# Resolution Foundation

## *Who Gains from Growth? Living standards in 2020*

**Institute for Employment Research and Institute for Fiscal Studies**
September 2012
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**Report for the Resolution Foundation**

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# Summary

This research has been commissioned by the Resolution Foundation in order to consider how working-age Britons will be affected by the changing employment structure of the UK economy. In particular, it looks at how projected changes in the mix of UK employment up to 2020 (including by gender, occupation, sector and earnings) are likely to affect the absolute and relative economic position of different household income groups.

To understand their prospects to 2020 and beyond, the analysis in this report combines the latest employment projections with a detailed model of the UK tax and benefit system.

The report is therefore built on the most sophisticated modelling yet undertaken in this area and presents a baseline projection of how well-off each group (those reliant on benefits, low to middle income families and higher-income households) can expect to be in 2020: their income, earnings, share of national income and employment prospects. The baseline scenario is a model of what 2020 will look like if Britain remains on its current path and there are no fundamental changes of policy direction.

It should be noted that all the projections in this report rest on GDP forecasts of modest growth to 2015 and of annual average growth of 2.5 per cent from 2015-2020 which, by comparison to more recent forecasts, now look optimistic. The forecasts also assume no additional changes to public spending beyond those announced by the Chancellor's 2011 Autumn Statement (and so don't include, for example, further cuts to welfare spending).

Under the baseline scenario, living standards for working-age households in 2020 are likely to be substantially lower for those in the bottom half of income distribution (the benefit-reliant and LMI groups) than they were for households in the same position a decade earlier. Over the 2008 to 2020 period as a whole, the modelling suggests a decline in real terms income of around 5 percent for low to middle income households and around 19 percent for households reliant on benefits. Only higher income households—those above middle income—see income growth, of around two per cent over the period.

The report suggests that three factors help to explain the overall changes in living standards for the decade ahead:

- Changes in the structure of employment. The UK economy is set to create both more highly skilled jobs at the top and more low skilled jobs at the bottom, while jobs in mid-level occupations are in decline. While these changes in the structure of the labour market are good for most people, they are also set to boost pay far more for higher income households than for those lower down;

- Changes in the way work is spread out between households, with employment or working hours looking likely to grow in higher income households faster than in households with lower incomes;

- Planned changes to the tax-benefit system. Most important is the indexation of benefits and tax credits to the Consumer Prices Index rather than the Retail Prices Index measure of inflation, which will see households that receive support from the state—particularly those with children—fall steadily further behind.

The report draws on lessons from around the world and from past UK experience to consider a number of alternative scenarios which could modify the baseline results. These include: a rise in earnings for the worst-paid; an increase in the share of workers with qualifications coupled with a rise in earnings for those with intermediate qualifications; an increase in the number of women in work; and a combination of all three.

While the report does not recommend specific policies for improving the prospects of low-to-middle income households in 2020, these alternative scenarios give a sense of the scale of impact that can be made by improvements in key areas. The analysis reveals that significant improvements require bold and wide-ranging action; improving our performance in single areas, such as female employment or skills, will not be enough. It also highlights the need for policies aimed at targeting, wherever possible, households on low incomes.

*Who Gains from Growth?* is the result of research carried out for the Resolution Foundation by the Institute for Employment Research and Institute for Fiscal Studies, building on a major piece of work funded by the Joseph Rowntree Foundation (JRF) and the UK Commission for Employment and Skills (UKCES).

This report contributes to the Resolution Foundation's Commission on Living Standards, an independent and wide ranging investigation into the pressures facing people on low to middle incomes. The Commission's final report will be published in the autumn.

## Key Results in Detail

- Total employment is projected to be 32.4 million in 2020. This suggests the creation of something in the order of an extra 1.5 million jobs over the decade
- Increasingly, jobs will tend to be created at the top and bottom of the jobs market – that is, in high-pay/high-skill and low-pay/low-skill employment. Middle-ranking jobs will decline. For example, the overall number of people working in manufacturing is projected to fall from 2.5 million to 2.3 million. The fastest-growing sector will be in the top three occupational classes of managers, professionals and top technicians which can

expect to employ around 14.7 million people in 2020 – up from 12.7 million a decade earlier. At the lower end, growth is expected in low skilled service roles, with more than 700,000 new jobs being created in retail, caring and leisure. Meanwhile, traditional jobs in the middle—from administrative secretarial work to skilled manufacturing—are set to decline.

- Under the baseline scenario, all working-age households below middle income in 2020 will be worse off than those in the same position a decade earlier. A household at the bottom of the low to middle income group[1] in 2008-2009 had an income of £10,600 a year[2]. By 2020-2021, under the baseline, the income of a household in that position falls to £9,000 a year (in 2008/09 prices), a real terms decline of 15 percent. A household at the top of the low to middle income group[3]) would, in the same position, see its income drop from £23,000 per year in 2008-2009 to £22,200 in 2020-2021, a real terms fall of three per cent.

- The share of household income from the state for LMI households is expected to fall substantially. In 2008-2009, around 20 per cent of gross household income in this group came from the state. In 2020-2021 this is projected to fall to 16.4 per cent.

- Household income inequality is expected to increase by 2020. Each of the scenarios for income and earnings in 2020-2021 see increases in most, if not all, measures of income inequality considered. Most of the scenarios which modify the baseline projections reduce the increase in inequality but do not eliminate it. While changes in the jobs market will improve living standards for the majority, they will also increase inequality by boosting the pay of the best-off more than others

- Some alternative scenarios – boosting low wages, improving skills or raising female employment - lead to modest improvements for those in the bottom half of the income distribution. However it is only when all three measures are combined that many people in the bottom half become substantially better off. Under the baseline scenario, the proportion of working age households in 2020 across which incomes have fallen is 52 percent. Under the 'combined action' scenario this figure falls to 22 per cent. Under this scenario, average annual income growth from 2008 to 2020 for the low to middle income group is plus 0.1 per cent rather than minus 0.4 percent in the baseline. This means that annual income for a household situated at the top of the LMI group (on middle income) would be £1,600 higher than under the baseline in 2020.

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[1] Defined as those in decile groups 2-5 of the equivalised working age household income distribution, excluding those who receive more than 50 per cent of their income from tax credits and benefits combined
[2] In this case a couple with no children at the 10th percentile
[3] The 50th percentile

- However, for households at the bottom of the LMI group the picture is much more difficult. Even when all three positive scenarios are combined, the income for a low income household[4] is £10,600 in 2008 and £9,300 in 2020. While this is better than the £9,000 figure in 2020 under the baseline scenario, it represents a drop in income of 12 per cent rather than 15 per cent.

The exploration of various scenarios for earnings and employment illustrates the difficulty in trying to implement policies which are directed at individuals (and especially their earnings) with the objective of improving the situation of households (and especially their incomes). A number of factors complicate the relationship between employment, individual earnings and household incomes, including the fact that:

- Many individuals in the lowest income households are not in work at all, thus increasing earnings does not affect them directly and could mean they fall further behind in the overall distribution of household income as others do better.
- Low earners are not necessarily located in the lowest income households – low earners are found at various points throughout the household income distribution and may be living with some of the highest earners. Therefore improving the situation for low-paid individuals does not only affect low income households.
- The tax and benefit system plays a major role as earnings are a less financially important component of total income in households near the bottom of the income distribution than they are in higher income households. In addition, increasing earnings for low-income households can result in the withdrawal of benefits or tax credits.

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[4] At the 10th percentile

# 1.    Introduction

This project has been sponsored by the Resolution Foundation in order to consider the implications of the changing employment structure of the UK economy for working-age families, especially people living on low-to-middle incomes (LMIs).  In particular, it looks at the way in which projected changes in the mix of UK employment by various dimensions (such as gender, occupation and sector) and earnings trends by such dimensions will impact on the absolute and relative economic position of the LMI group in 2020/21.

This analysis contributes to the Resolution Foundation's Commission on Living Standards. In the course of its work, the Commission has already done much to understand past trends in living standards for LMI households and the drivers of these trends. This report turns to the future, using the latest employment projections and a detailed model of the UK tax and benefit system to understand the prospects for people in the UK over the medium term.

At the time of writing, the UK macroeconomic outlook remains highly uncertain. The eventual path of the economic recovery has a heavy bearing on the prospects for LMI households. Looking back, it is known that the shape as well as the strength of economic growth determines living standards. The post-war decades, to give one example, were prosperous not just because growth was strong but also because the UK economy created large numbers of skilled, white-collar jobs. Two questions are of importance in the present context: what kinds of jobs is the UK economy creating in the early 21$^{st}$ century? And, what does this mean for the pay and incomes in Britain? This report makes a first attempt at addressing these questions. The first is addressed by the Working Futures projections which underlie the present analysis. The second question is the main focus of this report.

The analysis presented here is based on the most sophisticated modelling yet undertaken of how changes in the structure of UK employment are likely to affect both earnings and income. It is based on work carried out in a recent project funded by the Joseph Rowntree Foundation (JRF) – *Poverty and inequality in 2020: Impact of changes in the structure of employment* (Brewer et al, 2012) – and employment projections produced for the UK Commission for Employment and Skills (UKCES) – *Working Futures 2010-2020*. The Working Futures projections of employment in 2020 are made by various dimensions such as occupation and industry. In order to assess the implications of these developments for the LMI group, the IFS TAXBEN micro-simulation model has therefore been linked to the *Working Futures* projections. This linkage allows for consideration of the ways that changing labour market structures might impact on the position of the LMI group and others. Various alternative scenarios, with different patterns of employment or wage distributions, are developed to examine the sensitivity of these results in 2020 to different assumptions.

The remainder of the report proceeds as follows. Chapter 2 summarises the methodological approach (with more technical details provided in Annex 1). The baseline employment projections and their implications for income and earnings in 2020/21 are presented in

Chapter 3. Chapter 4 considers the implications of changing employment structure for the low to middle income group. This chapter considers a number of alternative scenarios regarding employment structure and wage growth to 2020/21. Finally, Chapter 5 provides concluding remarks.

## 2.    Methodology

### 2.1    Underlying models of employment and income

This project uses established models related to employment, pay, poverty and inequality to simulate various outcomes related to earnings, household income and employment looking forward to 2020/21.  The two main components underlying the simulations are:

- The various models used to produce the *Working Futures* (Wilson and Homenidou, 2011) employment projections (IER and Cambridge Econometrics); and
- The well-established micro simulation model developed by IFS to forecast the distribution of net household income in future years.

The projected changes in employment structure (*Working Futures*) are linked to expected changes in the distribution of net household income (and, in particular changes for the LMI group), by embodying them into the IFS model which accounts for the tax and benefits system. Whilst *Working Futures* focuses on jobs and individuals in employment, the micro-simulation model of the distribution of net household income considers how these individuals are situated within a broader household context.

The aim here is to understand changes in the structure of employment, what these changes mean for the distribution of wages in future and how this then feeds into household incomes with influences from the tax and benefit system. The approach may be summarised as comprising three steps:

1. Use of macroeconomic model to forecast distribution of jobs in the future;
2. Analysis of detailed individual level data to consider the characteristics and pay of individuals in particular jobs and the distribution of such individuals across households;
3. Production of simulated household incomes which account for taxes and benefits.

The first stage of the approach sets out what employment might look like in the future as a result of particular macroeconomic forecasts. The macro model  underlying this study is based upon a variety of research methods, ranging from complex econometric modelling to other more qualitative approaches and central to the forecasts (*Working Futures*) is a detailed regional multi-sectoral macroeconomic model (RMDM) developed by Cambridge Econometrics (CE). It projections for growth, made in late 2011, are of average GDP growth of 1.9 percent from 2010 to 2015 and 2.5 percent from 2015 to 2020, more optimistic than recent forecasts. The *Working Futures* results indicate where jobs are likely to be creased in the UK economy over the medium term if observed long-term trends in the underlying data continue.

In order to understand the wages paid to individuals who work in particular jobs, specifically those contained in the *Working Futures* forecasts for the UK labour market, and how wages impact at the household level, the second stage of the analysis utilises detailed survey data.

The characteristics of individuals (e.g. gender, region, qualification) in particular jobs (e.g. occupation, industry) and how these individuals are likely to be dispersed around different households allows for changes in wages to reflect the information on jobs growth. Future wages are obtained by assuming a constant level of growth over the period for wages for all individuals (though this assumption is altered later). Assumptions on wages growth are based on forecast increases in average earnings from the Office of Budget Responsibility published in November 2011 which ranged from 0.9 per cent for 2011 to 4.5 per cent by 2016 (in nominal terms).

Finally, using the IFS models, the effects of the tax and benefit system on household incomes is simulated. Within the detailed tax and benefit model, any changes to the system which had been announced up to the Chancellor's 2011 Autumn Statement and that come in effect over the forecasting period have been incorporated (including, for example, the introduction of Universal Credit). The forecasts therefore assume no additional changes to public spending and so do not include, for example, further cuts to welfare spending.

Further technical details of the underlying models and the overall approach in this study are available in Annex 1.

The analysis considers the implications of projected changes in employment structure for the household income distribution and in particular, the implications for LMI groups. In addition to the impacts of the existing forecast of employment structure, a number of alternative scenarios are considered. These scenarios are discussed further in the next section.

## 2.2  Alternative scenarios for 2020/21

As mentioned above, in this analysis, a number of scenarios which are different to the baseline projections for employment and wages are considered so that a range of possible futures might give some insight as to potential ways to ensure LMI groups are best off in the future. These alternative scenarios incorporate different assumptions about the distribution of employment and / or changes in relative wages over the period to 2020/21.

It should be noted that the macroeconomic assumptions which underlie the models discussed above are not altered in these other scenarios. The *Working Futures* forecasts assume that the UK economy is set to continue its recovery, and to settle down in the medium term to a pattern of modest growth, with only moderate rates of inflation. Measures of economic output such as Gross Domestic Product (GDP) and Gross Value Added (GVA) are projected to display long-term annual growth rates of around 2.5 per cent.

The focus here is not on these macro conditions in any case, but rather on the implications for LMI households. It should be emphasised that the Working Futures employment forecasts for 2020/21 are the starting point for all scenarios and various assumptions are then made on top of this baseline. The main focus of this project is whether the structural

changes projected for employment over the medium term are likely to have positive or negative consequences for the living standards of LMI households.

The particular scenarios which have been considered can be summarised as: those which alter the distribution of employment by particular characteristics of jobs; scenarios which alter the rate of wage growth for particular jobs/individuals relative to others; and scenarios which make alternate assumptions about both pay and employment. Table 1 summarises each of the scenarios considered, including the assumptions of the baseline projections.

