

North Worcestershire

Demographic Forecasts

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DRAFT

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Acknowledgements

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Table of Contents

Contact Details & Acknowledgements	i
Table of Contents	ii
1. Introduction	1
Context.....	1
Requirements.....	1
Approach & Methodology.....	2
Report Structure	4
2. The Latest Demographic Evidence	5
Headlines 2001–2011.....	5
Headlines 2001–2011.....	5
Population Estimates	6
Components of Change.....	8
Household Projections	12
3. Scenario Development	14
Introduction	14
Core Scenarios.....	15
Sensitivity Scenarios.....	20
Scenario Summary	21
4. Scenario Forecasts	22
Core Scenario Summaries	22
Scenario Commentary.....	22
5. Sensitivity Analyses	27
Sensitivity Scenarios: Introduction	27
Sensitivity Scenario 1: Headship Rate Sensitivity.....	27
Sensitivity Scenarios 2 and 3.....	30
Sensitivity Scenario 4	33
6. Appendix: Data Inputs and Assumptions	34
Population, Births & Deaths.....	34
Migration.....	36
Household Assumptions	37
Economic Activity Rates	40
Unemployment Rate	55
Commuting Ratio	58

1. Introduction

Context

- 1.1 In 2013, the South Worcestershire Councils (Malvern Hills District Council, Worcester City Council and Wychavon District Council) published their draft South Worcestershire Development Plan (SWDP). The overall housing provision requirement target set out in Policy SWDP 3 reflected the recommendation set out in the evidence in the Worcestershire Strategic Housing Market Assessment (SHMA) February 2012, based on Sensitivity Scenario 2.
- 1.2 Following the submission and Stage 1 hearings of the SWDP examination, the Inspector concluded in his Interim Conclusions (28 October 2013) that the February 2012 SHMA did not provide “a sound basis for the planning of housing provision in the Plan area”. The Inspector requested that further analysis was undertaken to support the derivation of an objective assessment of the housing need.
- 1.3 In direct response to the Inspector’s comments and request for further analysis, the South Worcestershire Councils commissioned additional work to support the derivation of an objective assessment of the housing need. The geographical scope of these additional requirements has been extended to include the three North Worcestershire districts.

Requirements

- 1.4 In line with the South Worcestershire requirements, the North Worcestershire Councils have requested new trend-based demographic scenarios for each of the three North Worcestershire districts, aggregated for North Worcestershire. It was specified that these new scenarios should be based on the latest demographic evidence to provide a reliable, up-to-date basis for identifying housing requirements in North Worcestershire.
- 1.5 The analysis presented here also includes up-to-date employment forecasts for each North Worcestershire district, examining the demographic implications of the anticipated jobs growth. Forecasts of employment (workplace based jobs) together with supporting information and explanation have been provided by three organisations: Cambridge Econometrics, Oxford Economics and Experian.

Approach & Methodology

- 1.6 Housing requirements are intrinsically linked to the size and structure of the population and, in turn, population growth can be constrained by housing availability. Any consideration of future housing development requires robust demographic information and analysis of the possible impact of demographic change on the demand and supply of housing, jobs, services, infrastructure and facilities.
- 1.7 The National Planning Policy Framework (NPPF) and the emerging National Planning Practice Guidance (NPPG) provide guidance on the development of a robust evidence base to support the objective assessment of housing need. The guidance makes it clear that data inputs, assumptions and methodology should be robust and should consider future growth potential from a number of perspectives.
- 1.8 A suite of demographic forecasts has been developed for the North Worcestershire districts. Trend-based forecasts have been developed using the latest demographic evidence and are benchmarked against the most recent official population projections from the Office for National Statistics (ONS).
- 1.9 Using economic forecasts from Cambridge Econometrics, Oxford Economics and Experian, employment-led scenarios have also been developed to test the demographic implications of jobs-growth trajectories.
- 1.10 Additional analysis has also been conducted to evaluate the sensitivity of the forecasts to:
1. household headship rate variations;
 2. economic activity rate and unemployment variations;
 3. internal migration assumptions.
- 1.11 To ensure transparency of the analysis presented here, all data inputs and assumptions are detailed in the Appendix and the output presented in a consistent format that allows comparison between scenarios.

Forecasting Methodology

- 1.12 Evidence is often challenged on the basis of the ‘appropriateness’ of the methodology that has been employed to develop growth forecasts. The use of a recognised forecasting product which incorporates an industry-standard methodology (a cohort component model) removes this

obstacle and enables a focus on assumptions and output, rather than methods.

1.13 Demographic forecasts have been developed for the North Worcestershire districts using the POPGROUP suite of products. POPGROUP is a family of demographic models that enables forecasts to be derived for population, households and the labour force, for areas and social groups. The main POPGROUP model (Figure 1) is a cohort component model, which enables the development of population forecasts based on births, deaths and migration inputs and assumptions.

1.14 The Derived Forecast (DF) model (Figure 2) sits alongside the population model, providing a headship rate model for household projections and an economic activity rate model for labour-force projections.

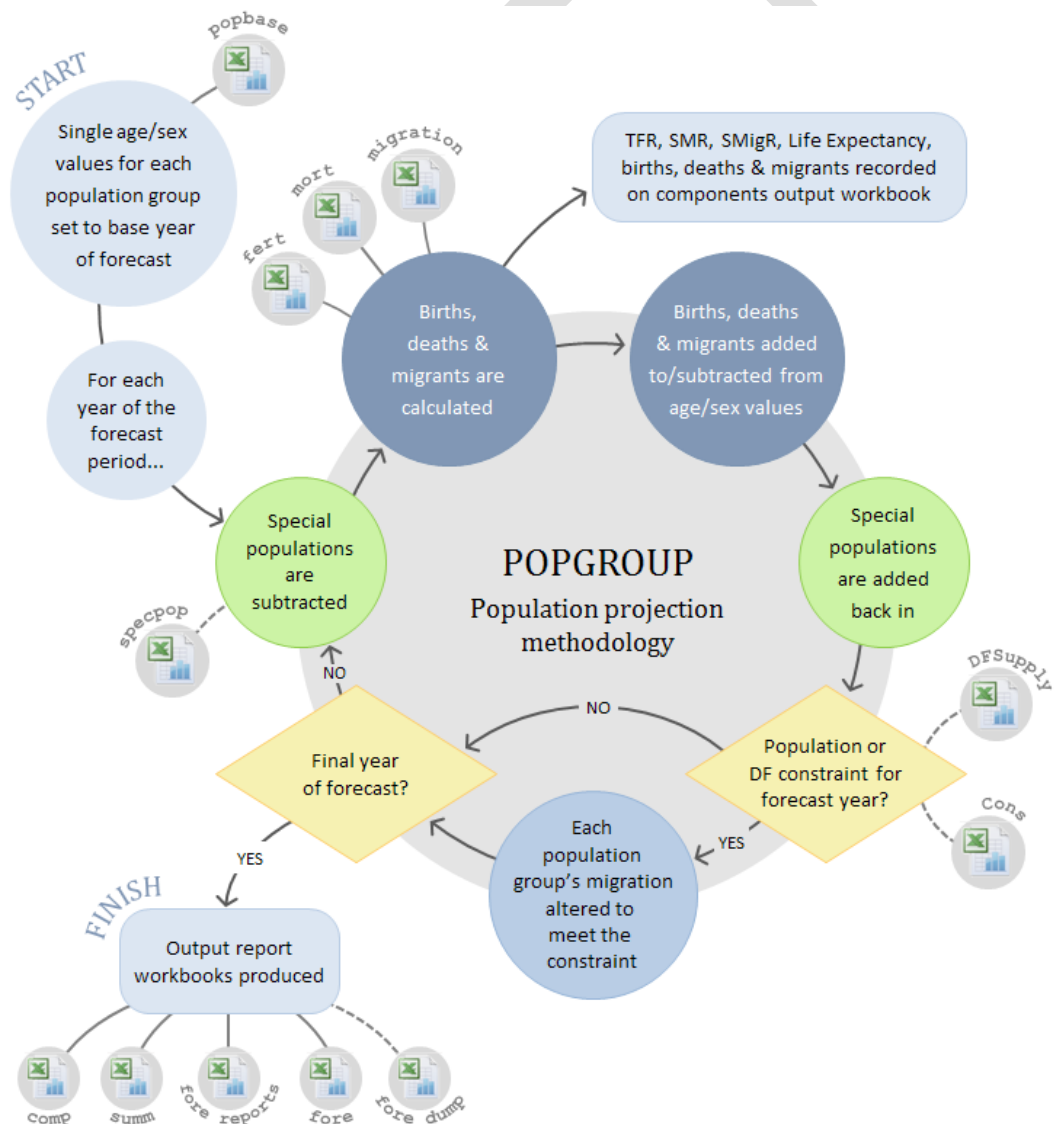
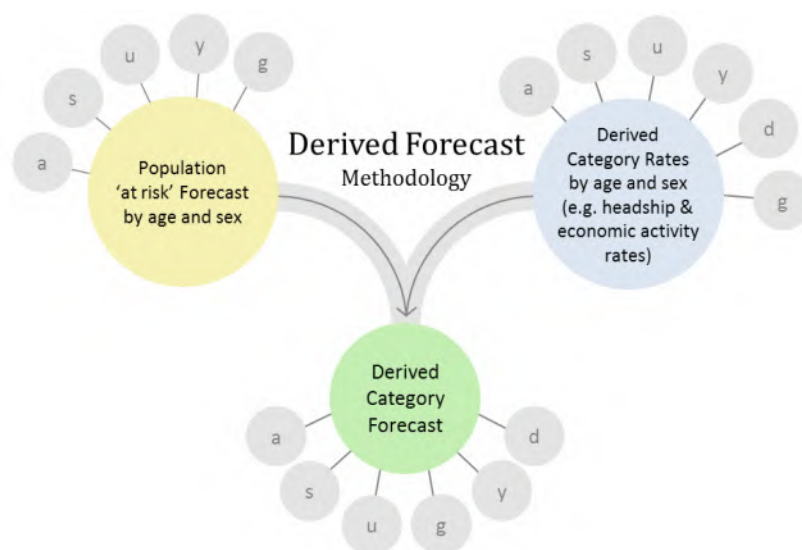


Figure 1: POPGROUP population projection methodology



$$D_{a,s,u,y,d,g} = \frac{P_{a,s,u,y,g} R_{a,s,u,y,d,g}}{100}$$

D Derived Category Forecast
P Population 'at risk' Forecast
R Derived Category Rates
a Age-group
s Sex
u Sub-population
y Year
d Derived category
g Group (usually an area, but can be an ethnic group or social group)

Figure 2: Derived Forecast (DF) methodology

Report Structure

- 1.15 Section 2 provides a short commentary on demographic change in North Worcestershire since 2001 and presents new demographic evidence available from the Office for National Statistics (ONS) and the Department for Communities and Local Government (CLG).
- 1.16 Section 3 describes the suite of scenario alternatives, developed to evaluate trend and employment growth trajectories.
- 1.17 Section 4 summarises the outcomes of each of these scenarios, presenting growth in terms of population, households, dwellings, labour force and jobs impacts. In Section 5, the results of the sensitivity analysis are presented.
- 1.18 The Appendix (Section 6) to this document contains guidance on the data inputs and assumptions used in the development of the scenarios.

2. The Latest Demographic Evidence

Headlines 2001–2011

- 2.1 The development of Local Plans is made considerably more challenging by the dynamic nature of key data inputs. Economic and demographic factors, coupled with the continuous release of new statistics, often undermine the robustness of underpinning evidence. This has been a particular issue during 2013, with the release of 2011 Census statistics, revisions to historical population estimates and updated household projections.

Headlines 2001–2011

- 2.2 The 2011 Census recorded a resident population of 275,826 within North Worcestershire, a 4.5% increase over the 2001–2011 decade (Table 1).

Table 1: North Worcestershire, population change 2001–2011. Source: ONS

District	2001 Pop	2011 Pop	Change	%
Bromsgrove	87,879	93,637	5,758	6.6%
Wyre Forest	97,218	97,975	757	0.8%
Redditch	78,817	84,214	5,397	6.8%
North Worcestershire	263,914	275,826	11,912	4.5%

- 2.3 Population growth has been most substantial in Bromsgrove and Redditch, with a 6.6% and 6.8% increase respectively since 2011. This has been balanced by very low population growth in Wyre Forest, which saw only 0.8% population growth over the decade.
- 2.4 Within each North Worcestershire district, population change has been driven by a mixture of natural change (the difference between births and deaths) and net migration (the overall balance of growth resulting from in-migration, out-migration, immigration and emigration). The balance differs substantially between districts (Figure 3).
- 2.5 With an excess of deaths over births, natural change has had a negative impact upon growth in Bromsgrove since 2001. This has been counter-balanced by a substantial, larger net in-migration

component, resulting in population growth.

- 2.6 In contrast, Redditch's growth has been driven largely by positive natural change with a relatively small net in-migration component.
- 2.7 Wyre Forest's population change has been almost exclusively due to net in-migration and a small, positive natural change impact.

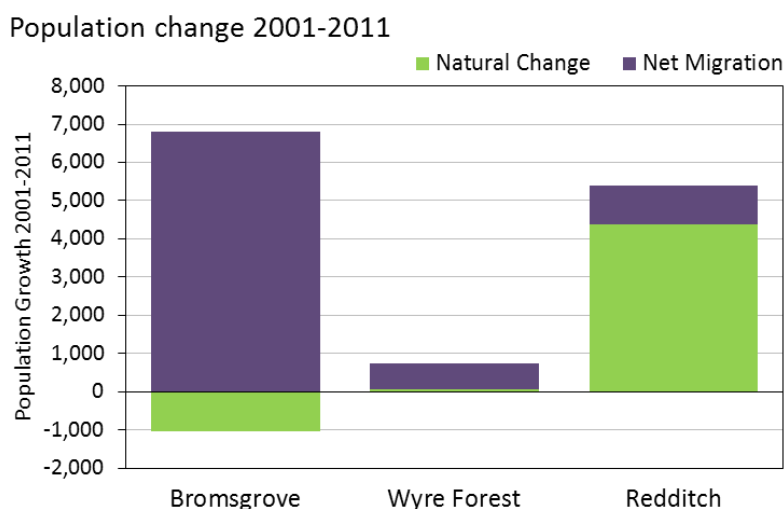


Figure 3: North Worcestershire, components of population change 2001–2011. Source: ONS

Population Estimates

- 2.8 The 2011 Census has provided a timely and definitive update on local population statistics. However, it has also resulted in the 'recalibration' of previous mid-year population estimates. This has important implications for both the interpretation of historical evidence on demographic change in local authority areas and on the derivation of projections of future growth based upon this evidence.
- 2.9 For the North Worcestershire districts, the 2011 Census has suggested that previous mid-year populations (interim mid-year estimates) under-estimated the scale of growth in Redditch but over-estimated growth in Wyre Forest (Figure 4). In Bromsgrove, the scale of growth was slightly over-estimated in the first half of the decade.
- 2.10 Given that births and deaths are robustly recorded through vital statistics registers, the 'error' in the mid-year population totals is due to the difficulty associated with the estimation of migration. Internal migration is adequately measured through the process of GP registration although data

robustness may be lower where there is non-registration or delay in registering. It is most likely that the 'error' in the mid-year population totals is due to the difficulty associated with the estimation of international migration impacts (i.e. immigration and emigration) at a local level.

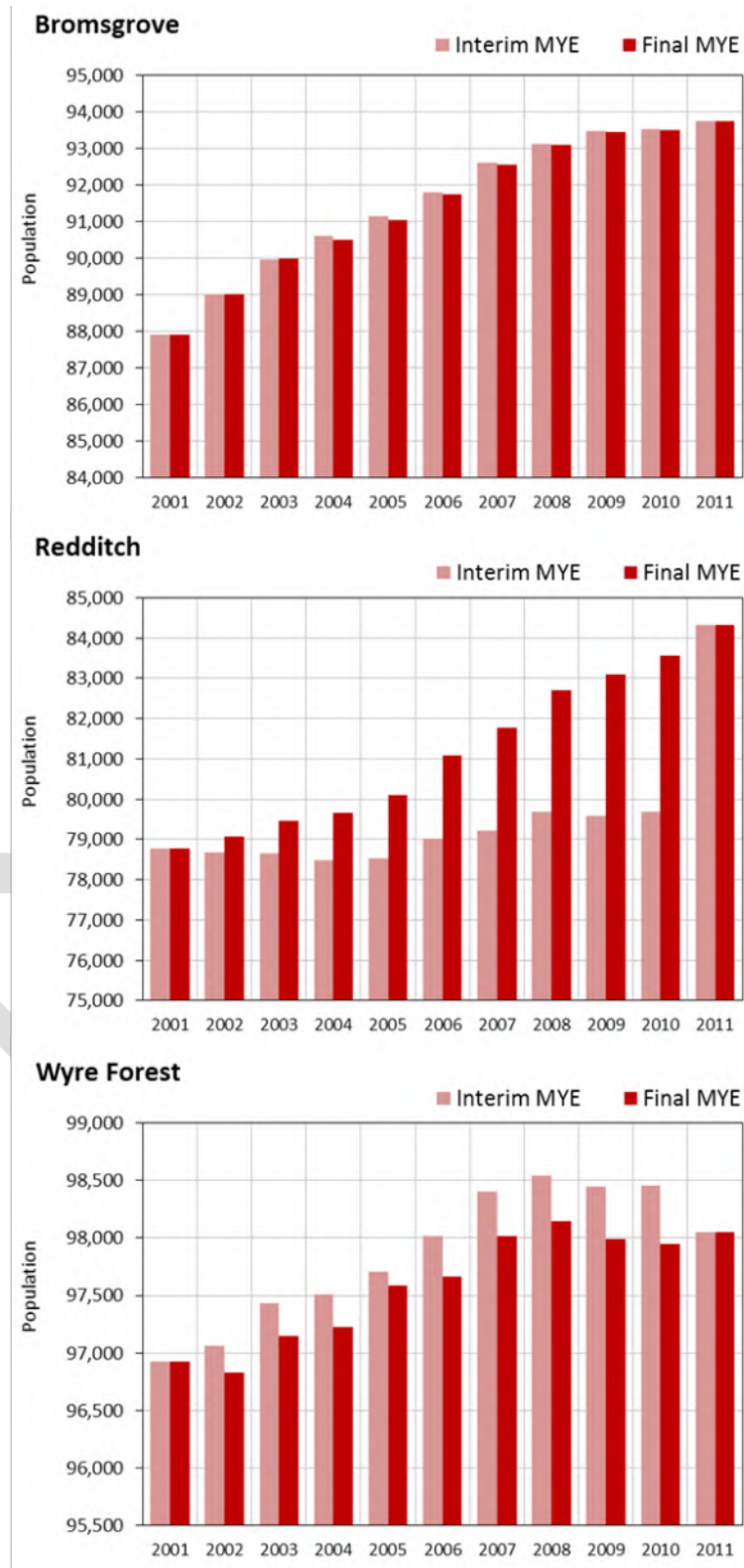


Figure 4: North Worcestershire, population counts 2001–2011. Source: ONS

Components of Change

- 2.11 On the assumption that births, deaths and internal migration have been robustly measured (and that the 2001 Census provided a robust population count for North Worcestershire districts), the 'adjustment' that resulted from the mid-year population estimate revisions is predominantly associated with the mis-estimation of international migration; the balance between immigration and emigration flows to and from North Worcestershire.
- 2.12 The result of the mid-year population estimate recalibration for North Worcestershire districts is that birth and death totals (and therefore natural change) remain largely unchanged. Small changes to internal migration may be evident but not substantial. With regard to international migration, ONS has not explicitly assigned the mid-year estimate adjustment to international migration. Instead it has identified an additional 'other unattributable' component, suggesting it has not been able to accurately identify the source of the 2001–2011 over-count (Figure 5).
- 2.13 For demographic analysis, the classification of this 'other unattributable' is unhelpful, but given the robustness of births, deaths and internal migration statistics compared to international migration estimates, it is assumed that it is most likely to be associated with the latter.
- 2.14 For the individual districts of North Worcestershire, the effect of the 'other unattributable' adjustment has varied depending upon the scale of population 'recalibration' that has been required following the 2011 Census results (Figure 5). No change has been made to the 2011/12 statistics as these relate to the 2012 mid-year estimate which followed the 2011 Census results.
- 2.15 In Bromsgrove, a small downward adjustment is evident in most years of the 2001/02–2011/12 decade. A larger downward adjustment is associated with the Wyre Forest mid-year population estimates. In contrast, the population estimates for Redditch have been subject to a consistent annual uplift due to the undercount experienced over the 2001–2011 decade.

