Technical Paper to Accompany Impact Assessment for Immigration and Social Security Co-ordination (EU Withdrawal) Bill 2020

Contents

A. Introduction

1. This Technical Annex provides more information on the methodology and data sources behind modelling used within the Impact Assessment for Immigration and Social Security Co-ordination (EU Withdrawal) Bill 2020 ('the Impact Assessment'). Modelling covers three distinct policy areas; long-term work migration (skilled workers route)[1], short-term work migration and student migration in higher education. The analysis described here is designed to give an initial view on the potential scale of the economic impacts of policy changes under the future immigration system. Analysis does not consider how the coronavirus pandemic could affect outcomes. It is too soon to tell what the impacts will be.

2. For each policy area, the analysis begins by setting out the methodology behind the 'baseline' projection of migration flows (independent of any policy changes), before presenting the assumptions and methodology behind the estimated policy impacts on flows. The final section of this Technical Annex sets out the overarching approach to estimating the fiscal impact of policy changes in each area.

3. There is considerable uncertainty within this modelling and there are several ways in which the uncertainty manifests itself:

    (1) **Data sources** – imperfect data (such as the use of survey data) often mean that confidence intervals can be large;

    (2) **Assumptions** – any modelling requires the use of evidence-based assumptions and expert judgement and migration is no exception; and

    (3) **Behavioural response and change** – predicting response or changes to behaviour can be highly uncertain.

4. The potential impacts should be considered in the context of this uncertainty and treated as orders of magnitude rather than precise estimates.

5. Unless otherwise specified, 'EEA' refers to the 27 EU member states[2] except for the Republic of Ireland, the three additional EEA member countries, and Switzerland. The Republic of Ireland is excluded because of the existence of the Common Travel Area with the UK. Switzerland is included because whilst it is neither in the EU nor the EEA, it is part of the single market, which means Swiss nationals have the same rights to live and work in the UK as other EEA nationals.

6. Data sources used to analyse migration collect information on the basis of nationality, or domicile. This information on nationality or domicile has been used to inform assessments of potential impacts discussed in this document, and the Impact Assessment. The Immigration and Social Security Co-ordination (EU Withdrawal) Bill 2020 makes provisions on the basis of citizenship, the terms 'national' and 'citizen' are

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[1] Under the current Tier 2 (General) route, a small proportion of migrants are estimated to stay for less than 12 months and, therefore, would not be classed as long-term migrants. However, the majority are long-term migrants.
[2] See https://www.gov.uk/eu-eea for a list of EU and EEA member countries

assumed to be interchangeable for the purposes of analysing potential impacts discussed in this document.

B.   Long-term work migration – skilled workers route – EEA nationals

7.   Modelling considers the impact of applying a RQF3 skill threshold and MAC recommended salary thresholds[3] to long-term EEA worker inflows. Modelling does not include all elements of the policy. For example, the analysis does not quantify the impact of requiring a job offer, English language requirements, or potential deterrent effects due to the imposition of fees and sponsorship requirements. Analysis of tradable points has also not been included (i.e. that applicants may be able to earn less if, for example, they are working in a shortage occupation or they have a relevant PhD).

B.1.   Long-term EEA work migration baseline

8.   To provide an understanding of the impact of policy choices on migration flows, it is important to be able to compare options on a like for like basis. In practice this means that there must be a common "baseline" of EEA migration against which to judge alternative outcomes.

9.   Projecting migration flows is extremely challenging for a number of reasons:

- There are a wide range of potential drivers, which are themselves inherently uncertain. Migration flows are subject to short term "shocks" that by their nature are unpredictable.
- There are significant limitations of the underlying data.
- Using statistical techniques to project forward assumes that past behaviours and relationships between variables remain stable over time and will continue in the future. In reality, the world is ever changing, and behaviours will adapt and evolve over time in response to a changing environment.

10.   The Migration Advisory Committee (MAC) migration forecasting report[4] discusses these challenges in more detail. Any analysis of future migration flows in this paper and the Impact Assessment is therefore not a forecast and should be considered in this context and the high levels of uncertainty that this implies. Nonetheless, to provide an understanding of the impact of work migration policy choices on economic outcomes, it is important to be able to compare options with one another on a like for like basis. To assess the impact of changes in work migration policy, a long-term work-related EEA baseline is constructed to project flows into and out of the UK in the absence of any policy change.

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[3] Experienced thresholds are set at the highest of the general threshold of £25,600 or the occupation specific threshold set at the 25th percentile. Modelling also includes new entrant thresholds set at 30 per cent below the experienced threshold. Except for 24 public sector occupations – where public sector pay bands are used for both experienced and new entrant workers.

[4]

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/467405/Migration_Forecasting_report.pdf

Long-term EEA work baseline inflows modelling

11.   The projection of EEA long-term work-related migration inflows is based on an econometric model that quantifies the relationship between inflows to the UK and demographic and economic factors. The model is based on factors that are cited as migration drivers in the existing literature, both for source countries and the UK, to capture both 'push' and 'pull' factors. This approach is consistent with previous empirical studies on migration[5].

12.   Demographic and economic factors used in the model include:

- Population aged 20-39 (as most migrants are in this age bracket);
- Relative unemployment rates; and
- Relative GDP per capita (using a purchasing-power-parity exchange rate)[6].

Data

13.   The model uses International Passenger Survey (IPS) data for annual inflows from 19 EU countries[7] between 2004 and 2015[8].

14.   IPS data is adjusted for other inflows such as asylum seekers and flows to and from Northern Ireland to estimate Long-Term International Migration (LTIM) which are used as the main measure of immigration, emigration and net migration across the whole population. As LTIM estimates are not provided by reason for migration and nationality, the preliminary adjusted IPS estimates are used in the regression analysis. IPS data provides reason for migrating based on a respondent's intentions, which may be different to the actual activity they undertake. As with all surveys, IPS is subject to sampling variability and since international migration estimates are based on a relatively small number of interviews some variables can only be disaggregated to a certain level before being subject to unacceptable margins of error, for example, migration from certain countries by single year.

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[5] Ortega, F. and G. Peri (2009). The Causes and Effects of International Migration: Evidence from OECD Countries 1980-2005.

Forte, G. and Portes, J. (2017): Macroeconomic Determinants of International Migration to the UK, GLO Discussion Paper, No. 69

[6] In the IMF WEO online database, the implied PPP conversion rate is expressed as national currency per current international dollar. Projections for GDP in current prices (converted in PPS) are available at: https://www.imf.org/external/pubs/ft/weo/2018/02/weodata/index.aspx

[7] The EU countries not included in the sample are: Ireland, Luxembourg, Cyprus, Malta, Slovenia, Romania, Bulgaria and Croatia, reflecting data availability. Romania and Bulgaria are excluded as they were subject to migration controls for most of the sample. In addition, migration controls remained in place for Romania and Bulgaria until 2014. The projections assume that migration flows from all EU countries respond to the demographic and economic determinants according to the estimated regression coefficients.

[8] IPS estimates at country level are available from 2000 and this level of granularity was selected to capture the most recent migration trends, foregoing a longer but more aggregated time series (from 1991).

15. It is important to note that the Office for National Statistics (ONS) have published preliminary adjustments to EU immigration figures[9]. These adjustments have not been published by reason for migrating, as this work focuses on work-related inflows adjustments to overall levels have not been included within the analysis.

Model specification

16. The model specification uses traditional panel data modelling techniques to project baseline migration inflows. The functional form utilised is[10]:

(1) $y_{it} = \beta_0 + X'_{it}\beta + u_{it}$, where X' is a vector of economic variables[11] for each country i at time t.

17. The final model yields[12]:

(2) $y_{it} = -1.0 - 1.9 rel\_gdp_{it-1} + 0.1 unemp\_diff_{it-1} + 0.1\Delta unemp\_diff_{it} + e_{it}$

Where:

- y_{it} is the natural logarithm of rate of EU inflows to the UK as a percentage of the population aged between 20 and 39 in country i in year t.
- $unemp\_diff$ is the difference between country i and UK unemployment rate, lagged by one year;
- rel_gdp is the ratio of the natural logarithm of GDP between country i and the UK, lagged by one year;
- e is the regression error.

18. The key quantified relationships from this are:

- A 1% change in relative GDP between EU countries and UK results in a -1.9% change in the work-related inflows.

- A 1ppt change in the difference between unemployment rates results in a 10% change in work-related inflows.

- A 1ppt change in the growth rate of the difference between unemployment rates results in a 10% change in work-related inflows.

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[9] https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/internationalmigration/articles/understandingdifferentmigrationdatasources/augustprogressreport

[10] 'Random effects' rather than 'fixed effects' are used to cater for the persistence of differences between relative income which could appear as fixed effects.

[11] https://www.imf.org/external/pubs/ft/weo/2017/01/weodata/index.aspx

[12] Alternative specifications were included to test the effect of exchange rate and inequality measured by GINI coefficients but were not found to be significant in explaining long term migration flows. Note that exchange rates will affect relative incomes – which are included. Model gives an overall R squared of around 0.5. All coefficients are significant at p<0.01.

- A 1% increase in population aged 20-39 in the origin country results in a 1% increase in work-related inflows.

19.   Having derived an estimate for the economic and demographic drivers of inflows from the EU, the estimates are then applied to forecast macroeconomic variables from the International Monetary Fund's (IMF) World Economic Outlook (WEO)[13] to project EU migration flows. This is done using April 2019 WEO[14] projections of GDP and unemployment for UK and EU members.

20.   After 2024, relative GDP per capita is assumed to remain at its projected 2024 level for the EU15. For EU8 and EU2 economies the speed of convergence with the UK is assumed to decelerate[15]. Population projections, beyond 2024, by country and age are sourced from United Nations Population Projections[16].

21.   The migration data used as a basis for the projection is the three-year average of the inflows between 2016 and 2018. A three-year period was chosen to avoid placing too much weight on single data points.

22.   As stated above, there is a significant amount of uncertainty surrounding any estimates of future migration flows. The projections here should not be treated as a forecast – instead they reflect a plausible future profile consistent with a set of future long-run fundamentals, which can be used to compare policy changes against.

23.   To illustrate the uncertainty around the central estimates, ranges have been estimated using the "average" (root mean squared) prediction errors for EU inflows from equation (2). The ranges are set at +/-20,000 respectively but are assumed to widen over time at a rate of +/- 2,000[17] each year to reflect the concept that uncertainty compounds over time (Figure 1).

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[13] In the IMF WEO online database, the implied PPP conversion rate is expressed as national currency per current international dollar. Projections for GDP in current prices (converted in PPS) are available at: https://www.imf.org/external/pubs/ft/weo/2018/02/weodata/index.aspx

[14] https://www.imf.org/external/pubs/ft/weo/2019/01/weodata/index.aspx

[15] EU8 and EU2 countries are assumed to continue to grow but at 80% of the previous year's growth rate.

[16] https://population.un.org/wpp/Download/Standard/Population/

[17] Based on +/- 10% of root mean squared error

Figure 1: Central range around projected long-term EEA work-related inflows[18]
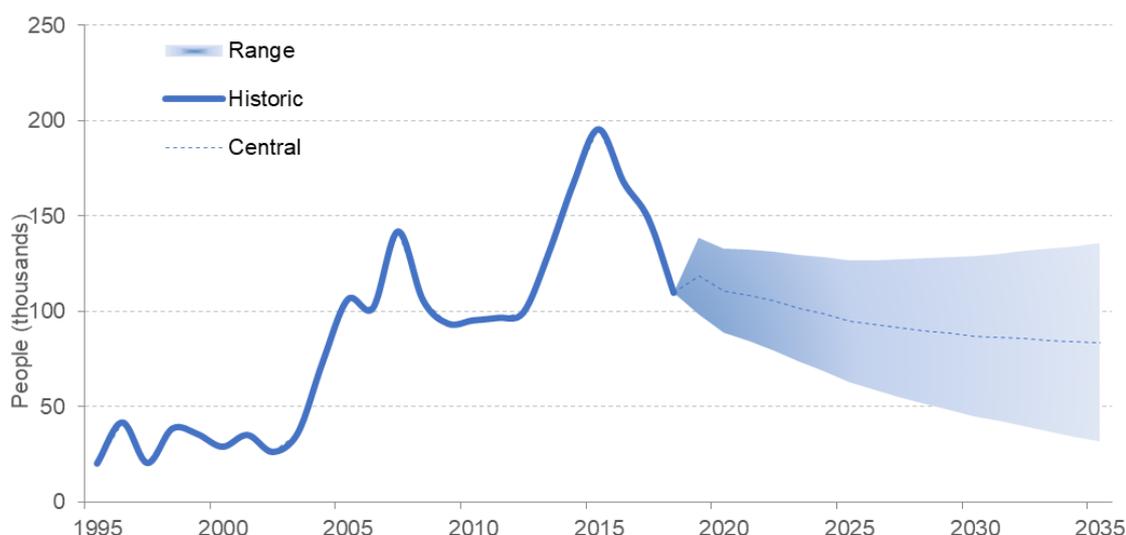
24.   Root mean squared error (RMSE) is a measure of how accurately the model predicted observed inflows and illustrates how far out the projection might be based only on how well the model predicted historic data points (using outturn data for economic and demographic drivers). This only captures one element of the uncertainty within the model. However, there are additional sources of uncertainty:

- Uncertainty in underlying outturn data;
- Uncertainty in projected fundamentals (for example, projected unemployment rates and relative GDP); and
- Uncertainty over time and stability of relationships between inflows and drivers of migration.

Long-term EEA work baseline outflows modelling

25.   To capture net migrant workers in the economy, outflows are modelled as a function of previous inflows. Outflows are linked to previous inflows by looking at the Office for National Statistics (ONS) estimates of long-term EEA emigrants by year of previous arrival[19]. This provides data on year of arrival of outflows who previously came for work between 2012 and 2018. This allows the estimation of a 10-year profile for length of stay of outflows (averaged over 2016-18).

26.   This 10-year outflow profile is applied to historic EEA inflows; these results are then compared to actual outflow data to infer the proportion of EEA inflows who eventually left the UK. Based on this, around 51% of long-term EEA inflows are estimated to leave

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[18] To estimate the final EEA projection estimated inflows from Norway and Switzerland are added to EU2, EU 8 and EU14 projections and inflows from Ireland are removed. Due to small volumes inflows from Norway, Switzerland and Ireland are not projected econometrically - instead volumes are assumed remain stable as a proportion of EU14 inflows over 2014-18.

[19] https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/internationalmigration/adhocs/010245internationalpassengersurveyestimatesoflongterminternationalemigrationfromtheukofformerimmigrantsbycitizenshipmainreasonforpreviousimmigrationandyearofpreviousarrivalintheuk2012to2017

the UK within 11 years. Given the data availability, all EU migrants who are estimated to leave the UK are assumed to do so within 11 years of arrival.

