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Abstract

Atkinson's book *Inequality: What Can Be Done?* (Harvard University Press, 2015) sets out a range of concrete proposals aimed at reducing income inequality, which cover a very broad span but include major changes to the income tax and social transfers system and the minimum wage. These are framed with specific reference to the UK but have much broader relevance in demonstrating how substantial the impact on inequality of such measures could be. This paper assesses the first-round effects of these tax, transfer and minimum wage reforms on income inequality and poverty based on a microsimulation approach using EUROMOD. The reforms involve a significantly more progressive income tax structure, a major increase in the minimum wage to the level which is estimated to represent the 'Living Wage', and alternative routes to reforming social transfers – either to strengthen the social insurance element or to restructure the entire system as a Participation Income (a variant of Basic/Citizen's Income). The results show how the first-round effects of either set of tax and transfer proposals would be to substantially reduce the extent of income inequality and relative income poverty and the paper draws out how the two approaches differ in their effects. The additional impact of raising the minimum wage to the Living Wage is modest, reflecting in particular the position of beneficiaries in the household income distribution and the offsetting effects on household income of the withdrawal of means-tested cash transfers.

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Reducing Poverty and Inequality through Tax-Benefit Reform and the Minimum Wage: The UK as a Case-Study

1. Introduction

Rising inequality in rich countries is now a very widely-shared concern, due to its economic, social and political consequences as well as for its own sake (see for example OECD, 2015a, b, and Stiglitz, 2012). Atkinson (2015) argues that increasing income inequality is not inevitable but can be reversed, and sets out a range of concrete proposals aimed at doing so. These cover a very broad span going well beyond traditional redistributive tools, but include substantial increases in direct redistribution via the income tax and social transfer systems as well as increasing the minimum wage. These tax/transfer and minimum wage reforms are the focus of this paper, which assesses their potential impact on income inequality, poverty, and work incentives, as well as which types of household would gain versus lose. The specific proposals are framed with reference to the UK, but analysis of their likely impact on inequality and poverty yields insights of much broader relevance. In particular, they speak to central choices about the design and progressivity of income tax and social insurance contributions on the one hand, and the role of means-tested versus social insurance-based versus universal cash transfer payments on the other.

The UK is a particularly helpful case to analyse in this context, because social insurance-based provision has been eroded and the role of means-testing expanded dramatically over recent decades (while income tax rates have been sharply reduced as in many other OECD countries). About four-fifths of non-pensioner social security spending is now means-tested, compared with around a quarter in the late 1970s; as the Institute for Fiscal Studies put it, “the contributory principle plays an increasingly marginal role in the social security system, particularly for those of working age” (Hood and Oakley, 2014). Atkinson (2015) argues this is the wrong approach, on the basis that means-testing suffers from the twin failures of the high marginal tax rates created as benefits are withdrawn, combined with unmet need as some of those who are entitled to the benefits do not take them up, for a variety of reasons including complexity and stigma. At the same time, income taxation could do more to counteract increasing inequality in the distribution of income from the market.

Atkinson presents two alternative strategies in response. Each involves increasing income tax progressively and increasing Child Benefit substantially for all families, irrespective of means, thereby enhancing redistributive impact and, via increasing universal payments, allowing reliance on means-testing to be reduced. These are then combined either with strengthening social insurance or, alternatively, with the implementation of a form of ‘basic income’.

Strengthening social insurance would build on and reinforce existing structures, and reverse some of the expansion in means-testing that has been such a striking feature of the recent UK experience. However, social insurance may have difficulty coping with what are widely discussed as “new social risks” associated with low pay, insecure intermittent employment and family dissolution, seen in the UK debate and elsewhere as posing major challenges to the insurance-based model. Raising social insurance rates will impact only on those entitled to those benefits, while extending coverage may not have immediate effects if additional entitlements have to be built up by more contributors/contributions.

On the other hand, a basic income paid to everyone irrespective of means and living situation has been advocated from different ideological starting-points and is now being seriously debated in various countries. (See for example the seminal study by Van Parijs, 1995, Standing, 2014, and Van Parijs and Vanderborght, 2017; for analysis and discussion in a UK context see Parker, 1989, Torry, 2013, 2016, Reed and Lansley, 2016, Piachaud, 2016, Martinelli, 2017). This would impact more broadly than strengthening social insurance, and may offer some advantages with respect to new social risks in particular. However, broad coverage means it would be either more costly or less generous, while involving much more fundamental structural change. The relative merits of these alternatives on work incentives, compared with ever-more reliance on means-testing, also plays a central role in the debate.

This paper aims to contribute to understanding and debate through an in-depth analysis of the impact of pursuing these alternative strategies in a UK context, using a static microsimulation approach. This employs the tax-benefit model for the UK incorporated into the broader EUROMOD microsimulation model for the European Union, based on data for a representative sample of UK households. This allows us to examine the immediate impact of the reform packages on household incomes taking

into account the complex interactions between the different elements of the packages, exploiting the capacity of the microsimulation model to capture the detailed parameters of the actual and proposed tax-benefit structures. (See Figari et al., 2015, for an overview of microsimulation and policy analysis, and for comparative exercises with similar goals for example Atkinson et al., 2002, Levy et al., 2013). We investigate the effects on a range of inequality and poverty measures and look at how different types of household and different parts of the income distribution are affected, bringing out the channels through which the reform packages have their (differing) effects. We also analyse their impact on the financial incentives facing those in work, both with respect to working versus not working and to changing their hours of work. While we do not seek to take behavioural responses directly into account in the simulations, these measures of how financial incentives would change help to highlight where such responses in terms of labour supply might be more or less substantial.

We then investigate how these tax/transfer reforms align with another of Atkinson's (2015) proposals, to raise the National Minimum Wage (NMW) to the level of the Living Wage. This has become particularly salient in a UK context given that the British government now intends to raise the NMW significantly for those aged 25 or above over a period of years; it is again also of much broader relevance given the very active debates in many countries about the role of minimum wages in addressing inequality in wages and household incomes as well as poverty. (Studies focused on the UK minimum wage include Dickens and Manning, 2004a, b, Butcher et al., 2012, Stewart, 2011, and Brewer and De Agostini, 2015; Vaughan-Whitehead, 2009, compares a range of country experiences with respect to the minimum wage, while the role of minimum wages as part of a broader anti-poverty strategy is discussed in Marx and Nolan, 2014, 2015). Here we look at the immediate impact that raising the UK minimum wage might have on inequality and poverty, on its own or combined with the implementation of the alternative tax/transfer reform proposals. Once again this is done via a static microsimulation approach with no change in employment or hours taken into account, which is an essential first step in a broader assessment of such a minimum wage increase and how it interacts with alternative tax/transfer reform strategies.

Our findings show that such major tax/transfer reforms could reduce income inequality and poverty substantially, with the immediate effects of raising the

minimum wage being much more modest. The results bring out the complex interactions between taxes, benefits and earnings underpinning how such reforms would impact, and the nature of the choices faced if inequality is to be addressed by these key policy tools.

2. Outline of the Proposals

The UK's social security system has long been taken as the archetype of the Beveridgean structure centrally founded in social insurance - though means-testing always played a larger role than Beveridge had envisaged, since the insurance-based elements did not achieve either the coverage or level of payment required to residualise it. However, insurance-based payments declined from about 70% of total social security expenditure in the 1960s and early/mid-1970s to 50% by the mid-1990s, being sharply cut back by the Thatcher government in particular. Insurance-based payments have been further eroded since then, so that around four-fifths of non-pensioner social security spending is now means-tested, while the focus of government policy is on bringing separate means-tested schemes for those of working age together into an integrated Universal Credit scheme. Child Benefit, which had for many years been a universal payment made with respect to all children, has more recently been withdrawn from higher-income families. The work incentives associated with the system and reforms have been a central focus for policy-makers and researchers (see for example Adam and Browne, 2010, 2013, Browne, 2015), while non-take-up of means-tested benefits has also featured as a long-term concern in the UK (see for example Atkinson, 1995, Hernandez et al., 2007, Hancock, et al, 2004) as well as elsewhere (Bargain et al., 2012, Eurofound, 2015).

Income tax rates have been sharply reduced over the last 40 years, as seen in many other OECD countries. The current structure has a basic rate of 20% and a higher rate of 40%, with an additional rate of 45% affecting only about 1% of the highest income taxpayers.

The final element of the point of departure for the reform package to be investigated is the National Minimum Wage (NMW). Introduced in 1999, this sets a statutory minimum applying to hourly gross earnings across all sectors of the economy (though lower rates may be paid to younger/inexperienced workers) and has been updated intermittently over time on the basis of the recommendations of the independent Low

Pay Commission set up to advise the government with respect to the operation of the NMW. In 2014, the base year for our simulations, the NMW represented about 40% of the mean hourly wage and 48% of the median hourly wage for full-time employees. Around 5% of all jobs, a total of 1.4 million, were then paid at the minimum wage according to the Low Pay Commission (2015).

