could be the most vulnerable if visa restrictions are introduced.

5.10 These points are reinforced by a series of scenarios on the introduction of work visas. The results of these tests show that the impacts are more dependent on how restrictive conditions on movement of people are, i.e. what skill levels visa applications are open to, rather than the level of rejection rates of applications. Therefore sectors with an over-representation of EU8 workers,

[27] Taylor, M (2017): Good work: the Taylor review of modern working practices, RSA for H.M.Government
[28] Green, A, Kispeter, E. and Meardi G. (2017): Regulating EU migrant labour - lessons from the construction industry

and proliferation lower skilled jobs, again appear to be more vulnerable to future changes in migration, in particular within *Distribution, Hotels, and Restaurants* and *Manufacturing.*

5.11 Any significant shift in immigration policy could lead to acute skills shortages, in these industries, and therefore Government needs to consider the spatial implications of deals negotiated and support cities to adapt to changes in both migration controls and the UK's international trading relationships as they evolve.

5.12 Government, local authorities, and partner agencies need to support the audit of skills needs across UK core cities to inform national migration policy and quotas, as well as helping to ensure that training provision meets local employer needs; and enable easy access to critical skills and talent from both EU and non-EU countries, and review of the 'occupation shortages' list.

5.13 It will also be important for authorities to provide certainty for on the residence rights of firm's EU workforce and EU workers who arrive up until the point of triggering Article 50; and clarity on hiring from EU countries during any transition period.

5.14 Norway, Switzerland and Canada offer 'models' for UK immigration policy. Lessons from these countries show that even with freedom of movement in place, the introduction of labour market regulations and managed controls can help minimise tensions surrounding the perceived negative effects of immigration, whilst meeting employers' genuine recruitment needs.[29]

[29] Ibid

Annex A: Employment by country of birth, 2015

SICode	Sector	North West			Greater Manchester			Liverpool City Region			Rest of North West		
		UK	EU	Non-EU	UK	EU	Non-EU	UK	EU	Non-EU	UK	EU	Non-EU
A	Agriculture, Forestry, and Fishing	89%	8%	3%	64%	14%	22%	44%	56%	0%	100%	0%	0%
B,D,E	Energy and Water	91%	5%	4%	84%	8%	7%	91%	9%	0%	96%	3%	1%
C	Manufacturing	87%	9%	4%	80%	11%	9%	95%	4%	1%	87%	10%	3%
F	Construction	96%	3%	2%	94%	3%	4%	95%	5%	0%	98%	1%	1%
G.I	Distribution, Hotels, and Restaurants	86%	7%	7%	77%	10%	13%	92%	4%	4%	90%	6%	4%
H,J	Transport and Communication	87%	5%	8%	87%	5%	8%	92%	1%	7%	86%	7%	7%
K,L,M,N	Banking and Finance	90%	5%	5%	85%	7%	9%	93%	3%	4%	95%	3%	2%
O,P,Q	Public Admin, Education, and Health	91%	2%	7%	87%	3%	10%	93%	1%	6%	93%	3%	5%
R,S,T,U	Other Services	91%	3%	7%	87%	3%	10%	92%	1%	6%	94%	1%	5%

Annex B:

