Institute for Fiscal Studies

The Impact of Proposed Tax, Benefit and Minimum Wage Reforms on Household Incomes and Work incentives

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Executive summary

- The UK government's proposed package of tax and benefit changes to be introduced between 2015–16 and 2019–20 (those announced in fiscal events up to and including the July Budget) will reduce household incomes by £455 a year on average. However, this average figure disguises considerable variation across the population.
- The biggest losers from these changes will be low-income households with children. Better-off households and pensioners will be less affected, or even gain from these changes.
- Low-income working households lose roughly the same as low-income non-working households from changes to the existing benefit system on average. However, this will change following the introduction of universal credit, as universal credit benefits some working households, in particular single-earner couples, but reduces the incomes of some non-working households.
- Cuts to out-of-work benefits will modestly strengthen work incentives on average. Two summary measures of the incentives for people to be in paid work, the participation tax rate and the replacement rate, fall by 2.5 percentage points (ppts) and 2.2ppts respectively. This is perhaps a smaller reduction than one might have expected given the scale of the benefit cuts.
- A key explanation for the limited effect these policies have on work incentives is the significant planned cuts to in-work support. Indeed, benefit changes other than universal credit increase participation tax rates for around 6.7 million people, and increase average participation tax rates among those groups who are more likely to receive tax credits while in paid work including lone parents and those whose partner is not in paid work. This arises because, for these individuals, in-work support is being cut by more than out-of-work benefits.
- Universal credit also strengthens work incentives on average, but in many ways has the opposite effect to other benefit changes. Whereas other benefit changes strengthen work incentives for those with a working partner but weaken them for those whose partner does not work, because universal credit increases the amount of support given to single-earner couples, it particularly strengthens work incentives for those whose partner is not in paid work. However, neither universal credit nor other benefit changes significantly strengthen work incentives for lone parents.
- Tax and benefit changes to be introduced over the next four years strengthen incentives for those in paid work to increase their earnings on average as fewer workers will lose means-tested support if they do so. The average effective marginal tax rate (EMTR, the proportion of a small increase in earnings that is lost in either higher taxes or withdrawn benefits) falls by 2.1ppts as a result of these changes.
- This strengthening of incentives largely arises because fewer workers are entitled to means-tested benefits and tax credits as a result of cut in means-tested support, meaning that they will no longer face withdrawal of support if they increase their earnings. But the incentive to increase earnings will weaken

for around 2.1 million workers who remain entitled to tax credits as a result of the planned increase in the tax credit withdrawal rate.

- Again, universal credit has the opposite effect to other benefit changes: it increases the number of workers subject to benefit withdrawal if they increase their earnings, but has the highly desirable effect of strengthening the incentive to earn more for those who face the weakest incentives under the current system. Benefit changes other than the introduction of universal credit increase the number of workers with EMTRs of more than 80% by 500,000 (from 1.3 million to 1.8 million) but universal credit then reduces this number by 1.3 million or 72%.
- The introduction of the new 'National Living Wage' announced in the Summer Budget will also strengthen the work incentives of those aged 25 and over whose hourly wage is currently below this level. It has the same effect on average replacement rates as tax and benefit changes for this group. However, since around five out of six workers are paid more than the NLW already, tax and benefit changes have a larger impact on the average replacement rate among all workers. Furthermore, among the group currently paid below than the NLW, it will strengthen incentives the least for those with the weakest incentives in the first place: for these individuals, most of the increased earnings are lost in withdrawn benefits and tax credits.

1. Introduction

On 8 July 2015, Chancellor George Osborne delivered the first Budget of the new all-Conservative administration, implementing a number of changes to taxes and benefits proposed by the Conservative party during the 2015 General Election campaign. These included increases in the income tax personal allowance and higher rate threshold, restrictions in tax relief on pension contributions and an increase in the inheritance tax nil-rate band for homeowners. Furthermore, full details of the Conservatives' promised cuts to social security benefits and tax credits were outlined for the first time, including a four year freeze on most benefits received by those of working age, substantial reductions in the amount of support provided through working tax credit and, in future, universal credit to low-income working families and, for new claimants and new births, limiting the child element of tax credits and universal credit to two children. But these are not the only changes to the tax and benefit system that will be introduced over the next few years. A number of reforms announced during by the previous Conservative-Liberal Democrat coalition government during its period in office were not fully implemented by May 2015, and are now set to be implemented by the current government. The most important of these is the integration of six working-age benefits and tax credits into universal credit: a very significant change to the structure of the benefits system for those of working age. These changes will all have an impact on household incomes, and on the incentives individuals face to enter paid work or increase their earnings, and these changes will have different impacts on different people depending on their income levels, family circumstances, age, disability status, housing tenure and consumption patterns, since peoples' tax liabilities and benefit entitlements depend on all of these factors.

Another important change that was announced in the July 2015 Budget was the introduction of a 'National Living Wage' (NLW, a higher minimum wage for those aged 25 and over) from April 2016, to reach 60% of the median wage by April 2020 (£9.35 an hour under current forecasts). The Office for Budget Responsibility estimates that overall this change will reduce national income by 0.1% as a result of fewer hours being worked. Thus, although some households will see their incomes increase as a result of being paid more per worked, others will lose out, either because they are no longer employed at the higher minimum wage rate, they face higher prices from firms having to pay the NLW to their employees or they see lower returns on shareholdings as a result of lower company profits. The gains to workers as a result of receiving a higher wage can be calculated relatively easily, but it is more difficult to ascertain which households will lose out. In this report, as well as showing the direct impact of tax and benefit changes on household incomes and work incentives, we analyse the distributional impact of the gains from the NLW, the impact of the NLW on the work incentives faced by those whose wages are currently below the level of the NLW, and how the introduction of the NLW affects the work incentives of those currently not in paid work to take a job at the minimum wage.

This report proceeds as follows. In Section 2 we set out the scope of policies included in our analysis and our methodological approach. In Section 3, we show the results of our

analysis of the distributional impact of tax and benefit changes. Section 4 shows the result of our work incentive analysis, and Section 5 concludes.

2. Methodology

The analysis presented in this report is essentially a complicated arithmetical exercise conducted using the IFS tax and benefit microsimulation model, TAXBEN. TAXBEN is an extremely detailed model of the UK tax and benefit system that calculates liabilities to income tax, employee and employer National Insurance contributions, council tax and the main indirect taxes (VAT, insurance premium tax and excise duties) and entitlements to the main benefits and tax credits under different tax and benefit systems. Thus, it only calculates the direct effects of tax and benefit changes on household incomes, and does not account for indirect effects on household incomes that may result from changes in behaviour caused by the tax and benefit reforms themselves. These potential behavioural responses are a key motivation for analysing the effect of reforms on work incentives. Quantifying changes in incentives resulting from tax and benefit reforms can help give us a sense of the scale of behavioural responses we might expect to see.

However, our analysis is not fully comprehensive: it does not include changes to most business taxes (corporation tax and business rates) and capital taxes (capital gains tax, inheritance tax, and stamp duties on property and share transactions). Thus, our analysis does not include the impact of some tax changes, including the increase in the nil-rate band for inheritance tax for homeowners and the reduction in the main rate of corporation tax that were announced in the July 2015 Budget. Similarly, our analysis does not include the impact of changes in the levels of spending by government departments on different households, for example the impact of increased spending on childcare services. Both increasing taxes that are formally incident on businesses and reducing departmental spending will have an impact on households' wellbeing, but it is much harder to calculate exactly how than it is to calculate mechanical gains and losses from tax and benefit changes.

We measure 'reforms' relative to a baseline where parameters in the April 2015 tax and benefit system are increased over time according to the usual uprating rules. This is the 'unchanged policy' baseline used by HM Treasury when costing policy measures in Budgets and Autumn Statements. In most cases, this involves direct tax thresholds and benefit rates increasing in line with CPI inflation and duty rates increasing in line with RPI inflation. The specific reforms that we include in our analysis are:

- Increases in the income tax personal allowance and higher rate threshold;
- Restrictions on tax relief on pension contributions (the £1 million lifetime limit and a reduction in the annual contribution limit for those with incomes above £150,000);
- Increases in tobacco duty and insurance premium tax;
- The introduction of the single tier pension for those reaching state pension age on or after 6 April 2016;
- The replacement of disability living allowance (DLA) with personal independence payment (PIP);

- The introduction of 'Tax-Free Childcare' (a 20% subsidy for the first £10,000 of childcare spending per child for families where all adults are in paid work and none has an income of more than £150,000 a year);
- A four-year freeze on most working-age benefits from 2015–16 to 2019–20;
- A reduction in the household benefits cap from £26,000 to £23,000 a year in London and £20,000 elsewhere;
- The restriction of the per-child element of child tax credit to two children in a family for new claims and new births from April 2017;
- The abolition of the family element of child tax credit for new claims from April 2017;
- The increase in the tax credit taper rate from 41% to 48%;
- Reductions in the first tax credit threshold and the work allowances in universal credit (note that we assume that this measure is implemented as planned in the July Budget, without any potential mitigations that may be introduced in the Autumn Statement on 25 November);
- The abolition of the work-related activity group premium in employment and support allowance (ESA) for new claims from April 2017.

We also show the impact of the introduction of universal credit in our analysis. Since this is such a fundamental reform to the working-age benefits system, we show the impact of universal credit separately from that of other changes to the benefits system.

Note that some of these changes will not affect all claimants by 2019–20 (the end point of our analysis), but we do not account for this in our analysis as modelling the dynamics of claimants' behaviour would make it intractable. Nor do we incorporate the transitional protection that claimants who are moved across to universal credit will receive when they first start claiming the new benefit. Therefore, our analysis should be thought of as showing the long-run impact of tax and benefit reforms due to come into effect in the current parliament.

3. Distributional analysis results

This section shows the results of our distributional analysis. We begin by comparing the average gains and losses from tax and benefit changes by income decile and then comparing this with the gains from the National Living Wage. We then show how the impact varies within each income decile by household type, and then show other breakdowns of our analysis.

3.1 Distributional impact of reforms by income decile

Impact by income decile group

Figure 3.1 shows the distributional impact of the reform by decile (tenth) of the income distribution. To construct the income deciles, we rank households by their income adjusted for family size using the McClements equivalence scale and split them into ten equal-sized groups.

Overall, the direct impact of tax and benefit changes is to reduce the average household income by £455 a year. An average loss of £470 a year from benefit changes other than the introduction of universal credit, plus an average loss of £70 a year from indirect tax changes and £5 a year from the introduction of universal credit are slightly offset by an average gain of £89 a year from changes to direct taxes.

Since the changes to benefits are the largest component of the changes, the overall distributional pattern is driven by the distributional effect of these changes. Unsurprisingly given the highly means-tested nature of the UK's working age benefits system, cuts to these benefits disproportionately affect the poorer half of households. We can see that the biggest losses occur in the lower-middle of the income distribution. This is because the big reduction in the first tax credit threshold does not affect those with the very lowest incomes, but those on modest incomes in paid work. However, those who are not in paid work are affected by other benefit cuts, including the four-year benefit freeze, the reduction in the household benefits cap and the restriction of the per-child element of child tax credit to two children. By contrast, the richest two tenths of households actually benefit from benefit changes that will be introduced over the next four years, namely the introduction of the single tier pension and tax-free childcare (which we classify as part of the benefits system rather than part of the tax system). These richer households are not significantly affected by cuts to means-tested benefits and tax credits.

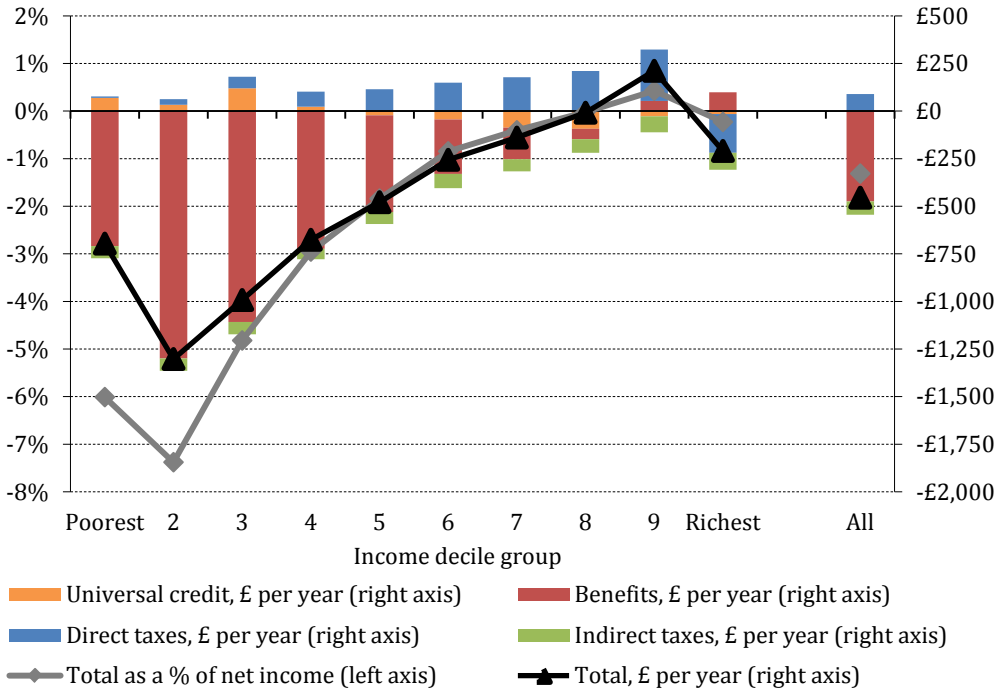
Direct tax changes are smaller, but mainly benefit higher-income households, though not the very richest. Many poorer households do not pay income tax in the first place and so do not benefit from increases in the personal allowance. Moreover, higher rate taxpayers gain more than basic rate taxes from the government's changes to income tax as a result of increases in the higher rate threshold (the point at which the 40% rate becomes payable). However, the very richest households lose out significantly from restrictions to tax relief on pension contributions, which means that the richest tenth of

households lose out on average from these changes. Indirect tax changes are small and have a roughly equal impact at all income levels.

Universal credit benefits lower-income households a little on average, but those in higher income groups lose out slightly as universal credit runs out at a lower income level than tax credits for non-renters, meaning that some higher income tax credit claimants lose out after transitional protection expires. However, as we shall see later, these averages disguise a great deal of variation in the impact between different types of household.

Overall, poorer households lose out from these changes, and lose out more than households around the middle of the income distribution. We would therefore expect the direct impact of these changes to be to increase the numbers of households below both absolute and relative poverty lines, relative to a scenario where these changes had not been introduced. Of course, one has to bear in mind that given the size of the UK government's budget deficit, it is likely that any government would have to introduce measures over this period that would either reduce household incomes by raising tax or cutting cash benefits, or reduce other items of government expenditure that affected households' wellbeing. Our analysis shows the distributional implications of the choices the government has made in terms of tax and benefit policies to reduce the deficit, but does not show how this would compare to the (unknown) policies of any other potential government.

Figure 3.1: Average gains and losses from tax and benefit changes to be introduced between 2015–16 and 2019–20 by income decile



Note: Income decile groups are derived by dividing all households into 10 equal-sized groups according to net income adjusted for household size using the McClements equivalence scale. Assumes full take-up of means-tested benefits and tax credits.
Source: Author's calculations using TAXBEN run on uprated data from the 2012–13 and 2013–14 FRS and 2012 LCFS.