27. This approach assumes the behaviour of EEA migrants in terms of the proportion choosing to stay in the UK and length of time in the UK remains stable over time and is constant across occupations, regions and sectors. This also assumes the same length of stay under policy scenarios as under freedom of movement.

28. Inflow and outflow modelling is combined to create a baseline for net long-term EEA work-related migration to the UK. This profile does not reflect a forecast and is an analytical tool to be able to consistently compare policy choices against one another and against a 'do-nothing' option. Actual net migration will differ from this analysis.

B.2.   Long-term EEA work policy modelling

29. The migration policy model uses data on inflows and on the current population of EU workers to estimate characteristics of future migration flows. It applies potential policy levers (such as skill and salary thresholds) to baseline inflows to estimate the impact of these policy levers on the level of inflows, and on net migration.

30. A skill threshold is modelled using the required skill for each occupation set out in Immigration Rules Appendix J[20]. In line with MAC recommendation 24[21], changes have been made to which occupations are regarded as RQF 3, affecting 14 different occupations. When a skill threshold policy lever is applied, each occupation either meets the criteria or does not, the response is binary. Future inflows of migrants in occupations that do not meet the required threshold are reduced to zero, while inflows to occupations that do meet the threshold are unaffected.

31. To model the impact of applying a specific salary threshold to enter the UK, the threshold is applied to the existing wage distribution of EEA migrants within each occupation, identifying the proportion within each occupation that would not meet the specified wage threshold. The model allows different salary thresholds to be set for the experienced (defined as those aged 26 or above) or new entrants (defined as those under 26).

32. Thresholds are set using published ASHE 2019[22] data on full time gross annual earnings of employees. Each occupation's threshold is set based on either the 25th percentile in that occupation (the occupation specific threshold) or £25,600 (the general threshold), whichever is greater[23]. Rather than use this approach for public sector occupations, the MAC instead recommend salary thresholds are based on national pay scales for 24 occupations that are primarily within the education and

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[20] https://www.gov.uk/guidance/immigration-rules/immigration-rules-appendix-j-codes-of-practice-for-skilled-work
[21] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/860669/PBS_and_Salary_Thresholds_Report_MAC.pdf
[22] https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/earningsandworkinghours/datasets/occupation4digitsoc2010ashetable14
[23] For modelling purposes thresholds are rounded to the nearest £1,000.

healthcare sectors. For the relevant occupations within the education sector, such as teachers, the general threshold is assumed not to apply and national pay scales as outlined in Appendix J are used instead[24]. For relevant healthcare occupations, salary thresholds are set at Band 5 for RQF 6 occupations and Band 3 for RQF 3 occupations. Nurses and midwives are the exception to this, as they are RQF 6 and are allowed, under certain conditions, to come to the UK on Band 3 if they are still training.

33.   Outflows respond to previous inflows over a 11-year period, as described for the baseline. When policies are imposed on worker inflows there will be a lagged response in outflows, which means the impacts will take time to reach steady state.

34.   The model only captures long-term migration flows and is based on the simplifying assumption that there are no dynamic or behavioural responses following a migration policy change. Long-term migrants are defined as those stating on entry to the UK that they intend to stay for 12 months or more. Short-term migrants (those intending to stay for less than 12 months) are not currently captured in this section of the analysis - see Section D 'Short-term EEA work migration'.

B.3.   Long-term EEA work – employment characteristics

35.   The IPS data on inflows includes information on whether a migrant is a worker or dependant alongside their sex and age. IPS data does not include information on the employment characteristics of migrant flows; and so data on the EEA population resident in the UK (the stock) is used to help inform where EEA workers might decide to work when they arrive in the UK, and their salaries. Therefore, this analysis assumes that the characteristics of the stock of EEA nationals are a reasonable proxy for the future flows of EEA nationals, in the absence of any policy change. The estimated occupation (four-digit SOC[25]) and sector split for EEA migrants is based on the Annual Population Survey (APS) three-year pooled dataset (2016-18).

36.   Population data for EEA workers (from the APS pooled dataset) is also used to estimate the regional distribution of EEA nationals across occupations. This is combined with regional differences in pay to estimate regional impacts of policy scenarios.

37.   For simplicity, it is assumed that the occupational distribution across sectors and regions stays the same over time – apart from changes that occur as a result of applying salary or skills-based restrictions.

38.   To analyse migration by sector, ONS 2-digit standard industrial classification of economic activities (SIC) codes are grouped into a bespoke list of 39 unique sectors. This provides more granularity than 1-digit SIC codes, whilst also maintaining a

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[24] https://www.gov.uk/guidance/immigration-rules/immigration-rules-appendix-j-codes-of-practice-for-skilled-work
[25] The standard occupational classification (SOC) is a common classification of occupational information in the UK. There are nine major SOC groups (1-digit SOC codes), 25 sub-major groups (2-digit SOC codes), 90 minor groups (3-digit SOC codes) and 369 unit groups (4-digit SOC codes).

manageable number of different sectors to conduct analysis with. A full list of this grouping is provided in Annex A.

Age

39.   IPS provides data on the age of migrant inflows; however, this is not disaggregated by occupation limiting the ability to model lower thresholds for new entrants.

40.   Therefore, to estimate age by occupation and enable modelling of different thresholds for new entrants (identified as those under 26), APS data is used to inform age profiles by occupation. Due to sample sizes limitations this is done at a 1-digit occupation level.

41.   To estimate the age profile of worker inflows, the analysis considers age on arrival[26] of those who say their main reason for migrating was for work and who arrived in 2012 or later[27] by current occupation.

42.   To estimate the age profile of worker outflows, the total stock of EEA nationals who came for work and are currently active in the labour market is used.

43.   A similar approach is taken to estimate the age profile of working dependants, with age profiles weighted by the assumed occupation distribution for this group.

Wages

44.   In the absence of reliable data on the wages of migrant flows, an estimate of the wage distribution of the existing stock of UK employees is used as a proxy for future flows. This may overstate the wages of new inflows, as EEA migrants are likely to progress through the wage distribution over time.

45.   The wage distribution of the migrant stock is derived from Annual Survey of Hourly Earnings (ASHE) 2019[28] data on earnings within occupations at 4-digit SOC and the occupational profile of EEA migrants (derived from APS data).

46.   The wage profile of EEA nationals is taken from ASHE 2019 data and is based on the wage profile of all UK employees. In order to model different thresholds for experienced and new entrant workers, ASHE data is filtered into earnings of those who are aged 26 or above and those under 26. The two earning distributions are weighted by the assumed proportion above and below 26 in each occupation to estimate a new baseline EEA wage distribution.

47.   Due to sample size issues, the under 26 earnings data is used at the 3-digit occupation level when applying the new entrant salary threshold[29].

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[26] Calculated by current age – years since arrival.
[27] 2012 has been chosen to help identify relatively recent arrivals (to ensure that recent labour market trends etc. are captured) whilst trying to maximise samples sizes.
[28] Annual Survey of Hourly Earnings is a comprehensive source of earnings data in the UK using a representative sample of PAYE records of both full-time and part-time employees.
[29] The earnings distribution for a 3-digit occupation is applied to all the 4-digit occupations within that group.

48.   The proportion of EEA inflows under the age of 26 is only available at a 1-digit occupation level due to sample sizes. It is therefore assumed that each 4-digit occupation within a 1-digit grouping has the same proportion who are under 26 years old.

49.   ASHE data does not differentiate between nationality, and therefore the modelling assumes that in each given four-digit occupation, workers of different nationalities have the same average wage; wage differentials are only driven by differences in the occupational distribution. This may not hold true as EEA workers are generally younger than UK workers, and hence likely to earn less. Previous analysis found some evidence of a wage penalty for EEA workers, for example, the MAC 2018 interim report on the impact of EEA nationals[30].

50.   The salary of each occupation at four-digit level is assumed to be equal across all industry sectors. In practice, it is likely that (even at this granular occupational level) workers doing similar jobs in different sectors will be paid differently.

51.   ASHE data used includes both full-time and part-time employee earnings and part-time worker wages are not pro-rated. The rationale behind this being that any salary threshold would apply to a worker's total earnings as opposed to their pro-rata pay.

52.   The wages of the current migrant stock and the salary threshold imposed on new flows are expressed in current prices. It also assumes the current stock of migrants is representative of the future migrant flows. This creates an implicit assumption that any imposed salary threshold will increase in line with any wage growth seen in the migrant stock.

53.   Regional variance in pay for occupations have been included to estimate the regional impact of salary thresholds. It is assumed that there are two major regional differences in pay[31]; 'London and the South East' and 'Other UK Regions'[32]. From this, the proportion affected for each region is determined by a mix of the regional distribution of EEA nationals within occupations and regional pay differences for occupations.

Dependants

54.   The number of EEA dependants is estimated based on the average ratio of dependants to workers observed in the IPS data between 2016 and 2018. The data indicates a dependant ratio of 0.16 (i.e. for every six workers there is one dependant)[33].

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[30] The recent interim report published the Migration Advisory Committee found a 5% wage gap between migrants from the New Member States and the UK-born – after controlling for industry, tenure and region. Non-EEA migrants were also found to earn 6% less than the UK-born whilst workers from EEA13 had no significant difference from pay of UK born workers.

[31] ASHE 2019 suggests variation in average weekly earnings between London and the South East and Other UK Regions, but little pay variation between other UK regions.

[32] North East, North West, Yorkshire and the Humber, East Midlands, West Midlands, East, London, South East, South West, Northern Ireland, Scotland and Wales

[33] A small portion of the LTIM inflows are attributable to 'Others' for whom it is not clear how they would act in the UK. For the purposes of this modelling, they have been apportioned proportionally across workers and dependants.

This dependant ratio has been relatively stable over time; therefore, the projections assume this stays constant over time and across scenarios.

55.   Dependants include working dependants, non-working dependants and children. To estimate the proportion of dependants that are children, IPS data on migrant flows is used. Using a three-year average between 2016 and 2018, it is estimated that children comprise 41% of all accompanying dependants.

56.   To consider the total labour market impact, the analysis estimates the total number of working dependants using APS 2016-18 data on the stock of EEA nationals who say their main reason for migrating was to 'accompany or join someone' and arrived in 2012 or later – this implies that 57% of adult EEA dependants are active in the labour market.

57.   This process leads to 34% of dependants who are assumed to be workers, 25% who are assumed to be inactive, with 41% deemed to be children. These dependant ratios are assumed to remain constant in the baseline as well as under a policy.

58.   A wage penalty has been applied for EEA working dependants. Data from the Labour Force Survey (LFS) April - June 2018 is used to find the difference in mean weekly earnings between EEA nationals who said their reason for migrating was for work and those who came to accompany/join. The income differential is then applied to estimated earnings of EEA working dependants.

Outflows distribution

59.   It is assumed that outflows have a similar age and wage distribution as the current stock of EEA nationals, even when a policy is applied to inflows.

60.   It is assumed that under any particular scenario there is no change to the behaviour of EEA migrants in terms of the proportion choosing to stay in the UK and length of time they are here. This means that outflows take some time to adjust to lower inflows.

B.4.   Long-term EEA work – labour market adjustment

Approach and rationale

61.   The analysis above makes no assumption for the potential behavioural responses of employers and market adjustment. However, the labour market is dynamic and, as with any change in environment, markets would be expected to adjust and reallocate resources to their most productive use. How employers choose to adjust and the relative ease with which this can be done will depend on the specific characteristics of an occupation (in particular whether it is governed predominately by market forces) as well as wider economic factors.

62.   To complement the modelling of initial impacts on the labour market, bespoke analysis has been developed to assess which occupations might be more or less likely to adjust to changes in labour supply and provide further context as to the relative importance

of impacts on the labour market. A set of three indicators was created, based on published data: the first considers the potential scope for adjustment, and is combined with two further indicators looking at the relative value of occupations (either economic or public value), and the reliance on EEA workers, to assess which occupations may face most difficulties, and where further consideration of policy impacts might be needed.

Potential scope for adjustment

63. This measure aims to capture the ability of occupations to adjust to unexpected changes in labour supply, either by substituting EEA labour for alternative sources of labour or capital for labour.

64. Occupations within sectors responsible for the provision of public services, such as medical services, education, social services, public administration and care are automatically assessed as occupations that might struggle to adjust by raising wages in order to substitute EEA labour for alternative sources of labour. This is because wages within such sectors are driven primarily by government policy, and so they are unlikely to adjust automatically to market forces and any change would have implications for public finances.

65. Occupations that are governed by market forces might be able to more easily adapt to labour supply changes. However, certain factors may mean that they are not able to do so. The following indicators are used to assess these occupations' scope for adjustment:

- *Scope for automation* –This indicator is assumed to act as a proxy for the ability of labour to be substituted for capital within an occupation, since automation is the most transparent form of capital substitution. These are ONS collated figures[34] based upon research conducted by Frey and Osborne (2013)[35]. The share of jobs in each occupation at risk of automation can provide an indication of the probability of automation of roles within an occupation[36]. Occupations with a low probability of automation may find it hard to adjust to labour supply reductions.

- *Real wage growth* –Real wage growth is included as an indicator of whether occupations are currently experiencing labour shortages, as an occupation struggling to recruit workers might increase wages to become more attractive to potential workers. A further reduction in labour supply could exacerbate these existing shortages.

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[34]https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/employmentandemployeetypes/articles/theprobabilityofautomationinengland/2011and2017

[35] Carl Benedikt Frey and Michael A. Osborne, 'The Future of Employment: How Susceptible are Jobs to Computerisation?' *Oxford Martin Programme on Technology and Employment* (2013) pp. 1-77

[36] Estimates for the probability of automation consider recent technological advances such as advanced robotics to assess the potential for job automation over some unspecific years, which are interpreted as medium to long run.

- *Underemployment* – In occupations with underemployment, employers might respond to a reduced labour supply by increasing the hours worked by the current workforce employed. If a small proportion of workers within an occupation say they would like to work more hours, this implies that there is minimal underemployment in these occupations.

- *Hard to fill vacancies as a proportion of total employment* –Hard to fill vacancy rates are included to establish whether an occupation is experiencing a labour shortage. If hard to fill vacancies form a large proportion of total employment for an occupation, it could indicate that there are structural issues within these occupations which is making it hard for employers to hire workers. These issues could include a poor working culture, a shortage of skilled workers or if the employer is based in a rural occupation[37].

High wage and high contribution to public services

66.   This indicator looks at the relative value of occupations affected, either economic or social value. Some areas of the labour market might provide greater economic value to the wider economy, and it is, therefore, important to understand whether labour supply changes are related to occupations that contribute disproportionately to the output of the economy.