Against this base, the elements of the reforms we investigate here comprise:

- Restructuring income tax rates and employee social insurance contributions;
- Raising Child Benefit levels of payment;
- *Either* increasing levels of payment for adults relying on social insurance benefits (which we will refer to as the SI option),
- *or* introducing a Participation Income for adults combined with abolishing the income tax personal allowance and exemption limit for social insurance contributions (which we will refer to as the PI option); and
- Raising the NMW to the level of the Living Wage.

As is commonly done, the tax and transfer elements of the reform examined here are designed to be budget neutral – in other words, any additional expenditure has to be financed by additional revenue raised by measures that are fully specified and included in the analysis. In Atkinson (2015) a different approach was adopted, with the tax and transfer measures designed to generate a surplus of £2.5 billion in order to fund other proposals included in his broader set, notably a capital endowment, a job guarantee, and an increase in the level of overseas aid. Here the income tax and social insurance changes proposed by Atkinson are implemented, with the specific parameters of the transfer reforms then configured to produce budget neutrality (in the first instance, before any behavioural responses). The increase in the NMW also has implications for the Exchequer, but these are treated separately.

The main features of each element of the reforms we simulate are now described, with full details given in Appendix 1.

Personal income tax and social insurance contributions

A central element in Atkinson's proposals is to move to a more progressive rate structure for the personal income tax, with an initial rate of 25%, intermediate rates of 35-55%, and a top rate of 65%. That top rate is much higher than the 45% in place currently in the UK, but not high by historical standards. Atkinson (2015) emphasises

that intermediate as well as top rates are key to the average tax paid by those on high incomes, that estimates of a revenue-maximising top tax rate are subject to very substantial error, and that perceived fairness as well as maximising revenue is important. Low levels of earned income (including self-employment and pension income) are taxed at a discounted rate of only 20%, and the upper limit for social insurance contributions is raised.

Raising Child Benefit

Atkinson (2015) sees a substantial universal Child Benefit as central to any programme to reduce inequality. The arguments against means-testing already outlined, together with concerns about generational and gender equity, motivate a payment for all children rather than a targeted one. Making the payment taxable is a way of reducing the benefit for higher-income parents. A substantial increase in Child Benefit, which would be paid for all children but with a larger payment for the first child in the family, is a core element in Atkinson's proposals. Following Atkinson's proposal, we set the Child Benefit rate for all but the first child at 18% of the median equivalised household net income. This corresponds to 0.3 (the modified OECD equivalence scale value for a child) of the relative poverty line, equal to 60% of the median equivalised household net income. This means raising current UK payment rates by a factor of four. As in the current system, a substantially higher rate is paid in respect of the first child and the rationale for setting the precise rate is explained below.

Strengthening Social Insurance

One route for reform of cash transfers for adults proposed by Atkinson entails renewing and reinvigorating the social insurance system – a 'Back to Beveridge' approach, as it were. This is especially salient in a UK context where the coverage of social insurance for those of working age has shrunk and benefit rates been eroded markedly, but is also of relevance in many other rich countries. While an important aspect of such an approach is getting back to a broader coverage, for the purpose of this simulation exercise we focus on the raising of payment rates. For insurance-based state pensions these rates are increased by one-quarter, while for the unemployed, currently paid less, the rate is raised by over half. Under this scenario the greatly increased Child Benefit would become taxable in the hands of the parent (in a couple,

the person with the lower taxable income). The combination of increased income tax, Child Benefit, and social insurance rates is configured to be revenue neutral in the first instance (with the Child Benefit rate for the first child set to achieve this, given the other tax and transfer changes being simulated).

Participation Income

Atkinson (2015) puts forward as an alternative to strengthening social insurance the introduction of a basic income. The idea of a universal payment replacing existing social transfers (and income tax concessions) is an old idea currently receiving renewed attention, but the Participation Income (PI) version advanced by Atkinson is for a partial payment that would complement rather than replace existing social transfers. Existing insurance-based social protection and pension schemes remain in place but where recipients are below the PI they are brought up to it, while the PI partially substitutes for means-tested schemes which remain in place but include the PI in their income tests. In Atkinson's formulation the PI would be paid to adults meeting a participation condition, for example caring for a child or an adult, seeking job training, doing voluntary work, doing paid work, etc., as well as those unable to participate due to ill-health or disability. Since this participation condition cannot be imposed in our simulation exercise due to lack of data, this is carried out on the basis that everyone is entitled. The level of PI we simulate is £75 per week or £3,902 per year which, like the SI alternative, is revenue-neutral when combined with the tax and Child Benefit reforms.¹ In this scenario Child Benefit acts as the child equivalent of the adult PI and is not taxed. The existing income tax and social insurance contribution income thresholds below which no tax/contribution is payable are abolished so these are payable on all incomes other than the PI.

The Minimum Wage

We consider an increase in the NMW for those aged 21 or over from £6.31 to £9.15 if living in London or £7.85 for those living outside London, with similar proportionate increases for younger workers. These figures are based on the most widely-used

¹ Note that the headline simulation results in Atkinson (2015), had a lower increase in Child Benefit and higher adult payment with the PI option, whereas here we apply the same increase in Child Benefit in both SI and PI options to facilitate comparison between the two structures, aligning the total costs by reducing the adult PI rate.

estimates of the ‘Living Wage’ required to meet minimum needs in the UK.² (In mid-2015 the UK government announced that it intended to raise the NMW substantially over a period of years, for those aged 25 and over only, and began that process in 2016; the 2014 baseline used here is before that increase.)

3. Simulating the Impact on Inequality and Poverty: Methodology and Data

The initial impact of these reforms on income inequality and poverty are examined here by combining household survey data and microsimulation techniques, taking a household level approach to analysing the redistributive as well as fiscal effects of the reforms. Using the tax-benefit model EUROMOD we simulate each of the tax/transfer reform scenarios separately and compare them in depth. We then look at the impact of increasing the NMW, on its own and combined with the alternative tax-transfer packages.

EUROMOD uses survey micro data on gross market incomes, labour market status and other characteristics from a nationally representative household sample, the Family Resources Survey (FRS). It then applies the tax and benefit policy rules in place in a given year and calculates for each individual and their household in the data the direct taxes, social insurance contributions and entitlements to cash benefits as well as the total household disposable (net) income. Due to lack of information in the survey data (e.g. previous working history and contributions), EUROMOD cannot calculate entitlements to certain benefits such as contributory pensions or disability benefits. In this case, EUROMOD uses the information on receipts of these benefits that households have reported directly in the survey data. Furthermore, in the calculation of benefit entitlements EUROMOD takes into account the fact that some households may not claim the means-tested benefits they are legally entitled to (i.e. benefit non take-up). The adjustment is done by applying the take-up proportions published by the Department for Work and Pensions (2010) and HM Revenue and Customs (2010).³

One of the main advantages of EUROMOD (and microsimulation models in general) is that it can calculate individual/household benefit entitlements and tax liabilities under hypothetical policy reforms (see for example Bourguignon and Spadaro, 2006).

² For more details, see: <http://www.livingwage.org.uk/>.

³ For more information on the take-up probabilities used for each benefit and the non take-up modelling approach in EUROMOD, see De Agostini and Sutherland (2014).

EUROMOD accounts for the interactions between policy rules and household circumstances as well as between the different policies which are vital for accurately estimating the first-order distributive and fiscal implications of policy reforms. The resulting levels of household disposable income after simulating the 2014/15 tax-benefit policies constitute our *baseline scenario* with which all reform scenarios are compared.

As already noted, we analyse the direct, first-order effects of the reforms and do not estimate any behavioural responses since these are highly complex to model and may be surrounded by large degrees of uncertainty, especially in the case of major structural reforms that may affect behaviour in several domains. Thus, we assume the same means-tested benefit non take-up rates in the baseline and in all reform scenarios, and the levels of employment and hours worked are held unchanged throughout. In-kind benefits and indirect taxes such as VAT and excise duties fall outside the scope of this analysis.

EUROMOD has been extensively validated both at household level (i.e. case-by-case validation) and aggregate level (i.e. against aggregate administrative data on benefit recipients, tax payers etc.) and has been widely used in the economics and social policy literature. See Sutherland and Figari (2013) for a comprehensive overview and recent uses of the model and De Agostini and Sutherland (2014) for a detailed description of the UK component as well as an explanation of why the baseline indicators are not exactly the same using simulated values as they are using FRS data.