How does this compare with the gains from the National Living Wage?

Changes to taxes and benefits were of course not the only policy changes announced in the July Budget that will affect household incomes. The introduction of a higher minimum wage for those aged 25 and over, the so-called 'National Living Wage' (NLW), will increase wages for some of those paid less than this level at the moment, though may also lead to lower employment, higher prices and lower returns on investment. Figure 3.2 below shows the distributional impact of the gains from the NLW – to do this analysis, we identify those currently paid less than the NLW in our FRS data as described in Box 3.1 and increase their wages to this level. We analyse the NLW as if it were fully in place in 2015–16, that is to say it is equal to 60% of current median earnings, which we estimate to be £7.68 per hour. Thus, for an individual earning the current National Minimum Wage (NMW) of £6.70, we increase their earnings by around 14.6%.[1]

Box 3.1. Identifying those in our FRS data who are paid less than the NLW

The FRS data we use contains the information we need to estimate households' tax liabilities and benefit entitlements, including information on individuals' earnings, hours worked, unearned income, demographic characteristics and whether they are receiving disability benefits and state pensions. The measure of earnings is generally thought to be of high quality, but it is known that the hours measure contains considerable measurement error.[a] Simply dividing reported earnings by reported hours to identify individuals with low hourly wages would therefore give an unreliable estimate of the number and types of individual who would be affected by the NLW.

To correct for this, we supplement our FRS data with information from the Labour Force Survey (LFS). This survey contains a good measure of weekly earnings, an estimate of hours worked and – crucially for our purposes – a direct measure of hourly pay for those individuals who are paid by the hour. The methodology we employ – similar to that used in earlier work for the Low Pay Commission[b] – is to impute the hourly wages of individuals in the FRS by matching them to "similar" individuals in the LFS who report their hourly pay. By "similar" we consider a wide range of characteristics – most obviously the level of weekly earnings and hours of work, but also their age, region and industry. We carry out the imputation separately by sex and three education groups (so low-educated men can only be matched with low-educated men, etc.). We only carry out this imputation for those individuals in the FRS who seem potentially able to receive a pay increase as a result of the NLW – those whose weekly earnings are already more than seventy times the NLW are assumed to be unaffected.

Notes: [a] See, for example, M. Brewer, R. May and D. Phillips (2009), Taxes, Benefits and the National Minimum Wage, Low Pay Commission Research Report (http://webarchive.nationalarchives.gov.uk/20130708092703/http://lowpay.gov.uk/lowpay/research/pdf/FromLPC_Document_Feb.pdf).
[b] M. Brewer and P. De Agostini (2013), The National Minimum Wage and its interaction with the tax and benefits system: a focus on Universal Credit, Institute of Social and Economic

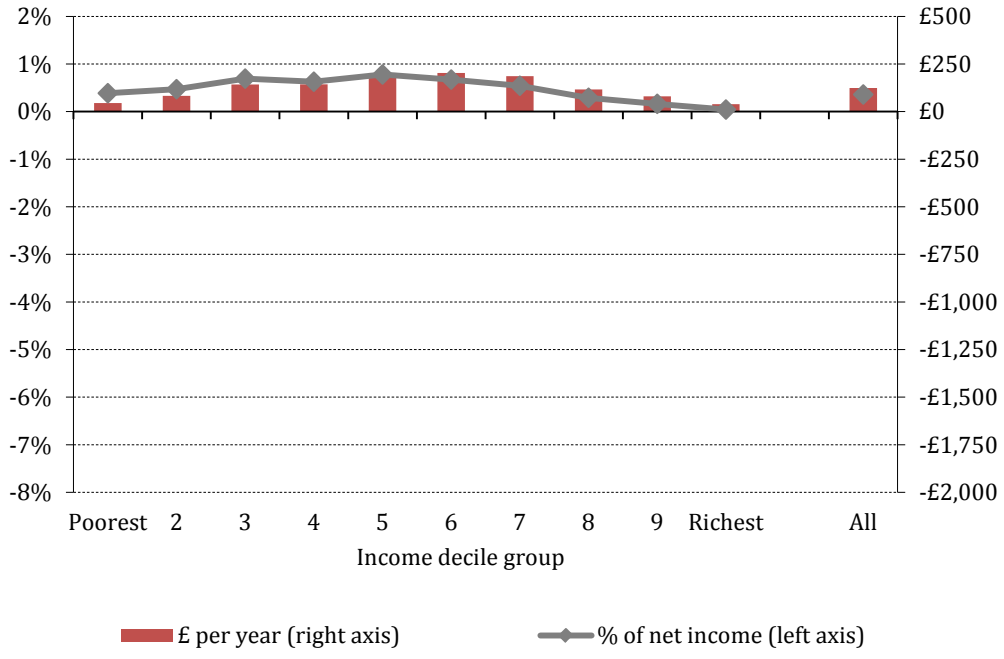
[1] There are a small number of individuals in our data who are estimated to be earning less than the NMW: we restrict the percentage increase in their wages to be the ratio between the NLW and the NMW. Also, we do not allow the NLW to impact those who are paid more than this wage rate to start off with. This contrasts with the OBR's analysis of the impact of the NLW, which does allow for some (small) spillover effects on those with slightly higher earnings.

Research, University of Essex (https://www.iser.essex.ac.uk/research/publications/522257). See also A. Hood, R. Joyce and D. Phillips (2014), 'Policies to help the low paid' in C. Emmerson, P. Johnson and H. Miller (eds), The IFS Green Budget February 2014, London: Institute for Fiscal Studies (http://www.ifs.org.uk/publications/7072).

We can see that, perhaps surprisingly, the largest cash gains from the introduction of the NLW are in the middle of the household income distribution, with the largest gain as a percentage of net income in the third income decile. There are several reasons for this. First, households with no one in paid work, who tend to be towards the bottom of the income distribution do not benefit from the NLW for obvious reasons. Second, those with the lowest hourly earnings do not all live in the households with the lowest incomes: many of those who earn less than the NLW have higher-earning partners whose earnings take the household into a higher income decile.

Comparing the gains from the introduction of the NLW with the losses from tax and benefit changes, we can see that for the poorer half of households who lose out significantly on average from the tax and benefit changes, the average gains from the introduction of the NLW are significantly smaller than the losses they face from tax and benefit changes. Overall, the gains from the NLW offset 27% of the losses from tax and benefit changes, and this figure is lower for the bottom four income deciles at 6% for both of the bottom two deciles (£45 and £83 versus £696 and £1,302 respectively), 14% for the third decile (£143 versus £993) and 21% for the fourth decile (£144 versus £676).

Figure 3.2: Average gains from the introduction of the National Living Wage by income decile



Note: Income decile groups are derived by dividing all households into 10 equal-sized groups according to net income adjusted for household size using the McClements equivalence scale.
Source: Author's calculations using TAXBEN run on uprated data from the 2012–13 and 2013–14 FRS and the 2012–13 and 2013–14 LFS.

3.2 How do the average impacts of tax and benefit changes vary between different types of household?

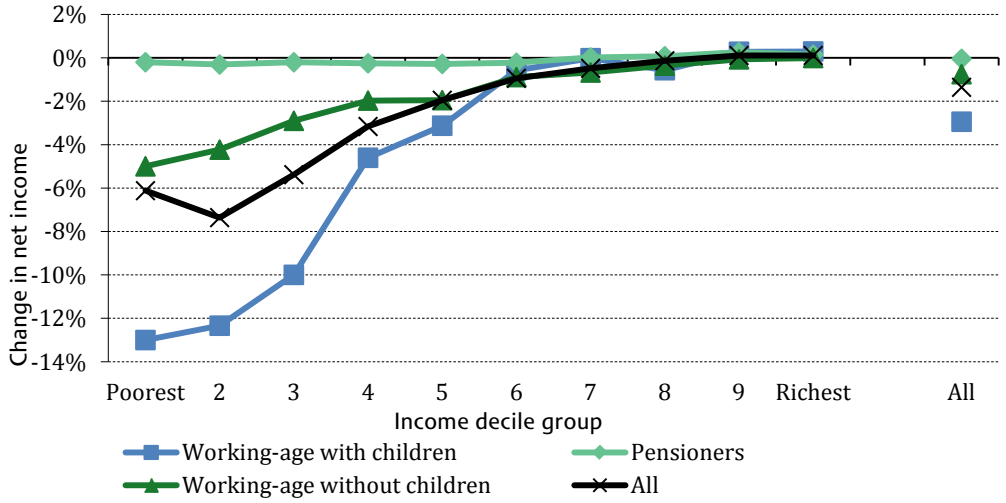
So far, we have only looked at average gains and losses by income decile. In Figure 3.3, we split households in each income decile into three distinct groups: those containing an individual aged over state pension age, those where all adults are aged under the state pension age and there are dependent children, and those where all adults are aged under state pension age and there are no dependent children. In panel a), we begin by only showing the impact of changes to benefits (other than the introduction of universal credit). We see that the biggest losers from these changes are low-income families with children. This is because tax credits, the area of the benefits system that has seen the largest cuts, are predominantly claimed by families with children. But low-income working-age households without children also lose out from some benefit changes including the four-year benefits freeze, the replacement of DLA with PIP and the abolition of the work-related activity group component of ESA. Pensioners, however, are largely unaffected by these changes to the benefits system to be introduced over the next four years.

Panel b) adds in the effect of tax changes. These are much smaller than the changes to benefits, meaning that they do not affect the broad pattern of we observe in panel a), but as in Figure 3.1 they slightly increase the losses for households in the poorest two income deciles, slightly reduce the losses or increase the gains for households in deciles 3-9 and increase losses in the highest income decile on average. This arises because, on average, poorer households lose more from increases in indirect taxes (tobacco duty and insurance premium tax) than they gain from the increases in the personal allowance and higher rate threshold, whereas this pattern is reversed for households in the middle and upper-middle of the income distribution. The richest tenth of households, particularly those with children lose out from the restrictions on tax relief on pension contributions.

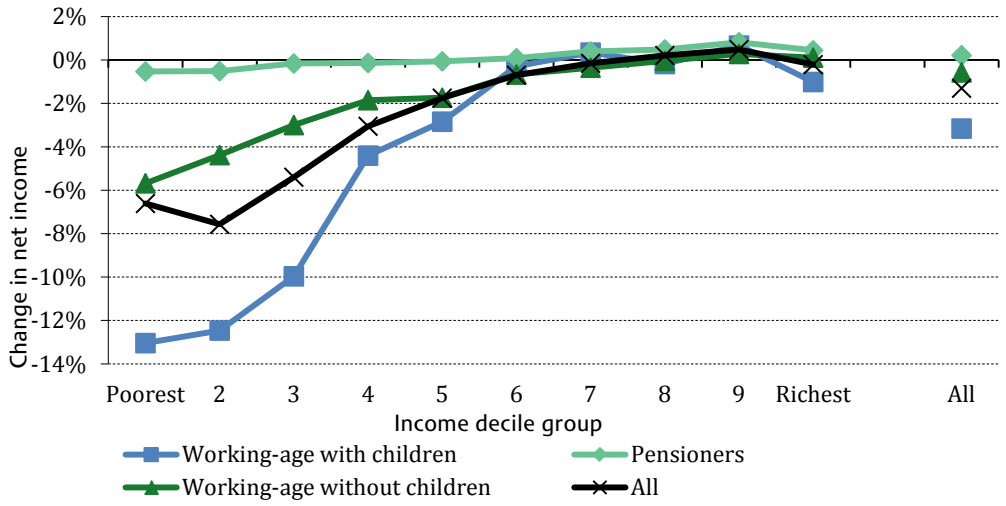
The impact of universal credit is added in panel c). We can see that universal credit dampens the impact of other benefit reforms for lower-income working age families. However, pensioner households in the bottom half of the income distribution lose out slightly. This is because couples where one person is aged above the state pension age but the other is not will have to claim universal credit rather than the more generous pension credit they can receive at the moment.

Figure 3.3: Average gains and losses from tax and benefit reforms to be introduced between 2015–16 and 2019–20 by income decile and household type

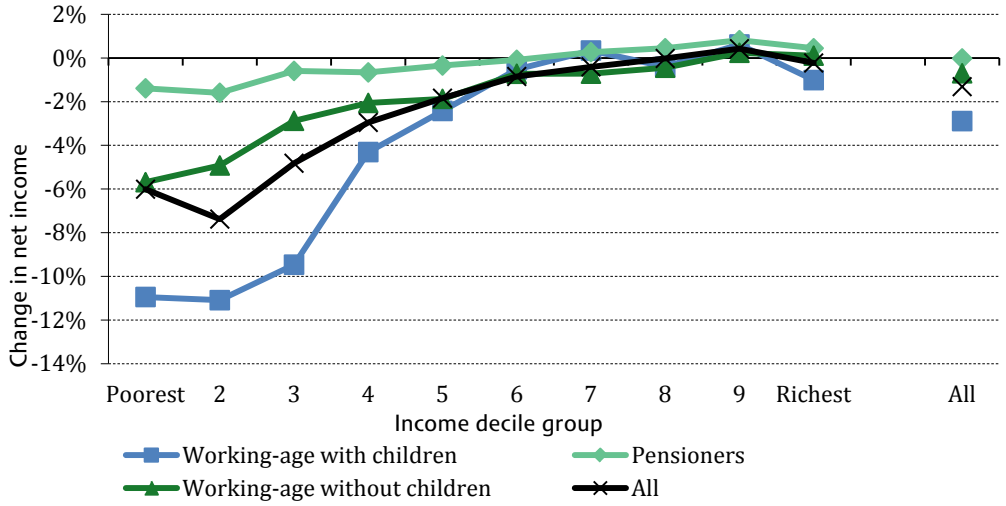
a) Benefit reforms only (excluding universal credit)



b) Tax and benefit reforms excluding universal credit



c) Tax and benefit reforms including universal credit



Note to Figure 3.3: Income decile groups are derived by dividing all households into 10 equal-sized groups according to net income adjusted for household size using the McClements equivalence scale. Assumes full take-up of means-tested benefits and tax credits.
Source for Figure 3.3: Author's calculations using TAXBEN run on uprated data from the 2012–13 and 2013–14 FRS and 2012 LCFS.

Another way of dividing working-age households is shown in Figure 3.4. Here we split according to whether any adult in the household is in paid work. Again, we show the impact of benefit reforms before adding in the impact first of tax reforms and finally universal credit.

Panel a) shows that working and non-working families in the poorest two income deciles lose a roughly similar amount from benefit changes as a share of their income. Although the reduction in the first tax credit threshold particularly affects working households, benefits make up a greater share of income for non-working households, meaning that they are more affected by the four-year benefits freeze. Furthermore, policies such as the restriction of the per-child element of child tax credit to two children and the abolition of the family element of the child tax credit affect both working and non-working families with low incomes. At higher income levels, non-working households lose more than working households (though note that the number of non-working working-age households in higher income deciles is not large): this is because these households tend to be those including DLA claimants (it is the receipt of DLA and other disability benefits that gets them into these higher income deciles), who lose out on average from the replacement of DLA with PIP, whereas higher-income working households are less likely to be affected by cuts to tax credits and other means-tested benefits.

