



POPGROUP_{v.4}

User Guide 3

How to Get Started with Labour Force Projections

Prepared by Ludi Simpson

edge analytics

0113 384 6087

popgroup@edgeanalytics.co.uk

Prepared by Ludi Simpson

Professor of Population Studies, University of Manchester
Please send suggestions for improvements and future Guides to:
ludi.simpson@manchester.ac.uk

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edgeanalytics

Leeds Innovation Centre | 103 Clarendon Road | Leeds | LS2 9DF
0113 384 6087 | popgroup@edgeanalytics.co.uk | www.edgeanalytics.co.uk

Commissioned by:

Local Government Association

Local Government House | Smith Square | London SW1P 3HZ
Tel 020 7664 3000 | Fax 020 7664 3030 | info@local.gov.uk | www.local.gov.uk



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I Introduction

Labour force projections are a valuable addition to understanding an area's likely future needs. They identify how the local population's changing size and age structure, together with foreseen changes in economic activity, will alter the size and composition of the workforce. The workforce includes all those who live in the area and are working or available for work (i.e. those who are employed or unemployed).

In the context of Local Plans, labour force projections form a key component of integrated demographic forecasting along with population and household projections. Although local labour force projections are arguably a requirement for local government's statutory planning responsibilities throughout the UK, none of the government departments provide official projections of the labour force either nationally or locally. Best practice instead bases an initial projection of economic activity on constant future rates, improves this crude assumption by using a forecast of future rates available from the Office for Budget Responsibility or another source, and further adjusts them according to local knowledge.

This Guide describes how to get started with local labour force projections in these ways. It can be used in England, Wales and Scotland, using the Derived Forecasts model of the POPGROUP suite of software. The Guide assumes that the reader has access to the Data Modules of labour force projections that are regularly produced for POPGROUP users (available from Edge Analytics). It describes how to view and analyse initial projections for a set of local authority areas chosen by the user, how to make alternative scenarios, and how to compare their results.

The Derived Forecasts software is installed and operates independently from the POPGROUP software for population projections. However, if you have already used POPGROUP (User Guide 1 provides an introduction), then you will find Derived Forecasts straightforward as the two software packages have similar design principles. If you have already worked with household projections (User Guide 2 provides an introduction) then you have used Derived Forecasts software and will find labour force forecasts simple to create and amend. You may not need all the detail of this Guide but may find useful the alternative scenarios that are suggested.

How the workforce relates to jobs depends on commuting, as not all the workforce will work in the same area as they live. Additionally, some will be unemployed and some will have more than one job. The relationships between jobs and the workforce, and housing, are the subjects of User Guides 5 and 6.

This Guide uses Districts in England as an example. There are no significant differences for users in Wales and Scotland.

1.1. How much time do I need?

An existing user of POPGROUP will be able to install a new labour force projection, view and analyse it as in Sections 2-4, all within ten minutes. A complete novice will want to put aside an hour or so. Each of the alternative scenarios in Section 5 takes only a few minutes to complete and run, as does the comparison of different scenarios in Section 6. The further scenarios of Section 7 are also straightforward and could take an hour in total to work through. However, the novice will want to put aside a further half a day to work slowly enough to consider the new skills that are being learned.

1.2. What else will I need to know?

This Guide is intended for those getting started with the software, by providing step-by-step support for specific common tasks. It assumes no prior knowledge. The Derived Forecasts reference manual remains the comprehensive Guide that should also be consulted to learn how the software operates and its full range of functionality.

Projections led by plans for jobs or housing are discussed in User Guides 4, 5 and 6 (see *Next steps* on page 36).

The POPGROUP suite of software (POPGROUP, Derived Forecasts, and their Data Modules) does not intend to be a 'black box'. When making projections, the user is responsible for the assumptions made about future population and economic activity.

POPGROUP is a very flexible engine for producing demographic forecasts and scenarios. To use it to its full, the user will consult its other Guides. All documentation for POPGROUP is available by emailing popgroup@edgeanalytics.co.uk.

1.3. Using the Guide with 2014-based population projections

The Guide uses the Labour Force Data Module which has within it the 2012-based official population projections (2011-based for Wales). Later in 2016, the 2014-based population projections will be available for each country in Britain, and Data Modules for POPGROUP will be produced from them. If when reading this Guide the user has those newer population projections and has run them in POPGROUP, then they may be used with this Guide. That user should work through Sections 1-4 below, then before starting Section 5 should work through Section 7.2, which shows how to run a labour force projection with an alternative population projection. The user should return to Section 5 and enter the same 2014-based projection throughout the rest of the Guide.

1.4. About this Guide

In this document, the names of Excel workbooks are written in bold grey font (e.g. **POPGROUP_Scenario**). Sheets within workbooks are written in bold grey italics surrounded by single quotation marks (e.g. '*Sched*').

Folder names are written in uppercase, surrounded by single quotations (e.g. '...POPULATION\OUTPUT'). Users may name folders and workbooks using both lower and upper case, depending on preference.

References to cells within worksheets, or to buttons/options within the workbooks are in blue italics surrounded by single quotations, for example, '*Validate*'.

Two types of text box are used in this document:



	Local authority areas
<p>This Guide refers to local authority areas in England, Wales and Scotland that are variously named Unitary Authorities, Districts, Boroughs or Council Areas. For shorthand, the Guide often refers to 'areas'.</p>	



Record results for your area

The Guide asks you to choose one or more areas, and follow instructions to replicate the official projection and make alternative scenarios.

You will manually record results for your area on page 34 to keep track of your progress.



Instructions and advice

Much of this Guide is structured as boxed instructions for an 'Action' accompanied by images of the 'POPGROUP view' that you will see.

Text outside the boxed instructions provides further advice and explanation.



Derived Forecasts (DF) is a model-maker

- DF makes a model in Excel for the area(s) you specify, starting in the 'base year' of the projection. Sections 2–3 of this Guide help you to use DF to replicate a pre-prepared projection. It is just one projection that can be made with this model.
- Sections 4–7 of this Guide show you how to use the model to develop alternative labour force projections for your local authority area(s). Each projection uses the same model for your area(s), with alternative assumptions.
- The assumptions for each projection are held in input files. Most projections do not try to predict the impact of all future policies, but rather show what will happen if some things continue and some things change in specific ways. The input files for all the projections from the model are kept in the model's input folder. The output files are saved to its output folder.
- After using this Guide, you could make labour force projections that start from a different year or refer to different areas, or you could explore making projections for other characteristics such as households or disability. These would be new models made with DF, and the input files for those new models would be held in different folders.
- The details of the calculations made for our labour force model are described in section 4. The range of models that can be created is described in the DF reference manual.

2 Install Derived Forecasts Software

If you have a folder titled '2. DF', the software is already installed. Skip to Section 3. This Guide does not repeat the installation instructions in the manual. However, here are some tips:



Location of Derived Forecasts (DF) on your computer

When installing the software, usually from a disc or a Dropbox address, the default location for the software is on your hard drive at 'C:\FORECAST\'. DF documentation and software will assume that this is its location. However, many organisations will prefer a different location and DF will work with any path that does not begin with a back slash '\

You can specify your path during the installation. If for any reason you need help, contact popgroup@edgeanalytics.co.uk.



Macros must be enabled when using DF

DF works in Excel by using programs known as 'macros'. After installation, you must follow the instructions in the manual to enable macros and trust access to Visual Basic. Otherwise, DF cannot work and you will receive error messages.



Multiple copies of DF

You may install the software on more than one computer within the organisation as specified on your licence. You may **not** pass the software to third parties. If the software is installed on a networked server, a single installation will serve all users connected to that server.

3 Install a Labour Force Projection from the Latest Data Module

Labour force projections for districts of England, Wales and Scotland have been produced in DF, and are supplied to users as either:

- (a) completed data files for selected local authority areas. In this case, install them as instructed, and continue with Section 4 to explore the results; or
- (b) a Data Module which is installed and used to select local authority areas. Most local authorities receive the Data Module. In this case, follow the notes in the rest of this Section.

3.1. Install the Data Module

Follow the instructions in the Data Module's manual. Installation is simply a matter of clicking on the Data Module provided, specifying the folder to contain the Data Module if it is not the default provided, and allowing files to be copied.

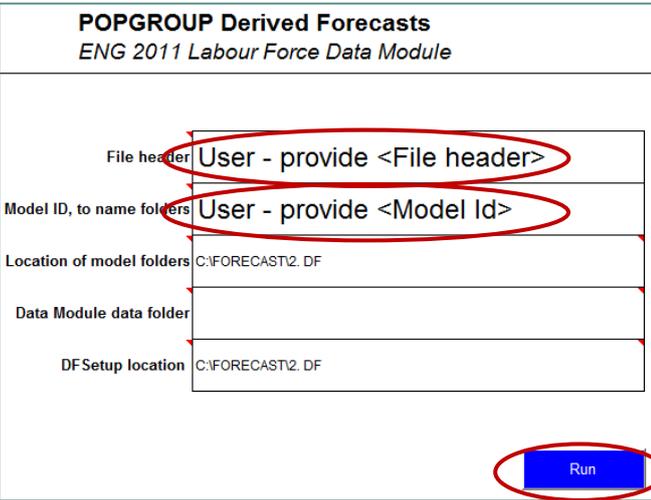
3.2. Produce the labour force projection

Further information is available in the Data Module's manual, which comes with the Data Module and is also available from popgroup@edgeanalytics.co.uk.



Which areas will you make a model for?

Before starting, decide which areas you wish to model. Up to 40 can be chosen, but usually you will choose either a single area or a group of neighbouring areas, for example all the districts within one county.

Action: Create a Labour Force forecast from a Data Module	POPGROUP view
<p>When opening the Data Module, e.g. DM_ENG2011LF_Setup.xls, two entries are required on this screen:</p> <ol style="list-style-type: none"> 1. The <i>'File header'</i> will be repeated on all input and output files and is for information only. You may make it a neutral name like 'Districts' or one that describes all the work you will do with this model. 2. The <i>'Model ID'</i> will be used to name folders containing the model's files. Use it to remind you of the areas, and that it is for the labour force, e.g. 'ManchesterLF' or 'EssexDistrictsLF' <p>After completing this screen, click <i>'Run'</i>.</p>	

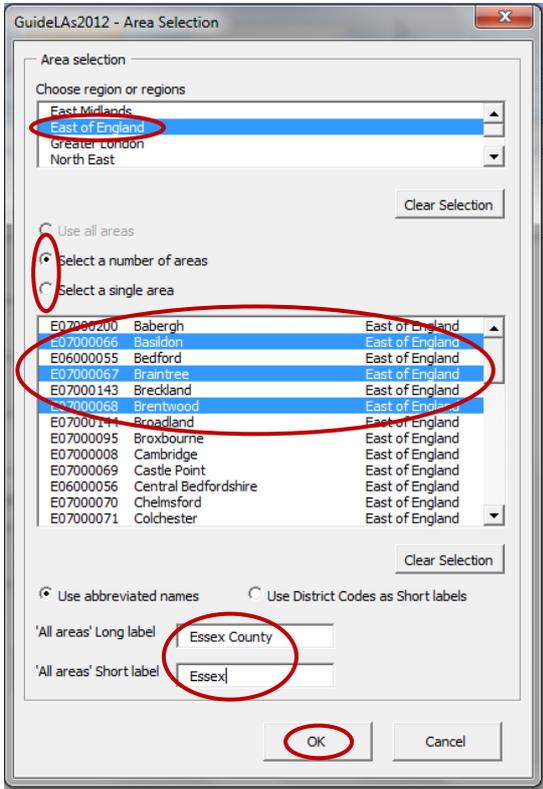
A further screen appears where you choose the Region(s) containing your area(s), and then choose your area(s).

