

CBI MIGRATION STUDY

1 INTRODUCTION

Positive net migration has been integral to Northern Ireland's social and economic rejuvenation. This study investigates the potential impact of Brexit on net migration flows and the consequence that this major institutional shock will have on long-run economic growth. In doing so, we demonstrate that without access to inward migration, Northern Ireland's economy will struggle to grow and current productivity levels will be at risk. Specifically, given the small population of only 1.8 million, Northern Ireland's future economic success is highly dependent on the private sector's ability to access international labour and skills.

Uncertainty surrounding the implications of Brexit has generated a chill for current and prospective immigrants to the UK. Furthermore, weak sterling and improving economies across Europe have combined to reduce the number of EU nationals in the local economy. We need to begin to take seriously a future with fewer migrant workers, limited access to skills and labour markets across Europe and a exacerbated brain drain of skilled indigenous workers seeking employment elsewhere in the global economy. This report is a step towards discussing the consequence of this potential future.

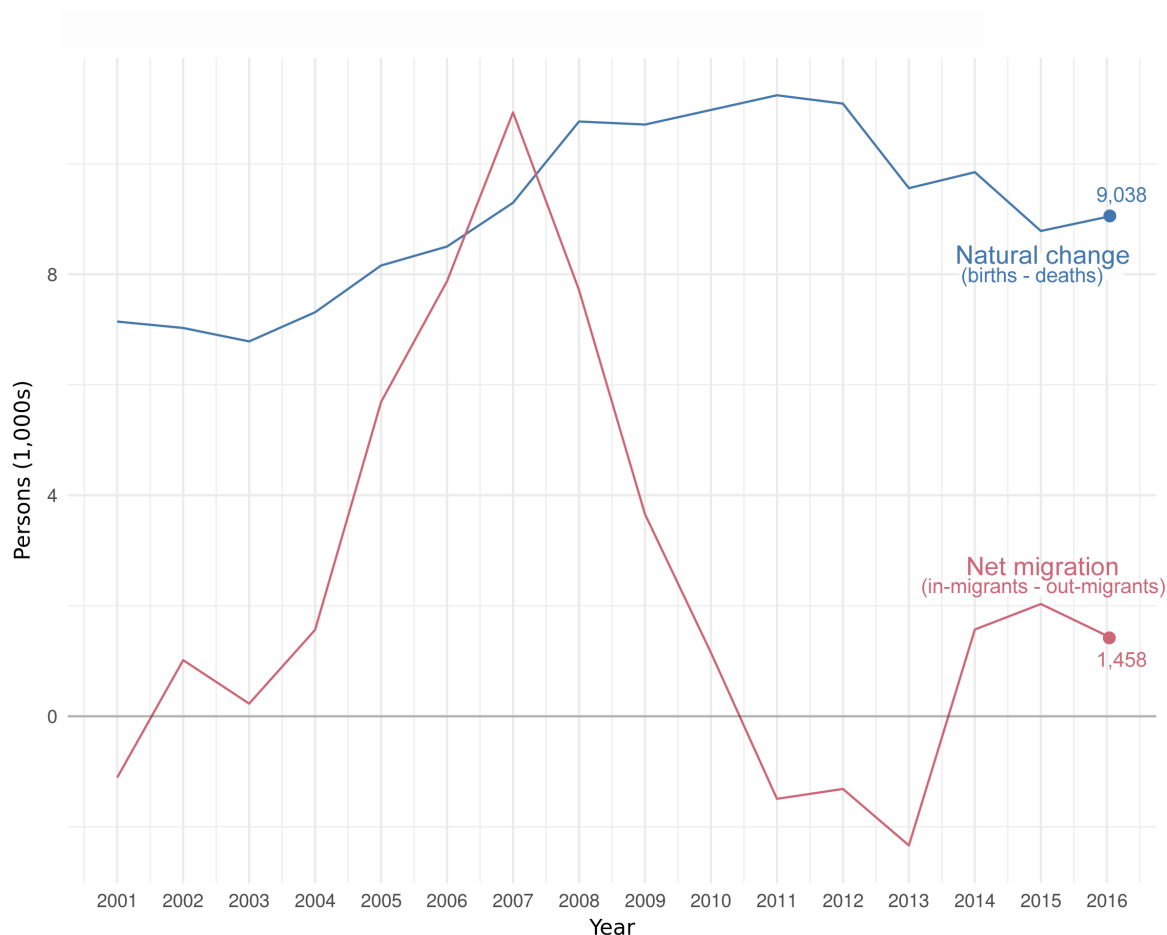
The population statistics in this report demonstrate that, even in the face of Brexit, employers will need to continue accessing young EU and international workers as the pool of indigenous working-age people diminishes. Given the demographic backdrop which includes an ageing population structure, the local economy will require significantly increased subvention from HM Treasury if living standards in Northern Ireland are to be maintained. Migration of working people from inside and outside the EU is one of the most realistic ways of mitigating our reliance on Westminster funding in the future. From a macroeconomic perspective, any restrictions on Northern Ireland's private sector to access people will reduce the economy's ability in the future to be self-sufficient.

The CBI therefore strongly recommends that any migration system for Northern Ireland is evidence-based and takes into consideration the full range of influencing factors such as population trends. Both the long-term and short-term consequences of any change to migration policy must be fully analysed.

2 OVERVIEW OF PAST AND PRESENT MIGRATION

Northern Ireland has continued to welcome people to live and work within its borders. Since the Troubles, it's economic success and progressive demographic diversity has been complemented with positive net migration (i.e., in-migration minus out-migration) from the rest of the world, combined with a positive natural change (i.e., births minus deaths). More recently, from the turn of the Century to the financial crisis of 2008/2009 Northern Ireland has benefited from a dramatic increase in migration inflows and, as a consequence, an increase in the natural change in population.

Figure 1. Natural change and net migration, Northern Ireland, 2001-2016



Source: *Population Estimates and Components of Population change, NISRA (October, 2017)*

However, propagated by the global financial collapse, the level of positive net migration has declined rapidly; falling into negative territory between 2010 and 2014 as more people left the region than came into it. While some improvement has since occurred, along with stronger economic growth between 2013 and 2016, net migration has remained subdued and has yet to reach the pre-crisis peak of 9,140 people in 2007. This can be seen in Figure 1.

Alongside lower net migration, Northern Ireland has also observed a broad downward trend in the natural change of population since its peak of 11,240 during 2011 to 9,038 in 2016. This is a trend that has been observed throughout all regions of Great Britain, driven by a decline in the baby-boomer generation and the fact the families in Great Britain have been having fewer children.

We begin this report with an overview of past and present migration inflows and outflows. Of specific interest is the impact on two intertwined aspects; *demography*, which refers to the structure of Northern Ireland's population, and the *economy*, which refers to the dependence of industry on migrant workers.

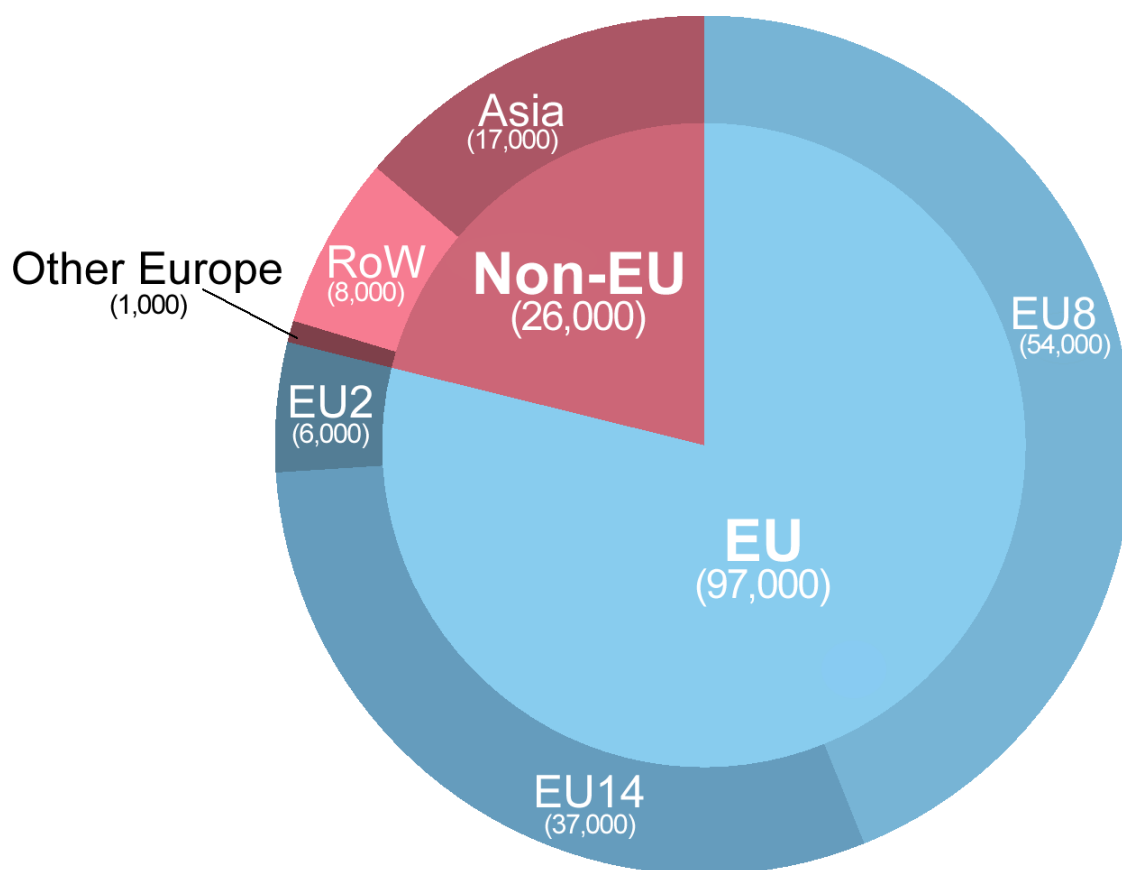
2.1 Impact on demography

When considering the structure of society, the NI Statistics Research Agency (NISRA) reported that between October and December 2016 there were 117,000 EU, including Republic of Ireland (RoI), residents in Northern Ireland representing 6.3 per cent of the local population.

This research by NISRA was conducted very shortly after the Brexit referendum and the uncertainty that would ensue. By June 2017 that figure fell by approximately 20,000 people to an estimated 97,000 EU citizens living in Northern Ireland. Alongside EU born citizens, there were an estimated 26,000 other international migrants. In total, it is estimated that Northern Ireland is home to 123,000 EU and international citizens, who represent 6.6% of the region's population. The full breakdown of the structure of migrants can be seen in Figure 2.

Note that the EU2 (formerly known as the A2) refer to the two countries that joined the EU on 1 January 2007: Bulgaria and Romania. EU2 nationals currently have certain restrictions placed on them; in the first 12 months of stay, working Bulgarian and Romanian nationals are generally required to hold an accession worker card or apply for one of two lower-skilled quota schemes.

