The distributional effect of tax and benefit reforms to be introduced between June 2010 and April 2014: a revised assessment

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Executive Summary

- The Chancellor claimed in his Budget speech that the June 2010 Budget was a 'progressive Budget'. Initial analysis of this claim showed that this was not true if measures announced in the Budget were analysed in isolation, or if their effects were considered over the longer term. Furthermore, HM Treasury analysis (as well as our own, in our post-Budget briefing) of the distributional effect of Budget measures did not include the effects of some benefit changes whose effects were difficult to allocate precisely to households. These measures represent £4.1 billion of the £11 billion of welfare cuts announced in the emergency Budget.

- In this paper we attempt to allocate the effects of these changes to housing benefit, Disability Living Allowance and tax credits to households. We do this by making assumptions about the impact of changes to Disability Living Allowance and tax credits, and by using analysis published since the Budget by the Government on the impact of the changes to housing benefit. Inevitably, though, these estimates will be less precise than those obtained directly from our tax and benefit microsimulation model. Our analysis shows that the overall effect of the new reforms announced in the June 2010 Budget is regressive, whereas the tax and benefit reforms announced by the previous Government for introduction between June 2010 and April 2014 are progressive.

- Low-income households of working age lose the most from the June 2010 Budget reforms because of the cuts to welfare spending. Those who lose the least are households of working age without children in the upper half of the income distribution. This is because they do not lose out from cuts in welfare spending and are the biggest beneficiaries from the increase in the income tax personal allowance.

- The biggest change to welfare policy in the June 2010 Budget in fiscal terms was the decision to link benefits with the Consumer Price Index (CPI) rather than the Retail Prices Index (RPI) or Rossi index from April 2011. This is very likely to mean less generous benefits in the years ahead. The savings from linking to a lower index will compound over time. The change is predicted to save the Government £1.2 billion in 2011–12 rising to £5.8 billion in 2014–15.

- The Government argued that the CPI is a better measure of inflation than the indices to which benefits are currently linked because the way it is calculated allows for the fact consumers are able to protect themselves from price changes by substituting towards relatively cheaper goods, and because the goods and services it covers better reflect the "inflation experience" of households receiving benefits. We find the first of these arguments to be sound, but the second to be more questionable. For those on universal benefits, the coverage of goods and services in the RPI is superior to the CPI. For those on means-tested benefits, with whom we may be more concerned, the Rossi's coverage of goods and services is superior to the CPI's given the current benefit system, but the case for the Rossi may weaken, once currently announced changes to the housing benefit system take full effect.

1. Introduction[1],[2]

The June 2010 Emergency Budget set out a number of tax and benefit changes that will be introduced by 2014–15. For the first time, the Budget documentation contained distributional analysis of the changes by household income, which showed that the measures to be introduced between June 2010 and April 2012 were progressive relative to household income,[3] and in his Budget speech the Chancellor used this as evidence that it was a 'progressive Budget'.[4] In our post-budget briefing, we cast doubt on this claim, demonstrating that many of the progressive tax rises that will be introduced over the next two years were announced by the previous Government, and that the Budget measures scheduled to come in between 2012 and 2014 are generally regressive. Moreover, the distributional analysis in the Budget documentation did not include the effects of some cuts to housing benefit, Disability Living Allowance and tax credits that

[2] Section 5 of this note has been substantially revised since the initial publication of the report in August 2010: see Appendix E for a list of the changes. These changes do not affect our assessment of the Budget's progressivity/regressivity in Sections 1–4.

[3] See Annex A of Budget 2010: http://www.hm-treasury.gov.uk/d/junebudget_annexa.pdf.

[4] See Budget speech, 22nd June 2010, http://www.hm-treasury.gov.uk/junebudget_speech.htm. The Chancellor also claimed that the Budget would not increase child poverty in 2012–13, although we believe this assessment also excludes the effect of some cuts to housing benefit, Disability Living Allowance and tax credits. We intend to assess this claim after the spending review.

are likely to affect the poorer half of the income distribution more than the richer half.[5] In Sections 2 and 3, we attempt to model the full impact of tax and benefit changes in the Budget, including these additional benefit cuts, on different income and expenditure groups. In Section 4, we show their impact on different sorts of households.

The reason that both we in our post-Budget analysis and HM Treasury did not take certain reforms into account is that the data underlying the tax and benefit microsimulation models we and HM Treasury use to perform this distributional analysis is insufficient to precisely identify those household that will be affected. In this paper we make the best use of the data that is available, together with some recently-published analysis of housing benefit cuts by the Department for Work and Pensions,[6] to attempt to estimate which households will be affected by the benefit cuts; inevitably, though, these estimates will be less precise than those obtained directly from our tax and benefit microsimulation model. We discuss the methodology for assigning losses to particular households in Appendix B.

The biggest change to benefit policy in terms of the long-run saving to the government in the June 2010 Budget was the decision to uprate benefits in line with the Consumer Price Index (CPI) rather than the Retail Prices Index (RPI) or Rossi index which have been used in the past.[7] Section 5 describes the differences between these various measures of the price level and evaluates the Government's claims that the CPI gives a more appropriate measure of inflation for benefit claimants, and Section 6 concludes.

2. The distributional effect of direct tax and benefit reforms to be enacted between 2010 and 2014

In this section, we examine the effect of direct tax and benefit changes to be introduced over the next four years, including the effects of the reforms to Housing Benefit, Disability Living Allowance and tax credits whose effects cannot be precisely modelled. Note we do not include the effect of indirect tax changes in this section.