If you chose more than one area, type a long and short label for the collection of *'All areas'*, e.g. 'Essex'.

!	Wales and Scotland
Regions are not a choice on your screen.	

!	Selecting a single area
If you choose to select a single area, you will not be asked to complete labels for <i>'All areas'</i> .	

When this screen is complete, click *'OK'*.



The model is then created and input files are filled with the projection assumptions. The projection outputs are created and saved. The model setup is saved in the Derived Forecasts (DF) folder, so that you can refer to it later.



The production of a model and running its projection may take some time

On a fast machine, a model for one area will take less than 1 minute. However, the time taken can be significantly longer for several areas, for a slower machine, or when using a slow connection to a server. With a combination of these things, it has been known to take more than 15 minutes. Progress is indicated on the screen.

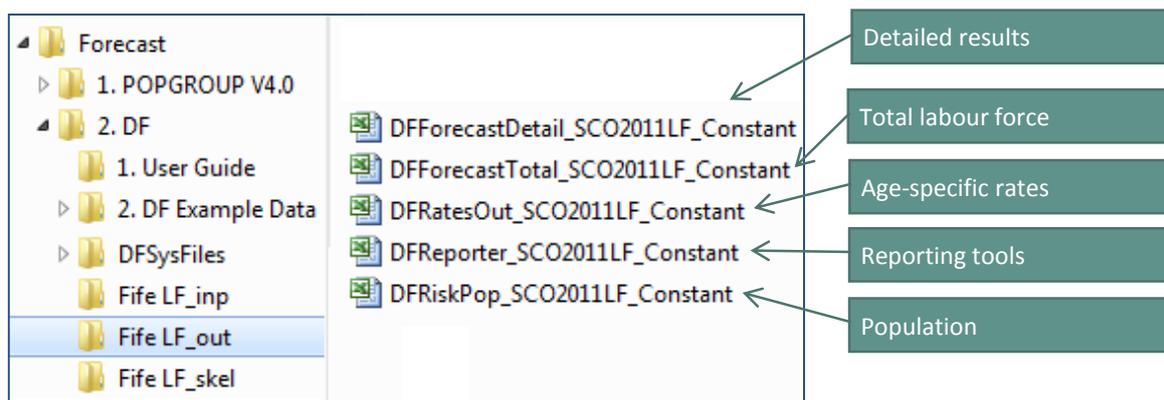
This baseline projection assumes that the future economic activity rate of each age and sex group does not change from the 2011 Census level. The future population is taken from the 2012-based ONS sub-national population projections.

The next Section of this User Guide explores the results of the projection in some detail and shows the user how to view and interpret the results. You will learn how to use Derived Forecasts, and how its files are structured. In the following sections, you will create alternative projections with other prepared sets of assumptions, make further assumptions of your own, and compare the results.

4 Summarise the Results of a Labour Force Projection

4.1. Find the output files

Whether you have been supplied with a projection in POPGROUP files, or have produced it using a Data Module, the results will be saved in an output folder. Your folder will have the Model ID specific to your areas. For example:



In the illustration, SCO stands for Scotland – other areas may have ENG or WAL in their file names. Check that these five files are there. Open each of them to see that they contain the results described.

We will mostly use the **DFReporter** file in this Guide, but all contain useful information, and are described in more detail in the Derived Forecasts reference manual.

4.2. Find the forecast size of the future labour force

If it is not already open, open the **DFReporter** file now.

View the size of the labour force from 2001 to 2037 following the instructions below, and record the results in the Section ‘Your Answers’ on page 34.

Action: View size of the labour force	POPGROUP view												
<p>In the DFReporter file, make sure you are in the '<i>Charter</i>' sheet.</p> <p>Note the defaults under '<i>Current Selection</i>'. They will produce the number of derived units (labour force) headed by each age group in a default year.</p> <p>Click:</p> <p style="text-align: center;"></p> <p>Which age group has the largest number of workers? It may differ between districts.</p> <p>Change the '<i>Current Selection</i>' by clicking on:</p> <p style="text-align: center;"></p> <p>Click the option '<i>Each year given Age group</i>'. Notice that the total workforce will be given for all persons and all ages.</p> <p>Click '<i>OK</i>' and then:</p> <p style="text-align: center;"></p> <p>Hover over the lines to see the workforce forecast in 2011 and in 2037.</p> <p>Record the results in 'Your Answers', page 34.</p>	<div data-bbox="655 293 1342 943"> <p>POPGROUP Derived Forecasts <i>Chart Generator - Training</i></p> <p style="text-align: right;"><input type="checkbox"/> Black and White Charts</p> <hr/> <table border="0"> <tr> <td>Chart Level</td> <td>Current Selection</td> </tr> <tr> <td>Population Groups</td> <td>Each Group and Total</td> </tr> <tr> <td>Gender</td> <td>All Persons</td> </tr> <tr> <td>Category types</td> <td>All Categories</td> </tr> <tr> <td>Chart type</td> <td>Each age group given year</td> </tr> <tr> <td>Derived Units or Rates</td> <td>Derived units</td> </tr> </table> <p style="text-align: center;">    </p> <hr/> <p style="text-align: center;"> Quick Charts  for year: <input type="text" value="2001"/> </p> <p style="text-align: center;"> <input type="button" value="Home"/> <input type="button" value="Back"/> <input type="button" value="Forward"/> <input type="button" value="Print"/> Notes / Reporter Charter </p> </div> <div data-bbox="655 1014 1342 1503"> <p>Chart Options</p> <p>Chart Type Populations Groups Categories </p> <p>Chart Type</p> <p><input type="radio"/> Each Age group given year</p> <p><input checked="" type="radio"/> Each year given Age group</p> <p>Years: <input type="list" value="2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014"/></p> <p>Gender: <input checked="" type="radio"/> All persons, <input type="radio"/> Male, <input type="radio"/> Female</p> <p>Age group: <input checked="" type="radio"/> All Ages, <input type="radio"/> Single Age group</p> <p>Single Age group: <input type="list" value="0-4, 5-9, 10-14, 15-19, 20-24, 25-29, 30-34, 35-39, 40-44, 45-49, 50-54"/></p> <p>Rates or Derived units: <input type="radio"/> Rates, <input checked="" type="radio"/> Derived Units</p> <p style="text-align: right;"> </p> </div> <p>If your model has just one area, you will see just one line on the chart.</p>	Chart Level	Current Selection	Population Groups	Each Group and Total	Gender	All Persons	Category types	All Categories	Chart type	Each age group given year	Derived Units or Rates	Derived units
Chart Level	Current Selection												
Population Groups	Each Group and Total												
Gender	All Persons												
Category types	All Categories												
Chart type	Each age group given year												
Derived Units or Rates	Derived units												

Action: View size of the labour force	POPGROUP view
<p>Return to the '<i>Charter</i>' sheet and click:</p> <div style="text-align: center; margin: 10px 0;"> <div style="background-color: #4F81BD; color: white; padding: 5px 15px; display: inline-block; border: 1px solid black;">Save New Chart</div> </div> <p>Enter any appropriate name for the saved chart, e.g. 'Total'.</p>	

Now that it has been saved, the chart is not protected and can be edited like any Excel chart. For example, you can change the font sizes, format the axes, and reorder the areas to be suitable for a report.

In the example chart, and perhaps in your own, the labour force is projected not to increase in the way that it did between 2001 and 2011. This may be due to the assumption in this first forecast that future economic activity does not change after 2011, whereas it had increased during the 2000s. You will use other assumptions in Section 5 and compare the results in Section 6.

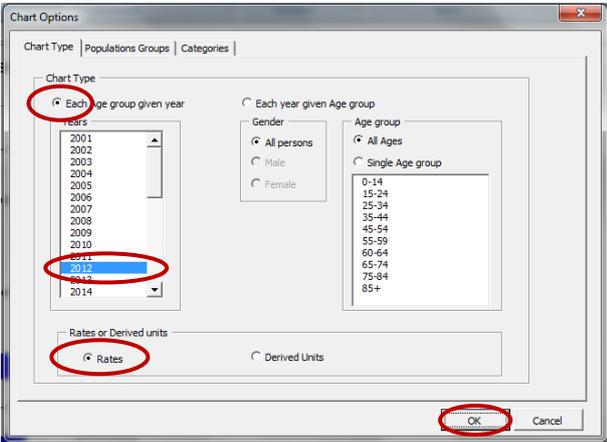
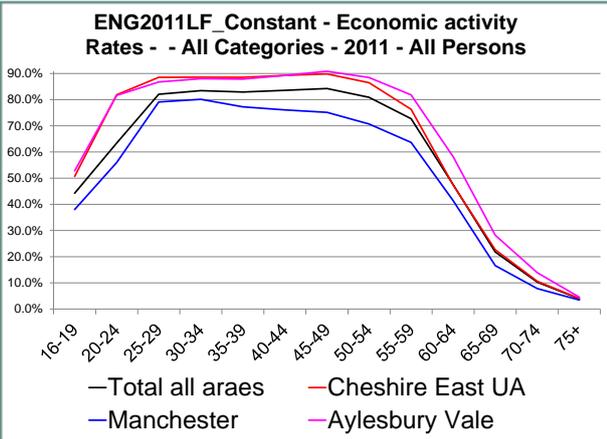
4.3. View the economic activity rates

The projection multiplies the population of each age-sex group by that age-sex group’s economic activity rate, which is simply the proportion of the population in the age-sex group that is working or available for work (i.e. those who are economically active; both those who are employed and those who are unemployed). For example:

Economic activity rate for 20–24 year old men

$$= \text{Men aged 20–24 working or available for work} / \text{Men aged 20–24 in the population}$$

In this first forecast, the rates have been taken from the 2001 and 2011 Censuses but are assumed to be constant after 2011.