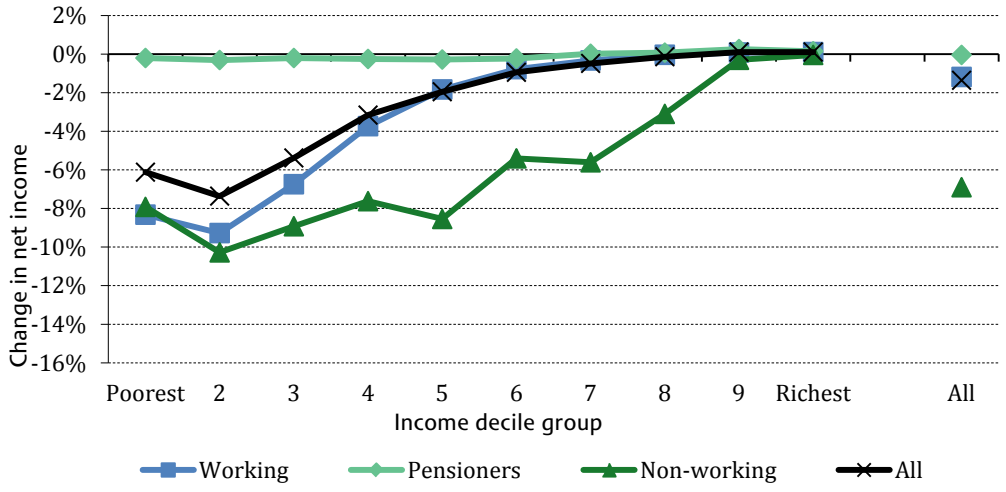
Little changes when we add taxes to our analysis in panel b). However, there are a number of subtle and interesting differences to report. First, as before, the bottom two deciles lose more from increases in indirect taxes than they gain from increases in direct taxes. However, this extends to the fifth income decile for non-working working-age households: this is because many of these households receive a lot of their income from

non-taxable sources such as DLA, and so do not benefit from the increase in the income tax personal allowance. Higher up the income distribution, all household types gain from tax changes overall, with the exception of working households in the top income decile. As only the very richest households are affected by the restrictions on tax relief on pension contributions that cause the top income decile to lose from tax changes overall, it is unsurprising that pensioner households and non-working working-age households in the top income decile are less affected by these changes, and so still gain on average from tax changes overall.

Universal credit (panel c), by contrast, sees working households gaining and non-working households losing. The existence of work allowances, which allow working families with children to earn a certain amount without losing any benefits, mean that working families gain on average despite these work allowances now being significantly lower than was originally proposed. However, certain types of non-working household lose out. Those with significant savings or unearned income lose out as these are treated much more severely in the universal credit means test than that for tax credits. Also, those who currently claim the severe or enhanced disability premium in income-based ESA will lose out as the result of a simplification of support for disabled people under universal credit which means that those who receive the most under the current system will lose out, although others with less severe disabilities will gain.[2]

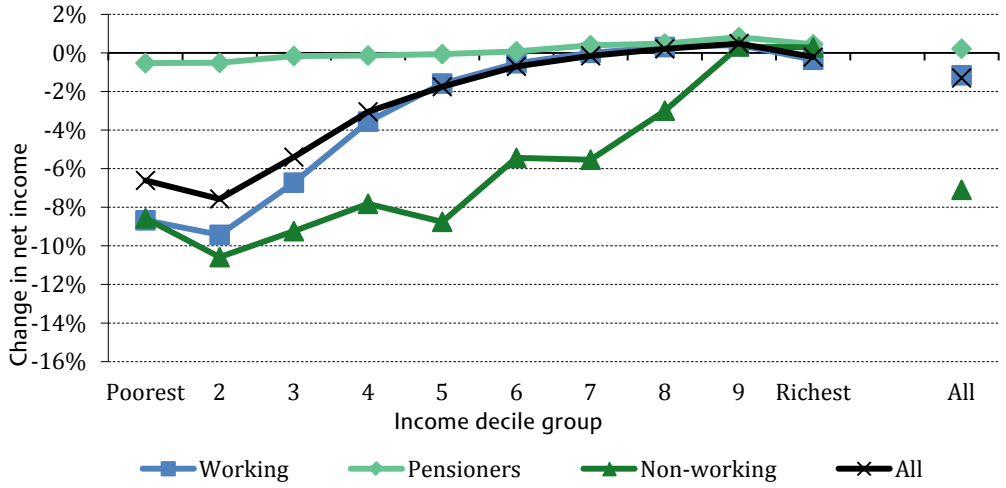
Figure 3.5: Average gains and losses from tax and benefit reforms to be introduced between 2015–16 and 2019–20 by income decile and household type

a) Benefit reforms only (excluding universal credit)

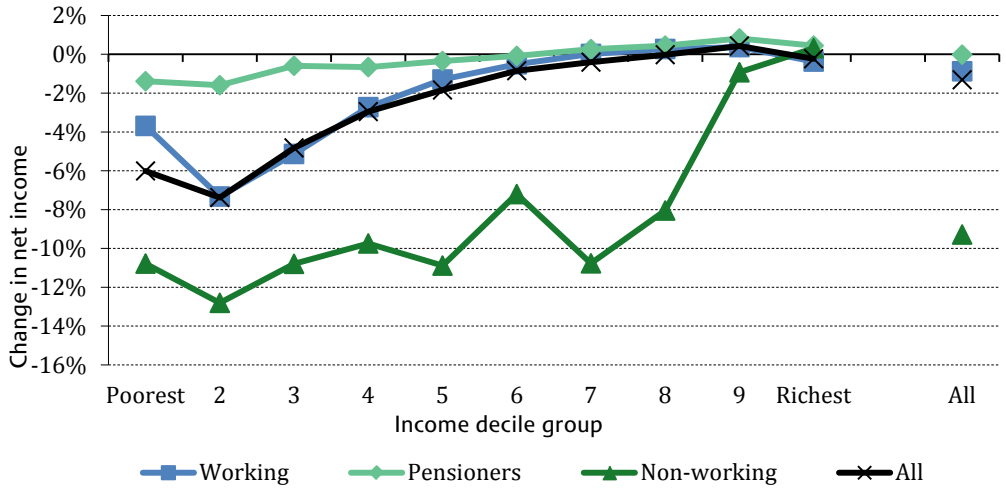


[2] The severe disability premium is available to those who claim the middle or higher rates of the care component of DLA. Those who receive the highest rate of the care component of DLA also receive the enhanced disability premium. Under universal credit, these people will receive a lower level of support, though those in the ESA support group who do not receive the middle or higher rates of DLA will receive more.

b) Tax and benefit reforms excluding universal credit



c) Tax and benefit reforms including universal credit



Note to Figure 3.4: Income decile groups are derived by dividing all households into 10 equal-sized groups according to net income adjusted for household size using the McClements equivalence scale. Assumes full take-up of means-tested benefits and tax credits.
Source for Figure 3.4: Author's calculations using TAXBEN run on uprated data from the 2012–13 and 2013–14 FRS and 2012 LCFS.

3.3 Other breakdowns

We can of course show results by measures other than household income. Figure 3.5 shows the average losses from the tax and benefit changes to be introduced between 2015–16 and 2019–20 for different types of household, both in cash terms and as a percentage of income. We can see that the biggest losers from the changes to benefits are workless households with children. These households are worst affected by the two-child limit of CTC, and are also affected by the four-year benefits freeze, the abolition of the family element of the child tax credit and, in a small number of cases, the benefits

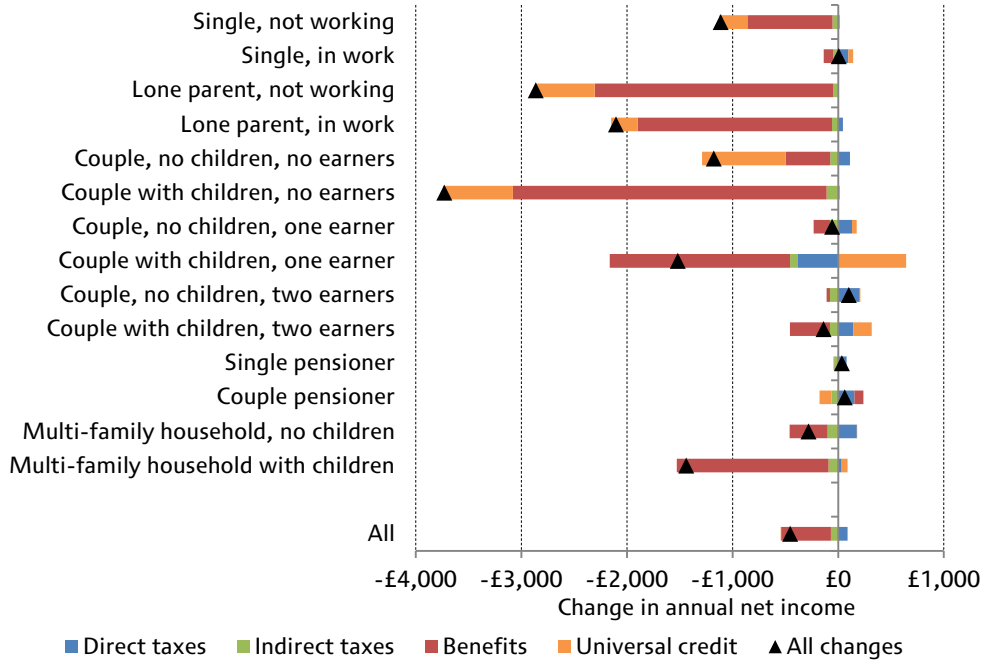
cap, the replacement of DLA with PIP and the abolition of the work related activity group premium in ESA. Workless families without children also lose out from some of these benefit changes. Those working family types that receive tax credits (principally lone parents and single-earner couples with children) also lose out from benefit changes, most notably the reduction in the tax credit threshold, but also other changes to tax credits such as the abolition of the family element of CTC and in some cases the two-child limit on the child element of CTC. Two-earner couples and working singles without children tend not to receive any benefits in the first place and so are not significantly affected by benefit changes. Changes to state pensions and other benefits received by pensioners were are relatively minor, so on average pensioners also will not see their incomes change significantly as a result of benefit changes being introduced over the next four years.

Universal credit also has a negative impact on the incomes of workless families on average. This is the result of changes that significantly reduce the benefit entitlements of a small number of families including the much harsher treatment of savings and unearned income in the universal credit means test relative to that in tax credits. Pensioners in couples also lose out on average: again, this is the result of significant losses for a relatively small number of families which arise because couples where one person is above the state pension age and the other is below will have to claim universal credit rather than the more generous pension credit to which they are currently entitled. The big winners from the introduction of universal credit are single earner couples with children, though working lone parents lose out, partly as a result of the harsher treatment of maintenance income in the means test for universal credit relative to that for tax credits. As with the other benefit changes, working families without children are less affected simply because they tend not to be entitled to benefits in the first place.

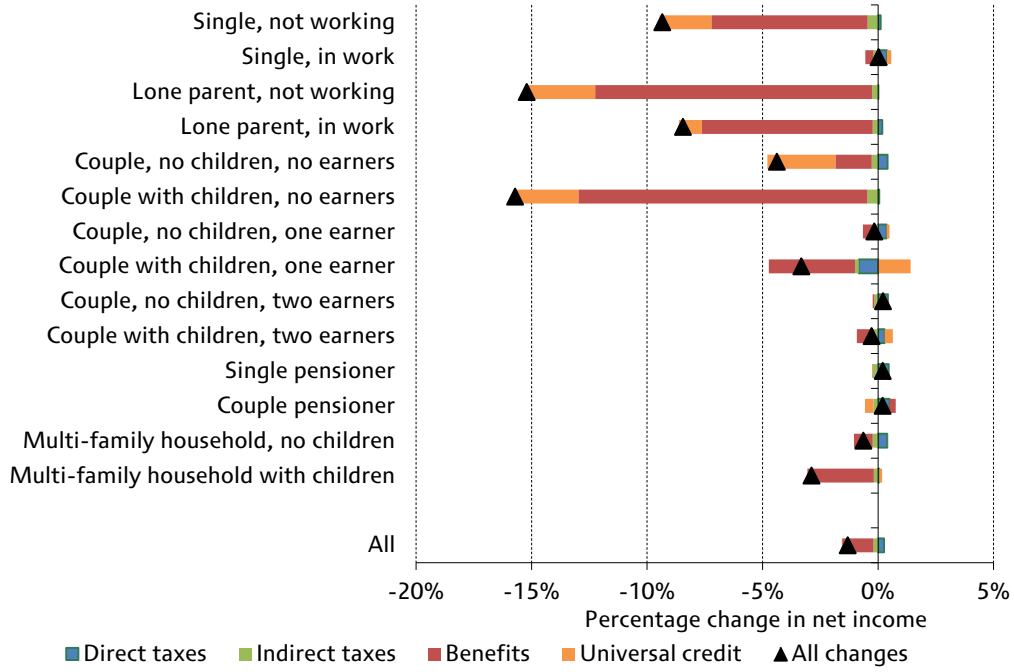
As before, tax changes are smaller in magnitude than changes to benefits. Direct tax changes, the most important of which are increases in the income tax personal allowance and higher rate threshold do not benefit most workless households, who do not pay income tax in the first place. And as many of the very richest households who are affected by the restriction of tax relief on pension contributions are single-earner couples with children, this group loses overall from direct tax changes, though it is likely that the majority of these households actually gain: a small number of large losses more than offset a large number of small gains when calculating the mean. Apart from this, there is not much difference in the impact of direct tax changes between household types. Indirect tax changes are even smaller, and their impact does not vary significantly by family type.

Figure 3.5: Average gains and losses to households from tax and benefit changes to be introduced between 2015–16 and 2019–20 by household type

a) Average annual cash gains and losses



b) Average gains and losses expressed as a percentage of net income



Note: Assumes full take up of means-tested benefits and tax credits.
Source: Author's calculations using TAXBEN run on uprated data from the 2012–13 and 2013–14 FRS and 2012 LCFS.

Further breakdowns of our analysis can be found in table 3.1. We first split households according to whether anyone in the household is disabled according to the statutory definition.[3] This variable is not available in the Living Costs and Food Survey, which we use to calculate losses from indirect taxes, so we only show gains and losses from changes to direct taxes and benefits in these first two rows. We can see that households containing a disabled person fare less well than those without from both changes to direct taxes, changes to benefits and the introduction of universal credit. We saw already that changes to direct taxes and universal credit both benefit those in paid work more than those who are not. Since those with a disability are less likely to be in paid work, this partly explains why households containing a disabled person gain less on average from these changes. Benefit changes also reduce the incomes of households containing a disabled person on average more than those where no individuals have a disability. This arises partly simply because disabled people are more likely to receive benefits and so lose out more than non-disabled when the generosity of benefits is reduced, and partly because some benefits specifically for disabled people are being cut. In particular, the replacement of DLA with PIP is expected to lead to a number of those currently claiming DLA losing their entitlement or seeing it reduced, and many of these will be disabled according to the statutory definition.