Figure 2.1 shows the distributional impact of direct tax and benefit changes due to be implemented between June 2010 and April 2012, split into the effect of measures announced by the previous Government in the March 2010 Budget or before, and those announced by the current Government in the June 2010 Budget. The key pre-announced measures are:

- An increase in all employees' and employers' National Insurance rates of 1% from April 2011,
- An increase in the threshold at which employees start to pay National Insurance of £23 per week from April 2011,

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[5] See http://www.ifs.org.uk/budgets/budgetjune2010/browne.pdf.

[6] See http://www.dwp.gov.uk/docs/impacts-of-hb-proposals.pdf.

[7] Note that the distributional effects of this policy were included in the analysis in the Budget documentation, and our analysis in our post-Budget briefing.

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- Real reductions in the point at which the higher rate of income tax starts to be paid in both April 2011 and April 2012,
- Restricting tax relief on pension contributions for those with incomes above £130,000,
- The expiry of a number of one-off giveaways for the financial year 2010–11, in particular a temporary real increase in some benefits and the income tax personal allowance.
- From April 2011, private sector tenants claiming Local Housing Allowance (LHA) would no longer be able to receive more in LHA than they have to pay in rent. (Previously claimants could keep up to £15 of the amount by which their LHA payment exceeded their rent).
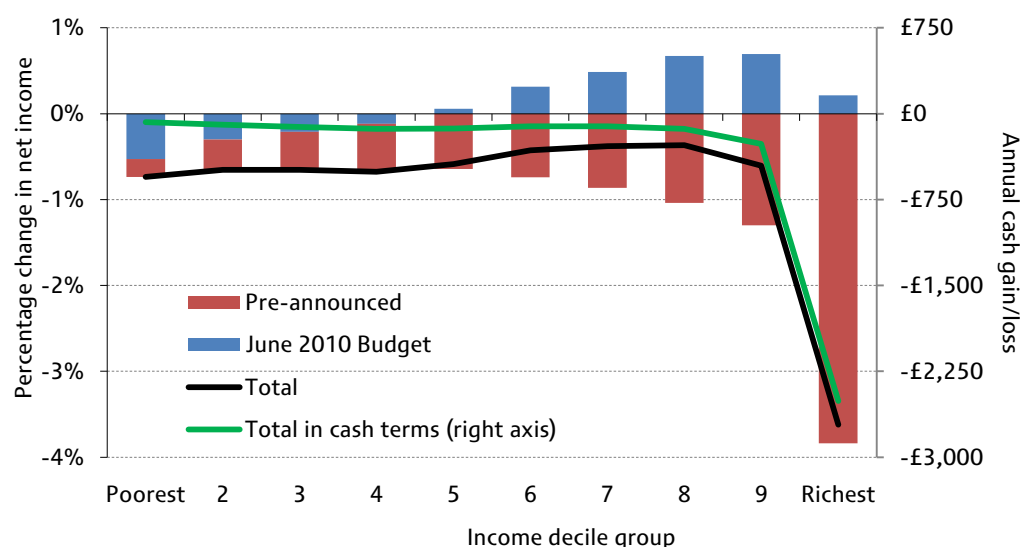
The main direct tax and benefit changes announced in the June 2010 Budget, most of which will be introduced in April 2011, and which are included in the analysis below, are:

- A £1,000 cash increase in the income tax personal allowance for those aged under 65,
- A £21 increase in the threshold at which employers start paying National Insurance Contributions,
- Using the CPI rather than the RPI or Rossi to uprate all benefits (see section 5 for more details),
- Increases in the child element of the Child Tax Credit in both April 2011 and April 2012,
- Withdrawing the family element of the Child Tax Credit from higher-income families,
- Increasing the rate at which tax credits are withdrawn from 39% to 41%,
- Removing the baby element of the Child Tax Credit,
- Freezing Child Benefit rates for three years,
- LHA rates will be set at the 30th percentile of local rents rather than the 50th percentile. This effectively means that LHA claimants will only be able to choose from the cheapest 30% of properties in their local area of the appropriate size for their family rather than the cheapest 50%.
- Irrespective of local rents, there will be caps on the total amount of rent that can be claimed under LHA and rents will be capped at the 4-bedroom rate. This will prevent claimants obtaining large amounts of LHA to live in high-rent areas.
- Changes to the way in which in-year changes are made to tax credit awards so that increases in income of more than £10,000 (rather than £20,000) will reduce tax credit payments and falls in income of up to £2,500 will not increase tax credit payments. Also, claimants will have to inform HMRC about changes in their circumstances more quickly.

Figure 2.1 includes the effect of all of these changes, including those which were previously excluded in both our and HM Treasury's analysis. This is based in part on a document released by the Department for Work and Pensions which shows some

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distributional analysis of housing benefit cuts.[8] Appendix A contains analysis which excludes the measures omitted by us in our initial assessment and by HM Treasury in the Budget document; a comparison between the two therefore reveals the impact of those omitted measures.

Figure 2.1: The effect of direct tax and benefit reforms to be introduced between June 2010 and April 2012 by household income decile group

Notes: Income decile groups are derived by dividing all households into 10 equal-sized groups according to income adjusted for household size using the McClements equivalence scale. Decile group 1 contains the poorest tenth of the population, decile group 2 the second poorest, and so on up to decile group 10, which contains the richest tenth. Assumes increases in employer NICs are passed on to employees in the form of lower wages.
Source: Authors' calculations using TAXBEN run on the 2007–08 Family Resources Survey.