67.   Equally, some parts of the labour market may contribute less to economic output but provide greater social value in terms of positive non-market spill-overs to the wider economy or are vital to the delivery of key public services. For example; a healthy workforce, who are capable and able to work, is a positive spill-over provided by individuals who work in health-related industries.

Recent reliance on migrant labour

68.   The extent to which affected occupations might need to adjust to labour market changes could depend on how reliant they have been on migrant labour. Occupations that have been heavily reliant on EEA migrant labour may have a more pressing need to adjust (for example, by increasing wages).

Data

69.   The analysis uses several published data sources, summarised in Figure 2

Figure 2*: Sources of data used for each indicator*

Measure	Data source	Year
High wage	ASHE	2018
High contribution to public services	APS	2016-2018 (three-year pooled)
Recent reliance on migrant labour	APS	2014-2018
Potential scope for automation	ONS collated figures	2017

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[37] This builds on the MAC's methodology which uses total vacancies as a proportion of total employment to assess labour shortages. However, this measure does not establish the type of vacancies, such as hard to fill.

Real wage growth (inflation adjusted to 2017/2018)	ASHE	2015-2018
Underemployment	APS	2016-2018 (three-year pooled)
Hard to fill vacancies as a proportion of total employment	Employer Skills Survey (ESS) and APS	2017 ESS and 2016-2018 (three-year pooled APS)

Key assumptions

70.   The analysis is carried out at the 4-digit SOC level. To ensure the analysis is as robust as possible, occupations with a sample size of less than 30 in the APS 2016-18 three-year pooled dataset are excluded. This list is then cross-referenced against other data sources to ensure all occupations with sample size issues[38] are excluded throughout our analysis.

71.   Multiple four-digit occupations make up each three-digit SOC grouping. An occupation is classified as having a high contribution to public services (high public value) at the 4-digit level if its 3-digit counterpart has a combined public sector workforce[39] share of above 50%.

Key limitations

72.   Scope for adjustment is measured based on four criteria to assess the ability of occupations to substitute labour for labour or capital for labour. This indicator can provide an indication of occupations potentially facing challenges based on our chosen criteria. However, this does not capture all the ways employers may adjust to policy changes.

73.   The final selection of occupations is based on several key judgements around thresholds. For example, occupations need to be in the top 25% for more than one of the 'hard to adjust' criteria in order to be judged as potentially facing adjustment difficulties. There is a risk that vulnerable occupations which fall below this margin are excluded.

74.   This analysis also relies on the assumption that outcomes observed in the past are representative of future trends, but in practice the dynamic nature of the labour market might mean that this is not the case. For example, expectation and the ability of occupations to adjust following a labour supply change will also depend on the wider economic environment.

Methodology

75.   Using the indicators described above, occupations are grouped into broad categories.

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[38] At the 4-digit SOC level, 257 out of 369 occupations are excluded.
[39] Where sectors responsible for the provision of public services are: Care, Education, Medical services, Social work and Public administration and defence.

High wage and high contribution to public services

76.   There are two sub-components to this measure:

- *High wage* – Occupations are ranked based on their average wage, and those occupations in the top quartile of the rankings are indicated as areas of the labour market that might be of high relative importance to the wider economy.

- *High contribution to public services* (public value) – Occupations which contribute highly to the delivery of public services are considered, based on their EEA workforce share in the following sectors: social work, care, public administration, education and medical services. Occupations can work across a number of different sectors. In order to consider the main occupations specific to these sectors, the analysis considers the share of EEA workers in each occupation within these five sectors. Occupations with a public sector workforce share of above 50% in these sectors are included as occupations that have a high contribution to public services.

Recent reliance on EEA workers

77.   This indicator considers annual average employment growth in each occupation between 2014 and 2018. Three sub-components are looked at:

- *Absolute EEA employment growth* – Occupations with the highest absolute employment growth are assessed.

- *EEA employment growth in growing occupations* – Occupations where a high proportion of total employment growth was driven by growth in EEA nationals are considered.

- *EEA employment growth in shrinking occupations* – Occupations which saw growth in EEA employment, whilst shrinking overall (either due to declining employment for non-EEA and/or UK nationals) are considered.

78.   Occupations are ranked for each of the sub-components above. Those occupations in the top quartile of rankings for at least one sub-component are defined as 'highly reliant on EEA national labour' occupations.

Potential scope for adjustment

79.   This measure assesses occupations against four sub-components. A high ranking indicates occupations may face difficulties under a specific indicator:

- *Scope for automation* – Occupations are ranked according to their probability of automation. Those with a low probability of automation rank highly; This suggests an occupations inability to substitute labour for capital as a result of a labour shortage.

- *Real wage growth* – The analysis ranks occupations based on their real wage growth, adjusting wages to account for inflation. Occupations with positive real wage growth rank highly. Occupations already experiencing real wage growth suggests that they are already experiencing labour shortages; with wages rising to increase the relative attractiveness of working in an occupation. Shortages which could lead to adjustment difficulties.

- *Underemployment* – The analysis ranks occupations based on the proportion of employees that would be willing to work longer hours. Occupations with minimal underemployment rank highly. Occupations with high underemployment could utilise their current employees working more hours to overcome adjustment difficulties.

- *Hard to fill vacancies as a proportion of total employment* – The analysis ranks occupations based on hard to fill vacancy rates. Occupations that currently have a large hard to fill vacancy rate may face adjustment difficulties through and hence rank highly.

80. When making a final judgement on the likelihood of occupations facing adjustment difficulties, the analysis ranks occupations for each sub-component. Occupations that are ranked in the top quartile for at least two of the sub-components are indicated as occupations that are likely to face adjustment difficulties.

81. Occupations within sectors responsible for the provision of public services[40], such as medical services, education, social services, public admin and care are automatically included within this indicator.

Results[41]

82. **High wage:** The analysis suggests that there are 29 high-skilled and medium-skilled occupations and 1 lower-skilled occupation, which are highly affected by the policy, and which might be of economic importance – this is measured by an average wage of at least £30,000.

83. **High contribution to public services:** The analysis indicates that there are 15 high-skilled and medium-skilled occupations and 1 lower-skilled occupation that contribute extensively to the delivery of key public services. These occupations are predominately in Health, Education and Welfare. For these chosen occupations, within their 3-digit counterpart, at least 53% of the EEA workforce are employed in sectors that deliver public services.

84. **Recent reliance on EEA migrant labour:** There are eight high-skilled and medium-skilled and 15 lower-skilled occupations that were identified as being reliant on EEA nationals for employment growth in recent years. Those that rank highly for absolute

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[40] Whose combined public sector workforce share is above 50% in these sectors (those occupations identified being of "public value" in the high wage/high contribution to public services).
[41] Results are summarised in Figures 10 and 11 in the main impact assessment.

EEA employment growth had growth of at least 2,600 EEA workers across 2014 to 2018 and 1,300 in shrinking occupations for the same period. Likewise, absolute EEA employment growth across 2014 to 2018 accounted for at least 60% of total employment growth in occupations selected based on their proportional EEA employment growth.

85. **Potential difficulty of adjustment:** The analysis suggests that 31 high-skilled and medium-skilled and ten lower-skilled occupations could face adjustment difficulties. Those occupations that ranked in the top quartile for scope of automation had a probability of automation below 44%. Similarly, for occupations highly ranked based on underemployment, fewer than 5% of employees indicated that they would work longer hours. Hard to fill vacancy rates were at least 2% for occupations in the top quartile of this measure. Moreover, occupations highly ranked for real wage growth experienced at least 3% growth from 2014 to 2018. Occupations which rank in the top quartile for one or more of the outlined measures are considered to potentially face adjustment difficulties. As well as this, occupations that the analysis indicates as contributing highly to public services are also automatically assumed to potentially face labour market adjustment difficulties – this is because wages in these occupations are not governed by market forces.

C.   Long-term work migration – skilled workers route – non-EEA nationals[42]

86.   Whilst the skilled workers route is more restrictive for EEA workers, it reduces some restrictions that currently apply to potential non-EEA workers, potentially offering greater opportunities to employers looking to source skilled labour from outside the UK and Europe.

87.   The analysis focusses on potential changes to out of country inflows under the Tier 2 (General) route following a loosening of the skill threshold from RQF 6 to RQF 3 level, and changes to salary thresholds following the MAC salary recommendations. Whilst the policy changes may alter incentives for non-EEA migrants using alternative routes by increasing the relative attractiveness of Tier 2 (General), there is not assumed to be any displacement between existing routes.

88.   There are also other changes to the existing Tier 2 (General) route, such as removing the annual limit and the Resident Labour Market Test (RLMT), that may also affect employer's behaviour when considering recruiting non-EEA citizens, but these changes are not expected to substantially affect volumes. For example, following recent policy changes, doctors and nurses, PhD-level occupations, those paid over £159,600 and those sponsored for a job connected with inward investment provisions are not subject to the cap. This means current volumes of Tier 2 (General) migrants coming to the UK are above the current annual limit; and, for those occupations included within the cap, employer demand is below the limit. In January 2020 the total number of restricted Certificate of Sponsorships (CoS) granted was 1,148, well below the monthly allocation of 2,945 (which included allocations carried over from previous months)[43].

C.1.   Long-term non-EEA work baseline

Long-term non-EEA work baseline inflows modelling

89.   For non-EEA citizens it is not possible to follow a similar approach to that used for EEA citizens and estimate non-EEA inflows based on the historical relationship between migrant inflows and economic and demographic factors. This is because non-EEA citizens are subject to immigration controls.

90.   Instead, to project Tier 2 (General) inflows for non-EEA nationals, internal Home Office workload projections from the Immigration Volumetrics Register (IVR) are used. This projects future applications by fitting time series models to historic data[44]. The IVR projections cover all applications (including those that are refused) and so to estimate the number of workers actually coming to the UK, the Tier 2 (General) IVR projections

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[42] Volumes in this section are rounded to the nearest 5,000.
[43] https://www.gov.uk/government/publications/employer-sponsorship-restricted-certificate-allocations/allocations-of-restricted-certificates-of-sponsorship
[44] Tier 2 forecasts are produced using the Autoregressive Integrated Moving Average (ARIMA) model, which is fitted to historical time series data to predict future trends.

are adjusted for grant rates based on published Home Office immigration statistics (estimated to be 98% in 2019[45]).

91.   Figure 3 shows Tier 2 (General) inflows increased by approximately 44% between 2018 and 2019, predominantly due to the decision to exempt doctors and nurses from the Tier 2 (General) cap, with approximately 25,000 Tier 2 (General) visas granted in 2018 and around 35,000 visas granted in 2019. Inflows under the central scenario are projected to remain at around 35,000 per year from 2020 onwards.

92.   There is a great deal of uncertainty associated with projecting future immigration flows. This uncertainty is accounted for by looking at the error between previous IVR forecasts and actual volumes at three, six, 12- and 24-month intervals after when the initial forecast was made. This variance is then applied to our central estimate to give steady state inflows of between 30,000 and 40,000 workers per year in the lower and upper scenarios respectively.

Figure 3: Range around projected non-EEA Tier 2 (General) main applicant inflows
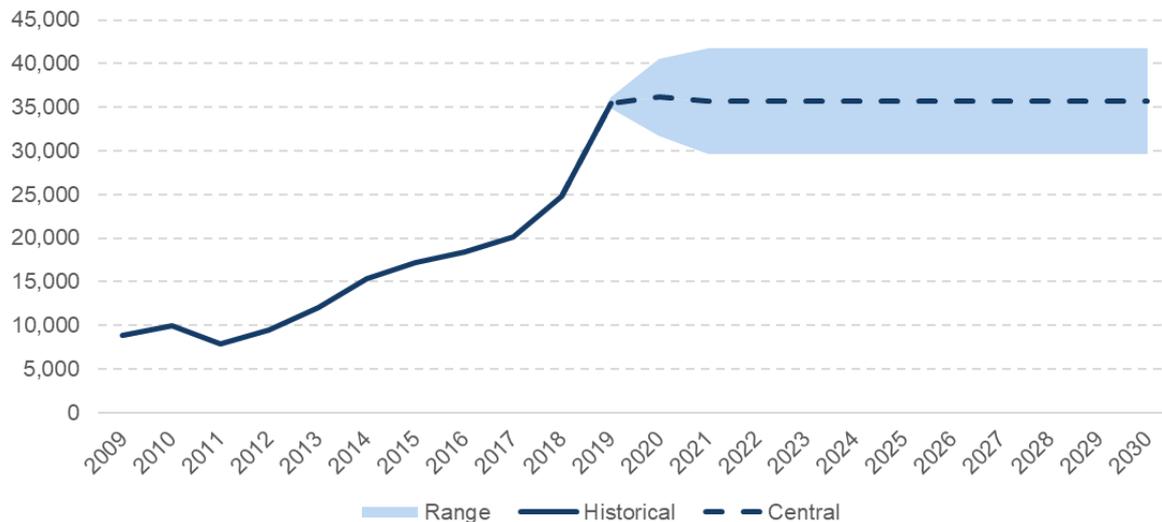
93.   Appendix J of the Immigration Rules[46] sets out the different salary thresholds for different types of Tier 2 (General) migrants. These are defined as follows:

- **Experienced workers** are those whose salary threshold is £30,000 or the 25th percentile of the relevant Annual Survey of Hours and Earnings (ASHE) wage distribution, whichever is higher;

- **New entrants** are those whose salary is £20,800 or the 10th percentile of the relevant ASHE wage distribution, whichever is higher; and

- **Public sector occupations** are health and teaching occupations, and salary thresholds are, in general, based on public sector pay scales.

[45] https://www.gov.uk/government/statistics/immigration-statistics-year-ending-december-2019
[46] https://www.gov.uk/guidance/immigration-rules/immigration-rules-appendix-j-codes-of-practice-for-skilled-work

94.   For simplicity, we apply the new entrant salary threshold to those aged under 26 and the experienced worker salary threshold to those aged 26 or above. Public sector workers are identified as those workers who are in occupations where the salary threshold is based on public sector pay scales. Forecasts are therefore split into whether a migrant is under 26, 26 or above or a public sector worker, based on Home Office internal management information (MI).

95.   Based on CoS used in 2018/19, migrants aged over 26 represent 48% of Tier 2 (General) inflows; migrants aged under 26 represent 6% of inflows; and public sector workers represent 46% of inflows.

Dependants

96.   The Tier 2 (General) dependant ratio is estimated to be 0.70 (i.e. for every four main applicants coming to the UK there are almost three dependants), based on the ratio of main applicants to dependants observed for Tier 2 grants in 2019[47]. This dependant ratio has been relatively stable over time; therefore, our projections assume it remains constant over the appraisal period and across scenarios. Figure 4 shows the projected inflows of dependants, assumed to be around 25,000 per year in the central scenario.