Action: View activity rates	POPGROUP view
<p>Go back to the '<i>Charter</i>' sheet. Try other options.</p> <p>To see the economic activity rates (rather than the <u>size</u> of the labour force) for each age in 2012.</p> <p>Click:</p> <p style="text-align: center;">Change Chart Options</p> <p>and choose '<i>Each Age group given year</i>', choose the year 2011, choose '<i>Rates</i>', and click '<i>OK</i>'.</p> <p>Click:</p> <p style="text-align: center;">Produce Chart</p> <p>Note that economic activity rates are calculated only for those aged 16 and older.</p> <p>How do the area activity rates differ at ages under 24? By how much? City areas tend to have lower economic activity, especially where there are higher education institutions, as students tend not be economically active.</p> <p>At what age does economic activity begin to fall? This age is expected to increase as the eligibility for a state pension changes.</p> <p>Save this chart from the '<i>Charter</i>' sheet.</p>	 <p style="text-align: center;">ENG2011LF_Constant - Economic activity Rates - - All Categories - 2011 - All Persons</p> 
<p>To see charts of male and females separately on one screen, use the '<i>Quick charts</i>' section at the bottom of the Charter sheet. Choose a year, e.g. 2011, and then click:</p> <p style="text-align: center;">Quick Charts</p>	<p>Be aware that the left hand scale may not be the same on each chart. You can change these axes manually.</p>

Action: View activity rates	POPGROUP view
<p>How do the representative rates change over time?</p> <p>Change the chart options, this time choosing <i>'Each year given Age group', 'Rates'</i>, Male, and the single age group 60-64.</p> <p>In the <i>'Charter'</i> sheet, use</p> <div data-bbox="245 616 493 669" style="border: 1px solid black; background-color: #0056b3; color: white; padding: 2px; display: inline-block; margin: 5px 0;">Save New Chart</div> <p>to keep the chart on the file.</p> <ul style="list-style-type: none"> • Repeat for age 16-19. • Repeat for females or for other ages. • Save the Reporter file with its charts and tables for later use. 	<p>The chart displays economic activity rates for males aged 60-64 from 2001 to 2036. The y-axis represents the percentage rate, ranging from 0.0% to 70.0% in 10% increments. The x-axis shows years from 2001 to 2036 in 5-year increments. Four data series are plotted: 'Total all areas' (black line), 'Cheshire East UA' (red line), 'Manchester' (blue line), and 'Aylesbury Vale' (magenta line). All series show an initial increase from 2001 to 2011, followed by a period of relative stability or slight decline. Aylesbury Vale consistently has the highest activity rate, starting around 65% and ending near 70%. Manchester has the lowest activity rate, starting around 40% and ending near 50%.</p>

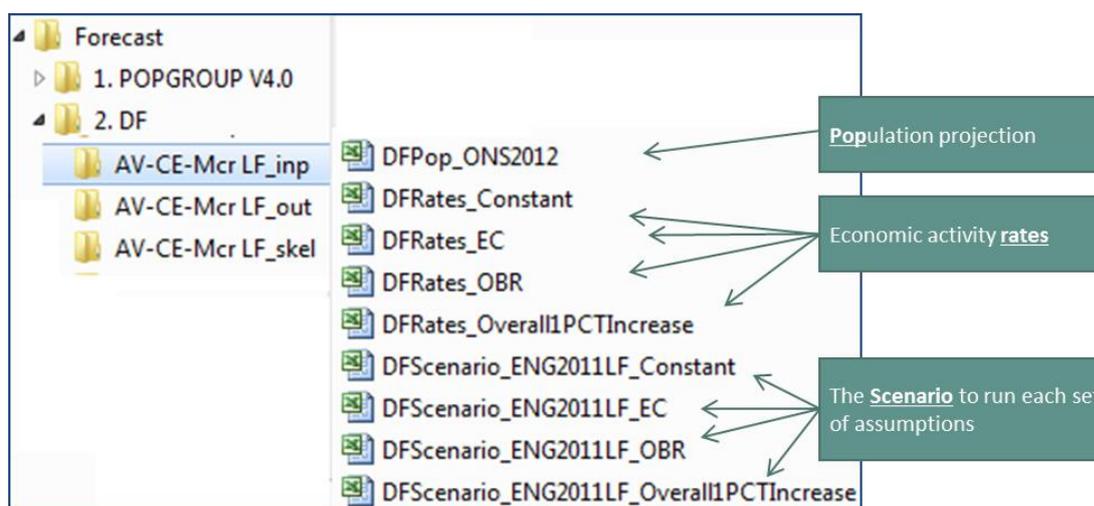
To make your own charts, you can copy the data from the detailed output files in the output folder.

This first forecast assumed that economic activity rates will not change after 2011. This may be less likely than other assumptions that you will try in Section 5.

4.4. Understand how Derived Forecasts created a labour force projection

4.4.1. Find the input files

The input files contain the assumptions made by projections. The folder containing them will look something like this, with your Model ID used to name the folders. The files are named according to their contents:



Note:

- The population projection is an official one from the relevant country. Section 5 will describe how to change this to a different population projection.
- There is more than one file of economic activity rates. Each represents a different assumption, and will be used in Section 5.
- There is more than one scenario file. Each projection uses a separate scenario to help keep track of the results and compare them. Only the scenario file labelled 'Constant' has been used so far.

Action: View Input files		POPGROUP view																																																																																																																																																									
<p>Open any of the DFRates files.</p> <p>Note there is a sheet called 'Notes' for documentation and validation, and a sheet for each area. The default sheet contains information that would be applied to any area that lacked data. This is very similar to POPGROUP files.</p> <p>Click on one of the area sheets. It will look similar to the image on the right.</p>	<p>Data entries are shaded in yellow</p> <table border="1"> <thead> <tr> <th>6</th> <th colspan="3">Category</th> <th>Annual Increment</th> <th>2001</th> <th>2002</th> <th>2003</th> <th>2004</th> <th>2005</th> </tr> </thead> <tbody> <tr> <td>7</td> <td>Male</td> <td>16-19</td> <td>Economic activity</td> <td></td> <td>46.2%</td> <td>44.7%</td> <td>43.5%</td> <td>43.9%</td> <td>45.7%</td> </tr> <tr> <td>8</td> <td>Male</td> <td>20-24</td> <td>Economic activity</td> <td></td> <td>52.9%</td> <td>55.0%</td> <td>53.9%</td> <td>54.2%</td> <td>55.7%</td> </tr> <tr> <td>9</td> <td>Male</td> <td>25-29</td> <td>Economic activity</td> <td></td> <td>80.8%</td> <td>81.5%</td> <td>80.4%</td> <td>80.3%</td> <td>81.5%</td> </tr> <tr> <td>10</td> <td>Male</td> <td>30-34</td> <td>Economic activity</td> <td></td> <td>81.7%</td> <td>81.5%</td> <td>82.5%</td> <td>82.4%</td> <td>83.2%</td> </tr> <tr> <td>11</td> <td>Male</td> <td>35-39</td> <td>Economic activity</td> <td></td> <td>79.6%</td> <td>79.9%</td> <td>80.3%</td> <td>81.1%</td> <td>80.9%</td> </tr> <tr> <td>12</td> <td>Male</td> <td>40-44</td> <td>Economic activity</td> <td></td> <td>76.5%</td> <td>76.5%</td> <td>77.7%</td> <td>77.4%</td> <td>77.4%</td> </tr> <tr> <td>13</td> <td>Male</td> <td>45-49</td> <td>Economic activity</td> <td></td> <td>72.9%</td> <td>74.4%</td> <td>74.8%</td> <td>74.7%</td> <td>75.3%</td> </tr> <tr> <td>14</td> <td>Male</td> <td>50-54</td> <td>Economic activity</td> <td></td> <td>68.9%</td> <td>68.7%</td> <td>70.5%</td> <td>70.2%</td> <td>71.7%</td> </tr> <tr> <td>15</td> <td>Male</td> <td>55-59</td> <td>Economic activity</td> <td></td> <td>57.6%</td> <td>58.8%</td> <td>61.2%</td> <td>61.5%</td> <td>63.0%</td> </tr> <tr> <td>16</td> <td>Male</td> <td>60-64</td> <td>Economic activity</td> <td></td> <td>39.1%</td> <td>39.0%</td> <td>43.4%</td> <td>44.5%</td> <td>44.8%</td> </tr> <tr> <td>17</td> <td>Male</td> <td>65-69</td> <td>Economic activity</td> <td></td> <td>9.8%</td> <td>11.6%</td> <td>13.1%</td> <td>13.4%</td> <td>14.3%</td> </tr> <tr> <td>18</td> <td>Male</td> <td>70-74</td> <td>Economic activity</td> <td></td> <td>5.1%</td> <td>4.9%</td> <td>5.5%</td> <td>6.3%</td> <td>6.0%</td> </tr> <tr> <td>19</td> <td>Male</td> <td>75+</td> <td>Economic activity</td> <td></td> <td>3.1%</td> <td>3.4%</td> <td>4.2%</td> <td>3.3%</td> <td>3.8%</td> </tr> <tr> <td>20</td> <td>Female</td> <td>16-19</td> <td>Economic activity</td> <td></td> <td>43.9%</td> <td>45.4%</td> <td>45.0%</td> <td>45.2%</td> <td>46.4%</td> </tr> </tbody> </table> <p>The facility for a regular annual change has not been used</p> <p>Economic activity rates, in this case interpolated from 2001 and 2011 Censuses.</p>					6	Category			Annual Increment	2001	2002	2003	2004	2005	7	Male	16-19	Economic activity		46.2%	44.7%	43.5%	43.9%	45.7%	8	Male	20-24	Economic activity		52.9%	55.0%	53.9%	54.2%	55.7%	9	Male	25-29	Economic activity		80.8%	81.5%	80.4%	80.3%	81.5%	10	Male	30-34	Economic activity		81.7%	81.5%	82.5%	82.4%	83.2%	11	Male	35-39	Economic activity		79.6%	79.9%	80.3%	81.1%	80.9%	12	Male	40-44	Economic activity		76.5%	76.5%	77.7%	77.4%	77.4%	13	Male	45-49	Economic activity		72.9%	74.4%	74.8%	74.7%	75.3%	14	Male	50-54	Economic activity		68.9%	68.7%	70.5%	70.2%	71.7%	15	Male	55-59	Economic activity		57.6%	58.8%	61.2%	61.5%	63.0%	16	Male	60-64	Economic activity		39.1%	39.0%	43.4%	44.5%	44.8%	17	Male	65-69	Economic activity		9.8%	11.6%	13.1%	13.4%	14.3%	18	Male	70-74	Economic activity		5.1%	4.9%	5.5%	6.3%	6.0%	19	Male	75+	Economic activity		3.1%	3.4%	4.2%	3.3%	3.8%	20	Female	16-19	Economic activity		43.9%	45.4%	45.0%	45.2%	46.4%
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<p>Open the DFPop file. This contains the official population projection.</p> <p>Look at the 'Notes' sheet to see where the data were taken from.</p>	<p>If the official population projection is not the most recent one, or you have an alternative population projection or forecast, Section 7.2 shows how to amend the scenario to use a different population projection.</p>																																																																																																																																																										

Derived Forecasts combines a projection’s assumptions about future population, and the economic activity rates as follows.