The household survey data we make use of are drawn from the FRS for 2009/10 which has a sample comprising of 25,200 households with 57,380 individuals. The data have very rich information on individual and household characteristics and financial circumstances.⁴

To account for income growth between the data income reference year (2009/10) and the year of interest in our analysis (2014/15) we apply growth factors by income source. For example, we adjust employment income by the growth in average weekly earnings. Disability benefits, contributory pensions and Council Tax that cannot be

⁴ The FRS is also the main source of data for the Households Below Average Income (HBAI) annual reports produced by the UK Department for Work and Pensions providing detailed information on households' living conditions measured by income in the UK. http://webarchive.nationalarchives.gov.uk/20120930153352/http://statistics.dwp.gov.uk/asd/frs/2009_10/frs_2009_10_report.pdf

simulated with the information available in the FRS are also updated to their 2014/15 levels according to actual indexation practice during this period. No adjustments are made for changes in the labour market, household composition or demographic characteristics of the population over this period.

An important issue to be taken into account in using EUROMOD for the specific application we are engaged in here relates to the way earnings are captured in the FRS and the bias this may introduce into the number of employed seen to be below the National Minimum Wage. The FRS asks respondents their weekly earnings and weekly hours worked, but taking the ratio of these two may produce a biased estimate of the worker's actual hourly wage (see, for example, Skinner et al., 2002). This can be seen by comparison with the Labour Force Survey that directly asks workers paid by the hour about their hourly pay. We therefore follow Brewer and De Agostini (2015) in imputing to all employees in the FRS an adjusted measure of their hourly wage rate, using a set of covariates common to both datasets.⁵ These adjusted earnings figures were used as the basis for calculating household net incomes in EUROMOD in the 2014 baseline and throughout our analysis. Comparisons between the adjusted and unadjusted baselines show that the two income distributions are similar. In then simulating the Minimum Wage reform, those with earnings in the baseline below the Living Wage for their age group, distinguishing those in/outside London, have their hourly earnings brought up to the relevant Living Wage.

The impact of the reforms on income inequality are assessed first in terms of a number of summary inequality measures, namely the Gini coefficient, the Atkinson measure (with its inequality aversion parameter set at 0.5), the mean log deviation, and the Theil index. Employing a variety of summary inequality measures rather than only one (most often the Gini) provides a more rounded picture since they incorporate different distributional weights and may thus give differing results. The impact on the income shares of different deciles in the distribution allow us to see where the effects underlying these summary measures are to be found, and are also presented. The impact on poverty is assessed in terms of the population proportions falling below a relative income threshold set at 60% of median household disposable income

⁵ This is done separately for first and second jobs, with predictors including age and age squared, marital status, number of dependent children by age, highest qualification, region of residence, part-time (only for main job), occupation, firm size and industry sector.

(adjusted for household size using the modified OECD equivalence scale), which is widely used in both a UK and EU context (in for example the official Households Below Average Income annual report and the EU's suite of Social Inclusion indicators).⁶ Poverty gap measures – reflecting the distance those in poverty on this measure are below the income threshold – are also employed to capture the impact on those who remain below the poverty threshold but still see some increase in their incomes.

The proportions gaining versus losing from each reform package, and the proportions gaining or losing at least 5% of their disposable income, are also reported: how these vary across different household types and circumstances is helpful in teasing out how the reforms have their overall impact and detecting any unintended consequences.

Finally, the impact on incentives is assessed in terms of the impact on poverty 'traps', where those in work see little or no financial return from working more hours or even compared with not working. This is captured by measuring the marginal effective tax rate (METR) facing those with some earnings if their income increases, and the Participation Tax Rate (PTR) capturing the proportion of gross earnings lost in higher tax liabilities or lower social transfers if moving into work. Higher METRs or PTRs indicate weaker work incentives. (For more detail on these measures and their calculation, see Appendix 2.)

4. Illustrating the Tax and Transfers Proposals with Hypothetical Households

The alternative tax/transfer reform strategies represent complex combinations of restructuring direct tax and social insurance contributions, increased Child Benefit, and either enhancing existing social insurance-based income support schemes or introducing a PI scheme. To bring out their main features and how they differ from the baseline, we look first at how they affect an illustrative household in different circumstances; this will be helpful in interpreting the results of the simulation of their impacts across the population. Focusing on a family comprising two working-age

⁶ Note that the poverty threshold as derived in the baseline is held fixed across the simulations even where median income changes, since otherwise the impact of the reforms on those in or around the poverty line may be obscured by their impact on the median. The same applies to the ranking of households by decile group.

adults and two children, we look at how their disposable income varies across the baseline and reform scenarios when:

- 1) both are unemployed and entitled to social insurance-based income support;
- 2) one is working full-time 40 hours per week and earning the (adult) minimum wage of £1,094 per month (which is 64% of median earnings),⁷ the other unemployed;
- 3) both are working 40 hours per week, each earning £1,094 per month;
- 4) both are working 40 hours per week, the female earning £1,094 and the male earning £1,462 per month (85% of median earnings);
- 5) both are working 40 hours per week, the female earning £1,094 and the male earning £1,720 per month (i.e. median earnings);
- 6) both are working 40 hours per week, the female earning £1,094 and the male earning £2,150 per month (125% of median earnings).
- 7) both are working 40 hours per week, the female earning £1,094 and the male earning £3,096 per month (180% of median earnings).

Table 1 shows how disposable income compares in the baseline versus alternative reform scenarios across these circumstances for such a household, and what underlies this in terms of the different sources going to make up the family's disposable income.

The baseline itself brings out the major role that means-tested transfers play in the UK system, as emphasised in the introduction. When there are no earnings because both adults are unemployed, even when both partners are entitled to insurance-based benefits (as we have assumed for this illustrative case) means-tested payments account for almost as much of their income. Furthermore, such payments continue to constitute a major part of household income even when one or both partners are working, across much of the earnings range we have illustrated here.

Now comparing the tax+CB+SI package with the baseline, the first point to note is that the amount of Child Benefit this family receives is much greater across all levels of earnings. When there are no earnings because both adults are unemployed, their insurance-based transfers are also considerably higher than in the baseline. Together

⁷ Median earnings are calculated using EUROMOD input data from the FRS after some adjustments including updating to 2014.

with the much higher Child Benefit, this means their disposable income is significantly higher than in the baseline, despite the fact that much of that increase has been offset by a reduction in means-tested transfers and increase in income tax (since Child Benefit is now subject to tax).

Table 1: Alternative Tax/Benefit Reforms Illustrated for Hypothetical Household of 2 Adults and 2 Children with Various Levels of Earnings

<i>Scenario</i>	Earnings	Child Benefit	Social insurance benefits	Means-tested benefits	Participation Income	Income tax	Social Insurance contr.	Total net income
<u>Household income (£, annual)</u>								
1/ No earners								
Baseline	0	1,773	7,541	6,045	0	0	0	15,360
Tax+CB+SI	0	7,377	11,781	1,449	0	1,317	0	19,290
Tax+CB+PI	0	7,377	7,541	1,449	262	0	0	16,630
2/ 1 earner £1,094 pm								
Baseline	13,125	1,773	3,771	6,765	0	486	1,314	23,634
Tax+CB+SI	13,125	7,377	5,890	1,300	0	1,803	1,314	24,576
Tax+CB+PI	13,125	7,377	3,771	516	4,033	2,983	2,271	23,568
3/ 2 earners £1,094 each pm								
Baseline	26,250	1,773	0	3,215	0	972	2,629	27,638
Tax+CB+SI	26,250	7,377	0	0	0	2,816	2,629	28,182
Tax+CB+PI	26,250	7,377	0	0	7,803	5,966	4,541	30,923
4/ 2 earners £1,094, £1,462 pm								
Baseline	30,666	1,773	0	1,501	0	1,808	3,393	28,739
Tax+CB+SI	30,666	7,377	0	0	0	3,652	3,393	30,998
Tax+CB+PI	30,666	7,377	0	0	7,803	6,970	5,305	33,571
5/ 2 earners £1,094, £1,720								
Baseline	33,762	1,773	0	299	0	2,394	3,928	29,511
Tax+CB+SI	33,762	7,377	0	0	0	4,239	3,928	32,972
Tax+CB+PI	33,762	7,377	0	0	7,803	7,673	5,841	35,428
6/ 2 earners, £1,094, £2,150								
Baseline	38,922	1,773	0	0	0	3,372	4,821	32,502
Tax+CB+SI	38,922	7,377	0	0	0	5,380	4,821	36,097
Tax+CB+PI	38,922	7,377	0	0	7,803	9,043	6,733	38,325
7/ 2 earners, £1,094, £3,096								
Baseline	50,274	1,773	0	0	0	5,522	6,785	39,740
Tax+CB+SI	50,274	7,377	0	0	0	9,343	6,785	41,523
Tax+CB+PI	50,274	7,377	0	0	7,803	14,555	8,697	42,202

Source: Authors' calculations with EUROMOD and hypothetical data for a household with zero housing costs and Council Tax.