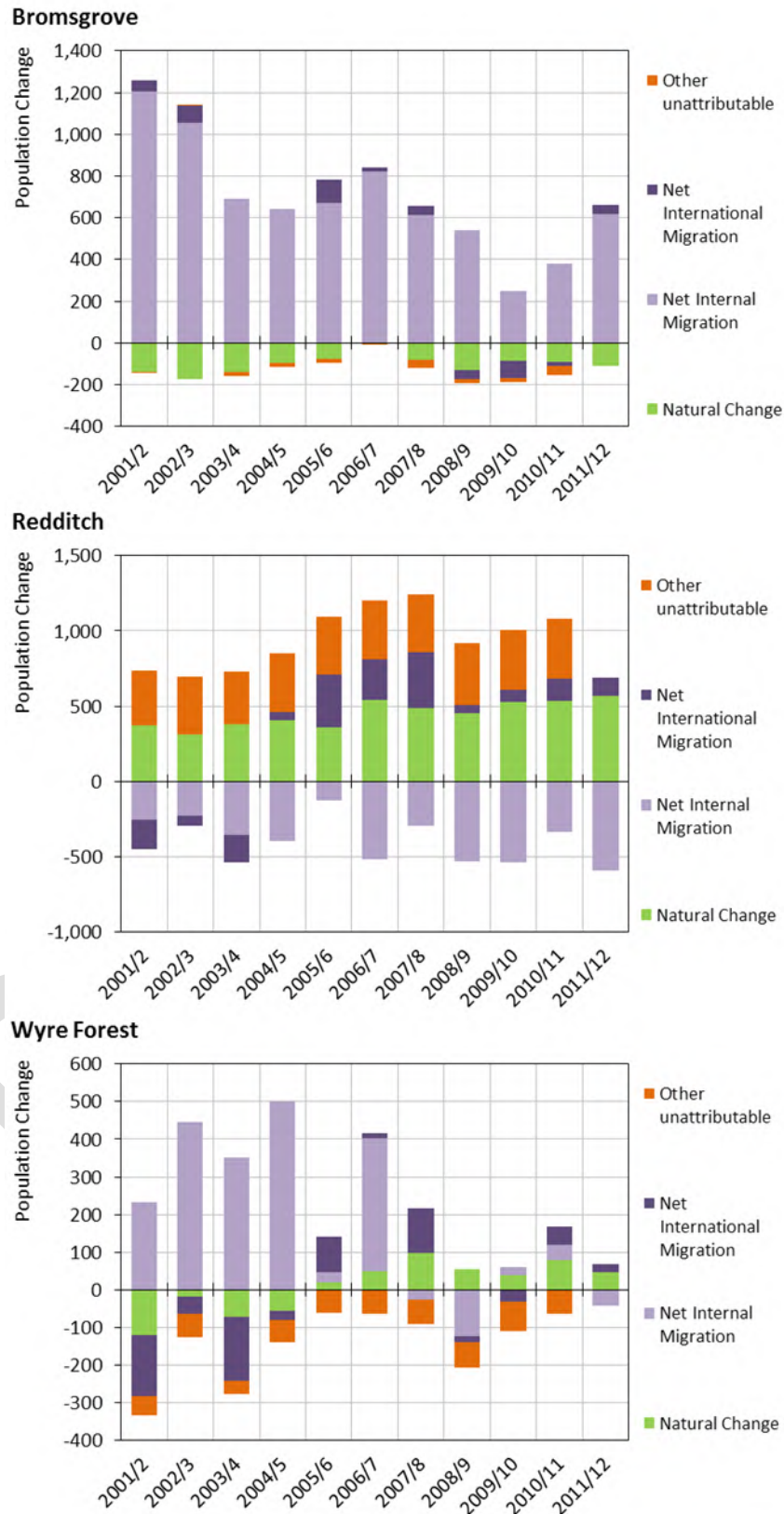


Figure 5: North Worcestershire, components of population change 2001/02–2011/12. Source: ONS

- 2.16 With an assumption that the 'other unattributable' element is assigned to international migration (for estimates to 2011) and with the inclusion of statistics from the 2012 mid-year estimate from ONS, an eleven-year profile of the 'components of change' for North Worcestershire districts is presented (Figure 6).
- 2.17 These components of change illustrations provide an annualised perspective on the profiles presented in Figure 3, with the additional disaggregation of migration into 'net internal' and 'net international' migration components.
- 2.18 Bromsgrove has experienced a consistent population decline due to natural change, balanced by a high level of net internal migration and a very small impact due to international migration. The impact of net internal migration has decreased over the decade.
- 2.19 Redditch has experienced a positive contribution from both natural change and net international migration. The impact of net internal migration has been negative in all years of the time-series.
- 2.20 In Wyre Forest, net internal migration has had a positive impact upon growth in the early part of the decade and a smaller impact in the latter years. Net international migration and natural change have varied between positive and negative contributions to annual population change.
- 2.21 The profile and trend in these components of change are important in the derivation of trend forecasts, with historical evidence used to derive future assumptions on migration. Scenarios presented in this analysis use both a 5-year (2007/08 to 2011/12) and a 10-year history (2002/03 to 2011/12) to set migration assumptions in the trend forecasts.

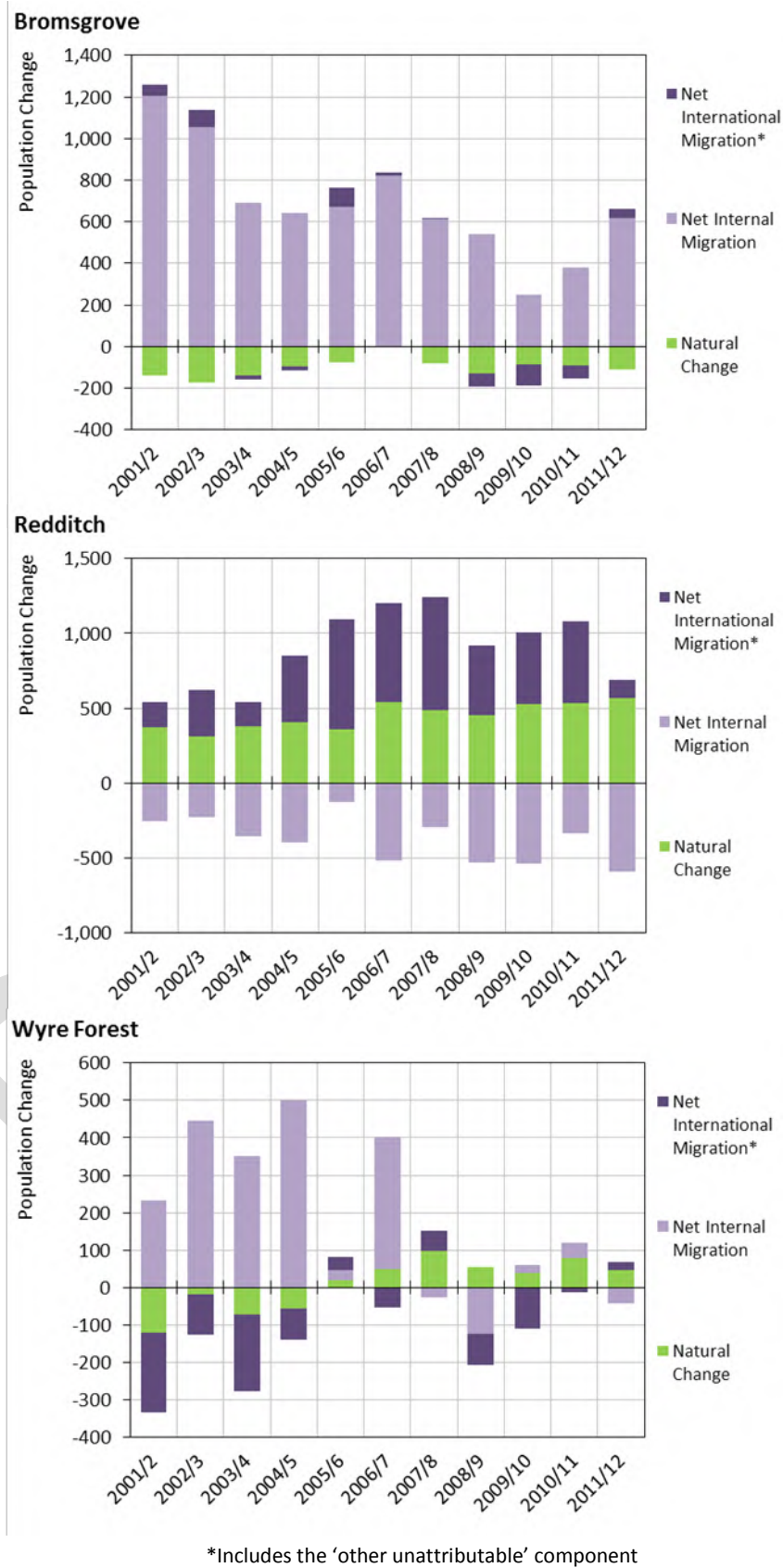


Figure 6: North Worcestershire, components of population change 2001/02–2011/12. Source: ONS

Household Projections

- 2.22 During the 2001–2011 decade the household projection methodology has been subject to substantial review, with a new approach adopted between the 2006-based and 2008-based outputs. In April 2013, CLG released its 2011-based household projections for local authorities in England, replacing the 2008-based projections.
- 2.23 The 2011-based projections provide an update on likely household growth trajectories (albeit to 2021 only), taking into account the unprecedented economic conditions that have affected local communities since 2008 and the substantial impact of population growth (particularly international migration) upon average household size.
- 2.24 **The general trend of the 2011-based projections suggests a reduction in the anticipated rate of household growth from 2011 to 2021, compared to the 2008-based projections.**
- 2.25 Identifying the ‘most likely’ speed and scale of future household formation presents a challenge to planners.
- 2.26 In providing its evidence on demographic change, Edge Analytics has typically used ‘headship rate’ assumptions from both the 2008-based and 2011-based household models. Household headship rates define the likelihood of a particular household type being formed in a particular year, given the age-sex profile of the population in that year. Household-types are modelled within a 17-fold classification (see Appendix, Table 16).
- 2.27 The use of assumptions from both the 2008-based and 2011-based models is in recognition of the uncertainty associated with future rates of household growth, given economic and demographic conditions. This approach presents a ‘range’ of household growth outcomes for each population forecast.
- 2.28 Alternative approaches to estimating household growth have sought to forecast a likely ‘recovery’ in household formation rates (reverting from 2011-based to 2008-based assumptions). In South Worcestershire, following the SWDP Stage 1 hearings, the Inspector requested that the household growth outcomes of the newly-developed demographic scenarios were assessed using the 2011-based headship rate assumptions to 2021 but, thereafter, applying rates of change in household formation that are consistent with the previous 2008-based household model (the ‘index’ approach).

2.29 For consistency with the South Worcestershire scenario forecasts, three alternative headship rate assumptions have been applied to the North Worcestershire scenarios in this report:

- Option A: CLG 2011-based headship rates, with the 2011-21 trend continued after 2021.
- Option B: CLG 2008-based headship rates, scaled to be consistent with the 2011 Census household total, but following the original trend thereafter.
- Option C: CLG 2011-based headship rates applied to 2021, reverting to the 2008-based rate of change in headship rates thereafter.

2.30 The Option C alternative is used in the main presentation of the forecast outcomes (i.e. the 'core' scenarios). The Option A and Option B alternatives are used to present the range of dwelling growth outcomes associated with 2011-based and 2008-based household formation rate assumptions as part of a sensitivity analysis (Sensitivity Scenario 1).

3. Scenario Development

Introduction

- 3.1 There is no single, definitive view on the likely level of growth expected in North Worcestershire; a mix of economic, demographic and national/local policy issues ultimately determines the speed and scale of change. For local planning purposes, it is necessary to evaluate a range of growth alternatives to establish the most 'appropriate' basis for determining future housing provision.
- 3.2 A range of scenario alternatives has been developed for the North Worcestershire Councils. These include:
- The 2010-based and 2011-based official projections from the ONS;
 - Updated 'migration-led' trend forecasts based on the latest demographic evidence;
 - Jobs-led scenarios based on employment forecasts from Cambridge Econometrics, Oxford Economics and Experian.
- 3.3 Scenarios have been produced for each of the three North Worcestershire districts and for North Worcestershire in aggregate. The forecasts have been produced with a base year of 2012 and a forecast horizon of 2030. Historical population data are included from 2001 to 2012¹.
- 3.4 Seven 'core' scenarios and four sensitivity scenario alternatives have been developed. Information on the assumptions underpinning each of the scenarios can be found in the Appendix to this document.
- 3.5 Analysis of the core scenarios is presented in Section 4 of this report and the sensitivity scenarios in Section 5. In the following sections, an overview of the scenario alternatives is provided.

¹ Note that in the detailed scenario output (supplied separately to the North Worcestershire Councils), the historical population totals and the components of change (migration, births and deaths) are sourced directly from the ONS revised mid-year estimates. Historical data on households/dwellings and labour force/jobs are derived from the population totals (using the derived forecast assumptions outlined in this document, see page 20).

Core Scenarios

Official Projections

- 3.6 In the development and analysis of population forecasts, it is important to 'benchmark' any growth alternatives against the latest 'official' population projection.
- 3.7 The most recent official projection is the ONS 'interim' 2011-based population projection (SNPP-2011), released following the publication of the 2011 Census. Despite being the most recent official projection, it is considered inappropriate as a growth benchmark as the normally robust rules on the calculation of long-term migration, fertility and mortality assumptions were not followed. Instead, ONS applied the assumptions from the previous official forecast, the 2010-based sub-national population projection (SNPP-2010), to a 2011 Census base population. This is unsuitable for two key reasons.
1. The revisions to the historical mid-year populations and the subsequent change in the historical impact of migration have not been taken into account.
 2. The 2011 Census population has a different age structure to the previous 2010-based population.
- 3.8 Both of these issues mean that the 2011-based projection is not sufficiently robust to underpin any analysis of long-term housing requirements. Therefore, the **SNPP-2010** is used here to benchmark against the other scenario alternatives. The scenario is rescaled to the 2011 Census population total, thereby enabling comparison with the other scenario alternatives. From 2011, the SNPP-2010 growth trend is continued. This scenario uses historical evidence from the period 2006–2010 and incorporates the long-term assumptions on fertility, mortality and international migration that were defined in the SNPP-2010.
- 3.9 The SNPP-2011 scenario is included for comparison on the output charts; for the reasons outlined above (and as this projection does not extend beyond 2021) it is not included within the analysis of demographic change from 2012 to 2030.

Alternative Trend Scenarios

- 3.10 In determining the migration assumptions for a new '2012-based' trend projection, historical data on the components of demographic change during the 2001–2012 time-period are a key consideration.

- 3.11 A five year historical period is a typical time-frame from which migration 'trend' assumptions are derived (this is consistent with the ONS official methodology). However, given the unprecedented economic change that has occurred since 2008, it is important to give due consideration to an extended historical time period for assumption derivation.
- 3.12 Three 'migration-led' scenario alternatives have been developed, based upon the latest demographic evidence:
- **Migration-led 5yr:** Internal and international migration assumptions are based on the last five years of historical evidence (2007/08 to 2011/12).
 - **Migration-led 10yr:** internal and international migration assumptions are based on the last 10 years of historical evidence (2002/03 to 2011/12).
 - **Natural Change:** in-migration, out-migration, immigration and emigration are set to zero.

Jobs-led Scenarios

- 3.13 In a 'jobs-led' scenario, population growth is determined by the number of jobs available within an area. POPGROUP evaluates the impact of a particular jobs growth trajectory by measuring the relationship between the number of jobs in an area, the size of the labour force and the size of the resident population.
- 3.14 Migration is used to balance the relationship between the size of the population's labour force and the forecast number of jobs. A higher level of net in-migration will occur if there is insufficient population and resident labour force to meet the forecast number of jobs. A higher level of net out-migration will occur if the population is too high relative to the forecast number of jobs.
- 3.15 The following jobs-led scenarios have been developed:
- **Jobs-led (Cambridge Econometrics)**
Population growth is constrained by an annual net change in jobs numbers as defined in the 'Cambridge Econometrics' employment forecast for the North Worcestershire districts.

- **Jobs-led (Oxford Economics)**

Population growth is constrained by an annual net change in jobs numbers as defined in the 'Oxford Economics' employment forecast for the North Worcestershire districts.

- **Jobs-led (Experian)**

Population growth is constrained by an annual net change in jobs numbers as defined in the 'Experian' employment forecast for the North Worcestershire districts.