The EU8 (formerly known as the A8) are the eight central and eastern European countries that joined the EU on 1 May 2004: Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia and Slovenia. The EU8 does not include the two other countries that joined on that date: Cyprus and Malta. EU8 nationals previously had restrictions on their rights to work and were required to register under the Worker Registration Scheme, but since 1 May 2011 EU8 nationals now have the same rights as other workers from the EU and EEA.

Figure 2. Population by non-UK nationality, June 2017

Source: *Annual Population Survey, ONS (June, 2017)*

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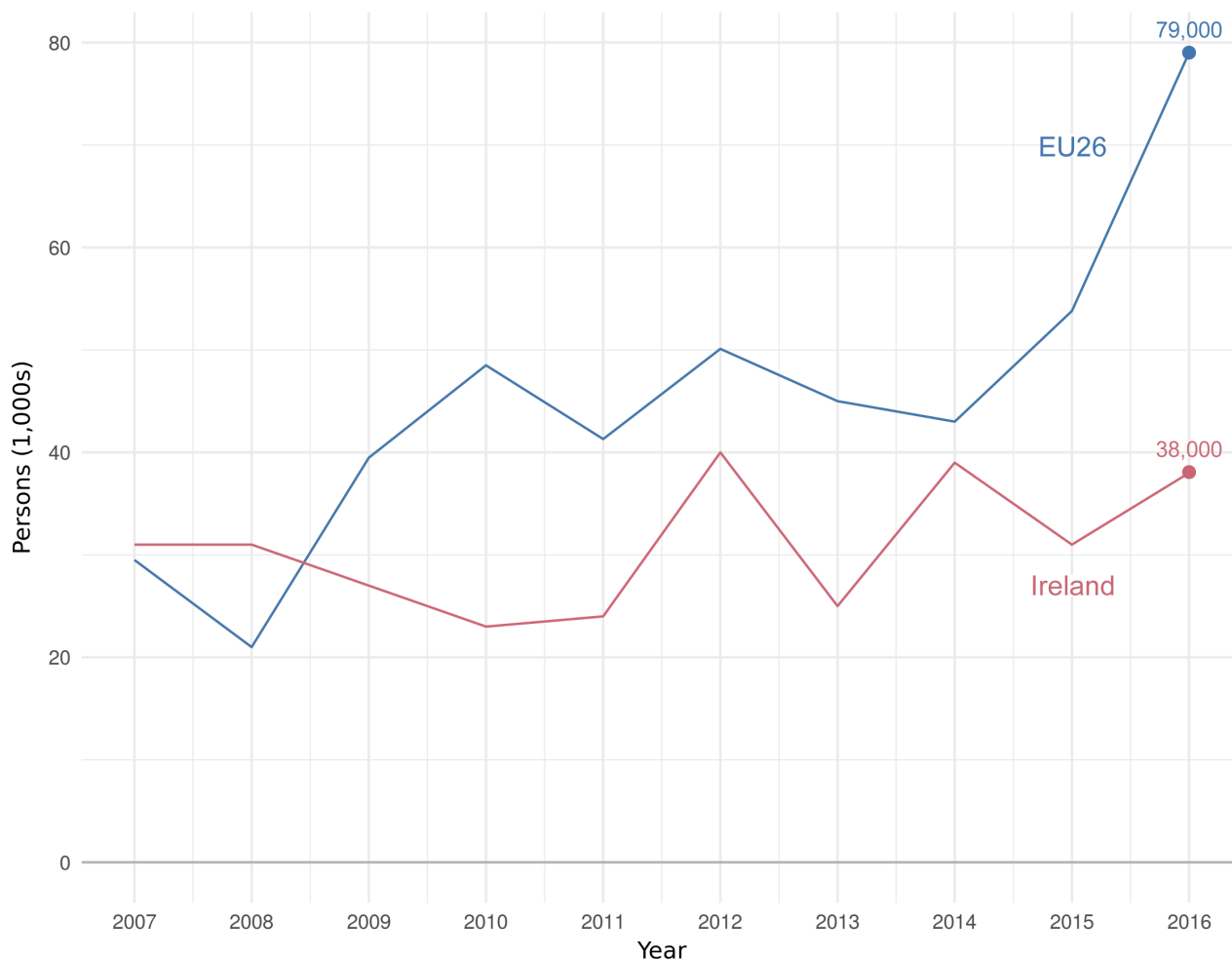
The EU 14 would be the other old member countries of the EU (before 2004): Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden.

There is a legitimate fear that, given the increased uncertainty regarding the institutional arrangement post-Brexit and the lack of Government in Northern Ireland, the number of EU and international migrants could continue to decline into the long-term as migrants find better social, political and economic opportunities elsewhere in the global economy.

In terms of the working age population, NISRA has estimated that there were 1,455,000 people residing in NI aged 16 or over. Of these 841,000 (58%) were employed and working in NI. Indeed, the majority of migrants in Northern Ireland come to work (40.5%), join family (25.6%), or study (14.5%). Furthermore, they found that between October and December 2016 79,000 persons resided in NI were born in the EU26; with 71,000 aged 16 or over. Of these, 57,000 (80%) were employed and working in NI.

Of the working age population, 38,000 residents in NI were born in Ireland; with 37,000 aged 16 or over. Of these, 21,000 (57%) were employed and working in NI. The total number of Northern Irish residents born in EU26 and Ireland from 2007 to 2016 can be seen in Figure 3.

Figure 3. Northern Ireland residents born in Ireland and EU26, 2007-2016



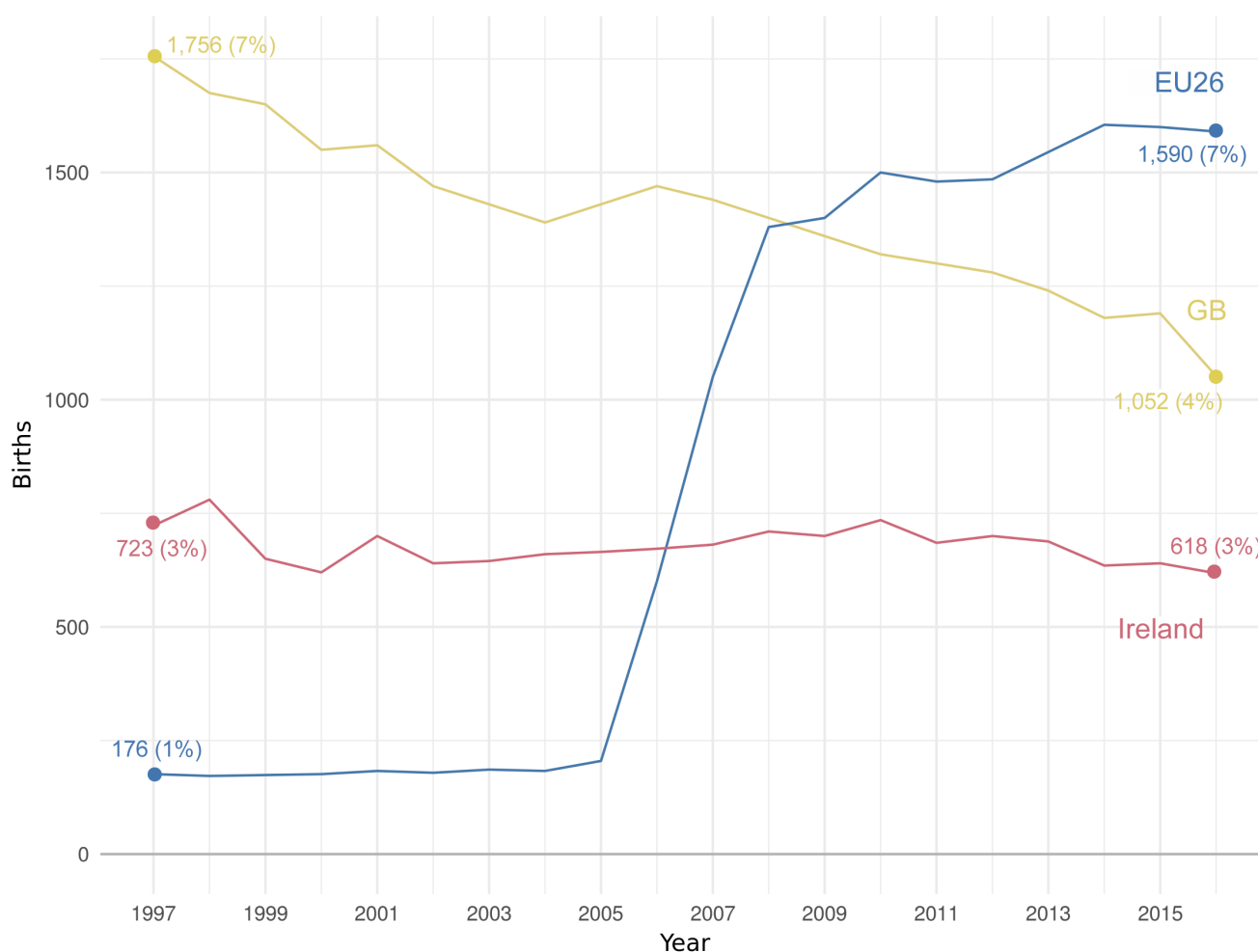
Source: *Labour Force Survey, NISRA (March 2018)*

Further, given that over the past 20 years the Northern Irish population has gradually become more socially intertwined with EU migration, a number of notable phenomena have emerged. First, there has been a long-term decline in births in Northern Ireland to mothers born in Great Britain. This is a decline in both absolute and relative terms. Specifically, there were 1,052 (4%) births in Northern Ireland to mothers from Great Britain in 2016, which is a fall from 1,756 (7%) births in 1997.

Second, there has been a small fall in births in Northern Ireland to mothers born in Ireland: 618 births to mothers from Ireland in 2016; down from 723 births in 1997.

Finally, there has been a substantial rise in births in Northern Ireland to mothers born in EU26 countries. This is a significant increase in both absolute and relative terms. In 2016 there were 1,590 (7%) births to mothers from EU26 countries; up from 176 (1%) births in 1997. The biggest rise in EU26 mothers came soon after the 2004 EU expansion.