As we saw in Figures 3.3 and 3.4, households containing individuals over state pension age lose less from these changes households where all adulta are of working-age, though older households do lose on average from the introduction of universal credit whereas working-age households gain on average. In particular, those households where the oldest person is aged between 60 and 69 lose out from the introduction of universal credit, as these are most likely to be the couples where one partner is aged above the state pension age and the other is below it who lose out as a result of no longer being entitled to claim pension credit. Furthermore, households where the oldest person is aged between 50 and 59 also lose less than younger households. A key factor driving this pattern is that people in their 50s are less likely to have dependent children, and we have seen that families with children will lose the most from the tax and benefit changes being introduced over the next four years. This analysis reminds us that the impact of tax and benefit changes on a particular household's income in one period will not necessarily be the same as at other points during their lifetime. Other recent analysis by IFS researchers examines the distributional impact of various tax and benefit reforms across the whole lifecycle.[4]

Table 3.1 also shows the extent to which the restriction of the child element of child tax credit and universal credit drives our results. Although households with one or two children lose more than childless households on average – households with one or two children still lose out from cuts to the tax credit threshold, the increase in the tax credit

[3] An individual is disabled according to this definition if they report having physical or mental health conditions or illnesses that has lasted, or is expected to last, 12 months or more, and that this reduces their ability to carry out day to day activities.

[4] See P. Levell, J. Shaw and B. Roantree (2015), 'Redistribution from a lifetime perspective', IFS Working Paper W15/27, http://www.ifs.org.uk/publications/7986.

taper rate and the abolition of the family element of the child tax credit – these losses are far smaller than those encountered by households with three or more children, and in particular the enormous £7,000 lost on average by households with at least four children.

Table 3.1: Average gains and losses for households from tax and benefit changes to be introduced between 2015–16 and 2019–20 by disability status, age of oldest person and number of children

Household type	Average annual cash gain/loss from				Total, cash	Total, % of net income
	Direct taxes	Indirect taxes	Benefits	UC		
No one disabled in household	+£94	N/A	–£366	+£34	–£238[a]	–0.6%
At least one disabled person in household	+£81	N/A	–£663	–£76	–£659[a]	–2.3%
Oldest person aged under 30	+£96	–£51	–£657	+£92	–£520	–2.0%
Oldest person aged 30-39	+£124	–£63	–£842	+£106	–£675	–1.8%
Oldest person aged 40-49	–£45	–£79	–£788	+£46	–£866	–2.0%
Oldest person aged 50-59	+£126	–£92	–£544	+£9	–£501	–1.2%
Oldest person aged 60-69	+£152	–£75	–£76	–£204	–£203	–0.6%
Oldest person aged 70 or over	+£103	–£51	–£53	–£32	–£33	–0.1%
No children	+£131	–£67	–£146	–£48	–£129	–0.4%
1 child	–£59	–£74	–£749	+£91	–£791	–1.9%
2 children	+£49	–£72	–£916	+£125	–£815	–1.9%
3 children	+£11	–£97	–£2,962	+£75	–£2,972	–6.9%
4+ children	–£77	–£88	–£7,004	+£17	–£7,153	–17.3%
Memo: all households	+£89	–£70	–£470	–£5	–£455	–1.3%

Notes: [a] Data limitations mean we are unable to show average losses from indirect taxes for households with and without an individual who is disabled according to the statutory definition. Thus, these totals exclude indirect taxes.
Assumes full take-up of means-tested benefits and tax credits.
Source: Author's calculations using TAXBEN run on uprated data from the 2012–13 and 2013–14 FRS and 2012 LCFS.

3.4 Summary

Households will lose an average of £455 a year from the tax and benefit changes to be introduced between 2015–16 and 2019–20, but this average figure hides significant variation between different types of household and households with different levels of income. In this section we have shown that the distributional impact of changes to benefits will dominate the overall picture. These changes will affect poorer working-age households the most, particularly those with children. As some of the changes to tax credits such as the increase in the taper rate and the reduction in the first income threshold will particularly affect those in paid work, low-income working households will lose as much as a proportion of their net income as those who are not in paid work. Pensioners, by contrast, will be largely unaffected by these changes.

Universal credit will mitigate these effects to some extent for some of these groups, in particular low-income couple households who are in work and have children. But other households, in particular those who have no one in paid work will see further reductions in their income from the introduction of universal credit (once transitional protection has expired). Pensioners will also see a small reduction in their income on average from the introduction of universal credit: this arises because of large losses to a small number of couples where one person is aged above the state pension age and the other is below it.

Changes to taxes are far smaller in magnitude: households of all types and income levels lose a small amount from increases in indirect taxes, but for middle- and higher-income households (though not the very richest), this is more than offset by reductions in direct taxes resulting from increases in the income tax personal allowance and higher rate threshold. However, the households with the very highest incomes will lose out from restrictions on tax relief on pension contributions, which mean that they lose out from tax changes overall.

4. The impact of the tax and benefit changes on financial work incentives

In this section, we examine the effects of tax and benefit changes to be introduced between 2015–16 and 2019–20 on financial work incentives. We first explain how we measure financial work incentives and how we use TAXBEN, the IFS tax and benefit microsimulation model, to calculate work incentive measures under different tax and benefit regimes. We then analyse the impact of tax and benefit reforms on these measures of financial work incentives. Finally, we show the impact of the National Living Wage (NLW) on the incentives for those currently earning less than the living wage, and on the incentives for those not in paid work to take a job at the minimum wage.

It is important to note that changes in financial work incentive measures are only one element of what will determine what happens to employment levels over the next few years. First, although changes in work incentive measures will give us some sense of the direction and scale of likely changes in labour supply levels, these will ultimately also depend on how responsive people are to the changes in the incentives they face. Second, even if there are changes in the amount of labour individuals want to supply, this may or may not be matched by demand for this labour from employers.

4.1 Measuring financial work incentives

Financial work incentives depend on the amount of income received without working, the gross wage rate an individual can command when working, and the taxes and benefits payable to or from them at different levels of earnings. In other words, they depend on the relationship between hours of work and net income after taxes and benefits. Therefore, to understand fully the financial work incentives facing any given individual, one would ideally look at the full relationship between hours worked and net income, known as the budget constraint. But to make analysis of the whole population tractable, we use summary measures of work incentives.

Specifically, we focus on two different concepts of work incentives: the first measures the incentive an individual faces to do paid work at all as opposed to not working (sometimes referred to as the extensive margin); the second measures the incentive for someone in work to increase their earnings slightly (sometimes referred to as the intensive margin) – whether by working more hours, seeking promotion or moving to a better-paid job. We use two measures to assess the incentive to work at all: using the participation tax rate (PTR), which evaluates the proportion of gross wages that does not increase the employee's net income because it is lost in either higher tax liabilities or lower benefit entitlements, and the replacement rate (RR), which evaluates the amount of income an individual receives when not working as a proportion of their in-work income. Formally,

$$PTR = 100\% - \frac{(in\ work\ income - out\ of\ work\ income)}{Gross\ earnings}$$

$$RR = \frac{out\ of\ work\ income}{in\ work\ income}$$

Thus, policies that reduce the level of benefits an individual receives if they are not working and policies that increase the amount of income an individual receives if they are in paid work (such as cuts in taxes on earned income) would tend to reduce both the participation tax rate and the replacement rate, reflecting a strengthening of work incentives.

PTRs and RRs do not measure exactly the same thing, however. RRs, by directly comparing an individual's income in-work and out of work, are a measure of the pure incentive to work they face. By contrast, PTRs measure the extent to which the tax and benefit system distorts an individual's decision whether to work of not. To see this, consider the case of an individual whose gross earnings are very small, but whose tax liabilities and benefit entitlements do not vary depending on whether they work or not. This person's replacement rate may be high, as their income may not vary very much whether they work or not. But their PTR will be zero as the difference between their in work and out of work incomes will be exactly the same as their gross earnings. Thus, the same policies may have different effects on the two measures. In particular, consider a policy reform that reduces both an individual's in-work and out-of-work income. Whether it reduces the PTR will depend on whether the in-work or the out-of-work income is reduces by more in cash terms. However, whether it reduces the RR will depend on whether the in-work or the out-of-work income is reduced by the most in percentage terms. Thus, a reform that reduces the in-work income more in cash terms, but the out-of-work income more in percentage terms will increase the PTR but reduce the RR.

We measure the incentive for those in work to increase their earnings using the effective marginal tax rate (EMTR), the proportion of a small increase in earnings that is lost in either higher tax payments or lower benefit entitlements. In this report, we calculate EMTRs by increasing individuals' earnings by one penny a week but leaving their hours of work unchanged.[5] As with PTRs and RRs, *higher EMTRs mean weaker work incentives*.

[5] An alternative would have been to increase hours of work slightly and leave the hourly wage unchanged. This can yield different results because entitlements to some benefits and tax credits depend on hours of work as well as on income. It is debatable which is the more relevant measure of work incentives: traditional labour supply analysis has focused on how hours of work respond to financial incentives, but more recent literature has found that the overall responsiveness of taxable income is much greater than that of labour supply – implying that much of the overall response of taxable income comprises other aspects of behaviour – and that responses often take other forms, such as intensity of effort per hour or moving jobs (see, for example, Saez, Slemrod and Giertz (2012) for a review). In practice, however, we have found in previous (unpublished) analysis that estimates of the distribution of EMTRs, and the effect of reforms on it, are not very sensitive to whether it is hours or the hourly wage that is increased (or indeed to the size of the increase used).

4.2 Calculating our work incentive measures

Calculating PTRs and RRs requires knowledge of individuals' net income both in and out of work. For those in paid work, it is relatively straightforward to calculate the net income they would get if they were not working: their benefit entitlements and tax liabilities can be fully characterised using TAXBEN given their observed characteristics (number of children, their partner's income, disability status etc.). For those not in paid work, financial incentives to move into work depend on what their gross earnings and hours would be if they were to work. These are not observed, and we therefore have to estimate them for each non-working individual.

For individuals aged below state pension age and not in paid work, we calculate the participation tax rates at four different hours points. We predict their earnings at each of these hours points using an ordinary least squares (OLS) regression of log weekly earnings of individuals observed employed in the relevant hours category on various characteristics including age, sex, region, ethnicity, education, housing tenure, number and ages of children, partnership status, and any partner's employment status and earnings.[6] Once we have calculated these four PTRs for each non-worker, we weight them according to estimated probabilities of that individual choosing to work that number of hours were they to enter paid work. These probabilities are calculated using a multinomial logit model, again estimated using the behaviour of individuals in paid work in our data with the same set of explanatory variables.[7]

There are two other points worth noting on our work incentive analysis. First, for members of couples, we focus on the relationship between an individual's working behaviour and their family's net income. This implicitly assumes that couples fully pool their income. Second, we ignore features of the tax and benefit system that provide support only temporarily and the fact that certain forms of support are available only after a waiting period, as we consider the long-term impact of an individual moving into work or increasing their earnings on their family's disposable income.

Our analysis is performed using the 2012–13 and 2013–14 editions of the Family Resources Survey (FRS), which contains detailed information on households'

[6]This is a relatively simple approach and has its disadvantages. The key disadvantage is that potential earnings in work are a determinant of the decision to start work, and therefore it would be natural to expect that the earnings that would be earned by someone not currently working would be lower than those earned by someone currently in work with identical observed characteristics. It is likely that ignoring this selection issue, which has been well discussed in the literature with various solutions proposed (see, for example, J. Heckman (1979), 'Sample selection bias as a specification error', Econometrica, vol. 47,pp. 153–61), will cause us to overestimate the earnings of the non-working individuals. It is, however, not known to what degree this will bias our estimates of EMTRs and PTRs.

[7]This methodology is the same as that used in S. Adam and D. Phillips (2013), 'An ex-ante analysis of the effects of the UK Government's welfare reforms on labour supply in Wales' IFS Report 75, http://www.ifs.org.uk/publications/6586; a fuller description is given in appendix A of that paper.

demographic characteristics, gross incomes and entitlements to non-means-tested benefits and state pensions, meaning that we can use it to calculate their entitlements to direct taxes and benefits. However, the FRS does not contain information on spending patterns for each household, meaning that we cannot use this data set to calculate changes in indirect tax liabilities. In principle indirect taxes matter just as much as direct taxes for work incentives – both create a wedge between what an employer is willing to pay to hire someone and what a worker's earnings enable him to buy after tax – but since (as we saw in section 3) planned indirect tax changes are relatively small, ignoring them should not affect the comparison of different tax and benefit systems, which is the focus of this report. We also exclude employer National Insurance Contributions from our work incentive measures: as with indirect taxes, these add to the wedge between what an employer is willing to pay to hire someone and what a worker's earnings enable them to buy after tax, but since there are no planned changes to these over the next four years, excluding these will not qualitatively affect our comparison of different tax and benefit systems.

4.3 The impact of tax and benefit changes on financial work incentives

Impact on the incentive for individuals to work at all

Table 4.1 shows average PTRs for different groups of individual before and after the tax and benefit change being introduced between 2015–16 and 2019–20. Overall, the average PTR falls by 2.5 percentage points (ppts) as a result of the tax and benefit changes being introduced over this period. This is a relatively small strengthening in average work incentives, though this does not necessarily mean that these changes will have only a small impact on labour supply. Just under half of this effect comes from the introduction of universal credit, with most of the remainder resulting from other benefit changes.

We see that tax changes (increasing the income tax personal allowance and higher rate threshold) slightly strengthen work incentives on average, and there is not much variation in this impact by group, though groups that are more likely to earn less than the personal allowance when they work such as lone parents see their PTRs fall by less as a result of these changes.

By contrast, benefit changes have significantly different effects between different groups of people. The big reductions in tax credits for those in work that result from the reduction in the first tax credit threshold mean that benefit changes *increase* the PTRs of around 6.7 million people for whom the reduction in in-work benefits is larger than the reduction in out-of-work benefits. Thus, among those groups who are more likely to be entitled to tax credits when they are working, including those who do not have a partner in paid work, lone parents, those with large families and families containing an adult on disability benefits. As lower earners are also more likely to be entitled to tax credits when they are in paid work, those groups that are more likely to have low (actual or predicted) earnings such as social renters also see their average PTRs increase as a result of these benefit changes. Those who see their PTRs fall the most as a result of

these changes are those in couples with children with a working partner: 8.6 million or 43% of this group see a reduction in their PTR as a result of benefit changes other than universal credit. This arises because, as we saw in the previous section, benefit changes reduce the average amount of support received by single-earner couples with children, but do not significantly affect the incomes of two-earner couples with children. Thus, having the second partner enter work becomes more attractive for couples with children. Put another way, the reductions to tax credits for single-earner couples mean that the family has less tax credit entitlement to lose if the second member of the couple moves into work.

A perhaps surprising result from Table 4.1 is the inconsistent pattern in PTR changes among those with large families. Given the big reductions in out-of-work benefit entitlements for large families, we might expect the work incentives of this group to be particularly strengthened, and indeed this is what we see for three child families. But we see the opposite for those with four or more children. There are two reasons why this does not occur. First, the child element of the child tax credit is available to both working and non-working families, so restricting this to two children will reduce both the in-work and out-of-work incomes of many families in this group. Second, families with four or more children are less likely to be two-earner couples, so members of this group are more likely to have a non-working partner, and we have seen that those who have children whose partner is not in paid work tend to see their PTRs increase as a result of the reductions in the first tax credit threshold and the increase in the taper rate.

In many cases, universal credit has the opposite effect to other benefit changes. By increasing the amount of support given to single-earner couples, it very significantly reduces PTRs on average for those in couples whose partner is not in paid work.[8] But because this additional support is then withdrawn when the second member of the couple enters paid work, the average PTR for those whose partner is in paid work increases, at least among families with children. As relatively few adults with large families or who live in families where one adult is disabled have a working partner, PTRs are particularly reduced for these groups.