3.16 The jobs growth figures used in each of these scenarios for the forecast period (2012 to 2030) are shown in Figure 7². These graphs show the annual change in the number of jobs as specified in the employment forecasts from Cambridge Econometrics, Oxford Economics and Experian. Further detail on the employment forecasts can be found in the [Amion Consulting report](#).

3.17 Three key data items are required to run jobs-led scenarios. Economic activity rates provide the basis for calculating the size of the labour force within the population. A commuting ratio and an unemployment rate control the balance between the size of the labour force and the number of jobs within an area. In the core scenarios, these assumptions are fixed throughout the forecast period (2012-2030). Further detail on these items is provided in the Appendix.

² Jobs constraints have not been applied before 2012. Prior to 2012, the mid-year population estimates constrain the POPGROUP model outcomes.

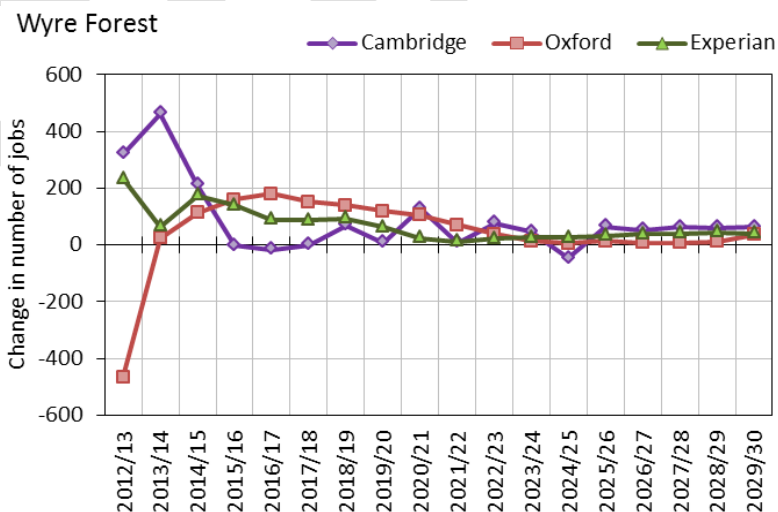
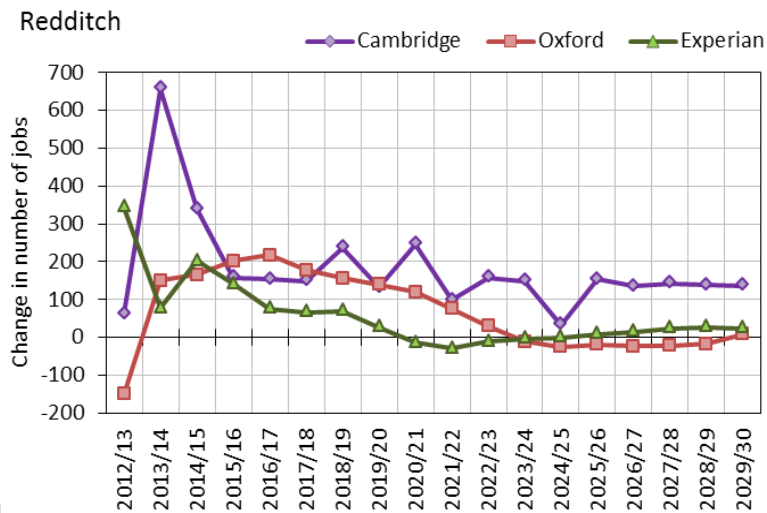
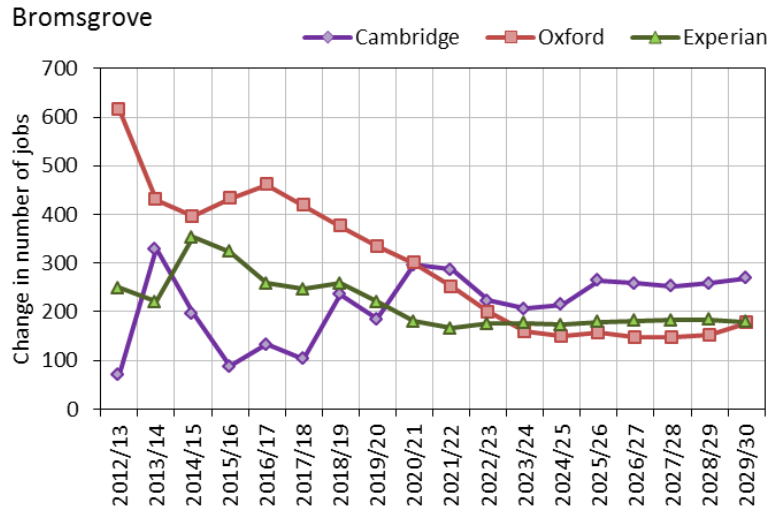


Figure 7: Jobs growth trajectories used in the POPGROUP model for each of the three North Worcestershire districts. Data source: Cambridge Econometrics, Oxford Economics, Experian.

Derived Forecast Implications: Households and Dwellings

- 3.18 In all of the scenarios presented in this report (core and sensitivity), the household and dwelling implications of each population growth trajectory were evaluated through the application of a communal population adjustment, household headship rates and a dwelling vacancy rate.
- 3.19 Communal population statistics have been derived from 2011 Census data.
- 3.20 Household headship rates are taken from the CLG's 2008-based and 2011-based household projections. In the 'core' scenarios, the 'Option C' combination of headship rates has been applied, in which the CLG 2011-based headship rates are applied to 2021. From 2021, the 2008-based rate of change in headship rates was reverted to.
- 3.21 The conversion of households to dwellings is based on a 'vacancy rate', taking account of both vacant properties and second homes in measuring the relationship between households and dwellings.
- 3.22 The Appendix to this document presents further information on the household model assumptions and the vacancy rates used.

Derived Forecast Implications: Labour Force and Jobs

- 3.23 In all scenarios (apart from the jobs-led scenarios) the labour force and jobs implications of each scenario are evaluated through the application of a commuting ratio, an unemployment rate and economic activity rates to the population projection.
- 3.24 In the 'jobs-led' scenarios, the commuting ratio, an unemployment rate and economic activity rates are used to determine population growth from a specified number of jobs (see page 16).
- 3.25 In all the 'core' scenarios, the commuting ratio, an unemployment rate and the economic activity rate are fixed throughout the forecast period (2012–2030).
- 3.26 The Appendix to this document presents further information on the underlying employment assumptions used.

Sensitivity Scenarios

Sensitivity Scenario 1: Headship Rate Sensitivity

- 3.27 In all of the ‘core’ scenarios, the ‘Option C’ headship rates are used (see page 13). Additional sensitivity analysis has been conducted using the original 2008-based and 2011-based headship rate assumptions, as follows:
- ‘Option A’: CLG 2011-based headship rates, with the 2011–2021 trend continued after 2021.
 - ‘Option B’: CLG 2008-based headship rates, scaled to be consistent with the 2011 Census household total, but following the original trend thereafter.
- 3.28 Each of the seven ‘core’ scenarios has been produced using the Option A and the Option B rates, for comparison with the Option C (‘index’) approach. Further information on these scenarios and the results can be found in the ‘Sensitivity Scenario 1’ section on page 27.

Sensitivity Scenarios 2 and 3: Employment Sensitivity

- 3.29 Two employment-sensitivity scenario alternatives (‘Sensitivity Scenario 2’ and ‘Sensitivity Scenario 3’) have been produced to evaluate the sensitivity of the jobs-led scenarios to changes in the unemployment rate and the economic activity rates.
- 3.30 The Appendix to this document details the assumptions underlying these sensitivity scenarios.
- 3.31 Further information on these scenarios and the results can be found in the ‘Sensitivity Scenarios 2 and 3’ section on page 30.

Sensitivity Scenario 4: Migration Sensitivity

- 3.32 To test the possibility of a higher net inflow of ‘internal’ migrants to North Worcestershire, an additional sensitivity scenario has been developed for both Bromsgrove and Redditch.
- 3.33 This sensitivity has examined the long-term impact of an internal net migration flow to Bromsgrove and Redditch that is 20% higher than that defined in the ‘Migration-led 10yr’ scenario.
- 3.34 No changes have been applied to migration flows to/from Wyre Forest.

Scenario Summary

3.35 Seven 'core' scenarios have been produced and four sensitivity scenario alternatives.

Table 2: Scenario definition summary

Scenario Type		Scenario Name
Core Scenarios	'Official' projections	SNPP-2010 (SNPP-2011 included on charts for comparison)
	Alternative trend scenarios	Migration-led 5yr Migration-led 10yr Natural Change
	Jobs-led scenarios	Jobs-led (Cambridge Econometrics) Jobs-led (Oxford Economics) Jobs-led (Experian)
Sensitivity Scenarios	Sensitivity Scenario 1 <i>(Headship Rate Sensitivity)</i>	All core scenarios
	Sensitivity Scenario 2 <i>(Employment Sensitivity)</i>	Jobs-led Cambridge (SENS2) Jobs-led Oxford (SENS2) Jobs-led (SENS2)
	Sensitivity Scenario 3 <i>(Employment Sensitivity)</i>	Jobs-led Cambridge (SENS3) Jobs-led Oxford (SENS3) Jobs-led (SENS3)
	Sensitivity Scenario 4 <i>(Migration Sensitivity)</i>	Migration-led 10yr (SENS4)

4. Scenario Forecasts

Core Scenario Summaries

- 4.1 A summary of the results for each core scenario is provided in the form of a chart and an accompanying table of statistics. The chart illustrates the trajectory of population change resulting from each scenario. The table summarises the change in population and household numbers from 2012–2030 that results from each scenario.
- 4.2 The scenarios are ‘ranked’ (high to low) according to the expected average annual dwelling growth throughout the projection period, based on the assumptions used in each scenario. The table also shows the estimated level of population change throughout the projection period, the average annual net migration associated with the population change and the expected average annual jobs growth.

Scenario Commentary

- 4.3 Comments are provided here on the North Worcestershire aggregate picture, with additional scenario illustrations provided for the three individual districts.
- 4.4 Under the trend scenarios (‘Migration-led 5yr’, ‘Migration-led 10yr’ and ‘SNPP-2010’), population growth over the forecast period (2012–2030) ranges from 4.6 to 9.3% (Table 3). Using a 10-year period (2002/03 to 2011/12) to derive future migration trends results in higher population growth than when using a 5-year history (2007/08 to 2011/12). Dwelling growth suggested by these three trend scenarios is 505–832 dwellings per year.
- 4.5 The ‘Natural Change’ scenario, where net migration is set to zero for each year of the forecast period, results in 1.6% population growth, driven solely by the excess of births over deaths. The dwelling growth expectation is 270 per year.
- 4.6 The three jobs-led forecasts result in much higher population growth (17.8–19.8%) compared to the demographic ‘trend’ scenarios, with a correspondingly high dwelling growth anticipated (1,308–1,429 dwellings per year). The population growth is driven by higher annual net migration, required to sustain the labour force in line with the forecast growth in job numbers.

North Worcestershire

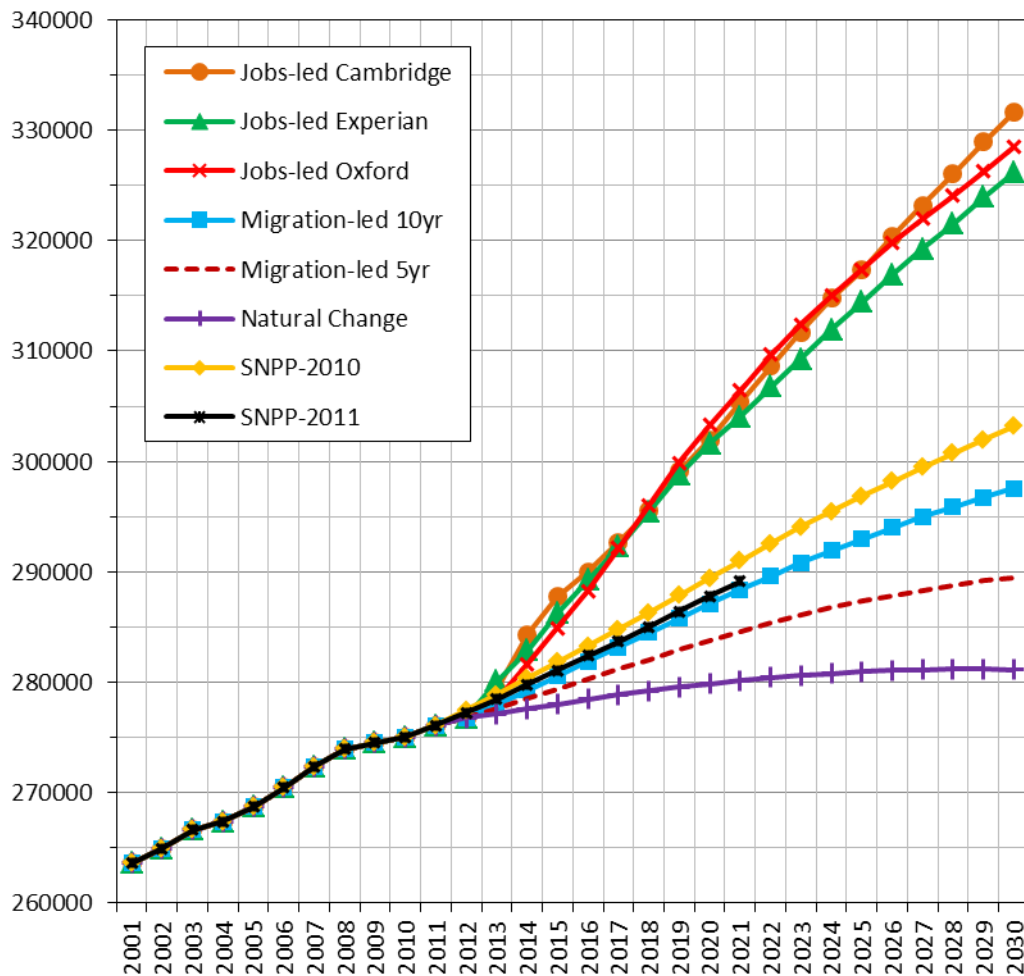


Figure 8: North Worcestershire scenario forecasts population growth 2012-2030

Table 3: North Worcestershire forecast summary 2012-2030 (ranked in order of population change)

Scenario	Change 2012 - 2030				Average per year		
	Population Change	Population Change %	Households Change	Households Change %	Net Migration	Dwellings	Jobs
Jobs-led Cambridge	54,849	19.8%	24,974	21.4%	2,642	1,429	484
Jobs-led Oxford	51,671	18.7%	23,584	20.2%	2,477	1,350	400
Jobs-led Experian	49,353	17.8%	22,841	19.6%	2,369	1,308	344
SNPP-2010	25,705	9.3%	14,540	12.4%	1,319	832	-75
Migration-led 10yr	20,782	7.5%	12,140	10.4%	973	694	-281
Migration-led 5yr	12,710	4.6%	8,856	7.6%	564	505	-487
Natural Change	4,354	1.6%	4,736	4.1%	0	270	-556

Bromsgrove

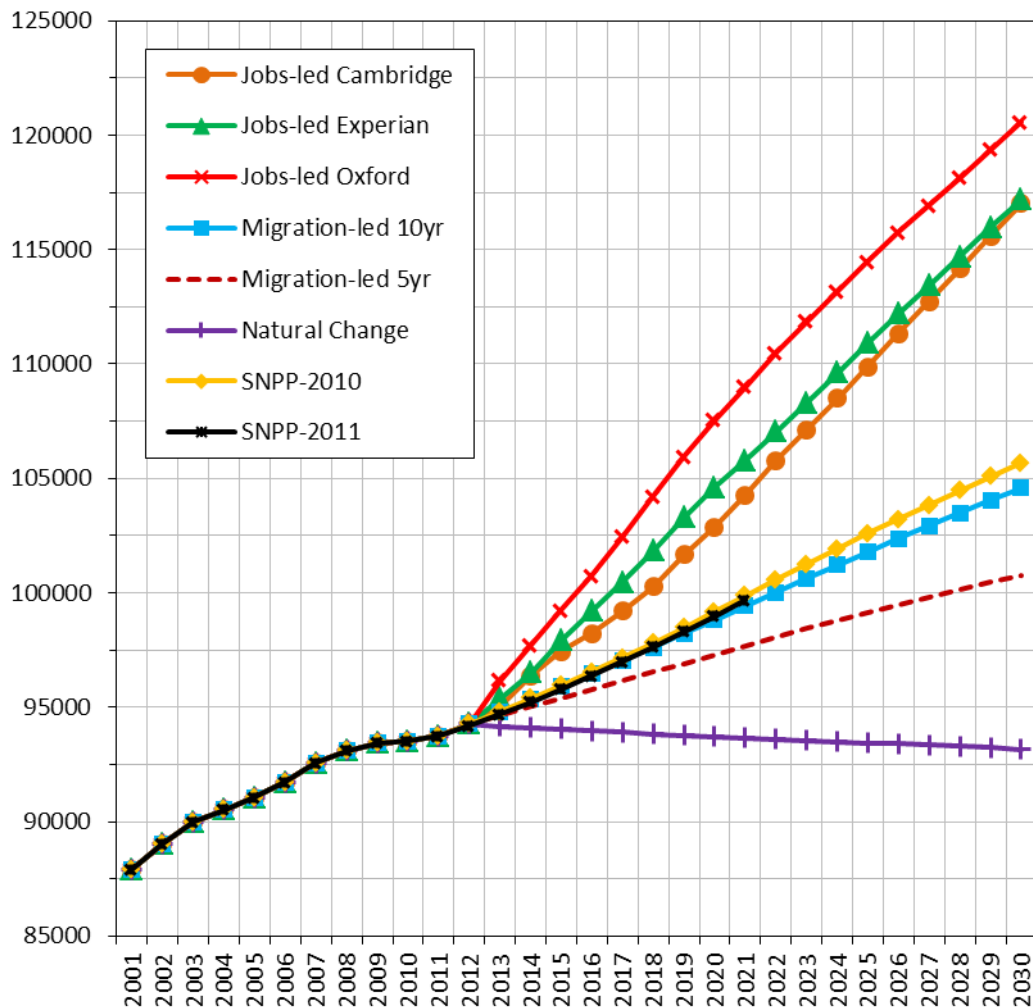


Figure 9: Bromsgrove scenario forecasts population growth 2012-2030

Table 4: Bromsgrove scenario forecast summary 2012-2030 (ranked in order of population change)