When one adult is in work on low earnings, their disposable income is closer to but still above the baseline, with higher social insurance benefits (for the unemployed partner) and Child Benefit substantially offset by reduced means-tested payments, but leaving the family much less reliant on means-tested payments than in the baseline. When both adults are in work at low earnings their disposable income is about the same as the baseline because their higher Child Benefit is offset by higher tax and loss of all means-tested payments. The same is true at somewhat higher levels of earnings, as income tax and social insurance contributions also rise. At the higher earnings levels shown in our illustration, there are no means-tested transfers in the baseline to be withdrawn and there is a substantial net gain in terms of disposable income. This ceases to be the case at higher earnings than we have illustrated, beyond the point where the higher Child Benefit is offset by the increase in income tax and social insurance contributions. As earnings rise further above that level there will be an increasing net loss as the proportion of earnings going in tax and social insurance contributions rises.

Turning to the reform package incorporating the PI (tax+CB+PI), the amount of Child Benefit is again much greater across all levels of earnings than in the baseline. When neither adult is working, their insurance-based transfers are the same as in the baseline, with the PI as a marginal top-up, and net income is similar to the baseline because most of the increase in Child Benefit has been offset by a reduction in means-tested transfers. When one adult is in work on low earnings, though, the other receives the full PI and their disposable income is slightly below the baseline, with the PI and higher Child Benefit substantially offset by reduced means-tested payments and the tax and contributions now payable on even that modest level of earnings. However if the unemployed adult did not qualify for unemployment insurance benefit then the family would be much better off with the tax+CB+PI package than in the baseline.

When both adults are in work at low earnings their disposable income is higher than in the baseline, although their PI and higher Child Benefit are partly offset by higher tax and zero means-tested payments. The same is true at somewhat higher levels of earnings, as income tax and social insurance contributions also rise. At the higher earnings levels shown in our illustration, there are low levels or no further means-

tested transfers to be replaced and the full PI continues to be paid, so there is a substantial net gain in terms of disposable income which is similar to or larger than seen with the tax+CB+SI package. As with that package, at higher earnings than we have illustrated, the scale of the increase in income tax and social insurance contributions results in a reduction in disposable income.

5. The Impact of the Tax and Transfers Proposals

We now compare the first-round effects of the alternative tax/transfer reform strategies across the income distribution. The impact on inequality of the tax and transfer reforms is assessed first in terms of summary inequality measures. We see from Table 2 that the tax+CB+SI reforms reduce the Gini coefficient from 31.9 to 28.9, a reduction of over 9%. The corresponding results with alternative summary inequality measures also shown in the table reveal larger proportionate reductions, of about one-fifth: those measures assign more weight than the Gini to the income gaps reduced by the reform. With the tax+CB+PI option, the impact of the tax and transfer reforms is to reduce the Gini to 26.2, by about 18% or twice the size of the reduction with the tax+CB+SI option. Alternative summary inequality measures are again reduced by considerably more than the Gini, with the tax+CB+PI package bringing them down by one-third or more.

Table 2: Impact of Alternative Tax/Benefit Reforms on Inequality

	Gini	Change	Atkinson $\epsilon = 0.5$	Change	MLD $\alpha = 0$	Change	Theil $\alpha = 1$	Change
Baseline	31.9		9.0		17.9		18.6	
Tax+CB+SI	28.9	-3.0	7.3	-1.7	14.3	-3.7	14.7	-3.9
Tax+CB+PI	26.2	-5.7	5.7	-3.3	11.5	-6.4	12.3	-6.3

Source: Authors' calculations with EUROMOD and FRS.

Focusing on poverty, Table 3 shows results first for all persons and then for children. We see that the percentage of persons in households below 60% of median equivalised disposable income is reduced by the tax+CB+SI reforms from 15.2% to 12.2%, a reduction of one-fifth. The (unweighted) poverty gap expressed as a proportion of total disposable income is reduced by 25%, so as well as bringing households up to the threshold the reform reduces the poverty gap for some others left below it. The tax+CB+PI reform has a considerably larger impact, bringing the poverty headcount down by 38% and the poverty gap by almost 60%. This reform

directs resources towards those below the threshold not in receipt of insurance-based payments, who cannot benefit from those being increased. They will benefit in particular if they are in receipt of only modest amounts of means-tested payments or are not taking up their means-tested entitlements. The impacts on child poverty are considerably greater for both reforms, with the tax+CB+PI package in particular reducing the child poverty gap by a striking four-fifths. (It is worth noting that using the same resources to pay all children a common rate of Child Benefit has less impact than the approach here which devotes more to the first child in the family.)

Table 3: Impact of Alternative Tax/Benefit Reforms on Poverty

	poverty headcount (%)	change in ppts relative to baseline	poverty gap (%)	change in ppts relative to baseline
<i>All</i>				
Baseline	15.2		4.4	
Tax+CB+SI	12.2	-3.0	3.4	-1.0
Tax+CB+PI	9.4	-5.8	1.9	-2.5
<i>Children</i>				
Baseline	16.1		4.3	
Tax+CB+SI	11.5	-4.6	2.3	-2.0
Tax+CB+PI	6.6	-9.5	0.9	-3.4

Source: Authors' calculations with EUROMOD and FRS.

As far as decile group shares are concerned, both packages produce an increase in share for each of deciles 1-7, no change for the 8th decile, and a decline for the top two deciles. As Table 4 shows, both the increases towards the bottom and the reductions at the top are larger with the PI than the SI option. With the tax+CB+SI package the share of the bottom 70% goes up by 2% of total income while the top 10% see a decline of about that magnitude, whereas with the tax+CB+PI package the bottom 70% see an increase of about 4.3% of total income, with the top 10% having a fall of 3.5% and the 9th decile group also seeing some decline in their share.

A very substantial proportion of households are affected by each of the reform packages. With the SI option, about 54% of all households see some gain while 28% would lose; 34% see a gain of 5% or more of their baseline income, and 10% lose that much. Under the PI option a larger proportion of households are affected than under the SI option, with 58% of households seeing some gain and 36% some loss. A higher proportion of these gains, and even more so of these losses, are substantial: 42% of all households see a gain of 5% or more and 21% a loss of that scale with the PI option.

So the tax+CB+PI package, in bringing about a substantially greater reduction in income inequality and poverty, is having substantial effects in both directions on considerably more households.

Table 4: Impact of Alternative Tax/Benefit Reforms on Decile Income Shares

decile	Baseline	Tax+CB+SI	Tax+CB+PI
1	2.92	3.40	4.38
2	4.97	5.31	5.54
3	5.94	6.26	6.52
4	6.82	7.20	7.44
5	7.80	8.19	8.39
6	8.99	9.31	9.45
7	10.40	10.60	10.66
8	12.22	12.20	12.07
9	15.04	14.63	14.12
10	24.91	22.90	21.42

Source: Authors' calculations with EUROMOD and FRS.

Table 5 compares the two packages in terms of the percentage in each decile seeing an income gain or loss of 5% or more. Focusing first on gains, we see that with the tax+CB+SI option about half the households in the bottom five deciles see such gains. The proportion of such gainers declines rapidly after the seventh decile, with very few in the top two deciles. With the tax+CB+PI option the proportion with a substantial gain is larger across the bottom half of the distribution, notably for the bottom decile where 80% see such a gain compared with 54% with the tax+CB+SI package.

Focusing on those with losses of 5% or more, Table 5 shows that with the tax+CB+SI option such households are to be seen across the distribution, but the percentage losing substantially is very low up to the 7th decile. It is still only 20% for the 9th decile, but then rises very sharply to 65% in the top decile. By contrast, the percentage experiencing substantial losses is higher with the tax+CB+PI package across the entire distribution, with 6-10% doing so up to the 7th decile, rising to almost half in the 9th decile and reaching 92% in the top decile. This primarily reflects the elimination in this reform of the thresholds below which income tax and social insurance contributions are not payable, so these are levied on all income. This results in a loss even at lower incomes if the gain from the PI is also offset by reductions in means-tested entitlements.

Table 5: Percentage of Households Gaining or Losing 5% or More from Alternative Tax/Benefit Reforms by Income Decile

decile	Tax+CB+SI		Tax+CB+PI	
	% gaining 5% or more	% losing 5% or more	% gaining 5% or more	% losing 5% or more
1	54.3	0.1	79.2	3.3
2	55.4	1.0	62.6	5.5
3	45.2	1.0	61.4	6.7
4	50.3	0.6	59.7	7.5
5	52.7	1.0	57.3	9.0
6	45.1	2.3	53.1	9.2
7	27.7	3.2	38.0	10.7
8	8.3	8.3	13.3	20.6
9	1.7	20.2	1.8	48.0
10	0.1	64.9	0.9	91.5
All	34.1	10.3	42.7	21.2

Source: Authors' calculations with EUROMOD and FRS.

It is also of interest to see the extent to which the same households are affected by the alternative packages, in terms of gains and losses – is the tax+CB+SI package ‘nested’ in the tax+CB+PI one, imposing gains and losses on a sub-set, or are different households affected? Table 6 cross-classifies those seeing gains of 5% or more, no change (i.e. less than 5%), and losses of 5% or more with each package. This shows that almost two-thirds of those who gain with the tax+CB+SI package also do so with the tax+CB+PI reform, while most of those who lose with the SI package also do so with the PI package.