The pre-announced direct tax and benefit changes to be in place by April 2012 are a progressive overall tax rise that will particularly affect the richest tenth of households. This is principally due to increases in National Insurance rates and the restriction of tax relief on pension contributions for high-income individuals. By contrast, the direct tax and benefit reforms announced in the June 2010 Budget are clearly regressive. This is because other benefit cuts are sufficient on average to offset the gains from the increase in the child element of the Child Tax Credit for poorer households. By contrast, the top half of the income distribution gains on average as a result of increases to the income tax personal allowance and the employer NI threshold. Overall, the direct tax and benefit changes are slightly regressive within the bottom nine decile groups, although it is the top decile group that loses out the most in both cash and percentage terms.

Tax and benefit reforms were also announced both by the previous Government and in the June 2010 Budget that will not come into effect until 2013 or 2014, and the losses to benefit and tax credit recipients from moving to CPI rather than RPI or Rossi uprating will increase over time. The particular reforms that were announced in the June 2010 Budget that will not come into effect until April 2013 or later are:

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[8] See http://www.dwp.gov.uk/docs/impacts-of-hb-proposals.pdf.

- A further real reduction in the point at which the higher 40% rate of income tax is paid in April 2013,
- Reforms to the medical test for Disability Living Allowance that are assumed to reduce the number of claimants by 20%,
- Reductions in housing benefit for those of working age living in social housing that is under-occupied,
- Increasing local reference rents (the maximum rents that private sector tenants can claim) in line with CPI rather than actual rents from April 2013 and
- Reducing housing benefit by 10% for those who have been claiming Job Seekers' Allowance for more than a year.
- A further change to the way in which in-year changes to tax credit awards so that increases in income of more than £5,000 will reduce tax credit payments from April 2013.

Figure 2.2 shows the effect of all direct tax and benefit changes to be introduced between June 2010 and April 2014. An analysis that excludes those benefit changes previously omitted from our analysis can again be found in Appendix A.

Figure 2.2: The effect of direct tax and benefit reforms to be introduced between June 2010 and April 2014 by household income decile group
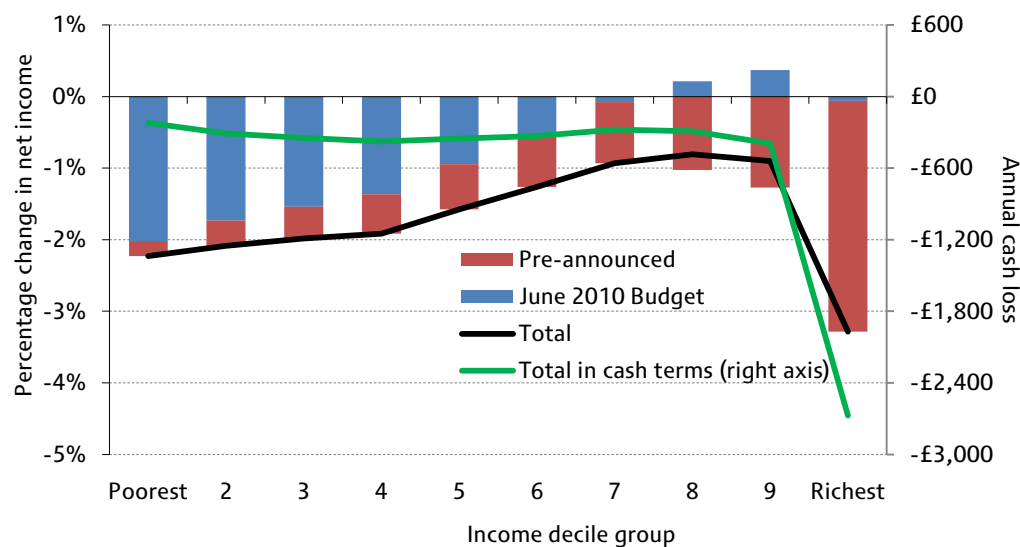
Notes: As for Figure 2.1.
Sources: As for Figure 2.1.

Changes announced in the June 2010 Budget to be introduced between 2012 and 2014 are also regressive. Indeed, the overall package of direct tax and benefit reforms now looks clearly regressive within the first nine decile groups of the income distribution: they each lose a similar amount in cash terms, on average, but this comprises a larger fraction of those with low incomes than those with higher incomes. However, it is still the richest tenth of households that lose the most in both cash and percentage terms.

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3. The overall distributional effect of the tax and benefit changes to be enacted between 2010 and 2014