## TABLE 1: Description of employment and pay scenarios

| Scenario | Description | Assumptions |
|---|---|---|
| 1 | Baseline | **Forecasts changes to the UK employment structure** (as set out in *Working Futures* projections) |
| 2 | 2010/11 structure | **Assumes the UK employment structure instead remains fixed** at its 2010/11 position (while overall employment levels rise in line with *Working Futures* projections) |
| A | Increased earnings inequality | **Assumes that earnings inequality rises significantly**<br><br>(Imposing the shape of average annual real earnings growth that occurred across the earnings distribution from 1975 to 1985 (using data from the Annual Survey of Hours and Earnings (ASHE)) on average annual real earnings growth between 2008/09 and 2020/21, whilst keeping average earnings the same as under the baseline. |
| B | Reduced earnings inequality | **Assumes that earnings inequality falls moderately**<br><br>(Since there is no recent example of earnings inequality falling moderately over the course of a decade, this scenario simply models a level of decline that seems reasonable over a decade (by taking the modest increase in inequality seen between 1990 and 2000 (according to ASHE) and reversing this shape of growth).) |
| C | Strong earnings growth at bottom | **Assumes a successful strategy to raise earnings at the bottom of the distribution**<br><br>(Within the bottom 3 income decile groups, earnings growth relative to the 5th decile group is pegged to the relativity observed between 1996 and 2006 (using FRS)—the 10 years of maximum impact from a rising National Minimum Wage. Relative earnings growth is maintained as in the baseline scenario for all other deciles.) |
| D | 'Good' skills | **Assumes significant improvement in low and intermediate skills**<br><br>(Models a reduction in the number of people with no qualifications compared to the baseline and 2010/11 structure, alongside an increase in the share of workers with intermediate qualifications and a static proportion with top qualifications (total employment |

| | | numbers are allowed to increase compared to the baseline)) |
|---|---|---|
| E | Higher female employment | **Raising Britain's female employment performance to that of better performing countries** |
| | | The number of women employed is assumed to increase by 7.2% relative to the baseline (with no offsetting reduction in the number of men employed) (total employment numbers are increased compared to Baseline) |
| F | Combined scenario | **Combining all three good scenarios** |
| | | (Combining strong earnings growth at the bottom, 'good' skills and higher female employment) |

## 2.3 Defining the LMI group

In considering the results stemming from the baseline employment and income projections and from the various scenarios outlined in section 2.2, the main group of interest is the low-to-middle Income (LMI) group. Comparisons are also drawn between this group and two other groups: one comprised of those who are 'benefit reliant' and the group with 'higher incomes'. Before looking at the future prospects for these groups, how these groups are defined and their current/recent position are first considered.

The work of the Resolution Foundation focuses on people living on low-to-middle incomes. These are people living in households below middle (median) income, but above the bottom 10 per cent, and who are not heavily reliant on means-tested benefits. The Resolution Foundation defines the LMI group as adults living in working-age households that fall into household income deciles 2 to 5 who receive less than one-fifth of their gross household income from means-tested benefits (excluding tax credits). Due to data limitations, the modified definition of the groups of interest applied in the present analysis are:

- **Low to middle income** (of primary interest) - those in decile groups 2-5 of the equivalised working age household income distribution (of households, not individuals), excluding those who receive more than 50 percent of their income from tax credit and benefits combined;
- **Benefit reliant** - those in decile group 1 of the equivalised working-age household income distribution (of households, not individuals), plus all households receiving more than 50 percent of their income from tax credits or benefits.
- **Higher income** -  those in decile groups 6 to 10 of the equivalised working-age household income distribution (of households, not individuals)

The three categories comprise 100 per cent of individuals in working-age households.

The Resolution Foundation considers the LMI group to faces unique challenges as a result of their position in the income distribution and thus it is the intention to focus on a group that

comprises people who are both 'too rich and too poor'. Individuals classified in the LMI group are too rich to be traditionally considered in need of state support, but are too poor to thrive independently in important private markets, from the housing market to the market for social care. Similarly, members of the LMI group are mostly in work, and so face considerable time constraints, but they often receive low or modest wages, and so face significant budget constraints as well.

Further details of the definition of the LMI and other groups used in this project are provided in Annex 2.

# 3.  The baseline employment projections

The focus of the present analysis is not on the overall forecasts of employment structure in 2020/21, rather the aim is to explore the implications of these projections for people with low-to-middle incomes. With this in mind, this section sets out only the main features of employment structure which are provided by the *Working Futures 2010-2020* forecasts. Further information on the detailed forecasts can be obtained in the *Working Futures* report (Wilson and Homenidou, 2012). This chapter also considers the characteristics of individuals in relation to the household income distribution in order to illustrate how changes in employment structure might be expected to impact on the situation of households.

## 3.1  Employment in 2020/21

The economic outlook over the medium to long term is highly uncertain in the current climate. It is not the aim of this paper to predict future macroeconomic conditions or to consider the impact of different macroeconomic projections for LMI households. The underlying projections for employment that are central to the present analysis are those set out in *Working Futures* and may indeed be considered as optimistic in the present context.[5] In order to fully appreciate the possible outcomes for the LMI group in 2020/21 which will be explored in subsequent sections of this report, it is first necessary to know the main features of the underlying forecast.

Underlying the Working Futures employment projections are assumptions regarding long-term changes in macroeconomic indicators. Gross Value Added (GVA) grew by 1.5 per cent per annum in the UK between 2000 and 2010. Employment in the UK grew by 0.4 per cent per annum from 2000 to 2010 and between 2010 and 2020 it is forecast to grow by 0.5 per cent per annum. Focusing on the employment projections set out in *Working Futures* the following key features are noted:

- Total employment (jobs) is projected to be more than 32.4 million in 2020. This is an increase of around 0.5 per cent per year between 2010 and 2020 (1.5 million jobs).
- Full-time employment is projected to remain the most common status of workers but share of total employment accounted for by full-time male employees is projected to fall whilst shares accounted for by part-time male employees, and self-employed females are projected to be greater in 2020 than in 2010.
- Total employment is projected to be lower in 2020 than in 2010 in:
    - agriculture, etc.;
    - mining and quarrying;
    - manufacturing;
    - public administration and defence; and
    - education.

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[5] NOTE that new projections for UKCES have been produced which take a more conservative view of future employment prospects in the UK over the medium term.

- The most rapid growth in employment is projected for electricity gas, water and miscellaneous services and other business services – both projected to grow by 1.5 per cent per annum to 2020. The *Working Futures* projections of changes in UK employment by sector are presented in Figure 1.
- The fastest growth in employment by occupation is forecast for the top three occupations (managers, professional and associate professional and technical occupations). Growth is also projected in caring, leisure and other service occupations and elementary occupations between 2010 and 2020, but at a slower rate. Total employment is projected to fall for administrative and secretarial occupations, skilled trades and process, plant and machine operatives.
- The share of all workers with qualifications at NQF Level 4 or above is projected to increase significantly. It is estimated that in 2020 less than six per cent of all individuals in employment will have no qualifications, just over one-third will be qualified to Level 1 or 2 and almost 60 per cent will have a qualification at Level 3 or higher (compared to around 53 per cent with Level 3 or higher in 2010).
- The fastest annual growth in employment is projected for London, the East of England and the South West, whilst the North East is expected to experience growth in employment of less than 0.05 per cent per year to 2020. Across the whole of the UK, employment is projected to grow 0.5 per cent per year between 2010 and 2020.

**FIGURE 1: Changes in UK Employment by Sector, 2010-2020 (per cent p.a.)**
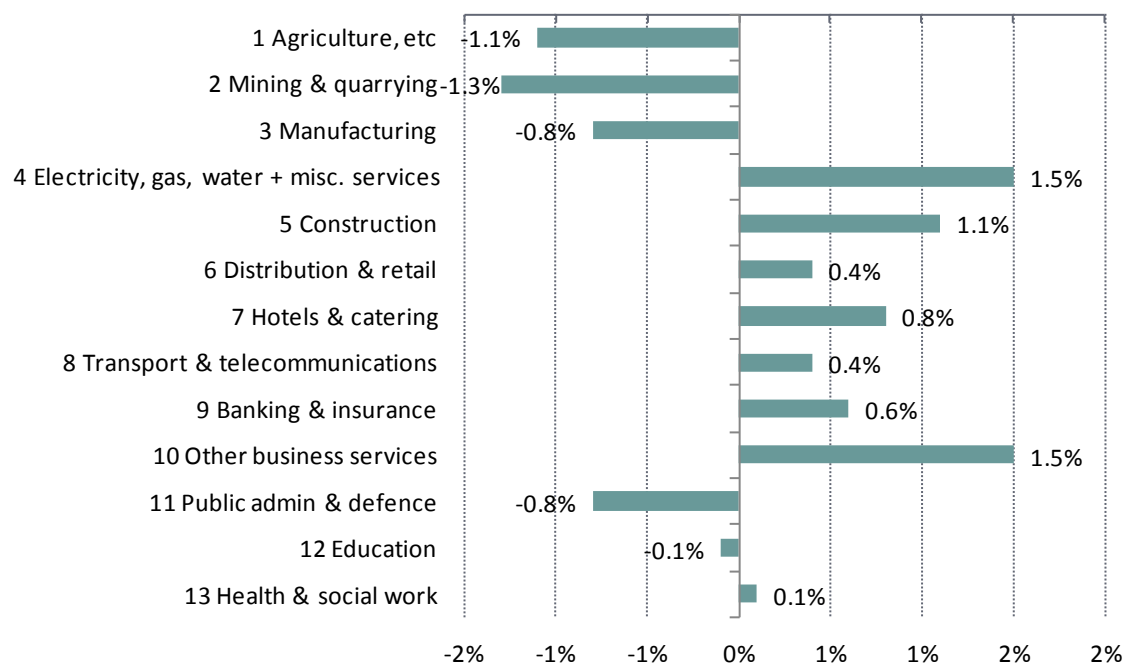


**Source:** Cambridge Econometrics, MDM revision 7146

While of interest in their own right, the above baseline employment projections for 2020/21 are not the focus here, as emphasised at the outset, instead the concern in this project is

how this future structure of employment might affect wages and in turn, the distribution of household incomes in 2020/21, and in particular, what implications this has for the living standards of LMI households.

In the remaining sections of this report, the implications of various future employment structures, including that in the baseline *Working Futures* results and a number of alternatives to these projections, are considered with respect to LMI households and others.

## 3.2 The relationship between labour market structure and the distributions of earnings and income in 2020/21

The relationship between changes in the structure of the labour market and changes in the distribution of income is far from straightforward for a number of reasons (NOTE 3). When the characteristics of workers are examined according to where they fall in the (weekly) earnings distribution it is not surprising that those with lower earnings are relatively more likely to have low qualifications, to be female and to be employed on a part-time basis.

As net household income is more indicative of living standards than are individual earnings it is necessary to consider the dispersion of individuals' characteristics when ranked according to household incomes rather than individual earnings. The distribution of individual characteristics such as gender and qualifications is unlikely to be the same when considering these across the household income distribution as when looking at the distribution of individual earnings. Differences arise for a number of reasons, including:

- A number of people are not in work at all and so do not enter into the distribution of individual earnings (which includes only workers) – the result is that workers who may be near the bottom of the earnings distribution will not necessarily be at the bottom of the household income distribution;
- Households vary in composition and may contain individuals who occupy different positions in the earnings distribution – individuals with low earnings may be nearer the top of the household income distribution where they live in households with high earners;
- Measures of household level income are typically adjusted for the size and structure of the household using 'equivalence scales' in order to reflect differences in the income required by different types of households to achieve the same living standards – an individual with relatively high earnings for example, might be positioned relatively low in the household income distribution if they are the only earner in a household with several children;
- Earnings do not comprise the only source of income for all households and households face different effective tax rates on earnings – the relationship between gross earnings and net income is complicated by the tax and benefit system which takes household circumstances into consideration.

These issues can be illustrated in a number of figures (2A through 3B, below) which show the characteristics of individuals (or jobs) ranked by net household income in 2020/21 as expected under the Working Futures employment projections and ranked by earnings. The ranking of households used in the figures in this section includes people who are not working age and who not employed so that the ranking here does not directly translate to the definitions of the LMI, benefit reliant and higher income groups set out in Section 2.3 (and used by RF), however, the figures still prove useful for understanding the relationships between individuals and households.

Only 20 per cent of individuals in households in the two lowest deciles of the household income distribution are expected to be in employment in 2020/21; many others live in households where someone else is in paid work. When considering workers only, the characteristics of individuals and / or jobs are less well correlated with net equivalised household income than with gross individual earnings. Figures 2A through 3B illustrate this. Females, for instance, are clearly more concentrated towards the lower end of the individual earnings distribution (Figure 2A) compared to across the household income distribution where women are similarly represented across the whole of the distribution. Many female workers are in households with male workers and so differences in household income by gender are smaller than differences in individual earnings by gender. Reducing the gender pay gap in general would not then be expected to have a large impact on overall household income inequality.

**FIGURE 2A: Gender of workers in 2020/21, by earnings decile group**
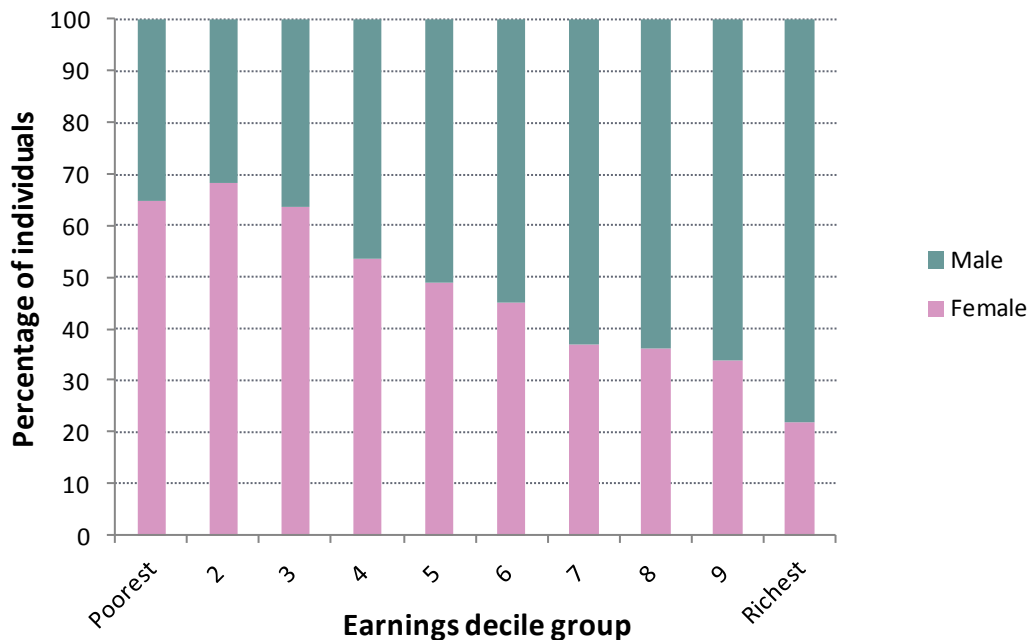


Notes and sources: as Figure 5.1.