Scenario	Change 2012 - 2030				Average per year		
	Population Change	Population Change %	Households Change	Households Change %	Net Migration	Dwellings	Jobs
Jobs-led Oxford	26,294	27.9%	10,527	27.3%	1,543	602	294
Jobs-led Experian	22,900	24.3%	9,324	24.2%	1,385	533	217
Jobs-led Cambridge	22,733	24.1%	9,264	24.0%	1,387	530	215
SNPP-2010	11,406	12.1%	5,348	13.8%	857	306	36
Migration-led 10yr	10,302	10.9%	4,893	12.7%	759	280	-67
Migration-led 5yr	6,490	6.9%	3,442	8.9%	564	197	-167
Natural Change	-1,125	-1.2%	215	0.6%	0	12	-243

Redditch

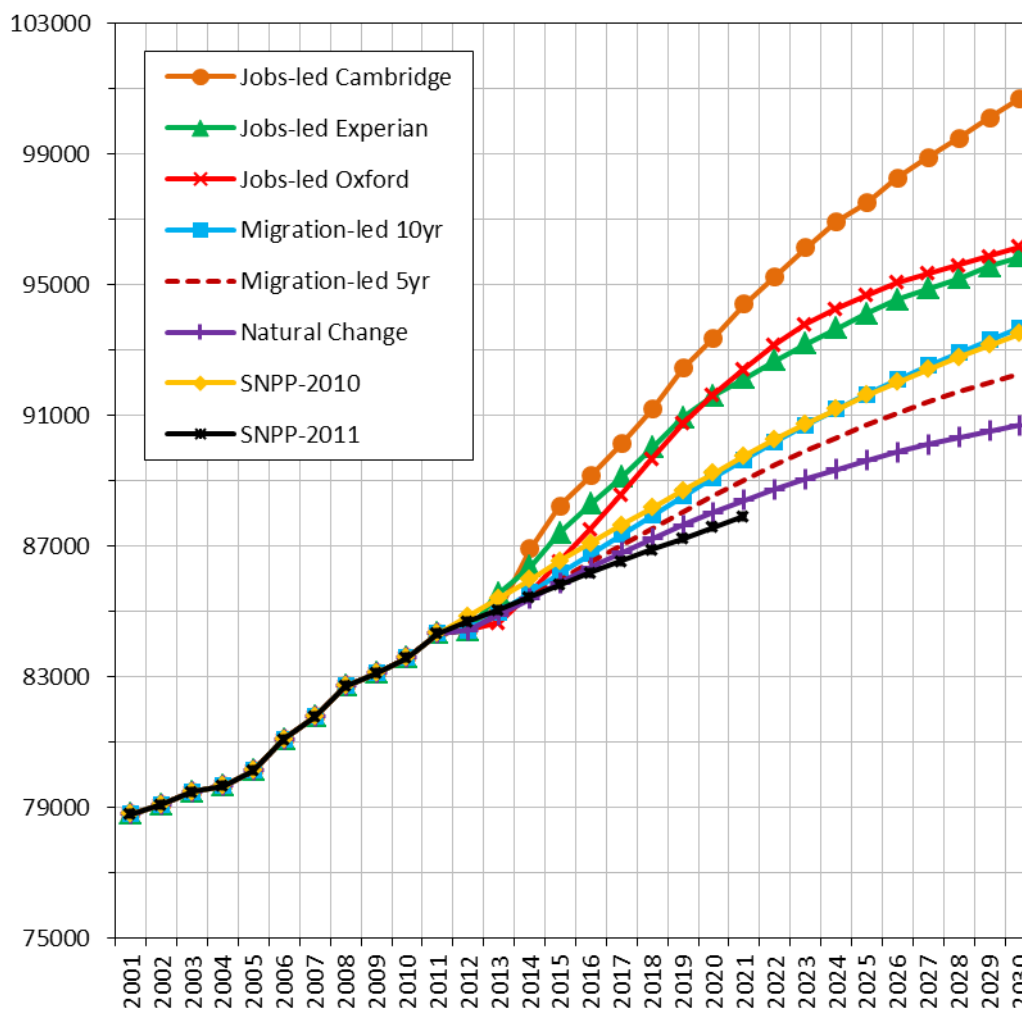


Figure 10: Redditch scenario forecasts population growth 2012-2030

Table 5: Redditch scenario forecast summary 2012-2030 (ranked in order of population change)

Scenario	Change 2012 - 2030				Average per year		
	Population Change	Population Change %	Households Change	Households Change %	Net Migration	Dwellings	Jobs
Jobs-led Cambridge	16,259	19.3%	7,468	21.4%	405	425	182
Jobs-led Oxford	11,734	13.9%	5,729	16.4%	188	326	65
Jobs-led Experian	11,425	13.5%	5,616	16.1%	172	319	58
Migration-led 10yr	9,250	11.0%	4,821	13.8%	76	274	19
SNPP-2010	8,638	10.2%	4,695	13.3%	76	267	14
Migration-led 5yr	7,855	9.3%	4,248	12.2%	14	242	-30
Natural Change	6,271	7.4%	3,697	10.6%	0	210	-79

Wyre Forest

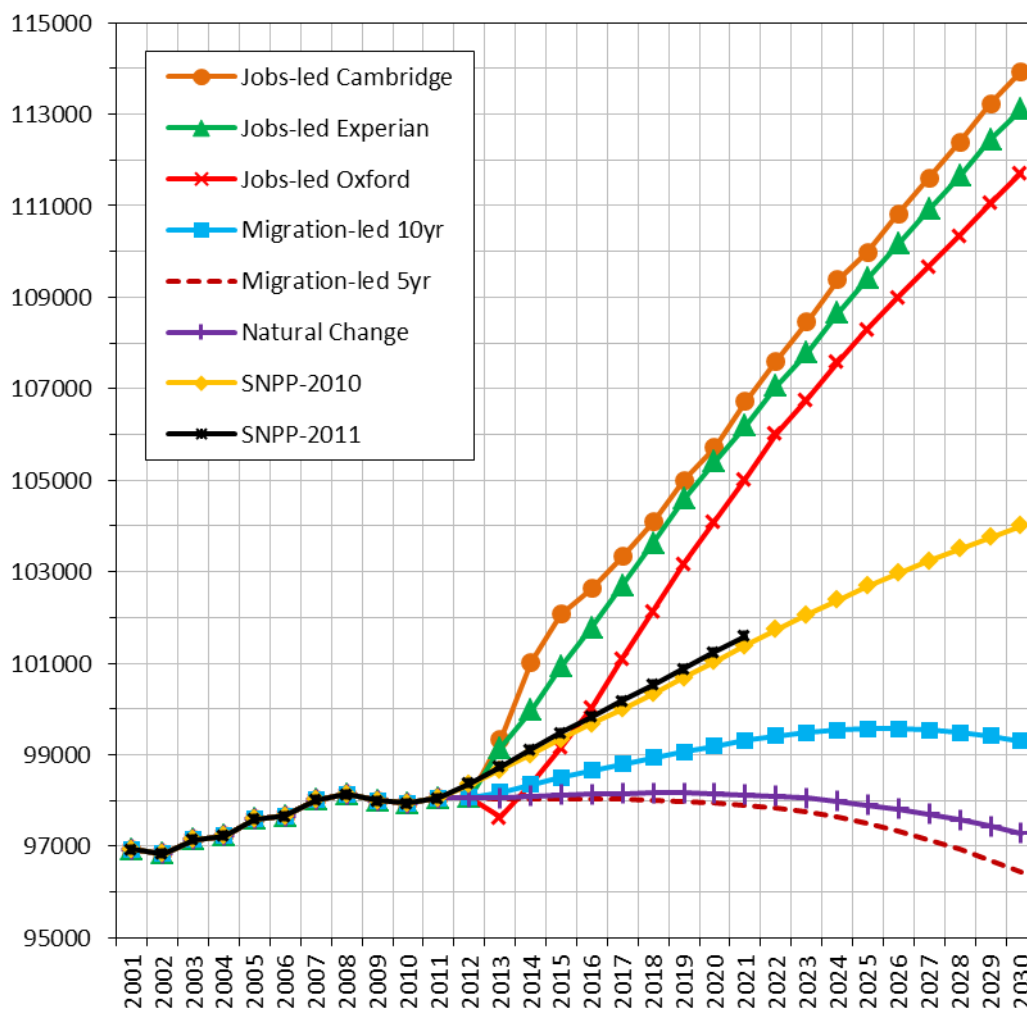


Figure 11: Wyre Forest scenario forecasts population growth 2012-2030

Table 6: Wyre Forest scenario forecast summary 2012-2030 (ranked in order of population change)

Scenario	Change 2012 - 2030				Average per year		
	Population Change	Population Change %	Households Change	Households Change %	Net Migration	Dwellings	Jobs
Jobs-led Cambridge	15,857	16.2%	8,241	19.1%	850	475	86
Jobs-led Experian	15,028	15.3%	7,902	18.3%	811	455	69
Jobs-led Oxford	13,643	13.9%	7,328	17.0%	747	422	40
SNPP-2010	5,660	5.8%	4,497	10.4%	385	259	-125
Migration-led 10yr	1,231	1.3%	2,425	5.6%	138	140	-233
Natural Change	-792	-0.8%	824	1.9%	0	48	-233
Migration-led 5yr	-1,634	-1.7%	1,166	2.7%	-14	67	-291

5. Sensitivity Analyses

Sensitivity Scenarios: Introduction

5.1 Sensitivity tests provide the means to objectively assess assumptions that have been made and to explore potential areas of uncertainty. Four sets of sensitivity scenarios have been produced:

- **Sensitivity Scenario 1**

The implications of using different household formation rates from the 2011- and 2008-based CLG models are examined.

- **Sensitivity Scenarios 2 and 3**

The implications of varying economic activity rates in the older age groups and altering unemployment rates on the jobs-led scenarios are examined.

- **Sensitivity Scenario 4**

The implications of altering net internal migration in Bromsgrove and Redditch are examined.

Sensitivity Scenario 1: Headship Rate Sensitivity

5.2 Identifying the ‘most likely’ speed and scale of future household formation presents a challenge to planners. Edge Analytics has typically used ‘headship rate’ assumptions from both the 2008-based and 2011-based household models.

5.3 The core scenarios presented in Section 4 have used the ‘Option C’ combination of headship rates:

- Option C: CLG 2011-based headship rates applied to 2021, reverting to the 2008-based rate of change in headship rates thereafter.

5.4 This sensitivity analysis presents the range of dwelling growth outcomes that would result if the alternative Option A and Option B headship rate trajectories were applied to each of the population growth scenarios:

- Option A: CLG 2011-based headship rates, with the 2011-21 trend continued after 2021.
- Option B: CLG 2008-based headship rates, scaled to be consistent with the 2011 Census household total, but following the original trend thereafter.

- 5.5 Using both the 'Option A' and 'Option B' headship rates enables an evaluation of the growth outcomes that would result from both the 2008- and 2011-based CLG household projection assumptions. Using the 2011-based household projection assumptions (Option A) results in a lower dwelling requirement than the 2008-based alternative (Option B) (Table 7). For example, in the SNPP-2010 scenario, under 'Option A' the annual average dwelling requirement is 811. Under 'Option B', 1,015 dwellings per year would be required.
- 5.6 The scale of variation between Options A and B illustrates the consequences of using the different projections. Exclusive use of the 2011-based assumptions can be criticised for being overly dependent upon a period where household formation rates have been suppressed; whereas exclusive use of the 2008-based rates can be criticised as being influenced by rates of household formation associated with an 'over-heated' housing market.
- 5.7 The 'index' approach ('Option C') outcomes are generally positioned between the 2011-based (Option A) and 2008-based (Option B) alternatives. Appending the 2008-based headship rate changes to the 2011-based statistics from 2012 onwards results in higher household growth and a corresponding higher annual dwelling requirement than in the 'Option A' outcome, in which the trend in the 2011-based rates is continued after 2021.

Table 7: North Worcestershire dwelling requirements
(ranked in order of 'Option C' dwelling requirement)

Scenario	Average annual dwelling requirement 2012 - 2030		
	Option A	Option B	Option C
Jobs-led Cambridge	1,408	1,620	1,429
Jobs-led Oxford	1,329	1,537	1,350
Jobs-led Experian	1,286	1,493	1,308
SNPP-2010	811	1,015	832
Migration-led 10yr	671	858	694
Migration-led 5yr	480	667	505
Natural Change	238	445	270

- 5.8 Similar sensitivity outcomes are presented for each of the three North Worcestershire districts (Table 8, Table 9, Table 10).

Table 8: Bromsgrove dwelling growth sensitivity
(ranked in order of 'Option C' dwelling requirement)

Scenario	Average annual dwelling requirement 2012 - 2030		
	Option A	Option B	Option C
Jobs-led Oxford	602	672	602
Jobs-led Experian	532	602	533
Jobs-led Cambridge	528	599	530
SNPP-2010	308	375	306
Migration-led 10yr	278	339	280
Migration-led 5yr	194	255	197
Natural Change	5	83	12

Table 9: Redditch dwelling growth sensitivity
(ranked in order of 'Option C' dwelling requirement)

Scenario	Average annual dwelling requirement 2012 - 2030		
	Option A	Option B	Option C
Jobs-led Cambridge	418	499	425
Jobs-led Oxford	319	396	326
Jobs-led Experian	312	389	319
Migration-led 10yr	266	344	274
SNPP-2010	258	341	267
Migration-led 5yr	233	310	242
Natural Change	200	276	210

Table 10: Wyre Forest dwelling growth sensitivity
(ranked in order of 'Option C' dwelling requirement)

Scenario	Average annual dwelling requirement 2012 - 2030		
	Option A	Option B	Option C
Jobs-led Cambridge	462	521	475
Jobs-led Experian	442	502	455
Jobs-led Oxford	409	468	422
SNPP-2010	245	299	259
Migration-led 10yr	126	175	140
Migration-led 5yr	53	101	67
Natural Change	33	86	48

Sensitivity Scenarios 2 and 3

Aligning Economic and Demographic Forecasts

- 5.9 Whilst the choice of household headship rate presents an important consideration when selecting assumptions about future demographic change, an equally important consideration is the appropriate alignment of economic forecasts (from Cambridge Econometrics, Oxford Economics and Experian) and demographic forecasts.
- 5.10 The 'core' scenarios presented above include three 'jobs-led' scenarios which use employment forecasts from each of the three providers to determine likely rates of population, household and dwelling growth. The population growth associated with these 'jobs-led' scenarios is, in all cases, higher than the trend scenarios suggest. This is because the demographic model is seeking to align itself with the underlying assumptions from the respective economic forecasts.
- 5.11 To achieve this alignment, the demographic model uses migration (either in- or out-migration) to balance the size of the resident labour force to the jobs growth anticipated. If the size of the labour force is too small to accommodate the required jobs growth, in-migration results. If the labour force is too large, out-migration results.
- 5.12 Three key parameters determine the balance of migration (population change) that is required to match the size of the labour force and the anticipated jobs growth:
- Economic activity rates
 - Unemployment rate
 - Commuting ratio
- 5.13 In the 'core' scenarios these three assumptions have been 'fixed' throughout the forecast period (2012–2030). In reality, and in the assumptions that have been applied in the respective economic forecasts from Cambridge Econometrics, Oxford Economics and Experian, these three assumptions change over time and have an important effect upon the relationship between population growth and jobs growth (and therefore upon the derived dwelling requirement).
- 5.14 To provide an assessment of the 'sensitivity' of the scenarios to changes to these parameters, two sensitivity scenario alternatives have been produced: 'Sensitivity Scenario 2' and 'Sensitivity Scenario 3'. In each of these sensitivities, the three jobs-led scenarios have been reproduced with

modified economic activity rates and unemployment rates. The following sections summarise the changes that have been made in each of these sensitivities.

Modifications made in Sensitivity Scenario 2

- 5.15 To take account of planned changes to State Pension Age (SPA), the following modifications have been made to the economic activity rates in 'Sensitivity Scenarios 2':
- Women aged 60-64: 40% increase from 2012 to 2020.
 - Women aged 65-69: 20% increase from 2012 to 2020.
 - Men aged 60-64: 5% increase from 2012 to 2020.
 - Men aged 65-69: 10% increase from 2012 to 2020.
- 5.16 In addition, the unemployment rate has been modified in 'Sensitivity Scenario 2' to account for a period of recovery post-2013. The commuting ratio parameter remains consistent with the 'core' scenario assumptions. Please refer to the Appendix for detail on the modifications to the economic activity rates and the unemployment rate, and for detail on the commuting ratio.

Modifications made in Sensitivity Scenario 3

- 5.17 In the third sensitivity scenario alternative, the unemployment rate has been reduced over the forecast period (2012–2030). These modifications have been made using an index based on the Experian employment forecast (for information on these changes please refer to the Appendix to this document and [the Amion Consulting report](#)).
- 5.18 The 2011 Census economic activity rates have been modified in the following way. Firstly, to account for planned changes to the SPA, the same uplift in economic activity rates has been applied as in 'Sensitivity Scenario 2' to the 60–69 age groups (see above, paragraph 5.15 and Appendix for further information). Secondly, additional changes been applied to the economic activity rates of the 25–74 age groups.
- 5.19 These changes are different for each of the Cambridge, Experian and Oxford forecasts and have been made following recommendations from Amion (for information on these changes please refer to the Appendix to this document and [the Amion Consulting report](#)).
- 5.20 As in Sensitivity Scenario 2 and the 'core' scenarios, the commuting ratio is kept fixed throughout the forecast period.

Sensitivity Scenarios 2 and 3: Results

- 5.21 The application of the modified assumptions on economic activity rates and unemployment rates results in changes to dwelling requirement when compared to the 'core' jobs-led scenarios. This is because these jobs-led scenarios are seeking to determine demographic change based upon a definitive trajectory of jobs growth. (Note that changing the economic activity rates and unemployment rates in the trend-based scenarios would have no impact on the resulting dwelling requirement, only on the derived labour force and jobs numbers).
- 5.22 The dwelling growth outcomes of the jobs-led 'core', the 'Sensitivity 2' and 'Sensitivity 3' scenarios for North Worcestershire are presented below (Table 11 to Table 14). Note that the 'Option C' headship rates are applied to derive the dwelling numbers, as requested by the SWDP Inspector.