In this section, we add on the effects of indirect taxes (principally, the increase in the standard VAT rate announced in the June 2010 Budget and the fuel, tobacco and alcohol duty escalators announced by the previous Government).[9] As IFS researchers have argued previously,[10] examining indirect tax payments at a snapshot in time and comparing this with net income gives a misleading picture of their progressivity because incomes are volatile and spending can be smoothed by borrowing and saving. This means that many people with low incomes at a point in time are not those we would normally consider as being poor; consider for example those who are temporarily unemployed, studying, taking a break from the labour market to raise children, are retired with hefty savings, and so on. We might want to consider the effect of tax and benefit changes as a percentage of annual expenditure and/or rank households by expenditure rather than income, as this might be a better guide to lifetime living standards.[11]
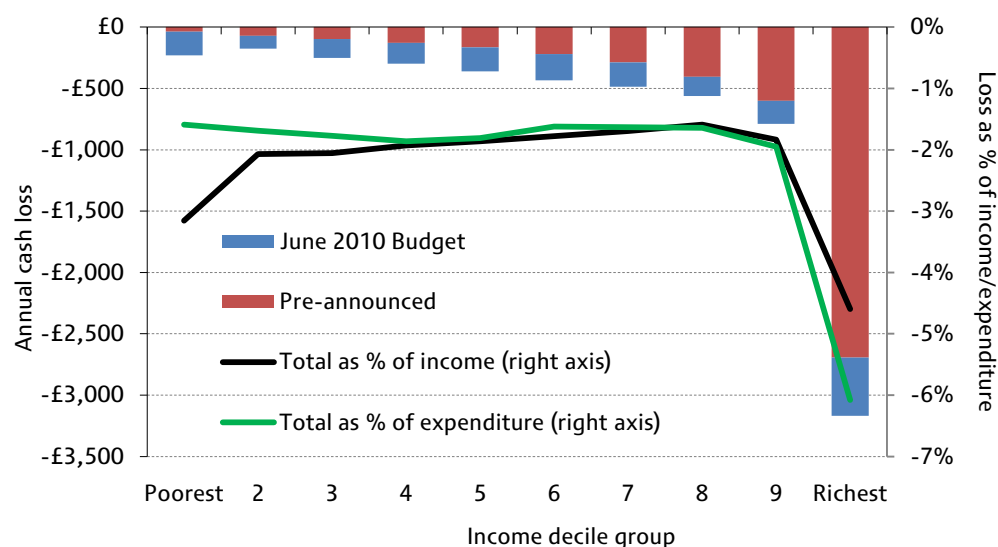
Figure 3.1 shows the effect of all tax and benefit changes to be implemented between June 2010 and April 2012 on households ranked by income, expressed both as a percentage of income and expenditure. We split the cash losses into those resulting from pre-announced by the previous Government and those announced in the June 2010 Budget and show the total loss as a percentage of net income and as a percentage of expenditure.

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[9] One effect of increasing indirect taxes is to temporarily increase inflation and hence the cash value of most benefits (since these are generally uprated in line with inflation, see section 5). We ignore this effect, and any other effects that higher inflation has on households' incomes (through for example, increasing index-linked annuity payments).

[10] See T. Crossley, D. Phillips and M. Wakefield (2009), 'Value added tax' in R. Chote, C. Emmerson, D. Miles and J. Shaw, *The IFS Green Budget: January 2009*, http://www.ifs.org.uk/budgets/gb2009/09chap10.pdf.

[11] S. Carrera (2010) 'An expenditure-based analysis of the redistribution of household income', *Economic and Labour Market Review* vol. 4 no.3 pp.18–27, http://www.statistics.gov.uk/elmr/03_10/downloads/ELMR_Mar10.pdf shows an analysis of the distributional effect of indirect taxes by both income and expenditure decile group.

Figure 3.1: The effect of all tax and benefit reforms to be introduced between June 2010 and April 2012 by household income decile group
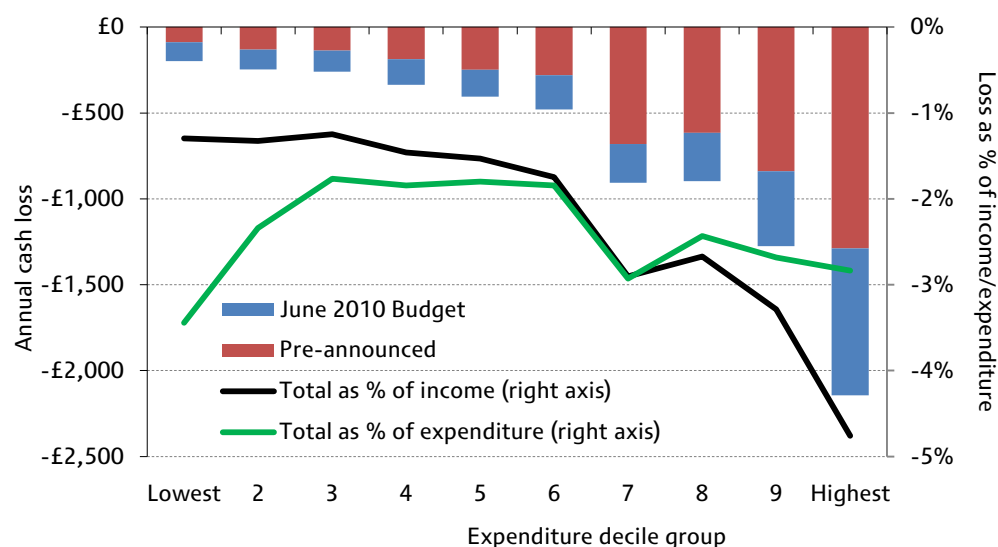

Notes: Income decile groups are derived by dividing all households into 10 equal-sized groups according to income adjusted for household size using the McClements equivalence scale. Decile group 1 contains the poorest tenth of the population, decile group 2 the second poorest, and so on up to decile group 10, which contains the richest tenth. Assumes increases in employer NICs are passed on to employees in the form of lower wages.
Sources: Authors' calculations using TAXBEN run on the 2007–08 Family Resources Survey and 2007 Expenditure and Food Survey.

Considering all tax and benefit reforms, the overall package of reforms is regressive within the poorest nine decile groups, although the richest tenth of households lose the most in both cash and percentage terms. This is because of the reforms announced in the June 2010 Budget: most of the losses for the bottom half of the income distribution are coming from measures announced in the June 2010 Budget, whereas most of the losses for the upper half result from pre-announced measures. However, this is at least in part because many households in the bottom decile group spend more than their income and hence the amount they lose from increasing VAT is high as a percentage of their income. Losses as a percentage of expenditure are very similar for each of the bottom nine decile groups.

Figure 3.2 shows the same analysis by expenditure decile group.