Figure 4: Range around projected Tier 2 (General) dependant inflows
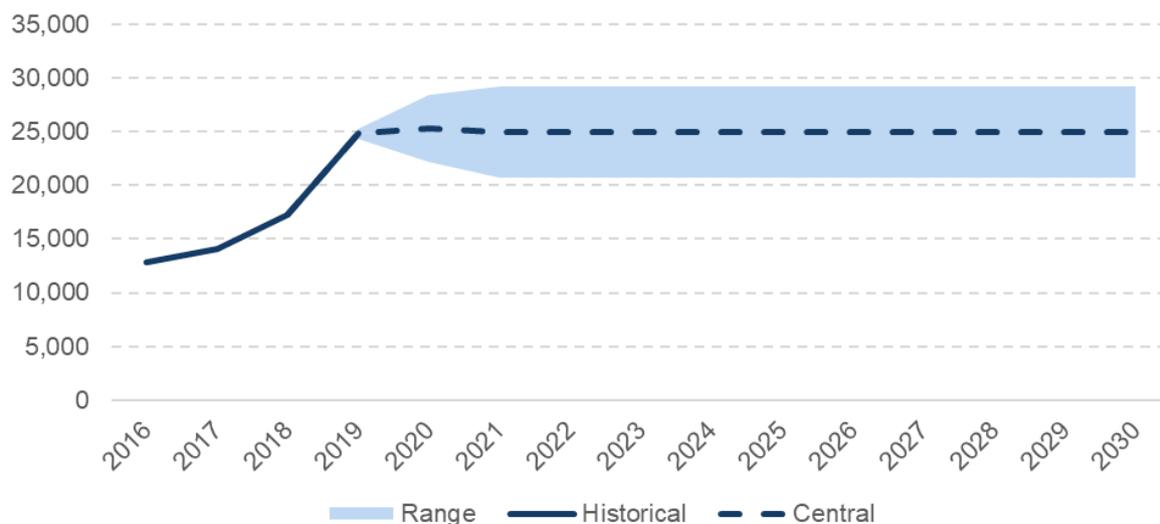
Long-term EEA work baseline outflows modelling

97.   To capture net migrant workers in the economy, outflows are modelled as a function of previous inflows. To link outflows to previous inflows, Migrant Journey Analysis


(MJA) data is used. This tracks the journeys of individual migrants[48] over time and can be used to estimate the proportion of migrants who settle permanently or leave the UK.

98. The outflows modelling looks at a specific cohort of migrants (those who started their 'journey' on a Tier 2 (General) visa between 2010 and 2013) and tracks the number of interactions they have with the visa system. This allows us to estimate, using the 2010-2013 cohort, the number of migrants who have switched into another route[49], the number who have applied for an extension, the number who have applied for settlement or the number whose application has expired and not been extended (which is assumed to mean they have left the UK). Linking the dates of these applications allows us to estimate how long after a person comes into the country these decisions are made.

99. Using the 2010-2013 cohort means migrant behaviour and intentions are assumed to remain unchanged and unresponsive to policy changes that have taken place after 2013, for example towards settlement. However, this is necessary to capture settlement decisions taken by migrants, as Tier 2 (General) migrants cannot apply for settlement until they have been in the UK for over five years. The analysis excludes those who are still on a visa and anyone who started their 'journey' on a Tier 2 (General) but who switched into another route. The analysis does not adjust for those who leave before the end of their visa.

100. Figure 5 shows, as expected, that, for a specific cohort, the proportion of migrants still with valid leave on the Tier 2 General route decreases over time. Applications for settlement represent a significant proportion of applications after 5-6 years (43%), reflecting the fact that indefinite leave to remain can only be granted if a migrant has lived and worked in the UK for 5 years.

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[48] A journey is defined as someone who has either been granted a visa product with indefinite leave to remain; or whose visa product has expired, and they have not made a subsequent application for leave to remain within a 12-month period.

[49] For simplicity, we do not include the number of people who switch into different routes within this analysis. This may slightly overestimate the number of extensions within a cohort but is not expected to significantly affect the results.

Figure 5: Proportion of Tier 2 (General) main applicants that end up settling in the UK or leaving the UK, based on Migrant Journey Analysis
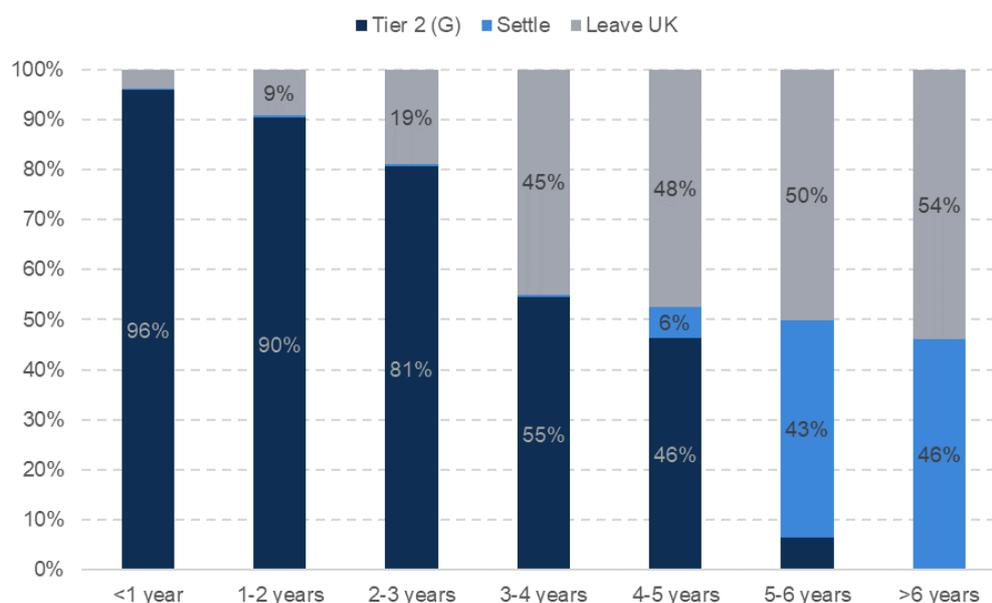
101. From the MJA data, the proportion of migrants who leave the UK each year are modelled as a function of the inflows in that year and the previous six years. Based on these calculations, the outflows of Tier 2 (General) workers are estimated to be between approximately 15,000 and 20,000 per year in steady-state. The outflows of dependants are estimated to be between approximately 10,000 and 15,000 workers per year in steady-state.

C.2.   Long-term non-EEA work policy modelling

102. Predicting the impact of lowering the salary threshold (for some occupations) and skills threshold is highly uncertain because it is dependent on (1) employers' behaviour and (2) the potential supply (or pool) of eligible non-EEA labour, which are unknown. Given this uncertainty, two illustrative scenarios for a potential increase in non-EEA skilled worker migration are modelled. The first uses EEA modelling as a proxy for a potential response to policy changes, the second uses the historic skill mix of Tier 2 (General) when it was last open to RQF 3 occupations.

EEA scenario

103. This scenario uses modelled changes in EEA inflows under different policy scenarios to consider the potential scale of a non-EEA response to the proposed policy changes. The number of EEA nationals estimated to be eligible under the current Tier 2 (General) Immigration Rules (i.e. an RQF 6 skill threshold and existing salary thresholds) is compared against the number of EEA nationals estimated to be eligible under future policy (i.e. an RQF 3 skill threshold and MAC recommended salary thresholds)[50]. Applying these two scenarios to the projected EEA baseline, implies an

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[50] Due to the differences in how salary thresholds are applied, this is done separately for public sector occupations and all other occupations. The final uplift of 72% is a weighted average of public sector occupations and all other occupations, based on the proportion of Tier 2 (General) inflows they make up under the baseline.

increase in eligible EEA inflows of 72 per cent when moving from current arrangements to the future policy arrangements. This percentage change in EEA inflows gives a rough approximation of the response of labour supply to a change in skills and salary thresholds, and this scenario considers the impact on non-EEA skilled workers if a similar percentage increase was observed. There are a number of limitations with this approach:

- The approach relies on applying policy scenarios to a highly uncertain modelled baseline of long-term EEA inflows under freedom of movement.

- The increase in non-EEA skilled workers is assumed to have the same occupation and wage distributions as eligible EEA nationals. This may be an unrealistic assumption.

- This scenario is based on the simplifying assumption that there are no behavioural responses from employers or migrants, which may overstate the overall increase in non-EEA migration flows as it fails to capture potential changes in labour demand from employers. This is therefore treated as our upper range.

Historic scenario

104.   In its recent report[51] the MAC did not attempt to account for the potential impacts of their recommendations on non-EEA workers, but did provide an overview of the historical use of Tier 2 (General) over time and scenarios assumed in other external research papers[52]. It found that when Tier 2 (General) was open to medium-skilled occupations they made up between 24 per cent and 35 per cent of all CoS used. This implies a medium to high-skilled ratio of between 1:3 and 1:2. Applying the lower ratio (i.e. around 1:3) to the current Tier 2 (General) baseline would result in an increase in current Tier 2 (General) inflows of around 32 per cent. This estimate is used as a lower scenario for the increase in non-EEA worker inflows. There are limitations with this approach:

- This scenario looks solely at the historic medium to high-skilled ratio of CoS used and the impacts if this was the case in future. It also does not consider any differences in salary thresholds between the two periods.

- The scenario assumes historical work migration patterns are representative of future patterns.

- For simplicity, this scenario does not model the impact of salary threshold changes following the MAC recommendations.

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[51] Migration Advisory Committee January 2020 "A Points-Based System and Salary Thresholds for Immigration" pg. 186
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/860669/PBS_and_Salary_Thresholds_Report_MAC.pdf
[52] Migration Advisory Committee January 2020 "A Points-Based System and Salary Thresholds for Immigration" pg. 189
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/860669/PBS_and_Salary_Thresholds_Report_MAC.pdf

- As above, it is assumed that the increase in skilled non-EEA workers have the same occupations and wage distributions as eligible EEA nationals. This is highly uncertain.

105. Figure 6 shows inflows of Tier 2 (General) migrants increase sharply following the policy change. Applying the EEA scenario described above to the baseline projection of non-EEA Tier 2 (General) inflows results in an estimated annual increase in non-EEA workers of between 20,000 and 30,000 with an additional 15,000 to 20,000 dependants (using steady state figures). Under the historical scenario there is an estimated annual increase of between 10,000 and 15,000 non-EEA workers and between 5,000 and 10,000 dependants (using steady state figures).

Figure 6: Inflows of long-term non-EEA working migrants under the baseline, upper and lower policy scenarios (based on central baseline estimate).
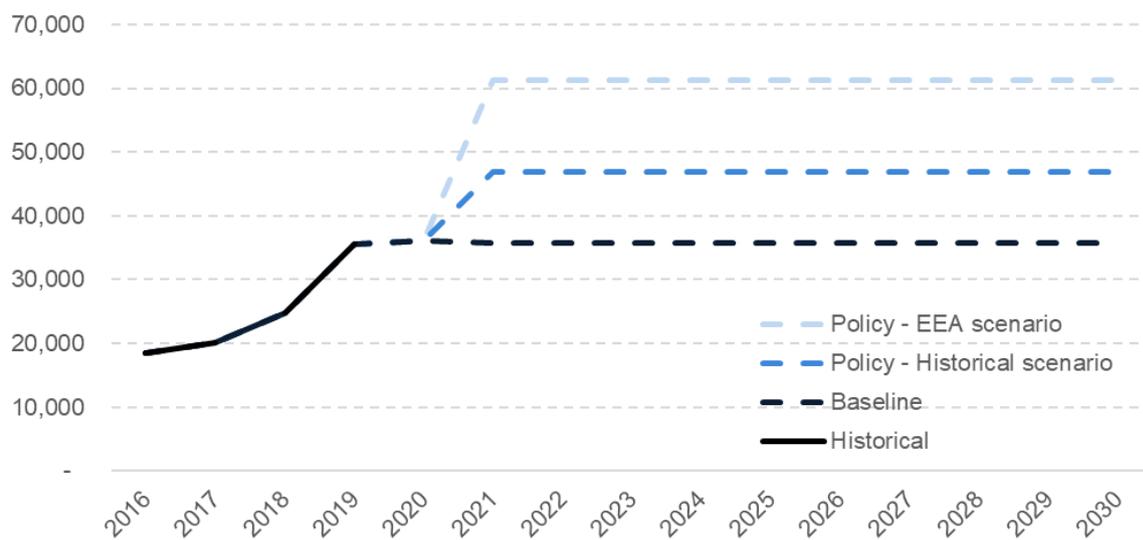
106. These estimates are extremely uncertain and are based on illustrative scenarios that provide a sense of scale of the potential impacts. External papers that also specifically look at the potential scale of increase in non-EU migration include:

- Portes and Forte (2019)[53] who assume that under a £30,000 minimum salary threshold the number of non-EU migrants increases by around 45,000 over 10 years compared to the counterfactual; and under a £20,000 minimum salary threshold the number of non-EU migrants increases by around 70,000 over 10 years compared to the counterfactual.

- The UK in a Changing Europe think tank[54] assume that under a restrictive scenario that the number of non-EU migrants increases by around 65,000 over 10 years compared to the counterfactual; and under a liberal scenario the number of non-EU migrants increases by around 160,000 over 10 years compared to the counterfactual.

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[53] https://www.wcpp.org.uk/wp-content/uploads/2019/03/FINAL-WCPP-report_Immigration-in-Wales-post-Brexit.pdf
[54] https://ukandeu.ac.uk/wp-content/uploads/2019/10/The-economic-impact-of-Boris-Johnsons-Brexit-proposals.pdf

107.   There is a lagged response in outflows of skilled workers following a policy change, reflecting the fact that a journey of a Tier 2 (General) migrant lasts up to six years. In the EEA scenario, the additional number of non-EEA workers is estimated to be between 80,000 and 115,000 higher in 2025, compared to the baseline; and the number of dependants is estimated to be between 55,000 and 80,000 higher in 2025, compared to the baseline.

108.   Under the historical scenario, of the additional number of non-EEA workers is estimated to be between 35,000 and 50,000 higher in 2025, compared to the baseline; and the number of dependants is estimated to be between 25,000 and 35,000 higher in 2025, compared to the baseline.

C.3.   Characteristics of non-EEA skilled workers

109.   Figure 7 details assumptions around the age, economic activity, occupation and wage of non-EEA workers and their dependants. These are used in estimating the fiscal impacts of non-EEA migrants.