Universal credit also reduces average PTRs for older workers. This is because for those with a partner above state pension age, universal credit reduces their out-of-work income as they will have to claim UC rather than the more generous pension credit they can receive at the moment. Furthermore, as low-income working families see their incomes increase as a result of the introduction of universal credit, those groups that are more likely to have low levels of (actual or predicted) earnings such as social renters and those not in paid work see their PTRs fall by more than average.

We can see this further in Figure 4.1 which shows PTRs by gross earnings level under the different tax and benefit systems. We see that tax changes do not affect PTRs at earnings levels below the income tax personal allowance (£10,600) but slightly reduce

[8] Since those claiming a disability benefit are less likely to be in paid work, their partners are less likely to have a working partner. Thus, the partners of those receiving a disability benefit also see significant reductions in their PTRs on average.

average PTRs at higher earnings levels. Benefit changes then increase average PTRs very slightly at very low earnings levels but reduce them at higher levels of earnings. At low levels of earnings, the reduction in in-work support through tax credits is larger than the reduction in their out-of-work benefits, but this reverses at higher earnings levels where in-work benefits become less important. Finally, universal credit further lowers average PTRs at all levels of earnings, though especially below £20,000, where its effects on the in-work incomes of workers will be particularly felt.

So far, we have only considered the impact of reforms on the *average* PTRs faced by different groups. But there is also significant variation in their impact across the whole distribution of PTRs (i.e. for those who have weaker-than-average or stronger-than-average work incentives to start off with). Figure 4.2 shows the impact of the reforms on the whole distribution of PTRs. Reading across, we can see that just under 80% of people have a PTR of less than 50%, meaning that they get to keep at least half of what they earn when they move into work, and that this figure does not change significantly as a result of the tax and benefit changes being introduced between 2015–16 and 2019–20. We can also see that the reduction in the average PTR caused by benefit changes other than universal credit comes about as a result of lower PTRs among those who faced stronger incentives to start off with. For example, the number of people with PTRs of less than 30% will fall by around 2 million as a result of tax and benefit reforms excluding universal credit. But these reforms do little to the reduce the number of people with PTRs of more than 50%. By contrast, universal credit does reduce PTRs for those individuals initially facing weak work incentives. Most dramatically, universal credit reduces the number of individuals with PTRs above 75% by 1.9 million or more than three-quarters.

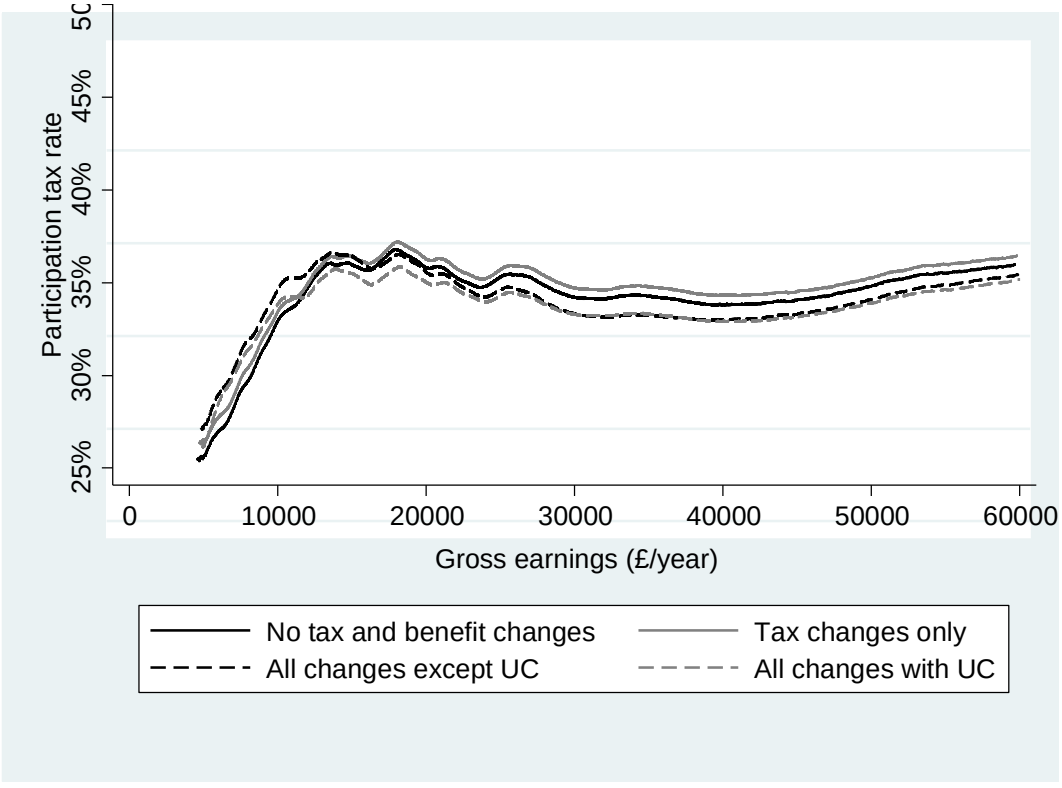
Table 4.1: Impact of tax and benefit reforms on average participation tax rates by group

Group	Average PTR pre-reform	Impact of:			Average PTR without UC	Average PTR with UC
		Direct tax changes	Benefit changes	UC		
Single, no children	37.9%	–0.4	–0.4	–1.1	37.2%	36.1%
Lone parent	40.6%	–0.2	+4.5	+1.3	44.8%	46.1%
Partner not working, no children	46.3%	–0.4	+0.7	–6.5	46.5%	40.0%
Partner not working, with children	64.5%	–0.3	+0.7	–11.9	64.9%	53.0%
Partner works, no children	22.1%	–0.4	–1.1	+0.2	20.5%	20.7%
Partner works, with children	32.6%	–0.4	–3.8	+2.1	28.4%	30.4%
Without children	32.4%	–0.4	–0.5	–1.2	31.4%	30.2%
With children	39.9%	–0.3	–1.8	–0.8	37.8%	37.0%
Of which:						
1 child	37.8%	–0.4	–1.8	–0.5	35.7%	35.2%
2 children	40.4%	–0.4	–1.7	–1.0	38.4%	37.4%
3 children	46.1%	–0.3	–3.4	–1.1	42.3%	41.2%
4+ children	45.3%	–0.2	+2.4	–2.5	47.5%	45.0%
Age 19–24	27.9%	–0.3	–0.5	–1.1	27.2%	26.1%
Age 25–54	36.6%	–0.4	–1.3	–0.6	34.9%	34.3%
Age 55–State Pension Age	35.3%	–0.4	–0.2	–3.0	34.6%	31.7%
White	34.7%	–0.4	–1.1	–0.9	33.3%	32.3%
Non-white	38.4%	–0.3	–0.4	–2.0	37.6%	35.6%
Receiving a disability benefit	48.6%	–0.3	+0.6	–3.9	48.9%	45.0%
Partner receiving a disability benefit	56.4%	–0.3	+0.4	–10.0	56.5%	46.5%
No adult in family receiving a	33.8%	–0.4	–1.1	–0.7	32.3%	31.6%

disability benefit						
Social renter	49.2%	–0.3	+0.4	–3.6	49.4%	45.8%
Private renter	37.8%	–0.4	–0.8	–0.7	36.6%	36.0%
Owner-occupier	31.0%	–0.4	–1.4	–0.6	29.2%	28.6%
Not working	38.7%	–0.3	–0.2	–2.3	38.1%	35.9%
Working	33.9%	–0.4	–1.3	–0.6	32.2%	31.6%
All	35.2%	–0.4	–1.0	–1.1	33.8%	32.7%

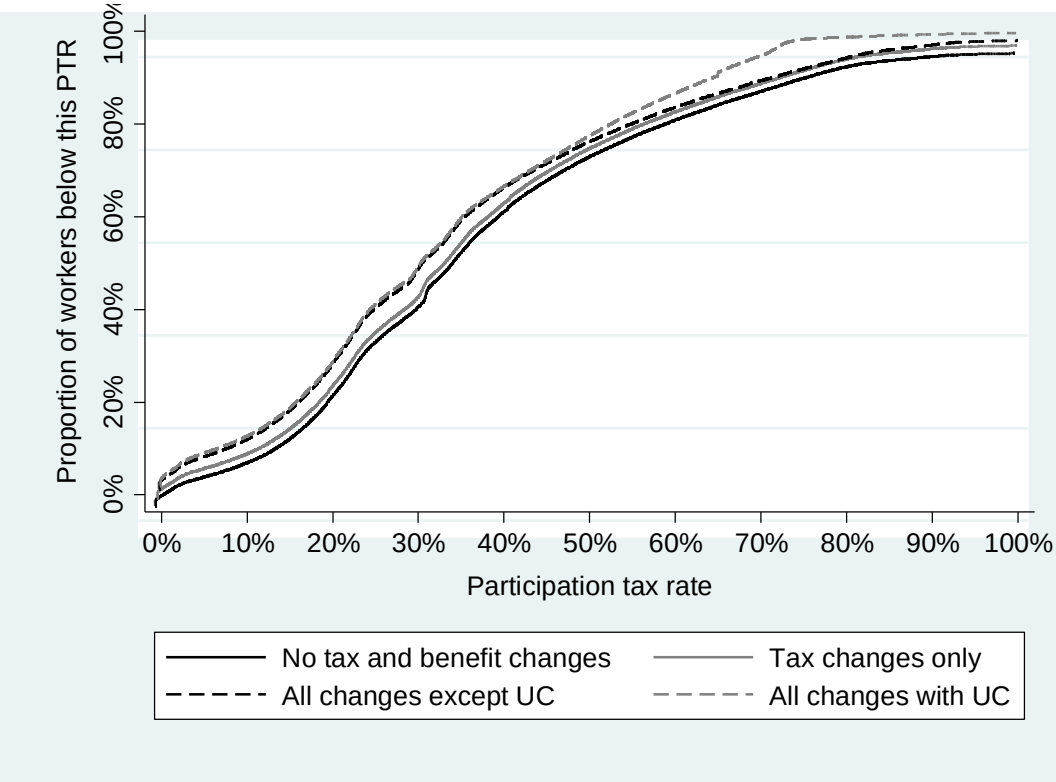
Note: Sample: all individuals aged between 19 and the State Pension Age.
Source: Author's calculations using TAXBEN run on uprated data from the 2012–13 and 2013–14 FRS.

Figure 4.1: Average PTRs by earnings, pre- and post-tax and benefit changes



Note: Lowess-smoothed lines. Sample: all individuals aged between 19 and the State Pension Age.
Source: Author's calculations using TAXBEN run on uprated data from the 2012–13 and 2013–14 FRS.

Figure 4.2: The distribution of PTRs, pre- and post-tax and benefit changes



Note: Sample: all individuals aged between 19 and the State Pension Age.
Source: Author's calculations using TAXBEN run on uprated data from the 2012–13 and 2013–14 FRS.

Table 4.2 shows the same analysis as Table 4.1 for replacement rates (RRs). PTRs and RRs move generally in the same direction, though there are some differences. First, examining the overall average change, the overall effect of tax and benefit policies is still a small reduction in the mean RR – the mean RR falls by 2.2ppts compared to 2.5ppts for the mean PTR – but the effects of each set of policies is somewhat different. This is because the measures are slightly different in that the PTR depends on the *difference* between an individual's income when in work and their income when they are out of work, whereas the RR depends on the *ratio*. Thus, to reduce an individual's RR significantly, a policy must either increase an individual's in work income or reduce their out-of-work income by a large percentage. Therefore tax changes, which slightly increase most peoples' incomes when in work, have only a minimal effect on the mean RR. Benefit changes other than universal credit by contrast have a larger effect on the average RR than they do on the average PTR. This is because, although these changes slightly reduce in-work incomes on average, they reduce out-of-work incomes by much more in percentage terms. Universal credit both slightly increases in-work incomes and slightly reduces out-of-work incomes on average, and so has a smaller effect on the average RR than it has on the average PTR.

In some cases, benefit changes have the opposite effect on the average RR to the effect they have on the average PTR. For example, lone parents and those in couples whose partner is not in paid work, see their average PTRs increase as a result of benefit

changes but their average RRs fall. This is because although these reforms reduce their in-work income more than their out-of-work income in cash terms, changes such as the two-child limit in tax credits[9] and the four-year benefits freeze reduce their out-of-work income more than their in-work income in percentage terms. However, for those in couples without children whose partner does not work, these changes still slightly increase the average RR.

On the whole though, the patterns of changes in work incentives is similar whether we use RRs or PTRs as our measure. For example, lone parents see their average PTRs increased the most, and their average RRs reduced the least by benefit changes other than universal credit, whereas those in couples with children with a working partner see their work incentives strengthened the most by these changes whichever measure is used. And universal credit strengthens the work incentives of those in couples without a working partner the most, and weakens the work incentives of those whose partner is in paid work whichever measure is used.

Looking at the other breakdowns in Table 4.2, older people see their RRs reduced by less than younger people on average by benefit changes other than universal credit, but by more than younger people on average as a result of universal credit. These people are less likely to have children and so see a smaller reduction in their out-of-work incomes as they are not affected by the cuts to out-of-work tax credit entitlements. As discussed previously though, some of this group, namely those whose partner is above the state pension age, do see their out-of-work incomes reduced by the introduction of universal credit, as they will no longer be able to claim the more generous pension credit if they are not in paid work. Those in families where someone is claiming a disability benefit are less likely to have a partner in paid work and so see their work incentives particularly strengthened by universal credit. Those who are not in paid work and those in social housing tend to have lower potential earnings than those currently working, and so see their RRs fall less on average as a result of benefit changes other than universal credit than current workers.

We can see this point further in Figure 4.3, which shows average RRs by earnings before and after tax and benefit changes. Again, tax changes have little impact at any earnings level. Benefit changes other than universal credit particularly reduce RRs at higher earnings levels (above £15,000). This is because at lower levels of earnings, there are reductions in both their in-work incomes as well as their out-of-work incomes as a result of reductions in the first tax credit threshold and the increase in the taper rate. Those whose (actual or predicted) earnings are higher are less likely to receive benefits if they are in work and so only see their out-of-work incomes reduced by these changes. Universal credit has a roughly similar impact on average RRs at all earnings levels: recall that in Table 4.2 we saw that universal credit reduces RRs for those whose partner does not work but increases them for those whose partner is in paid work, and as there is a mixture of those with and without a working partner at each earnings level, the two effects roughly balance out.

[9] Note that we do see particularly large reductions in average RRs among large families, which was not the case with PTRs.

Finally, Figure 4.4 shows the whole distribution of RRs before and after the tax and benefit changes. We see that again tax changes have no visible effect on the distribution of RRs. Benefit changes other than universal credit reduce the median (middle) RR by around 1.9ppts, but have little effect on the number of people with high RRs (above 80%). This is because those with very high RRs tend to receive the in-work tax credits that are being cut, reducing their in-work income. Universal credit does however have the highly desirable effect of reducing RRs for those facing the very highest RRs at the moment: it reduces the number of individuals facing RRs at least 80%, by around 700,000.