Table 11: North Worcestershire – dwelling growth summary for Sensitivity Scenarios 2 and 3

Scenario	Average annual dwelling requirement 2012 - 2030		
	Core Scenario	Sensitivity Scenario 2	Sensitivity Scenario 3
Jobs-led Cambridge	1,429	1,253	1,252
Jobs-led Experian	1,308	1,132	1,137
Jobs-led Oxford	1,350	1,173	1,178

Table 12: Bromsgrove – dwelling growth summary for Sensitivity Scenarios 2 and 3

Scenario	Average annual dwelling requirement 2012 - 2030		
	Core Scenario	Sensitivity Scenario 2	Sensitivity Scenario 3
Jobs-led Cambridge	530	471	479
Jobs-led Experian	533	475	482
Jobs-led Oxford	602	543	549

Table 13: Redditch – dwelling growth summary for Sensitivity Scenarios 2 and 3

Scenario	Average annual dwelling requirement 2012 - 2030		
	Core Scenario	Sensitivity Scenario 2	Sensitivity Scenario 3
Jobs-led Cambridge	425	374	376
Jobs-led Experian	319	270	275
Jobs-led Oxford	326	276	282

Table 14: Wyre Forest – dwelling growth summary for Sensitivity Scenarios 2 and 3

Scenario	Average annual dwelling requirement 2012 - 2030		
	Core Scenario	Sensitivity Scenario 2	Sensitivity Scenario 3
Jobs-led Cambridge	475	407	398
Jobs-led Experian	455	388	380
Jobs-led Oxford	422	355	347

Sensitivity Scenario 4

- 5.23 In Sensitivity Scenario 4, the internal in-migration flows for both Bromsgrove and Redditch have been altered (migration flows to Wyre Forest have remained unchanged). This sensitivity scenario is based on the 'Migration-led 10yr' core scenario and was developed to examine the impact of an increased inflow of internal (UK) migrants upon the annual dwelling requirement. In each year of the forecast period (2012–2030), the net internal migration flow from the 'Migration-led 10yr' core scenario has been increased by 20%.
- 5.24 In Bromsgrove, this results in a dwelling requirement 22% higher than that of the 'Migration-led 10yr' core scenario (Table 15). In Redditch, the dwelling requirement increases by 13%, from 274 to 310.

Table 15: North Worcestershire – dwelling growth summary for Sensitivity Scenario 4

District	Average annual dwelling requirement 2012 - 2030	
	Migration-led 10yr (Core Scenario)	Migration-led 10yr (SENS4)
Bromsgrove	280	341
Redditch	274	310
Wyre Forest	140	140
North Worcestershire	694	791

6. Appendix: Data Inputs and Assumptions

- 6.1 The POPGROUP model draws data from a number of sources, building an historical picture of population, households, fertility, mortality and migration on which to base its scenario forecasts. Using the historical data evidence for 2001-2012, in conjunction with information from ONS national projections, a series of assumptions have been derived which drive the scenario forecasts.
- 6.2 In the following sections, a narrative on the data inputs and assumptions underpinning the scenarios is presented.

Population, Births & Deaths

Population

- 6.3 In each scenario, historical population statistics are provided by the mid-year population estimates for 2001 to 2012, with all data recorded by single-year of age and sex.
- 6.4 These data include the revised mid-year population estimates for 2002–2010, which were released by the Office for National Statistics (ONS) in May 2013. The revised mid-year population estimates provide consistency in the measurement of the components of change (i.e. births, deaths, internal migration and international migration) between the 2001 and 2011 Censuses.
- 6.5 For the 'SNPP-2010' and 'SNPP-2011' scenarios, future population counts are provided for each area by single-year of age and sex, to ensure consistency with the trajectory of the official projections.
- 6.6 The 'SNPP-2010' scenario is scaled to ensure consistency with the 2011 mid-year population estimate total, following its designated growth trend thereafter. This enables the different scenario alternatives to be more easily compared and does not alter the underlying assumptions or growth trajectory.

Births & Fertility

- 6.7 Historical mid-year to mid-year counts of births by sex from 2001/02 to 2011/12 for each district

have been sourced from ONS Vital Statistics.

- 6.8 A 'national' age-specific fertility rate (ASFR) schedule, which measures the expected fertility rates by age and sex for England in 2013/14, is included in the POPGROUP model assumptions. This is derived from the ONS 2012-based national population projection and is used in combination with a local (i.e. district-specific) fertility differential to produce age-specific fertility rates for each area.
- 6.9 Long-term assumptions on changes in age-specific fertility rates are taken from the ONS 2012-based national population projection for England.
- 6.10 In combination with the 'population-at-risk' these provide the basis for the calculation of births in each year of the forecast period.

Deaths & Mortality

- 6.11 Historical mid-year to mid-year counts of deaths by age and sex from 2001/02 to 2011/12 for each district have been sourced from ONS Vital Statistics.
- 6.12 A 'national' age-specific mortality rate (ASMR) schedule, which measures the expected mortality rates by age and sex for England in 2013/14, is included in the POPGROUP model assumptions. This is derived from the ONS 2012-based national population projection and is used in combination with a local (i.e. district-specific) mortality differential to produce age-specific fertility rates for each area.
- 6.13 Long-term assumptions on changes in age-specific mortality rates are taken from the ONS 2012-based national population projection for England.
- 6.14 In combination with the 'population-at-risk' these provide the basis for the calculation of deaths in each year of the forecast period.

Migration

Internal Migration

- 6.15 Historical mid-year to mid-year counts of in- and out-migration by five year age group and sex from 2001/02 to 2011/12 have been sourced from the 'components of change' files that underpin the ONS mid-year population estimates. The original source of these internal migration statistics is the Patient Register Data Service (PRDS), which captures the movement of patients as they register with a GP. This data provides an accurate representation of inter-area flows, albeit with some issues with regard to potential under-registration in certain age groups (young males in particular).
- 6.16 For future internal migration flows, a schedule of Age-Specific Migration Rates (ASMigR) is used in combination with the 'population-at-risk'.
- 6.17 In the 'SNPP-2010' and the 'SNPP-2011' scenarios, the ASMigR schedules are drawn directly from the ONS 2010-based assumptions.
- 6.18 In the migration-led scenarios, the ASMigR schedules are derived from the historical migration data. In the 'Migration-led 5yr' a five-year history is used and in the 'Migration-led 10yr' scenario, a ten-year migration history is used.
- 6.19 In 'Sensitivity Scenario 4', the 'Migration-led 10yr' scenario output counts have been applied, but with a 20% uplift on the net internal migration counts for Bromsgrove and Redditch.
- 6.20 For the 'Natural Change' scenario, the ASMigR schedule sets the internal in- and out-migration flows to zero for each year in the forecast period.
- 6.21 The jobs-led scenarios calculate their own migration assumptions to ensure an appropriate balance between population, households and the labour force, given the 'constraints' on jobs growth that are imposed in each scenario.

International Migration

- 6.22 Historical mid-year to mid-year counts of total immigration and emigration from 2001/02 to 2011/12 have been sourced from the 'components of change' files that underpin the ONS mid-year population estimates. Any 'adjustments' made to the mid-year population estimates to

account for asylum cases are included in the international migration balance.

- 6.23 Implied within the international migration component of change is an 'other unattributable' figure, which ONS identified within its latest mid-year estimate revisions. The POPGROUP model has assigned the 'other unattributable' to international migration as it is the component with the greatest uncertainty associated with its estimation.
- 6.24 For future international migration flows, counts of migrants are defined.
- 6.25 In the 'SNPP-2010' and the 'SNPP-2011' scenarios, the international in- and out-migration counts are drawn directly from the ONS 2010-based assumptions.
- 6.26 For the 'Migration-led 5yr' and 'Migration-led 10yr' scenarios, the international in- and out-migration counts are derived from historical data, using a five and ten year history respectively. A schedule of ASMigRs is derived from either a 5-year or 10-year migration history and used to distribute future counts by single year of age.
- 6.27 In 'Sensitivity Scenario 4', the international migration assumptions are consistent with the 'Migration-led 10yr' core scenario.
- 6.28 In the 'Natural Change' scenario, the future migration counts set the in- and out-migration flows to zero for each year in the forecast period
- 6.29 The jobs-led scenarios calculate their own migration assumptions to ensure an appropriate balance between population, households and the labour force, given the 'constraints' on housing or employment growth that are imposed in each scenario.

Household Assumptions

- 6.30 For each scenario, the household and dwelling implications of the population growth trajectory have been evaluated through the application of headship rate statistics, communal population statistics and a dwelling vacancy rate. These data assumptions have been sourced from the 2001 and 2011 Censuses and the 2008-based and 2011-based household projection models from the CLG.

Household Headship Rates

6.31 A household is defined as:

“One person living alone, or a group of people (not necessarily related) living at the same address with common housekeeping - that is, sharing a living room or sitting room or at least one meal a day.”³

6.32 Household headship rates define the likelihood of a particular household type being formed in a particular year, given the age-sex profile of the population in that year. Household-types are modelled within a 17-fold classification (Table 16).

Table 16: Household type classification

ONS Code	DF Label	Household Type
OPM	OPMAL	One person households: Male
OPF	OPFEM	One person households: Female
OCZZP	FAMC0	One family and no others: Couple: No dependent children
OC1P	FAMC1	One family and no others: Couple: 1 dependent child
OC2P	FAMC2	One family and no others: Couple: 2 dependent children
OC3P	FAMC3	One family and no others: Couple: 3+ dependent children
OL1P	FAML1	One family and no others: Lone parent: 1 dependent child
OL2P	FAML2	One family and no others: Lone parent: 2 dependent children
OL3P	FAML3	One family and no others: Lone parent: 3+ dependent children
MCZDP	MIX C0	A couple and one or more other adults: No dependent children
MC1P	MIX C1	A couple and one or more other adults: 1 dependent child
MC2P	MIX C2	A couple and one or more other adults: 2 dependent children
MC3P	MIX C3	A couple and one or more other adults: 3+ dependent children
ML1P	MIX L1	A lone parent and one or more other adults: 1 dependent child
ML2P	MIX L2	A lone parent and one or more other adults: 2 dependent children
ML3P	MIX L3	A lone parent and one or more other adults: 3+ dependent children
OTAP	OTHHH	Other households
TOT	TOTHH	Total

6.33 Household headship rates used in the POPGROUP modelling have been taken from the CLG 2008-based and 2011-based household projections. The 2011-based household projections were released for local authority districts in England in April 2013, superseding the 2008-based model. However, as the 2011-based household model is underpinned by the 2011-based SNPP, the headship rate assumptions have only been published for the 2011-2021 period.

³ CLG. *Household Projections: Notes and Definitions for Data Analysts*. <https://www.gov.uk/household-projections-notes-and-definitions-for-data-analysts>.

6.34 For the forecasting analysis presented in this report, three alternative headship rate assumptions have been applied:

- Option A: CLG 2011-based headship rates, with the 2011-21 trend continued after 2021.
- Option B: CLG 2008-based headship rates, scaled to be consistent with the 2011 Census, but following the original trend thereafter.
- Option C: CLG 2011-based headship rates applied to 2021, reverting to the 2008-based rate of change in headship rates thereafter.

6.35 The Option C alternative is used in the main presentation of the forecast outcomes. Option A and Option B alternatives are used to present the range of dwelling growth outcomes associated with 2011-based and 2008-based household formation rate assumptions (Sensitivity Scenario 1).

Communal Population

6.36 Household projections in POPGROUP take account of the 'population-not-in-households' (communal population). This data has been drawn directly from the 2011 Census.

Vacancy Rates

6.37 The relationship between households and dwellings is modelled using a 'vacancy rate'. Using Council Tax statistics provided by the South Worcestershire Councils, vacancy rates have been calculated from vacant properties and second homes (excluding holiday lets). These rates are defined as follows (remaining constant throughout the forecast period).

Table 17: Vacancy rates used in the POPGROUP model

District	2011 Vacancy Rate (%)
Bromsgrove	2.8
Redditch	2.3
Wyre Forest	3.6

Economic Activity Rates

- 6.38 For each scenario (excluding the jobs-led scenarios), the labour force and jobs implications of the population growth trajectory have been evaluated through the application of three key data items: economic activity rates, a commuting ratio and an unemployment rate. In the jobs-led scenarios, these three data items are used to determine the population growth required by a particular jobs growth trajectory.
- 6.39 'Economically active' refers to the population that is both employed and unemployed, i.e. the labour force. Economic activity rates determine the level of labour force participation associated with a particular age-sex category.
- 6.40 The economic activity rates used in all the scenarios are based on the latest statistics from the 2011 Census, published in November 2013. In the 'core' scenarios, the rates are fixed across the forecast period (2012–2030). In Sensitivity Scenario 2, alterations have been made to the economic activity rates.
- 6.41 This section provides evidence and rationale for the derivation of the economic activity rate statistics used in the scenario analysis.

2011 Census Economic Activity Rates

- 6.42 Economic activity rates provide the basis for estimating the size of the labour force. Economic activity rates by five year age group (ages 16-74) and sex have been derived from 2011 Census statistics.
- 6.43 The 2011 Census statistics include an open-ended 65+ age categorisation, so economic activity rates for the 65–69 and 70–74 age groups have been estimated using a combination of Census 2011 tables, disaggregated using evidence from the 2001 Census. The 2011 economic activity rates for the three North Worcestershire districts are shown in Figure 12.
- 6.44 In the 'core' scenarios, the economic activity rates are fixed across the forecast period at the 2011 level and therefore do not take into account any increase in economic activity that may arise from changes to the State Pension Age (SPA).

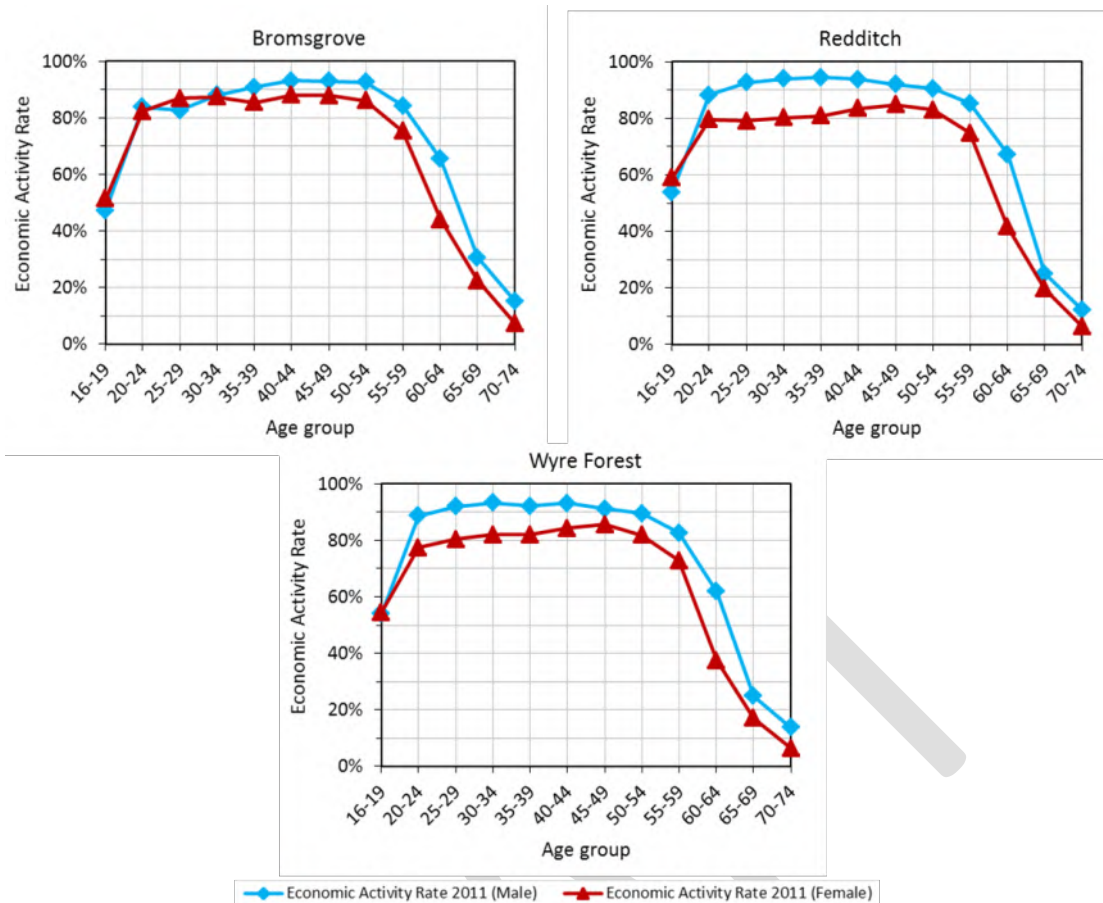


Figure 12: Economic activity rates 2011 – North Worcestershire Districts. Source: ONS

2001–2011 Economic Activity Rate Comparison

- 6.45 A comparison of the 2001 and 2011 economic activity rates for the three North Worcestershire districts is provided in Figure 13 and Table 18. This comparison indicates that economic activity rates have increased in the older age groups for both males and females in each of the three districts, particularly for females, for whom rates have seen a general increase across all age-groups 20+.
- 6.46 In Bromsgrove, for example, economic activity rates increased by 113% for females aged 65-69 between 2001 and 2011 (Table 18), compared to a 69% increase in the same age group for men. These trends in labour force participation rates are an important consideration when estimating how rates of economic activity might continue to evolve over the period of the scenario forecasts presented here.