Figure 7: Assumptions on age, economic activity, occupation and earnings for main applicants and dependants

Migrant characteristic	Main applicants	Dependants
Age	Based on Home Office MI between April 2018 and March 2019. This distribution is assumed to be the same under the baseline and policy scenarios.	Based on Home Office MI between April 2018 and March 2019. This distribution is assumed to be the same under the baseline and policy scenarios.
Economic activity	All main applicants are assumed to be employed under both baseline and policy scenarios.	We use Home Office MI to identify those who come as a child (48%) or partner dependants (52%). For partner dependants, they are split into 'employment' and 'inactive'. This breakdown is based on APS data, looking at the economic activity of non-EEA migrants who arrived after 2013. Of those non-EEA migrants that arrived in or after 2013 and who came to accompany and join, we estimate 41% are in employment and 59% are inactive. Of those dependants in employment, it is assumed 11% are self-employed. This is assumed the same under the baseline and policy scenarios.
Occupation	Under the baseline, we use Home Office MI data between April 2018 and March 2019 to estimate the number of non-EEA workers in each occupation.	APS data over a 3-year period is used to estimate the number of non-EEA Tier 2 Partners who are employed in each occupation.

	Under the policy, additional skilled non-EEA migrants are assumed to have the same occupation distribution as EEA medium-skilled and high-skilled workers. This distribution is taken from EEA modelling described above and based on ASHE earning data and APS data on the occupation distribution resident EEA nationals[55].	
Earnings	Under the baseline, wages are based on Home Office MI between **April 2018 and March 2019.** Under the policy, the wage distribution of additional medium-skilled and high-skilled workers is taken from EEA modelling described above.	The analysis assumes that those dependants who are working earn less than main applicants. A 44% income differential is applied which reflects the difference in weekly median earnings between non-EEA nationals who came to the UK to accompany/ join and non-EEA nationals who came to the UK to work. This is based on 2019 Labour Force Survey data. This figure is then applied to Annual Survey of Hours and Earnings (ASHE) 2019 data, which calculates an earnings distribution for working dependants.

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[55] Clergy and sportspeople are removed from the occupation distribution and these occupations are not eligible to use the Tier 2 (General) Route.

D. Short-term EEA work migration

110. This section accompanies the 'Short-Term EEA Citizen Worker' section of the Impact Assessment. It explains the data sources and methodology used to produce the analysis on short-term work migration and details the limitations of the analysis. The analysis primarily looks at Her Majesty's Revenue and Customs (HMRC) analysis, commissioned by Home Office, on short-term employments and the activity of employees in the UK labour market.

111. The section focuses on estimates of EEA nationals supplying labour, or coming to supply labour, for up to 12 months in the UK labour market, and the role of short-term work in the UK labour market.

112. It has not been possible to quantify the number of EEA nationals qualifying under routes to supply short-term labour within the new immigration system (assumed to be equivalent to most current Tier 5 routes). Therefore, this section explains how the relevant data can be used to estimate potential baseline volumes; to estimate the characteristics of short-term EEA workers used to inform fiscal analysis[56]; and to provide insight into labour market impacts.

D.1. Data

113. Data on the number of short-term workers is taken from ONS Short-Term International Migration data[57], the HMRC Pay As You Earn Real Time Information (PAYE RTI) system, and the Migrant Worker Scan (MWS)[58]. Table 2 in the Impact Assessment sets out information relating to ONS data, and nothing further is added in the following sections of this Technical Annex. Instead, this section focusses on HMRC data and analysis.

Her Majesty's Revenue and Customs Pay as You Earn Real Time Information (HMRC PAYE RTI) data

114. The HMRC PAYE RTI system covers all employees rather than a sample of people or employers, and thus enables detailed analysis of employees to be undertaken.

115. Most people who pay Income Tax do so through PAYE RTI. This is the system that employers and pension providers use to deduct Income Tax and National Insurance contributions when they pay wages to employees and pensions to occupational pensioners.

116. The analysis undertaken covers employees paid by employers only. It does not cover self-employment income or income from other sources such as pensions, property

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[56] Detailed explanation of the fiscal analysis of short-term EEA workers is included in the 'Short-Term EEA Worker Fiscal Modelling' section of this document.

[57] Office for National Statistics User Requested Data (16 Dec 2019) Reference Number 11013

[58] Table 3 in the Impact Assessment sets out a glossary of terms used in this analysis.

rental and investments. Where individuals have multiple sources of income, only work as an employee is included.

Migrant Worker Scan (MWS) data

117. MWS data is used to identify the nationality and other characteristics of individuals seen to be employees in the HMRC PAYE RTI system.

118. The nationality of individuals is taken from National Insurance records and is only available for those who were allocated a National Insurance number (NINO) via the adult registration process.

119. For most residents in the UK (including foreign nationals), NINOs are automatically issued to individuals when they turn 15 years and 9 months. This standard registration process does not collate information on nationality.

120. Individuals that are not allocated a NINO through the standard registration process (for example, those who come from abroad after the age of 16) have to apply for a NINO through the Department for Work and Pensions' (DWP) adult NINO registration process. This process records nationality at the point of registration. Subsequent naturalisation (to UK citizenship), other changes in nationality and multiple nationalities are not recorded.

121. The system records the date when the NINO registration occurred, and also the person's date of arrival in the UK. The registration date does not represent the date an individual arrived in the UK; it can be some months or even years between arrival and registering for a NINO.

122. DWP operate the NINO allocation service. Information on the National Insurance system is not intended to be a precise and continuing reflection of an individual's nationality/citizenship. Information on NINO allocation and nationality is available in statistics released by DWP.

123. This information is logged with HMRC's National Insurance and PAYE service. An extract from this system known as the MWS collates NINO, nationality recorded at NINO registration, UK arrival date and NINO registration date.

D.2.   Methodology

124. The analysis aims to estimate:

- The duration of time that an individual is continuously active as an employee in the labour market, whether employed by one or multiple employers; and

- The proportion of jobs that are short term or long term in different sectors of the economy.

125. The analysis uses PAYE RTI data from 6 April 2014 to 5 April 2019 (that is the tax years 2014/15 to 2018/19), focusing on employees who were in paid employment during the 2016/17 tax year – providing a cohort of employees for which to make estimates relating to the aims outlined above.

126. The methodology has five steps, as set out below:

    (1) Identify employments in PAYE RTI for which at least a part of the employment occurred in 2016/17.
    (2) Determine nationality and other characteristics of the employees who undertook these employments.
    (3) Determine the duration of these employments.
    (4) Identify all employments for those individuals in Step (2) (i.e. those that had a portion of an employment in 2016/17), that occurred between 6 April 2014 and 5 April 2019.
    (5) Determine a person's period of labour market activity as an employee across all employments in the period 6 April 2014 to 5 April 2019.

Step (1) – Identifying employments in PAYE RTI

127. The first step obtained a list of all employments held within PAYE RTI with at least a part of the employment occurring in 2016/17 tax year.

128. It is possible, of course, for a single employee to hold concurrent employments in a given period of time.

Step (2) – Identification of nationality and other characteristics

129. Each employment was linked to the MWS to identify if it was undertaken by an EEA citizen[59] or not.

130. The person's age is determined from the PAYE RTI data and the effective arrival date is also determined using MWS data. The effective arrival date is an estimate based on the earlier of either the NINO registration date or self-reported arrival date in the MWS. This helps avoid classing some individuals who return to the UK after a period abroad (and re-register) as being classed as new arrivals.

Step (3) – Determining the duration of an employment

131. For each employment identified from Step (1) (i.e. those with some portion of employment occurring in 2016/17 tax year) the analysis considers the number of months between the first occurrence of pay and last occurrence of pay in the overall

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[59] As defined in Section A.

period covered by the analysis. This is used to estimate the duration of an employment in the following bands: up to 12 months and longer than 12 months.

132.   If there is a period of no pay in between the first and last month of the employment, then the duration for that employment is categorised as an intermittent employment duration.

133.   Some factors of why there may be periods of no pay within an employment can include secondments, career breaks, unpaid parental leave, and work as self-employed. This list is not exhaustive and there may be other factors as to why an individual has not been paid.

134.   Short-term employments are considered to be those that have a duration of up to 12 months. Long-term employments have a duration of more than 12 months.

Step (4) – Identifying all employments between April 2014 and March 2019 linked to those

135.   For each person identified in Step (2) (i.e. those that had a portion of an employment in 2016-17 tax year), they were linked to PAYE RTI data from April 2014 to March 2019 to obtain all their employment activity over a five year period.

136.   If an employee receives pay in a tax month, they are classified as being active in the labour market in that month. This is done to enable Step (5) in the methodology.

Step (5) - Determine a person's labour market activity as an employee

137.   This step estimates the duration of time that a worker is continuously active in the labour market, whether employed by one or several different businesses.

138.   For this analysis, a person is continuously active in the labour market if:

- They have at least one employment in PAYE RTI, of which part of it occurs in the 2016-17 tax year;
- The person has more than one employment in PAYE RTI, the gap between any consecutive employments is less than 4 months.

139.   Where a person is continually active in the labour market, their period of activity as an employee is determined by the time period between the first time they receive pay and the last time they receive pay, as recorded in PAYE RTI.

140.   Individuals who have any 'large' (i.e. a period longer than 3 consecutive months) gaps of payments in between two employments (between 2014/15 and 2018/19), will automatically have their period of labour market activity categorised as intermittent. A gap in pay of up to 3 months is permitted to allow time for people to move between employments.

D.3. Results

141. The figures below outline counts of EEA nationals who arrived in 2016/17 by their period of labour market activity as an employee; the median duration of labour market activity and age distribution for EEA national arrivals in 2016/17 defined as '*short-term employee flows*'[60]; and the 15 sectors with greatest shares of short-term employments/short-term employments undertaken by EEA nationals.

Figure 8: Duration of labour market activity of EEA nationals arriving in the UK in 2016-17, and who had a period of employment in 2016/17[61]

Up to 3 Months		More than 3 and up to 6 months		More than 6 and up to 12 months		More than 12 months		Intermittent		Total
Counts	%	Counts	%	Counts	%	Counts	%	Counts	%	Counts
36,000	12	29,000	9	30,000	10	152,000	49	62,000	20	**308,000**
All up to 12 Months										
Counts					%					
95,000					31					

142. Of those 308,000 EEA nationals that arrived in the UK in 2016-17 tax year and had a portion of their employment beginning in 2016-17:

- Around 31% had a period of labour market activity as an employee up to 12 months;
- Around 49% had a period of labour market activity as an employee greater than 12 months; and
- Around 20% had an intermittent period of labour market activity.

143. EEA nationals that arrived in the UK in 2016/17 but who did not start work until later are not included. This means that the numbers in Figure 8 do not represent a full year of EEA nationals arriving in the UK. HMRC analysis estimates an additional 30,000 EEA nationals arrived in the UK in 2016/17, registered for a National Insurance number and began a short-term period of employment in 2017/18.

Figure 9: Median period of labour market activity for an EEA national who arrived in the UK in 2016/17, and meets criteria of 'short-term EEA worker 'flow'[62][63]

	Up to 3 months	More than 3 and up to 6 months	More than 6 and up to 12 months
Median period of labour market activity (months)	2	5	9

144. Figure 8 outlines 95,000 EEA nationals arrived in the UK in 2016-17, started work as an employee in 2016/17, and had a period of labour market activity of up to 12 months

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[60] See Table 3 in the Impact Assessment for this definition.

[61] HMRC PAYE RTI and MWS Analysis. See 'Limitations' outlined below. Counts are rounded to the nearest thousand. Percentages are rounded to the nearest unit. Due to rounding, sums of breakdowns may not equal the totals stated

[62] See Table 3 in the Impact Assessment for definition

[63] HMRC PAYE RTI and MWS Analysis. See 'Limitations' outlined below. Counts relate to the median number of months.

(taking into account activity up to 6 April 2019). Figure 10 provides the age distribution for this group and illustrates 74% of *short-term EEA worker 'flows'*[64] were under the age of 30. Some EEA migrants who arrived in 2016/17 will have had short-term jobs starting after 2016/17 and will not be included in these figures.

Figure 10: Age breakdown of EEA nationals arriving to the UK in 2016/17 with a period of labour market activity of up to 12 months[65]

	Under 18	18-30	31- 40	41 - 50	51 - 64	65+
%	2	72	15	8	3	0

145. Figure 11 below provides the top 15 sectors with greatest shares of short-term employments. Sectors are based on Home Office's analysis of migration which reclassifies standard ONS sector classifications[66].

Figure 11: The 15 sectors with the greatest share of short-term employments in 2016/17[67]

Sector	Duration of Employment		
	Up to 12 months (%)	More than 12 months (%)	Intermittent (%)
Other services	54	35	11
Hospitality	42	49	9
Agriculture	41	49	10
Building services	32	60	8
Professional business services	31	60	9
Recreational services	27	54	19
Creative industries and broadcasting	26	58	15
Warehousing and support for transport	26	70	5
Retail	24	69	7
Personal and domestic services	22	65	13
Social work	22	68	10
Care	21	70	9
Land transport	18	77	6
Construction	18	76	7
Real estate	18	75	7

146. Within 'Other Services' 54% of employments were short-term, which is the highest share across all sectors. As the figures cover a full year an individual may have had more than one short duration during 2016/17, so the proportion of short-term employments at any one point in time during 2016/17 would generally be lower.

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[64] See Table 3 in the Impact Assessment for definition

[65] HMRC PAYE RTI and MWS Analysis. See 'Limitations' outlined below. Percentages are rounded to the nearest unit.

[66] As described in the 'Long-term EEA work policy modelling' section of this document. See Annex A for the full list of this grouping.

[67] HMRC PAYE RTI and MWS Analysis. See 'Limitations' outlined below. Sector information has been based on migration analysis sectors. 'Other Services' includes employment agencies – some agency employees may be supplying labour to other sectors of the labour market whilst being paid by employment agencies. Percentages are rounded to the nearest unit.

147. Information from the MWS enables an assessment of whether employments were undertaken by EEA citizens. Figure 12 sets out the 15 sectors with the highest shares of short-term employments in 2016/17 undertaken by EEA nationals.

Figure 12: The 15 sectors with the greatest share of EEA short-term employments in 2016/17[68]

Sector	EEA share of all short-term employments (%)
Agriculture	46
Food and drink manufacturing	35
Building services	29
Other services	28
Warehousing and support for transport	28
Hospitality	22
Textiles and clothing	21
Other manufacturing	17
Professional technical services	16
Pharmaceuticals and chemicals	16
Land transport	15
Wholesale (excl. motor vehicles)	15
Professional business services	15
Automotive and transport	15
Steel and other metals and commodities	14

D.4.   Limitations

148. Limitations and important features relating to data sources are set out below.

Limitations of PAYE RTI data

149. This analysis is produced using HMRC administrative data, which is collected by HMRC to administer the tax system. Since the data collection has not been designed primarily with the purpose of analysing short-term employment and migration, it is not able to address the full range of topics that a survey source would be able to, but on the other hand does offer much better coverage of the population.