**FIGURE 2B: Gender of workers in 2020/21 by household income decile group**
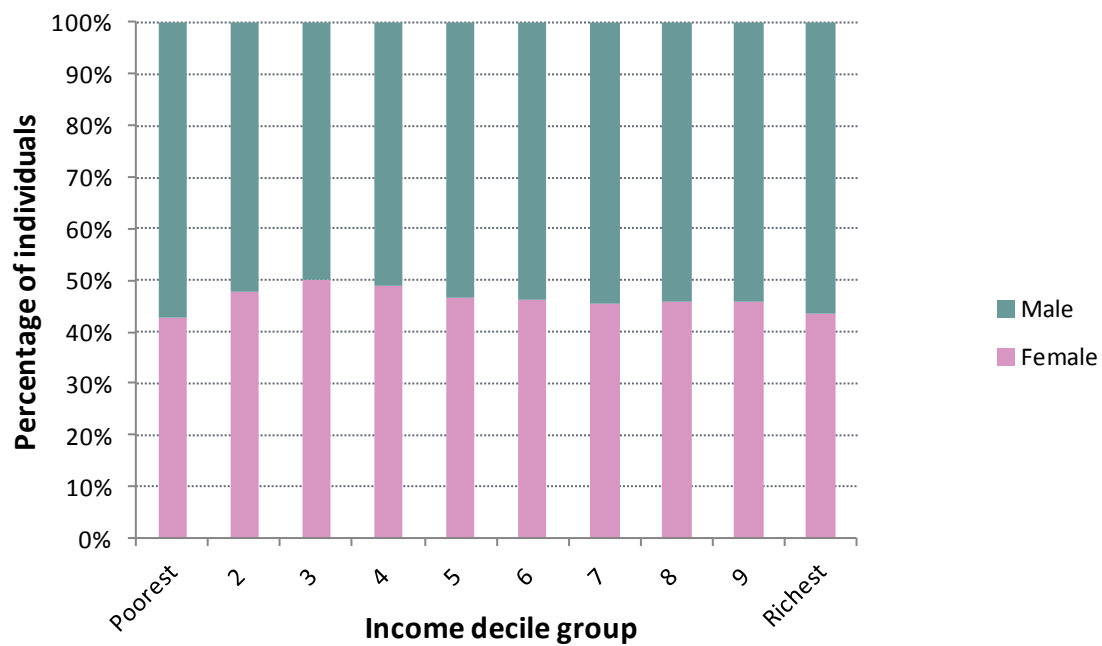


Notes and sources: as Figure 5.4.
Gender relates just to those in employment.

Figure 3A indicates some correlation between earnings and level of qualification however; household income is less well correlated with these characteristics of workers as shown in Figure 3B. There are for instance, more workers with NQF Levels 1 or 2 in the top half of the household income distribution (around 16 per cent of individuals) than there are in the bottom half (11 per cent). All else equal, an increase in the earnings of workers with such qualifications would be of more benefit to individuals in richer households than lower income households – so whilst low paid individuals might be better paid it is not necessarily so that low-income households would benefit most.

**FIGURE 3A: Qualification levels of workers in 2020/21 by earnings decile group**
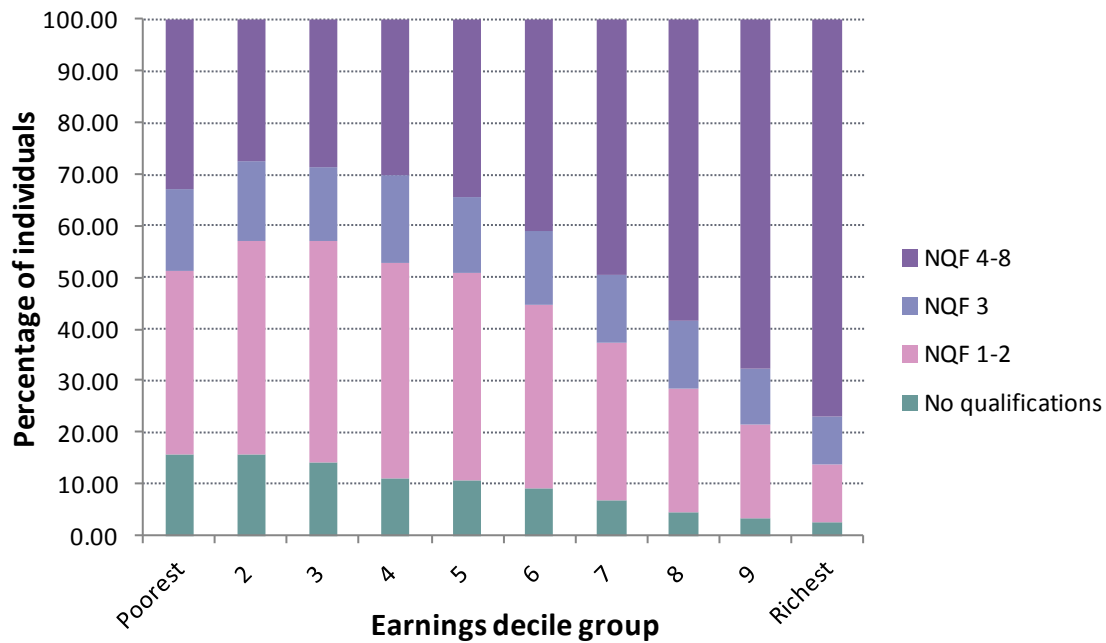


Notes: Earnings are measured before the deduction of any tax, at the individual level, among workers only (i.e. excluding those with zero earnings).
Sources: Authors' calculations using Family Resources Survey 2008-09, TAXBEN, and assumptions specified in the text (in relation to the *Working Futures* baseline forecasts of employment).

**FIGURE 3B: Qualification levels of workers in 2020/21 by household income decile group**
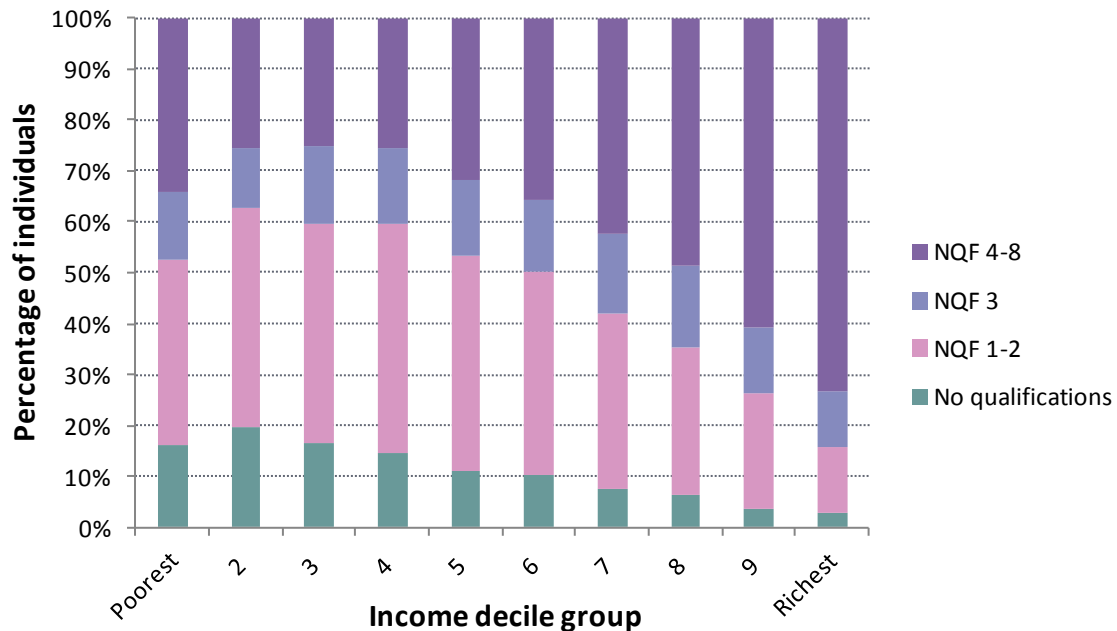


Notes: Net household income is measured after taxes, inclusive of benefits, before the deduction of housing costs, at the household level, and equivalised using the modified OECD equivalence scale. Qualifications relate just to those in employment.
Sources: Authors' calculations using Family Resources Survey 2008-09, TAXBEN, and assumptions specified in the text (in relation to the Working Futures baseline forecasts of employment).

Figure 4 shows that earned income makes up a noticeably smaller share of net household income in low-income households than in households further up the income distribution. In the bottom decile, earnings make up less than 40 per cent of net household income compared to more than 80 per cent in households at or above the median. Earnings are considerably less important financially in low-income households than in high-income ones.

**FIGURE 4: Gross earnings as a share of net household income in 2020-21, by household income decile group**
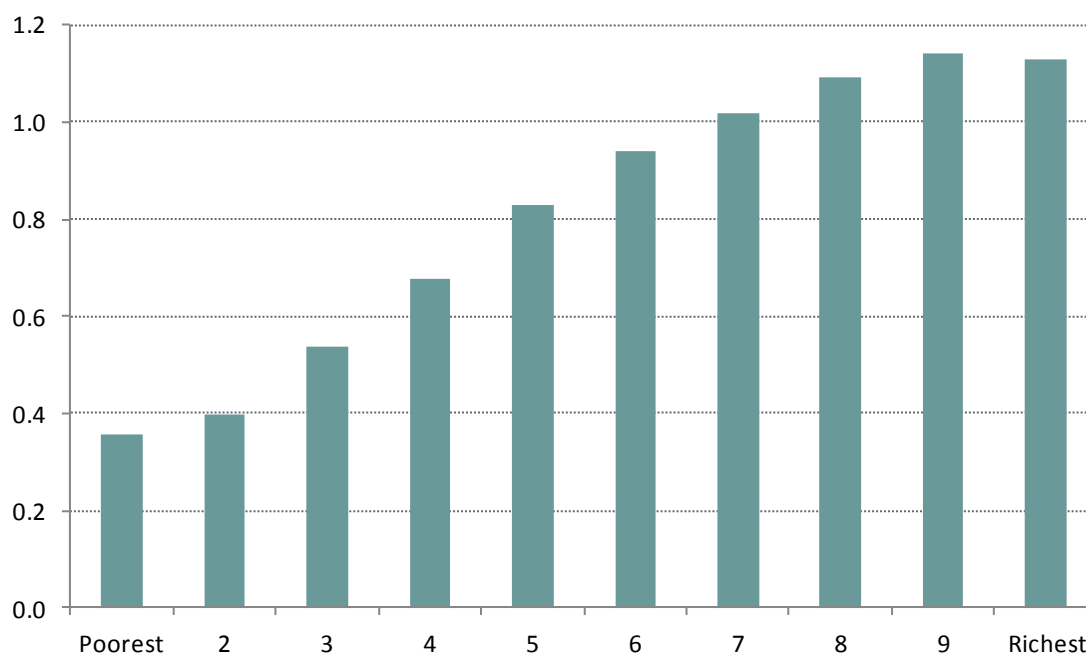


Notes: Definitions of earnings and net household income as in Figure 5.1 to 5.6.
Sources: Authors' calculations using FRS 2008-09, TAXBEN, and assumptions specified in the text.

It is relatively likely that individuals who are in work and who are near the bottom of the household income distribution receive means-tested benefits or tax credits.[6]   A rise in earnings for such individuals would result in withdrawal or reduction of these benefits – equivalent to a tax on additional earnings. Figure 5 shows the mean marginal effective tax rates (METRS) on earned income (i.e. the proportion of small increases in gross earnings that is foregone due to increases in tax liability and reductions in benefit entitlement) for workers in each household income decile group. It is clear in this figure that workers in the bottom 30 per cent of the household income distribution encounter the highest average METRs. This illustrates the importance of the tax and benefit system in determining outcomes at the household level and an important contribution of the analysis undertaken in this project[7] has been to explicitly account for this interaction between labour market

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[6] (In the 2020–21 world considered here, almost all of the existing means-tested benefits and tax credits have been replaced with Universal Credit, a single means-tested payment which is expected to be phased in from October 2013.)
[7] And the JRF project

change and the tax and benefit system, using the IFS tax and benefit micro-simulation model.

**FIGURE 5: Average marginal effective tax rate (%) on earned income among workers in 2020-21, by household income decile group**
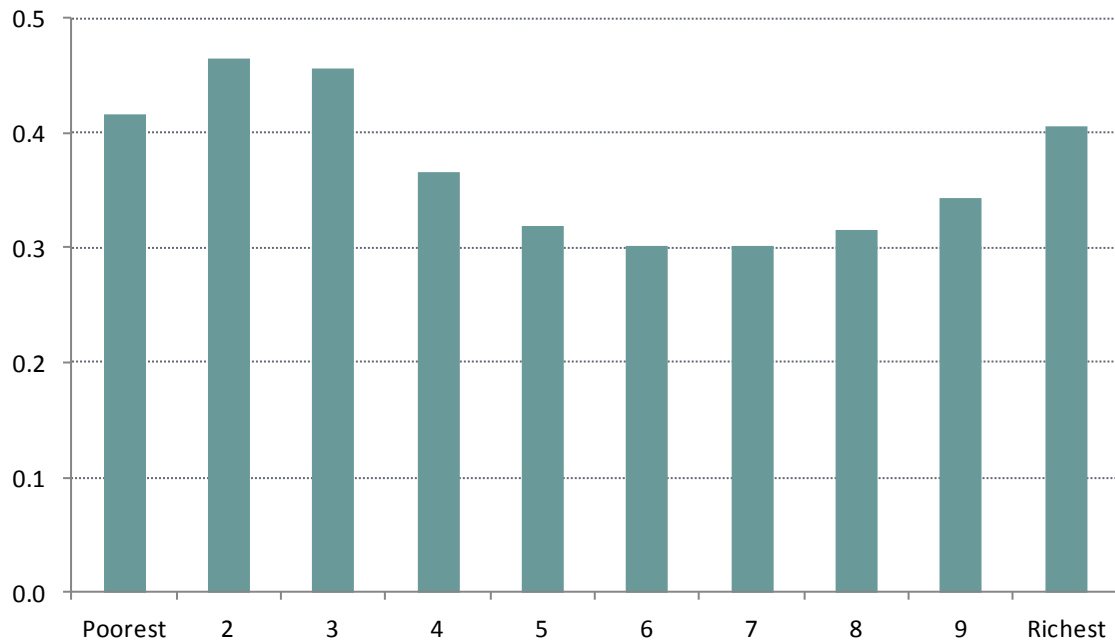


Notes: Assumes full take-up of benefits. Definitions of earnings and net household income as in Figure 5.1 to 5.6. Sources: Authors' calculations using Family Resources Survey 2008-09, TAXBEN, and assumptions specified in the text.

In the next section, the overall implications of the employment and pay structure in 2020/21 for individuals and households in the UK are considered.

# 4. Implications of changing employment structure for the low to middle income group

Based on the approach outlined in Chapter 2, this chapter considers the implications of the underlying employment projections for the groups of interest in 2020/21 and also the outcomes which might arise if the employment structure and / or relative rates of earnings growth were to differ from that assumed in the baseline. After considering the baseline situation (referred to here as 'the current path'), a number of alternative scenarios are considered. These scenarios incorporate different assumptions about relative wage growth and the future structure of employment by various dimensions in order to examine whether the prospects for LMI group can be improved over those resulting from the original projections. It is important to note however that the variations explored in the scenarios do not change the macroeconomic assumptions which underlie the models of employment and income.