For each age and sex:

$$\text{The labour force in year Y} = (\text{Population in year Y}) * (\text{Rates in year Y})$$

$$(\text{DFPop}) \times \text{DFRates}$$

The total labour force in a year is then calculated by summing the labour force for each of the age and sex categories.

5 Three Other Prepared Scenarios of the Future Labour Force

If you wish to use 2014-based or other population projections throughout this Guide, work through Section 7.2 now, before returning to this Section.

For many purposes, you will want to create your own labour force projections. For example:

- to compare the impact of different assumptions in order to judge the realism of each set
- to see how sensitive the projections are to alternative assumptions
- to update the projections with more recent projections of population change
- to estimate how plans for housing or jobs might affect the population.

As there is no official forecast or projection of economic activity rates in the UK, users should consider the most likely future for economic activity rates in their area, using the data provided in the data module and other data available to them.

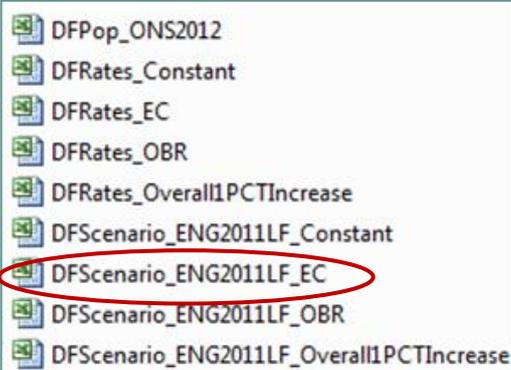
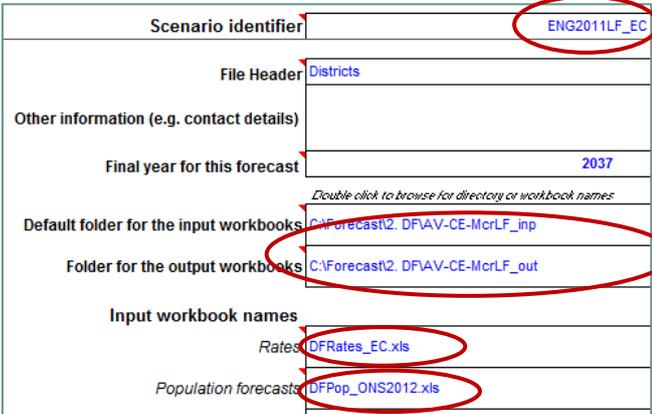
This Section guides you through making three other projections that are provided in the data module, before comparing them in Section 6. Other scenarios are discussed in Section 7. Projections led by plans for housing or jobs are not included here: they are discussed in User Guides 4 and 5 (see page 36).

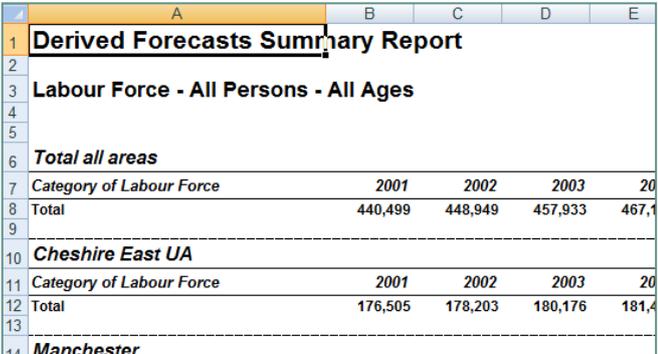
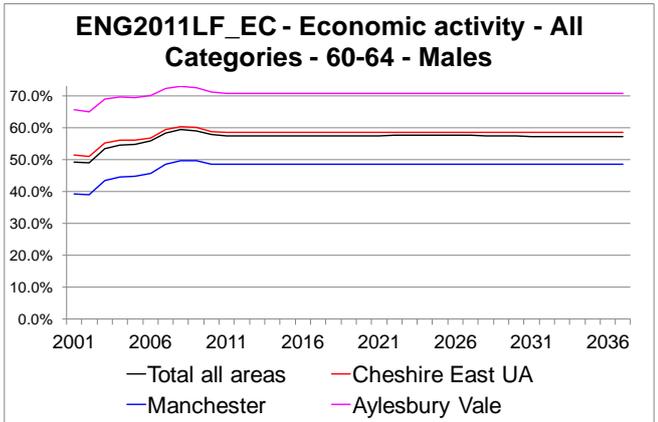
The four scenarios provided in the Data Module are as follows:

- **Constant** – Future rates at each age and sex held constant after the local Census 2011 value. This set of rates is the ‘default’ set – which is automatically run by the data module and which you explored in the previous section.
- **EC** – The trend for the UK from European Commission 2015 Ageing Report, starting from the District’s 2011 Census economic activity.

- **OBR** – The trend for the UK from the Office for Budget Responsibility 2015 Fiscal Sustainability Report, starting from the District’s 2011 Census economic activity.
- **Overall1PCTIncrease** – Increase rates gradually at each age and sex by 1% altogether between 2011 and 2021, in effect altering the total economic activity without consideration of age and sex differences. After 2021 the rates remain constant.

An Appendix in this guide gives details of the data used for these scenarios. The instructions here are to run them and record the results.

Action: Implement the European Commission scenario provided with the Data Module	POPGROUP view
<p>From your input folder, open the DFScenario file for the European Commission projection of economic activity.</p>	
<p>You do not need to change anything here. Note:</p> <ul style="list-style-type: none"> • The scenario identifier indicates it is the EC projection • The default folders are those that you chose • The economic activity rates are those of the EC projection • The population forecasts are an official projection. 	
<p>Click at the top of the sheet:</p> <div style="text-align: center; margin-top: 10px;">  </div>	<p>You may be warned that:</p> <p>All other Excel files that are open will be closed without saving (if this is a problem, click <i>'Cancel'</i> and save those files).</p> <p>The forecast will be run, the results saved, and the Reporter file left open.</p> <p><i>If this is your first labour force forecast in Derived Forecasts, congratulations!</i></p>

Action: Explore the results, record the forecast total labour force	POPGROUP view																																													
<p>The DFReporter file is left open after running a forecast.</p> <p>Click: </p> <p>Provide a name for the new sheet, which the report will be saved onto, e.g. 'Default'.</p> <p>Make a note of the total Labour Force in 2037 in 'Your Answers' on page 34.</p> <p>The 2011 value should be the same as in the forecast with constant rates, but this forecast with EC rates will be different after 2011.</p>	 <table border="1"> <thead> <tr> <th colspan="5">Derived Forecasts Summary Report</th> </tr> <tr> <th colspan="5">Labour Force - All Persons - All Ages</th> </tr> <tr> <th colspan="5">Total all areas</th> </tr> <tr> <th>Category of Labour Force</th> <th>2001</th> <th>2002</th> <th>2003</th> <th>2037</th> </tr> </thead> <tbody> <tr> <td>Total</td> <td>440,499</td> <td>448,949</td> <td>457,933</td> <td>467,111</td> </tr> <tr> <th colspan="5">Cheshire East UA</th> </tr> <tr> <th>Category of Labour Force</th> <th>2001</th> <th>2002</th> <th>2003</th> <th>2037</th> </tr> <tr> <td>Total</td> <td>176,505</td> <td>178,203</td> <td>180,176</td> <td>181,444</td> </tr> <tr> <th colspan="5">Manchester</th> </tr> </tbody> </table>	Derived Forecasts Summary Report					Labour Force - All Persons - All Ages					Total all areas					Category of Labour Force	2001	2002	2003	2037	Total	440,499	448,949	457,933	467,111	Cheshire East UA					Category of Labour Force	2001	2002	2003	2037	Total	176,505	178,203	180,176	181,444	Manchester				
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<p>From the Charter sheet, change the options to ask for a time series of Male age 60–64, and save the chart (as you did in the last Section).</p> <p>The EC projection is quite flat for elderly ages, which is not that different to the scenario with constant future rates.</p>	 <table border="1"> <caption>ENG2011LF_EC - Economic activity - All Categories - 60-64 - Males</caption> <thead> <tr> <th>Year</th> <th>Total all areas</th> <th>Cheshire East UA</th> <th>Manchester</th> <th>Aylesbury Vale</th> </tr> </thead> <tbody> <tr> <td>2001</td> <td>~50%</td> <td>~52%</td> <td>~40%</td> <td>~65%</td> </tr> <tr> <td>2006</td> <td>~50%</td> <td>~55%</td> <td>~45%</td> <td>~68%</td> </tr> <tr> <td>2011</td> <td>~50%</td> <td>~58%</td> <td>~48%</td> <td>~70%</td> </tr> <tr> <td>2016</td> <td>~50%</td> <td>~58%</td> <td>~48%</td> <td>~70%</td> </tr> <tr> <td>2021</td> <td>~50%</td> <td>~58%</td> <td>~48%</td> <td>~70%</td> </tr> <tr> <td>2026</td> <td>~50%</td> <td>~58%</td> <td>~48%</td> <td>~70%</td> </tr> <tr> <td>2031</td> <td>~50%</td> <td>~58%</td> <td>~48%</td> <td>~70%</td> </tr> <tr> <td>2036</td> <td>~50%</td> <td>~58%</td> <td>~48%</td> <td>~70%</td> </tr> </tbody> </table>	Year	Total all areas	Cheshire East UA	Manchester	Aylesbury Vale	2001	~50%	~52%	~40%	~65%	2006	~50%	~55%	~45%	~68%	2011	~50%	~58%	~48%	~70%	2016	~50%	~58%	~48%	~70%	2021	~50%	~58%	~48%	~70%	2026	~50%	~58%	~48%	~70%	2031	~50%	~58%	~48%	~70%	2036	~50%	~58%	~48%	~70%
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<p>If you wish, explore other options from the reporter file.</p> <p>Save the reporter file so that your reports and charts are not lost. You can keep it with the same name, and add to the reports and charts at a later time.</p>																																														

Now implement the other two prepared projections.