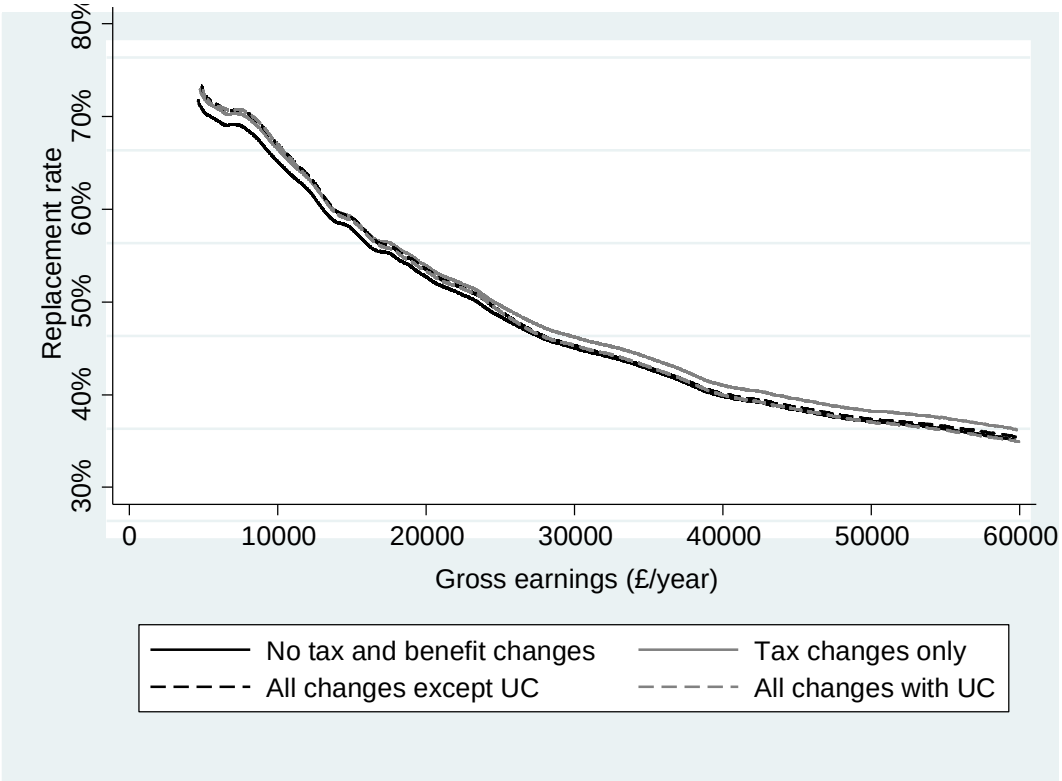
Table 4.2: Impact of tax and benefit reforms on average replacement rates by group

Group	Average RR pre-reform	Impact of:			Average RR, post reform without UC	Average RR, post reform with UC
		Direct tax changes	Benefit changes	UC		
Single, no children	38.2%	–0.1	–1.0	–0.7	37.1%	36.3%
Lone parent	70.6%	–0.1	–0.2	–0.6	70.2%	69.7%
Partner not working, no children	59.4%	–0.1	–0.4	–4.5	58.9%	54.5%
Partner not working, with children	70.2%	–0.1	–1.4	–6.4	68.7%	62.3%
Partner works, no children	55.0%	–0.0	–0.7	+0.0	54.2%	54.3%
Partner works, with children	65.1%	–0.1	–2.5	+0.9	62.5%	63.4%
Without children	47.8%	–0.1	–0.8	–0.9	46.9%	46.0%
With children	66.9%	–0.1	–2.0	–0.7	64.8%	64.0%
Of which:						
1 child	63.4%	–0.1	–1.8	–0.4	61.6%	61.1%
2 children	67.9%	–0.1	–1.6	–1.0	66.2%	65.2%
3 children	74.3%	–0.1	–3.9	–1.0	70.3%	69.4%
4+ children	81.1%	–0.1	–3.9	–1.3	77.2%	75.9%
Age 19–24	44.2%	–0.1	–0.9	–0.6	43.2%	42.6%
Age 25–54	56.5%	–0.1	–1.5	–0.6	54.9%	54.3%
Age 55–State Pension Age	57.3%	–0.1	–0.6	–2.0	56.7%	54.7%
White	54.7%	–0.1	–1.3	–0.8	53.3%	52.6%
Non-white	56.5%	–0.1	–1.3	–1.3	55.2%	53.9%
Receiving a disability benefit	70.5%	–0.1	–1.7	–2.1	68.6%	66.6%
Partner receiving a disability benefit	73.6%	–0.1	–1.5	–4.6	72.0%	67.4%
No adult in family receiving a	53.4%	–0.1	–1.2	–0.7	52.2%	51.5%

disability benefit						
Social renter	65.0%	–0.1	–1.2	–1.8	63.7%	61.9%
Private renter	57.0%	–0.1	–1.2	–0.3	55.7%	55.4%
Owner-occupier	51.9%	–0.1	–1.3	–0.8	50.5%	49.8%
Not working	61.0%	–0.1	–1.2	–1.4	59.7%	58.3%
Working	52.6%	–0.1	–1.3	–0.6	51.2%	50.6%
All	54.9%	–0.1	–1.3	–0.8	53.6%	52.7%

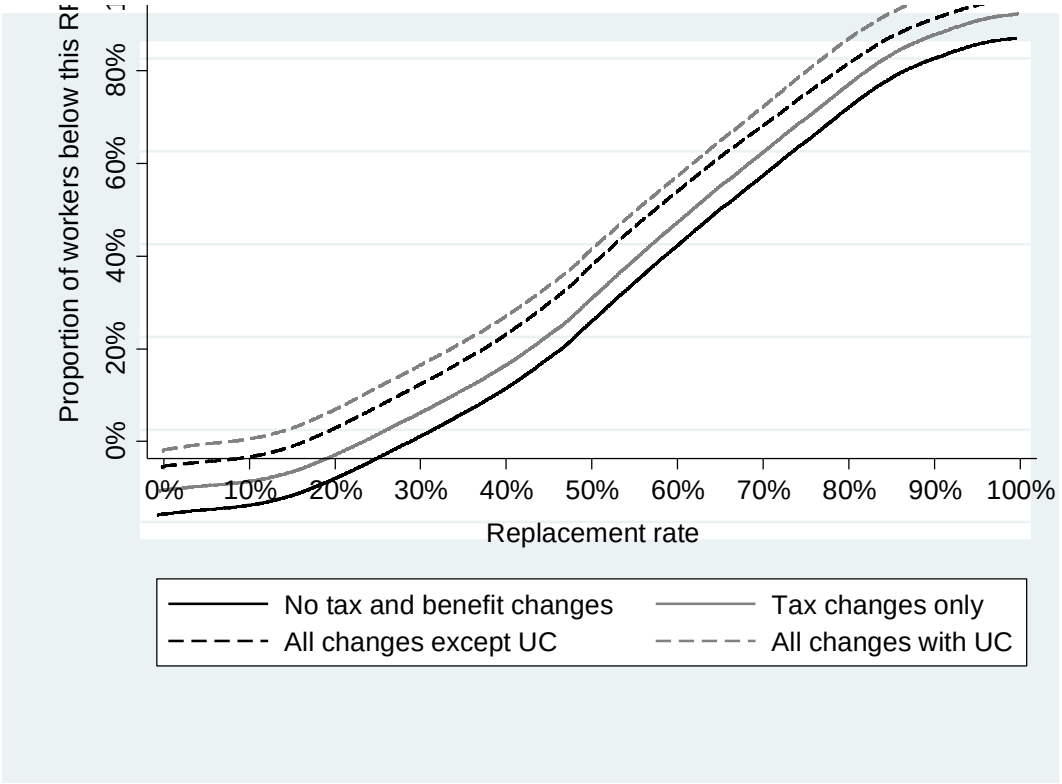
Note: Sample: all individuals aged between 19 and the State Pension Age.
Source: Author's calculations using TAXBEN run on uprated data from the 2012–13 and 2013–14 FRS.

Figure 4.3: Average replacement rates by earnings, pre- and post-tax and benefit changes



Note: Lowess-smoothed lines. Sample: all individuals aged between 19 and the State Pension Age.
Source: Author's calculations using TAXBEN run on uprated data from the 2012–13 and 2013–14 FRS.

Figure 4.4: The distribution of replacement rates, pre- and post-tax and benefit changes



Note: Sample: all individuals aged between 19 and the State Pension Age.
Source: Author's calculations using TAXBEN run on uprated data from the 2012–13 and 2013–14 FRS.

Impact on the incentive for individuals in paid work to earn more

Table 4.3 shows the impact of tax and benefit reforms on effective marginal tax rates (the proportion of a pound of additional earnings that is lost in tax or withdrawn benefits). Overall, tax and benefit changes to be introduced between 2015–16 and 2019–20 reduce the average EMTR, strengthening incentives for those in paid work to increase their earnings. Direct tax changes slightly reduce average EMTRs. This small average reduction comes about as a result of large reductions in EMTRs for a small number of individuals who are taken below either the personal allowance or the higher rate threshold as a result of increases in these two income tax thresholds. Thus, those groups that contain more individuals with incomes either around the personal allowance or around the higher rate threshold see larger average reductions in EMTRs. As these are two groups with very different levels of earnings, there is no clear pattern in the types of people who are particularly likely to see these big reductions in the EMTRs.

Benefit changes other than universal credit reduce the average EMTR more substantially. There are three aspects of the changes that affect peoples' EMTRs:

- First, because these changes involve reductions in the maximum amount of benefits to which families are entitled, some people find that they are no longer entitled to anything and so see their EMTR fall substantially as they no longer face the withdrawal of benefits if they slightly increase their earnings.
- Second, the reduction in the first tax credit threshold similarly means that entitlement to tax credits runs out at a lower income level, again meaning that some people no longer face withdrawal of tax credits if they increase their earnings, reducing their EMTR. (This also means that a small number of lone parents who work at least 16 hours per week but earn less than the current tax credit threshold of £6,420 see an increase in the EMTR as they would now face withdrawal of tax credits if they increased their earnings).
- Finally, the increase in the tax credit taper rate means that 2.1 million workers who remain on the tax credit taper see their EMTRs increase as they now face steeper withdrawal of tax credits if they increase their earnings. However, as with the other changes, it also means that some workers find that they are no longer entitled to tax credits at all at their current level of earnings and so no longer face tax credit withdrawal if they increase their earnings.

Overall, the factors that reduce EMTRs by reducing the number of people on benefit and tax credit tapers are more important and these changes reduce the average EMTR by 1.9ppts. As we would expect, they particularly reduce EMTRs among groups who were more likely to be entitled to means-tested benefit and tax credits in the first place, including those in couples with children, those in couples without children whose partner is not in paid work and those in families where someone is claiming a disability benefit. Those with large families, who see particularly large reductions in their tax credit entitlements are also particularly likely to see their EMTR fall substantially as a result of being taken out of the tax credit system altogether. However, for the very lowest-earning groups where relatively few people are taken out of tax credits altogether, the increase in the tax credit taper rate is more important. For example, the average EMTR increases among lone parents by 1.9ppts. It also falls by less than the average for social renters, another relatively low-earning group.

Universal credit increases the overall average EMTR very slightly, but this disguises big increases for some groups and big reductions for others. By combining several overlapping means tests into a single one, UC removes the very highest EMTRs that exist under the current system when individuals face the withdrawal of multiple benefits and tax credits over the same range of income. This means that groups such as lone parents and those on disability benefits see big reductions in their average EMTRs. However, this also means that entitlement to benefits extends to higher income levels and so more individuals will face withdrawal of benefits if they increase their earnings, increasing their EMTR. In particular, the increase in the level of in-work support given to couples with children (and to a lesser extent single people without children) under universal credit means that average EMTRs among these groups increase.

These patterns are also reflected in Figure 4.5 which shows average EMTRs by earnings before and after these tax and benefit changes. It shows that tax changes reduce EMTRs around the level of the personal allowance where some individuals are taken out of

income tax, and around £43,000 where individuals are taken out of the higher rate of income tax. Benefit changes do not reduce average EMTRs at the very lowest levels of earnings, where individuals are more likely to still be entitled to tax credits and facing a higher withdrawal rate following the changes, but at higher earnings levels these changes significantly reduce average EMTRs. Individuals at these higher levels of earnings are less likely to be facing benefit or tax credit withdrawal if they increase their incomes following the reforms. This effect diminishes at earnings levels above £30,000 and disappears entirely beyond £45,000: individuals with earnings above this level are not entitled to means-tested benefits and tax credits in the first place and so are not affected by changes to these programmes. Universal credit reduces EMTRs at earnings levels between £10,000 and £20,000, where the highest average EMTRs are to be found under the current benefit system, but then increases them on average between £20,000 and £40,000 as it extends benefit entitlement to higher earnings levels.

We can also see some of these patterns in Figure 5.6, which shows the distribution of EMTRs before and after these tax and benefit changes. The figure shows that the most common EMTR faced by workers is 32%, the EMTR faced by a basic-rate taxpayer who also pays employee National Insurance Contributions (NICs) but does not face withdrawal of means-tested benefits or tax credits. We can see that tax changes increase the number of workers with EMTRs below 40% very slightly (by around 200,000) as the reduction in the higher rate threshold increases the number of basic-rate taxpayers (and reduces the number of higher-rate taxpayers). Other than this, tax changes have no visible impact on the distribution of EMTRs.

Benefit changes increase the number of individuals with this EMTR further, as they reduce the number of people who are on benefit and tax credit tapers. Thus, these changes reduce the number of people with EMTRs of at 40% or more by around 1.6 million, of at least 50% by around 1.3 million and of at least 60% and of at least 70% by around 1 million. However, these changes, particularly the increase in the tax credit taper increase the number of people with an EMTR of at least 80% by around 500,000.

This increase in the number of people with very high EMTRs is however more than reversed by the introduction of universal credit. UC reduces the number of individuals with EMTRs of at least 80% by around 1.3 million or 72%. This arises because UC replaces a number of overlapping means tests with a single one, which ensures that EMTRs cannot rise too high. However, universal credit increases the number of individuals with EMTRs of more than 60% by around 800,000 (from 1.3 million to 1.8 million) as it extends benefit entitlement to more families, meaning that more individuals face withdrawal of benefits if they increase their earnings.