Figure 4. Births in Northern Ireland to mothers born in GB, EU26 and Ireland, 1997-2016

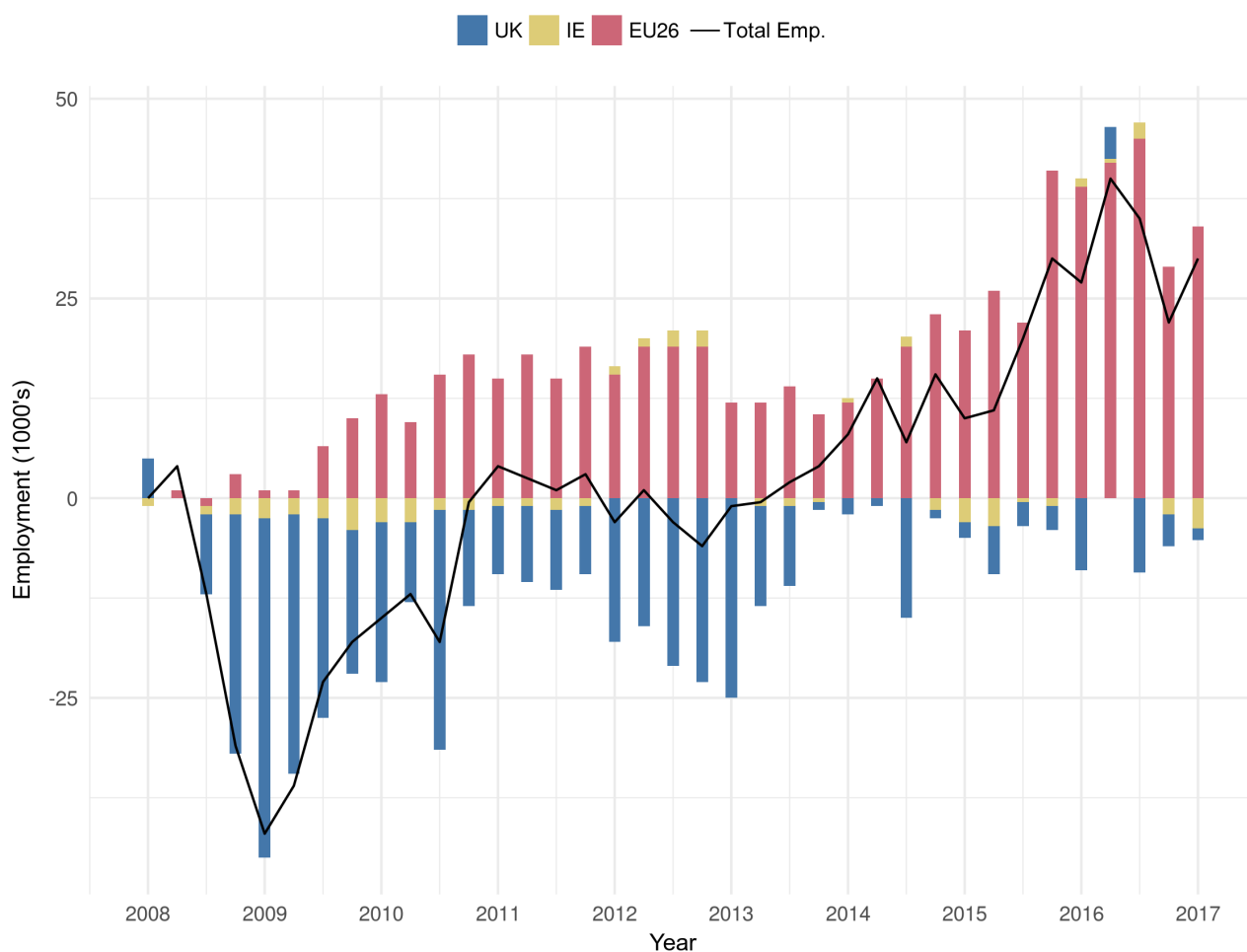


Source: Registrar General Annual Report: Births, NISRA (2016)

2.2 Impact on the economy

In the last decade, NI employment growth has been largely reliant on migrant labour. Due to the global financial crisis, employment fell by 40,000 between Q1 2008 and Q2 2009. The dramatic shock allowed for a restructuring of the labour market. Indeed, by 2014 employment levels had risen back to their pre-crisis levels, however this employment was driven by a inflow of migrant workers from the EU26 countries. Specifically, employment of UK nationals was impacted by the financial crisis, which never recovered. Therefore, UK employment had effectively been replaced by employment from other EU workers. By 2016, employment had risen by nearly 40,000 above the pre-crisis levels. Again, this boost in employment was driven by people born in EU26 now living in Northern Ireland. This information is shown in Figure 5 below.

Figure 5. Change in employment by country of birth, Northern Ireland, 2008-2017

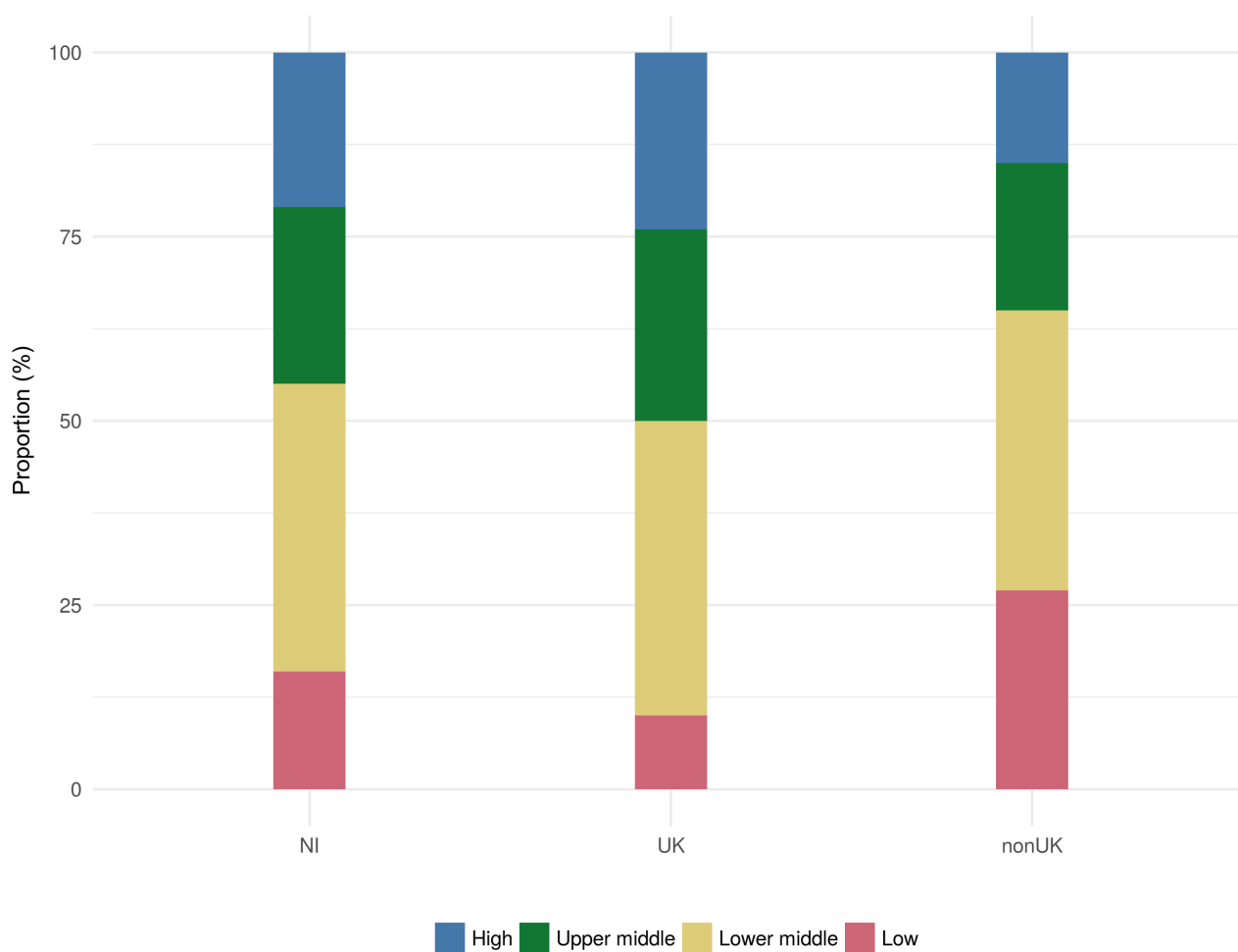


Source: *Labour Force Survey, NISRA (March, 2018)*

The Department for the Economy (DfE) statistics suggest that between 2008-2016 the number of people in employment in NI rose by 36,000. At the same time the number of EU-born people in employment rose by 40,000.

With only 3 per cent of the UK's population, firms in Northern Ireland have traditionally struggled to attract workers from management level right down to low-skilled workers. However, the rise in migrant workers has helped to resolve a known challenge for Northern Ireland: the skills gap. It is widely known that Northern Ireland suffers from a so-called brain drain whereby highly skilled and well-educated domestic workers see a lack of economic opportunities and progression, and find employment elsewhere in the UK and further afield. Migrant workers bring skills that are employed in all levels of occupational complexity; which is seen in Figure 6.

Figure 6. Proportions of skill level of occupation and country of birth groups employed in Northern Ireland, Q4 2015 – Q3 2016



Source: *Labour Force Survey, NISRA (March, 2018)*

Figure 6 also indicates that, although migrant workers do not fulfil proportionately as many high skilled jobs as Northern Irish and UK workers, they still provide a significant number of skills to technology, education and healthcare sectors. Indeed, during the last two decades, the business community in Northern Ireland has benefited hugely from the free movement of skilled workers. Productivity data for the region shows that in the last number of decades, the biggest productivity gains were attained during 2003-2007 when Eastern European migrant workers came to live in Northern Ireland. Immigration has played a vital role by supplementing skills and plugging skills gaps, which is critical for success of the industrial strategy.

Table 1 clearly shows the labour market structure of Northern Ireland from October to December, 2016. Interestingly,

Table 1: Labour market status by country of birth, Northern Ireland, Oct - Dec 2016

	RoI (%)	EU (26) (%)	Non-EU (%)	UK (%)	Total (%)
Employed	21,000 (57)	57,000 (80)	24,000 (56)	739,000 (57)	841,000 (58)
Unemployed	*	*	*	42,000 (3)	49,000 (3)
Inactive	16,000 (43)	11,000 (15)	11,000 (35)	527,000 (40)	565,000 (39)
Total	37,000 (100)	71,000 (100)	40,000 (100)	1,307,000 (100)	1,455,000 (100)

Source: *Economic and Labour Market Statistics Branch (NISRA) Labour Force Survey*

Figures may not sum due to rounding

** Sample size too small for a reliable estimate*

Although Northern Ireland has been a big beneficiary of migrant workers, over the past two years businesses have reported a growing number of long-established migrant employees are leaving Northern Ireland. Crucially, and for the first time, those leaving are not being replaced by new arrivals. DfE statistics suggest that the number of EU nationals (excluding Irish citizens) employed in Northern Ireland has fallen from 54,000 at the end of June 2016 to 40,000 by the end of March 2018 – a drop of 26%. Due to this, Northern Ireland's employers are facing a growing skills shortage. Firms need continued access to low & high skilled migrant labour to support economic prosperity in the region

Although the latest labour market statistics from NISRA (2017) show that private sector employee jobs have grown to a series high in June 2017 (547,170 jobs), they also report that there is some evidence that the annual growth in private sector jobs is slowing; from 17,130 over the year to June 2016 to 10,700 over the year to June 2017.