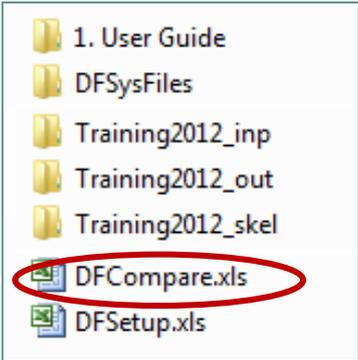
<p>Action: Implement the Office for Budget Responsibility scenario and the Steady increase scenario provided with the Data Module</p>	<p>POPGROUP view</p>
<p>From your input folder, open the DFScenario file for the Office for Budget Responsibility projection of economic activity.</p> <p>As before, run the scenario using</p> <div style="text-align: center; margin: 10px 0;"> Run Model </div> <p>Record the size of the Labour Force in 2037, in 'Your Answers'.</p> <p>Make the chart for Males 60–64, it is not as flat as the EC projection.</p> <p>Look at any other reports and charts if you wish.</p> <p>Save the Reports file.</p>	<div style="border: 1px solid black; padding: 5px;"> <ul style="list-style-type: none"> DFPop_ONS2012 DFRates_Constant DFRates_EC DFRates_OBR DFRates_Overall1PCTIncrease DFScenario_ENG2011LF_Constant DFScenario_ENG2011LF_EC DFScenario_ENG2011LF_OBR <li style="border: 2px solid red; border-radius: 10px; padding: 2px;"> DFScenario_ENG2011LF_Overall1PCTIncrease </div> <div style="text-align: center; margin-top: 10px;"> <p>ENG2011LF_OBR - Economic activity - All Categories - 60-64 - Males</p> </div>
<p>Repeat the actions for the final prepared scenario, which increases economic activity by 0.1% at every age for each year after 2011 up to 2021, and then remains constant.</p> <p>Record the size of the Labour Force in 2037, in 'Your Answers'.</p> <ul style="list-style-type: none"> ● Make the chart for Males 60–64. A 1% increase for this age-sex group is probably small compared to the change in the previous years. ● Look at any other reports and charts if you wish. ● Save the Reports file. 	<div style="text-align: center; margin-top: 10px;"> <p>ENG2011LF_Overall1PCTIncrease - Economic activity - All Categories - 60-64 - Males</p> </div>

6 Compare Scenarios

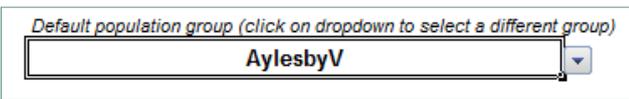
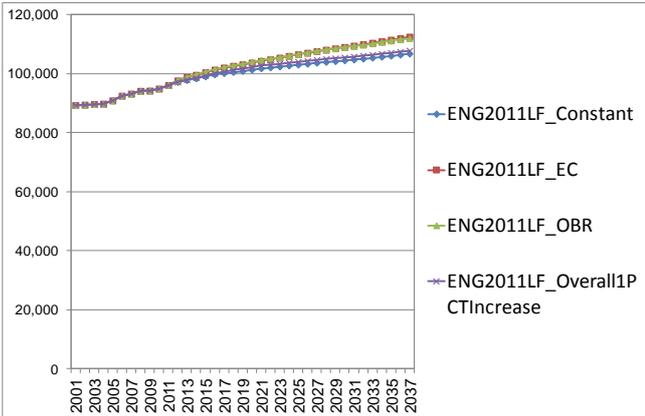
This Section uses Derived Forecasts’ **DFCompare** file to compare the results from different projections.

When you have completed any part of Section 5, you will have created a new projection. Each projection has a scenario file with its identifier. The identifier is used to name the output files from that projection. The output files from all the projections are collected in the Derived Forecasts output folder. There will be a new folder to collect output files only when you create a new model for other areas, or use a different base year, or refer to an output other than the labour force.

The **DFCompare** file is intuitive to use. If you have used it for household projections, its functioning with labour force forecasts is exactly the same. The steps below get you started.

Action: Load selected projections into DFCompare and analyse the results	POPGROUP view
<p>Go to the folder ‘2. DF.’</p> <p>It will probably contain sub-folders and files like those pictured (but your folders will carry the name you gave as your model ID).</p> <p>Open DFCompare</p>	

Action: Load selected projections into DFCompare and analyse the results	POPGROUP view				
<p>There will be no summary files listed.</p> <p>Double click the cell next to <i>'Output folder to search'</i>, go to the output folder of your model, click <i>'OK'</i>.</p> <p>Click:</p> <div data-bbox="365 562 520 633" style="border: 1px solid black; background-color: #0056b3; color: white; text-align: center; padding: 2px; width: fit-content; margin: 0 auto;">Refresh list</div> <p>You can delete any projections you do not want to compare on this occasion.</p>	<div data-bbox="727 331 1369 593" style="border: 1px solid black; padding: 5px;"> <p style="text-align: right; font-size: small; color: blue;">double click to browse for another folder</p> <p>Output folder to search: C:\Forecast\2_DFAV-CE-McrLF_out\</p> <hr/> <p>List of derived forecast files in the nominated output folder</p> <table border="1" style="width: 100%; border-collapse: collapse; font-size: small;"> <tr><td><i>DFForecastTotal_ENG2011LF_Constant.xls</i></td></tr> <tr><td><i>DFForecastTotal_ENG2011LF_EC.xls</i></td></tr> <tr><td><i>DFForecastTotal_ENG2011LF_OBR.xls</i></td></tr> <tr><td><i>DFForecastTotal_ENG2011LF_Overall1PCTIncrease.xls</i></td></tr> </table> </div> <p style="margin-top: 10px;">:Total any Refresh list</p> <p>Notice that Derived Forecasts finds all the DFForecastTotal output files. It does not use the results for each age group separately.</p> <p>It has the forecasts in alphabetical order, not the order you produced them in.</p> <p>DFCompare extracts the summary output from those files.</p>	<i>DFForecastTotal_ENG2011LF_Constant.xls</i>	<i>DFForecastTotal_ENG2011LF_EC.xls</i>	<i>DFForecastTotal_ENG2011LF_OBR.xls</i>	<i>DFForecastTotal_ENG2011LF_Overall1PCTIncrease.xls</i>
<i>DFForecastTotal_ENG2011LF_Constant.xls</i>					
<i>DFForecastTotal_ENG2011LF_EC.xls</i>					
<i>DFForecastTotal_ENG2011LF_OBR.xls</i>					
<i>DFForecastTotal_ENG2011LF_Overall1PCTIncrease.xls</i>					
<p>Click:</p> <div data-bbox="357 999 517 1070" style="border: 1px solid black; background-color: #0056b3; color: white; text-align: center; padding: 2px; width: fit-content; margin: 0 auto;">Get data from workbooks</div> <p>You will get a message <i>'No aggregate categories selected – do you want to continue?'</i></p> <p>Click OK: this is not relevant to us because there is only one category of economic activity.</p>					
<p>Click:</p> <div data-bbox="367 1397 513 1469" style="border: 1px solid black; background-color: #0056b3; color: white; text-align: center; padding: 2px; width: fit-content; margin: 0 auto;">Produce Summaries</div> <p>Derived Forecasts will collect all the results, and sheets will appear on DFCompare for:</p> <ul style="list-style-type: none"> • documentation (<i>'Notes'</i>) • results (<i>'Pivot Tables'</i> – do not change these) <p>charts for the <i>'Economic activity'</i> and for <i>'Total'</i> – both are the same and refer to the total labour force.</p>					

Action: Load selected projections into DFCompare and analyse the results	POPGROUP view
<p>Still on the '<i>Menu</i>' sheet, click on the cell for the '<i>Default population group</i>'. If you have more than one area, choose the area to show by default on all the charts.</p>	
<p>Move to the '<i>Total</i>' sheet and check that the different projections make sense to you.</p> <p>In the example opposite for Aylesbury Vale, the four forecasts are the same up to 2011. Your area(s) will of course be different to Aylesbury Vale, and the scale may be different too. The data are from the 2001 and 2011 Censuses.</p> <p>The projections for Constant rates and 1pct increase are lower than the projections from the EC and OBR.</p> <p>Your own area may look different after 2011 from the example. Although in this projection the assumption for each area is one of constant future economic activity at each age, the projection depends on (a) the local level of economic activity; and (b) the future age structure of the population (which is not the same for each area).</p>	<p>Chart of projected total labour force: Aylesbury Vale</p>  <p>The chart has been edited to increase the size of the labels before copying to this Guide. All POPGROUP output files are unprotected so that they can be edited.</p>

7 Further Scenarios for the Labour Force

In this Section you will change the assumptions of the labour force projections, making new forecasts of your own. The first and largest part focuses on changing the assumptions about future economic activity, while the second part shows how to change the population forecast. As already discussed (in Section 4.4 above), future economic activity and future population between them determine the future labour force. Every change in the labour force can be usefully understood as having two components: the effect of changing population, and the remainder due to changing economic activity. The Derived Forecasts software provides this decomposition in a table within its Reporter, as described in the third part of this Section.

	Skeleton Files
<p>As in POPGROUP, Derived Forecast models include a folder of empty skeleton files, one of each type, for the user to fill up and save in the input folder.</p> <p>It is often easier to amend the data in a file that has already been filled and saved in the input folder. This is what we have done for every scenario in this guide.</p> <p>It is a function of the Data Modules to fill empty skeleton files with data from an official or other pre-prepared projection, which the user can amend for their own scenarios.</p>	

7.1. Changing the assumptions about future economic activity rates

An Appendix to this Guide documents the scenarios that you have implemented so far. There is no official government labour force projection for national or local areas. The two projections for the UK as a whole are undertaken by government agencies for specific policy purposes: the OBR for long-term economic forecasting, and the EC for budgetary policy related to ageing. The Appendix makes clear that they do not agree on future trends. This means that a local economic

strategy must argue the case for the particular projection of economic activity rates that it uses, and may make amendments to them. In this section further scenarios are suggested, including the continuation of local changes observed between the last two censuses.

In order to justify a projection of economic activity rates, you may have to consider how each age-sex group differs between the scenarios. The range between different scenarios will show you the possibilities. To choose a main or principal assumption for each age-sex group, you will use local and national economic evidence and that suggests which future is most likely.

7.1.1. How do I amend future economic activity?

The OBR and EC projections of economic activity are recorded in the '*Default*' sheet of the **Rates** file, so that after 2011 the local area follows the movement up or down of the UK projection for each age-sex group.

There are two main ways of amending the projection of economic activity on a **Rates** file:

- 1 Enter or paste new values for economic activity on the '<area>' sheet. For any year where values are entered, they must be entered for every age-sex group.
 - These values will be used in the forecast. The '*Default*' sheet is only referred to for years when the area sheet has no values.
- 2 Enter or paste new values into the '*Default*' sheet.
 - These values will apply to each area in the model, for each year when there are there are no values in the area sheet.
 - The values are not used directly, but the *change* on the '*Default*' sheet is added to the last value given on the area sheet(s).

In both cases, save the file with a new name and document the changes in the '*Notes*' sheet.

There is also an option to forecast based on an annual increment from the first year, documented in the DF reference manual.