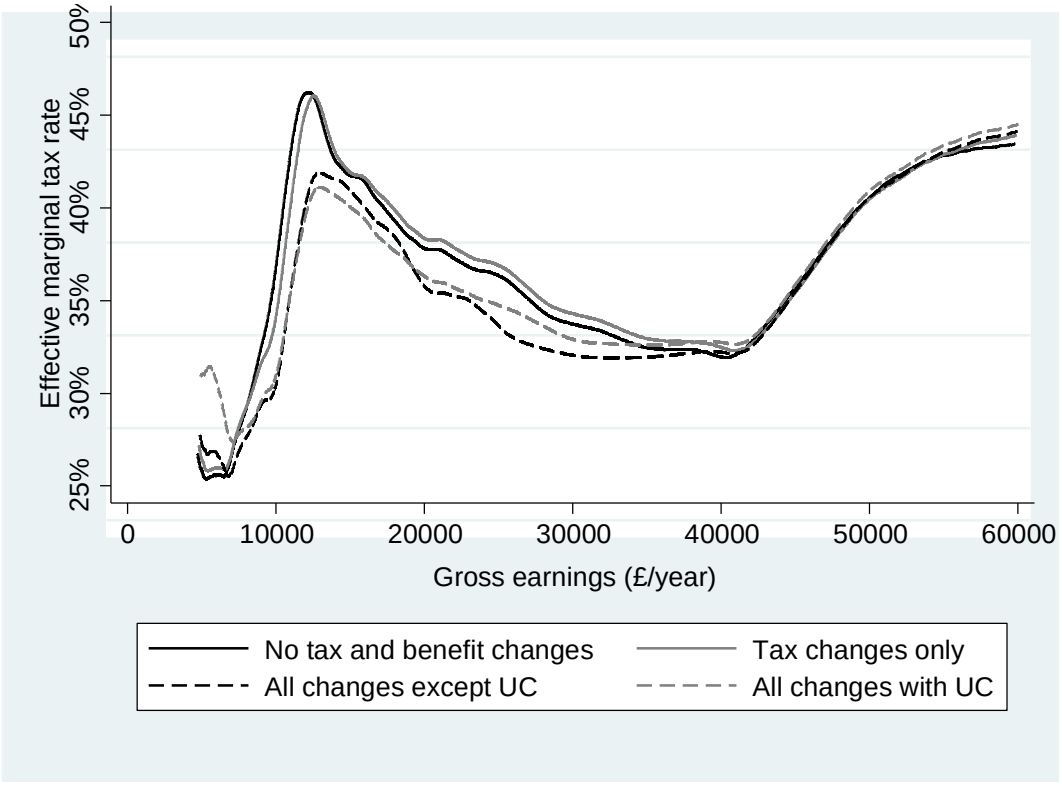
Table 4.3: Impact of tax and benefit reforms on average EMTRs by group

Group	Average EMTR pre-reform	Impact of:			Average EMTR, post reform without UC	Average EMTR, post reform with UC
		Direct tax changes	Benefit changes	UC		
Single, no children	32.4%	–0.3	–1.5	+0.2	30.6%	30.8%
Lone parent	66.3%	–0.3	+1.9	–8.0	67.9%	59.9%
Partner not working, no children	39.7%	–0.4	–2.4	–0.1	36.9%	36.8%
Partner not working, with children	58.7%	–0.3	–3.6	+1.7	54.8%	56.4%
Partner works, no children	31.1%	–0.4	–0.5	–0.0	30.3%	30.3%
Partner works, with children	38.4%	–0.4	–4.1	+1.1	34.0%	35.1%
Without children	32.4%	–0.4	–1.0	+0.1	31.0%	31.1%
With children	44.9%	–0.3	–3.4	+0.3	41.1%	41.4%
Of which:						
1 child	42.8%	–0.3	–2.7	–0.0	39.7%	39.7%
2 children	45.1%	–0.4	–3.2	+0.4	41.5%	42.0%
3 children	52.5%	–0.3	–7.7	+0.3	44.6%	44.9%
4+ children	56.0%	–0.3	–5.7	+4.1	50.0%	54.1%
Age 19–24	27.8%	–0.4	–0.3	+1.1	27.1%	28.2%
Age 25–54	39.0%	–0.3	–2.3	+0.1	36.4%	36.5%
Age 55–State Pension Age	34.6%	–0.4	–1.5	–0.5	32.7%	32.2%
White	36.8%	–0.3	–1.9	+0.1	34.5%	34.6%
Non-white	40.6%	–0.3	–2.1	+0.9	38.1%	39.0%
Receiving a disability benefit	49.0%	–0.2	–5.2	–4.0	43.7%	39.6%
Partner receiving a disability benefit	47.5%	–0.3	–3.6	+1.3	43.6%	44.9%
No adult in family receiving a disability	36.8%	–0.4	–1.9	+0.2	34.6%	34.7%

benefit						
Social renter	47.1%	–0.4	–1.7	+0.1	45.0%	45.1%
Private renter	41.2%	–0.3	–2.0	+0.6	38.9%	39.5%
Owner-occupier	34.7%	–0.4	–2.0	+0.0	32.4%	32.4%
All	37.1%	–0.3	–1.9	+0.1	34.9%	35.0%

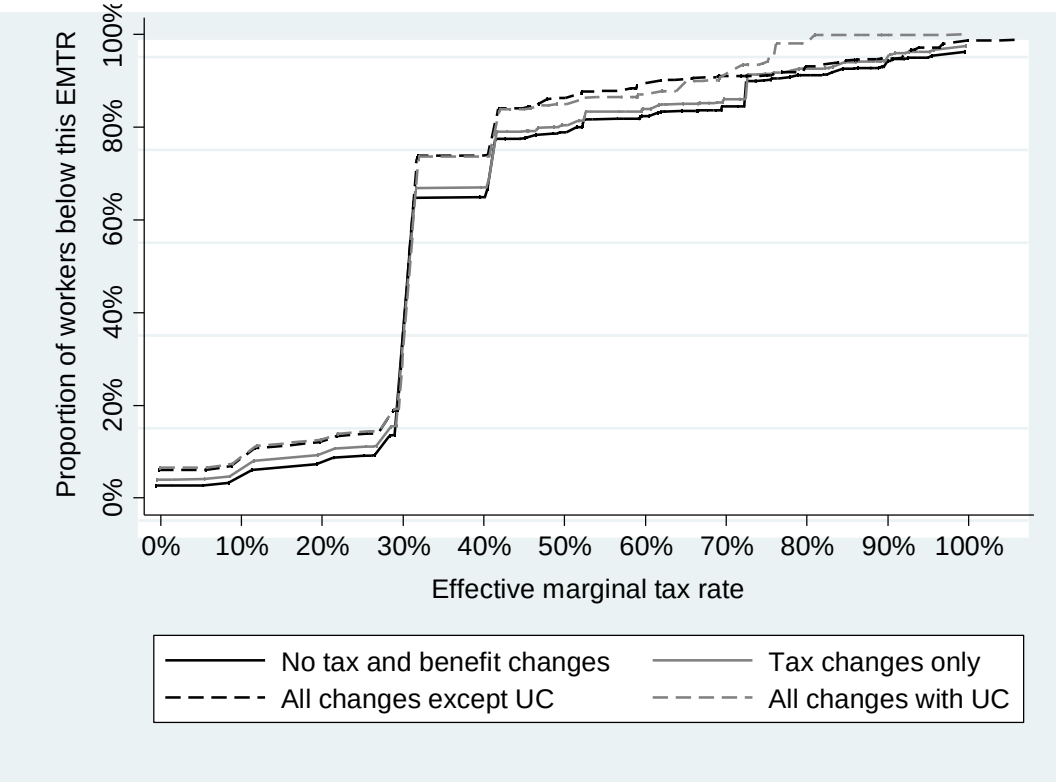
Note: Sample: all individuals who are in paid work and aged between 19 and the State Pension Age.
Source: Author's calculations using TAXBEN run on uprated data from the 2012–13 and 2013–14 FRS.

Figure 4.5: Average EMTRs by earnings, pre- and post-tax and benefit changes



Note: Lowess-smoothed lines. Sample: all individuals who are in paid work and aged between 19 and the State Pension Age.
Source: Author's calculations using TAXBEN run on uprated data from the 2012–13 and 2013–14 FRS.

Figure 4.6: The distribution of EMTRs, pre- and post-tax and benefit changes



Note: Sample: all individuals who are in paid work and aged between 19 and the State Pension Age.
Source: Author's calculations using TAXBEN run on uprated data from the 2012–13 and 2013–14 FRS.

4.4 Summary

Tax and benefit changes to be introduced between 2015–16 and 2019–20 slightly strengthen the incentive for individuals to be in paid work on average – the average PTR falls by 2.5ppts and the average RR by 2.2ppts as a result of these changes. But this impact is not uniform across different types of people: those in couples whose partner is not in paid work see their work incentives particularly strengthened, whereas lone parents see only a small reduction in their RRs and an increase in their PTRs on average. It is universal credit that particularly strengthens incentives for those whose partner is not in paid work. Other changes to the benefit system often have the opposite effect to universal credit: they increase PTRs for those in couples whose partner is not in paid work, but reduce them for those whose who have a working partner. Similarly, and not unrelatedly, benefit changes other than universal credit have the unwelcome effect of weakening work incentives for those who have the weakest work incentives at the moment (as they reduce the tax credits that these individuals receive when they are working), but universal credit has the opposite (and welcome) effect, removing the very weakest work incentives that exist under the current system by rationalising the multiple means tests that exist under the current system of benefits and tax credits into a single one.

These changes also on average strengthen the incentives for those in paid work to increase their earnings as measured by the effective marginal tax rate (EMTR). The mean EMTR falls by 2.1ppts as a result of these changes. This comes about largely because of changes to benefits other than the introduction of universal credit, which reduce the number of workers who are entitled to means-tested benefits or tax credits and who hence face losing some of these benefits if they increase their earnings. However, for those workers who remain entitled to tax credits, EMTRs increase as a result of the tax credit taper rate increasing from 41% to 48%. This means that the average EMTR among lone parents increases slightly, and that the number of individuals with EMTRs of at least 80% increases by around 500,000. Again, though, the introduction of universal credit more than reverses these undesirable effects. By combining several overlapping benefit and tax credit tapers into a single one, universal credit removes the very high EMTRs that can exist under the current system, reducing the number of workers with EMTRs above 80% by 1.3 million or 72%. However, by withdrawing means-tested support for those in work more gradually, it extends benefit entitlement to higher earnings levels and increases the number of workers with EMTRs of at least 60% by 800,000.

5. The impact of the National Living Wage on work incentives

As discussed in Section 4, individuals' incentives to engage in paid work depend on comparison between how much income they would receive if they do work, and how much they would receive if they do not. Thus, these incentives depend both on taxes and benefits that create a wedge between the amount it costs and employer to employ someone and the financial gain to an employee from working, and the level of earnings an employee can command if they work. Section 4 examined the effects of changes in taxes and benefits that are to be introduced between 2015–16 and 2019–20 on financial work incentives. In this section, we add in the effects of the introduction of the National Living Wage on the work incentives of those who are currently paid less than this level (which we assume to be 60% of current median earnings, and on the incentive for those currently not in paid work to take a minimum wage job.

A key caveat to this analysis is that it only considers the gains from the NLW and ignores the losses. Unless paying a higher NLW is matched by commensurately higher productivity, the higher wages must be paid for by someone, through reduced employment, higher prices or lower profits. The analysis in this section does not take either of these effects into account.

Another important point to bear in mind is that although the NLW does, as we shall see, strengthen work incentives and would therefore likely increase labour supply to at least some extent, there is no guarantee that there will be the labour demand to match this supply (indeed, the OBR expect the NLW to lead to lower employment overall).[10] To give an extreme example, a minimum wage of £100 per hour would no doubt make working at the minimum wage very attractive for many people, but it is unlikely that many would be able to find work if the minimum wage were at this level.

5.1 The impact of the NLW on the incentive of those paid below the NLW to be in paid work

In this section, we examine the impact of the NLW on the replacement rates (RRs) of those currently paid below the NLW. (It would not be meaningful to do this analysis for PTRs, as these measure the extent to which the tax and benefit system distorts decisions around whether to enter paid work rather than the pure incentive to work people face). We do this by increasing the earnings of those who we estimate (using the methodology described in Box 3.1) to be earning below the NLW by the ratio of the NLW to their

[10] See Annex B of Office for Budget Responsibility (2015), 'Economic and fiscal outlook – July 2015', Command Paper 9088, http://cdn.budgetresponsibility.independent.gov.uk/July-2015-EFO-234224.pdf.

estimated hourly wage.[11,12] Table 5.1 shows how the introduction of the NLW affects the average replacement rate among all workers and among just those who are currently paid below the NLW (there is no effect in our analysis on those who are not paid below the NLW since we do not account for the impact of the NLW on an individual's partner's earnings on their in-work and out-of-work incomes), and compares this to the effect of tax and benefit changes (including and excluding universal credit). Comparing the second and third columns with the first one give the impact of tax and benefit changes only (thus the first three columns show the same numbers for all workers as in Table 4.2), to which we can add the impact of the NLW by comparing the figures in the second and third columns with those in the fourth and fifth columns respectively.

Table 5.1: Impact of NLW and tax and benefit changes on the replacement rates of those who are in paid work

Group	Replacement rate:				
	Pre-reform	Post-reform:			
		Without UC or NLW	With UC, without NLW	Without UC, with NLW	With UC and NLW
Do not benefit from NLW (84%)	50.1%	48.7%	48.1%	48.7%	48.1%
Benefit from NLW (16%)	65.8%	64.7%	64.0%	62.9%	62.2%
All workers	52.6%	51.2%	50.6%	50.9%	50.3%

Note: Sample: all individuals who are in paid work and aged between 19 and the State Pension Age.
Source: Author's calculations using TAXBEN run on uprated data from the 2012–13 and 2013–14 FRS.

Overall, we can see that the introduction of the NLW reduces the average RR among those who are in paid work by 0.3ppts, both in the scenarios with and without universal credit. This is far smaller than the impact of tax and benefit changes, which reduce average RRs among workers by 1.4ppts excluding universal credit and 2.0ppts including

[11] As we are analysing the NLW as if it were introduced in 2015–16, we downrate the estimated NLW for 2020–21 of £9.35 in line with OBR forecasts of average earnings growth to a 2015–16 value of £7.68. Thus, for someone currently estimated to be earning the minimum wage of £6.70, we increase their earnings by around 14.6% to estimate their earnings if they were paid the NLW. There are a small number of individuals in our data who are estimated to be earning less than the NMW: we restrict the percentage increase in their earnings to be the ratio between the NLW and the NMW.

[12] Note that we do not allow the NLW to impact those who are paid more than this wage rate to start off with. This contrasts with the OBR's analysis of the impact of the NLW, which does allow for some (small) spillover effects on those with slightly higher earnings.

it. This is of course mainly because the vast majority of workers (84% of them according to our estimates) are paid more than the NLW to start off with.

However, the NLW does have a significant effect on their RR among the 16% of workers who are currently paid below this level. Indeed, for this group, the introduction of the NLW is more important, reducing average RRs by 1.8ppts both in the systems with and without universal credit. It is also interesting to note that this group sees their work incentives strengthened by less than average from tax and benefit changes – their average RR falls by only 1.1ppts as a result of tax and benefit changes other than the introduction of universal credit and 0.6ppts as a result of universal credit itself. (We saw in Figure 4.3 that tax and benefit changes other than universal credit do less to reduce replacement rates at low levels of earnings, so this is not altogether unsurprising).

Among those who are paid less than the NLW, we can analyse its effects on different types of people. Table 5.2 shows the results of this analysis. We see that the NLW does less to strengthen work incentives for lone parents and those in couples with children whose partner is not in paid work, ironically the groups that have the weakest work incentives to start off with. This arises because these are the groups that have the highest EMTRs, which means they lose much of the increase in their gross earnings from the NLW through taxes and withdrawn benefits. This is a reminder that not all of the gains resulting from the NLW benefit households: some also benefits the exchequer through higher taxes on employment income and lower means-tested benefit and tax credit payments. (This is not to say that the NLW will strengthen the public finances: if it is not fully paid for by higher productivity, the NLW will lead to some combination of lower employment, higher prices and lower profits, all of which will have a negative impact on the public finances. Analysis by HM Treasury suggests that increasing the minimum wage is roughly revenue-neutral overall once these other factors are accounted for.[13])

[13] See pp.16–28 of Department for Business, Innovation and Skills (2014), 'National minimum wage: government evidence for the Low Pay Commission on the additional assessment', https://www.gov.uk/government/publications/national-minimum-wage-government-evidence-for-the-low-pay-commission-additional-assessment.