Table 6: Overlap Between Households Gaining or Losing 5% or More from Alternative Tax/Benefit Reforms

		Tax+CB+SI package				
		%	Gaining	no change	Losing	Total
Tax+CB+PI Package	Gaining		21.9	20.6	0.2	42.7
	no change		7.8	26.9	1.4	36.1
	Losing		4.4	8.1	8.6	21.2
	Total		34.1	55.7	10.3	100.0

Source: Authors' calculations with EUROMOD and FRS.

It is also important to assess how the pattern of substantial gainers and losers varies across the income distribution by household type, in terms of characteristics such as age and household composition and in terms of circumstances such as the number of household members with earnings. Table 7 shows how the percentage of households by type seeing a substantial gain varies, overall and across the distribution. (In interpreting these patterns one must be aware that the underlying number of

households to which some of these percentages apply is sometimes small – because for example there are not many 2-earner households towards the bottom of the distribution, as illustrated in Appendix 3.)

Table 7: Percentage Gaining 5% or More from Alternative Tax/Benefit Reforms by Household Type and Income Decile

	All	With elderly	With children	Working age	No earner	2+ earners
<i>% gaining 5% or more with Tax+CB+SI Package</i>						
Decile	%	%	%	%	%	%
1	54.3	90.3	87.7	49.7	52.6	45.1
2	55.4	79.8	61.4	47.8	62.0	49.6
3	45.2	78.7	44.9	35.7	60.5	39.4
4	50.3	69.6	56.1	44.0	55.5	56.0
5	52.7	69.6	64.4	47.1	56.7	66.8
6	45.1	65.2	59.1	38.9	58.1	52.0
7	27.7	51.6	39.0	22.0	49.1	29.0
8	8.3	28.9	8.3	3.8	32.9	5.9
9	1.7	7.3	1.6	0.6	8.4	0.3
10	0.1	0.9	0.0	0.0	1.1	0.0
All	34.1	57.2	46.5	28.4	52.7	26.1
<i>% gaining 5% or more with Tax+CB+PI Package</i>						
Decile	%	%	%	%	%	%
1	79.2	36.2	95.5	85.2	69.1	100.0
2	62.6	14.9	83.4	77.6	42.4	97.6
3	61.4	10.5	80.5	76.3	30.6	94.7
4	59.7	11.7	80.1	74.7	20.9	96.1
5	57.3	10.5	80.2	72.1	15.8	90.0
6	53.1	9.5	80.9	65.3	14.5	72.6
7	38.0	6.9	65.4	45.3	9.2	47.0
8	13.3	1.9	24.6	15.8	8.8	15.5
9	1.8	1.2	3.5	1.9	4.5	1.7
10	0.9	1.7	0.8	0.8	8.1	0.2
All	42.7	10.0	65.4	50.6	34.0	42.5

Source: Authors' calculations with EUROMOD and FRS. Notes: The category 'with elderly' refers to households with at least one individual aged 65+. The category 'with children' includes households with at least one individual aged below 18. The category 'working age' refers to households with the head (person with the highest level of gross market income), aged between 16 and 61 if female and between 16 and 64 if male. The categories 'no earner' and '2+ earners' include households with no or 2+ earners, where earner is defined as having positive income from employment and/or self-employment. Thus households may be included in more than one category.

The most striking difference between the two reform packages is with respect to households with older people, where a majority gain (by more than 5%) with the tax+CB+SI package compared with only 10% gaining with the tax+CB+PI package. This reflects the fact that the insurance-based state pension has been increased by 25% in the tax+CB+SI package, whereas in the tax+CB+PI package those receiving a

full insurance pension see no gain. By contrast, a substantial proportion of households with children gain with each of the packages, reflecting the substantial increases in Child Benefit, but there are considerably more gainers across the bottom two-thirds of the distribution with the PI option, since more households with children also gain from the PI itself.

Looking at all working-age households, in the bottom half of the distribution up to half are substantial gainers from the tax+CB+SI package, but 70-80% of those households gain from the tax+CB+PI package. About half all households with no earners gain with the tax+CB+SI package, with significant numbers gaining across the bottom 7 deciles, whereas only one-third gain from the tax+CB+PI package, concentrated in the bottom 3 deciles. For households with two earners, on the other hand, only one-quarter gain from the tax+CB+SI package while over 40% gain from the tax+CB+PI package, with a very high proportion of gainers in the bottom half, declining as one moves further up the income distribution.

Table 8 shows the corresponding figures for those losing 5% or more of their household income. This brings out that very few elderly households lose substantially with the tax+CB+SI package except at the top of the distribution, but the tax+CB+PI reform produces substantial losses for those households outside the bottom two deciles – principally because all their other income is liable to tax from the first pound. Few households with children lose with either package except at the top. For all working-age households, the percentage losing is also low and mostly in the top two deciles. Very few working-age households with no earners see substantial losses with the SI package, whereas with the PI package there are some losers across the distribution. For households with two or more earners, there are rather few substantial losers outside the top two deciles with either package, while most of those in the top decile see losses.

Table 8: Percentage Losing 5% or More from Alternative Tax/Benefit Reforms by Household Type and Income Decile

	All	With elderly	With children	Working age	No earner	2+ earners
<i>% losing 5% or more with Tax+CB+SI Package</i>						
Decile	%	%	%	%	%	%
1	0.1	0.8	0.0	0.0	0.1	0.0
2	1.0	3.3	0.3	0.3	1.4	0.8
3	1.0	0.2	1.3	1.3	0.2	1.1
4	0.6	0.1	0.8	0.7	0.1	0.3
5	1.0	0.2	0.9	1.3	0.2	0.8
6	2.3	0.2	1.0	2.8	0.2	0.3
7	3.2	0.4	0.2	3.8	0.5	1.6
8	8.3	0.7	0.8	9.9	1.8	5.1
9	20.2	3.0	2.7	23.3	5.5	16.8
10	64.9	21.9	42.9	71.4	18.8	71.4
All	10.3	2.4	3.6	12.1	1.2	16.4
<i>% losing 5% or more with Tax+CB+PI Package</i>						
Decile	%	%	%	%	%	%
1	3.3	0.3	1.4	3.7	4.8	0.0
2	5.5	8.2	2.3	4.4	8.3	0.0
3	6.7	21.8	1.5	2.1	14.0	0.0
4	7.5	26.0	1.0	1.5	20.0	0.6
5	9.0	32.7	0.6	1.0	27.0	0.4
6	9.2	37.6	0.3	0.7	35.4	1.0
7	10.7	46.2	0.4	1.9	47.4	0.8
8	20.6	64.0	2.1	11.0	67.2	7.0
9	48.0	79.4	18.4	41.7	82.3	41.8
10	91.5	93.3	83.1	90.8	85.8	93.6
All	21.2	38.5	7.8	16.8	22.9	24.4

Source: Authors' calculations with EUROMOD and FRS. Notes: See Table 7.

Reducing the role of means-testing is a central aim of the reforms, for the reasons set out in the introduction. Just over 9 million households were in receipt of payments from the means-tested income support schemes in the baseline being used for our simulations (2014-15). The tax+CB+SI reform would reduce that by 1.1 million households, or almost 12%. It would also reduce expenditure on means-tested support schemes by £15.4 billion out of a total in the baseline of £63 billion, or by 25%. The tax+CB+PI reform would reduce the number in receipt of payments from the means-tested income support schemes by about 2.2 million households, or 22%, and total spending on these benefits goes down by £33 billion or 53% - about twice the effect of the SI package.

This has implications for the impact of the reforms on work incentives and particularly on the marginal effective tax rate (METR) facing those who are earning, to which we now turn. The mean METR across these persons in the baseline is 36%, and in the tax+CB+SI reform simulation this average increases to 41%. With the tax+CB+PI package the overall average METR rises considerably more, to 48%. Since one of the motivations of the SI and PI is to *reduce* high METRs due to means-testing, it is informative to identify the contributions of the different components of household income to these effects on the average METR. With the tax+CB+SI package, the changes to the income tax system add 5.8 percentage points to the average METR and the social insurance contributions add 0.5, with the contribution of means-tested benefit withdrawal falling by over 2 percentage points, together producing the overall increase of over 4 percentage points. The corresponding figures for the tax+CB+PI package are that the income tax changes – now including the abolition of the personal allowance – add a full 14 points, the changes in social insurance contributions add another 1.4 points, while the contribution of means-tested benefit withdrawal falls by almost 4 percentage points – producing the overall increase of 12 points.