150. The quality of administrative data will depend on factors such as the topics covered and the quality of the information submitted by the people providing it. . For example, the quality of the statistics on the number of individuals receiving pay from PAYE employment in this publication depends on information submitted by employers.

151. These statistics inherently do not cover any undeclared employment income.

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[68] HMRC PAYE RTI and MWS Analysis. See 'Limitations' outlined below. Sector information has been based on migration analysis sectors. 'Other Services' includes employment agencies – some agency employees may be supplying labour to other sectors of the labour market whilst being paid by employment agencies. Percentages are rounded to the nearest unit.

152. We assume that a payment recorded in PAYE RTI corresponds to some form of employment activity within that month.

153. Where an employee is awaiting their National Insurance number, employers are still required to make PAYE RTI submissions when payments are made to those individuals. These employments are assigned a Temporary Reference Number by HMRC. Where these employments have not been linked to an individual in our statistical analysis, they have been excluded.

Important Features of MWS data

154. The Migrant Worker Scan (MWS) record migrants' nationality at the time of registration. It does not typically hold information on any changes in nationality after the allocation of the NINO. If does not record whether an individual holds more than one nationality, only one of these is recorded.

155. The classification of EEA members is based on current EEA membership and not which countries were in the EEA at the time the NINO was issued or an individual arrived in the UK.

E. International Higher Education student migration modelling

156. The analysis set out in this section focuses on the impact of policy changes on long-term EU and non-EU domiciled students currently studying at higher education institutions. Students are analysed across all levels of study within higher education, but those in further education or those studying at Alternative Providers are not included. There is currently limited data on the volume of EU students in further education in the UK as colleges are not currently required to collect this data, and therefore it is difficult to estimate how many will be affected by the future system.

157. The analysis also does not account for the wider behavioural response of universities under the future system, such as whether they will offer more places to UK and non-EU students to mitigate some of the potential reduction in EU student inflows. The analysis also does not provide granularity on modes of study, gender or specific nationalities as there is no available evidence on how these subsets of international students specifically would respond to the policies in the future immigration system. Furthermore, the analysis only estimates the impact of the future immigration system on the higher education sector, and it does not account for impacts on individual institutions.

158. There are other factors which have not been accounted for in this analysis, such as the impact of visa fees as the policies have not been finalised, whilst there is limited data on the restrictions on employment rights and proof of funds. The analysis also does not account for any changes to tuition fees, as they are outside the scope of Home Office policy.

## E.1. International student baseline inflow modelling

159. The baseline projections for first-year EU student enrolments is based on historical trend data from Higher Education Statistics Agency (HESA) data between academic year 2000/01 and 2017/18. HESA collects data from universities, higher education colleges and other specialist providers of higher education in England, Wales, Scotland and Northern Ireland.

160. The historical period set out in the baseline projections was chosen to ensure the forecast trends were not distorted by recent years. The baseline projection of EU student inflows can be seen in Figure 13 below. EU first-year student enrolments have increased by more than 50% between 2000/01 and 2017/18, and the baseline projections estimate that this will continue to gradually increase in the absence of any policy intervention. The analysis assumes a steady state beyond 2026/27 due to the uncertainty of projecting migration inflows.

Figure 13 – Projection of EU student inflows between Academic Year 2011/12 to 2029/30[69]
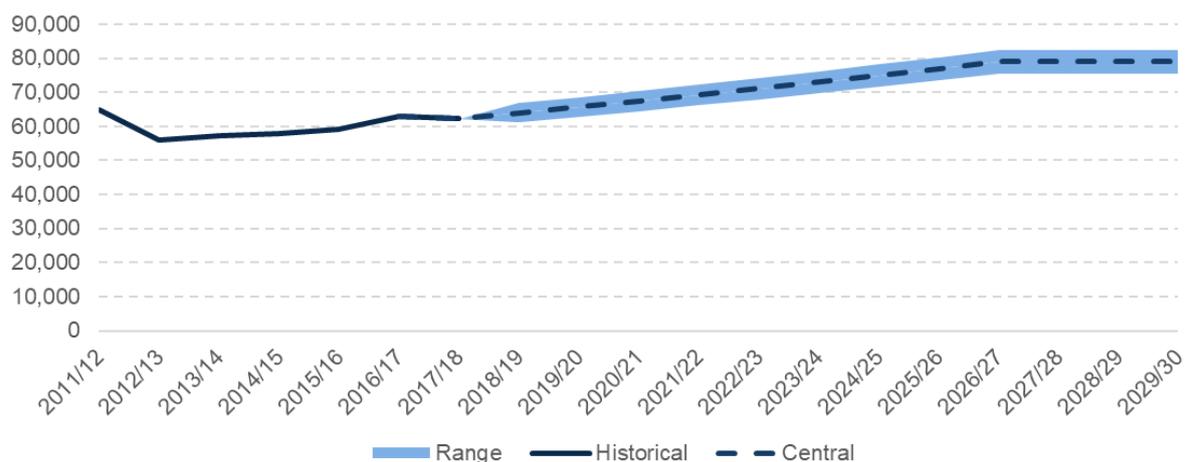
161. To construct a baseline for non-EU enrolments, the growth rate in Tier 4 IVR projections are applied to HESA first year enrolments for non-EU students. The IVR projections used in the analysis are not the most recent projections as newer versions make some account for impacts of policy announcements such as the introduction of the graduate visa.

Figure 14 - Projection of non-EU student inflows between Academic Year 2011/12 to 2029/30[70]

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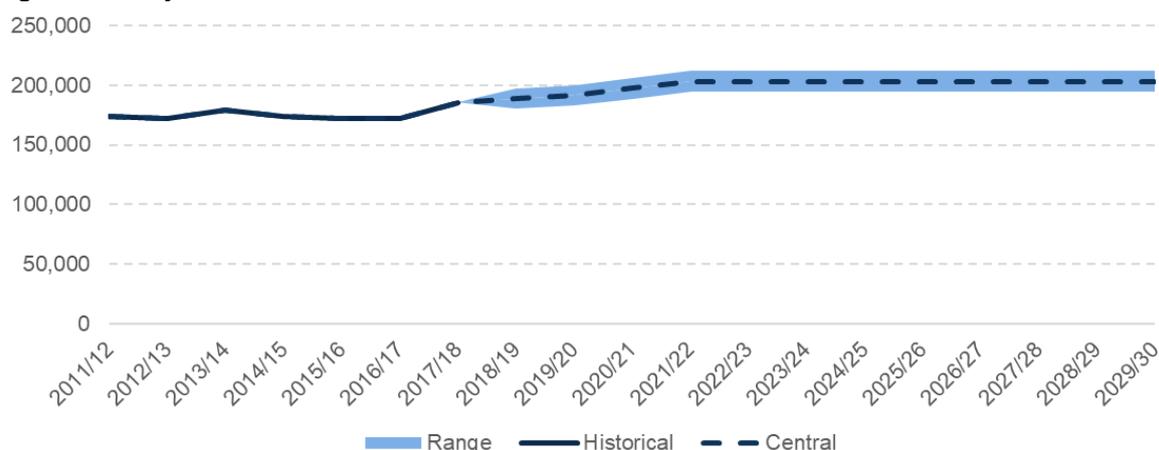
162. Figure 14 indicates that the baseline projections for non-EU students are also expected to increase gradually until it reaches a steady state from 2021/22 and onwards, which is attributed to the fact internal workload projections do not go beyond that for Tier 4 (General) students.

163. As with any form of economic modelling, there is inherent uncertainty as there are a range of possible factors which can drive migration (both economic and political), and this has been outlined in more detail in paragraph 9. Therefore, the baseline

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[69] Home Office analysis of Higher Education Statistics Agency (HESA) data
[70] Home Office analysis of Higher Education Statistics Agency (HESA) data

projections for EU and non-EU student enrolments should be treated as indicative, as historical trends are not always representative of future forecasts.

164. Coefficient of variation[71] (CV) analysis is used in order to better capture this uncertainty. Year-on-year CV between 2000 and 2017 is conducted to estimate the historical volatility in EU and non-EU student volumes, disaggregated by level of study. This is estimated to be around ±5%, and this is applied to baseline inflows to give a range of uncertainty for EU and non-EU student inflows in the relevant scenarios.

E.2.   Student characteristics

Level of study

165. HESA data for 2017/18 showed that generally the proportion of international students in postgraduate (research) courses were similar for both EU and non-EU students (5%)[72]. However, the trends differed for courses below postgraduate (research). Generally, there were a greater proportion of EU students (55%) in undergraduate courses, whilst non-EU students tended to be on postgraduate (taught) level courses (55%)[73]. The analysis assumes that these proportions have remained the same over the forecast period.

Age

166. HESA data for 2017/18 on the ages of international students indicate that there are around a quarter of EU students who are between the ages of 15 and 19, whilst non-EU students account for less than fifth of students in this age bracket. However, there tends to be a greater proportion of non-EU students than EU students in the other age groups, with almost 55% of non-EU students being between 20 and 24[74]. The data broadly shows that around 90% of international students were under the age of 30.

Dependants

167. Under current immigration rules, non-EEA students are only allowed to bring dependants (defined as a spouse, civil partner, unmarried or same-sex partner or child under 18) if they are on a postgraduate level course (RQF 7 and above) sponsored by a higher education institution which lasts at least nine months. Dependants of Tier 4 visas are allowed to undertake work, including self-employment. EEA students currently benefit from freedom of movement and therefore no restrictions are placed on bringing dependants. Under the future system however, EEA students will be subject to the same restrictions as non-EEA students.

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[71] The coefficient of variation is measured as the ratio of the standard deviation to the mean and is used to calculate the dispersion of a distribution.
[72] These are PhD level courses and are rounded to the nearest 5%.
[73] These are masters level courses and are rounded to the nearest 5%.
[74] This is rounded to the nearest 5%.

168. As there is currently limited data on the volume of dependants that EEA students have, the analysis uses Survey of Graduating International Students (SOGIS) 2017 data on dependants of EU students to estimate this[75]. The data highlights that around 97% of EU students who responded to the survey did not have children, whilst the remaining students had between one and three children. SOGIS (2017) data also provides information on the marital status of final year students, which is used as a proxy for the marital status of student inflows. The analysis assumes that all students who are married or in a civil partnership will bring a dependant with them. The EEA skilled workers analysis assumes that all those who are coming to the UK to accompany EEA migrants are dependants of workers, and therefore the number of dependants of EEA students may be double counted.

169. The SOGIS data only gives an indication of how many children EU students have, not necessarily how many they bring to the UK. Some EU students who live in relatively close proximity to their home country may choose to leave some children at home if they can visit them during holidays. As a result, this approach may overestimate the number of dependants. However, as this proportion is extremely small (around 3%), it is unlikely to have a material impact.

170. For non-EEA students, historical visa data between 2009 and 2019 is used to estimate the ratio of Tier 4 dependant grants to main Tier 4 grants, and this is applied to the non-EU student inflows outlined in the modelling[76].

171. As there is limited evidence on the activity of adult dependants to international student migrants in higher education, the analysis assumes they have the same activity rate and salaries as dependants of international workers (as set out in EEA and non-EEA skilled work sections). This may not be the case if dependants of international students have different characteristics to dependants of international workers (for example, they may be younger).

172. Due to limited data, the analysis also assumes the age of adult dependants are the same as students; for the age profiles of child dependants, the assumptions are the same as the workers methodology outlined above.

E.3.   International students baseline outflows modelling

173. To estimate the total stock of international student migrants in Higher Education, expected length of study estimates from HESA in 2017/18 are applied to the inflows of international students to Higher Education. The expected length of study is defined as from the commencement of study (the first learning or teaching week) to the completion of the course, which normally includes time for examinations[77].

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[75] Survey of Graduating International Students (SoGIS) by Economic and Social Research Council Centre for Population Change, Office for National Statistics and Universities UK

[76] 'Entry clearance visas granted outside of the UK' https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/868220/entry-clearance-visa-outcomes-datasets-dec-2019.xlsx

[77] https://www.hesa.ac.uk/collection/c17051/a/splength

174. The analysis disaggregates this data by study level. In general, the majority of non-EU students (55%) tend to be on courses which last less than a year. This is supported by HESA data which shows that the majority of them tend to be studying masters-level courses and these courses tend to be shorter compared to undergraduate and PhD level courses. The expected length of stay is different for EU students with only 35% of them coming on a course for less than a year. Around half of EU students come to study on courses which last between two and four years[78].

175. The analysis does not include non-continuation rates (i.e. those who drop out of their courses), which may have an impact on outflows. However, the size of this impact is uncertain as there is no available data on non-continuation rates.

176. The expected length of stay is estimated to be the same under both the baseline and policy scenario.

E.4.   International student policy modelling

177. To estimate the impact of a future immigration system on international student inflows, the analysis considers the impact of introducing the graduate visa[79] and restricting the rights to bring dependants. As outlined above, there are other restrictions that may also have an impact on student enrolments, but these have not been included in this analysis.

Restricting rights to bring dependants

178. Bespoke SOGIS 2017 data found around 2.5% of EU undergraduates had one or more child dependants, whilst 6.3% of EU postgraduates had two or more child dependants. The analysis assumes that half of these would be deterred from coming to the UK, as undergraduates would not be allowed to bring dependants under the existing rules of the Tier 4 visa and postgraduates would be less likely to bring more than one dependant as Tier 4 postgraduate dependant visas are subject to monthly maintenance requirements[80]. The rationale for assuming only half would be deterred is because some EU students may choose to come and study in the UK regardless of the restriction, and they may leave their children with their families in their country of origin. As a result, the deterrence impact is estimated to be up to 5% for EU students, depending on level of study[81].

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[78] Estimates here are rounded to the nearest 5%.

[79] This increases the post-study work period for non-EU students but is a restriction on post-study work for EU students.

[80] https://www.gov.uk/tier-4-general-visa/family-members

[81] Survey of Graduating International Students (SoGIS) by Economic and Social Research Council Centre for Population Change, Office for National Statistics and Universities UK. This is rounded to the nearest 5%.

Introducing the graduate visa

179. The impact of the introduction of the graduate visa on EU student enrolments is extremely difficult to estimate, as EU students currently benefit from freedom of movement and therefore are subject to no restrictions upon graduation. Longitudinal Education Outcomes (LEO) data provides a breakdown of student destinations after graduation and this has been used to estimate the impact of the post-study work restriction on EU students[82]. It shows that there is a significant difference between EU and non-EU students in employment two years after graduation (depending on the level of study).

