

## **EMPLOYMENT IMPLICATIONS and JOBS-LED FORECASTS**

How the employment constraints work with POPGROUP and Derived Forecasts (and previously LABGROUP)

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### **1. INTRODUCTION.**

The labour force implied by a population forecast and, in the other direction, the population implied by a particular supply of labour force or jobs, are described in the POPGROUP reference manual briefly in sections 3.4 and 3.6. The arithmetic of POPGROUP's calculations is set out in section 6.5 of the reference manual.

The description here explains the link between population, the labour force and jobs in words and in more detail. The link is similar in principle to that between population, households and housing.

Since 2010, the software module Derived Forecasts has all the functionality of the previous LABGROUP. This FAQ has been revised to refer to the files of Derived Forecasts.

### **2. FILES INVOLVED.**

In addition to the population forecast and its input files, information is needed on (a) economic activity rates at each age and sex (file 'DFRates') because not everyone is economically active and (b) the relationship between those economically active and the number of jobs (file 'DFSupply'). This latter file is optional, but needed if a link between population and number of jobs is required. Unemployment and commuting mean that the number of jobs may be more or less than those residents of an area who are economically active.

The DFSupply file requires the user to specify the ratio (labour force)/(employment) as a single factor, or as the two separate elements of unemployment rate and net commuting rate which when combined give the ratio. These can be estimated for each area from the last census or from more recent data when available. See also section 7 below.

### **3. LABOUR FORCE AND JOBS IMPLICATIONS OF A POPULATION FORECAST: NO EMPLOYMENT CONSTRAINT.**

When there is no labour force or jobs constraint, the user can nonetheless ask POPGROUP to calculate the labour force and jobs implied by a population forecast. This is achieved by ticking the box 'Produce labour force impact' on the Scenario file's 'Constraints\_and\_impacts' sheet. An economic activity rate file and an DFSupply file must be specified (the latter is optional, but needed to compute the number of jobs).

After each year of the population forecast, POPGROUP multiplies the population at each age and sex in that year, by the economic activity rates, to give the implied labour force, which is printed at the bottom of the output components file. It uses the information on the DFSupply file to convert the labour force into a number of jobs, which it also prints at the bottom of the output components file.

Without the constraint, POPGROUP is answering the question: "How big will the labour force be and how many jobs will be needed, if things continue as in the past?"

If a housing constraint is included, the labour force impact can still be requested. POPGROUP is then answering the question: "How big will the labour force be and how many jobs will be needed, if population change is led by these housing plans?"

### **4. EMPLOYMENT CONSTRAINTS: IMPLICATIONS FOR A POPULATION FORECAST.**

When a constraint of labour force or jobs is given by the user, POPGROUP works in the other direction to calculate how the migration must be changed in order to meet the constraint: how many more (or fewer) migrants are needed to meet the specified number of jobs (or labour force). Such a forecast is often called a 'jobs-led forecast', just as the use of housing constraints provides a 'housing-led forecast'. The constraint is specified on POPGROUP's 'cons' file, and must be named on the scenario's 'Constraints\_and\_impacts' sheet. The constraint and its impact on population are printed at the bottom of the output components file.

Employment constraints are usually used after a 'trend population forecast' has been prepared, where the migration has been set to the level or trend of past years. The size of the labour force and the number of jobs implied by this trend forecast can be computed, as in the previous point. The interest of planners is then: how would the migration (and therefore the population) be different if the economy provided more or fewer jobs? The planners give a target or planned number of jobs (or an annual change in these) as a constraint.

With an employment constraint, POPGROUP is answering the question: "How big will the population be, if it is led by this supply of employment?" The housing implications can also be requested on the scenario file, but there cannot be a housing and an employment constraint in the same year, because these would conflict.

On the constraints file, the 'change in total derived units' refer to the labour force, and 'change in total supply units' refers to employment (jobs). Either one of these is entered by the user for a specified year. For example, if 500 is specified for 2009 against 'change in total supply units' then the user is saying that in the year mid-2009 to mid-2010 the total number of jobs will increase by 500. This may be more OR less than would have been implied by the trend forecast with no constraint. With a constraint, POPGROUP alters the migration to meet the target.

POPGROUP has a choice of four migration streams to alter. For example, if there are more jobs on the constraint than without it, there needs to be more migration in net terms into the area. This can be met by an increase in local in-migration or an increase in international migration, or a decrease in local out-migration, or a decrease in international out-migration. The choice between these four, or a combination of them, is specified on the scenario file as 'Migration weights' next to each migration file, which must add to 100%. By default the migration weight is 100% on the UK in-migration, but the user may prefer to spread it equally between in- and out- UK migration, 50% on each.