Immigration must not only be viewed through the narrow prism of being about filling domestic skills shortages. Overseas workers bring fresh ideas, added diversity, and unique skills sets which cannot be replicated and are critical for success of the industrial strategy. Migrants often bring unique cultural understanding or specialist knowledge which indigenous workers cannot provide, even if trained to the highest degree.

Today's firms are operating in a global environment and if they are not able to access the world's top talent, from academia to engineering to life sciences, then they will be at a distinct competitive disadvantage. Language proficiency is a prime example where there are not enough local workers with the necessary skills; this forces local businesses to recruit native speakers to fill the language skill gap.

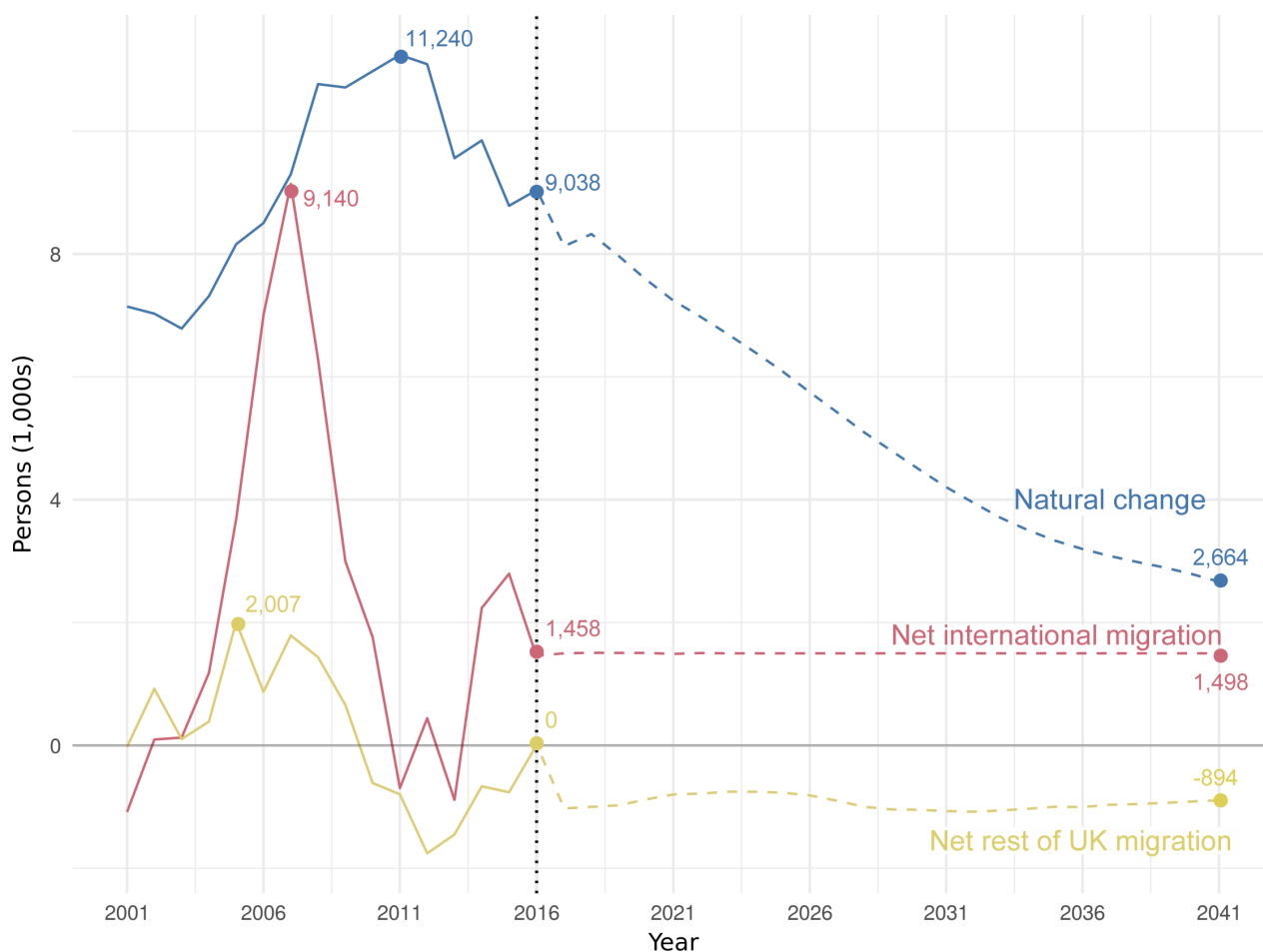
3 THE NECESSITY OF FUTURE MIGRATION FOR NORTHERN IRELAND

This section investigates the how critical continued migration is for the Northern Irish economy.

3.1 Population projections

The demographic benefits of migration are made clear in projections from the ONS regarding Northern Ireland's future population growth.

Figure 7. Actual and projected natural change and net international and rest of UK migration, Northern Ireland, 2001 – 2041



Source: Northern Ireland Principal Population Projection Summary, ONS (October, 2017)

Figure 7 demonstrates the Office for National Statistics (ONS) principal projection¹ of migration and natural change for the Northern Irish population. From this, we can see that migration—particularly from EU citizens moving to Northern Ireland—has helped mitigate long-term economic and demographic challenges; but challenges still remain.

There are projected to be more births than deaths in every year going forward, but the level of this positive natural change is to decline from its peak of 11,240 in 2011 to 2,664 by 2041. Each year for the next 25 years all of Northern Ireland's population growth is projected to come from this (declining) natural change and net international migration, which includes migration from the EU and the rest of the world.

This international migration is based upon NISRA projections which have not included a tightening of immigration restrictions in a post-Brexit world. However, UK Government policy ambitions to reduce immigration to “tens of thousands” combined with the impact of Brexit would suggest that net international migration to Northern Ireland will decline further and never again reach its peaks seen prior to the global financial crisis of 9,140 and in 2014 and 2015 of 3130 which boosted Northern Irish employment and real GDP. Overall, this Government policy would further inhibit Northern Ireland's population growth.

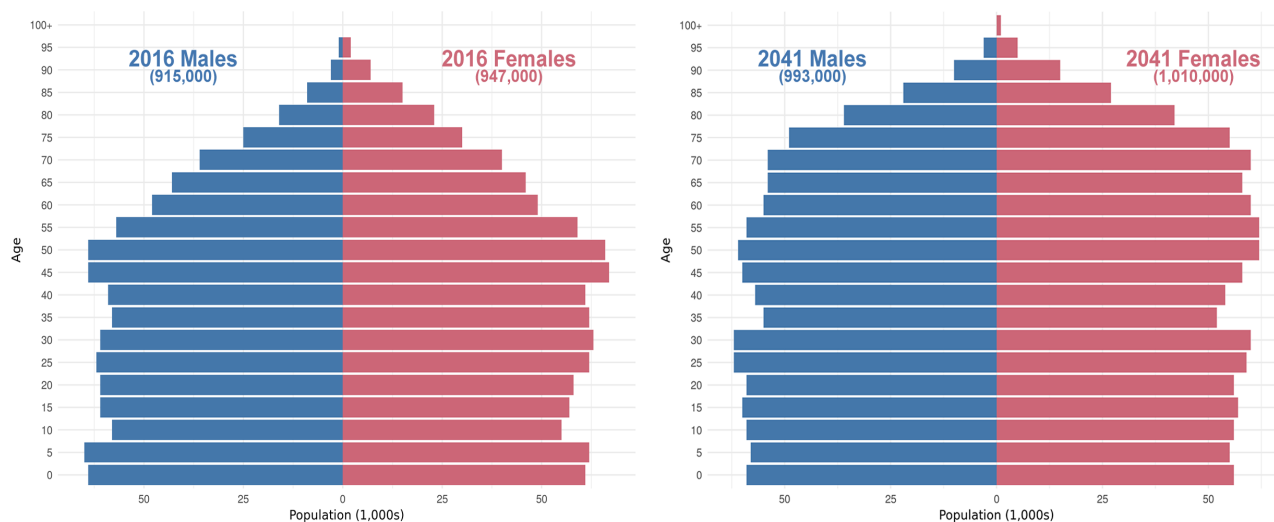
Importantly, the age profile of the Northern Irish population is also projected to change over the next 25 years, as shown in Figure 8. The working age population is predicted to decrease. The proportion of the population of state pension age will increase by over 30% in the coming years. People aged 75 and over are projected to be the fastest growing age group in Northern Ireland, increasing by 64% over the next 25 years. Although the prediction that people in Northern Ireland are to live longer is welcome, it is also the case that people in the oldest age categories become more likely to need access to health and social care services to support them in old age. This trend is expected to put significant strain on health and social care resources.

In anticipation of this population change, common throughout most developed nations, the Department of Health in Northern Ireland has been striving to transform how it delivers and manages health and social care to meet the population needs. In 2011, a review of healthcare delivery by the Department of Health set out a vision and strategy for responding to the many challenges that the health sector faced.

¹ A full description of population projections are given in section A.1 of the Technical Annex.

Transforming your Care set out a shared view of how that transformation would take place and a huge component was the reallocation of resources from secondary care to the primary and community care sectors. Private sector companies charged with delivering that community care for the NHS however are encountering severe problems accessing staff to fulfil those contracts.

Figure 8. Estimated and projected age structure of the Northern Irish population, mid-2016 and mid-2041



Source: *Projected populations in five year age groups, Northern Ireland, ONS (October, 2017)*

Private sector health and social care suppliers have reported in 2018 that they must now turn down a significant proportion of tendering for new contracts because they have no staff to carry out the work. Should this continue to be the case there will be a problem for Northern Ireland's NHS to transform its delivery model, make the necessary savings and improve patient outcomes.

A further concern from a macroeconomic perspective, relates to Northern Ireland's aging population. Official statistics from NISRA (2017) show that the region's overall projected population growth over the 25 year period to mid-2041 is significantly lower than in the rest of the UK (7.6 per cent compared with 11.2 per cent). At the same time, our population is projected to age at a much faster rate.

Out of all the UK countries, at 43.1 per cent Northern Ireland had the largest percentage growth of people aged 85 and over between mid-2006 and mid-2016. The population aged 65 and over in NI is projected to increase by 65.1 per cent to 491,700 people from mid-2016 to mid-2041, with the result that almost one in four people (24.5 per cent) will be in this age category. The population

aged 85 and over is projected to increase by 127.2 per cent to reach 82,800 people over the same period, which will see their share of the population doubling from 2.0 per cent to 4.1 per cent.

These demographic changes will serve to put much more pressure on the dependency rate in Northern Ireland. In NI, the dependency rate for children has fallen from two thirds of the total number of dependants to just over a half (55.3%) in 2016 as the ratio of children to working age people declined.