It should be noted that, throughout this analysis, the pensioner population are excluded entirely, i.e. they are not part of the distribution from which summary statistics have been taken. Unless otherwise stated, statistics have been derived by summarising individual-level distributions (not household-level). Also note that the distribution has been trimmed, dropping anyone in the top and bottom three percentile groups of the household income distribution, so that there is no concern over the modelling methods not being robust for forecasting the incomes of the very rich.

As stated in the previous section, the remainder of this chapter considers the effects for the LMI group (and others) that different employment structures might give rise to in 2020/21. The first set of results considers the implications of the baseline projections, which are set out in *Working Futures 2010-2020*. Then the impact of the 2010/11 employment structure is examined and finally results are provided for a number of alternative scenarios.

## 4.1 The current path

### 4.1.1 Employment in 2008/09 and 2020/21

Table 2 show the distribution of employment of individuals in the LMI group by industry in 2008/09 and under the *Working Futures* projections for 2020/21. Of the industries with the highest concentration of LMI employment, distribution (in which 17 per cent of the LMI group were employed in 2008/09) and health and social work (in which 17 per cent of the LMI group were employed in 2008/09) are forecast to experience overall positive employment growth in the UK over the period 2010 to 2020 of 0.4 per cent and 0.1 per cent per annum, respectively (see Figure 1 in Chapter 3 for projected employment change by industry). An overall reduction of 0.8 per cent per annum is projected for manufacturing.

Under the baseline projections, around 27 per cent of the LMI group is expected not to be employed in 2020/21 compared with 23 per cent in 2008/09. The distribution of those in employment by industry for the LMI group is provided in Table 2 for both 2008/09 and

2020/21 (the baseline, as projected by *Working Futures*). Distribution accounted for the greatest share of 2008/09 LMI employment (16.9 per cent) followed by Manufacturing (13.2 per cent) and Health and Social Work (12.7 per cent). Mining and quarrying, Agriculture, etc. and Banking and insurance make up the smallest shares of employment amongst LMI individual (0.2 per cent, 1.6 per cent and 2.4 per cent, respectively in 2008/09).

**TABLE 2: Distribution of LMI employment by industry**

| Industry | Share in 2008/09 | Projected share in 2020 |
|---|---|---|
| 1 Agriculture, etc | 1.6% | 1.6% |
| 2 Mining & quarrying | 0.2% | 0.1% |
| 3 Manufacturing | 13.2% | 10.8% |
| 4 Electricity, gas, water + misc. services | 6.8% | 6.8% |
| 5 Construction | 9.9% | 10.1% |
| 6 Distribution | 16.9% | 17.4% |
| 7 Hotels & catering | 6.2% | 5.6% |
| 8 Transport & telecommunications | 7.0% | 6.8% |
| 9 Banking & insurance | 2.4% | 2.5% |
| 10 Other business services | 9.6% | 9.9% |
| 11 Public admin & defence | 5.8% | 5.3% |
| 12 Education | 7.7% | 7.8% |
| 13 Health & social work | 12.7% | 15.2% |
| All sectors | 100% | 100% |

### 4.1.2 Income in 2008/09 and 2020/21

Equivalised net household income for the LMI group in 2008/09 ranged from £203.08 to £440.25 per week (£10,590 to £22,960 annually) (2008/09 prices) (in terms of equivalent income for a couple with no children). Under the baseline simulation, income in 2020/21 will range from £172.53 to £425.29 per week (£9,000 to £22,200 annually) (2008/09 prices) indicating a reduction in the real household incomes of people in the LMI group to 2020/21 (resulting, at least partly, from the projected changes to employment structure over the period).

In 2008/09, the LMI group's share of net equivalised household income was 23 per cent compared to 9.6 per cent for the benefit-reliant group and 61.8 per cent for the higher income group. In 2020/21, the LMI group is expected to capture a smaller share of gross equivalised earnings (21.9 per cent). Just over 20 per cent of household income amongst LMIs was received from the State in 2008/09. A smaller share (16.4 per cent) of LMI

household income is expected to come from the State in 2020/21 reflecting changes in the tax and benefit system which are incorporated in the modelling exercise.

### 4.1.3   Inequality in 2008/09 and 2020/21

Income (household) inequality ratios in 2008/09 and 2020/21 are provided in Table 3.  In 2008/09 inequality was greater in the bottom half of the income distribution with the 50:10 ratio (1.98) higher than the 90:50 ratio (1.93). This is estimated to still hold true under the *Working Futures* projections of employment in 2020/21 with the difference between these two inequality ratios increasing.   Both inequality measures are expected to increase over the period. The 90:10 ratio is found to increase from 3.81 in 2008/09 to 4.5 in 2020/21 (under the baseline) – indicating an increase in inequality between the poorest and richest households of 18 per cent. Table 4 shows inequality ratios for previous periods though caution should be taken in comparing these figures to those in Table 3 due to difference in the underlying data and calculations. In any case, inequality in 2020/21 looks to be greater than that observed in a number of previous periods. This is particularly so for inequality in the lower half of the income distribution.

**TABLE 3: Household income inequality ratios, 2008/09 and 2020/21**

|         | Inequality Ratio | | |
|---------|-------|-------|-------|
|         | **90:10** | **90:50** | **50:10** |
| **2008/09** | 3.81 | 1.93 | 1.98 |
| **2020/21** | 4.50 | 2.05 | 2.20 |

**TABLE 4: Household income inequality ratios for earlier periods**

|         | Inequality Ratio | | |
|---------|-------|-------|-------|
|         | **90:10** | **90:50** | **50:10** |
| **1970**[1,3] | 3.21 | 1.82 | 1.76 |
| **1980**[1,3] | 3.22 | 1.85 | 1.74 |
| **1990**[1,3] | 4.38 | 2.15 | 2.03 |
| **2000/01**[2,3] | 4.17 | 2.02 | 2.06 |

**Note:** 1) Calculated for Great Britain, from FES; 2) Calculated for United Kingdom, from FRS. 3) Figures based on before housing costs (BHC) household incomes.
**Source**: Taken from Institute for Fiscal Studies:  Inequality and Poverty Spreadsheet which accompanies IFS Commentary No. 124, "Living Standards, Poverty and Inequality in the UK: 2012".

### 4.1.4 Results for the baseline and the employment structure in 2010/11

The analysis has also considered the likely outcome for the LMI group if, rather than achieving the structure of employment set out in the *Working Futures* projections, the structure of employment (by sector, occupation, etc. ) were to be the same in 2020/21 as observed in 2010/11. In this case, referred to as Scenario 2 (see Table 1), employment patterns across all dimensions (e.g. gender, occupation, industry) are fixed at their 2010/11 values. This scenario is particularly useful as it sketches out a hypothetical 2020/21 world in which the total level of employment is the same as that forecast by *Working Futures* (and thus as utilised in the baseline (Scenario 1)) but the mix of workers of different types (by qualifications, gender, industry and so on) is unchanged from 2010/11. Comparing the results of the baseline (Scenario 1 with *Working Futures* main projections) and Scenario 2 (employment with 2010/11 structure) allows the effects of changes in employment structure on the income distribution to be isolated.

In the baseline scenario, 27.4 per cent of people in the LMI group are non-employed in 2020/21 whilst in Scenario 2 (2010/11 employment structure) this is marginally lower at 27.2 per cent.

Figure 6 shows average annual growth in real net household income between 2011/12 and 2020/21 as simulated for Scenarios 1 and 2. In this figure, the observed changes in income between 2008/09 and 2011/12 have been accounted for in order to strip out the influence of the 2008/09 recession and the sluggish recovery to 2011/12. Under the baseline scenario, average annual real growth in net household income is higher for the LMI group (20th to 50th percentiles) than where there is no change to the employment structure after 2010/11 (Scenario 2). The picture of employment in 2020/21 set out in *Working Futures* is inequality increasing over the employment structure observed in 2010/11. For the LMI group, however, annual growth is shown to be negative over the period 2011/12 to 2020/21. It is only for individuals in households with income above about the 55th income percentile that the baseline scenario results in positive growth in net household income. The projected growth rate is lower for individuals in lower parts of the distribution (except between centiles 4 and 8) compared to those at higher points.

**FIGURE 6: Average annual real growth in net household income among non-pensioner population between 2011-12 and 2020-21 under *Working Futures* baseline and without changes to employment structure between 2010-11 and 2020-21, by percentile point**
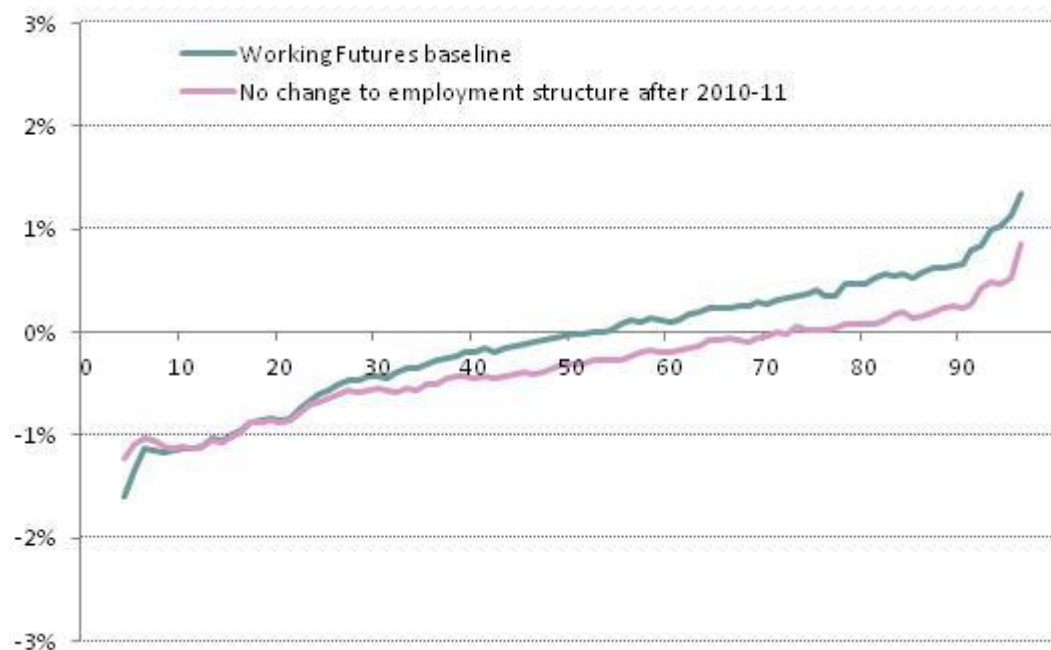


**Notes:** The top and bottom 3 percentile points are not shown due to high levels of uncertainty from sampling and measurement error. Net household income is measured after taxes, inclusive of benefits, before the deduction of housing costs, at the household level, and equivalised using the modified OECD equivalence scale. Data include workless households.
**Sources:** Authors' calculations using Family Resources Survey 2008-09, TAXBEN, and assumptions specified in the text.

Under the baseline scenario, real equivalised average annual household income growth between 2008/09 and 2020/21 is estimated to be -0.4 per cent for the LMI group (see Table 5). For the benefit reliant group real equivalised average annual household income is projected to decline by 1.7 per cent per annum. Those in the higher income group are comparatively better off in that this growth rate is positive but just (0.2 per cent per annum). With the employment structure of 2010/11 imposed in the future, annual growth in real equivalised average household income is projected to be negative for all three groups and is lower than in that found for the baseline scenario (-0.5, -1.8 and -0.1 per cent per annum for the LMI, benefit reliant and higher income groups, respectively).

Annual growth in *real equivalised household earnings* is positive under both scenarios for the benefit reliant group (1.0 per cent per annum in the baseline and 0.4 per cent with 2010/11 employment structure) whilst the employment structures of both the *Working Futures* projections and 2010/11 result in negative growth for both the LMI and higher income groups. The rate of decline in household earnings is greater under scenario 2 than under the baseline employment structure for both groups. However, figures for the benefit reliant group should be read with caution and are likely to be explained in large part by changes in the composition of the group.

**TABLE 5: Average annual real growth in equivalised household earnings and income between 2008-09 and 2020-21 under *Working Futures* baseline and with 2010-11 employment structure, by LMI and other group**

| | WF baseline (Scenario 1) | 2010/11 employment structure (Scenario 2) |
|---|---|---|
| **Real equivalised average annual household earnings growth** | | |
| **LMI** | -0.2% | -0.5% |
| **Benefit Reliant** | 1.0% | 0.4% |
| **Higher Income** | -0.3% | -0.7% |
| **Real equivalised average annual household income growth** | | |
| **LMI** | -0.4% | -0.5% |
| **Benefit Reliant** | -1.7% | -1.8% |
| **Higher Income** | 0.2% | -0.1% |

Table 5 helps to illustrates how changes in household earnings do not directly translate in to analogous changes in household incomes. Taking the LMI group, though under the baseline scenario, real equivalised household earnings are expected to decline by 0.2 per cent per annum between 2008/09 and 2020/21, household income growth is projected to be more negative at -0.4 per cent per annum. Among benefit reliant households, while household earnings growth is expected to be positive between 2008/09 and 2020/21,average household income is expected to decline by more than 1.5 per cent per annum under both scenarios 1 and 2. For the benefit reliant group, this difference between growth in earnings and income at the household level reflects largely the impact of impending changes to benefits payments in the period covered by the analysis. For the higher income group, household earnings are expected to decline by a greater rate than income in both scenarios which is likely to reflect other sources of income evening out the overall income of households in this group as well as beneficial changes to taxation.

## Summary of outcomes under scenarios 1 and 2

Looking at the baseline projections for employment (as set out in *Working Futures*) and what would happen if employment were to continue on its current path (with the same structure as observed in 2010/11), the outcomes for the LMI group can be summarised as follows:

- If employment in 2020/21 takes on the structure projected by *Working Futures*, 27.4 per cent of people in the LMI group would be *non-employed* in 2020/21 compared to 23 per cent in 2008/09. If employment structure were to remain unchanged from 2010/11, then the unemployment rate for this group would be expected to be 27.2 per cent (marginally lower than the baseline estimate);

- Under the baseline, a decline in real household incomes is expected for people in the LMI group – this is in part due to the changes in employment structure set out in the projections but also due to changes in tax and benefits over the period to 2020/21;
- The LMI's *share of net equivalised household income* is expected to decline from 23 per cent in 2008/09 to 22 per cent in 2020/21 under the baseline scenario. The share of household income which comes from the State is also expected to decline for LMI households from just more than 20 per cent in 2008/09 to around 16 per cent in 2020/21 – this again reflects changes in the tax and benefit system which are expected to come into effect over this period;
- A number of *household income inequality* measures are expected to worsen in 2020/21 (under the baseline employment projections) compared with 2008/09. The 90:10 ratio is projected to increase from 3.81 to 4.50, the 90:50 from 1.93 to 2.05, and the 50:10 from 1.98 to 2.20;
- Average annual real growth in *net household income* between 2011/12 and 2020/21 is forecast to be negative for all households along the income distribution if employment structure were to remain the same as observed in 2010/11 but if the employment projections from *Working Futures* were to hold in 2020/21 then this rate of decline in household income would be less at most points along the household income distribution and positive, but low, growth would be expected for those above the 65th percentile;
- Between 2008/09 and 2020/21, real equivalised average annual household *income* growth for the LMI group is estimated to be -0.4 per cent per annum under the baseline scenario and -0.5 per cent per annum under scenario 2;
- Annual growth in real equivalised household *earnings* is expected to be negative for the LMI group under scenarios 1 and 2 at -0.2 and -0.5 per cent per annum, respectively.