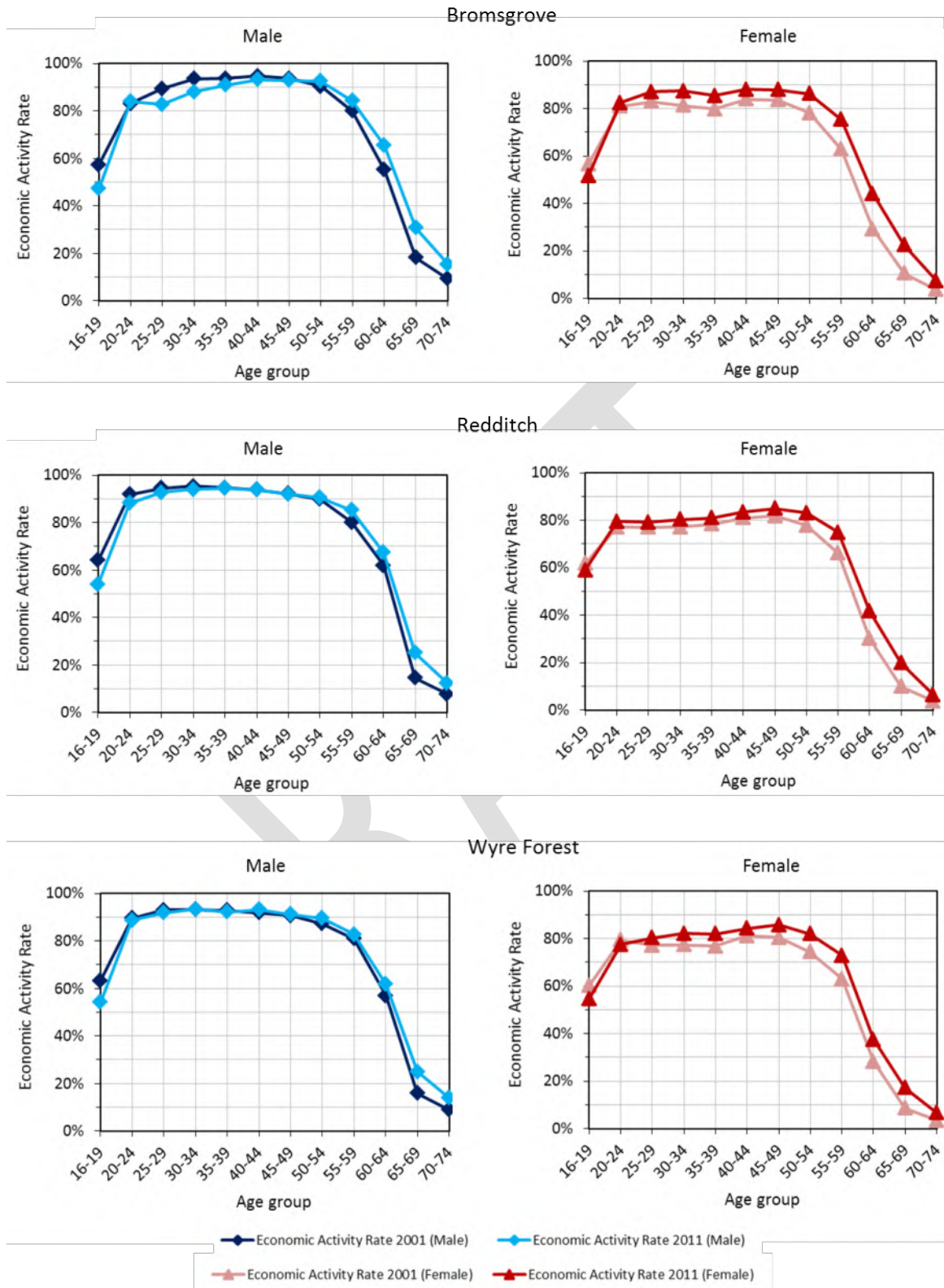


Figure 13: 2001 and 2011 Economic Activity Rate comparison

Table 18: Comparison of 2001 and 2011 Economic Activity Rates. Source: 2001 and 2011 Censuses.

Bromsgrove						
Sex	Male			Female		
Age	2001	2011	Change 2001-2011	2001	2011	Change 2001-2011
16-19	57.3%	47.3%	-18%	56.4%	51.5%	-9%
20-24	83.1%	83.9%	1%	80.9%	82.4%	2%
25-29	89.3%	82.7%	-7%	82.9%	87.0%	5%
30-34	93.5%	88.1%	-6%	81.2%	87.4%	8%
35-39	93.6%	90.8%	-3%	79.7%	85.4%	7%
40-44	94.6%	93.2%	-2%	83.9%	88.1%	5%
45-49	93.7%	92.9%	-1%	83.5%	87.9%	5%
50-54	90.3%	92.6%	3%	78.2%	86.2%	10%
55-59	80.0%	84.3%	5%	62.8%	75.4%	20%
60-64	55.2%	65.5%	19%	29.3%	44.1%	51%
65-69	18.1%	30.7%	69%	10.6%	22.5%	113%
70-74	9.2%	15.3%	66%	3.7%	7.4%	101%
Redditch						
Sex	Male			Female		
Age	2001	2011	Change 2001-2011	2001	2011	Change 2001-2011
16-19	64.1%	53.9%	-16%	61.8%	59.0%	-4%
20-24	91.8%	88.2%	-4%	77.2%	79.5%	3%
25-29	94.5%	92.6%	-2%	77.0%	79.1%	3%
30-34	95.3%	93.9%	-1%	77.1%	80.2%	4%
35-39	94.6%	94.5%	0%	78.3%	80.9%	3%
40-44	93.8%	93.8%	0%	80.9%	83.5%	3%
45-49	92.1%	91.9%	0%	81.8%	84.9%	4%
50-54	89.9%	90.6%	1%	77.8%	83.0%	7%
55-59	80.1%	85.2%	6%	66.1%	74.8%	13%
60-64	61.9%	67.4%	9%	30.0%	41.7%	39%
65-69	14.6%	25.2%	72%	9.9%	19.8%	100%
70-74	7.8%	12.4%	60%	3.8%	6.5%	73%
Wyre Forest						
Sex	Male			Female		
Age	2001	2011	Change 2001-2011	2001	2011	Change 2001-2011
16-19	63.2%	54.1%	-14%	60.2%	54.5%	-10%
20-24	89.5%	88.8%	-1%	79.3%	77.4%	-2%
25-29	93.1%	91.9%	-1%	77.1%	80.3%	4%
30-34	93.2%	93.4%	0%	77.2%	82.0%	6%
35-39	92.9%	92.2%	-1%	76.8%	82.0%	7%
40-44	91.9%	93.2%	1%	81.1%	84.3%	4%
45-49	90.7%	91.1%	1%	80.4%	85.7%	7%
50-54	87.2%	89.5%	3%	74.4%	81.9%	10%
55-59	80.9%	82.7%	2%	63.0%	72.8%	16%
60-64	57.0%	61.8%	9%	28.3%	37.5%	33%
65-69	15.9%	24.9%	56%	8.6%	17.1%	99%
70-74	9.0%	13.9%	54%	3.5%	6.5%	85%

Alterations to Economic Activity Rates: Sensitivity Scenario 2

- 6.47 In Sensitivity Scenario 2, changes have been made to the age-sex specific economic activity rates to take account of changes to the State Pension Age (SPA) and to accommodate potential changes in economic participation which might result from an ageing but healthier population in the older labour-force age-groups.
- 6.48 Employment forecasts (including those from Cambridge Econometrics, Oxford Economics and Experian forecasts that are used in this report) have routinely applied changes to older-age economic participation rates in the derivation of longer-term forecasts of jobs growth. It is therefore important to give these assumptions due consideration in the demographic assessment of these forecasts.
- 6.49 The SPA for women is increasing from 60 to 65 by 2018, bringing it in line with that for men. Between December 2018 and April 2020, the SPA for both men and women will then rise to 66. Under current legislation, the SPA will be increased to 67 between 2034 and 2036 and 68 between 2044 and 2046. It has been proposed that the rise in the SPA to 67 is brought forward to 2026–2028⁴.
- 6.50 ONS published its last set of economic activity rate forecasts from a 2006 base⁵. These incorporated an increase in SPA for women to 65 by 2020 but this has since been altered to an accelerated transition by 2018 plus a further extension to 66 by 2020. Over the 2011–2020 period, the ONS forecasts suggested that male economic activity rates would rise by 5.6% and 11.9% in the 60-64 and 65-69 age groups respectively. Corresponding female rates would rise by 33.4% and 16.3% (Figure 14). Given the accelerated pace of change in the female SPA and the clear trends for increased female labour force participation across all age-groups in the last decade, these 2011–2020 rate increases would appear to be relatively conservative assumptions.

⁴ <https://www.gov.uk/changes-state-pension>

⁵ ONS January 2006, Projections of the UK labour force, 2006 to 2020
<http://www.ons.gov.uk/ons/rel/lms/labour-market-trends--discontinued-/volume-114--no--1/projections-of-the-uk-labour-force--2006-to-2020.pdf>

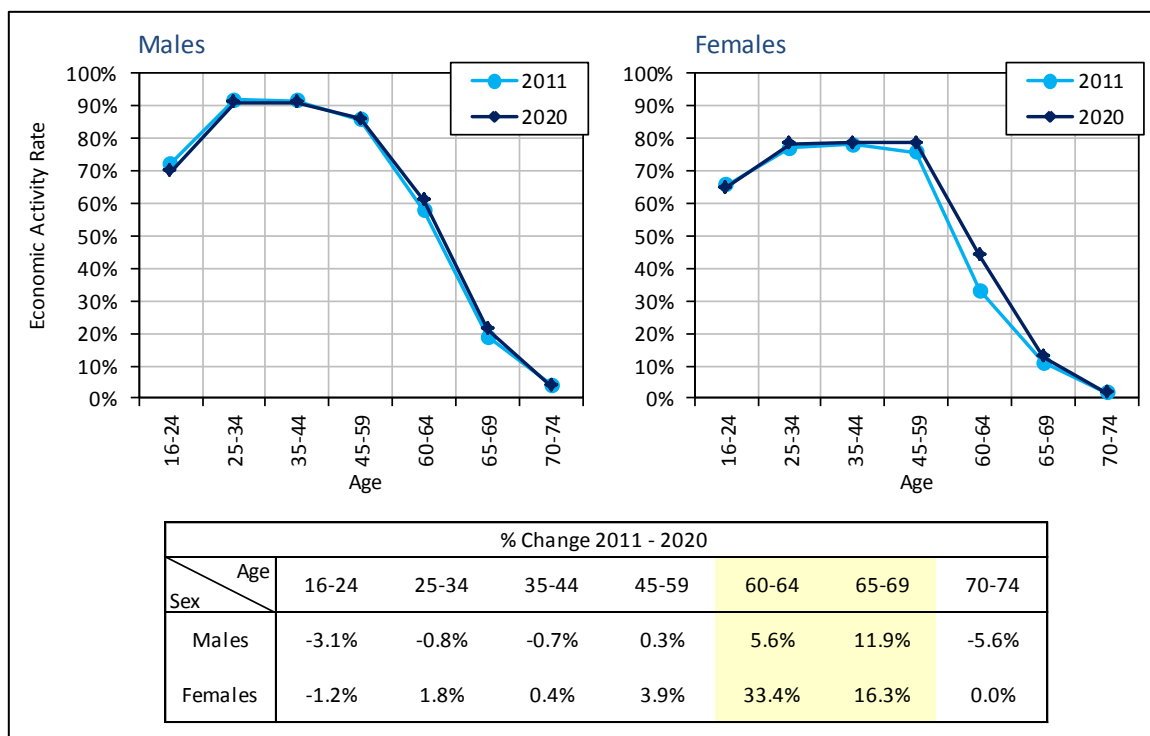


Figure 14: ONS Labour Force Projection 2006 – Economic Activity Rates 2011–2020. Data source: ONS

- 6.51 To take account of planned changes to the SPA, the following modifications have been made to the economic activity rates in ‘Sensitivity Scenario 2’:
- Women aged 60-64: 40% increase from 2012 to 2020.
 - Women aged 65-69: 20% increase from 2012 to 2020.
 - Men aged 60-64: 5% increase from 2012 to 2020.
 - Men aged 65-69: 10% increase from 2012 to 2020.
- 6.52 Note that the rates for women in the 60–64 age and 65–69 age-groups are higher than the original ONS figures, accounting for the accelerated pace of change in the SPA. No changes have been applied to other age-groups. In addition, no changes have been applied to economic activity rates beyond 2020. This is an appropriately prudent approach given the uncertainty associated with forecasting future rates of economic participation.
- 6.53 These alternative economic activity rates are presented as realistic and robust alternatives to the very unlikely scenario of ‘fixed’ rates over the forecast period. A detailed illustration of the changes that have been applied to the economic activity rates in each of the jobs-led scenarios in Sensitivity Scenario 2 are summarised in Table 19 and Figure 15.

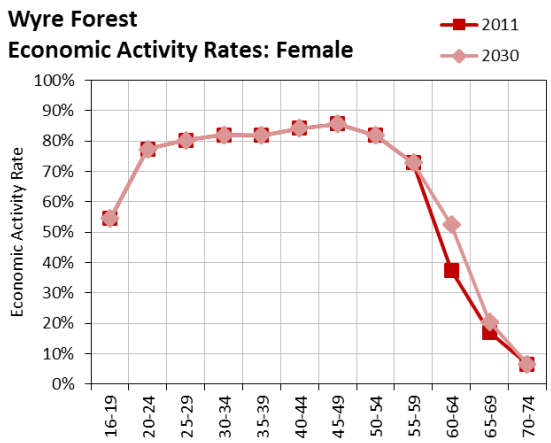
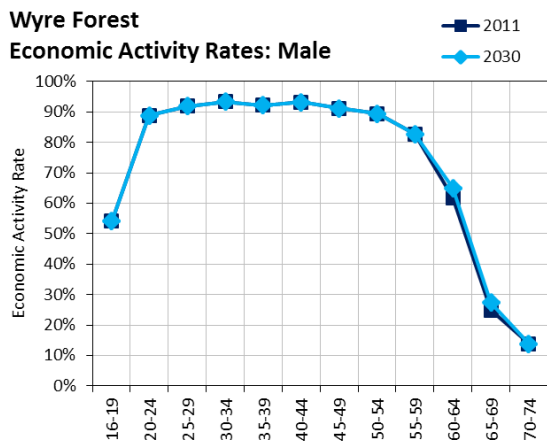
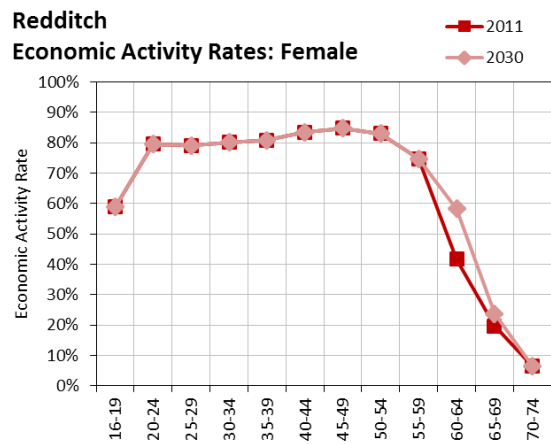
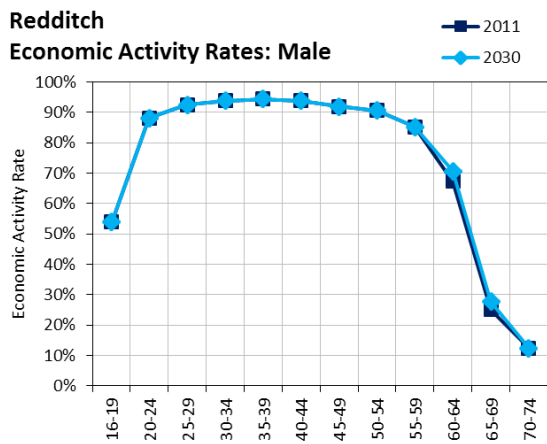
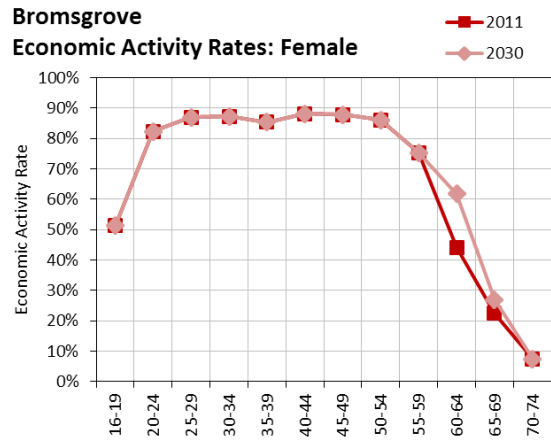
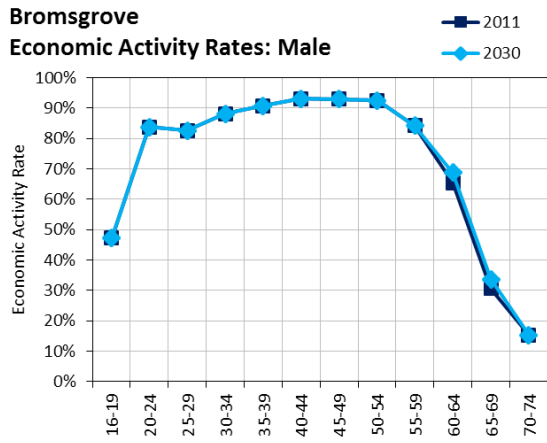


Figure 15: 'Sensitivity Scenario 2' Economic Activity Rate profiles

Table 19: 'Sensitivity Scenario 2' Economic Activity Rate alterations. Changes are highlighted in blue.