Industry	Cheshire and Warrington		Cumbria		Greater Manchester		Lancashire		Liverpool City Region	
	Employment Share (%)	LQ	Employment Share (%)	LQ	Employment Share (%)	LQ	Employment Share (%)	LQ	Employment Share (%)	LQ
01 : Crop and animal production, hunting and related service activities	0.2	0.1	0.2	0.1	0.0	0.0	0.1	0.1	0.0	0.0
02 : Forestry and logging	0.0	0.0	0.2	2.0	0.0	0.0	0.0	0.0	0.0	0.0
03 : Fishing and aquaculture	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
05 : Mining of coal and lignite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
06 : Extraction of crude petroleum and natural gas	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
07 : Mining of metal ores	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08 : Other mining and quarrying	0.1	1.0	0.1	1.0	0.0	0.0	0.0	0.0	0.0	0.0
09 : Mining support service activities	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10 : Manufacture of food products	1.4	1.2	2.5	2.1	1.6	1.3	2.3	1.9	1.0	0.8
11 : Manufacture of beverages	0.1	1.0	0.2	2.0	0.1	1.0	0.1	1.0	0.0	0.0
12 : Manufacture of tobacco products	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
13 : Manufacture of textiles	0.1	0.5	0.2	1.0	0.5	2.5	0.5	2.5	0.1	0.5
14 : Manufacture of wearing apparel	0.0	0.0	0.0	0.0	0.1	1.0	0.1	1.0	0.0	0.0
15 : Manufacture of leather and related products	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
16 : Manufacture of wood and of products of wood and cork, except furniture;manufacture of articles of straw and plaiting materials	0.3	1.0	0.9	3.0	0.4	1.3	0.5	1.7	0.4	1.3
17 : Manufacture of paper and paper products	0.2	1.0	0.7	3.5	0.2	1.0	0.5	2.5	0.1	0.5
18 : Printing and reproduction of recorded media	0.3	0.8	0.2	0.5	0.5	1.3	0.5	1.3	0.5	1.3
19 : Manufacture of coke and refined petroleum products	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
20 : Manufacture of chemicals and chemical products	0.7	2.3	0.2	0.7	0.6	2.0	0.5	1.7	0.7	2.3
21 : Manufacture of basic pharmaceutical products and pharmaceutical preparations	0.6	6.0	0.1	1.0	0.1	1.0	0.1	1.0	0.4	4.0
22 : Manufacture of rubber and plastic products	0.4	0.8	0.9	1.8	0.7	1.4	0.9	1.8	0.3	0.6
23 : Manufacture of other non-metallic mineral products	0.2	1.0	0.2	1.0	0.1	0.5	0.2	1.0	0.4	2.0
24 : Manufacture of basic metals	0.1	0.5	4.2	##	0.2	1.0	0.3	1.5	0.1	0.5