Figure 3.2: The effect of all tax and benefit reforms to be introduced between June 2010 and April 2012 by household expenditure decile group


Notes: Expenditure decile groups are derived by dividing all households into 10 equal-sized groups according to expenditure adjusted for household size using the McClements equivalence scale. Decile group 1 contains the lowest-spending tenth of the population, decile group 2 the second lowest-spending, and so on up to decile group 10, which contains the highest-spending tenth. Assumes increases in employer NICs are passed on to employees in the form of lower wages.

Sources: Authors' calculations using TAXBEN run on the 2007 Expenditure and Food Survey.

A different picture emerges when we consider the effect of reforms by household expenditure decile group. When losses are expressed as a percentage of net income, the overall package of tax and benefit reforms appears progressive. However, when losses are expressed as a percentage of expenditure, an inverted U shape emerges, with both the highest-spending and lowest-spending households losing the most. Also, we can again see that the measures announced in the June 2010 Budget are less progressive than the reforms pre-announced by the previous Government – the June 2010 Budget measures represent a larger share of the total loss for lower-spending households.

Figure 3.3 shows the distributional effect of all tax and benefit reforms to be introduced between June 2010 and April 2014 by income decile group.

Figure 3.3: The effect of all tax and benefit reforms to be introduced between June 2010 and April 2014 by household income decile group
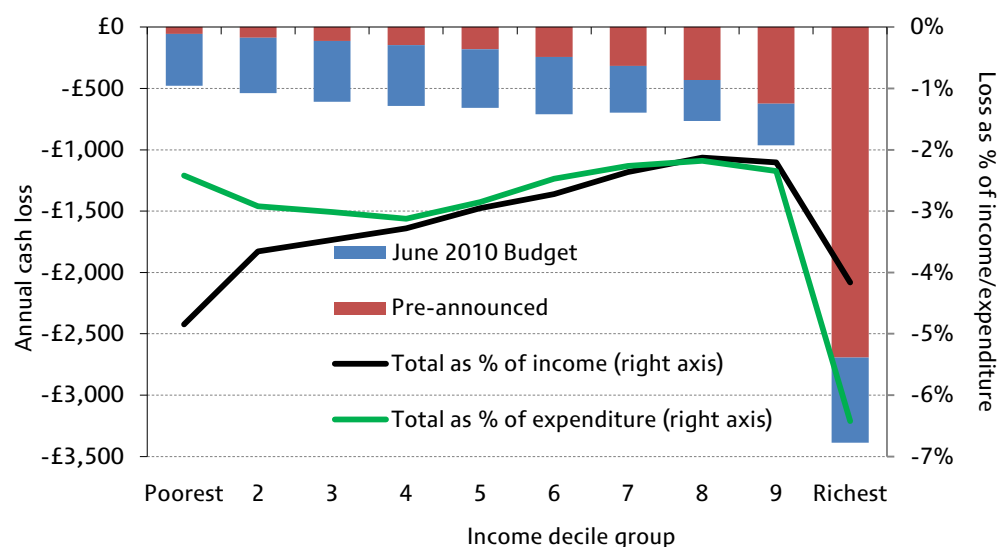
Notes: As for Figure 3.1.
Sources: As for Figure 3.1.

The overall distributional effect of reforms by income decile group is clearly regressive within the bottom nine decile groups of the income distribution when losses are expressed as a percentage of net income, and the bottom decile group loses a larger proportion of their net income than the top decile group. This pattern is less clear cut when loses are considered as a percentage of expenditure. There is a U shaped pattern of losses in this case within the bottom nine decile groups, although it is the richest tenth that loses the most when losses are expressed relative to expenditure. The measures announced in the June 2010 Budget are regressive as they hit the poorest more than the seventh, eighth and ninth decile groups in cash, let alone percentage, terms.

Figure 3.4 shows the same analysis by expenditure decile group.

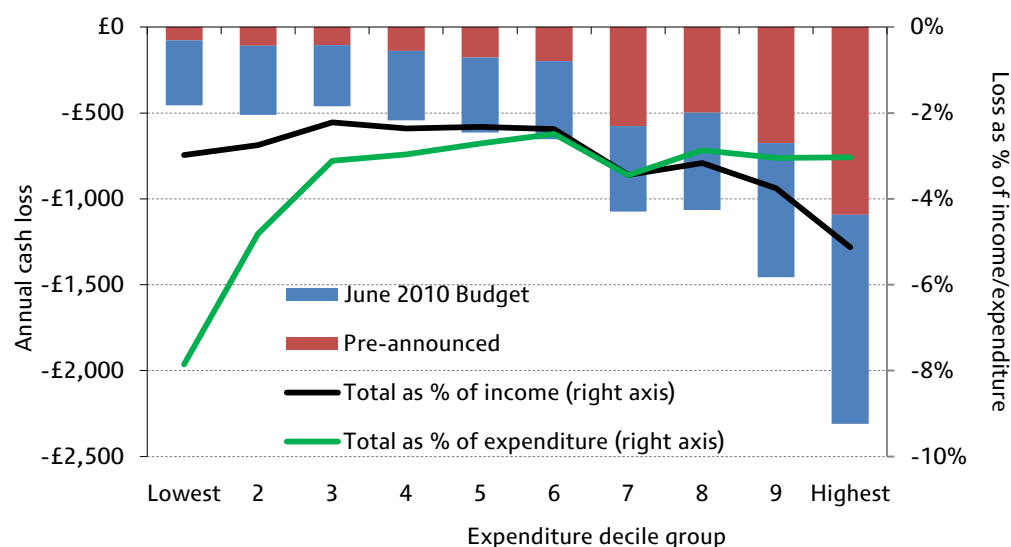**Figure 3.4: The effect of all tax and benefit reforms to be introduced between June 2010 and April 2014 by household expenditure decile**

Notes: As for Figure 3.2.
Sources: As for Figure 3.2.