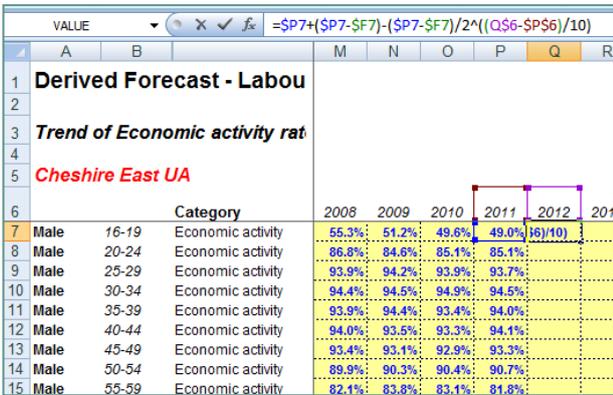
7.1.2. An example of changing the area sheet values: continue change from the 2001–2011 Census with a logistic curve

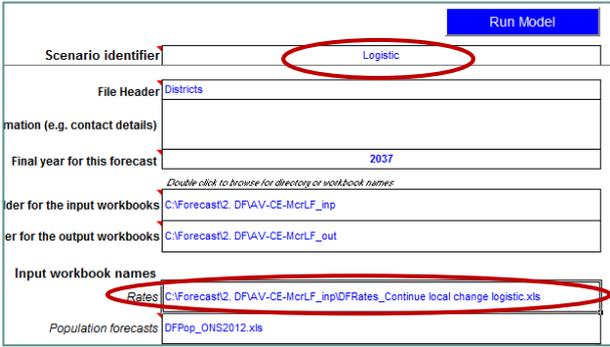
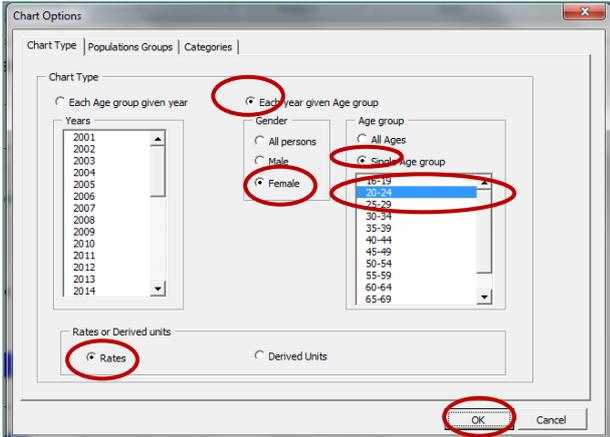
To continue local change you could enter formulae in the area sheets that repeat the change from 2001 to 2011 into the future. This would be *linear extrapolation*. You may feel that the extent of change is not so certain and prefer to lessen it in the future. This Section shows how to implement a particular way of dampening the extrapolation provided by the logistic curve. One of the simpler forms of the logistic curve ensures that the change between two past years is repeated in the long term, but that only half that change is achieved after one time period of the same length. In this example the time period is the ten years from 2001–2011, and the formula is:

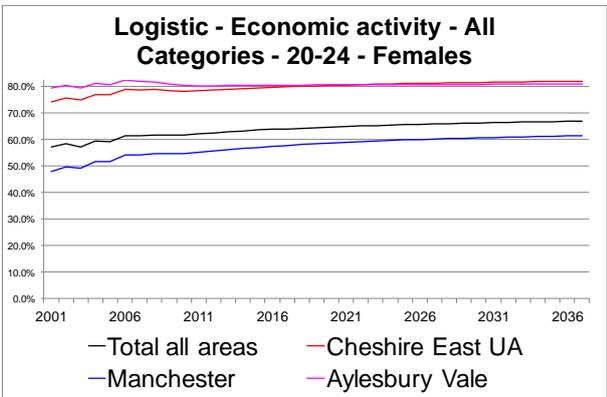
$$EA_Y = EA_{2011} + EA_{2011-2001} - \frac{EA_{2011-2001}}{2^{(Y-2011)/10}}$$

EA_Y is the economic activity in a future year Y, EA_{2011} the activity in 2011, and $EA_{2011-2001}$ the change in economic activity between 2001 and 2011, which may be negative. For example, if economic activity for an age-sex group was 60% in 2001 and 65% in 2011, in 2016 the projected activity would be $65 + 5/2^{1/2} = 66.5\%$, while in 2021 it would be 67.5%.

The following instructions show how to enter that formula in all the area sheets. The instructions below suggest amending the **Rates** file representing no change in activity rates, but could use any of the **Rates** files produced by the Data Module.

Action: Create a Rates file continuing local change with a logistic curve	POPGROUP view
<p>From your input folder, open the DFRates file for the constant economic activity.</p> <p>Save the file with a new name, eg <i>DFRates_Continue local change logistic.xls</i></p>	<p>Note that:</p> <ul style="list-style-type: none"> the '<i>Default</i>' sheet is blank, each of area sheet(s) has the 2001 and 2011 economic activity from the Census and an interpolation for the years between, No data for years after 2011. <p>When there are no data for a year, the previous year is continued unchanged.</p>
<p>If you have more than one area sheet in your file, select them all by clicking on the first area's tab, pressing shift, and clicking on the last area's tab. Each entry you make will now be repeated in each area.</p> <p>Enter the formula for the logistic curve described above, in the first cell of 2012 (it is Q7) in of one of the area sheets:</p> $=SP7+(\$P7-\$F7)-(\$P7-\$F7)/2^{((Q\$6-SP\$6)/10)}$ <p>You can copy and paste this formula to your spreadsheet.</p>	 <p><i>Make sure you use the \$ signs exactly as shown here, so that you can copy the formula to other years and age-sex groups. When you copy the formula, a \$ makes sure that row or column stays the same.</i></p>
<p>Now repeat the formula for all years and age-sex groups:</p> <ul style="list-style-type: none"> Copy the cell you have just made (Q7) Select all the cells from 2012 to 2037 and all the age sex groups (Q7:AP320) Paste formulas. 	
<ul style="list-style-type: none"> Document the change on the '<i>Notes</i>' sheet '<i>Validate</i>' Save the file. 	<p>The <i>Validate</i> button checks that the entries in a workbook are within the allowed values and are consistent with each other. Any errors that are found are listed on the '<i>Notes</i>' sheet, and the user must make corrections before running a forecast.</p>

<p>Action: Run the logistic scenario, view the rates, record the forecast</p>	<p>POPGROUP view</p>
<p>From your input folder, open any of the scenario files, amend it as follows, and run the scenario:</p> <ul style="list-style-type: none"> Change the Scenario identifier, for example to 'Logistic'. Double click the entry for the Rates file, and select the one you have just created. Document the forecast (further down the sheet), e.g. 'Continue local change, repeating half the 2001-2011 change by 2021, and then more slowly.' Click: <div style="text-align: center; margin-top: 10px;">  </div>	 <p>The scenario will be automatically saved after running, named using the scenario identifier.</p>
<p>On the '<i>Reporter</i>' sheet, find the forecast workforce in 2037, and record it under 'Your Answers' on page 34.</p>	<p>The forecast may be higher or lower than those you have recorded so far.</p> <p>The previous scenarios applied the same pattern of future change to each area. This scenario looks at the local change between 2001 and 2011, and continues that change. The impact will be different in each area.</p>
<p>On the '<i>Charter</i>' sheet, show the change over time for one age-sex group:</p> <ul style="list-style-type: none"> Click Change Chart Options Choose '<i>Rates</i>', '<i>Each year given Age group</i>', '<i>Female</i>', '<i>Single age group</i>', '<i>20-24</i>' (or any other age-sex group) Click '<i>OK</i>' Click '<i>Produce Chart</i>'. 	

Action: Run the logistic scenario, view the rates, record the forecast	POPGROUP view
<p>Areas are similar in their change from one census to the next, but any differences will show up in this scenario.</p> <p>Save the chart on the '<i>Charter</i>' sheet, using the button:</p> <div data-bbox="325 562 595 618" style="text-align: center;"> Save New Chart </div> <p>Try other age-sex groups.</p>	 <p>The chart displays four data series over time (2001-2036):</p> <ul style="list-style-type: none"> Total all areas (black line): Starts at ~58% in 2001, rises to ~68% by 2036. Cheshire East UA (red line): Starts at ~75% in 2001, rises to ~80% by 2036. Manchester (blue line): Starts at ~48% in 2001, rises to ~62% by 2036. Aylesbury Vale (purple line): Starts at ~78% in 2001, rises to ~82% by 2036.

You may wish to view how all the age-sex groups change in a single area, on the same chart. The Charter does not have this facility, but you can easily make a chart in an Excel file that uses the data from the Rates file you have made.

You may notice that for any age-sex group, areas differ in 2001 and 2011 but the pattern between 2001 and 2011 is very similar. This is because the change between the two censuses was estimated from national change (see the Appendix for details).

7.1.3. An example of changing the Default sheet: use the average of the EC and OBR projections

In this example, only the default sheet will be changed.

When there are alternative scenarios suggested and it is not clear which is better, it can be sensible to choose the average of more than one. This has the advantage of ensuring that the most extreme errors in a scenario will be reduced. However, if one scenario is clearly agreed to be poorer than another for particular age-sex group then it should not be used even in an average for that age-sex group, because it will make the forecast worse.

The average of assumptions that have already been prepared on **DFRates** files can be easily calculated with a formula in a new **DFRates** file, and used in a new scenario, as in the instructions below.

Action: Average the OBR and EC economic activity rate projections	POPGROUP view																								
<p>From your input folder, open the DFRates file for the EC.</p> <p>Save the file with a new name, e.g. DFRates_AverageEC-OBR.xls</p> <p>Open the EC rates file again, and the OBR rates file.</p>	<p>The following steps will be easier if you close other Excel files now, leaving only these three open.</p>																								
<p>Go back to the AverageEC-OBR file.</p> <p>On the 'Default' sheet, in the cell for the first age-sex group in 2001 (cell F7), type the formula for an average of the OBR and EC values:</p> <p>=AVERAGE([DFRates_EC.xls]Default!F7,[DFRates_OBR.xls]Default!F7)</p> <p>Then:</p> <ul style="list-style-type: none"> • Copy cell F7 • Select all the cells in the worksheet, 'F7:BC32' • Paste Formulas. <p>You can copy and paste this formula to your spreadsheet.</p>	<div data-bbox="762 667 1369 705" style="border: 1px solid black; padding: 2px;"> <p>f_x =AVERAGE([DFRates_EC.xls]Default!F7,[DFRates_OBR.xls]Default!F7)</p> </div> <table border="1" data-bbox="762 779 1369 896"> <thead> <tr> <th></th> <th>Category</th> <th>Annual Increment</th> <th>2001</th> <th>2002</th> <th>2003</th> <th>2004</th> <th>2005</th> </tr> </thead> <tbody> <tr> <td>7</td> <td>Male 16-19</td> <td>Economic activity</td> <td>64.5%</td> <td>62.3%</td> <td>60.9%</td> <td>60.4%</td> <td>60.0%</td> </tr> <tr> <td>8</td> <td>Male 20-24</td> <td>Economic activity</td> <td>81.7%</td> <td>83.3%</td> <td>81.6%</td> <td>81.5%</td> <td>82.0%</td> </tr> </tbody> </table> <p>Tip, if you are not used to formulae in Excel referring to other worksheets:</p> <ul style="list-style-type: none"> • Type in cell F7: =average(• navigate to F7 on the EC file, click on it • type a comma • navigate to F7 on the OBR file, click on it • type the closing bracket • press Return • Delete the \$ signs. 		Category	Annual Increment	2001	2002	2003	2004	2005	7	Male 16-19	Economic activity	64.5%	62.3%	60.9%	60.4%	60.0%	8	Male 20-24	Economic activity	81.7%	83.3%	81.6%	81.5%	82.0%
	Category	Annual Increment	2001	2002	2003	2004	2005																		
7	Male 16-19	Economic activity	64.5%	62.3%	60.9%	60.4%	60.0%																		
8	Male 20-24	Economic activity	81.7%	83.3%	81.6%	81.5%	82.0%																		
<ul style="list-style-type: none"> • Document the change on the 'Notes' sheet • 'Validate' • Save the file. 																									
<p>Open a scenario, and run as you have run other scenarios:</p> <ul style="list-style-type: none"> • Change the Scenario ID, the Rates file, documentation and run the forecast 	<p>Record the results in 'Your Answers'.</p>																								

The same approach can be taken to:

- Average more than two scenarios
- Use the maximum or minimum of two or more scenarios.