Figure 15 – EU and non-EU students in employment two years after graduation, 2012/13 cohort[83]

Level of Study	EU	Non-EU	Difference
Undergraduate	30%	10%	20ppt
Postgraduate (taught)	25%	10%	15ppt
Postgraduate (research)	35%	20%	10ppt

180. In order to estimate the potential impact of restricting the post-study work rights of EU students, the difference in work outcomes set out in Figure 15 has been used a proxy to estimate the change in student inflows that might result from the change.

181. This estimate should be treated as indicative and is highly uncertain, as it assumes that EU student employment outcomes will be the same as non-EU student employment outcomes under the future system, which may not necessarily be the case. Furthermore, the difference may not directly equate to the reduction in EU inflows coming to study in the UK, as there are other factors which could influence a student's decision to come to study in the UK and this can often change after graduation. It is likely that the difference in the proportion in work after 2 years is a high estimate of the potential impact as it would most likely be lower following the extension to post-study work period for non-EEA nationals under the graduate route which may reduce the difference in outcomes between EU and non-EU students after graduating, irrespective of changes to EU enrolments.

182. However, the graduate visa may have a positive impact on non-EU student enrolments, as the length of the visa is significantly longer than the current post-study work period. This could incentivise more non-EU students to come and study in the UK. To estimate the impact of the graduate visa on non-EU student enrolments, the analysis looks at the impact of the introduction of the previous post-study work visa on non-EU first-year enrolments between 2008 – 2011 by level of study and uses this as a proxy to estimate the impact of the graduate visa. The analysis assumes the increase in non-EU student enrolments is estimated to be around 10%, depending on the level of study[84]. This assumes the change in non-EU first-year enrolments can be directly attributed to the introduction of the post-study work visa, which may not necessarily be the case.

[82] https://www.gov.uk/government/publications/graduate-outcomes-leo-international-outcomes-2006-to-2016
[83] Based on Longitudinal Educational Outcomes data, 2012/13 graduating cohort. Figures are rounded to the nearest 5%. This is also based on the matched percentage.
[84] Rounded to the nearest 5% - figures may not sum due to rounding.

E.5.   University impacts

183.   The modelling uses HESA tuition fee income data for 2017/18, disaggregated by level of study to estimate the total income[85]. This section of the analysis is disaggregated by level of study as different levels of tuition fees are charged at each level. The growth rate of the stock of international students over the forecast period is used and applied to the outturn of tuition fee income of 2017/18 to estimate the projected fee income until 2030.

184.   Projected tuition fee income is estimated to increase under the future immigration system, and this is primarily because the increase in non-EU student tuition fee income is expected to more than offset the decline in EU student tuition fee income, and it is expected to increase by between £1bn and £2bn over the first five years of the policy[86]. The average annual additional tuition fee income under the future system would reflect around 2% of total tuition fee income, assuming it was to stay broadly stay the same as recent levels.

Figure 16 - Projected tuition fee income of universities from migrant students under future system[87]
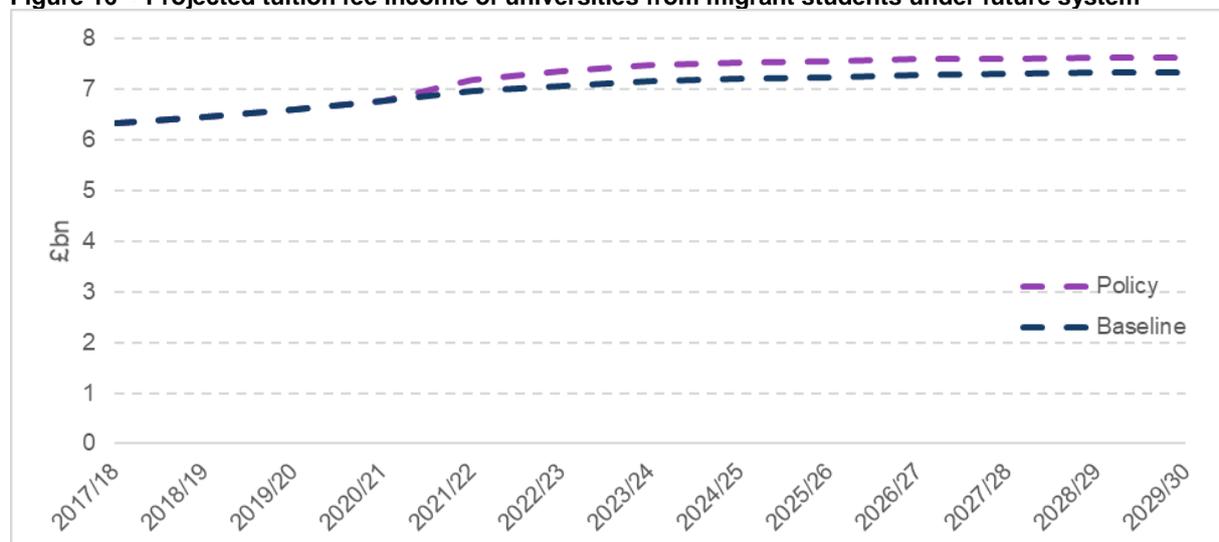
185.   However, this estimate does not account for any changes in tuition fees under the future system, which may also have an affect on both EU student inflows and the projected tuition fee income of universities. As previously stated, this does not reflect any behavioural changes of universities under the future system, such as whether they offer more places to UK or non-EU students to offset the reduction in EU students.

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[85] We do not assume any changes to fees, either through policy or inflation.
[86] All estimates under £1bn are rounded to the nearest £0.1bn, whilst estimates above £1bn are rounded to the nearest billion.
[87] Bespoke analysis of Higher Education Statistics Agency (HESA) data.

F.   Fiscal impact of migration

F.1.   Overview

186.   A static analysis of the 2017/18 fiscal year is used to estimate tax revenue and government spending attributable to migrants of a given age, economic status and earned income. This analysis is applied to changes in future net migration flows (by wage, age and economic activity) to estimate the order of magnitude of the impact on the public finances.

187.   This analysis is not a projection of the future state of the economy; it is based on the latest data on fiscal expenditure and tax rates which captures the UK economy in its current state, adjusting for productivity growth and inflation, allowing specific impacts of changes to migration to be explored, holding all other factors constant.

188.   In the literature there are a number of different approaches to calculating the effect of policy changes on fiscal balances. The central methodology used here represents a 'marginal' approach to measuring the impact of migration and therefore makes a distinction between spend and revenue that is unlikely to vary according to the number of individuals moving to the UK. This assumption is tested within the sensitivity analysis sections below.

189.   The modelling framework considers initial impacts of specific policy changes. It does not consider dynamic responses of the economy and behavioural responses of individual and firms. As such, fiscal impacts from a change in migration are presented over the short-term, defined as the first five years of the policy (2021 to 2025). The approach considers the cumulative change in migrant volumes over this period.

190.   No assumption is made for how migrants age over this period. However, as the appraisal period is over a five-year period, and fiscal spend unit costs are estimated in five-year age groups, this should have a relatively small impact.

F.2.   Fiscal spend

191.   The analysis uses a top down approach to apportion total expenditure on public services at the individual level. This results in estimated unit costs for different types of public expenditure, by migrant age group and economic activity.

Key data sources

192.   Data on expenditure of public services is obtained from Public Expenditure Statistical Analysis (PESA) published by HM Treasury, which provides data on public sector expenditure broken down by functions. The analysis is based on data for 2017/18[88].

193.   Data on migrant population characteristics is obtained from the APS produced by the ONS. APS data for 2017/18 is used to derive population characteristics such as

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[88] https://www.gov.uk/government/statistics/public-expenditure-statistical-analyses-2018

volumes of existing residents by nationality and age distribution. When using estimates of total UK population, the analysis uses ONS 2017[89] data, which is considered more accurate than the APS.

194.   Data on social protection expenditure is obtained from the Family Resources Survey[90] (FRS) for 2017/18. FRS data for 2017/18 is used to obtain the average benefit received for EEA nationals of working age in the UK.

195.   Figure 17 describes how these data are apportioned on a per capita basis. Unit costs are based on 2017/8 prices these have been inflated to 2019/20 prices and adjusted using OBR long-term projections real labour productivity growth to account for future economic growth[91].

Figure 17 - Methodology for apportioning fiscal spend components across different nationalities

Major spend components	Marginal approach
Public goods (i.e. R&D, Defence) Debt interest	Under a marginal approach this spend is only allocated to the resident population. The rationale is that the marginal costs of providing these services to an additional migrant is zero/negligible.
Housing development	Allocated on a per capita basis
Police services	Allocated on a per capita basis
Health	Office of Budget Responsibility (OBR) [92] estimates on health spending by age are applied.
Pre-primary education	Allocated evenly to 0-4 year-olds
Primary and secondary education	Allocated evenly to 5-17 year-olds
Tertiary education	Allocated evenly to students in higher education, based on Student Loans Company data (excluding international non-EEA students)
Social protection: benefits	Estimates per head costs based on FRS data to reflect the average benefit received for EEA nationals of working age, dependent on earnings. Non-EEA inflows are not assumed to be eligible for benefits
Social protection: personal social services	Social protection and social exclusion allocated on a per capita basis.

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[89] https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration

[90] FRS is self-reported, this means it is likely to under-report benefit receipt figures as some respondents do not know or do not have the necessary information to answer the specific questions about individual benefits which makes it difficult to collate accurate information; more information on this, and the FRS more generally, is available at https://www.gov.uk/government/statistics/family-resources-survey-financial-year-201617. For estimates of benefit expenditure and caseload for EEA nationals, publications from HMRC or DWP should be used; https://www.gov.uk/government/statistics/income-tax-nics-tax-credits-and-child-benefit-statistics-for-eea-nationals-2015-to-2016 and https://www.gov.uk/government/statistics/nationality-at-point-of-national-insurance-number-registration-of-dwp-working-age-benefit-recipients-data-to-november-2017 respectively.

[91] https://obr.uk/efo/economic-fiscal-outlook-march-2019/

[92] http://budgetresponsibility.org.uk/fsr/fiscal-sustainability-analytical-papers-july-2016/

	Family and child social services allocated using APS data on share of family units and age of head of household.
	Old age social services apportioned equally to 65 and above population.

F.3.   Fiscal revenue

196.   The analysis uses a bottom-up approach to calculate the expected contribution to direct and indirect taxes from migrants, based on individuals' characteristics, and data on their earnings and spending patterns.

Key data sources

197.   Total revenue is taken from the OBR's Economic and Fiscal Outlook[93]. The analysis also considers information on indirect taxes by nationality in the Living Cost and Food survey data between 2014/15 and 2015/16[94] and council tax in ONS data on the effects of taxes and benefits on household income[95] 2017/18.

Figure 18 : Methodology for apportioning fiscal revenue components across different nationalities

Major revenue components	Marginal approach
Income Tax	Tax rates for 2019/20 are applied to estimated taxable income
National insurance contributions (NICs)	NICs rates for 2019/20 are applied to estimated earnings
Indirect taxes (include VAT, duties on specific products such as alcohol and tobacco, licences such as television and intermediate taxes)	Indirect tax rates are calculated depending on earning deciles. Data from the Living Cost and Food survey[96] between 14/15 and 15/16 is used to estimate the effective tax rate (indirect tax divided by disposable income) by household income decile for EEA and non-EEA nationals. This captures spending patterns (savings/remittances) for different nationality groups

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[93] https://obr.uk/efo/economic-fiscal-outlook-march-2019/

[94] https://www.ons.gov.uk/peoplepopulationandcommunity/personalandhouseholdfinances/expenditure/adhocs/008529householdexpenditureanddisposableincomebydisposableincomedecilegroupbyoriginofhouseholdreferencepersonukfinancialyearending2015tofinancialyearending2017

[95] https://www.ons.gov.uk/peoplepopulationandcommunity/personalandhouseholdfinances/incomeandwealth/datasets/theeffectsoftaxesandbenefitsonhouseholdincomefinancialyearending2014

[96] https://www.ons.gov.uk/peoplepopulationandcommunity/personalandhouseholdfinances/expenditure/adhocs/008529householdexpenditureanddisposableincomebydisposableincomedecilegroupbyoriginofhouseholdreferencepersonukfinancialyearending2015tofinancialyearending2017

Corporation taxes Business rates	Profits and the capital stock change with the size of the workforce. In a marginal approach the assumption is made that any changes in migrant workers will have an impact of company taxes and business rates. This assumes that contributions to Company tax and Business rates are ultimately driven by consumption in the same way as indirect taxes, and the per capita allocation is based on an individual's contribution to indirect taxes.
Council tax	Allocated depending on earning deciles, based ONS[97] estimates of council tax paid per household in each income decile. An adjustment is made for those receiving a council tax reduction and the number of economically active individuals in each household.
Capital gains tax Inheritance tax Gross operating surplus, interest and dividends All other taxes/income streams	Under a marginal approach this revenue is allocated only to the resident population. The rationale is that a newly arrived migrant will have little or no impact on these revenue streams.

F.4. Long-term EEA work migration fiscal modelling

198. This section describes how the static analysis above is applied in the context of future migration modelling.

Fiscal spend

199. The spend unit costs described above are applied to the estimated change in net EEA migration (by age and economic activity) to estimate the saving in public expenditure.

Fiscal revenue

200. The long-term EEA worker migration model described in Section B estimates the earnings of EEA migrants under the baseline and policy scenarios. Revenue estimates described in Figure 18 are applied to modelled future earnings and adjusted for real labour productivity growth overtime to account for future economic growth[98]. Indirect tax revenue from inactive dependants is not estimated as they are assumed to be supported by their working partner. Taxes on consumption by inactive dependant migrants is therefore assumed to be captured within indirect tax paid by workers.

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[97]

https://www.ons.gov.uk/peoplepopulationandcommunity/personalandhouseholdfinances/incomeandwealth/datasets/theeffectsoftaxesandbenefitsonhouseholdincomefinancialyearending2014
[98] https://obr.uk/efo/economic-fiscal-outlook-march-2019/

Sensitivity Analysis

201. Under the marginal approach described above, newly arrived migrants are assumed to have little or no impact on spending on services such as pure public goods, debt interest and EU transactions and revenue streams such as capital gains tax, inheritance tax and gross operating surplus. However, they are assumed to have an impact on congestible public goods and taxes paid by businesses such as corporation tax and business rates. Two sensitivity scenarios are included in order to test the impact of assumptions on which element of revenue and spend are apportioned to migrants.