Simultaneously, the dependency ratio of people of pensionable age has been rising and is expected to increase from 271 per 1,000 people of working age to 377. For Northern Ireland, these population statistics are a stark reminder that employers will need to access young international workers as the local pool of working age people diminishes.

From a macroeconomic perspective, any restrictions on Northern Ireland's private sector to access people will reduce the economy's ability in the future to be self-sufficient. Given this demographic backdrop and the additional costs of the ageing population, it will require significantly increased subventions from HM Treasury if living standards in Northern Ireland are to be maintained; migration of working people from inside and outside the EU is one of the most realistic ways of mitigating our reliance on Westminster funding in the future. In summary, any ambitions to re-balance Northern Ireland's public and private expenditure will be thwarted by limited access to immigration.

The CBI therefore strongly recommends that any migration system for Northern Ireland is evidence-based and takes into consideration the full range of influencing factors such as population trends as outlined above. Both the long-term and short-term consequences of any change to migration policy must be fully analysed.

Immigration is not just a skills issue though. Against a backdrop of low unemployment and an ageing workforce, more than a third (35%) of businesses view access to labour supply as a threat to the UK's labour market competitiveness. This is a rising concern, with half (50%) believing it to be a threat to competitiveness in five years' time.

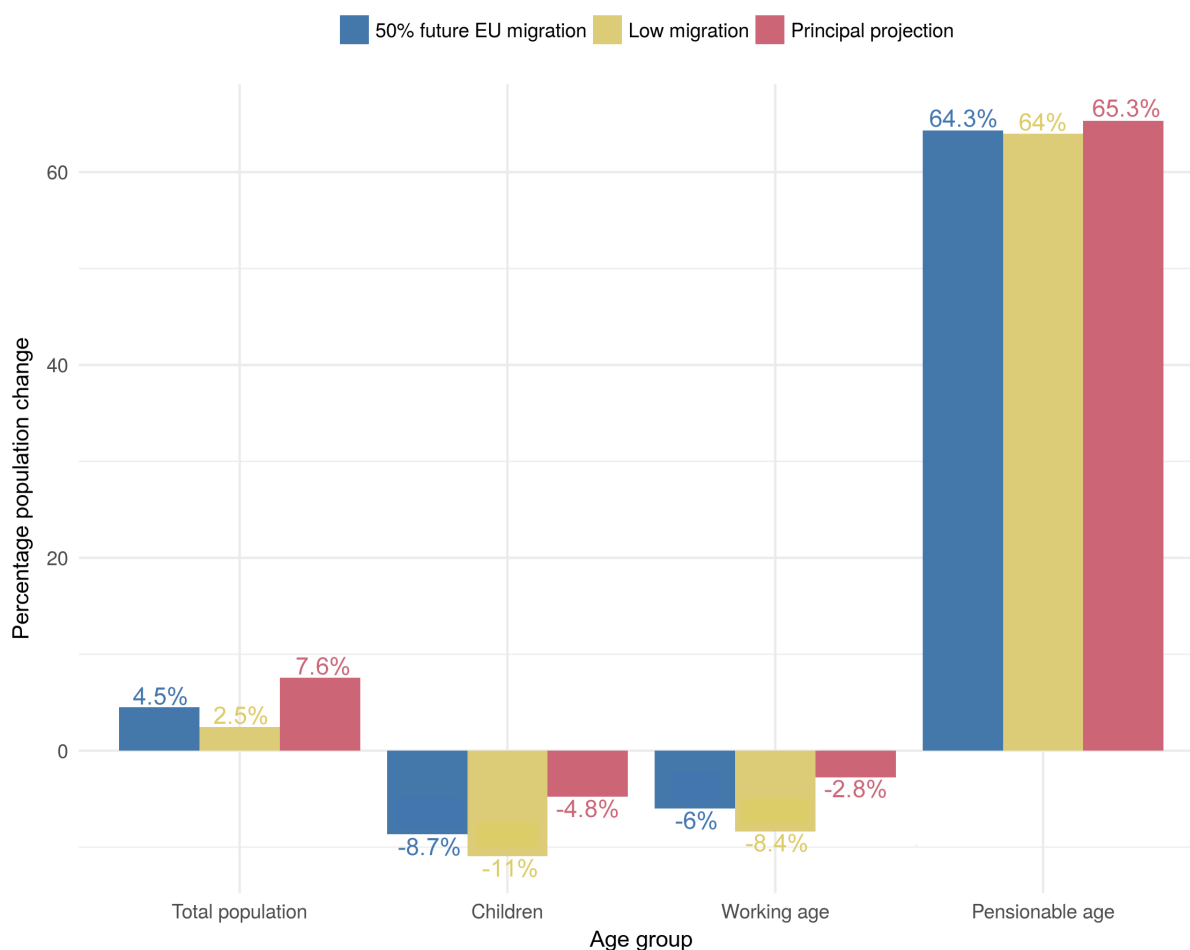
3.2 Fiscal forecasts

Demographic and economic benefits of migration to Northern Ireland are directly linked through growth in the working age population and the impact on tax revenue. The size of the population aged 16 to 64, which makes up most of the working age population, is crucial for the economy and public finances. These individuals are more likely to be working and will be generating the highest tax receipts, for example, in income tax.

Taking factors, including the changing relationship between the UK and EU, demographic change and possible future policy changes into account, we judged that the 50% less future EU migration and low migration variants of the population projections were appropriate for Northern Irish circumstances in preparing forecasts.

Figures 8 and 9 demonstrate how the variants affect the age structure of the population compared to the principal projections in Northern Ireland and the UK. These Figures highlight the significance

Figure 9. Projected population by age group, Northern Ireland and UK, 2016-2041

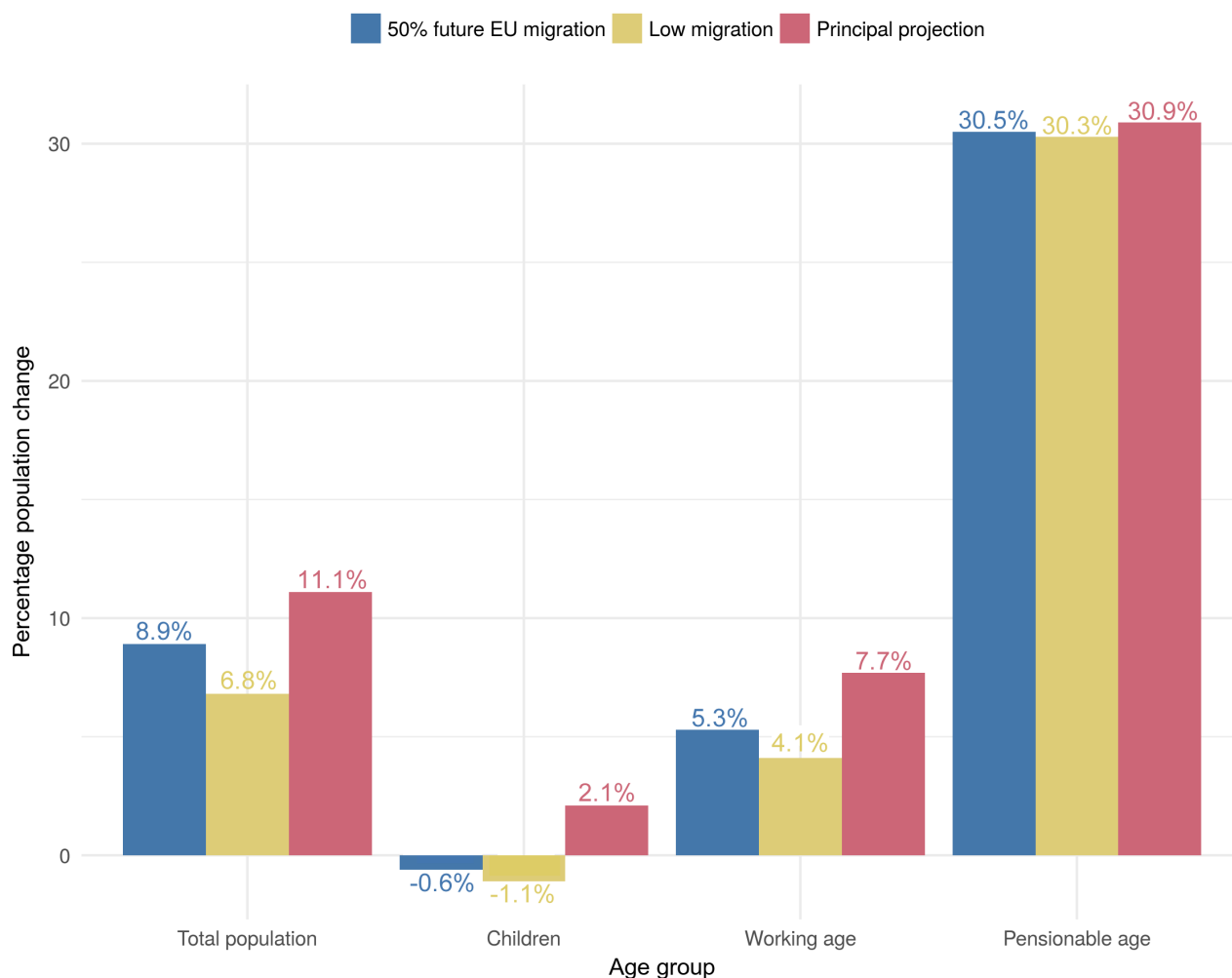


Source: *Projected populations at mid-years by age last birthday in five year age groups, NI, ONS (October, 2017)*

of migration to Northern Ireland's population growth relative to the rest of the UK, and the greater exposure Northern Ireland faces to reduced inward migration as a consequence of UK policy changes. This outcome would severely impact Northern Ireland's economic prospects.

The 50% future EU migration and low migration variants used here are produced by varying the international in and out flow assumptions and using the principal assumptions for fertility and mortality. All 2016-based migration variants assume that net migration increases or reduces the UK principal net migration assumption by 80,000 in total. In the first projected year (mid-2017) the variants only assume half of the long-term width (40,000 higher or lower than the principal assumption), to allow for a smoother transition.