When losses for each expenditure decile group are expressed as a proportion of net income, the overall package of reforms is slightly progressive, although the June 2010 Budget measures are regressive, since they represent a very similar cash loss for each of the seven lowest-spending decile groups. The overall package is regressive when losses are expressed as a proportion of expenditure.

4. **The distributional effect of tax and benefit reforms to be introduced between 2010 and 2014 by household type**

Figure 4.1 shows the distributional effect of all tax and benefit reforms to be implemented between June 2010 and April 2014 by household type.

Figure 4.1: The effect of all tax and benefit reforms to be introduced between June 2010 and April 2014 by household type
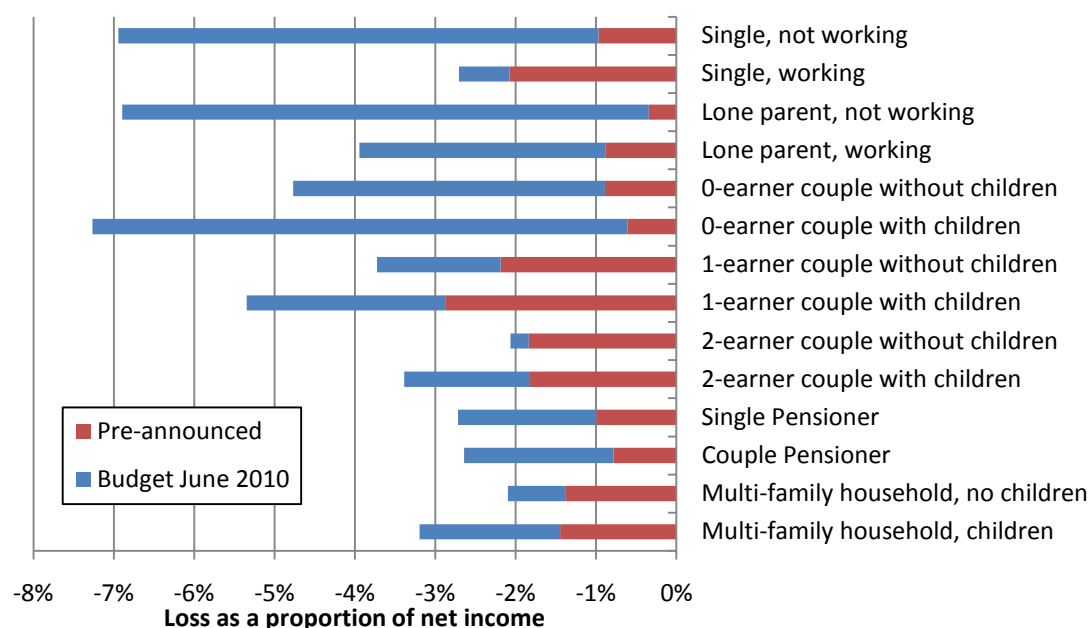

Notes: Assumes increases in employer NICs are passed on to employees in the form of lower wages.
Sources: Authors' calculations using TAXBEN run on the 2007–08 Family Resources Survey and 2007 Expenditure and Food Survey.

Low income groups and pensioners bore the least pain from the tax and benefit reforms announced by the previous Government, whereas richer groups such as single earner couples and single individuals in work were hit hardest as a proportion of income. The reforms announced in the June 2010 Budget disproportionately affect those groups that are most reliant on benefits, namely the single unemployed, lone parents and zero-earner couples. By contrast, households with little or no benefit entitlement and those with multiple workers are unaffected by the welfare cuts announced in the June 2010 Budget but benefit disproportionately from the increase in the income tax personal allowance.

Many of the differences we see here are in fact caused by different households' positions in the income distribution. In figures 4.2–4.4 below we show the distributional effect of pre-announced changes, Budget measures and all changes for families with children, pensioners and others within each income decile group. (A more detailed analysis by family type and income quintile can be found in Appendix C).

Figure 4.2: The effect of pre-announced tax and benefit reforms to be introduced between June 2010 and April 2014 by income decile group and household type

Notes: Income decile groups are derived by dividing all households into 10 equal-sized groups according to income adjusted for household size using the McClements equivalence scale. Decile group 1 contains the poorest tenth of the population, decile group 2 the second poorest, 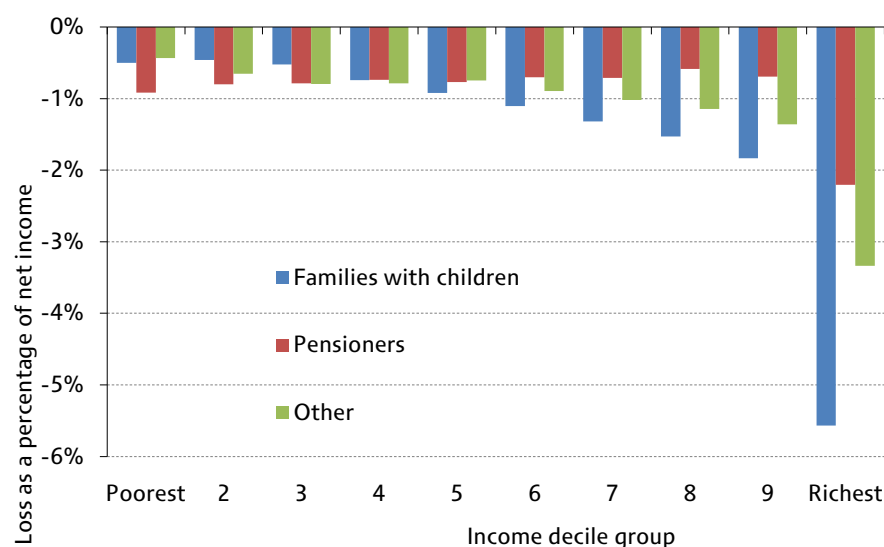and so on up to decile group 10, which contains the richest tenth. Assumes increases in employer NICs are passed on to employees in the form of lower wages.
Sources: Authors' calculations using TAXBEN run on the 2007–08 Family Resources Survey and 2007 Expenditure and Food Survey.