25 : Manufacture of fabricated metal products, except machinery and equipment	1.0	1.0	1.2	1.2	1.0	1.0	1.4	1.4	0.8	0.8
26 : Manufacture of computer, electronic and optical products	0.3	0.8	0.2	0.5	0.3	0.8	0.2	0.5	0.1	0.3
27 : Manufacture of electrical equipment	0.2	1.0	0.4	2.0	0.3	1.5	0.3	1.5	0.4	2.0
28 : Manufacture of machinery and equipment n.e.c.	0.4	0.8	0.2	0.4	0.5	1.0	0.5	1.0	0.3	0.6
29 : Manufacture of motor vehicles, trailers and semi-trailers	1.6	3.2	0.1	0.2	0.3	0.6	0.7	1.4	1.1	2.2
30 : Manufacture of other transport equipment	0.1	0.3	2.5	6.3	0.2	0.5	2.2	5.5	0.3	0.8
31 : Manufacture of furniture	0.1	0.3	0.2	0.7	0.2	0.7	0.8	2.7	0.2	0.7
32 : Other manufacturing	0.1	0.5	0.2	1.0	0.2	1.0	0.2	1.0	0.2	1.0
33 : Repair and installation of machinery and equipment	0.4	1.0	0.2	0.5	0.3	0.8	0.2	0.5	0.2	0.5
35 : Electricity, gas, steam and air conditioning supply	0.3	0.8	0.2	0.5	0.5	1.3	0.3	0.8	0.2	0.5
36 : Water collection, treatment and supply	0.1	1.0	0.1	1.0	0.0	0.0	0.0	0.0	0.0	0.0
37 : Sewerage	0.1	1.0	0.0	0.0	0.1	1.0	0.2	2.0	0.1	1.0
38 : Waste collection, treatment and disposal activities; materials recovery	0.7	1.8	0.6	1.5	0.6	1.5	0.6	1.5	0.7	1.8
39 : Remediation activities and other waste management services. This division includes the provision of remediation services, i.e. the cleanup of contaminated buildings and sites, soil, surface or ground water.	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
41 : Construction of buildings	1.2	0.9	1.5	1.1	1.2	0.9	0.9	0.6	0.8	0.6
42 : Civil engineering	0.9	1.3	0.9	1.3	0.8	1.1	2.0	2.9	0.7	1.0
43 : Specialised construction activities	1.8	0.7	2.5	1.0	1.9	0.8	2.2	0.9	2.1	0.8
45 : Wholesale and retail trade and repair of motor vehicles and motorcycles	1.8	1.0	1.9	1.1	1.2	0.7	1.6	0.9	1.1	0.6
46 : Wholesale trade, except of motor vehicles and motorcycles	3.2	0.8	2.5	0.6	4.0	1.0	3.7	0.9	2.9	0.7
47 : Retail trade, except of motor vehicles and motorcycles	10.4	1.1	11.2	1.2	10.4	1.1	10.5	1.1	10.5	1.1
49 : Land transport and transport via pipelines	2.2	1.1	3.3	1.7	2.1	1.1	2.0	1.0	3.0	1.5
50 : Water transport	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0
51 : Air transport	0.0	0.0	0.0	0.0	0.5	1.7	0.0	0.0	0.1	0.3
52 : Warehousing and support activities for transportation	2.6	1.5	0.9	0.5	2.2	1.3	1.2	0.7	2.7	1.6
53 : Postal and courier activities	1.0	1.3	0.7	0.9	0.9	1.1	0.7	0.9	0.7	0.9
55 : Accommodation	1.8	1.1	6.7	4.2	1.1	0.7	2.2	1.4	1.4	0.9

56 : Food and beverage service activities	6.4	1.1	7.1	1.2	5.8	1.0	6.0	1.0	6.4	1.1
58 : Publishing activities	0.2	0.5	0.3	0.8	0.2	0.5	0.3	0.8	0.2	0.5
59 : Motion picture, video and television programme production, sound recording and music publishing activities	0.1	0.3	0.2	0.5	0.3	0.8	0.1	0.3	0.2	0.5
60 : Programming and broadcasting activities	0.0	0.0	0.0	0.0	0.3	3.0	0.0	0.0	0.0	0.0
61 : Telecommunications	0.8	1.1	0.2	0.3	0.9	1.3	0.8	1.1	0.6	0.9
62 : Computer programming, consultancy and related activities	2.0	0.9	0.5	0.2	1.5	0.7	0.9	0.4	1.0	0.4
63 : Information service activities	0.1	0.5	0.0	0.0	0.1	0.5	0.2	1.0	0.2	1.0
64 : Financial service activities, except insurance and pension funding	2.6	1.6	0.7	0.4	1.6	1.0	0.8	0.5	1.6	1.0
65 : Insurance, reinsurance and pension funding, except compulsory social security	0.2	0.7	0.0	0.0	0.5	1.7	0.1	0.3	0.3	1.0
66 : Activities auxiliary to financial services and insurance activities	1.2	0.8	0.4	0.3	1.5	1.0	0.8	0.5	0.8	0.5
68 : Real estate activities	1.6	0.9	1.5	0.9	2.1	1.2	1.4	0.8	1.6	0.9
69 : Legal and accounting activities	3.8	1.7	1.5	0.7	3.3	1.4	2.6	1.1	2.5	1.1
70 : Activities of head offices; management consultancy activities	3.0	1.2	1.0	0.4	3.0	1.2	1.2	0.5	1.9	0.7
71 : Architectural and engineering activities; technical testing and analysis	2.6	1.4	2.1	1.2	1.9	1.1	1.2	0.7	1.4	0.8
72 : Scientific research and development	0.4	0.8	0.1	0.2	0.2	0.4	0.2	0.4	0.3	0.6
73 : Advertising and market research	0.6	1.0	0.1	0.2	0.5	0.8	0.2	0.3	0.2	0.3
74 : Other professional, scientific and technical activities	0.7	0.9	0.5	0.6	0.7	0.9	0.5	0.6	0.6	0.8
75 : Veterinary activities	0.3	1.5	0.4	2.0	0.2	1.0	0.2	1.0	0.2	1.0
77 : Rental and leasing activities	0.4	0.8	0.3	0.6	0.6	1.2	0.5	1.0	0.6	1.2
78 : Employment activities	4.0	1.3	0.8	0.3	3.2	1.0	2.2	0.7	2.7	0.8
79 : Travel agency, tour operator and other reservation service and related activities	0.4	1.3	0.3	1.0	0.5	1.7	0.4	1.3	0.2	0.7
80 : Security and investigation activities	0.6	0.9	0.4	0.6	0.9	1.3	0.4	0.6	1.0	1.4
81 : Services to buildings and landscape activities	2.2	1.0	1.9	0.8	2.9	1.3	1.9	0.8	1.9	0.8
82 : Office administrative, office support and other business support activities	1.8	1.1	0.7	0.4	1.9	1.1	1.2	0.7	1.6	0.9
84 : Public administration and defence; compulsory social security	3.0	0.7	4.2	1.0	4.0	1.0	5.0	1.2	5.6	1.3
85 : Education	7.2	0.8	8.3	1.0	8.8	1.0	9.5	1.1	9.6	1.1