## 4.2    Changing inequality

Section 4.1 has described the prospects for LMI households under reasonable central scenarios for the UK economy – the employment structure set out in the *Working Futures* results and the structure observed in 2010/11. In the discussion above, the focus has been purely on how forecast changes to the structure of UK employment (with respect to distribution of jobs across occupations, industries and so on) might affect the earnings and income distribution, with particular emphasis on those in the LMI group.

The two scenarios explored above (1 and 2) do not examine possible changes in wage inequality itself – rather the two simulations assume that earnings grow at a constant rate which is the same for all jobs. It is known however, that over time, the wages paid for different occupations and in different sectors can grow at markedly different rates. Indeed, in recent history, in addition to changes in the structure of employment the UK has seen a general growth in wage inequality as some jobs have seen far quicker wage growth than others.

In this section the implications of making changes to the *wage distribution* rather than to the overall employment structure are considered. The assumptions regarding relative wage growth are imposed alongside the *Working Futures* employment structure for 2020/21 (rather than that observed in 2010/11 or in the 2008/09 data). The question of interest here is whether changing the relative rates of wage growth in the model will result in a general rise or fall in household income inequality and ultimately the effects of these changes for LMI households. For all scenarios explored in this report, observations in recent UK history or international comparisons have been used to inform the quantitative parameters entered into the model wherever possible.

The scenarios explored in this section consider the outcomes when ***earnings inequality is increased*** (scenario A) and when it is reduced (scenario B). In scenario A, the shape of average annual real earnings growth across the earnings distribution that was observed between 1975 and 1985 (a period when inequality increased markedly in the UK) is imposed on average annual real earnings growth between 2008/09 and 2020/21, whilst keeping average earnings the same as under the baseline. [8]  In more recent decades, general growth in earnings inequality has slowed significantly thus this scenario should be seen as highly pessimistic, though not implausible. To implement these changes in the model, the following annual real growth rates for each earnings quintile were applied to the data between 2008/09 and 2020/21, with the implied percentage adjustments to the level of earnings in each quintile relative to the *Working Futures* 2020/21 baseline presented in parentheses:

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[8] Note that a little bit of the increase in earnings inequality happens anyway under the baseline, because the forecast changes to employment structure achieve this. This scenario ensures that the combination of those changes to employment structure plus the new earnings adjustments imposed achieve the target outcome: the pattern of earnings growth seen between 1975 and 1985.

Quintile 1: -2.0% (-17.1%)
Quintile 2: -1.0% (-10.2%)
Quintile 3: -0.1% (-3.1%)
Quintile 4: +0.3% (+1.0%)
Quintile 5: +0.7% (+4.3%)

The next scenario (B) considers the impact of an opposite change to that implemented in Scenario A – that is, a **reduction in wage inequality**. A reduction in general earnings inequality has not been observed over a sustained period in the UK in recent years thus it is not possible to obtain estimates for the relevant earnings growth from real historical earnings data. Instead, a modest fall in earnings inequality on the same scale with which inequality rose in the 1990s is assumed here. A note of caution is necessary as this scenario is very optimistic and would represent a marked reversal of recent historical trends. Nevertheless, this scenario provides a basis for exploring the effects of reduced earnings inequality. For scenario B, the shape of earnings growth between 1990 and 2000 (a period with relatively modest rise in inequality) is reversed so that inequality in earnings is reduced. The annual real growth rates for each earnings quintile (and the implied percentage adjustments to the level of earnings in each quintile relative to the *Working Futures* 2020/21 baseline in parentheses) which have been incorporated into the model for scenario B are:

Quintile 1: +1.1% (+20.0%)
Quintile 2: +0.9% (+12.6%)
Quintile 3: +0.6% (+5.2%)
Quintile 4: +0.2% (-0.3%)
Quintile 5: -0.2% (-6.4%)

As stated above, in the baseline scenario 27.4 per cent of people in the LMI group are estimated to be non-employed in 2020/21. The share of non-employed individuals in the LMI is 0.5 percentage points higher in scenario B (27.9 per cent) where earnings inequality is reduced compared to the baseline. The unemployment rate for the LMI group is found to be lower in Scenario A, with increased earnings inequality, at 26.6 per cent.

Figure 7 shows average annual growth in *real net household income* between 2011/12 and 2020/21 as simulated for the baseline scenario and for scenarios A and B. As in Figure 6 above, here the actual changes in household income between 2008/09 and 2011/12 have been removed.

Adjusting the growth rates of individual earnings for different parts of the distribution in order to reduce earnings inequality (as set out in Scenario B) results in higher growth in household income for the LMI group compared to that found under the baseline scenario (scenario 1). The reduction in earnings inequality that has been introduced under Scenario B results in the average annual percentage change in net household income being greater

than in the baseline projections along most of the income distribution, up to about the 77th percentile. Growth is negative at the lower end of the household income distribution up until about the 35th percentile under the reduced inequality scenario whilst in the baseline scenario household income growth is negative between 2008/09 for those below around the 65th percentile of the household income distribution. When greater earnings inequality is introduced (Scenario A), the rate of growth in net household income is lowered compared to the baseline (and Scenario B) except for at the higher end of the income distribution (from around 75th percentile and above) where there is greater annual growth for the higher earnings inequality scenario than for both scenarios 1 and A.

As can be seen in Figure 7, the results from these scenarios in terms of household income give a sense of 'worst' and 'best' case bookends for the central scenarios set out in Section 4.1. The implications for the household income distribution are not obvious because of the complex way in which individuals at different levels of earnings are distributed across households. The reduction in earnings inequality which is introduced in Scenario B results in higher growth in income at the lower end of the income distribution but here this growth is positive along the whole distribution except above around the 80th percentile. A nearly opposite outcome is found under the increased earnings inequality scenario (A) where annual growth in net household income is negative for households who are in the bottom 60 per cent of the income distribution and positive for higher income households.

**FIGURE 7: Average annual real growth in net household income among non-pensioner population between 2011-12 and 2020-21 under *Working Futures* baseline and scenarios A and B, by percentile point**



**Notes and sources:** as in Figure 6.1.

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As was discussed in section 4.1, under the baseline employment projections, household income inequality is set to increase to 2020/21. Scenario A, in which additional earnings inequality is introduced into the projections, results in the 90:10 and 90:50 inequality measures being increased further over the baseline scenario whilst there is no noticeable change for the 50:10 household income ratio. When earnings inequality is reduced, in Scenario B, there is a small reduction in the 90:50 ratio compared with the baseline results but both the 90:10 and 50:10 ratios increase compared to the baseline. The 50:10 ratio is higher in scenario B than in scenario A as well. Whilst the lower earnings inequality scenario (B) would result in lower income inequality overall all, inequality in the lower half of the household income distribution would be greater and inequality in the upper half would be lower compared to the baseline measures.

The earnings share for the LMI group is 19.5 per cent under scenario A and 22.5 per cent under scenario B – compared to 21.1 per cent in the baseline. Whilst with increased earnings inequality (A) the share of gross equivalised earnings increase for both the benefit reliant and higher income groups, this share decreases by 0.6 percentage points for the LMI group when compared to the shares found under the *Working Futures* baseline projections. Under scenario B, with reduced earnings inequality, the earnings shares increase over the baseline figures for both the LMI and benefit reliant groups but the share of higher income group decreases.

As discussed earlier, under the baseline the LMI group's net equivalised household income share is 21.3 per cent. This share is higher for the LMI group when earnings inequalities are reduced (B) (22.7 per cent) and lower when earnings inequalities are increased (A) (20.5 per cent). Scenario A results in a greater income shares for both the benefit reliant and higher income groups than found in the baseline whilst B shows the opposite.

Annual growth in *real equivalised household earnings* is positive for the benefit reliant group under all three scenarios as shown in Table 6. With increased earnings inequality imposed in the model (scenario A), earnings growth is expected to be negative for the LMI and higher income groups. Only the higher income group is found to have projected negative earnings growth under scenario B which is as expected for this scenario. The projected growth rates for earnings in scenarios A and B are of course artefacts of the scenarios themselves which impose particular growth rates for different quintiles of the household income distribution. Growth in household incomes however does not necessarily follow the growth rates of earnings. Under both Scenarios A and B, only the higher income group is expected to experience positive growth in household income. The negative rate of income growth is found to be greater under scenario A than B for the LMI group but the reverse is found for the benefit reliant group. Again, figures for the benefit reliant group should be taken with caution due to the small size of the group and the potential importance of compositional changes.

**TABLE 6: Average annual real growth in equivalised household earnings and income between 2008-09 and 2020-21 under *Working Futures* baseline and Scenarios A and B, by LMI and other groups**

| | WF Baseline | Increased earnings inequality (Scenario A) | Decreased earnings inequality (Scenario B) |
|---|---|---|---|
| **Real equivalised average annual household earnings growth** | | | |
| **LMI** | -0.2% | -0.6% | 0.2% |
| **Benefit Reliant** | 1.0% | 1.2% | 3.1% |
| **Higher Income** | -0.3% | -0.1% | -0.3% |
| **Real equivalised average annual household income growth** | | | |
| **LMI** | -0.4% | -0.6% | -0.2% |
| **Benefit Reliant** | -1.7% | -1.8% | -1.9% |
| **Higher Income** | 0.2% | 0.2% | 0.2% |

## Summary of outcomes under scenarios A and B

This section has compared the baseline projections for employment (as set out in *Working Futures*) to what might happen in 2020/21 if earnings inequality were to worsen or to be reduced. The main observations here include:

- In recent times there has been growth in overall wage inequality as different types of jobs have experienced different rates of wage growth thus imposing greater pay inequality in this exercise is a reasonable, if pessimistic, assumption to make;
- Reductions in general wage inequality have not been observed over any sustained period in recent years so that it has not been possible to obtain data to guide the magnitude of changes to be imposed in the model to consider the effects of lower earnings inequality. Instead recent historical trends have been reversed. This approach, represents a very optimistic, if unlikely, future outcome;
- Imposing greater earnings inequality results in a lower unemployment rate for the LMI group compared to the baseline findings as well as compared to the scenario in which earnings inequality is reduced;
- The two scenarios which change earnings inequality overall result in different growth in net household incomes between 2011/12 and 2020/21 across the income distribution when compared to the baseline – reducing earnings inequality increases growth at lower points of the income distribution (lower than 75th percentile) whilst increasing inequality only improves growth in household income for the upper percentiles (65th and above);
- Increasing earnings inequality (scenario A) results in greater inequality in household income compared to the baseline as measured by the 90-10 and 90-50 ratios;
- Reducing earnings inequality (scenario B) results in the 90-10 and 50-10 ratios increasing compared to those obtained in the baseline results;

- The shares of net equivalised household income and earnings are higher for the LMI group when earnings inequality is reduced (scenario B) than when there is greater inequality (A).

## 4.3   Finding a 'good' scenario

In this section, four additional scenarios are explored. These scenarios are intended to show the possible effects of making changes that are focused on particular individuals or groups rather than the more broad approach in scenarios A and B where overall earnings inequality is increased or reduced.

In **Scenario C**, *strong earnings growth at the bottom of the income distribution* is assumed. Within the bottom 3 income decile groups, earnings growth relative to the 5th decile group is pegged to the relativity observed between 1996 and 2006, using the Family Resources Survey (FRS). Across the rest of the earnings distribution, relative earnings growth in different deciles is kept the same as in the *Working Futures* baseline.

Average earnings growth is constrained to remain the same as under the baseline. If interpreted as a 'strong minimum wage scenario', the economic assumption is therefore approximately that the incidence of the higher employer costs resulting from increases in the minimum wage falls on other employees. This is not quite exact, though, because the employer costs of increases in the (gross) minimum wage will differ from the employer savings in corresponding reductions to the wages of others, since the labour tax wedge will be different on average between minimum wage workers and others. In any case, the annual real growth rates imposed on each income decile (with implied percentage adjustments to the level of earnings in each decile relative to the *Working Futures* 2020/21 baseline in parentheses) are as follows:

> Decile 1: +2.2% (+36.5%)
> Decile 2: +1.1% (+18.9%)
> Decile 3: +0.5% (+9.7%)
> Decile 4: -0.2% (-1.7%)
> Decile 5: +0.0% (-1.7%)
> Decile 6: +0.1% (-1.7%)
> Decile 7:  +0.1% (-1.7%)
> Decile 8: +0.1% (-1.7%)
> Decile 9: +0.1% (-1.7%)
> Decile 10: +0.3% (-1.7%)

A *'good skills'* scenario has also been considered. In this scenario (**D**), there is first an adjustment to the employment numbers (i.e. through reweighting of the data). This scenario models a reduction in the number of people with no qualifications compared to scenario 2 (where employment structure is as observed in 2010/11) that is twice as great as

that arising under the baseline (with the employment structure set out in *Working Futures*). In 2010/11 (scenario 2) 9.39 per cent of workers had no qualifications, in the baseline scenario 6.39 per cent had none, and in this scenario (D) just 3.39 per cent of all workers are assumed to have no qualifications.

The number of people in the top qualifications bracket (NQV Level 4 and above) is assumed to be the same as under the baseline (41.94 per cent by 2020) and the proportion in the second-top qualifications bracket (NQV Level 3) is assumed to be the same as in scenario 2 (i.e. to be unchanged since 2010/11) rather than declining as observed in the baseline projections. The proportions of total jobs which are then imposed in the employment structure for Scenario D are:

> No qualifications: 3.39%
> NVQ 1- 2: 33.67%
> NVQ 3: 21.0%
> NVQ 4+: 41.94%

Along with adjusting the proportion of jobs by qualification level, an upwards earnings adjustment is also made for individuals with NVQ Level 1 and 2 so that the ratio of mean earnings for this group relative to the overall mean is maintained at 82 per cent (as in scenario 2 – no change to employment structure from 2010/11) rather than falling to 78 per cent (as in the baseline (scenario 1)). No other adjustments were made to earnings so that average earnings are allowed to rise relative to the baseline.

In **Scenario E**, the number of women employed is assumed to increase by 7.2 per cent relative to the baseline. This increase in employment by women is added to the total level of employment set out in the *Working Futures* projections and there is no offsetting reduction in the number of men employed[9]. This scenario is summarised as the '*good female employment*' scenario. These new jobs for women are assumed to have the same distribution of characteristics (in terms of industry, occupation, etc) as the existing jobs for women found in the *Working Futures* projections.