Bromsgrove (Sensitivity Scenario 2 Economic Activity Rates)						
Sex	Male			Female		
Age	2011	2030	Change 2011-2020	2011	2030	Change 2011-2030
16-19	47.3%	47.3%	0%	51.5%	51.5%	0%
20-24	83.9%	83.9%	0%	82.4%	82.4%	0%
25-29	82.7%	82.7%	0%	87.0%	87.0%	0%
30-34	88.1%	88.1%	0%	87.4%	87.4%	0%
35-39	90.8%	90.8%	0%	85.4%	85.4%	0%
40-44	93.2%	93.2%	0%	88.1%	88.1%	0%
45-49	92.9%	92.9%	0%	87.9%	87.9%	0%
50-54	92.6%	92.6%	0%	86.2%	86.2%	0%
55-59	84.3%	84.3%	0%	75.4%	75.4%	0%
60-64	65.5%	68.7%	5%	44.1%	61.8%	40%
65-69	30.7%	33.7%	10%	22.5%	27.0%	20%
70-74	15.3%	15.3%	0%	7.4%	7.4%	0%

Redditch (Sensitivity Scenario 2 Economic Activity Rates)						
Sex	Male			Female		
Age	2011	2030	Change 2011-2020	2011	2030	Change 2011-2030
16-19	53.9%	53.9%	0%	59.0%	59.0%	0%
20-24	88.2%	88.2%	0%	79.5%	79.5%	0%
25-29	92.6%	92.6%	0%	79.1%	79.1%	0%
30-34	93.9%	93.9%	0%	80.2%	80.2%	0%
35-39	94.5%	94.5%	0%	80.9%	80.9%	0%
40-44	93.8%	93.8%	0%	83.5%	83.5%	0%
45-49	91.9%	91.9%	0%	84.9%	84.9%	0%
50-54	90.6%	90.6%	0%	83.0%	83.0%	0%
55-59	85.2%	85.2%	0%	74.8%	74.8%	0%
60-64	67.4%	70.7%	5%	41.7%	58.3%	40%
65-69	25.2%	27.7%	10%	19.8%	23.7%	20%
70-74	12.4%	12.4%	0%	6.5%	6.5%	0%

Wyre Forest (Sensitivity Scenario 2 Economic Activity Rates)						
Sex	Male			Female		
Age	2011	2030	Change 2011-2020	2011	2030	Change 2011-2030
16-19	54.1%	54.1%	0%	54.5%	54.5%	0%
20-24	88.8%	88.8%	0%	77.4%	77.4%	0%
25-29	91.9%	91.9%	0%	80.3%	80.3%	0%
30-34	93.4%	93.4%	0%	82.0%	82.0%	0%
35-39	92.2%	92.2%	0%	82.0%	82.0%	0%
40-44	93.2%	93.2%	0%	84.3%	84.3%	0%
45-49	91.1%	91.1%	0%	85.7%	85.7%	0%
50-54	89.5%	89.5%	0%	81.9%	81.9%	0%
55-59	82.7%	82.7%	0%	72.8%	72.8%	0%
60-64	61.8%	64.9%	5%	37.5%	52.5%	40%
65-69	24.9%	27.4%	10%	17.1%	20.6%	20%
70-74	13.9%	13.9%	0%	6.5%	6.5%	0%

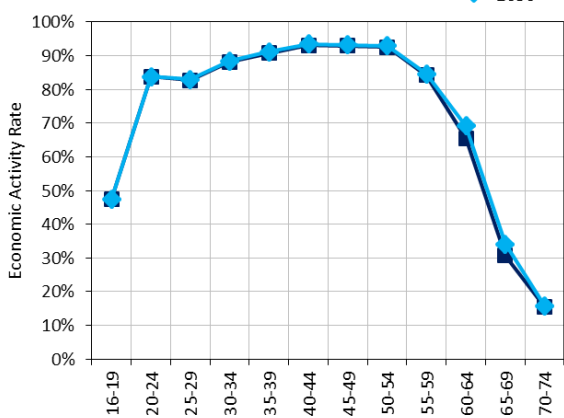
Alterations to Economic Activity Rates: Sensitivity Scenario 3

- 6.54 In 'Sensitivity Scenario 3', the base 2011 Census economic activity rates have been modified; firstly, to account for planned changes to the SPA; and secondly to ensure consistency with the assumptions being made within the Cambridge Econometrics, Oxford Economics and Experian employment forecasts. These changes have been made following recommendations from Amion Consulting (for information on these changes please refer to [the Amion Consulting report](#)).
- 6.55 The changes applied in the 'Jobs-led Experian' scenario are summarised in Table 21 and Figure 17. The changes applied in the 'Jobs-led Oxford' scenario are summarised in Table 20 and Figure 16. The changes applied in the 'Jobs-led Cambridge' scenario are summarised in Table 22 and Figure 18.

Oxford Forecasts

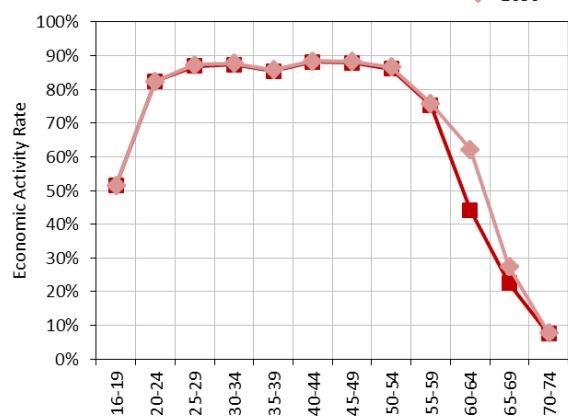
Bromsgrove

Economic Activity Rates: Male



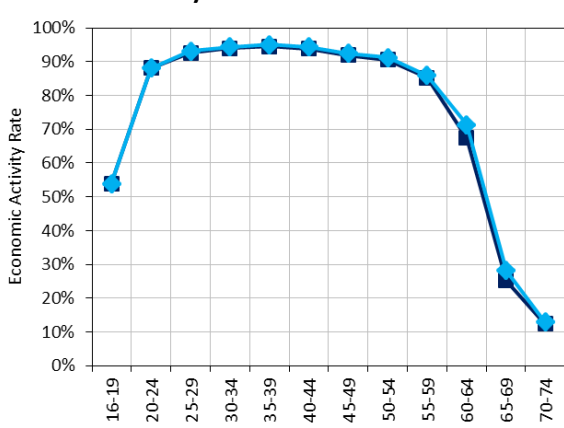
Bromsgrove

Economic Activity Rates: Female



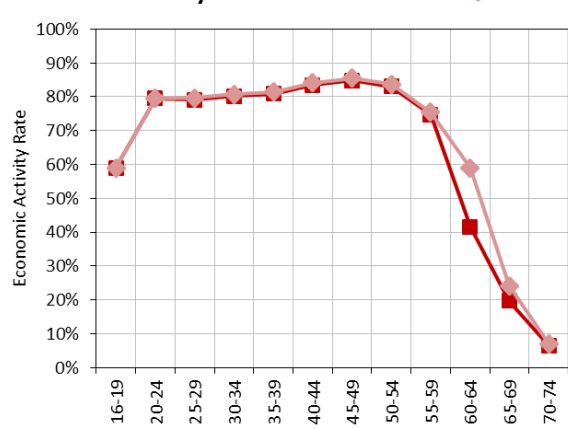
Redditch

Economic Activity Rates: Male



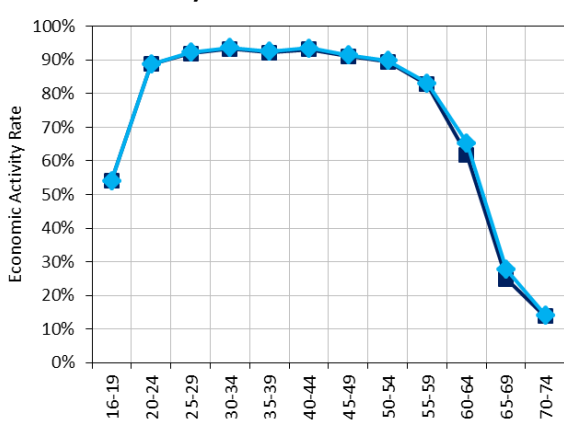
Redditch

Economic Activity Rates: Female



Wyre Forest

Economic Activity Rates: Male



Wyre Forest

Economic Activity Rates: Female

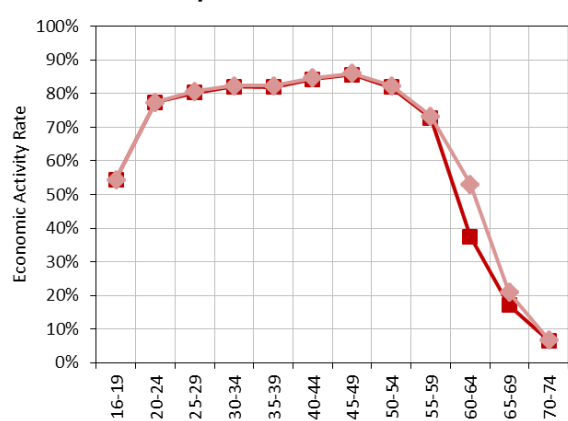


Figure 16: 'Sensitivity Scenario 3' Economic Activity Rate profiles used in the 'Jobs-led Oxford' scenario

Table 20: 'Sensitivity Scenario 3' Economic Activity Rate alterations for the 'Jobs-led Oxford' scenario

Bromsgrove (Sensitivity Scenario 3 Economic Activity Rates) Oxford						
Sex	Male			Female		
Age	2011	2030	Change 2011-2030	2011	2030	Change 2011-2030
16-19	47.3%	47.3%	0%	51.5%	51.5%	0%
20-24	83.9%	83.9%	0%	82.4%	82.4%	0%
25-29	82.7%	83.0%	0%	87.0%	87.3%	0%
30-34	88.1%	88.5%	0%	87.4%	87.7%	0%
35-39	90.8%	91.2%	0%	85.4%	85.8%	0%
40-44	93.2%	93.5%	0%	88.1%	88.5%	0%
45-49	92.9%	93.3%	0%	87.9%	88.3%	0%
50-54	92.6%	93.0%	0%	86.2%	86.6%	0%
55-59	84.3%	84.7%	1%	75.4%	75.8%	1%
60-64	65.5%	69.2%	6%	44.1%	62.2%	41%
65-69	30.7%	34.0%	11%	22.5%	27.3%	21%
70-74	15.3%	15.7%	2%	7.4%	7.7%	4%

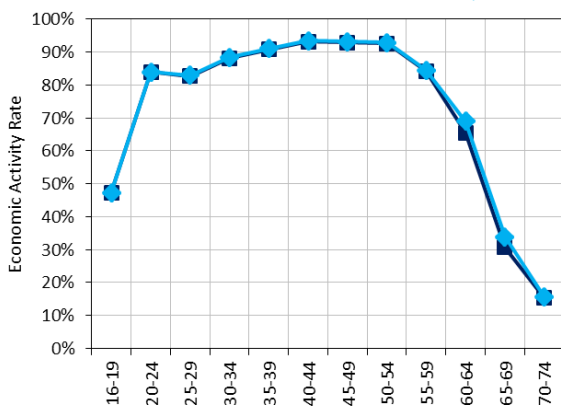
Redditch (Sensitivity Scenario 3 Economic Activity Rates) Oxford						
Sex	Male			Female		
Age	2011	2030	Change 2011-2030	2011	2030	Change 2011-2030
16-19	53.9%	53.9%	0%	59.0%	59.0%	0%
20-24	88.2%	88.2%	0%	79.5%	79.5%	0%
25-29	92.6%	93.1%	1%	79.1%	79.7%	1%
30-34	93.9%	94.5%	1%	80.2%	80.7%	1%
35-39	94.5%	95.1%	1%	80.9%	81.5%	1%
40-44	93.8%	94.4%	1%	83.5%	84.1%	1%
45-49	91.9%	92.5%	1%	84.9%	85.5%	1%
50-54	90.6%	91.3%	1%	83.0%	83.7%	1%
55-59	85.2%	85.9%	1%	74.8%	75.5%	1%
60-64	67.4%	71.4%	6%	41.7%	59.0%	42%
65-69	25.2%	28.2%	12%	19.8%	24.2%	23%
70-74	12.4%	12.9%	4%	6.5%	7.0%	8%

Wyre Forest (Sensitivity Scenario 3 Economic Activity Rates) Oxford						
Sex	Male			Female		
Age	2011	2030	Change 2011-2030	2011	2030	Change 2011-2030
16-19	54.1%	54.1%	0%	54.5%	54.5%	0%
20-24	88.8%	88.8%	0%	77.4%	77.4%	0%
25-29	91.9%	92.3%	0%	80.3%	80.7%	0%
30-34	93.4%	93.7%	0%	82.0%	82.4%	0%
35-39	92.2%	92.6%	0%	82.0%	82.4%	0%
40-44	93.2%	93.6%	0%	84.3%	84.7%	0%
45-49	91.1%	91.5%	0%	85.7%	86.1%	0%
50-54	89.5%	89.9%	1%	81.9%	82.4%	1%
55-59	82.7%	83.2%	1%	72.8%	73.3%	1%
60-64	61.8%	65.4%	6%	37.5%	53.0%	41%
65-69	24.9%	27.7%	11%	17.1%	20.9%	22%
70-74	13.9%	14.2%	3%	6.5%	6.9%	5%

Experian Forecasts

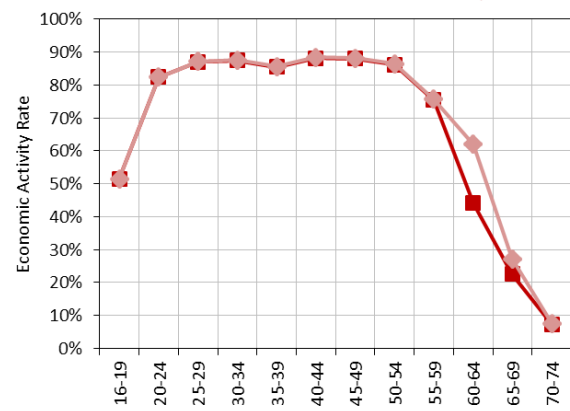
Bromsgrove

Economic Activity Rates: Male



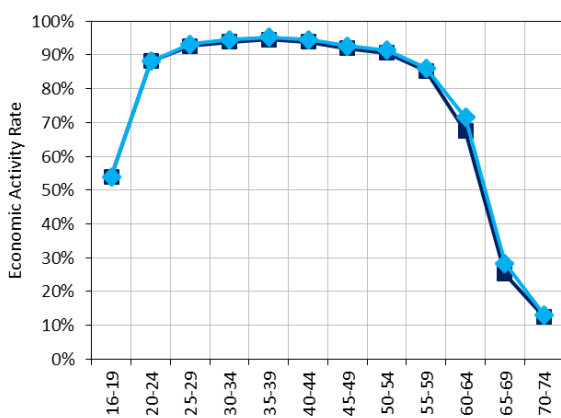
Bromsgrove

Economic Activity Rates: Female



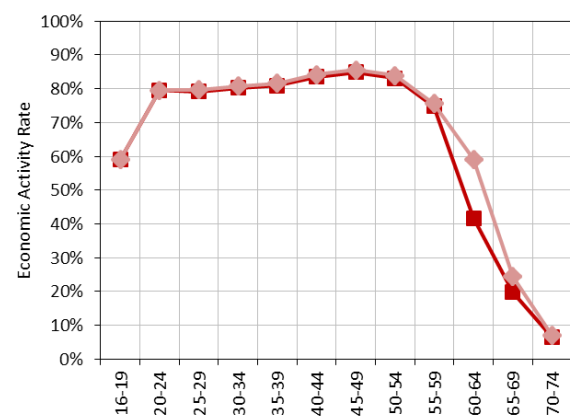
Redditch

Economic Activity Rates: Male



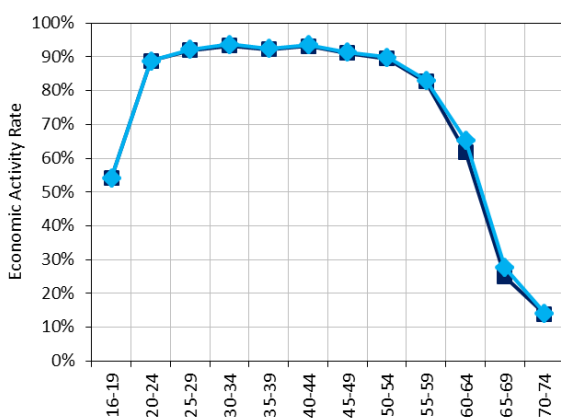
Redditch

Economic Activity Rates: Female



Wyre Forest

Economic Activity Rates: Male



Wyre Forest

Economic Activity Rates: Female

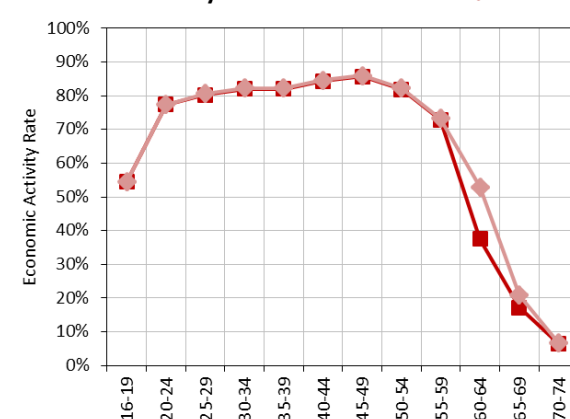


Figure 17: 'Sensitivity Scenario 3' Economic Activity Rate profiles used in the 'Jobs-led Experian' scenario

Table 21: 'Sensitivity Scenario 3' Economic Activity Rate alterations for the 'Jobs-led Experian' scenario

Bromsgrove (Sensitivity Scenario 3 Economic Activity Rates) Experian						
Sex	Male			Female		
Age	2011	2030	Change 2011-2030	2011	2030	Change 2011-2030
16-19	47.3%	47.3%	0%	51.5%	51.5%	0%
20-24	83.9%	83.9%	0%	82.4%	82.4%	0%
25-29	82.7%	82.9%	0%	87.0%	87.2%	0%
30-34	88.1%	88.3%	0%	87.4%	87.6%	0%
35-39	90.8%	91.0%	0%	85.4%	85.7%	0%
40-44	93.2%	93.4%	0%	88.1%	88.3%	0%
45-49	92.9%	93.1%	0%	87.9%	88.1%	0%
50-54	92.6%	92.8%	0%	86.2%	86.4%	0%
55-59	84.3%	84.5%	0%	75.4%	75.6%	0%
60-64	65.5%	69.0%	5%	44.1%	62.0%	41%
65-69	30.7%	33.9%	11%	22.5%	27.2%	21%
70-74	15.3%	15.5%	1%	7.4%	7.6%	3%

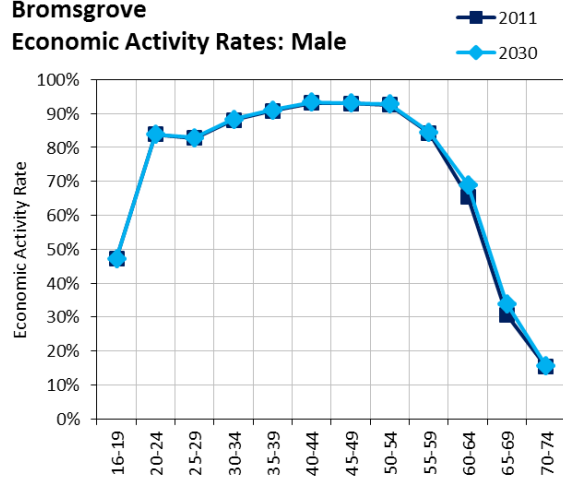
Redditch (Sensitivity Scenario 3 Economic Activity Rates) Experian						
Sex	Male			Female		
Age	2011	2030	Change 2011-2030	2011	2030	Change 2011-2030
16-19	53.9%	53.9%	0%	59.0%	59.0%	0%
20-24	88.2%	88.2%	0%	79.5%	79.5%	0%
25-29	92.6%	93.2%	1%	79.1%	79.8%	1%
30-34	93.9%	94.6%	1%	80.2%	80.8%	1%
35-39	94.5%	95.2%	1%	80.9%	81.6%	1%
40-44	93.8%	94.5%	1%	83.5%	84.2%	1%
45-49	91.9%	92.6%	1%	84.9%	85.6%	1%
50-54	90.6%	91.4%	1%	83.0%	83.8%	1%
55-59	85.2%	86.0%	1%	74.8%	75.6%	1%
60-64	67.4%	71.5%	6%	41.7%	59.1%	42%
65-69	25.2%	28.3%	12%	19.8%	24.3%	23%
70-74	12.4%	13.0%	5%	6.5%	7.1%	9%