86 : Human health activities	7.2	0.9	7.9	1.0	8.3	1.1	9.6	1.3	11.5	1.5
87 : Residential care activities	2.0	0.9	2.9	1.3	2.0	0.9	2.6	1.1	2.7	1.2
88 : Social work activities without accommodation	2.6	0.9	2.1	0.7	2.8	0.9	3.4	1.1	3.5	1.2
90 : Creative, arts and entertainment activities	0.1	0.3	0.2	0.7	0.3	1.0	0.2	0.7	0.2	0.7
91 : Libraries, archives, museums and other cultural activities	0.4	1.3	0.6	2.0	0.1	0.3	0.2	0.7	0.2	0.7
92 : Gambling and betting activities	0.2	0.7	0.2	0.7	0.3	1.0	0.3	1.0	0.6	2.0
93 : Sports activities and amusement and recreation activities	1.4	0.9	1.0	0.7	1.3	0.9	1.6	1.1	1.8	1.2
94 : Activities of membership organisations	0.6	0.8	0.7	0.9	0.6	0.8	0.4	0.5	0.6	0.8
95 : Repair of computers and personal and household goods	0.2	1.0	0.1	0.5	0.2	1.0	0.2	1.0	0.1	0.5
96 : Other personal service activities	0.9	0.8	0.8	0.7	0.8	0.7	0.9	0.8	1.0	0.8
97 : Activities of households as employers of domestic personnel	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
98 : Undifferentiated goods- and services-producing activities of private households for own use	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
99 : Activities of extraterritorial organisations and bodies	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Annex C: Population modelling assumptions

Scenario 1: Recent trends, or Post-referendum Baseline (change in migration not driven by policy other than the decision to leave the EU)

Inward Migration

- 2011 Census data[30] on origin and destination of international migrants were used to obtain a profile of migrants by local authority, broken down into EU14, EU8, E2 and EU Other, and Non-EU.
- Percentage changes in ONS data on provisional Long-Term International Migration (LTIM) estimates[31] for the UK (this data is not available below the national level) since the EU referendum for the same geographic areas were calculated. This was done by comparing the level of inward migration in the year ending March 2017 (latest available data) with the level of inward migration in the year ending June 2016 (when the EU referendum took place).
- These calculated percentage changes for the UK were subsequently applied at the local authority level.