7.2. An alternative scenario of population change

All the labour force projection scenarios in previous Sections have used the official sub-national population projections from the 2012-based round (2011 in Wales). There will often be different scenarios of future population to reflect more up to date information. You may have population scenarios with different assumptions for migration, fertility or mortality.

The 2014-based official projections were due in only a few months when this was written. Those who have those projections may benefit from using them throughout this Guide. To do so, complete this Section after Section 4 and before Section 5. In the rest of the Guide, always use the new official projections.

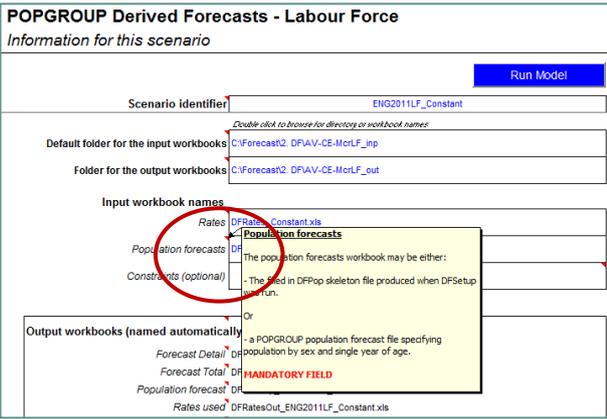
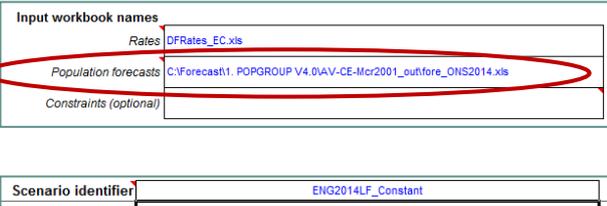
There are four ways to easily produce labour force projections based on a different population projection. Use whichever seems simplest for you. If the only output you need is the total labour force, then the fourth option is probably suitable.

1. Amend the Derived Forecasts input file **DFPop** directly. If the population projection has been produced outside POPGROUP, copy its results into this input file, document and save.
2. Load a POPGROUP population forecast into a **DFPop** file using the option on the **DFPop** 'Notes' sheet. The population forecast must start in a year the same as or before the Derived Forecast's first year, 2001. Document and save this input file.
3. Name a POPGROUP population forecast in the **DFScenario** file when running the labour force projection. The population forecast must start in a year the same as or before the Derived Forecast's first year, 2001. This is simpler than option 2.
4. Unlike the first three options which run Derived Forecasts with a new population input file, you can also run POPGROUP and ask that DF be run in the background. Name the **DF Rates** file in a POPGROUP scenario on its '*Constraints_and_impacts*' sheet. POPGROUP will then run DF in the background, and provide on its **comp** output file the total labour force. No information about economic activity rates or the labour force at different ages will be presented in the **comp** file. The population forecast must start in a year the same as or *after* the Derived Forecast's first year. This is often the method used when the interest is only the projected total labour force.

If the labour force projections start at a date (eg. 2001) earlier than the population projections (e.g. 2012), only method 4 is available. If the user is prepared to enter population estimates for

earlier years (in the example, 2001-2011), Method 1 can also be used. Alternatively, a population model starting in 2001 can be created from one starting in 2012, for example using the Data Module **MYEandChange** to enter past mid-year estimates, and the utility **JoinPOPGROUPmodels** to add the projection from 2012.

To complete the following activity for this Section, choose one population projection that you have created with the same areas as used for labour force projections, and the same or earlier start year than 2001. In **DFScenario**, name the output file that begins **fore_**.

Action: See the labour force implications of a different population projection, within Derived Forecasts	POPGROUP view
<p>Open the DFScenario file for the projection with Constant rates.</p> <p>Move the cursor over the red triangle next to <i>'Population forecasts'</i>, to see the options available. The comments behind red triangles are a source of help on all POPGROUP files.</p> <p>Double click on the cell next to <i>'Population forecasts'</i>, and navigate to your folder of POPGROUP output files that has the projection you wish to use.</p>	 <p>POPGROUP Derived Forecasts - Labour Force Information for this scenario</p> <p>Scenario identifier: ENG2011LF_Constant</p> <p>Default folder for the input workbooks: C:\Forecast2_DFAV-CE-McrLF_inp</p> <p>Folder for the output workbooks: C:\Forecast2_DFAV-CE-McrLF_out</p> <p>Input workbook names:</p> <ul style="list-style-type: none"> Rates: DFRates_Constant.xls Population forecasts: Population forecasts (selected) Constraints (optional): <p>Output workbooks (named automatically):</p> <ul style="list-style-type: none"> Forecast Detail: DFForecastDetail.xls Forecast Total: DFForecastTotal.xls Population forecast: DFPopulationForecast.xls Rates used: DFRatesOut_ENG2011LF_Constant.xls
<p>Choose the fore_ output file from the projections you wish to use.</p> <ul style="list-style-type: none"> Change the Scenario Identifier Amend the notes Run the projection. <p>Record the size of the labour force in 2037 and the change 2011-2037.</p>	 <p>Input workbook names:</p> <ul style="list-style-type: none"> Rates: DFRates_EC.xls Population forecasts: C:\Forecast1_POPGROUP V4.0\AV-CE-Mcr2001_outfore_ONS2014.xls Constraints (optional): <p>Scenario identifier: ENG2014LF_Constant</p>

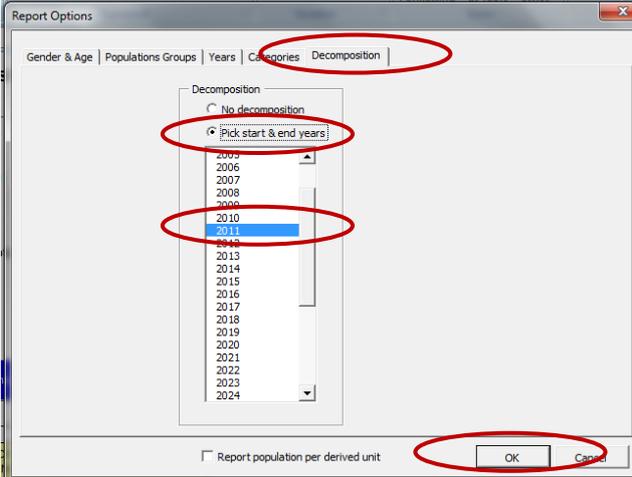
7.3. Decomposition of change in the labour force: population and economic activity rate effects

There is a useful facility on the Reporter output file that tells what the forecast would have been without any change in economic activity rates. This is the ‘Population effect’ on the future labour force. The remaining change is labelled the ‘Economic activity rates effect’.

This facility will help you to answer the following questions:

- How much of the projected labour force change is due only to the changing population?
- How much is the labour force forecast to change due to the changing economic activity rates?

You will see that this facility is easy to use and by answering the above questions it provides the results from the ‘constant rates’ projection that was run first in this guide. It also provides the change in workforce between two years.

Action: Use the decomposition analysis in a Reporter file	POPGROUP view
<p>From your output folder, open the DFReporter file for the OBR file. It will be called something like</p> <p>DFReporter_ENG2011LF_OBR.xls</p>	<p>There are a lot of output files, referring to each of the forecast scenarios you have run so far.</p> <p>They are all available for viewing and using in other applications.</p>
<p>Click:</p> <div data-bbox="320 1339 627 1435" style="border: 1px solid black; background-color: #0056b3; color: white; padding: 5px; text-align: center; width: fit-content; margin: 10px auto;"> Change Report Options </div> <p>Use the ‘<i>Decomposition</i>’ tab to ‘<i>Pick start & end years</i>’.</p> <p>Use the Ctrl key to highlight just 2011 and 2037, before clicking ‘<i>OK</i>’. Produce the report, giving the sheet a recognisable name, such as <i>Decomp2011-37</i>.</p>	

Action: Use the decomposition analysis in a Reporter file	POPGROUP view																																													
<p>The results show how population change and economic activity change both contribute to change in the labour force. Record the results in the 'Your Answers' section</p> <p>The '<i>population effect</i>' is change in the labour force if there were only population change and no change in economic activity. This should be the same as was forecast in the first labour force projection you ran.</p> <p>Check this is the case, by matching it with 'Your answers' from the 'Constant rates' scenario.</p> <p>Expected changes in the size of the child and elderly populations will hardly affect the labour force, because economic activity is zero or very low for those ages.</p>	<table border="1"> <thead> <tr> <th data-bbox="762 315 788 342">22</th> <th colspan="4" data-bbox="788 315 1375 342">Decomposition of Change</th> </tr> <tr> <th data-bbox="762 342 788 369">23</th> <td colspan="4" data-bbox="788 342 1375 369"></td> </tr> <tr> <th data-bbox="762 369 788 396">24</th> <th colspan="4" data-bbox="788 369 1375 396">2011 - 2037</th> </tr> <tr> <th data-bbox="762 396 788 423">25</th> <th data-bbox="788 396 1107 423"></th> <th data-bbox="1107 396 1203 423"><i>Population Effect</i></th> <th data-bbox="1203 396 1315 423"><i>Rate Effect</i></th> <th data-bbox="1315 396 1375 423"><i>Change</i></th> </tr> <tr> <th data-bbox="762 423 788 450">26</th> <td data-bbox="788 423 1107 450">Total all areas</td> <td data-bbox="1107 423 1203 450">35,009</td> <td data-bbox="1203 423 1315 450">29,755</td> <td data-bbox="1315 423 1375 450">64,765</td> </tr> <tr> <th data-bbox="762 450 788 477">27</th> <td colspan="4" data-bbox="788 450 1375 477"></td> </tr> <tr> <th data-bbox="762 477 788 504">28</th> <td data-bbox="788 477 1107 504">Cheshire East UA</td> <td data-bbox="1107 477 1203 504">-11,259</td> <td data-bbox="1203 477 1315 504">10,637</td> <td data-bbox="1315 477 1375 504">-621</td> </tr> <tr> <th data-bbox="762 504 788 530">29</th> <td data-bbox="788 504 1107 530">Manchester</td> <td data-bbox="1107 504 1203 530">35,626</td> <td data-bbox="1203 504 1315 530">13,328</td> <td data-bbox="1315 504 1375 530">48,954</td> </tr> <tr> <th data-bbox="762 530 788 557">30</th> <td data-bbox="788 530 1107 557">Aylesbury Vale</td> <td data-bbox="1107 530 1203 557">10,642</td> <td data-bbox="1203 530 1315 557">5,790</td> <td data-bbox="1315 530 1375 557">16,432</td> </tr> </thead> </table> <p>In this example, the effect of population change is to reduce the workforce in one district but to increase it in the others. This reflects the districts' different rates of growth in their population at working ages.</p> <p>In contrast, the impact of the projection of economic activity rates according to the OBR has the effect of increasing the labour force in each area.</p>	22	Decomposition of Change				23					24	2011 - 2037				25		<i>Population Effect</i>	<i>Rate Effect</i>	<i>Change</i>	26	Total all areas	35,009	29,755	64,765	27					28	Cheshire East UA	-11,259	10,637	-621	29	Manchester	35,626	13,328	48,954	30	Aylesbury Vale	10,642	5,790	16,432
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8 Your Answers

Use this section to record answers for each of your area(s). Write the area names in the column headings.