The imposed 7.2 per cent increase arises from increasing the female activity rate by 8 per cent relative to 2010/11 (i.e. scenario 2), assuming that the employment rate among women who are in the labour force is the same as under the *Working Futures* baseline (94.1 per cent). This 8 per cent increase brings the female activity rate in the UK in line with the average for the 12 'highest-performing' major economies in terms of the female activity rate.

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[9] The source of these new jobs is not modelled using a macroeconomic framework and thus the characteristics of these additional female jobs are somewhat arbitrary. These additional jobs reflect the characteristics of female employment that are exhibited within the working futures projections rather.

Finally, **Scenario F** combines the changes implemented in scenarios C, D and E. The same adjustments to earnings are made as in scenario C (where there is strong earnings growth at the bottom of the income distribution). Earnings for NVQ 1-2 are also scaled up by the same factor as in scenario D (effectively layering on top the more robust returns to low skills). Finally, the reweighting adjustment applied in scenario E is imposed to increase the number of female workers in the data (i.e. extra female workers are 'cloned').

These scenarios result in a lower proportion of the LMI group being not employed than found in the baseline. The 'good skills' scenario (D) results in 27.3 per cent being non-employed whilst 'good female employment' (E) and the combination of these two scenarios with strong earnings growth at the bottom of the income distribution (F) results in the lowest share of the LMI group being non-employed (25.4 per cent) .

Imposing relatively strong earnings growth near the bottom of the earnings distribution and improving skills, as set out in Scenarios C and D, respectively, are found to have little effect on the unemployment rate for the LMI group when compared to the baseline results. Scenario E in which there is an increase in the number of jobs held by women results in 25.5 per cent of the LMI group not being employed in 2020/21 compared to 27.4 per cent under the *Working Futures* baseline only. Under the combined scenario the LMI unemployment rate is 25.4 per cent.

Figure 8 presents average annual growth in real net household income between 2011/12 and 2020/21 as simulated for the baseline along with scenarios C, D, E and F. Unsurprisingly, the combined scenario (F) results in higher growth in household income all along the distribution, particularly so at the bottom end of the distribution (below the median). The increase in growth is greatest amongst the LMI group (deciles 2 to 5) and smallest towards the upper end of the income distribution (higher income).  The other scenarios, 'good' skills (D) and 'good' female employment (F), also result in higher growth in household income than found in the baseline with the improvement in skills resulting in a greater increase in annual growth than increased female employment does from about the 30th income percentile and above.

In scenarios D and E, real equivalised average annual household income growth is found to be (mainly) negative for the LMI group and the benefit reliant group but positive for the higher income group. For the combined scenario (F), growth in household income is negative until about the 25th percentile.

Scenario C, which assumes strong earnings growth for low earners, provides similar results to those arising from the 'good' female employment scenario (E). As shown in Figure 8, scenario C results in income growth being higher than under the baseline for most of the income distribution. From around the 75th percentile, this scenario decreases income growth below that in the baseline working futures scenario.

**FIGURE 8: Average annual real growth in net household income among non-pensioner population between 2011-12 and 2020-21 under *Working Futures* baseline and scenarios D, E and F, by percentile point**
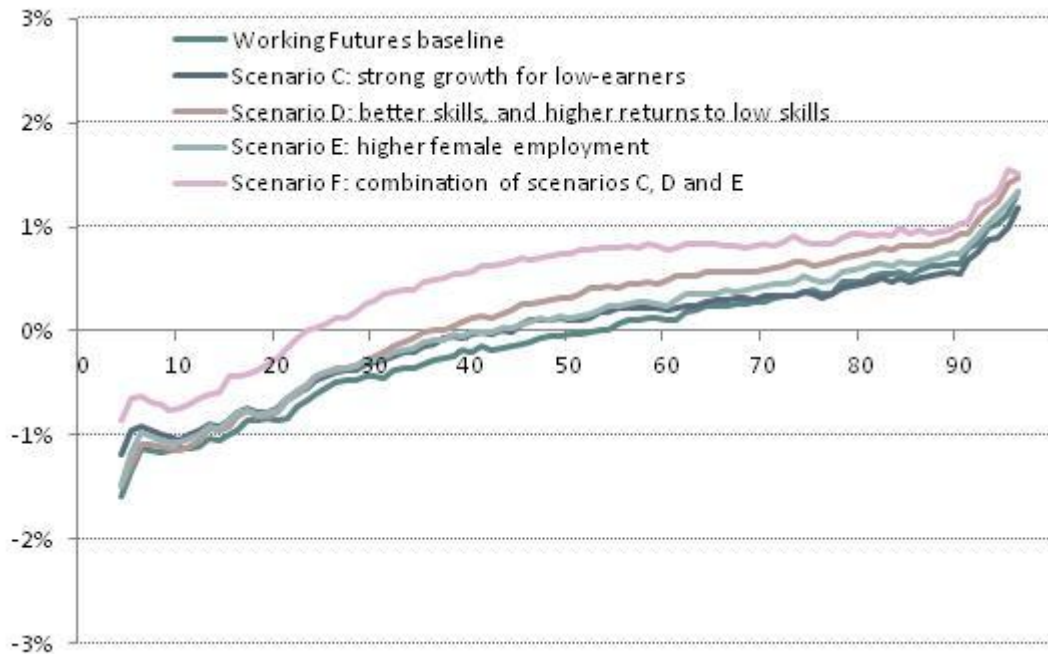


Notes and sources: as above.

Table 7 shows a number of indicators of household income inequality. Of the four scenarios set out in this section only Scenario C (which imposes strong earnings growth at the bottom of the income distribution) and Scenario F results in the 90:10 ratio being reduced compared to the baseline estimates. Inequality within the top half of the household income distribution is lower in all four scenarios compared to the *Working Futures* baseline but in the lower half of the income distribution the scenarios explored in this section all result in greater inequality as indicated by the 50:10 household income ratio.

**TABLE 7: Household income inequality ratios, Baseline and Scenarios C, D, E and F**

| Inequality Ratio | 2020/21 (Baseline) (Scenario 1) | Strong earnings growth at bottom (Scenario C) | Good skills (Scenario D) | Good female employment (Scenario E) | Combined: C+D+E (Scenario F) |
|---|---|---|---|---|---|
| **90:10** | 4.50 | 4.43 | 4.58 | 4.50 | 4.48 |
| **90:50** | 2.05 | 2.00 | 2.02 | 2.03 | 1.97 |
| **50:10** | 2.20 | 2.21 | 2.26 | 2.22 | 2.27 |

The LMI group accounted for 21.1 per cent of gross equivalised earnings under the baseline estimates. In comparison to the baseline, the four scenarios explored in this section (C, D, E and F) all result in higher shares for the LMI group – ranging between 21.5 per cent for the 'good skills scenario' (D) to 22.7 per cent under the combined scenario (F). The income share attributed to the benefit reliant group changes very little as a result of these four scenarios whilst the income share of the higher income group is reduced in all compared to the baseline.

As seen previously, earnings and household incomes are not linearly related in the present model. The four scenarios in this section result in the LMI group having a greater share of net equivalised household income compared to the baseline results whilst the benefit reliant group have a smaller share in all scenarios compared to the baseline. The income share attributed to the higher income group changes little compared to the baseline.

Annual growth rates in real equivalised household earnings and income are provided for the LMI, benefit reliant and higher income groups for the baseline estimates and scenarios C, D, E and F are shown in Table 8. The average annual growth rate of earnings for the LMI group is relatively low, but positive, for all four scenarios compared to the baseline. The highest growth is found under the combined scenario in which household earnings are projected to increase by 0.6 per cent per annum – the three other scenarios growth is 0.1 per cent or less per annum. The benefit reliant group gain most in terms of earnings growth as a result of these alternative scenarios compared to the *Working Futures* baseline. Whilst in the baseline earnings for this group are projected to increase by 1 per cent per annum, under the 'good skills' scenario (D) growth is estimated at 1.1 per cent per annum and in the combined scenario is 2.0 per cent per annum.

**TABLE 8:  Average annual real growth in equivalised household earnings and income between 2008-09 and 2020-21 under *Working Futures* baseline and Scenarios C, D, E and F, by LMI and other groups**

| % p.a. | WF Baseline | Strong earnings growth at bottom (Scenario C) | Good skills (Scenario D) | Good female employment (Scenario E) | Combined: C+D+E (Scenario F) |
|---|---|---|---|---|---|
| **Real equivalised average annual household <u>earnings</u> growth** | | | | | |
| **LMI** | -0.2% | 0.0% | 0.1% | 0.0% | 0.6% |
| **Benefit Reliant** | 1.0% | 1.3% | 1.1% | 1.6% | 2.0% |
| **Higher Income** | -0.3% | -0.3% | -0.1% | -0.2% | 0.1% |
| **Real equivalised average annual household <u>income</u> growth** | | | | | |
| **LMI** | -0.4% | -0.4% | -0.2% | -0.3% | 0.1% |
| **Benefit Reliant** | -1.7% | -1.8% | -1.7% | -1.8% | -1.7% |
| **Higher Income** | 0.2% | 0.2% | 0.4% | 0.3% | 0.5% |

Growth in equivalised average annual household incomes is negative for the LMI group in all scenarios shown in Table 8 except the final combined scenario where it is estimated to be 0.1 per cent per annum. Similarly, growth in household income is found to be negative for the benefit reliant group in all scenarios considered in this section. For the higher income group, the alternative scenarios result in positive growth in household incomes, as does the baseline scenario.

## Summary of outcomes under scenarios C, D, E and F

In this section, a number of alternative scenarios which might result in better outcomes for the LMI group have been considered. The main findings here include:

- Compared to the baseline results, all scenarios explored in this section (imposing strong earnings growth at the bottom of the income distribution; improving the skills of the workforce; increasing female employment; and a combination of all three of these changes) result in lower unemployment rates for the LMI group;
- Unsurprisingly, the combined scenario (F) results in higher growth in household income all along the distribution, particularly so at the bottom end of the distribution (below the median). The increase in growth is greatest amongst the LMI group (deciles 2 to 5) and smallest towards the upper end of the income distribution (higher income).  The other scenarios, 'good' skills (D) and 'good' female employment (F), also result in higher growth in household income than found in the baseline with the improvement in skills resulting in a greater increase in annual growth than increased female employment does from about the 30th income percentile and above;
- Of the four scenarios set out in this section only Scenario C (which imposes strong earnings growth at the bottom of the income distribution) and Scenario F result in the 90:10 ratio being reduced compared to the baseline estimates. Inequality within the top half of the household income distribution is lower in all four scenarios compared to the *Working Futures* baseline but in the lower half of the income distribution the scenarios explored in this section all result in greater inequality as indicated by the 50:10 household income ratio. The results for this scenario illustrate that a minimum wage approach, for instance, may be ineffective in targeting LMI households as such low earners are located in households across the entire household income distribution and not just those near the bottom;
- As seen previously, earnings and household incomes are not linearly related in the present model. The four scenarios in this section result in the LMI group having a greater share of net equivalised household income compared to the baseline results whilst the benefit reliant group have a smaller share in all scenarios compared to the baseline. The income share attributed to the higher income group changes little compared to the baseline;
- Growth in equivalised average annual household incomes is negative for the LMI group in all scenarios shown in Table 8 except the final combined scenario where it is estimated to be 0.1 per cent per annum. Similarly, growth in household income is found

to be negative for the benefit reliant group in all scenarios considered in this section. For the higher income group, the alternative scenarios result in positive growth in household incomes, as does the baseline scenario.

## 4.4 Other implications of changing employment structure and relative earnings growth in 2020/21

Drawing on the results explored in sections 4.1 thru 4.3 above, this section now compares the outcomes for the LMI and other groups across the various scenarios that have been explored. Some of the results in this section have been put forth in the preceding sections but it is useful to discuss the outcomes overall in order to get a better grasp on the potential for implementing changes that might impact on the situation of people with low to middle incomes.

Table 9 provides a number of summary statistics for the LMI group which have been collated from the outcomes generated through the scenarios set out above and for the base year, 2008/09. Included in this table is the share of the LMI group who are expected not to be employed under each scenario. All of the scenarios point to an increase in unemployment amongst the LMI group over that found in 2008/09. In 2008/09 around 23 per cent of people in the LMI group were not employed. Under all scenarios considered, this figure is higher in 2020/21. The baseline *Working Futures* projections results in 27.4 per cent of the LMI group estimated to not be employed given this particular employment structure. The highest unemployment figure (27.9 per cent) is found for the scenario where earnings inequality is reduced (scenario B). Most of the scenarios make little difference to this unemployment rate. The combined scenario (F) which might be considered the optimal, if unrealistic, outcome results in 25.4 per cent of the LMI group not being employed in 2020/21 – 2 percentage points lower than that found under the baseline projections.

The last two columns of Table 9 provide the equivalised upper and lower bounds of the net household income range for the LMI group, in £ per week in 2008/09 prices and are expressed in terms of the equivalent income for a couple with no children. In 2008/09, equivalised net household income amongst this group ranged from £203 per week to £440 per week. If the employment structure in 2020/21 takes on that set out in the recent *Working Futures* projections, then in the present model, the income range would be £173 to £425 per week. When greater earnings inequality is introduced (scenario A), the lower bound of net household income within the LMI group is £169, the lowest found across the scenarios. In the combined scenario, equivalised net household income of the LMI group ranges between £179 and £456 per week.

Also included in Table 9 is the average proportion (across households) of 'gross' income (including benefits, but before netting off taxes) from the state for each scenario and for 2008/09. Under all scenarios, the share of income from the state is found to be lower in 2020/21 than in 2008/09. This is unsurprising given changes to the benefits and tax credits

system that feed into the simulations of 2020/21 outcomes. In the combined scenario (F) the share of income from the State is 1.6 percentage points lower than in the baseline.

**TABLE 9: Comparison of employment, state income and household income ranges for the LMI group under all scenarios**

| | Proportion not employed | Share of income from the State[1] | Equivalised net household income range (£ per annum in 2008/09 prices)[2] | |
| --- | --- | --- | --- | --- |
| | | | Lower | Upper |
| 2008/09 structure | 23.0% | 20.1% | £10,590 | £22,960 |
| WF baseline | 27.4% | 16.4% | £9,000 | £22,180 |
| 2010/11 employment structure | 27.2% | 16.7% | £9,030 | £21,730 |
| A: increased earnings inequality | 26.6% | 16.4% | £8,790 | £21,740 |
| B: reduced earnings inequality | 27.9% | 15.6% | £9,150 | £23,020 |
| C: strong lower earnings growth | 27.4% | 15.7% | £9,120 | £22,420 |
| D: improvement in qualifications and higher returns to lower skills | 27.3% | 15.8% | £9,020 | £23,010 |
| E: increased female employment | 25.5% | 15.7% | £9,100 | £22,490 |
| F: combined C+D+E | 25.4% | 14.8% | £9,340 | £23,790 |

**Notes:** 1. Average proportion (across households) of 'gross' income (including benefits, but before netting off taxes) from the state.
2. Equivalised upper and lower bounds of the **net household income** range for the LMI group, in £ per annum in 2008/09 prices, expressed in terms of the equivalent income for a couple with no children.