Outward Migration

- Since data on origin and destination of international migrants leaving the UK is not available at the local authority level, total change in UK outward migration – calculated from ONS data on provisional Long-Term International Migration (LTIM) estimates[2] for the UK by comparing the level of outward migration in the year ending March 2017 (latest available data) with the level of outward migration in the year ending June 2016 (when the EU referendum took place) – was applied uniformly across all local authorities.

Scenario 2: EU migration is subject to visa restrictions

Inward Migration

- 2016 ONS data on workers in the UK by skill level of occupation[32] were were used to obtain a skills profile of migrants by local authority, broken down into EU14, EU8, E2 and EU Other, and Non-EU. National shares of skilled workers among EU14, EU8, E2 workers were applied directly to local authority numbers of immigrants, while shares of EU Other were estimated from the residual as data is unavailable for EU other nationals due to disclosure controls. This was done by apportioning the difference between the calculated number of EU14, EU8, and E2 workers using national skills share data and the total number of EU migrants from the 2011 Census according to the calculated skills profile for each local authority.
- Assumptions as below were subsequently made about the number of EU migrants who would be eligible for a work visa under a system where EU nationals require a visa to work in the UK post-Brexit – with those ineligible assumed to not even apply – and how many of these applications would be successful:

Scenario 2a: Less restrictive visa conditions, lower rejection rate

- Only high- and upper medium-skilled workers are eligible, and therefore only high- and upper medium-skilled workers apply for visas.
- A rejection rate based on historic data for non-EU visa applications, calculated from Home Office immigration statistics[33], is applied.

Scenario 2b: More restrictive visa conditions, lower rejection rate

- Only high-skilled workers are eligible, and therefore only high-skilled workers apply for visas.
- A rejection rate based on historic data for non-EU visa applications, calculated from Home Office immigration statistics[4], is applied.

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[30] NOMIS, MF02UK - Origin and destination of international migrants (expanded country of origin)
[31] https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/internationalmigration/datasets/migrationstatisticsquarterlyreportprovisionallongterminternationalmigrationltimestimates
[32] https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/internationalmigration/articles/migrationandthelabourmarketuk/2016#how-skilled-were-non-uk-nationals-living-in-the-uk
[33] https://www.gov.uk/government/publications/immigration-statistics-april-to-june-2017/list-of-tables#visas

Scenario 2c: Less restrictive visa conditions, higher rejection rate

- Only high- and upper medium-skilled workers are eligible, and therefore only high- and upper medium-skilled workers apply for visas.
- A rejection rate based on historic data for Accession Worker Card applications from Bulgarian and Romanian nationals, calculated from Home Office immigration statistics[34], is applied.

Scenario 2d: More restrictive visa conditions, higher rejection rate

- Only high-skilled workers are eligible, and therefore only high-skilled workers apply for visas.
- A rejection rate based on historic data for Accession Worker Card applications from Bulgarian and Romanian nationals, calculated from Home Office immigration statistics[35], is applied.

Adjustments required for Scenarios 2a-d are applied to Scenario 1 outputs (i.e. it is assumed that visa restrictions are in addition to the Post-referendum Baseline) from 2021 (i.e. end of proposed transition period) onwards

Outward Migration

- Since data on origin and destination of international migrants leaving the UK is not available at the local authority level, total change in UK outward migration, calculated from ONS data on provisional Long-Term International Migration (LTIM) estimates[2] for the UK was applied uniformly across all local authorities. [i.e. outward migration scenario is unchanged from Scenario 1]

[34] https://www.gov.uk/government/publications/immigration-statistics-april-to-june-2017/list-of-tables#european-economic-area-eea

[35] https://www.gov.uk/government/publications/immigration-statistics-april-to-june-2017/list-of-tables#european-economic-area-eea