Section	Area 1	Area 2	Area 3	Area 4
4.2 Projection with constant economic activity rates				
Age group with largest number of workers				
Total labour force 2011				
Total labour force 2037				
Change 2011-37 (use a calculator)				
5.1 Projection with European Commission economic activity rates				
Total labour force 2037				
Change 2011-37 (use a calculator)				
5.1 Projection with Office for Budget Responsibility economic activity rates				
Total labour force 2037				
Change 2011-37 (use a calculator)				
5.1 Projection with increase of 1% in economic activity 2011-2021				
Total labour force 2037				
Change 2011-37 (use a calculator)				
7.1.2 Local change continued – logistic extrapolation				
Total labour force 2037				
Change 2011-37 (use a calculator)				
7.1.3 Average of OBR and EC assumptions				
Total labour force 2037				
Change 2011-37 (use a calculator)				
7.2 Alternative population projection				
Total labour force 2037				
Change 2011-37 (use a calculator)				
7.3 Decomposition of change in labour force 2011-2037 for thescenario				
Change due to population forecast				
Change due to activity rates forecasts				
Total change in labour force				

9 Common Problems



Message 'Cannot run the Macro' or similar

POPGROUP works in Excel by using programs known as 'macros'. After installation you must follow the instructions in the manual to enable macros and trust access to Visual Basic. Otherwise, POPGROUP cannot work and you will receive error messages.

If you do not have the manual, contact popgroup@edgeanalytics.co.uk.



I get a Windows error

Occasionally there will be a Windows error. Usually it is unclear why it has happened. Coming out of Excel and starting the task again will usually solve the problem. Occasionally after an error, you will be left with a window with program code. Again, close that window and Excel, and try again. These occasional errors are inevitable with a complex program working on many different operating environments, and are not unique to POPGROUP.

If an error occurs more than once, note what happened (take a screen shot if you can), and email details to popgroup@edgeanalytics.co.uk.

10 Next Steps

POPGROUP is a versatile tool for analysis of population dynamics. The 'How to...' Guides currently expected in this series are:

1. How to get started with population projections
2. How to get started with household projections
3. How to get started with labour force projections
4. How to create population projections led by a plan for house-building
5. How to create population projections led by an economic plan for jobs
6. How to integrate population, housing and labour force projections.

Section 7.2 mentioned how Derived Forecasts can be run in the background when making a population projection with POPGROUP, to give the total workforce implied by the future population. Guides 5 and 6 will describe in detail how to use the two software Modules together, including the relationship between labour force and jobs, and how to model the impact of an economic plan by including a target future number of jobs as a constraint.

Derived Forecasts is very flexible software that can make models for projecting any characteristics strongly related to age and sex. This flexibility is bypassed in this User Guide because we are using Data Modules that configure Derived Forecasts to set up the model with pre-selected options. The flexibility when setting up a Derived Forecast is described in its manual that comes with the software and is available from popgroup@edgeanalytics.co.uk.

That flexibility could be used to develop a model with single years of age between 55 and 69, if assumptions were developed in that detail for alternative impacts of the changing pension age. Both the EC and OBR work which has been used in this User Guide were developed with models of single years of age. Data for economic activity by single year of age are seldom available for

local areas and for this reason five-year age groups have been used, with aggregate data from the EC and OBR work.

The current lack of an official projection of the labour force suitable for local planning puts pressure on local planners to come up with suitable and defensible assumptions about likely levels of future economic activity. A range of policies relating to education, welfare benefits, investment and pensions can be expected to affect economic activity. It is advisable to implement a range of plausible values of future economic activity, and plan according to a likely outcome and the uncertainty.

Some users make forecasts for areas smaller than local authorities, for example for electoral wards or for service areas. Methods developed for small areas are documented and available from popgroup@edgeanalytics.co.uk. The NRS has its own [advice and guide](#) for small areas in Scotland.

Appendix A: Documentation of the four scenarios provided with the Data Module

A review of trends in economic activity and options for making labour force projections can be found in the following report and its references: [CMIST Working Paper 2015-04: National and local labour force projections for the UK](#). That review informed the scenarios used in the Data Module. This appendix describes the data used, and summarises the differences between the OBR and EC projections of economic activity.

The scenarios are:

- **Constant** - Future rates at each age and sex held constant at the local Census 2011 value. This set of rates is the 'default' set – which is automatically run by the data module and which you explored in the previous section.
- **EC** – The trend for the UK from the European Commission 2015 Ageing Report, from which detailed data are available on request. The projected UK changes are applied to the District's 2011 Census economic activity.
- **OBR** – The trend for the UK from the Office for Budget Responsibility 2015 Fiscal Sustainability Report, held in the file Labour market participation rates by age and gender - Fiscal sustainability report 2015 published 5th November 2015. The projected UK changes are applied to the District's 2011 Census economic activity.
- **Overall1PCTIncrease** – Increase rates gradually at each age and sex by 1% altogether between 2011 and 2021, in effect altering the total economic activity without consideration of age and sex differences.

Each of the four scenarios includes the local district data for 2001 and 2011, and interpolation for the intervening years 2002–2010. The interpolation for each district follows the UK annual changes in those years, but where the local change from 2001 to 2011 is different from the UK, a tenth of that difference is added each year. Data for 75+ for 2001 have not been released, and have been estimated here by taking the UK change for 75+ economic activity from the local 2011 value.

Data from the Labour Force Survey (LFS) for each district are available from NOMIS but have sample errors for age-sex groups which are too large to be of use in monitoring annual trends.

These data for local areas have not been used in the data module but may be of help to users to understand their locality.

The EC and OBR trends for the UK are applied to each district's values from 2011. For example, if the OBR projects an increase of 1 percentage point in the activity rate for 60-64 year old men between 2011 and 2020, then the local activity rate for 60-64 year old men in 2020 is projected by adding 1% to the local activity rate for 2011.

Users may wish to consider whether the social composition or other characteristics of a local area will affect its future economic activity. A change in economic activity for the UK may be likely to be focused more on some groups than others.

The OBR scenario has the data released online in November 2015 by the OBR and used in its **2015 Fiscal Sustainability Report** for the UK. Rates for age 16-19 were not provided by OBR for 2009-2019 and have been estimated as follows: 2009-2014 are taken from Eurostat's estimates from the LFS, and 2015-2019 interpolated between the 2014 value and the 2020 projected value provided by the OBR.

The EC scenario has Eurostat data for the UK from the LFS for 2001-2012, before its own projection from 2013 onwards (**European Commission DG Economic and Financial Affairs 2015 Ageing report**, data available on request). 75+ is not included in the EC projections, and has been estimated here by applying the ratio of 75+ to 70-74, averaged from estimates 2008-2014.

The EC and OBR differ not only in their future trend, but in their values for UK economic activity in past years from 2001. Although all have been taken from the LFS, both EC and OBR differ slightly from past values provided by NOMIS. These differences are likely to be due to (a) their treatment of the institutional population, (b) the exact twelve month period taken to represent a year, (c) the use of Annual Population Survey data in addition to the LFS, or (d) the weighting of activity rates for single years of age when computing rates for age-groups: documentation is insufficient to explain which of these account for the differences.

Sample error also affects the estimates for the UK from the LFS; age-sex groups have 95% confidence intervals of up to 1 percentage point either side of the estimate.

The differences between the OBR and EC projections of economic activity are considerable in some age groups. They can be summarised as follows:

- For the age-group 16-19 which is most affected by participation in education, both OBR and EC project no or very little change compared to the descent in economic activity experienced in the 2000s.
- For the age-group 20-24 the series are similar, with EC higher than OBR for females.
- For the age groups 25-29 through to 55-59, when economic activity is at its highest, the EC projection is usually higher than OBR's, particularly after about 2021.
- The OBR calculated their future trend based on data only up to 2008, while the EC used data up to 2013.
- For older ages, 60 and above, the OBR projection is higher than the EC. As well as using different methodologies to consider the impact of rising pension ages, the OBR assumed that female activity rates at older ages would further catch up male rates. In their projection, the amount by which female economic activity rates are currently less than male rates is reduced by one half by about 2035, at each older age.

In choosing whether to amend these standard projections, there is room to consider:

- What local evidence might support either the OBR or EC projection of future economic activity, or a different projection for some age-sex groups?
- Has local economic activity been unusually low relative to the national, and will it catch up – or vice versa has it been unusually high?
- Is future change in economic activity mostly by particular social groups, for example of relatively low or high income, that are disproportionately found or not found in your areas?
- Are there local circumstances that mean the local trend of economic activity at ages 16-19 and 20-24 is likely to be different from assumptions about the UK?

Appendix B: How do labour force forecasts differ from household forecasts?

It may be useful to consider the differences between household and labour force forecasts. Both are forecasts *derived* from a population that has been forecast by age and sex. Both apply rates at each age and sex, but there are significant differences between them. Official projections exist for households but not for the labour force, while the categories and adjustments involved in household projections are more complex than for the labour force, as summarised in this table.

	Household forecasts	Labour force forecasts
Is the population multiplied by proportions at each age and sex?	Yes, household representative rates (England, Scotland) or household membership rates (Wales, N Ireland).	Yes, economic activity rates.
Are there official projections for countries within the UK?	Yes	No, except for the OBR and EC policy-based forecasts for the UK as a whole.
Are there official projections for districts within each country?	Yes	No
Is an adjustment to the forecast population needed?	Yes – the population in communal establishments, i.e. that does not live in households.	Not usually. Some suggest that students should be forecast separately, but that is rarely undertaken.
Are there <i>types</i> of derived unit?	Yes – household types are usually forecast.	No – only the economically active population is usually forecast, although skills levels or other categories could be modelled.
Is the ‘population in each derived unit’ meaningful?	Yes – it is the average household size.	No.
Are there different practical strategies for forecasting in England, Scotland and Wales?	Yes – each country’s official projections take a different approach.	Not yet.