Figure 9 presents annual growth in *real gross equivalised earnings* for the LMI group for the *Working Futures* baseline employment projections and the other scenarios. The results are variable across the scenarios. Under the baseline, real gross equivalised earnings are expected to decline by 0.2 per cent per annum between 2008/09 and 2010/11. Scenarios 2 (2010/11 employment structure) and B (increased earnings inequality) worsen this outcome by 0.3 percentage points (to -0.5 per cent per annum) and 0.5 percentage points (to -0.6 per cent per annum), respectively.[10] Growth in earnings is found to be improved for the LMI group under the remaining scenarios. The largest growth for this group is found under the combined scenario (F) which is estimated to increase average annual earnings growth in LMI households by 0.7 percentage points (to +0.6 per cent per annum between 2008/09 and 2020/21).

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[10] Numbers may not sum due to rounding

**FIGURE 9: Annual growth in real gross equivalised earnings for LMI group in baseline scenario, and deviation from baseline results in other scenarios**
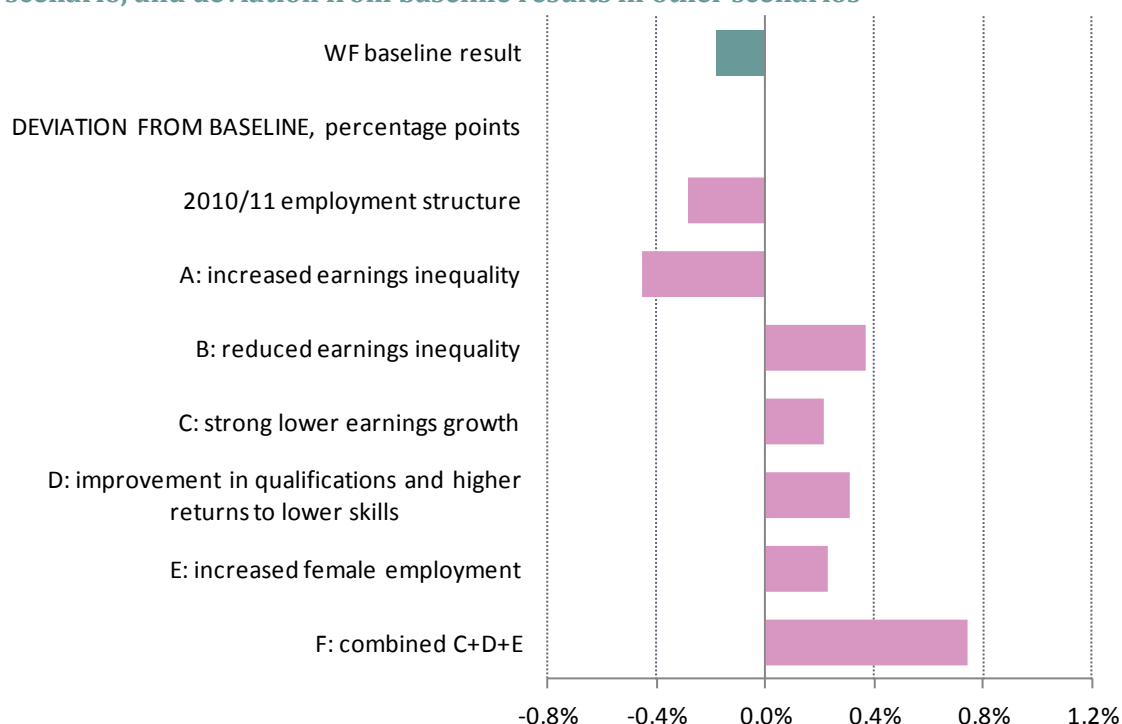


Still looking at earnings, it is useful to examine the annual growth in real earnings from each of the scenarios at various points in the individual earnings distribution. Figure 10 shows how growth in real earnings differs for each percentile point across the scenarios. For the highest earnings group (p90), the scenario in which increased earnings inequality is assumed, unsurprisingly, results in the highest level of growth (0.5 per cent per annum) whilst this scenario results in negative earnings growth of -0.3, -1.2 and -2 per cent per annum for the 50th, 25th and 10th percentiles, respectively.

As can be seen in Figure 10, a number of the scenarios result in negative earnings growth for individuals at lower points in the earnings distribution. Whilst at the 75th and 90th percentiles, positive growth is found in most cases. At the 25th and 10th percentiles, the scenario in which female employment is increased (E), this results in negative earnings growth which is greater in magnitude than that found under the baseline. This result might be reflective of the concentration of females in employment that is relatively lower paid and / or more likely to be part-time.

Under the final combined or optimal scenario, earnings growth is found to be positive along the full earnings distribution. The rate of growth shown in Figure 10 ranges from 0.3 per cent per annum at the 75th and 50th percentiles and 1.2 per cent per annum at the 10th percentile.

**FIGURE 10: Real earnings growth at particular percentile points of the gross individual earnings distribution (including workers only) by scenario**
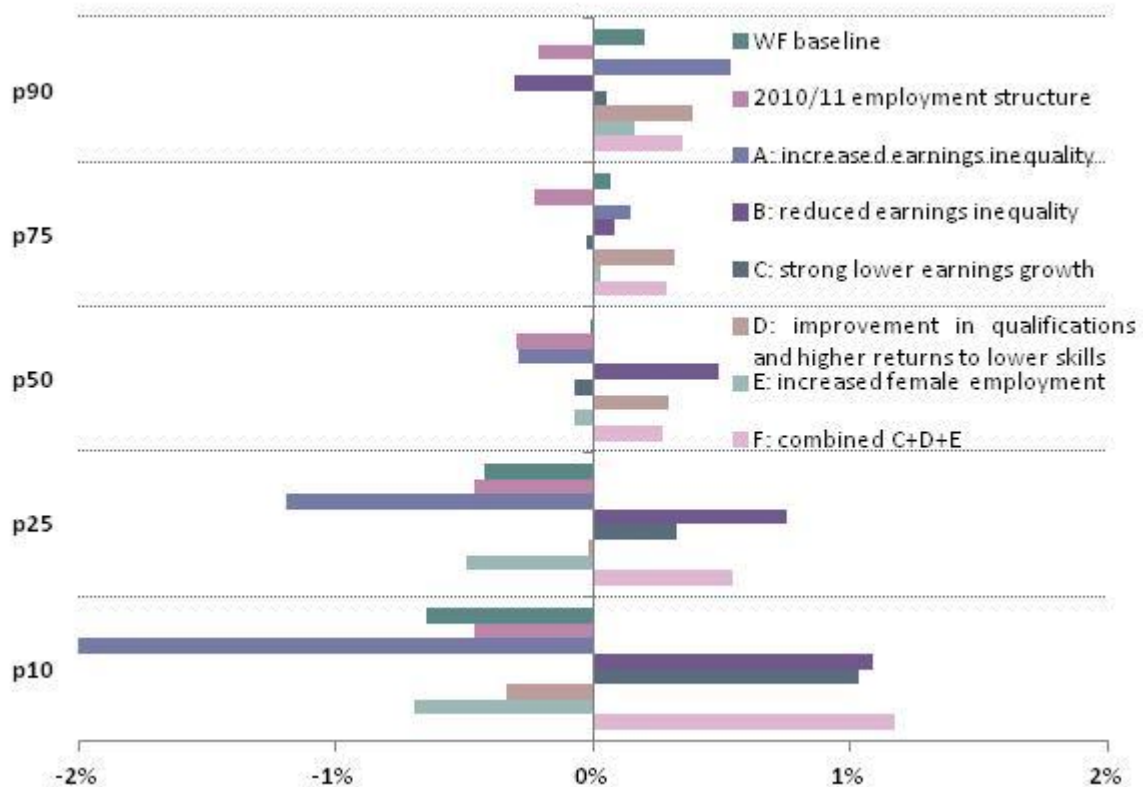


Moving on from individual earnings, the focus now turns to household incomes in order to help illustrate that the translation of changes in earnings which result from changes in employment structure and / or relative pay growth, is not straightforward. Figure 11 shows annual growth in real equivalised average annual household income between 2008/09 and 2020/21 for the LMI group under the baseline Working Futures employment projections as well as deviation from these results in other scenarios.

Negative growth is found for all scenarios except the final combined scenario in which real equivalised average annual household income is expected to be 0.5 percentage points higher than in the baseline, resulting in marginally positive growth on average each year between 2008/09 and 2020/21. The greatest negative impact is found under scenario A in which increased earnings inequality is assumed.

**FIGURE 11: Annual growth in real equivalised average annual household income for LMI group in baseline scenario, and deviation from baseline results in other scenarios**
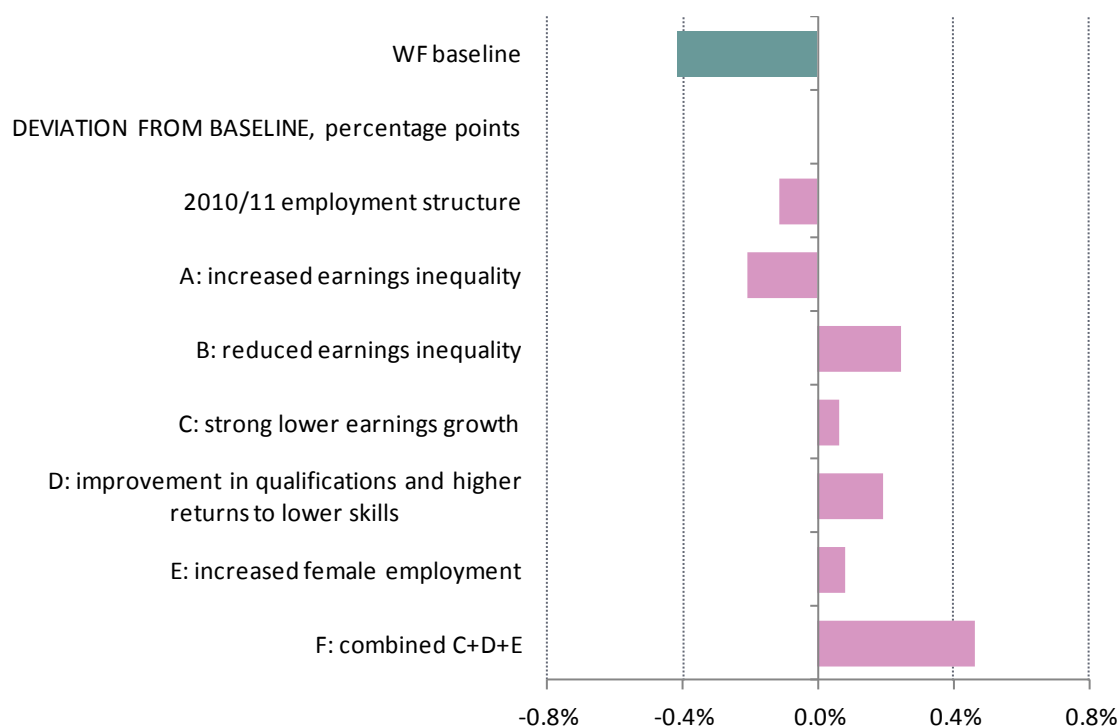


Annex B outlines further results for incomes and earnings shares for the three income groups as well as additional inequality metrics.

## Summary of implications for all scenarios

This section has drawn together the various employment and pay scenarios which have been explored and compared their implications for various measures of household income, earnings and inequality. The main findings include:

- Weekly net (equivalised) household income of the LMI group ranged between £203 and £440 per week in 2008/09. Both these upper and lower bounds are expected to decrease for the baseline projections and under most scenarios considered. The lower income bound for the LMI group is expected to be lower in 2020/21 under all estimates produced here whilst reducing earnings inequality (Scenario B), improving qualifications (D) are found to increase the upper bound of weekly income for the LMI group;

- Growth in real gross equivalised household earnings between 2008/09 and 2020/21 is expected to be positive for the benefit reliant group under all scenarios however, lower growth and negative growth in earnings is expected under a number of scenarios for the LMI group. Household earnings growth is found to be negative for the higher income group for all but the final, combined scenario;

- The pattern of growth in real equivalised average annual household income by group is markedly different. Average household income is expected to decline for the benefit reliant group under all scenarios for 2020/21 and for the LMI group negative growth is

expected in all but the final, combined scenario. For the higher income group, only the scenario in which the employment structure remains as observed in 2010/11 results in negative growth in household income;

- Whilst overall earnings growth for those in the bottom half of the earnings distribution looks relatively weak over the forecast period, the findings for household income growth are worse. Weaker income growth results from a number of factors, weaker state support being a major one. This is apparent too in the reduction in the share of income coming from the State in 2020/21 compared to 2008/09;

- All future scenarios indicate that the net equivalised household income share for the LMI group is expected to be lower in 2020/21 than in 2008/09. This varies for gross equivalised individual earnings share. The same is found for the benefit reliant group. Both the individual earnings and household income shares of the higher income group are expected to increase to 2020/21.

- According to the 90-10 ratio, overall inequality in household income is set to increase in 2020/21 compared to 2008/09. Whilst some of the changes implemented in a number of scenarios lessen the impact of the Working Futures employment projections, the end result is increased inequality.

# 5.     Conclusion

Considering the impacts of changes in the structure of UK employment on the lives of people on low to middle incomes is not a straightforward exercise. Whilst they are of interest in their own right, our employment projections and the underlying macroeconomic forecasts are not the main focus of this report and are largely kept unchanged in the scenarios which have been discussed.  Our focus is on outcomes in terms of earnings and, more importantly, household incomes which ensue from a particular employment structure and assumptions about relative earnings growth.

The baseline *Working Futures* projections of employment in 2020/21 result in a worsened picture for LMI households. The group's share of household income is set to decrease and inequality is set to increase under these projections. Looking at alternative scenarios in which these projections are augmented in terms of employment structure and / or relative pay indicates that trying to overcome the impact of the underlying long-term trends of employment change is not simple and would take concerted efforts.

The various scenarios explored here have illustrated the complex relationship between employment, earnings and household incomes. Whilst the characteristics of workers may be correlated with individuals' positions in the earnings distribution (e.g. individuals with lower earnings are relatively more likely to have low qualifications, to be female and to be employed on a part-time basis) such correlations between characteristics of individuals and jobs and household incomes are not as clear.

A number of people are not in work at all and thus do not hold a place in the distribution of individual earnings at all. Individuals who may be near the bottom of the earnings distribution will therefore not necessarily be at the bottom of the household income distribution as households also include individuals who are out of work. Households also vary in composition and individuals who occupy different positions in the individual earnings distribution may reside in the same household. As a result individuals with low individual earnings may live in households with high earners, for example, and therefore will be located nearer the top of the household income distribution.