Figure 10. Projected population by age group, United Kingdom, 2016-2041



Source: *Projected populations at mid-years by age last birthday in five year age groups, UK, ONS (October, 2017)*

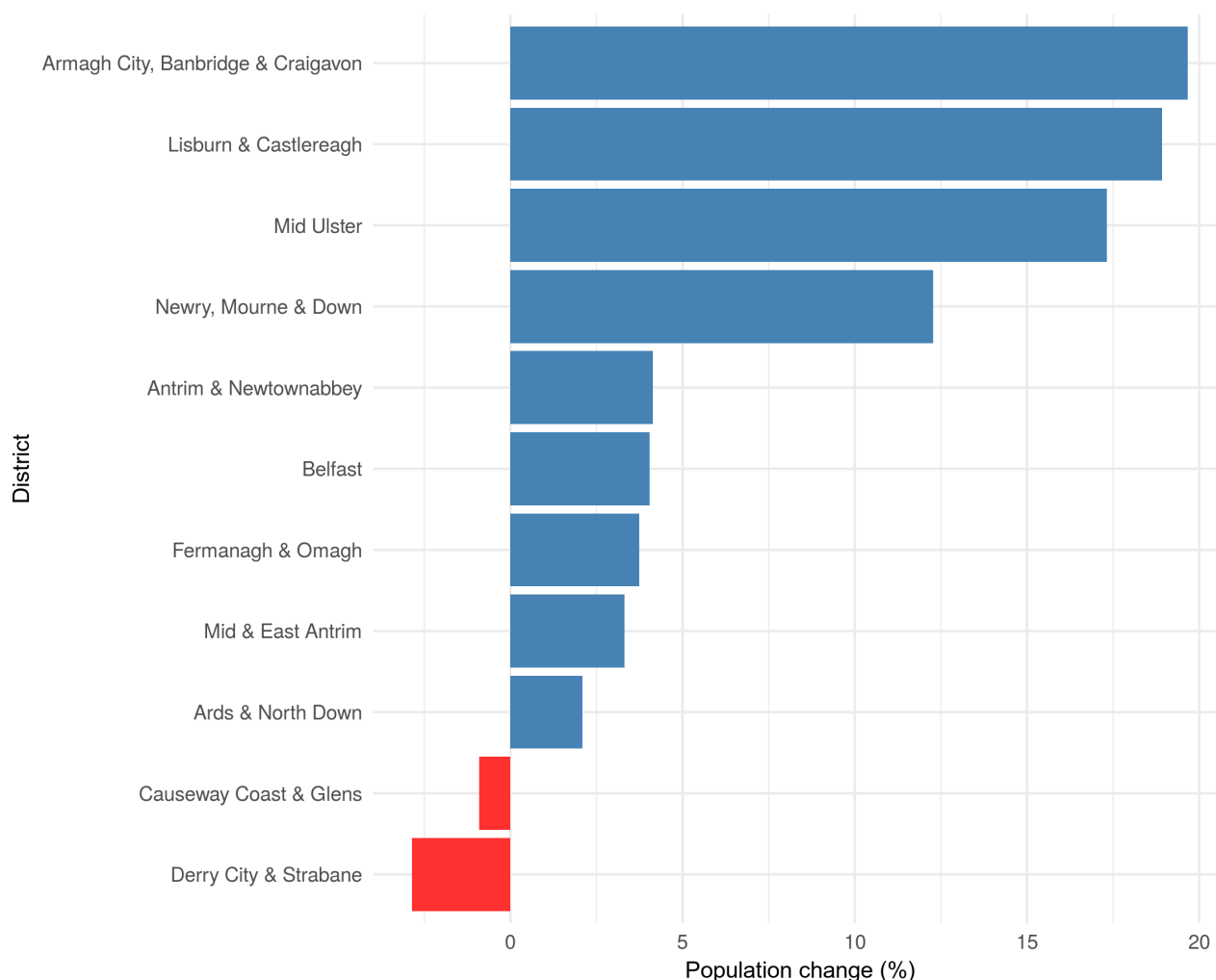
The comparison between the impact of Northern Ireland and the UK reflects both the greater significance of migration to Northern Ireland's population growth relative to the rest of the UK, and the greater exposure that Northern Ireland faces to reduced inward migration as a consequence of UK policy changes. This outcome would severely impact Northern Ireland's economic prospects.

3.3 People and places

Migration not only enhances our economic prospects and contributes to our demographic sustainability, it also enriches our culture and strengthens our society. Migrants contribute to a diverse, open and modern society and there is also some evidence to suggest that they increase qualities of tolerance, inclusiveness and openness to inter-cultural learning amongst Northern Irish citizens. Migration supports key places such as our rural communities, bringing a supply of labour to the rural economy and helping sustain essential public services including healthcare and schools.

Ageing and declining rural populations heighten the need for migrants. For example, in the *Causeway Coast & Glens*, the combination of lower levels of unemployment with growth in important sectors such as tourism and food and drink has attracted migrants to live and work in rural areas. Between 2005 and 2015, around 20% of total estimated population growth in the *Causeway Coast & Glens* came from people born outside the UK.

A projected reduction in migration due to Brexit will impact different areas of Northern Ireland in different ways. Overall, as shown in Figure 9, the total population of Northern Ireland is projected to increase by up to 7.6% from 2016 to 2041. This will lead to an increase in population for most local districts; especially for districts in and around Belfast. However, although population across Northern Ireland is projected to increase, there are districts such as the *Causeway Coast & Glens* and *Derry City & Strabane* that will experience a fall in population.

Figure 11. Sub-regional projected percentage change in total population, 2016-2041

Source: 2016-based population projections for areas within Northern Ireland, NISRA (April, 2018)

3.4 Economic consequences

The impact of Brexit, and the consequence of lower levels of net migration, will have a negative impact on the real GDP of Northern Ireland. Using the 50% future EU migration variant², the labour market shock due to the projected reduction in net migration from Brexit is simulated through a dynamic stochastic general equilibrium (DSGE) model and the size of the shocks are estimated by calculating the percentage change in working age population between the two projections³.

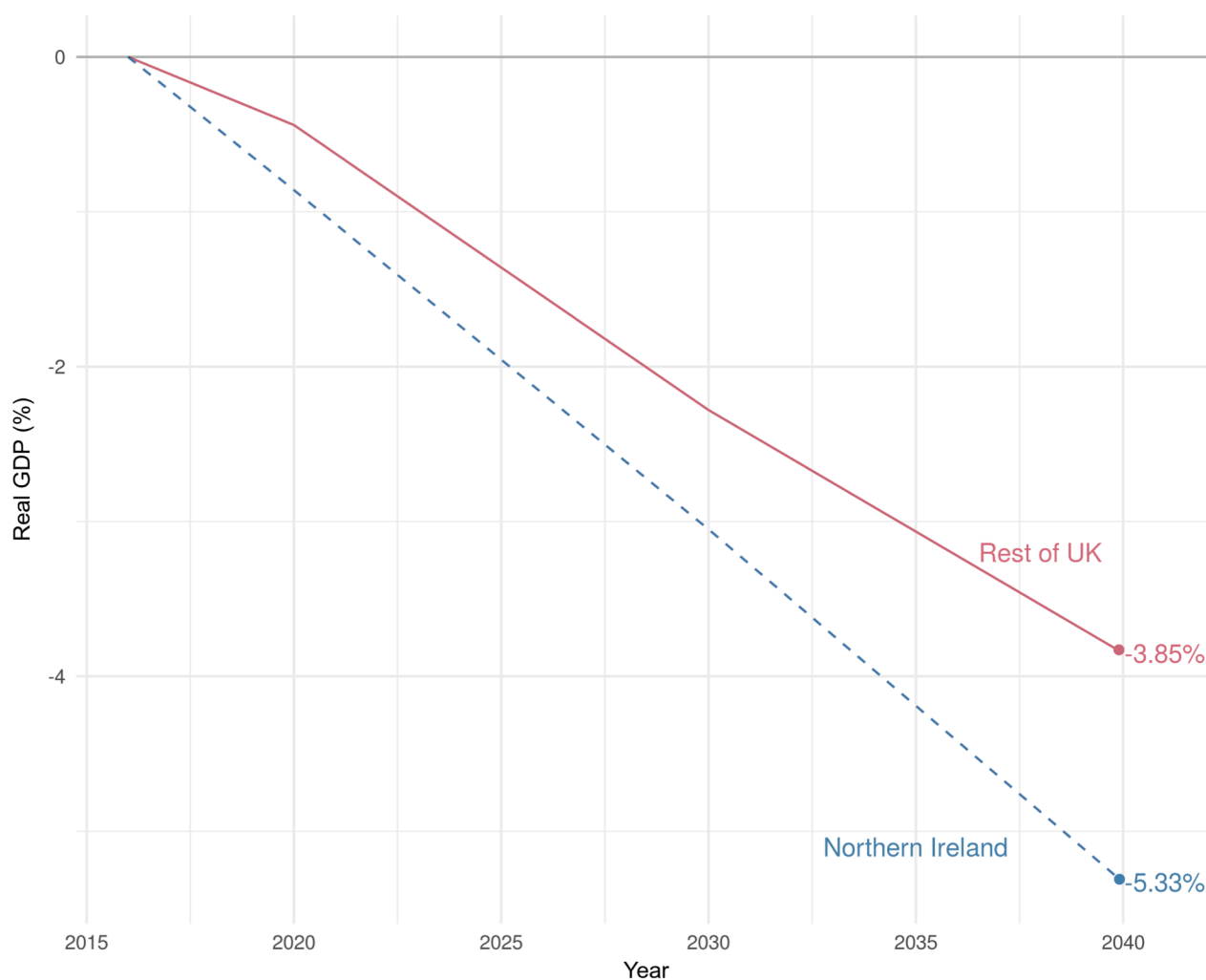
² Description of the 50% future EU migration variant is given in section A.1 of the Technical Annex and reasoning as to why this population projection variant was used is given in section A.2.

³ An explanation of DSGE modelling is given in section A.3 of the Technical Annex.

The modelling in this paper highlights the economic impact of reduced levels of migration. The model seeks to quantify the impact that lower migration post Brexit could have on the Northern Irish economy. It estimates that real GDP in Northern Ireland will reduce by at least 5.33% by 2041 than it would have been otherwise, using the principal projection of migration. See Figure 12. This is equivalent to a fall of approximately £625 million in GDP by 2040.

The model created also suggests that if the consequence of Brexit leans closer to a low migration variant, real GDP would fall in Northern Ireland by 13.15% compared to a fall in the rest of the UK of 7.9%. Proportionally, Northern Ireland experiences a larger negative impact relative to the rest of the UK. For more information, consider the Technical Annex of this report.

Figure 12. Projected change in real GDP, Northern Ireland and rest of UK, 2016-2041



3.4.1 Dynamic macroeconomic consequences

The DSGE model does not take into consideration the dynamic nature of what lower migration and the institutional impact of Brexit can have on real GDP. Indeed, migrant workers bring new skills and expertise and typically have high levels of entrepreneurship which helps lay the foundations for future economic growth. Moreover, as already noted, a large number of EU and international students that come to study in Northern Irish universities also add to the diversity of our communities, enrich the learning experience and, in the case of those who can remain in Northern Ireland, go on to contribute to economic prosperity.

Further, the model is limited such that if firms in Northern Ireland cannot access the labour they need, many will decide to focus their future investments in the Republic of Ireland. Here the option of relocating to the Republic of Ireland is far easier than it is for firms operating elsewhere in the UK to relocate overseas. Already, uncertainty over future access to EU labour and skills is causing firms to consider relocating more seriously. Several businesses, particularly larger firms, have already signalled that they have already started exploring re-location opportunities. A number have already purchased facilities in the Republic of Ireland and others are considering expanding facilities they already possess.