Table 5.2: Impact of NLW and tax and benefit changes on the replacement rates of those who are in paid less than the NLW by person type

Group	Replacement rate:				
	Pre-reform	Post-reform:			
		Without UC or NLW	With UC, without NLW	Without UC, with NLW	With UC and NLW
Single, no children	45.8%	45.0%	44.1%	42.3%	41.5%
Lone parent	74.2%	74.6%	74.5%	73.8%	73.4%
Partner not working, no children	70.8%	70.5%	63.5%	67.6%	61.3%
Partner not working, with children	82.7%	83.1%	76.8%	81.9%	75.7%
Partner works, no children	64.0%	62.8%	62.9%	61.2%	61.2%
Partner works, with children	76.7%	74.5%	75.9%	72.9%	74.4%
All below NLW	65.8%	64.7%	64.0%	62.9%	62.2%

Note: Sample: all individuals who are in paid work and aged between 19 and the State Pension Age.
Source: Author's calculations using TAXBEN run on uprated data from the 2012–13 and 2013–14 FRS.

5.2 The impact of the NLW on the incentive for those paid less than the NLW to work an additional hour

In section 4, we examined the impact of tax and benefit changes to be introduced between 2015–16 and 2019–20 on effective marginal tax rates (EMTRs) for different groups. This gives an assessment of how the incentive to work an additional hour has changed if we assume that an individual's gross hourly wage would remain the same in each scenario. However, the NLW strengthens the incentive for an individual to work an additional hour in a different way, by increasing the gross wage earned for working an additional hour rather than allowing the individual to keep a greater proportion of their earnings. Thus, reporting the effect of the NLW on EMTRs would not give an estimate of how strong an incentive individuals face to work an additional hour. To see this, consider an individual who faces an EMTR of 50% whether their gross wage rate is £10 or £20. Their incentive to undertake an additional hour's paid work is clearly stronger in the case where their gross wage is £20 rather than £10, but this is not reflected in their EMTR. We therefore measure this incentive by the gain to an employee in cash terms from working an additional hour, which we calculate by multiplying each individual's

predicted hourly wage with and without the NLW[14] by the proportion of an additional pound's earnings they get to keep (i.e. 100% minus their EMTR).[15]

Table 5.3 shows the average gain from working an additional hour for all employees before and after both tax and benefit changes and the NLW. As in Table 5.1, comparing the first columns with the second and third columns gives the impact of tax and benefit changes with and without the introduction of universal credit, and comparing the second or third with the fourth or fifth gives the impact of the NLW. Note that under all scenarios the average gain from working an additional hour is less than the NMW for those paid less than the NLW as some of the additional earnings are lost in either higher taxes or lower benefit entitlements. We see that for those paid below the NLW and who therefore potentially benefit from its introduction, the impact is significant and indeed greater than the impact of tax and benefit changes. We also see that those paid below the NLW see a reduction in the EMTRs as a result of the introduction of universal credit, whereas those paid more than the NLW see an increase: this is consistent with Figure 4.5 which shows that universal credit reduces average EMTRs at lower earnings levels, but increases them at higher ones.

Table 5.3: Impact of NLW and tax and benefit changes on the gain to working an additional hour by whether paid below NLW

Group	Cash gain from an extra hour of paid work:				
	Pre-reform	Post-reform:			
		Without UC or NLW	With UC, without NLW	Without UC, with NLW	With UC and NLW
Do not benefit from NLW (84%)	£10.39	£10.62	£10.60	£10.62	£10.60
Benefit from NLW (16%)	£4.22	£4.45	£4.49	£4.86	£4.89
All workers	£9.28	£9.51	£9.50	£9.59	£9.58

Note: Sample: all employees aged between 19 and the State Pension Age.
Source: Author's calculations using TAXBEN run on uprated data from the 2012–13 and 2013–14 FRS.

[14] For those paid below the NLW, this is the NLW in the 'with NLW' and the higher of their predicted hourly wage and the NMW in the 'without NLW' scenario. For others, it is their predicted hourly wage throughout (calculated using the methodology described in Box 5.1), other than those already earning more than 70 times the NLW, for whom we use their earnings as recorded in the FRS divided by their reported hours.

[15] Note this assumes that the EMTR is constant over the small range of additional earnings that an individual earns when they work an additional hour. As the tax and benefit system is piecewise-linear, this is not too unrealistic an assumption, though our methodology will not give the correct answer for those who are just below a threshold in the tax and benefit system, or whose entitlement to a benefit or tax credit will run out if they work for an additional hour.

In Table 5.4, we investigate the impact on different types of people paid below the NLW. This variation comes about because, as we saw in Table 4.3, different groups have different average EMTRs. We see that those groups who have higher EMTRs, mainly because they are entitled to means-tested benefits and tax credits and so face withdrawal of benefits or tax credits if they increase their earnings, both have lower gains from working an additional hour and see these increase by less as a result of the NLW. This is because much of the additional earnings resulting from the NLW are lost in lower benefit entitlements for this group. We also see that, for lone parents paid less than the NLW, the reduction in the gain from working an additional hour brought about by higher EMTRs resulting from the tax and benefit changes other than universal credit are not offset by the higher NLW, though are more than offset by the reductions in EMTRs that are brought about by universal credit. Furthermore, the higher EMTRs brought about by universal credit for those in couples with children whose partner is not in paid work reduce the average gain from working an additional hour more than the NLW increases it. For other groups paid less than the NLW though (i.e. people without children, and those in couples with children whose partner is in paid work), the tax and benefit changes increase the average gain from working an additional hour, and then increase it again by a larger amount as a result of the NLW.

Table 5.4: Impact of NLW and tax and benefit changes on the gain to working an additional hour of those who are in paid less than the NLW by person type

Group	Cash gain from an extra hour of paid work:				
	Pre-reform	Post-reform:			
		Without UC or NLW	With UC, without NLW	Without UC, with NLW	With UC and NLW
Single, no children	£4.27	£4.59	£4.61	£5.08	£5.06
Lone parent	£2.09	£1.63	£2.33	£1.73	£2.54
Partner not working, no children	£3.86	£4.20	£4.37	£4.68	£4.84
Partner not working, with children	£2.06	£1.95	£2.02	£2.14	£2.22
Partner works, no children	£5.29	£5.42	£5.42	£5.84	£5.86
Partner works, with children	£4.35	£4.88	£4.74	£5.33	£5.17
All below NLW	£4.22	£4.45	£4.49	£4.86	£4.89

Note: Sample: all individuals who are in paid work and aged between 19 and the State Pension Age.
Source: Author's calculations using TAXBEN run on uprated data from the 2012–13 and 2013–14 FRS.

5.3 Impact of the NLW on the incentives for those not in paid work to take a job at the minimum wage

Our analysis in section 4 showed the impact of tax and benefit changes on the replacement rates of both workers and non-workers. In that analysis, we predicted how much those not in paid work would earn were they to enter paid work based on their characteristics and the earnings of those with similar characteristics who are in paid work. In this sub-section, we analyse the incentive these individuals face to take a job paid at the minimum wage (i.e. the NMW in our scenario without the NLW, and, for those aged 25 or over, the NLW in the scenario with the NLW).[16] These figures will therefore likely give an underestimate of the strength of incentives individuals face to enter paid work – it is likely that many of those currently not in paid work could find a job paid more than the NLW if they did choose to enter paid work. However, as the minimum wage (whether it is the NMW or the NLW that applies) is by definition the lowest amount that someone could earn if they worked a certain number of hours, this analysis puts a lower bound on the strength of the work incentives those currently not in paid work face.

In Table 5.5, we show RRs for those currently not in paid work under the same scenarios analysed previously in this section, under the assumption that they will all be paid the minimum wage in each scenario. We see that under all scenarios, replacement rates are high on average, perhaps unsurprisingly as we are calculating RRs at a relatively low level of earnings. As we saw in Figure 4.3, tax and benefit reforms other than universal credit do not have a very large impact on replacement rates at these levels of earnings as these individuals see reductions in the amount of tax credits they receive when in work as well as in their out-of-work benefits. However, we again see that universal credit significantly strengthens incentives on average for those in couples whose partner is not in paid work and single people without children, though very slightly weakens them for those in couples with children whose partner is in paid work.

The NLW has, on average, a bigger impact than tax and benefit changes on the incentives for those not in paid work to take a job at the minimum wage in the scenario without universal credit, but a slightly smaller impact than the impact of tax and benefit changes including universal credit. It particularly strengthens the incentive to take a minimum wage job for those in couples without children, but does the least for those in couples with children whose partner is not in paid work and lone parents. This is because these groups have the highest EMTRs, and so the additional earnings they receive as a result of the NLW feed through into lower benefit and tax credit entitlements rather than higher net incomes. Since universal credit lowers average EMTRs for lone parents, this is true to a lesser extent for this group after the introduction of universal credit.

[16] As in section 4, we calculate replacement rates at four different hours points and weight them by estimated probabilities that they would work that number of hours.

Table 5.5: Impact of NLW and tax and benefit changes on the replacement rates of those who are not in paid work, assuming paid minimum wage in work

Group	Replacement rate:				
	Pre-reform	Post-reform:			
		Without UC or NLW	With UC, without NLW	Without UC, with NLW	With UC and NLW
Single, no children	53.0%	52.1%	50.9%	50.8%	49.4%
Lone parent	76.9%	76.3%	76.8%	75.8%	75.8%
Partner not working, no children	78.6%	79.4%	73.9%	77.6%	71.9%
Partner not working, with children	85.0%	84.8%	77.2%	83.5%	76.1%
Partner works, no children	73.7%	73.0%	73.5%	71.0%	71.5%
Partner works, with children	82.6%	81.3%	82.7%	79.7%	81.1%
All not in paid work	69.1%	68.4%	66.9%	67.0%	65.3%

Note: Sample: all individuals aged between 19 and the State Pension Age who are not in paid work.
Source: Author's calculations using TAXBEN run on uprated data from the 2012–13 and 2013–14 FRS.

5.4 Summary

The NLW will strengthen work incentives for those who are currently paid less than the level of the NLW, and will strengthen the incentive for those not in paid work to take a minimum wage job. Even among those affected, the impact is not large, reducing the average replacement rate by 1.8ppts, smaller than the average impact of tax and benefit changes on the whole population, though the same as the impact of these reforms on the average replacement rates of this group. And as only around a sixth of workers are paid less than the NLW, the NLW has a much smaller impact than tax and benefit changes on the overall average replacement rate among workers than tax and benefit changes, reducing it by 0.3ppts. Within this average effect, there is some variation, with the effect being smaller for those who face the weakest work incentives in the first place, as these individuals see most of the increase in gross wages feed through into lower benefit entitlements rather than higher net income.

When we consider the incentive for those paid below the NLW to work an additional hour, we again find that tax and benefit changes do more to strengthen this incentive on average for all workers, though among those who are paid less than the NLW, the NLW

does more to strengthen this incentive than changes to taxes and benefits do. The incentive to work an additional hour is strengthened the least for those who face the highest EMTRs as a result of facing withdrawal of benefits and tax credits if they increase their earnings.

Finally, the NLW will strengthen the incentive for those not in paid work to take a job at the minimum wage. The impact it will have is greater than the impact of tax and benefit changes excluding universal credit, but smaller than the impact of tax and benefit changes including universal credit. As before, this effect will be smaller for those who lose most of the increased earnings brought about by the NLW through lower benefit and tax credit payments, in particular lone parents and those in couples with children whose partner is not in paid work. However, universal credit reduces the extent to which this is the case for lone parents by reducing their EMTRs on average, enabling them to keep more of the increased earnings they would receive as a result of the NLW.

6. Conclusions

Tax and benefit reforms to be introduced between 2015–16 and 2019–20 will reduce household incomes by an average of £455. However, this average figure disguises substantial variation in the impact between different types of household.

The overall distributional impact of tax and benefit changes is dominated by the impact of changes to benefits, since these are the largest in revenue terms. The biggest losers from these changes are low-income working-age households, particularly those with children. As some of the cuts to tax credits, in particular the reduction in the first income threshold and the increase in the taper rate, reduce the amount of support given to working families, low-income working households will lose around the same amount as non-working low-income households. However, universal credit will change this, increasing losses for non-working households but reducing them for low-income working households. By contrast, pensioner households will be largely unaffected by these changes.

Reducing out-of-work benefits strengthens incentives for people to enter paid work on average: the average PTR falls by 2.5ppts and the average RR falls by 2.2ppts as a result of planned tax and benefit changes. But planned reductions in in-work support mean that the overall strengthening of incentives is perhaps smaller than one might have expected given the scale of the benefit and tax credit cuts. Indeed, tax and benefit changes increase PTRs on average for lone parents and those in couples whose partner is not in paid work. However, these reductions in support for single-earner couples themselves strengthen the incentive for the both members of a couple to work rather than just one, since they have less means-tested support to lose if the second member of the couple enters paid work. As most people either have a partner who is in paid work or are single and childless, changes to benefits other than universal credit strengthen incentives for individuals to be in paid work on average.

In many cases, universal credit has the opposite effect to other benefit changes. By increasing the amount of support given to single-earner couples, it strengthens the incentive to enter paid work for those whose partner is not in paid work but weakens the incentive for both members of a couple to work rather than just one. It also has the highly desirable impact of strengthening work incentives for those who face the weakest incentives to enter paid work under the current system. Furthermore, it does most to strengthen work incentives at low earnings levels, whereas other changes to benefits do little to strengthen the work incentives of those with low (actual or potential) earnings. However, neither universal credit nor other changes to benefits significantly reduce average RRs for lone parents, and they increase average PTRs for this group.

Cuts to benefits and tax credits will mean that fewer of those in paid work will be entitled to means-tested support, and so will no longer face withdrawal of this support if they increase their earnings. This significantly reduces EMTRs for these individuals, and means that the average EMTR among workers falls. However, for those workers who remain entitled to tax credits, the incentive to increase earnings weakens as a result of an increase in the tax credit taper. This weakens incentives for working lone parents to

increase their earnings, on average, and increases the number of workers with EMTRs of at least 80% by 500,000.

Again, universal credit has the opposite effect to other benefit changes in many cases. It increases the number of working couples with children who are entitled to means tested support, and hence the number who face withdrawal of this support if they increase their earnings. However, by replacing multiple overlapping benefit and tax credit tapers with a single one, it strengthens incentives to earn more for those who have the weakest incentives at the moment, including many lone parents. Indeed, universal credit reduces the number of workers with EMTRs of at least 80% by 72%, or 1.3 million.

The introduction of the National Living Wage (NLW) will strengthen work incentives for those who are currently paid less than this (we estimate around 16% of workers). For this group, it will have a slightly larger impact than that of tax and benefit changes, though as most workers are not affected, it has a smaller effect on the work incentives among workers as a whole. Among those affected, the impact is smallest on those who face the weakest work incentives, since these workers lose most of the higher gross wages in withdrawn benefits and tax credits.