Figure 4.3: The effect of tax and benefit reforms announced in the June 2010 Budget to be introduced by April 2014 by income decile group and household type
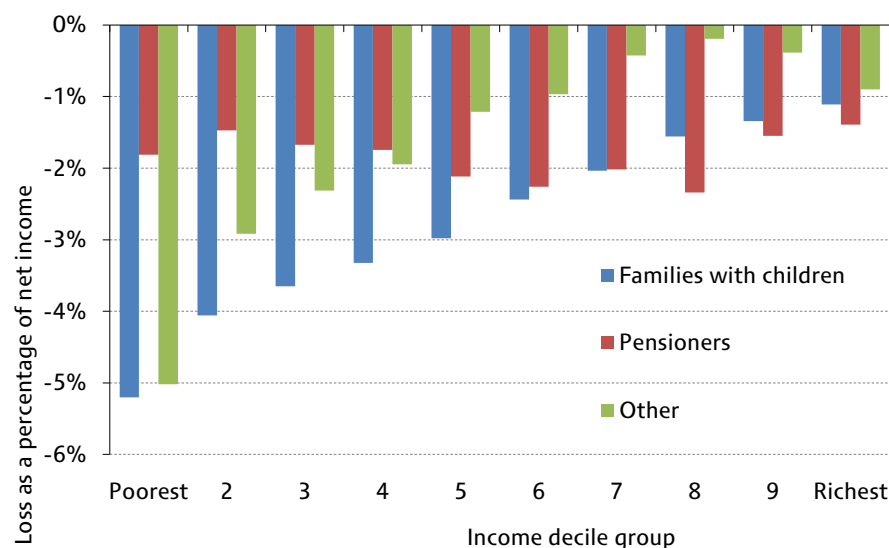
Notes: As for Figure 4.2.
Sources: As for Figure 4.2.

Figure 4.4: The effect of all tax and benefit reforms to be introduced between June 2010 and April 2014 by income decile group and household type
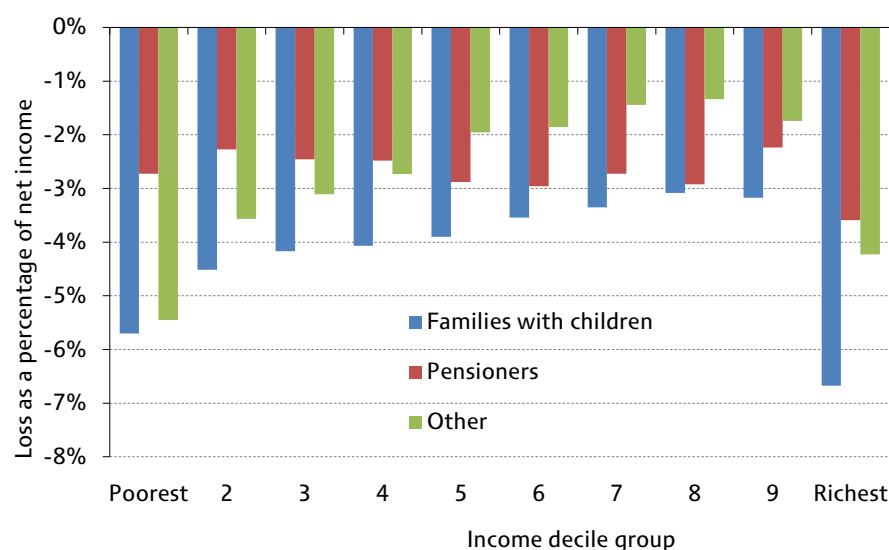
For the pre-announced reforms, the main difference is by income decile group – there is little difference between family types within each decile group. The only exception to this is that in richer decile groups, pensioners do not lose as much as households of working age. This is because pensioners do not have to pay National Insurance Contributions, and because pensioners are relatively unaffected by the restriction of tax relief on pension contributions for those with incomes above £150,000.

The measures announced in the June 2010 Budget are regressive within families with children and those of working age without children, but affect all pensioners relatively equally. This is because benefits for pensioners were spared from the cuts made to other areas of welfare expenditure which hit the poor of working age, and because richer pensioners do not benefit from the increase in the personal allowance for those aged under 65. Those who are least affected by the Budget measures are those of working age without children in the upper half of the income distribution. This is because they are not eligible for benefits in the first place so cannot lose out as a result of cuts to welfare spending, and because they are the biggest beneficiaries from the increase in the personal allowance.

Overall, as we saw earlier, the package is slightly regressive within the poorest nine-tenths of the income distribution, but the richest tenth lose the most. This effect is driven by those of working age – the effect of reforms among pensioners is broadly the same across the income decile groups. Those who are least affected by the tax and benefit reforms are those of working age without children in the upper-middle of the income distribution. Families with children lose out the most within each tenth of the income distribution as they are the group that is worst affected by the benefit cuts announced in the June 2010 Budget.

5. Linking benefits to the Consumer Prices Index[12]

In the Government's Emergency Budget in June, the Chancellor George Osborne announced that from April 2011, benefits and tax credits would be uprated using the Consumer Prices Index (CPI) measure of inflation rather than the two measures that are currently used, the Retail Prices Index (RPI) and Rossi index. The CPI will also supplant the RPI as the price inflation measure used as part of the "triple lock" for uprating the Basic State Pension – the rule that it increases with the highest of earnings, prices or 2.5%, which will be used from April 2011.