- **Sensitivity 1 – includes all spend and revenue components**

  ▪ Public goods (such as R&D, Defence) are allocated on a per capita basis
  ▪ Other indirect taxes such as capital gains tax, inheritance tax, the climate change levy and environmental levies are allocated to individuals based on estimated consumption patterns and income. This assumes the same relationship between earnings and tax contribution as indirect tax.
  ▪ Other receipts such as gross operating surplus, interest and dividends and other income streams are allocated on a per capita basis.

- **Sensitivity 2 – exclude all public goods and only includes taxes income tax, NIC, council tax and indirect taxes.**

  ▪ Under this scenario all public goods (both pure and congestible) are excluded.
  ▪ Under this scenario business rates and corporation tax are excluded. This means only income tax, NIC, council tax and indirect taxes are included.

Figure 19: Long-term EEA worker fiscal results (2021-2025) - £'bn – central baseline estimates[99]

	Marginal approach	Sensitivity 1	Sensitivity 2
Reduction in spend	6	9	4
Reduction in revenue	(8)	(10)	(7)
Net fiscal contribution	**(2)**	**(0.7)**	**(3)**

F.5.   Long-term non-EEA work migration fiscal modelling

202. The same fiscal methodology described above is used when assessing the fiscal impact of non-EEA nationals.

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[99] Figures may not sum due to rounding. Financial volumes over £1 billion are rounded to the nearest £1 billion. Financial values below £1 billion are rounded to the nearest £0.1 billion

Fiscal spend

203.   Unit costs are applied to non-EEA migrants based on migrant characteristics such as age and economic activity. These assumptions are described in Section C.

204.   Unlike for EEA nationals, non-EEA nationals are assumed to have no access to welfare payments (in the baseline as well as policy scenarios) in their first five years in the country.

Fiscal revenue

205.   The non-EEA skilled worker modelling estimates the baseline earnings of non-EEA migrants and the change under a given policy scenario. Revenue estimates described in Figure 18 are applied to modelled future earnings and adjusted for real labour productivity growth overtime to account for future economic growth[100]. Indirect tax revenue from inactive dependants is not estimated as they are assumed to be unable to access public funds and so do not receive their own income.

206.   Given the level of uncertainty in the fiscal methodology, the same sensitivity scenarios are applied to both the EEA and historic policy scenarios. Under Sensitivity 1 the net fiscal benefit falls by approximately 25% in the EEA scenario, and 33% in the historic scenario; and under Sensitivity 2, the net fiscal benefit increases by approximately 3% in the EEA scenario and increases by approximately 8% in the historic scenario.

Figure 20 : Long-term non-EEA fiscal results (2021-2025) - £'bn (central baseline volume prediction)[101]

	Marginal approach (central estimate)		Sensitivity 1		Sensitivity 2	
	EEA scenario	*Historic scenario*	*EEA scenario*	*Historic scenario*	*EEA scenario*	*Historic scenario*
Increase in spend	(3)	(1)	(4)	(2)	(2)	(0.8)
Increase in revenue	6	2	7	3	5	2
Net fiscal contribution	3	1	2	0.9	3	1

F.6.   Short-term EEA workers[102] fiscal modelling

207.   The approach described above is amended for use in estimating the fiscal impact of EEA national flows who supply employee labour for up to 12 months, but there are some differences in data sources and assumptions.

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[100] https://obr.uk/efo/economic-fiscal-outlook-march-2019/
[101] Figures may not sum due to rounding. Financial volumes over £1 billion are rounded to the nearest £1 billion. Financial values below £1 billion are rounded to the nearest £0.1 billion
[102] Those who arrive to the UK and supply labour for up to 12 months.

208. The approach for short-term EEA workers provides an estimated annual impact – given the presence of these workers in the UK are assumed not to exceed 12 months, a five-year timeframe for analysis is not appropriate.

209. Estimates for short-term EEA workers use HMRC PAYE RTI and MWS analysis, described in Section D. This analysis provides information on volumes, age profile, assumed period of activity in the UK labour market, average earnings, Income Tax and employee National Insurance contributions. Analysis focuses on those described as *short-term EEA worker 'flows'* as set out in Table 3 in the main impact assessment, and where italics are used in the below they also refer to terms set out in that table.

Fiscal Revenue

210. Estimates for fiscal revenue include the components of covering Income Tax contributions, National Insurance contributions, Indirect Taxes[103], Business Rates, Corporation Tax and Council Tax.

211. The definition of *short-term EEA worker 'flows'* does not provide a uniform 12-month period of time in which to establish themselves as an employee in the UK. Information on earnings, Income Tax and employee National Insurance contributions focuses only on earnings and tax contributions occurring in 2016/17, even where *short-term EEA worker 'flows'* continue as employees beyond the end of 2016/17.

212. These factors may lead to undercounts of potential fiscal revenue within estimated 'annual impacts' for an 'average' EEA worker coming to work in the UK for up to 12 months.

213. Estimates for fiscal revenue assume the behaviour of short-term migrants is analogous to that of longer-term migrants. As such estimates of indirect taxes, for example, assume the effective tax rate for long-term workers with similar earnings as *short-term EEA worker 'flows'* holds for *short-term EEA worker 'flows'*. All *short-term EEA worker 'flows'* are assumed to live in accommodation making them subject to council tax contributions, and not in communal establishments such as hotels or hostels (where some might stay for short periods in the UK). There is uncertainty as to how far this may hold.

214. The analysis does not account for end of year reconciliations of individuals' Income Tax liabilities after the end of the tax year. Adjustments to an individual's liability could occur for example if an individual has had a period of employment on an emergency tax code or has had other non-employment sources of income, such as savings that are taxed through PAYE. This may increase or decrease the final Income Tax liability for each individual. The extent to which this will affect the estimates of net fiscal impacts will be limited but is uncertain.

Fiscal Spend

215. Fiscal spend estimates for this group covers expenditure in Housing development, Police services, Health and Social protection: personal social services. There is some

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[103] As specified in Figure 18 above

uncertainty as to how far the presence of short-term workers impacts public spending decisions in all components included in these estimates.

216.   Given their short-term duration in the UK, *short-term EEA worker 'flows'* are assumed to not bring dependants, and so do not impose costs to pre-primary or primary and secondary education. As workers, they are also assumed not to consume tertiary education.

217.   It is assumed no expenditure on benefits occurs for this group, given *short-term EEA worker 'flows'* are unlikely to pass the habitual residence test[104].

218.   For fiscal spend (and for council tax revenue), unit estimates for longer term EEA workers are assumed to be representative for short-term EEA worker, and apportioned to account for the assumed length of stay in the UK for short-term EEA workers. There is uncertainty as to how far this may hold.

Fiscal Impacts

219.   Results from this methodology and these assumptions are presented in the 'Short-Term EEA Citizen Workers' section of the Impact Assessment. The results presented in the Impact Assessment give an assumed marginal impact of *short-term EEA worker 'flows'*. No sensitivities have been run for estimating fiscal impacts for short-term EEA workers.

F.7.   Fiscal impacts of international students in Higher Education

220.   The methodology for estimating the fiscal impacts of international students in higher education is broadly similar to that of EEA and non-EEA workers, although there are some differences described below.

221.   To estimate the cost to Government from the provision of student loans, we use Student Loans Company data to estimate the average loan paid per EU full-time undergraduate student[105]. This is then multiplied by the Resource and Accounting Budget (RAB) charge to estimate the cost to the government of borrowing to support the student finance system[106]. This is then multiplied by the loan-take up rate to estimate how many students take up the loan[107]. Each EU student is also assumed to be provided with a teaching grant[108]. The total estimate for the cost of education of EU students to the government is

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[104] For example, see https://www.gov.uk/government/news/improved-benefit-test-for-migrants-launched for information on the Habitual Residence Test.

[105] Table 3B(i), Student Loans Company.

[106] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/811997/Student_loan_forecasts_2018-19_-_text.pdf

[107] Table 3B(ii), Student Loans Company.

[108] Page 6, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/805104/ANNEX_Estimating_the_changing_cost_of_HE.pdf

estimated to be around £4,075 per student. This cost is not applied to non-EU students as they cannot get access to student loans.

222. Full-time students are also not required to pay council tax[109]. However, if a student shares accommodation with an employed individual (such as a working dependant) or a part-time student, they are liable to pay 75% of the council tax bill. Therefore, a 25% discount to council tax is applied for working dependants in the analysis. Welfare costs are excluded as EU students are not allowed to access welfare, and all working dependants are assumed to be employed.

Sensitivity Analysis

223. The same fiscal sensitivity scenarios outlined in paragraph 201 are conducted for international students under the policy scenario, where EU students are subject to the same immigration controls as non-EU students. Figure 21 shows that under sensitivity 1, the net fiscal contribution of EU students increase by around 60% to £0.5bn relative to the baseline; and under sensitivity 2, it falls by around 15% to £0.3bn relative to the baseline[110].

Figure 21 – EU students fiscal results relative to baseline AY 2021/22-2025/26 (£bn)[111]

	Marginal approach (central estimate)	Sensitivity 1	Sensitivity 2
Reduction in spend	1.2	1.6	0.9
Reduction in revenue	(0.8)	(1.1)	(0.6)
Net fiscal contribution	**0.3**	**0.5**	**0.3**

224. Figure 22 shows that when the same sensitivity scenarios are applied to non-EU students, the net fiscal contribution under sensitivity 1 is estimated to fall by around 85% relative to the central estimate, and this is attributed to the inclusion of other expenditure components such as pure public goods and all congestible goods. Under sensitivity 2, business rates, corporation tax and pure public goods are excluded and therefore both expenditure and revenue fall relative to the central estimate. However, as the reduction in spend is greater than the reduction in revenue relative to the central estimate, the net fiscal contribution increases by around 20% to £0.3bn.

Figure 22- Non-EU students fiscal results relative to baseline AY 2021/22-2025/26 (£bn)[112]

	Marginal approach (central estimate)	Sensitivity 1	Sensitivity 2
Increase in spend	(0.7)	(1.2)	(0.4)
Increase in revenue	0.9	1.3	0.7
Net fiscal contribution	**0.2**	**0.0**	**0.3**

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[109] https://www.gov.uk/council-tax/discounts-for-full-time-students
[110] These are rounded to the nearest 5%.
[111] Figures are rounded to the nearest 0.1bn and therefore may not sum due to rounding.
[112] Figures are rounded to the nearest 0.1bn and therefore may not sum due to rounding.

G. Annex A: Grouping 2-digit SIC sectors into a bespoke list of sectors for migration analysis.

2-digit SIC code	Migration analysis sector
01 Crop, animal production, hunting	Agriculture
02 Forestry and logging	Agriculture
03 Fishing and aquaculture	Agriculture
05 Mining of coal and lignite	Extraction
06 Extraction crude petroleum and gas	Extraction
07 Mining of metal ores	Extraction
08 Other mining and quarrying	Extraction
09 Mining support service activities	Extraction
10 Manufacture of food products	Food and Drink Manufacturing
11 Manufacture of beverages	Food and Drink Manufacturing
12 Manufacture of tobacco products	Food and Drink Manufacturing
13 Manufacture of textiles	Textiles and clothing
14 Manufacture of wearing apparel	Textiles and clothing
15 Manufacture of leather and related	Textiles and clothing
16 Manufacture wood and wood products	Other Manufacturing
17 Manufacture paper & paper products	Other Manufacturing
18 Printing and recorded media	Other Manufacturing
19 Manufacture of coke & refined petrol	Extraction
20 Manufacture of chemicals	Pharmaceuticals and Chemicals
21 Manufacture of pharmaceuticals	Pharmaceuticals and Chemicals
22 Manufacture rubber plastic products	Steel and other metals and commodities
23 Manuf non-metallic mineral products	Steel and other metals and commodities
24 Manufacture of basic metals	Steel and other metals and commodities
25 Manuf fab metal prods, ex machinery	Steel and other metals and commodities
26 Manuf computr, electronic & optical	Electronics
27 Manufacture of electrical equipment	Electronics
28 Manuf of machinery n.e.c.	Parts and machinery
29 Manuf vehicles and trailers	Automotive and Transport
30 Manufacture of other transport	Automotive and Transport
31 Manufacture of furniture	Other Manufacturing
32 Other manufacturing	Other Manufacturing
33 Repair and installation of machinery	Repair and Installation
35 Electricity, gas and air cond supply	Utilities
36 Water collectn, treatment & supply	Environmental services
37 Sewerage	Environmental services
38 Waste collectn, treatment, disposal	Environmental services
39 Remediation & other waste managmnt	Environmental services
41 Construction of buildings	Construction
42 Civil engineering	Construction
43 Specialised construction activities	Construction
45 Wholesale retail trade repair vehicles	Motor trades
46 Wholesale trade, except vehicles	Wholesale (excl. motor vehicles)
47 Retail trade, except vehicles	Retail
49 Land transport inc. via pipelines	Land transport
50 Water transport	Air and Water Transport
51 Air transport	Air and Water Transport

52	Warehousing & support for transport	Warehousing and support for transport
53	Postal and courier activities	Post
55	Accommodation	Hospitality
56	Food and beverage service activities	Hospitality
58	Publishing activities	Creative Industries and Broadcasting
59	Film, video, television sound record	Creative Industries and Broadcasting
60	Programming and broadcasting	Creative Industries and Broadcasting
61	Telecommunications	Utilities
62	Computer programming and consultancy	Computer services
63	Information service activities	Creative Industries and Broadcasting
64	Financial ex insurance and pension	Banking, market infrastructure
65	Insurance, reinsurance and pension	Ancillary financial services and insurance
66	Auxiliary to financial and insurance	Ancillary financial services and insurance
68	Real estate activities	Real Estate
69	Legal and accounting activities	Professional Business Services
70	Head offices; management consultancy	Professional Business Services
71	Architectural and engineering	Professional Technical Services
72	Scientific research and development	Research and Development
73	Advertising and market research	Professional Business Services
74	Other prof, scientific and technical	Professional Technical Services
75	Vetinary activities	Professional Technical Services
77	Rental and leasing activities	Other services
78	Employment activities	Other services
79	Travel, tour operator, reservation	Other services
80	Security & investigation activities	Other services
81	Services to buildings and landscape	Building Services
82	Office admin, support and other	Other services
84	Public admin, defence, social sec	Public administration and defence
85	Education	Education
86	Human health activities	Medical services
87	Residential care activities	Care
88	Social work without accommodation	Social work
90	Creative, arts and entertainment	Creative Industries and Broadcasting
91	Libraries, archives, museums	Recreational Services
92	Gambling and betting activities	Recreational Services
93	Sports, amusement, recreation	Recreational Services
94	Activities membership organisations	Other services
95	Repair of computers and other goods	Repair and Installation
96	Other personal service activities	Personal and domestic services
97	Domestic personnel	Personal and domestic services
98	Undifferentiated goods	Other services
99	Extraterritorial organisations	Other services