Table 9 shows the impact on mean METRs by income decile group, in other words averaged over the individuals who are earning and in households in that part of the distribution. (As Appendix 3 brings out, this means averaging over varying numbers of earners by decile, since there are far more earners in the middle and upper income ranges than towards the bottom.) We see that the rise in the overall average METR with the tax+CB+SI package is driven by increases for earners in the top half of the household income distribution, with little change for the bottom decile group and marked reductions for the third and fourth deciles. The table also shows the contribution of the different key elements of the transfer and tax systems in this context to this change in mean METRs. We see that the increases in METRs in the top half reflect the impact of the increases in income tax rates and raising the earnings ceiling for social insurance contributions purposes. The income tax increases have less impact in the bottom half while employee social insurance contributions are unchanged there, and means-tested benefit withdrawal plays a reduced role in decile groups 3-5 in particular as the increase in social insurance-based transfers makes them less important. One-fifth of workers in the bottom 5 deciles have higher METRs and

14% have lower METRs than in the baseline. In the top 5 deciles, 57% of workers see their METRs increase while 4% see them falling.

Table 9: Percentage point change in Mean METR from Alternative Tax/Benefit Reforms by Income Decile

Decile	Total	Means-tested benefits	Contribution of	
			Income Tax	Employee SI contributions
			<u>Tax+CB+SI Package</u>	
	%	%	%	%
1	0.9	-0.6	1.2	0.0
2	-0.7	-3.3	2.6	0.0
3	-3.5	-7.5	4.0	0.0
4	-3.7	-9.5	5.8	0.0
5	0.6	-4.6	5.0	0.1
6	3.2	-1.9	4.8	0.2
7	5.3	-0.7	5.7	0.4
8	7.3	-0.1	6.9	0.6
9	8.9	0.0	8.0	0.9
10	7.6	0.0	6.0	1.5
All	4.4	-2.0	5.8	0.6
			<u>Tax+CB+PI Package</u>	
	%	%	%	%
1	12.8	-8.9	16.7	3.7
2	1.3	-13.8	13.0	2.3
3	-0.9	-15.1	12.1	2.0
4	2.3	-12.8	13.5	1.7
5	7.7	-6.2	12.5	1.4
6	10.1	-3.3	12.2	1.2
7	13.0	-1.2	13.1	1.0
8	16.1	-0.3	15.4	1.1
9	17.5	-0.1	16.4	1.3
10	15.6	0.0	13.9	1.7
All	11.8	-3.7	14.0	1.5

Source: Authors' calculations with EUROMOD and FRS.

With the tax+CB+PI package, on the other hand, Table 9 shows that the average METR for the bottom decile group increases substantially, and mean METRs are also considerably higher from the fifth to the tenth decile group. This reflects the fact that, on the tax side, as well as higher income tax rates the personal tax allowance is abolished and employee social insurance contributions are also levied from the first pound. Thus, as the table shows, these two components work to very substantially increase mean METRs across the entire distribution. A substantial reduction in the extent of withdrawal of means-tested transfers offsets this in deciles 2-4, but is not sufficient to do so at the bottom and is much less significant in the top half of the

distribution. In the bottom 5 decile groups, 74% of workers see their METRs increase and 25% experience a reduction in their METRs. In the top half of the distribution, METRs increase for 96% of workers compared to the baseline while only 3% see a reduction.

Although the PI itself is not liable to tax, the fact that under the tax+CB+PI package both income tax and social insurance contributions are levied on all additional income is thus central to its impact on METRs. In addition, the PI replaces some but not all the means-tested benefits received by many of the households receiving those transfers, so they continue to face high withdrawal rates as their earnings increase marginally. However, they would need less additional market income to escape from means-testing altogether than under the baseline. This is an important feature of what is in effect a partial basic income that is not captured by these marginal calculations.

As well as the financial incentive facing those in work to increase their hours or find a better-paying job, their incentive to remain in work is also of considerable importance. To capture the impact of the alternative reform packages on this aspect we calculate the Participation Tax Rate (PTR), which captures the proportion of gross earnings that is not reflected in an increase in the person's net income because it is lost in either higher tax liabilities or lower social transfers.⁸ The mean PTR in the baseline is 50.6%, and ranges from over 60% towards the bottom, 50% around the middle, and 40% towards the top of the income distribution; it is primarily driven by the social insurance benefits, and to a lesser extent means-tested payments, that those in work would receive if unemployed. With the tax+CB+SI package the mean PTR across earners rises to 62.7%, with an increase of about this order seen across most of the income distribution (though greater for the bottom decile). This reflects the fact that insurance-based benefits, to which many of those in work would be entitled if they became unemployed, have been increased substantially. With the tax+CB+PI option, on the other hand, the mean PTR falls to 45.4%. This fall is most pronounced towards the bottom of the income distribution, but average PTRs decline for the bottom 60-70%. This reflects the fact that an individual in employment will still receive the PI

⁸ We estimate the PTRs on the sample of in-work individuals only as it does not require us to make strong assumptions about the wages of individuals who are currently out of work. Assuming that out-of-work individuals face higher PTRs, our estimates provide a lower bound. Nevertheless, we are primarily interested in the change rather than the level of PTRs and thus, we expect our conclusions to hold for the sample of out-of-work individuals too.

amount, and only for the top third of the income distribution is this outweighed by the effect of the higher tax rates.

It is worth noting, in including this analysis of tax/transfer strategies, that both SI and PI strategies rely on entitlements defined at the level of the individual, whereas means-testing is (in the UK) applied to benefit units (essentially the nuclear family). This makes each of the reform strategies seem badly targeted and expensive when compared with the baseline family means-tested system and using indicators based on household income. However, there are positive features of individual-based entitlements that relate to independence and autonomy (Bennett and Sutherland, 2011) as well as work incentives for second earners in couples.

6. Raising the Minimum Wage to the Living Wage

We now turn to the final element of the reforms to be analysed, which is a substantial increase in the minimum wage. As outlined earlier, the proposal to be examined is an increase the NMW up to the level of the Living Wage, from £6.31 to £7.85 per hour for those for those aged 21 and over living outside London and £9.15 if living in London, with similar increases for younger persons. Employment and hours worked are held unchanged in the simulations. With everyone in the (adjusted) sample with hourly earnings below the Living Wage brought up to that wage, 27% of all individual earners are affected.⁹

In the simulation almost 22% of households would see some income gain, and about one-third of those, that is 7.5% of all households, would see their disposable income increase by 5% or more. We look at the impact this has on inequality and poverty relative to the baseline, and also if it is combined with the alternative tax/transfer reform packages examined in the previous section.

The impact on income inequality is shown in Table 10, where we see that raising the NMW to the Living Wage (LW) reduces the Gini coefficient only marginally, from 31.9 to 31.7. The reduction in the alternative summary inequality measures is similar

⁹ This is considerably higher than estimates of numbers to be directly affected by the increase in the NMW actually being implemented by the British government, produced for example by the Office for Budgetary Responsibility and the Resolution Foundation (D’Arcy and Kelly, 2015; D’Arcy et al., 2015). This is mostly because the increase being simulated here is considerably greater than that being implemented, and unlike it applies to those aged under 25.

in scale. The impact of the alternative tax/transfer packages on summary inequality measures is also marginally greater when they are combined with the increase in the Minimum Wage, with the difference the latter makes then being very similar to vis-à-vis the baseline.

Table 10: Impact of the Living Wage and Alternative Tax/Benefit Reforms on Inequality

	Gini coefficient	Change	Atkinson	Change	MLD	Change	Theil	Change
Baseline	31.9		9.0		17.9		18.6	
+ LW	31.7	-0.2	8.9	-0.1	17.8	-0.1	18.4	-0.2
Tax+CB+SI	28.9	-3.0	7.3	-1.7	14.3	-3.7	14.7	-3.9
+LW	28.8	-3.1	7.2	1.8	14.1	-3.8	14.5	-4.1
Tax+CB+PI	26.2	-5.7	5.7	-3.3	11.5	-6.4	12.3	-6.3
+LW	26.1	-5.8	5.7	-3.3	11.4	-6.5	12.2	-6.4

Source: Authors' calculations with EUROMOD and FRS.

Table 11 shows that increasing the Minimum Wage reduces the baseline poverty headcount from 15.3% to 14.9%, or by 0.4 percentage points, and adds about that much to the poverty-reducing effect of each of the tax/transfer reform packages. It has a smaller impact on the poverty gap vis-à-vis the baseline, and leaves it unchanged when added to the tax/transfer reform packages.

Table 11: Impact of the Living Wage and Alternative Tax/Benefit Reforms on Poverty

	Poverty headcount (%)	Change in ppts relative to baseline	Poverty gap	Change in ppts relative to baseline
Baseline	15.2		4.4	
+ LW	14.9	-0.4	4.3	-0.1
Tax+CB+SI	12.2	-3.0	3.4	-1.0
+LW	11.9	-3.4	3.3	-1.1
Tax+CB+PI	9.4	-5.8	1.9	-2.5
+LW	9.1	-6.1	1.8	-2.6

Source: Authors' calculations with EUROMOD and FRS.