Wyre Forest (Sensitivity Scenario 3 Economic Activity Rates) Experian						
Sex	Male			Female		
Age	2011	2030	Change 2011-2030	2011	2030	Change 2011-2030
16-19	54.1%	54.1%	0%	54.5%	54.5%	0%
20-24	88.8%	88.8%	0%	77.4%	77.4%	0%
25-29	91.9%	92.2%	0%	80.3%	80.6%	0%
30-34	93.4%	93.7%	0%	82.0%	82.3%	0%
35-39	92.2%	92.5%	0%	82.0%	82.3%	0%
40-44	93.2%	93.6%	0%	84.3%	84.6%	0%
45-49	91.1%	91.5%	0%	85.7%	86.0%	0%
50-54	89.5%	89.8%	0%	81.9%	82.3%	0%
55-59	82.7%	83.1%	0%	72.8%	73.2%	1%
60-64	61.8%	65.3%	6%	37.5%	52.9%	41%
65-69	24.9%	27.7%	11%	17.1%	20.9%	22%
70-74	13.9%	14.2%	2%	6.5%	6.8%	5%

Cambridge Forecasts

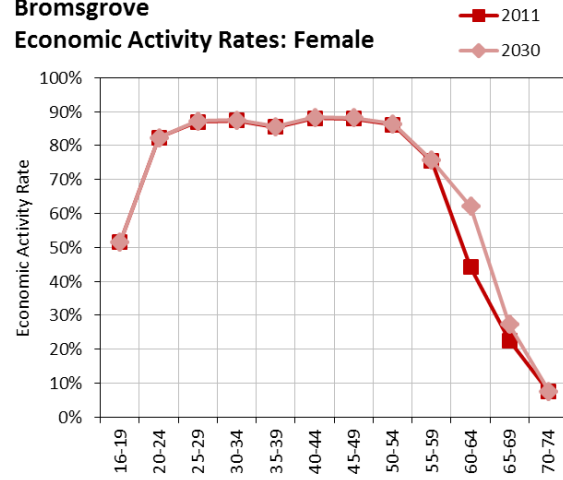
Bromsgrove

Economic Activity Rates: Male



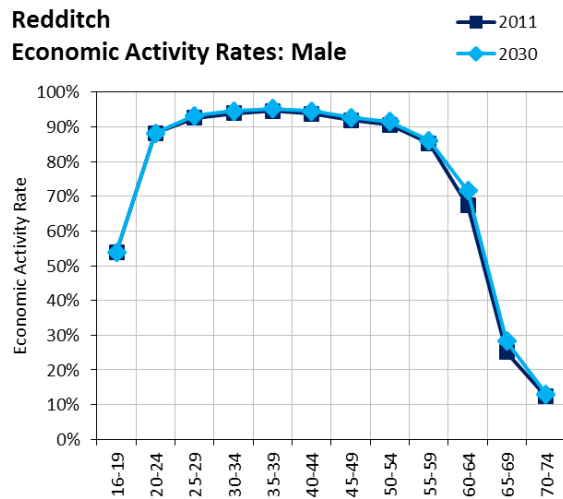
Bromsgrove

Economic Activity Rates: Female



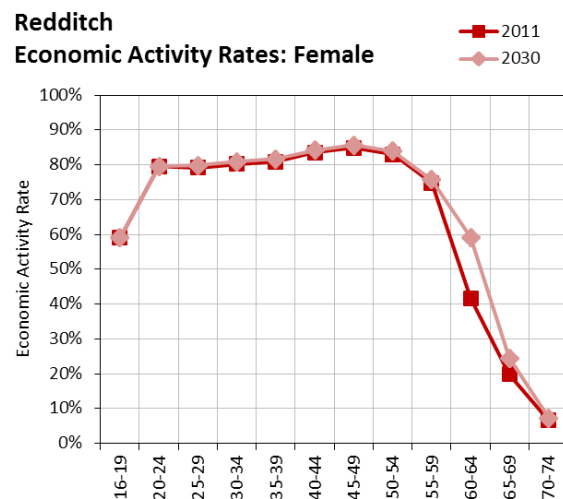
Redditch

Economic Activity Rates: Male



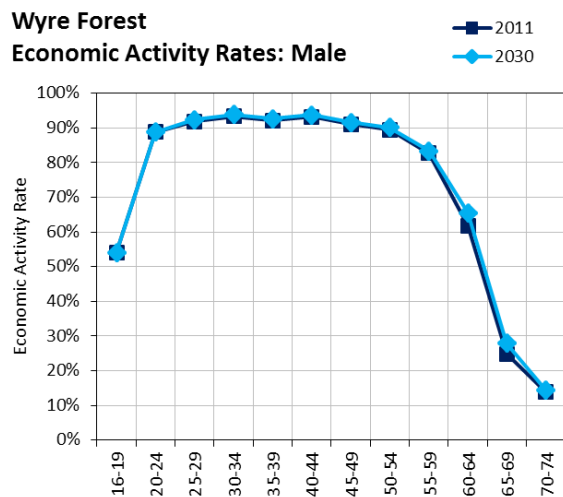
Redditch

Economic Activity Rates: Female



Wyre Forest

Economic Activity Rates: Male



Wyre Forest

Economic Activity Rates: Female

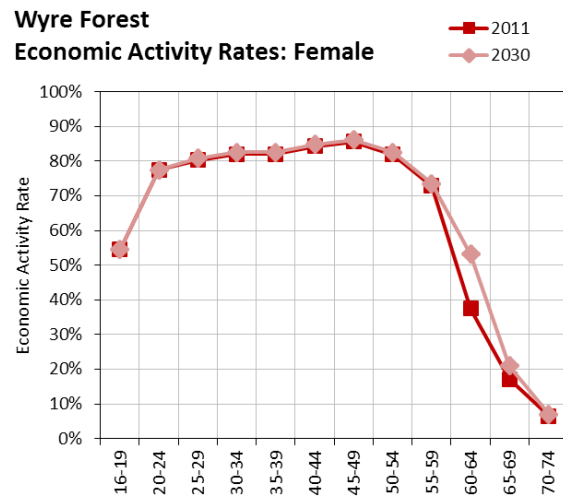


Figure 18: 'Sensitivity Scenario 3' Economic Activity Rate profiles used in the 'Jobs-led Cambridge' scenario

Table 22: 'Sensitivity Scenario 3' Economic Activity Rate alterations for the 'Jobs-led Cambridge' scenario

Bromsgrove (Sensitivity Scenario 3 Economic Activity Rates) Cambridge						
Sex	Male			Female		
Age	2011	2030	Change 2011-2030	2011	2030	Change 2011-2030
16-19	47.3%	47.3%	0%	51.5%	51.5%	0%
20-24	83.9%	83.9%	0%	82.4%	82.4%	0%
25-29	82.7%	82.9%	0%	87.0%	87.2%	0%
30-34	88.1%	88.3%	0%	87.4%	87.6%	0%
35-39	90.8%	91.0%	0%	85.4%	85.7%	0%
40-44	93.2%	93.4%	0%	88.1%	88.3%	0%
45-49	92.9%	93.2%	0%	87.9%	88.2%	0%
50-54	92.6%	92.9%	0%	86.2%	86.5%	0%
55-59	84.3%	84.5%	0%	75.4%	75.7%	0%
60-64	65.5%	69.0%	5%	44.1%	62.1%	41%
65-69	30.7%	33.9%	11%	22.5%	27.2%	21%
70-74	15.3%	15.6%	1%	7.4%	7.6%	3%

Redditch (Sensitivity Scenario 3 Economic Activity Rates) Cambridge						
Sex	Male			Female		
Age	2011	2030	Change 2011-2030	2011	2030	Change 2011-2030
16-19	53.9%	53.9%	0%	59.0%	59.0%	0%
20-24	88.2%	88.2%	0%	79.5%	79.5%	0%
25-29	92.6%	93.3%	1%	79.1%	79.8%	1%
30-34	93.9%	94.6%	1%	80.2%	80.9%	1%
35-39	94.5%	95.2%	1%	80.9%	81.6%	1%
40-44	93.8%	94.6%	1%	83.5%	84.2%	1%
45-49	91.9%	92.7%	1%	84.9%	85.6%	1%
50-54	90.6%	91.5%	1%	83.0%	83.9%	1%
55-59	85.2%	86.1%	1%	74.8%	75.6%	1%
60-64	67.4%	71.6%	6%	41.7%	59.2%	42%
65-69	25.2%	28.3%	13%	19.8%	24.4%	23%
70-74	12.4%	13.0%	5%	6.5%	7.2%	10%

Wyre Forest (Sensitivity Scenario 3 Economic Activity Rates) Cambridge						
Sex	Male			Female		
Age	2011	2030	Change 2011-2030	2011	2030	Change 2011-2030
16-19	54.1%	54.1%	0%	54.5%	54.5%	0%
20-24	88.8%	88.8%	0%	77.4%	77.4%	0%
25-29	91.9%	92.4%	1%	80.3%	80.8%	1%
30-34	93.4%	93.8%	1%	82.0%	82.5%	1%
35-39	92.2%	92.7%	1%	82.0%	82.5%	1%
40-44	93.2%	93.8%	1%	84.3%	84.8%	1%
45-49	91.1%	91.7%	1%	85.7%	86.2%	1%
50-54	89.5%	90.1%	1%	81.9%	82.5%	1%
55-59	82.7%	83.3%	1%	72.8%	73.5%	1%
60-64	61.8%	65.6%	6%	37.5%	53.2%	42%
65-69	24.9%	27.8%	12%	17.1%	21.0%	23%
70-74	13.9%	14.3%	3%	6.5%	7.0%	7%

Unemployment Rate

- 6.56 For each scenario (excluding the jobs-led scenarios), the labour force and jobs implications of the population growth trajectory have been evaluated through the application of three key data items: economic activity rates, a commuting ratio and an unemployment rate. In the jobs-led scenarios, these three data items are used to determine the population growth required by a particular jobs growth trajectory.
- 6.57 The unemployment rate, together with the commuting ratio, controls the balance between the size of the labour force and the number of jobs available within an area.

Historical Unemployment Rates

- 6.58 Unemployment statistics from NOMIS provide an indication of the variation in the unemployment rate since 2004/05. Whilst sampling issues introduce some uncertainty to the data, a 5-year and a 9-year average is presented to give an indication of how unemployment has altered during the recessionary period (Table 23).

Table 23: Historical unemployment rates for the three North Worcestershire districts. Source: Annual Population Survey, NOMIS

Date	Unemployment Rate (%)		
	Bromsgrove	Redditch	Wyre Forest
2004/05	4.1	3.4	4.0
2005/06	3.3	2.7	1.9
2006/07	-	3.9	6.3
2007/08	4.5	4.7	4.5
2008/09	5.5	9.3	9.3
2009/10	6.4	5.8	4.9
2010/11	7.6	8.4	4.7
2011/12	5.8	3.2	8.3
2012/13	3.7	5.9	7.2
Maximum	7.6	9.3	9.3
Minimum	3.3	2.7	1.9
9yr Average	5.1	5.3	5.7
5yr Average	5.8	6.5	6.9

Note: These figures are July to June unemployment rates. – indicates missing data

- 6.59 On average, the unemployment rate would need to reduce by 17% across Worcestershire if the 5-year average was to revert to its 9-year equivalent (Table 24).

Table 24: Unemployment rates for the six Worcestershire districts. Source: Annual Population Survey, NOMIS

	Unemployment Rate % (9 year average)	Unemployment Rate % (5 year average)	% change	5yr unemployment reduced by 17%
Bromsgrove	5.1	5.8	-13%	4.8
Malvern Hills	4.2	5.1	-21%	4.2
Redditch	5.3	6.5	-24%	5.4
Worcester	4.6	5.1	-10%	4.2
Wychavon	3.4	3.8	-12%	3.1
Wyre Forest	5.7	6.9	-21%	5.7
		Average	-17%	

Note: 9 year average from 2004/05 to 2012/13 and the 5 year average from 2008/09 to 2012/13

Core Scenarios

6.60 An average unemployment rate for ages 16+ has been calculated from the APS unemployment statistics for the nine-year period 2004/05–2012/13 (Table 23). For each of the three North Worcestershire districts, this nine-year average has been used in the core scenarios:

- Bromsgrove 5.1%
- Redditch 5.3%
- Wyre Forest 5.7%

6.61 For the core scenario analysis, the unemployment rate is fixed throughout the forecast period.

Sensitivity Scenario 2

6.62 In 'Sensitivity Scenario 2', the unemployment rate has been modified to account for a period of recovery post-2013. These assumptions assume that an initial unemployment rate is defined based upon the average for the last five years (2008/09–2012/13) (see Table 23). Over the 2013–2020 forecast period, these initial unemployment rates have been incrementally reduced and remain fixed thereafter (Table 25). The reduction in unemployment is equivalent to the (17%) average difference between the 9 year and 5 year unemployment rates for the six Worcestershire districts (Table 24).

6.63 These improvements to unemployment rates are considered to be quite conservative but do provide an appropriate basis for what is likely to be a gradual recovery from current economic conditions.

Table 25: Sensitivity Scenarios 2 unemployment rates

District	Unemployment Rate (%) 2013	Unemployment Rate (%) 2020	Change
Bromsgrove	5.8	4.8	-1.0
Redditch	6.5	5.4	-1.1
Wyre Forest	6.9	5.7	-1.2

6.64 The most recent unemployment statistics, published by ONS in January 2014, suggest that unemployment rates continue to fall; for the West Midlands, the unemployment rate was down 1.3 percentage points from June to August 2013 and down 0.8 from a year earlier⁶.

Sensitivity Scenario 3

6.65 In 'Sensitivity Scenario 3', the unemployment rate has been reduced over the forecast period (2012–2030). These modifications have been made using an index based on the Experian employment forecast (for information on these changes please refer to [the Amion Consulting report](#)). The changes to the unemployment rates are summarised in Figure 19.

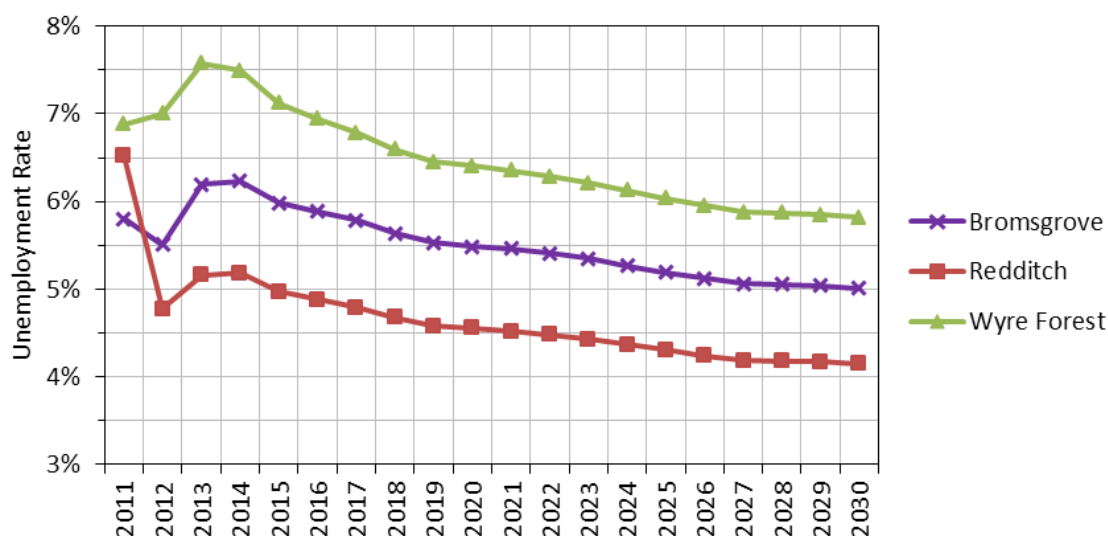


Figure 19: SENS2 unemployment rates

⁶ Labour Market Statistics, January 2014. ONS Statistical Bulletin
http://www.ons.gov.uk/ons/dcp171778_347785.pdf

Commuting Ratio

- 6.66 For each scenario (excluding the jobs-led scenarios), the labour force and jobs implications of the population growth trajectory have been evaluated through the application of three key data items: economic activity rates, a commuting ratio and an unemployment rate. In the jobs-led scenarios, these three data items are used to determine the population growth required by a particular jobs growth trajectory.
- 6.67 The commuting ratio, together with the unemployment rate, controls the balance between the size of the labour force and the number of jobs available within an area.
- 6.68 Information on commuting from the 2011 Census has not yet been published. Using a combination of statistics from the 2011 Census, commuting ratios have been derived by Edge Analytics for each of the three North Worcestershire districts. In all the scenarios (both 'core' and sensitivity) these rates are 'fixed' and held constant for the forecast period 2012 to 2030.
- 6.69 The commuting ratio is the balance between the number of workers living in a district (i.e. the resident labour force) and the number of jobs available in the district. The number of workers includes all economically active residents (i.e. all residents aged 16–74). The number of jobs has been calculated by subtracting the number of residents not in employment and the number of residents aged 0–15 and those aged 75+ from the district's workday population.
- 6.70 The derived 2011 commuting ratios for Bromsgrove, Redditch and Wyre Forest are shown below in Table 26. For comparison, these are presented alongside the 2001 commuting ratios, derived from 2001 Census statistics. In the case of the 2001 commuting ratio, 'workers' and 'jobs' are both derived from aggregating the travel-to-work statistics. A commuting ratio greater than 1 indicates that the size of the resident workforce exceeds the number of jobs available in the district, resulting in a net out-commute.

Table 26: Commuting ratio comparison

Bromsgrove		2001 Census	2011 Census
Workers	<i>a</i>	44,334	44,867
WorkDay Population minus those not in Work minus 0-15 yr olds minus 75+			86,399 22,940 16,530 9,300
Jobs	<i>b</i>	34,865	37,629
Commuting Ratio	<i>a/b</i>	1.27	1.19
Redditch		2001 Census	2011 Census
Workers	<i>a</i>	41,096	41,464
WorkDay Population minus those not in Work minus 0-15 yr olds minus 75+			80,332 21,059 16,558 5,133
Jobs	<i>b</i>	37,467	37,582
Commuting Ratio	<i>a/b</i>	1.10	1.10
Wyre Forest		2001 Census	2011 Census
Workers	<i>a</i>	48,350	45,060
WorkDay Population minus those not in Work minus 0-15 yr olds minus 75+			88,991 27,271 16,785 8,859
Jobs	<i>b</i>	37,831	36,076
Commuting Ratio	<i>a/b</i>	1.28	1.25