Measures of household level income are typically adjusted for the size and structure of the household in order to reflect differences in the income required by different types of households to achieve the same living standards (i.e. expressed in terms of equivalised incomes) which results in a further disjoint between earnings and household incomes. Finally, earnings are not the only source of income for all households and households face different effective tax rates on earnings. The tax and benefit system which takes household circumstances into consideration further complicates the relationship between individual earnings and household incomes.

This analysis does not point to a specific solution for improving the prospects for low to middle income Britain but it does go some way in providing a better understanding of how changes in pay and employment structures are likely to affect different groups. This is useful from a policy perspective as it illustrates that what might at first glance appear as an instrument for improving LMI living standards may cause some unexpected results.

While our baseline findings present an extremely challenging decade, these scenarios also show that things could be different. Made in isolation, the changes we have examined have only a modest impact. But their combined effect is significant. Under the combined scenario, income for a typical household at middle income will be £1,600 higher in 2020 than in the baseline scenario.  Furthermore, under this scenario income growth from 2008 to 2020 is forecast to be negative across only 22 percent of the distribution, rather than across 52 percent under the baseline.

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# Annex 1    Technical Methodology

This annex contains more detailed information on the approach used in this study with greater detail on the underlying models and data which have been discussed briefly in Section 2 (Methodology). As stated, the approach uses two main sets of models, those which produce the *Working Futures* employment projections for the UK, and the IFS models of tax and benefits. These models and other details of the current analysis are set out in this annex.

## *Working Futures* methodology

The *Working Futures* 2010-2020 employment projections (Wilson and Homenidou, 2011) serve as the baseline in looking at the implications of employment structure for people in the LMI group and all along the income distribution. *Working Futures* concentrates primarily on a quantitative, economic based approach to anticipating changing employment structures, including changing skills needs. The main focus is on sectoral and occupational employment structures, but the analysis also distinguishes highest qualifications held by people in employment, gender and status (full-time and part-time employees and self-employment), as well as region of employment.

The detailed examination of sectoral as well as occupational change and their implications for skill requirements at both a micro and macro levelis based upon the use of a variety of research methods, ranging from complex econometric modelling, to other more qualitative approaches, depending upon the objectives of the work and the nature of the basic data available. Central to *Working Futures* is a detailed regional multi-sectoral macroeconomic model (RMDM) developed by Cambridge Econometrics (CE). The approach adopted uses existing official data from the national accounts and the Labour Force Survey. Full details of the forecasting approach are set out in the *Working Futures* Technical Report (Wilson and Homenidou, 2012).

The CE macroeconomic forecasts are used to develop detailed industry results for all the English regions and the three other countries which make up the UK. These results are subsequently extended to include occupations and qualifications using various modules developed by IER. These modules are based on data from the Labour Force Survey and other sources and are used to develop historical measures of the occupational and qualification structure of employment within industries. A combination of econometric methods and judgment is then used to generate projections of these patterns forward to 2020 (for details see Wilson and Homenidou, 2012).

## IFS Poverty Module and TAXBEN methodology

The IFS model is based on the sample of the population in the Family Resources Survey (FRS). The FRS includes detailed data on incomes and other issues. The modelling comprises reweighting key data from the survey in order to reflect expected changes in household characteristics (i.e. demographic change and employment changes), uprating financial variables such as earnings to their expected future levels, and computing households' net

(post tax and benefit) income using TAXBEN, the IFS tax and benefit micro-simulation model. Other adjustments and assumptions are also made in this process. The model produces a simulated distribution of future net household income from which statistics of interest, such as forecasted poverty and inequality, are obtained.

The approach to simulating the distribution of net household income is best understood in terms of a number of steps:

1. Begin with 'base data' on the distribution of private income and household characteristics (25,003 households from the 2008/09 FRS).
2. Financial variables, e.g. earnings, are up-rated to assumed future levels.
3. Data are re-weighted to reflect expected socio-demographic change (ONS forecasts), and employment changes (using *Working Futures* projections). Essentially, this means increasing the relative weight given to types of people expected to become relatively more common. In the baseline scenario changes in total employment between 2008/09 and 2020/21 are made in line with *Working Futures* forecasts. The overall level of employment is then assumed fixed for most other 2020-21 scenarios, but the structure within that total is changed by changing the relevant weights.[11]
4. Tax liabilities and benefit and tax credit entitlements are also simulated, given the expected future tax and benefit system, using TAXBEN (IFS' static tax and benefit micro-simulation model).
5. Incomes are adjusted to reflect non-take-up (and non-reporting) of means-tested benefits and tax credits.

These steps yield a simulated future distribution of household incomes, from which forecasted statistics of interest are obtained. Further details of the IFS modelling approach are available in Brewer, Browne and Joyce (2011).

### Combining the Models

The *Working Futures* projections are incorporated into this IFS framework by reweighting the FRS data to adjust the number of employed individuals in each of the following categories in 2020 so as to match the patterns in the *Working Futures* projections (see step 3 above). Forecasts of employment growth by the following dimensions are used:
- Gender;
- Region (9 English regions and Wales/Scotland/Northern Ireland);
- Qualification level (4 categories);
- Status (Full-time/part-time/self-employed);
- Occupation (9 categories);

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[11] The FRS data is weighted to account for non-random response to the survey and to resemble the UK population as a whole, according to certain characteristics which are used to form a set of 'control totals'. The reweighting techniques involves specifying control totals and implementing an algorithm which computes a set of weights to make the data from the FRS conform to the set of control totals.

- Industry (13 categories).

For the present analysis, the reweighting element (step 3 in the previous list, above) exploits the detailed forecasts of employment by subgroup from *Working Futures*. In practice, the level of disaggregation in employment forecasts that can be explicitly modelled using this reweighting technique is limited, and there are good reasons to avoid high levels of disaggregation, even if technically feasible. Imposing too many constraints on the weights can result in some households being given very high or very low weights in order to satisfy all the constraints (more generally, adding constraints increases the variance of the weights). This makes the simulation results unstable and particularly prone to sampling error.

Pay data were taken from the FRS (2008/09) and wages were projected to 2020/21 by imposing a range of alternative growth rates which reflect both historical trends and possible alternative future paths for things like gender pay differentials. For the baseline estimates, the growth rate of pay was assumed to be the same for all individuals (3.6 per cent per annum, as in *Working Futures*). For the various scenarios, which are explored further in Chapter 4 of the main report, pay growth was varied according to individual's characteristics. For these scenarios, views have been taken about pay differentials by gender and qualifications held. Using these growth rates and the characteristics of individuals in the data, their individual earnings are then uprated by the appropriate group-specific amount.

A range of assumptions about patterns of pay and employment patterns in the future were developed for the scenarios. These assumptions have been informed by observed historical trends in rates of returns (e.g. to occupations, qualifications, etc), and changes in patterns of pay and pay relativities between particular groups (e.g. male-female earnings ratios) over the period various periods.

The development of the quantitative scenarios on employment is based on the main *Working Futures* projections to 2020, with variations in employment structure added around that baseline (e.g. increased proportion of employed people with at least some qualifications). The 2008/09 FRS data are re-weighted so that, in the newly weighted data, the number of jobs in each of the above categories matches that implied by the *Working Futures* baseline or these alternative structures. These forecasts of employment growth between 2008/09 (the base data) and 2020/21 are then applied to the FRS data using the algorithm set out in Gomulka (1992). This provides the link between the 'individual' employment and earnings focus in *Working Futures* and the household focus of the IFS model which is used to draw out the implications for poverty and inequality.

The sets of assumptions provide the basis for an exploration of the implications of changing employment structures for the LMI group and others and for inequality overall. The basic

approach sees the whole distribution of household incomes in the UK in future years being simulated.

The various scenarios considered for the evolution of pay are incorporated in step 2 of the procedure outlined above, where the earnings of working individuals are uprated by particular assumed amounts which depend upon their characteristics, such as their gender, industry or occupation. Details of these pay assumptions are outlined in Section 5, along with the results of the simulations under each scenario.

# Annex 2   Defining the LMI and other groups

The Resolution Foundation (RF) defines the LMI group as adults living in working-age households that fall into household income deciles 2 to 5 who receive less than one-fifth of their gross household income from means-tested benefits (excluding tax credits).  In more detail, the Resolution Foundation follows a three-stage process in defining the LMI group (and other groups of interest):

1. Remove retired households from the overall population
2. Equivalise gross incomes (before housing costs) among the remaining working-age population and, on this basis, divide households into ten deciles.
3. Re-categorise all households that receive more than one-fifth of their household income from income-related benefits (excluding Tax Credits) into the 'benefit reliant' group.

Adults living in deciles 2 to 5 are defined as belonging to the LMI group.  By contrast, those living households in deciles 6 to 10 are classified as the 'higher income' group and those living in households in decile 1, along with those identified in Step 3 above, as the 'benefit reliant' group.

In some cases, the limitations of a particular data source (for example the lack of data on income-related benefits) means that RF adopts a simplified version of this definition.  This project will adopt as full a version of the above definition as possible, using reasonable proxies where necessary. In the case of the present analysis, the following definitions apply:

- **Low to middle income** (of primary interest) -   those in decile groups 2-5 of the equivalised working age household income distribution (of households, not individuals), excluding those who receive more than 50 percent of their income from tax credit and benefits combined;
- **Benefit reliant** - those in decile group 1 of the equivalised working-age household income distribution (of households, not individuals), plus all households receiving more than 50 percent of their income from tax credits or benefits.
- **Higher income** -   those in decile groups 6 to 10 of the equivalised working-age household income distribution (of households, not individuals)

The three categories add up to 100 per cent of individuals in working-age households.

# Annex 3    Additional results

## Income and earnings shares

Table 10 shows shares of net equivalised household income and gross equivalised earnings for the benefit reliant, LMI and higher income groups for the baseline projections and each of the alternative scenarios. It should be noted that In 2008/09, the LMI group had nearly 22 per cent of gross equivalised individual earnings and 23 per cent of household income. These shares are reduced in 2020/21 under the baseline working futures employment projections to 21.1 per cent of earnings and 21.3 per cent of household income. The shares of earnings increase from 2008/09 to 2020/21 under the baseline assumptions for the benefit reliant and higher income groups but the household income share increases only for the higher income group, from 61.8 per cent in 2008/09 to 66.5 per cent in 2020/21 under the baseline.

Scenario B (reduced earnings inequality) and the combined scenario (F) both result in the LMI group having a higher share of individual earnings than the baseline scenario and compared to 2008/09 shares. The household income shares in these scenarios however are lower than in 2008/09 for the LMI group but are higher than under the baseline projections alone. The changes made under these scenarios do mitigate the negative effects on income shares which result from the changes in employment structure between 2008/09 and 2020/21 which are set out in Working Futures, but not completely.

**TABLE 10:  Net equivalised household income and gross equivalised earnings shares for LMI, Benefit Reliant and Higher Income groups, by scenario**

|  | Gross equivalised Individual earnings shares | | | Net equivalised household income shares | | |
|---|---|---|---|---|---|---|
|  | LMI | Benefit reliant | Higher income | LMI | Benefit reliant | Higher income |
| 2008/09 | 21.9% | 1.6% | 73.2% | 23.0% | 9.6% | 61.8% |
| 1: *Working Futures* baseline | 21.1% | 1.8% | 75.1% | 21.3% | 7.7% | 66.5% |
| 2: 2010/11 employment structure | 21.5% | 1.8% | 74.5% | 21.8% | 8.0% | 65.5% |
| A: increased earnings inequality | 19.5% | 1.9% | 76.6% | 20.5% | 7.9% | 67.1% |
| B: reduced earnings inequality | 22.5% | 2.2% | 73.3% | 22.7% | 7.1% | 65.6% |
| C: strong lower earnings growth | 21.9% | 1.8% | 74.3% | 22.0% | 7.2% | 66.2% |
| D: improvement in qualifications and higher returns to lower skills | 21.5% | 1.7% | 74.8% | 21.7% | 7.4% | 66.5% |
| E: increased female employment | 21.8% | 1.8% | 74.4% | 21.9% | 7.2% | 66.4% |
| F: combined C+D+E | 22.7% | 1.7% | 73.6% | 22.7% | 6.6% | 66.3% |

**Note:** Top and bottom 3 per cent of each distribution has been dropped affects income and earnings shares
**Source:** Author's calculations.

## Household income inequality

The baseline projections indicate that household income inequality is set to increase from 2008/09 to 2020/21. In 2008/09, overall inequality, as indicated by the 90-10 ratio was 3.81 compared to 4.50 in 2020/21 under the baseline employment forecasts. This inequality measure is the same or greater as the baseline estimate in three other scenarios: Scenario A with increased earnings inequality; Scenario D – the good skills scenario; and Scenario E – the 'good' female employment scenario. All of the scenarios indicate greater inequality than observed in 2008/09.

Inequality in the upper half of the household income distribution, as indicated by the 90-50 ratio, is again increased over 2008/09 in all scenarios. Amongst the scenarios, this measure is highest in scenario A (increased earnings inequality) where there is particularly strong growth at higher incomes. This scenario also results in the highest level of overall inequality (as measured by the 90-10 ratio). Individual earnings are more directly related to household incomes at higher points in the distribution as earnings are a greater proportion of net income than in lower parts of the income distribution.

The 50-10 ratio, which indicates household income inequality in the bottom half of the income distribution is also worsened over 2008/09 in the baseline estimates and all other scenarios as shown in Table 11. The final combined scenario results in the highest 50-10 ratio (2.27). In this scenario, strong earnings growth at the bottom of the earnings distribution, improved skills and greater female employment are beneficial to households near the lower end of the household income distribution but the overall effects of these changes are likely to be greatest for those individuals already in work and not necessarily in the lowest income households. The increased 50-10 ratio may reflect that despite the changes implemented in this scenario, there are many in the poorest households who remain out of work altogether and thus are not affected by improvements in earnings.

**TABLE 11: Household income inequality ratios for 2008/09, baseline and other scenarios**

|  | 90:10 | 90:50 | 50:10 |
|---|---|---|---|
| 2008/09 | 3.81 | 1.93 | 1.98 |
| 1: *Working Futures* baseline | 4.50 | 2.05 | 2.20 |
| 2: 2010/11 employment structure | 4.33 | 2.02 | 2.14 |
| A: increased earnings inequality | 4.66 | 2.12 | 2.20 |
| B: reduced earnings inequality | 4.36 | 1.95 | 2.23 |
| C: strong lower earnings growth | 4.43 | 2.00 | 2.21 |
| D: improvement in qualifications and higher returns to lower skills | 4.58 | 2.02 | 2.26 |
| E: increased female employment | 4.50 | 2.03 | 2.22 |
| F: combined C+D+E | 4.48 | 1.97 | 2.27 |

## The Resolution Foundation

The Resolution Foundation is an independent research and policy organisation. Our goal is to improve the lives of people with low to middle incomes by delivering change in areas where they are currently disadvantaged. We do this by:

- Undertaking research and economic analysis to understand the challenges facing people on a low to middle income;

- Developing practical and effective policy proposals; and

- Engaging with policy makers and stakeholders to influence decision-making and bring about change.

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