The limited impact of such a substantial increase in the Minimum Wage on income inequality and poverty reflects two key features of low pay and the tax/transfer system: low paid employees are widely spread across the household income distribution rather than concentrated towards the bottom, and for a substantial number of those affected some of the gain from the higher wage is clawed back by withdrawal

of means-tested benefits. This is consistent with recent and earlier studies for the UK (Brewer and De Agostini, 2015; D'Arcy et al., 2015) and indeed with similar studies focused on the minimum wage in other countries (Marx and Nolan, 2014). The reduction in poverty rates is even lower for women and children than the average impact, and the same is true of the effects on their poverty gaps. This reflects the fact that while women earners are more likely to be in low pay than men, male low earners are more likely to be in households below the income poverty threshold, and many are in single-person households.

About 21% of households with one earner and 35% of those with two earners see some increase in disposable income vis-à-vis the baseline as a consequence of the Minimum Wage increase. Table 12 looks at how the proportion gaining from the minimum wage increase varies by income decile, overall and for one and two-earner households separately. We see that households around the middle of the distribution are most likely to gain, with smaller numbers of gainers in the top and bottom quintiles. For households with one earner, the percentage gaining is highest towards the bottom and declines in a linear fashion as one moves up the deciles. For two-earner households, the proportion gaining is high across the bottom and middle parts of the distribution. This reflects the fact that households with an earner, and even more so two earners, are mostly not at the bottom of the distribution, as emphasised earlier and shown in Appendix 3, but if they are then they will generally be earning less than the Living Wage.

If we concentrate on the minority of gainers seeing a gain of 5% or more in disposable income, then the bottom half of Table 12 shows that the proportion of all households seeing such gains is now about 10% across much of the distribution, falling away in the top three quintiles. The absolute gain may be less for earners in households higher up the distribution, and will also be a lower proportion of that higher earnings level and thus less likely to reach our 5% threshold.

Table 12: Percentage Gaining in Disposable Income Terms from the Living Wage by Household Income Decile and Number of Earners

Decile	All	1 earner	2+ earners
		<u>% Gaining</u>	
1	14.2	39.4	61.9
2	14.2	29.7	52.1
3	22.4	28.7	62.9
4	28.3	25.3	63.5
5	29.2	23.0	50.6
6	31.3	16.7	49.6
7	31.2	13.1	40.4
8	24.6	7.0	27.7
9	19.1	3.9	19.4
10	10.9	1.2	9.0
All	22.5	20.9	35.3
		<u>% Gaining 5% or more</u>	
1	10.9	29.6	52.0
2	6.6	12.5	28.2
3	9.2	9.6	31.0
4	8.9	9.5	17.1
5	9.9	7.6	17.5
6	10.5	4.9	17.3
7	9.5	4.3	11.1
8	6.0	2.1	7.2
9	3.0	0.8	2.6
10	0.4	0.1	0.4
All	7.5	8.9	11.0

Source: Authors' calculations with EUROMOD and FRS.

Turning to the impact on work incentives, the simulation results show the increase in the Minimum Wage producing a marginal increase in the average Marginal Effective Tax Rate, from 36.1 to 36.4%. Looking across the household income distribution, modest increases (most less than 1 percentage point) are seen in the average METR for the first, third and fourth deciles, with a marginal decline for the second decile. This reflects the varying balance between declines in METRs arising from reduced means-tested benefits versus increases associated with income tax and NI contributions: for the second decile the former outweighs the latter, whereas for deciles 1, 3 and 4 the opposite is the case. The overall number of households receiving means-tested benefits is reduced by about 116,000, 1.3% of the number in receipt of such transfers in the baseline, and expenditure on those benefits is reduced by 1.5%. While not insignificant, this is very much less than the impact of the

alternative tax/transfer reforms discussed above on the numbers relying on means-tested benefits, reflecting the fact that, as already highlighted, many of those who benefit from increases in the Minimum Wage are in households around the middle of the household income distribution. The mean PTR hardly changes, from 50.6% to 49.9%, with a fall of about 1 percentage point seen across most of the bottom half of the distribution.

The inclusion of the Minimum Wage increase makes little difference to the impact of the alternative tax/transfer packages on the average METR across earners described in the previous section. Increasing the Minimum Wage does add modestly to the numbers lifted out of reliance on means-tested benefits with each package. With the tax+CB+SI package this increases the number of households no longer relying on such benefits from 1.13 million to 1.23 million, while in the case of the tax+CB+PI package the increase is from 2.17 million to 2.26 million.

Finally, raising the Minimum Wage with no changes in employment or hours worked would also be expected to have a significant positive impact on the government's finances via the extra income tax and social insurance contributions employees would pay on the additional earnings, as well as lower expenditure on social transfers. The simulation results suggest that, compared with the baseline, the extra revenue generated from income tax would be £1.6bn. and employee social insurance contributions would go up by £1.1bn. (Earned income goes up by a total of £10.1bn. in the Living Wage simulation, so households 'retain' over two-thirds of that total). With spending on in-work benefits also falling by £1bn., the net gain for the Exchequer from lower spending and increased revenue would be of the order of £3.7 bn.

When the increase in the Minimum Wage is combined with the tax/transfer proposals, the estimated first-round impact on the Exchequer would be to generate a similar surplus in the case of the tax+CB+SI package and a slightly larger one, of £4.0 bn., with the tax+CB+PI package (because more of the increase in pay is liable to income tax and social insurance contributions) *ceteris paribus*. However, increasing the Minimum Wage would also have other effects not captured here, such as potentially reducing company profits, which could impact negatively on other taxes. It would also have a direct impact on pay costs for the exchequer in bringing public sector

employees up to the minimum, as well as a more indirect effect through the increased costs of services purchased from the private sector, including ones previously provided by public employees but now ‘contracted out’. An overall assessment of the likely effects on the government finances is thus complex, and would of course also need to incorporate judgements about the extent to which the numbers in work and hours worked would be affected.

7. Conclusions and Implications

This paper has analysed the immediate impact of tax and transfer reforms along the lines put forward by Atkinson (2015) to address rising income inequality, which entail increasing income tax in a progressive fashion, substantially raising universal Child Benefit, either strengthening social insurance or implementing a ‘participation income’ variant of basic income, and substantially increasing the Minimum Wage. The static microsimulation approach used the tax-benefit model for the UK in EUROMOD, based on data for a representative sample of UK households. While the analysis relates to the UK the results are of much broader relevance, in particular informing debates about how to avoid the increasing reliance on means-testing which is seen in many countries but argued by Atkinson (2015) to be the wrong approach.

The simulations show that each of the tax and transfer reform packages has a substantial impact on summary measures of inequality and poverty. Importantly, when one uses summary measures that are more sensitive than the Gini or the poverty headcount to the tails of the distribution, the impacts of the tax/transfer reforms are considerably larger. The tax+CB+SI package reduces the Atkinson and Theil inequality measures by one-fifth and the poverty gap by one-quarter; with the tax+CB+PI package these reductions are as much as one-third and three-fifths respectively. This bears out the claim that enhanced direct redistribution can be a major element in a broader strategy aimed at tackling inequality.

For the same overall cost, the tax+CB+PI package produces a larger immediate impact on both inequality and poverty because it directs resources towards low-income households not in receipt of the insurance-based payments that are the focus of the tax+CB+SI package. In achieving this greater impact the PI-focused package affects considerably more households, both positively and negatively: 43% of all

households see a substantial gain and 21% a substantial loss, compared to 34% and 10% respectively with the SI-focused alternative.

As far as incentives to work are concerned, the effects are complex. The average marginal effective tax rate on earners rises considerably with the tax+CB+SI reform but by considerably more with the tax+CB+PI package, reflecting the increase in tax rates (which now apply on all income other than the PI itself). The mean participation tax rate rises sharply with the tax+CB+SI option, since the benefits that would be lost on taking up employment are higher, but falls with the tax+CB+PI package since the PI is received both in and out of work. The tax+CB+SI reform reduces the numbers in receipt of any means-tested payment, with expenditure on those schemes down by one-quarter as higher social insurance benefits float recipients off means-tested payments. The tax+CB+PI reform would reduce total spending on means-tested benefits by over one-half, because the PI replaces a significant proportion of means-tested support. Furthermore, while a substantial number of households do not benefit in net income terms because they simply receive PI instead of some of their means-tested payments, it is an important feature of such a partial basic income – not captured by marginal effective tax rates – that they then need much less market income to escape from means-testing altogether.

Finally, we examined the immediate impact of a substantial increase in the Minimum Wage, on its own or together with either of the tax/transfer reform packages. While affecting a substantial proportion of earners, such an increase has only a very modest impact in reducing inequality or poverty. This reflects the fact that low paid employees are widely spread across the household income distribution rather than concentrated towards the bottom, and for a substantial number of those affected much of the gain from the higher wage would be clawed back by withdrawal of means-tested benefits. The inclusion of the Minimum Wage increase makes little difference to the impact of the alternative tax/transfer packages on the average METR across earners described in the previous section. Increasing the Minimum Wage does add modestly to the numbers lifted out of reliance on means-tested benefits with each package.