3.4.2 Sector-specific consequences

We investigate the impact of Brexit and restricted migration on specific sectors of Northern Ireland.

- **Agri-food:** The NI Food & Drink Association has estimated that 48% of their member's full-time employees, and 91% of seasonal contract agricultural workers, are EU nationals. While local firms do not wish to be so reliant on European labour, they recognise that these workers are not replacing indigenous labour but instead are addressing important shortages in the regional labour market. Without access to European labour the agri-food sector cannot grow and contribute to the Executive's efforts to rebalance the regional economy.
- **Health:** *Transforming your Care* set out a shared view of how that transformation would take place and a huge component was the reallocation of resources from secondary care to the primary and community care sectors. Private sector companies charged with delivering that community care for the NHS however are encountering severe problems accessing staff

to fulfil those contracts. They have reported that they must now turn down a significant proportion of tendering for new contracts because they have no staff to carry out the work.

- **Tourism:** By 2020, the tourism sector in NI aims to double the contribution to GDP and generate £1bn in tourism spend, creating 10,000 new jobs in the process. These ambitions cannot be achieved without access to migrant workers. This sector currently relies heavily on a strong supply of migrant labour and ambitions to grow requires that an international pool of workers remains accessible.
- **Construction:** Having experienced the worst housing crash in Europe back in 2008, Northern Ireland's construction sector is only just recovering in terms of economic activity. In March 2016, the Construction Industry Training Board (CITB) commissioned a skills and training survey. The survey found that right across the UK this sector had common themes around recruitment difficulties and skill shortages, skills deficiencies and gaps in established workforces as well as training and development activity. Construction firms in Northern Ireland report the same issues and additionally note that the industry has really struggled to attract young people as the sector's turbulent past during 2007-2014 – which resulted in parents encouraging young people to bypass this sector for job security reasons. NI construction companies have expressed concerns about bidding for further work as they currently face skills shortages. Attracting international workers into this sector will also be crucial if NI is to realise its ambitions for infrastructure delivery in terms of roads and housing.
- **Manufacturing:** CBI members report skills shortages in a range of manufacturing sub-sectors. While there is a significant need for lower and mid-tier skills in the manufacturing sector there is also a significant need for high-level skills too. For example, the regional manufacturing sector extends to knowledge intensive areas such as medical diagnostics, pharmaceuticals, food nutrition, aerospace and plastic composites and engineering. Companies report the need to attract qualified engineers (chemical, design as well as project management engineers), chemists and graduates with PhDs from across Europe to meet their business needs. Any restrictions on that access to professional talent will severely restrict Northern Ireland's ambition to grow its knowledge economy.
- **Universities:** Securing a sustainable Higher Education system is vitally important as today's young people will drive tomorrow's economic growth. We must, therefore, nurture their talent so that our students can maximise their potential as global citizens. Local universities

have expressed deep concerns that restrictions on the freedom of movement between European countries will have implications for thousands of NI students who go to Europe to study or engage on work exchange programmes. Investment in research and development by local businesses has never been higher, although there is still more to do if we are to reach our knowledge economy growth ambitions. It is essential therefore that both businesses and universities in NI will continue to have access to research funding opportunities as well as have access to the best international research staff to work on collaborative projects. The most successful universities globally are those that can attract world-leading talent. For example, Queen's University in Belfast currently employs 764 EU staff members (479 EU academics and researchers as well as 285 EU Professional Support staff). Future limitations on the freedom of movement of talent into Northern Ireland could potentially jeopardise both of our local universities ability to produce world-class research - which is determined by their ability to collaborate on global projects and attract the best of international talent. Beyond damaging our universities' future research capabilities, this dent to their global competitiveness will be further amplified if local universities have restricted access to research funding and income from international students. Currently, QUB has 1,010 EU students enrolled for the 2016-17 academic year.

4 CONCLUDING POINTS

Summary (to be done by AMCG):

- Prior to its dissolution the local Executive was taking steps to address Northern Ireland's economic fragility through its own regionally focused Industrial Strategy which envisioned "*a globally competitive economy that works for everyone.*" This vision required Northern Ireland to transform its economic competitiveness, grow the private sector and increase wealth. Such objectives however are highly correlated with rising productivity and access to talent. Local companies argue that the private sector simply cannot grow and deliver industrial strategy goals if access to European migrant labour is unduly curtailed.

A TECHNICAL ANNEX

Most economic literature on migration finds that migrant workers have a positive effect on the host country and can contribute to higher economic growth. This growth can be achieved through incoming migrants providing a boost to the labour supply, thereby expanding the productive capacity of the economy, resulting in higher levels of economic activity and employment, making the economy as a whole more competitive. As well as adding to the supply side of the economy (expansion in the labour force), migrants also contribute to increased demand for goods and services in the economy (as migrants are also consumers).

The impact of reduced migration is exacerbated given that the majority of the migrants who come to Northern Ireland are economically active and provide a significant remedy to the known skills shortage emanating from the brain drain. Indeed, a reduction of migration was shown to have a significant impact on the working age population of Northern Ireland. How the population is projected for the future is important to accurately estimate the impact that lower migration will have on real GDP.

A.1 Background on population projection variants

The Office for National Statistics (ONS) produce a set of population projections for all regions of Great Britain. These population projections provide an indication of the future size and age structure of the population based on mid-year population estimates and a set of assumptions of future fertility, mortality and migration. These projections are widely used for resource allocation and planning.

New principal projections are based on the long-term assumptions of future fertility, mortality and net migration (that is, immigrants minus emigrants), summarised in Table 3. The long-term assumptions are agreed in consultation with NISRA.

In terms of migration, the principal projection assumes that Northern Ireland will experience a net inflow of approximately 600 workers; that is, a net inflow of 1500 migrant workers from the EU and rest of the world and a net outflow of 600 Northern Irish workers.

Table 2: Long-term assumptions for the 2016-based national population projections

Northern Ireland	
Long-term average number of children per woman (Fertility)	2.00
Expectation of life at birth in 2041 (Mortality): Males	82.8
Expectation of life at birth in 2041 (Mortality): Females	85.8
Net international migration (Migration)	+1,500
Net UK migration (Migration)	- 900

Source: *Office for National Statistics*

The principal projection is not the only population projection produced by the ONS and NISRA. A number of other population projection variants are produced for the Northern Irish economy based on the principal population projection. In this report we considered the following:

- **High migration variant:** Inherits the fertility and mortality assumptions of the principal projection and further assumes that there will be a net international migration change of 6,000 per year and maintains the net UK migration change at approximately -900 people per year.
- **50% future EU migration variant:** Inherits the fertility and mortality assumptions of the principal projection and further assumes that there will be half in-migration from the EU than what is currently witnessed, which is approximately -1000 workers. Again, it maintains that the net UK migration change is approximately -900 people per year.
- **Low migration variant:** Inherits the fertility and mortality assumptions of the principal projection and further assumes that there will be a net international migration change of -3,000 per year and maintains the net UK migration change at approximately -900 people per year.

The assumed long-term annual net international migration variants are summarized in Table 3.

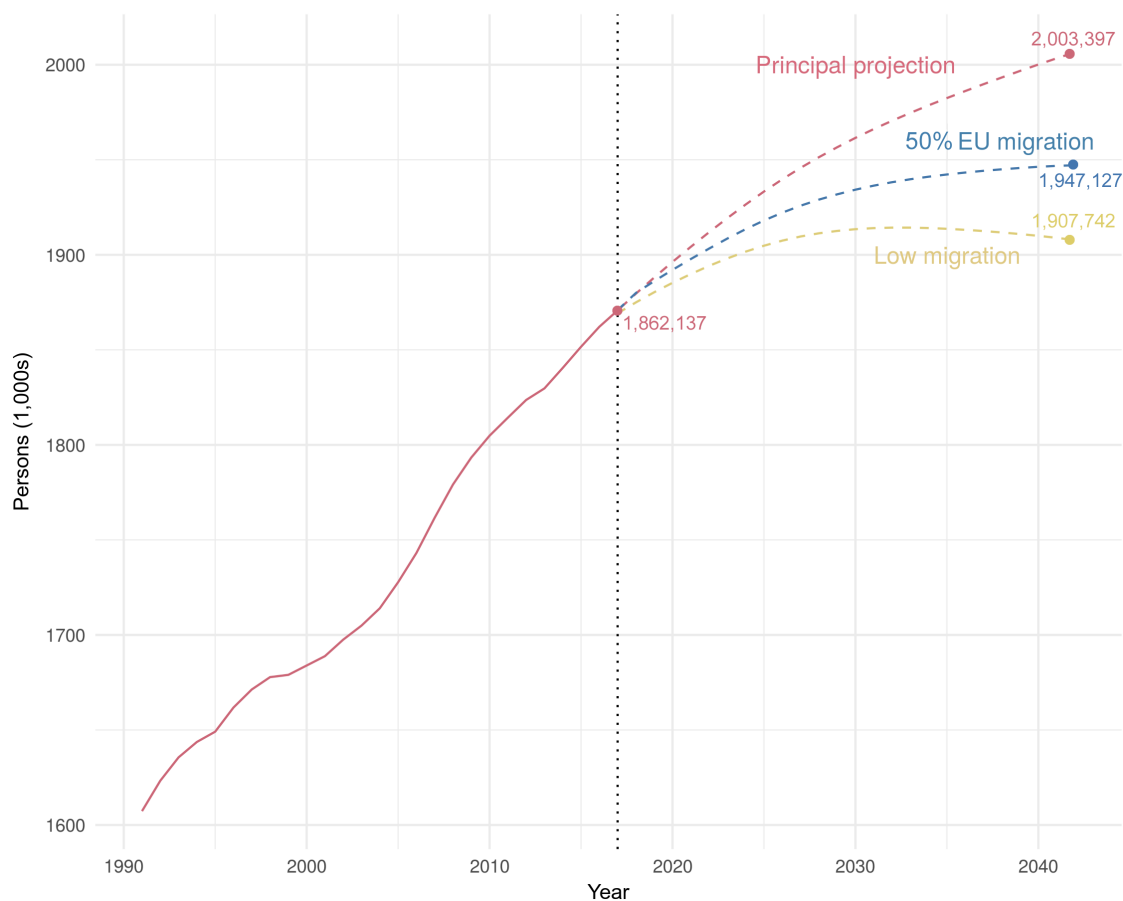
Table 3. Assumed long-term annual net international migration for the standard variants, Northern Ireland

	Principal	High	50% future EU	Low
Northern Ireland	1,500	6,000	-1,000	-3,000

Source: *Migration assumptions, Office for National Statistics*

These population projections can be drawn out and represented graphically to get an idea of the impact of each projection variant on the overall population of Northern Ireland. The impact of these population variants are shown in Figure 13. Here, we can see that the projected populations notably diverge over time.