Thus POPGROUP needs to be told several things before it can implement an employment constraint: the economic activity rates, the conversion between labour force and jobs, and the migration flows which should be adjusted, as well as the employment constraint itself.

## **5. EMPLOYMENT CONSTRAINTS: WHAT POPGROUP CALCULATES**

POPGROUP first computes the next year's population without the constraint. It converts this population to employment using the economic activity rates and the ratio of labour force to employment specified on the DFSupply file. POPGROUP then compares the employment implied by this first forecast with the constraint. It now knows what the gap that must be met by altering the migration.

POPGROUP then computes the fraction of a job produced by one migrant. It uses the migration weights specified on the scenario to combine the four migration flows, and then the economic activity rates, and finally the ratio of labour force to employment, to calculate this fraction of a job produced by each migrant on average. It is usually less than one, because some migrants will not be employed (including all children). If there is net out-commuting from the area, then the number of local jobs will be even lower, but this can work in the opposite direction if there is net in-commuting. One can expect that usually the fraction of a job from one migrants will be between 0.4 and 0.7. Put another way, the number of migrants required to fill each job will usually be between 1.5 and 2.5. The actual figure is not output by POPGROUP but can be calculated by the user (see below).

POPGROUP then fills the employment gap to meet the constraint, by adding or deducting as many migrants as are needed according to the migrant calculation just made. These additional migrants (or reduced number) changes the population. This

final, constrained population is used in all the outputs. The change in population caused by having the constraint is printed at the bottom of the output components file.

## **6. HOW MUCH EXTRA POPULATION IS ASSOCIATED WITH EACH JOB (OR EACH ECONOMICALLY ACTIVE PERSON?)**

The previous point explains how POPGROUP calculated the jobs/migrant ratio, and that it is not printed on the output files. The user can calculate the figure by running two forecasts, one with the employment constraint, and one without it.

For any year using a constraint, the output components file will have at the bottom of the components file 'Population impact of constraint'. This can be compared with the impact of the constraint on the employment figure at the end of that same year. The employment figure is also found at the bottom of the components file: subtract the employment for the forecast with constraint from the employment for the forecast without it. (Note that the line that says 'Change in employment' is NOT the difference between constraint and without constraint, but simply the change from the year before.)

For a period longer than a year, the impact of a constraint is more than the sum of the single years, because migrants have children in the subsequent years (and out-migrants' children are no longer there). The impact can again be computed from two forecasts, one with and one without constraint, recording the final population and the final employment.

Note that the proper comparison is between two forecasts at the end of a period in which the forecasts differ only because one has an employment constraint.

## **7. WHAT IS THE RELATIONSHIP BETWEEN JOBS AND THE LABOUR FORCE?**

(a) Is the number of jobs supposed to be a full-time equivalent or all jobs?

This does not matter, so long as the results are interpreted consistently with what is entered in the DFSupply file. Whether the number of jobs is a total or a full-time equivalent, will depend on the data used to compute the conversion factor between labour force and jobs.

(b) Does the labour force refer to full-time equivalent jobs?

No. The economic activity rates in a labour force projection are usually based on the census or a survey in which every person who has a job for a significant number of hours is counted *as well as* those who are unemployed but seeking work. Together these make up the labour force or the economically active or the workforce (equivalent terms). The labour force does not refer to full-time equivalent workers or the number of jobs, but the number of people available for work. Some people in the

labour force will have no job, and others will have more than one job.

(c) What should be put into POPGROUP to state the relationship between labour force and jobs?

POPGROUP allows the user to specify an overall conversion factor or two separate factors in the file lfjobs.xls. The overall factor is (labour force in area / jobs in area). The two factors are for commuting (employed residents in area / jobs in area) and unemployment (unemployed in area / labour force resident in area). Perhaps there should also have been factors for multiple employment and job vacancy rates, since both these mean that the number of jobs may not equal the number of people employed, in addition to commuting and unemployment. If multiple jobs and vacancy rates are significant and can be measured, they should be used to adjust the commuting factor before entering it in lfjobs.xls.

In practice, POPGROUP users will usually compute a single conversion factors as:  
(labour force in the area / jobs in the area).

(d) Where do I get information for the jobs conversion factors?

The best sources for an overall conversion factor will be those that measure labour force and number of jobs in the same year, for the areas that are being forecast or similar areas. It might for example come from the Population Census (using the hours worked to find a number of full-time equivalent jobs), or from the Labour Force Survey and the Annual Business Enquiry.

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