The impacts described here, across the various reforms, are static, first-round ones and an overall assessment would need to incorporate judgements about the extent and

nature of behavioural responses. The measures of the effects on financial incentives we have reported are helpful in that regard with respect to the response of households; employer responses are of course also important, notably the potential dynamic effects of a higher minimum wage on investment in training and upskilling workers to enhance productivity.

These findings bring out the complexities involved in teasing out the potential distributional impacts of major (rather than marginal) reforms to the tax-benefit system, but also the value of in-depth microsimulation in seeking to do so. From a strategic perspective, the lessons are of relevance well beyond the UK. They show that the traditional levers of direct redistribution, though by no means the only tools available to tackle inequality, offer considerable scope to do so. They also highlight the difficulties involved in seeking to move away from means-testing once it comes to play a dominant role. However, the results presented here suggest that this is challenging but possible, and that either strengthening social insurance or introducing a participation income offer feasible routes to doing so. The positive features of these reform strategies include the impact of individual-based entitlements on personal independence and autonomy that may be masked by focusing purely on household income. Combined with substantial universal child-focused income support and the reinforcement of progressive income taxation, they are a key part of ‘what can be done’ to reduce inequality.

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Appendix 1: Policy changes in detail

I Changes common to both reform packages

1. Personal income tax and social insurance contributions

Table A1 Income tax schedule

2014 baseline system		Reforms		
Rate	Upper threshold of taxable income £/year	Rate		Upper threshold of taxable income £/year
		With SI	With PI	
20%	31,866	25%	30%	25,000
40%	150,000	35%	40%	45,000
45%	n/a	45%	50%	90,000
		55%	60%	190,000
		65%	65%	n/a

Note that the thresholds apply to income after the deduction of the personal allowance. The level of this allowance varies across the baseline and the two reform scenarios. Note also that all rates but the top one are higher by 5 percentage points when combined with the Participation Income (PI) scheme than when combined with Social Insurance (SI). In addition, both reforms include an earned income discount for low income taxpayers such that a maximum of 20% of earned income (employment and self-employment earnings plus pensions) is deducted from the tax base. For annual earned income over £23,333 the discount is reduced at a rate of 40% up to taxable incomes of £35,000, when it is exhausted.

Other income tax changes

In the 2014 baseline system the personal allowance is withdrawn at high income. In the reforms this feature is removed. Furthermore, the married couples allowance and transfer between spouses of a part of un-used personal allowances are abolished.

Social insurance contributions

The upper limits for payment of full rates of contributions for employees and self-employed are increased by 31% to £55,000 per year.

2. Child Benefit

Table A2 Rates of payment £/week

	2014 baseline system	Reform
First child	20.50	89.15
Second and subsequent children	13.55	52.50

The current withdrawal of Child Benefit at higher incomes is abolished.

So that the child benefit increases result in reductions in means-tested benefit entitlements the premia related to children in the benefits that do not include child

benefit in their income test (Housing Benefit, Child Tax Credit, Council Tax Benefit) are reduced by the amount of the increase (or to zero if the increase exceeds them).

3. *Other changes*

The cap on the total amount of benefits that may be received is abolished.

II Strengthening Social Insurance

As well as the changes listed in the first section, the following changes are made:

1. *Social insurance benefits*

The basic State Pension, Bereavement Allowance and contributory Employment and Support Allowance (ESA) are increased by 25%.

Contributory Jobseeker's Allowance (JSA - unemployment insurance benefit), which starts lower is increased by 56%.

2. *Income tax changes*

The personal tax allowance is reduced from £10,000 to £8,000 per year. Age additions are retained at their absolute value (£500 per year for people aged between the state pension age and 74 and £660 per year for people aged over 75).

3. *Other changes*

Child benefit is made taxable in the hands of the resident parent with the lower taxable income.

III Participation Income

As well as the changes listed in the first section, the following changes are made:

1. *Participation Income*

The PI is set at £3,902 per year (£75 per week). All adults (people not entitled to child benefit) are eligible and are assumed to meet any participation condition.

2. *Income tax changes*

The personal income tax allowance and age allowances are set to zero.

3. *Interaction with the tax-benefit system*

Existing incomes from non means-tested earnings replacements benefits (referred to as T) are considered as contributing towards the Participation Income entitlement. These include contributory JSA and ESA, residual Incapacity Benefit, Industrial Injuries Benefit, basic State Pension, Bereavement Allowance and Maternity Allowance. For eligible individuals with incomes $T > PI$ Participation Income is set to zero. For eligible individuals with incomes $T \leq PI$ Participation Income is equal to the difference of the two (i.e. $PI - T$).

The PI is not itself taxed. Child Benefit is not taxed in the PI package.

Individuals pay tax on T_n (where T_n is T net of industrial injuries benefit and maternity allowance). However, in the tax treatment T_n is reduced by the maximum

between their entitlement to PI or the basic State Pension in case they receive the latter.

PI enters the income-tests for the benefits Child Tax Credit, Working Tax Credit, Housing Benefit, Council Tax Benefit, Pension Credit, Income Support and income tested JSA and ESA.

IV The Minimum Wage

Raising the minimum wage is considered as a stand-alone reform and in combination with the SI package and PI package in turn.

The minimum wage is increased from £6.31 to £7.85 per hour for those aged 21 and over with positive employment income not living in London and to £9.15 per hour for those living in London. For those aged 18 to 20, the minimum wage is increased from £5.03 to £6.26 per hour outside London and to £7.29 in London. Finally, for those aged 16 and 17 the minimum wage is increased from £3.72 to £4.63 outside London and to £5.39 in London.

Appendix 2: Measuring Work Incentives

The incentive for those in work to increase their earnings has been measured in the paper by calculating the marginal effective tax rate (METR) for each person in work, i.e. the proportion of a small increase in earnings that would be lost in either higher tax payments or lower benefit entitlements. This is calculated by applying a marginal increase to individual earnings and recalculating the household's net income, applying the rules of the tax and transfer systems in the baseline versus reform scenarios (and taking household-level features into account where relevant). Browne (2015) notes that performing this calculation by increasing earnings marginally while leaving hours of work unchanged may produce different results to increasing hours of work slightly and leaving the hourly wage unchanged, because entitlements to some benefits and tax credits depend on hours of work as well as on income, but reports that in practice the results are similar.

The incentive to remain in work has been measured by calculating the participation tax rate (PTR) for each person in work. The formula is: $PTR_i = 1 - \left(\frac{HDI_{wi} - HDI_{nwi}}{E_{wi}} \right)$ where $(HDI_{wi} - HDI_{nwi})$ is the difference in total household net income (HDI) if an individual i is working (subscript w) as opposed to not working (nw); E_{wi} are the earnings of individual i . The higher the value of PTR, the smaller the gain from working and the weaker the incentive to continue doing so. Using EUROMOD, we take each earner in a household in turn and set his or her earnings to zero, calculate the transfers to which they would then be entitled, and calculate the new household net income. We do not calculate the PTR for persons who do not report any earnings in the survey.

Appendix 3: Composition of Income Decile groups

As background to the results presented in the paper on the impact of the reform scenarios on different decile groups, Table A2.1 shows how different types of household are spread across the income distribution. Older households are defined as ones where the household reference person is aged 65 or over, and working age households as one where that person is under 65. The household reference person or HRP in the FRS is taken to be the person in whose name the accommodation is owned or rented; if there are two or more such persons, the one with the highest income is taken to be the HRP; if they have the same income, the HRP is taken as the eldest.

The table shows that working-age households are spread rather evenly across the deciles, whereas older ones are less likely to be found at the very top or bottom. Households with no earners are unsurprisingly more likely to be in the bottom half of the distribution while one-earner households are also slightly more likely to be in the bottom half whereas those with two or more earners are more likely to be in the top half, with few in the bottom two deciles.

Table A2.1: Distribution of Households Types by Income Decile, Equivalised Net Income

Decile	With elderly	With children	Working age	No earners	1 earner	2+ earners
1	5.8	9.7	10.9	22.1	10.3	1.1
2	12.4	12.0	9.5	19.4	11.6	2.2
3	11.2	12.5	9.7	14.1	14.2	4.5
4	12.1	12.2	9.4	11.3	12.5	8.0
5	12.6	11.5	9.3	9.5	11.0	10.2
6	11.5	10.6	9.8	7.4	9.8	12.5
7	10.0	9.5	10.0	5.7	8.1	13.9
8	9.3	8.0	10.2	4.3	7.9	14.3
9	8.5	7.5	10.4	3.7	7.4	15.5
10	6.6	6.5	10.8	2.6	7.3	17.7

Source: Authors' calculations with EUROMOD and FRS. Notes: See Table 7.