Figure 13. Population projection variants, Northern Ireland, 1990-2041



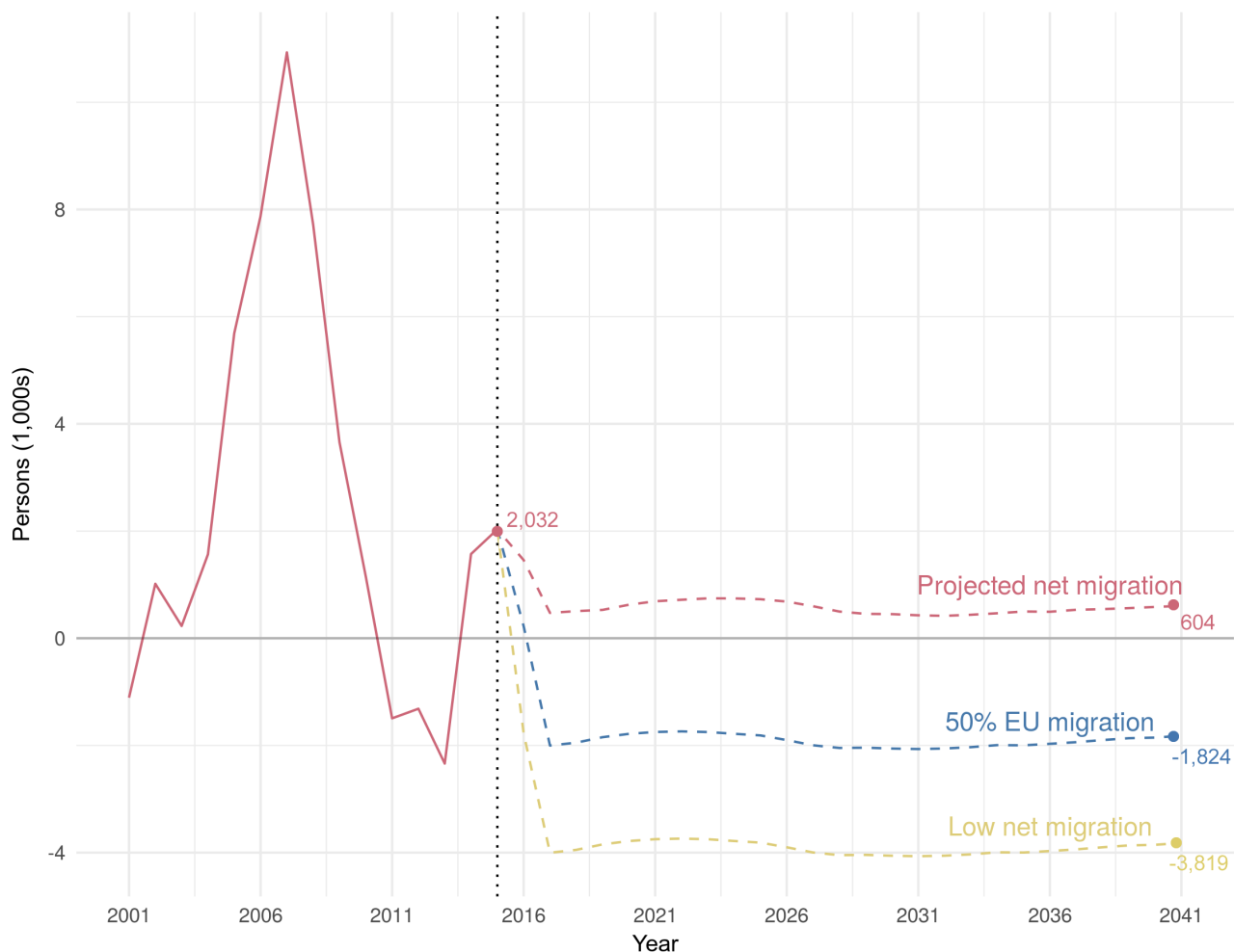
Source: *Office for National Statistics*

A.2 Assumptions of future population and migration levels

To estimate the economic impact we first consider what the level of migration could be if recent migration trends continued; and then consider the level of migration after the UK leaves the EU. To do so we take a number of considerations:

- As noted in the previous section, there are many alternative projections for net overseas migration. Due to the erratic nature of migration prior to 2016 we take a cautious approach and take the principal projection as the projected net migration, which shows a healthy positive inflow of migration.
- We then take the 50% future EU migration population variant as a good indicator in the event of Brexit. This indicator suggests a difficulty for migrant workers from the EU to enter Northern Ireland. The friction provided by this indicator maps well to a difficulty, or potential reluctance, to enter Northern Ireland.
- The difference between these two projections—around 2,500 people per year—is the reduction in migration caused by Brexit.
- Due to the uncertainty presented by Brexit, we also replicate the model with the low net migration variant, which estimates a reduction in migration by around 4,500 people per year compared to the principal projection. This is done as a sensitivity analysis to see if similar results are derived.

The different migration projections used are shown in Figure 14 and simulated through the economic model. Specific interest is paid to the number of people of working age from 2018 to 2041. The difference between the principal projection of the working age population and the two variants over this time can be seen in Table 4. Unsurprisingly, the low migration variant shows a significantly diminished work force relative to the principal projection.

Figure 14. Northern Irish net overseas migration, historical and projections, 2001-2041

Source: *Components of change (mid-year to mid-year), total fertility rate and expectation of life at birth based on the mortality rates for the year, ONS (October, 2017)*

Table 4. Difference in working age population for Northern Ireland, 2018-2041

	2018	2021	2026	2031	2036	2041
50% EU migration	0	-4,000	-13,000	-21,000	-30,000	-40,000
Low migration	-6,000	-16,000	-36,000	-55,000	-76,000	-100,000

A.3 Dynamic stochastic general equilibrium modelling

Dynamic stochastic general equilibrium (DSGE) models are a well-accepted method in macroeconomics that attempts to explain economic phenomena, such as economic growth and the effects of economic policy, through econometric models based on applied general equilibrium theory and microeconomic principles.

As their name suggests, DSGE models are dynamic (studying how the economy evolves over time), stochastic (taking into account the fact that the economy is affected by random shocks), general (referring to the entire economy), and of equilibrium (subscribing to the Walrasian, general equilibrium theory).

Much like computable general equilibrium (CGE) models, DSGE models are large-scale simultaneous equation models that combine general equilibrium theory with empirical economic data to derive the impact of policies or shocks. Within the model we define the objective functions of households, firms and Government as well as factor in price and wage setting problems, the growth of technology, rate of investment and market equilibrium conditions⁴. Households and firms aim to maximize their objective functions subject to some constraints, whilst Government aims to maintain the chosen fiscal closure.

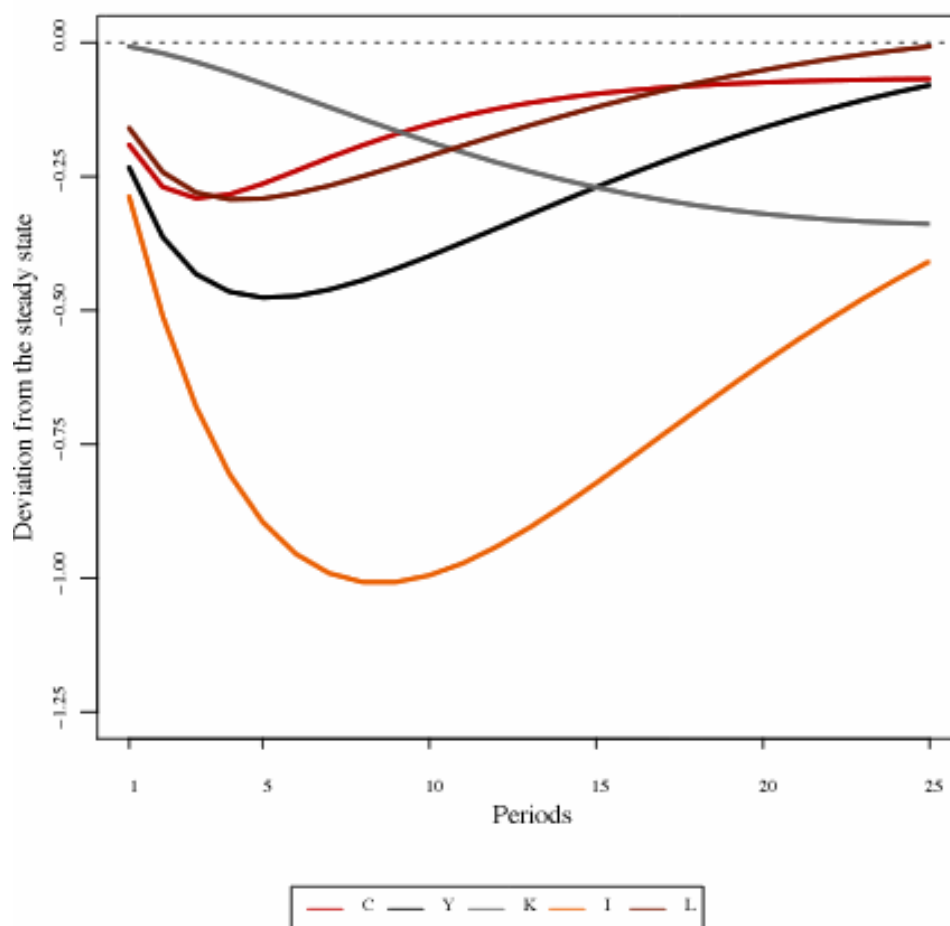
In absence of any economic shocks, the model is in steady state equilibrium. In this equilibrium, demand equals supply and every market clears. After an economic shock, the economy falls out of equilibrium and imbalances occur across the economy. As a result of market clearing conditions, all markets adjust across time until a new equilibrium is achieved. Therefore, the economy transitions from one equilibrium and, over time, transitions to a new long-run equilibrium.

The labour market shock leads to a new equilibrium characterised by a lower natural rate of employment and lower real GDP. In doing so, due to the interlinked nature of the economy, a fall in the supply of labour will also trigger a fall in aggregate demand and therefore its components; consumption, Government spending and investment. Figure 14 shows the dynamics of consumption and capital investment given a sustained negative shock to labour following the working age population projections given above⁵.

⁴ The DSGE model used is a minor alteration of: Smets, F. and Wouters, R., 2003. An estimated dynamic stochastic general equilibrium model of the euro area. *Journal of the European economic association*, 1(5), pp.1123-1175.

⁵ The DSGE model was created and run in the R programming language using the gEcon library. The model used can be found at:
https://github.com/O1sims/MigrationNI/blob/master/models/DSGE_model.gcn

Figure 14. DSGE model simulating the impact of a negative labour shock



Note: This shows the trajectories of capital (K), income (Y), consumption (C) and investment (I) due to a collapse of labour (L).