In this section of the briefing note, we describe the differences between these various measures of inflation, and evaluate the Government's claim that the CPI provides a more appropriate measure of inflation for benefit recipients.

5.1. Differences between indices

The three measures of inflation – RPI, Rossi and CPI – are constructed in a similar way. They all compare the cost of buying a representative 'basket' of goods and services bought by an 'average' household to the cost of the same basket a year earlier. The basket is adjusted each year to take account of changes in purchasing patterns, with items added and removed and the weights assigned to different areas of consumption changed. However, the measures differ in a variety of ways.

The RPI is the longest standing measure of inflation and is currently used to uprate the majority of state benefits and pensions. The Rossi index (named after the Minister for Social Security in the early 1980s, Hugh Rossi) is calculated in the same way as the RPI, but excludes certain housing costs – mortgage interest payments, rent and Council Tax – from its coverage. It is used to uprate most means tested benefits, since household which receive these benefits are unlikely to own their home with a mortgage and often have increases in rent and Council Tax covered by benefits. Rossi can therefore be seen as a better reflection of increases in the cost of living for households on means tested benefits than the RPI.

The CPI, the measure of inflation that the Bank of England targets when it sets interest rates,[13] differs from these two measures in a variety of ways.[14] Firstly, the CPI covers

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[12] This section of the briefing note has been substantially revised since the initial publication of the report. See Appendix E for a list of the changes. For comparison, the original versions of table 5.2 is also reproduced in Appendix E. These changes do not affect our assessment of the Budget's progressivity/regressivity in sections 1–4 of the briefing note.

[13] Office for National Statistics, *The New Inflation Target: the Statistical Perspective*, December 2003 , available at http://www.statistics.gov.uk/downloads/theme_economy/New_inflation_target_0312 10.pdf.

[14] See also *Differences between the RPI and CPI measures of inflation*, Office for National Statistics, available at

different goods. Relative to the RPI it excludes mortgage interest payments, Council Tax, buildings insurance, house purchase costs, TV licences, Road Fund licences and trades union subscriptions. Unlike the Rossi, rent is included in the CPI. The CPI also includes some things not covered by the RPI, including stock broker fees, university accommodation fees, and overseas student fees.

Secondly, the CPI draws on different data to the RPI. The calculation of the RPI relies heavily on data from the ONS's Living Costs and Food Survey (LCFS) of households, whereas the CPI uses the UK national accounts. Partly because of this, the RPI and CPI cover different populations. The RPI excludes the highest earners, foreign visitors to the UK, non-profit institutions serving households (e.g. nursing homes) and pensioner households that derive at least three quarters of their total income from pensions and benefits, whereas the CPI includes all of these.

Finally, there is a difference in the formula used to calculate the CPI and RPI inflation rates. Both are calculated in several stages. In the first stage, a sample of prices for a particular item (e.g. for different brands of white sliced bread) is gathered from all over the country. An average of these prices is taken across different 'strata', defined by region and the type of shop (independent or chain retailer). This gives what is known as an 'elementary aggregate' price. A weighted average of these elementary aggregates is then taken to give an overall national average price index for that item. These different item indices are then aggregated further into 'sections' (e.g. 'bread') made up of a number of related items. Sections are aggregated into 'groups' like food. Finally, an overall price index is calculated from the different group indices.[15]

The difference between the CPI and the RPI (and Rossi) comes in how the elementary aggregate average prices for the items are derived. In the RPI, one of two simple arithmetic averages of all the prices sampled for each item is taken. In the CPI, by contrast, a geometric average is used. In both cases, prices at higher aggregation levels are calculated as simple weighted arithmetic averages. This difference, known as the 'formula effect', means that even if the CPI and RPI covered the same goods and the same population, the CPI would tend to give a lower level of inflation than the RPI.[16] The RPI inflation measure overstates the true increase in the cost of living when prices rise, since the way it is calculated does not allow for the fact that consumers can mitigate the impact of price changes on their welfare by substituting away from goods which have

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http://www.statistics.gov.uk/downloads/theme_economy/cpi-rpi-information-note.pdf.

[15] See Office for National Statistics, *Consumer Price Indices Technical Manual*, 2010, available at http://www.statistics.gov.uk/downloads/theme_economy/CPI_Technical_manual-2010.pdf for details (in particular section 2).

[16] One of the two averages used to calculate elementary aggregate prices in the RPI – the "ratio of averages" – can, under some circumstances, give a lower measure of inflation than the geometric mean.

become relatively more expensive towards cheaper goods. The different method of the CPI does take this into account, although in a very particular way, which makes certain assumptions about consumer behaviour.[17] The ONS believes that this is the most important factor in explaining the difference between the CPI and the RPI.[18]

5.2. The Government's stated rationale for the change

Because of both the formula effect and the fact that the items excluded from it tend to rise in price more quickly than average prices, the CPI tends to give a lower rate of inflation than either Rossi or the RPI (see figure 5.1 below). This means the decision to link benefits to the CPI is likely to save the government money. These savings will cumulate over time: in any given year the differences between different measures of inflation may be small, but over many years the difference in the value of benefit payments will be substantial. The June 2010 Budget forecast that indexing working-age benefits and tax credits to the CPI will save £1.2 billion in 2011/12, rising to £5.8 billion by 2014/15, relative to maintaining the current set of indexation rules.

Figure 5.1 CPI, RPI and Rossi year-on-year changes 1991-2009
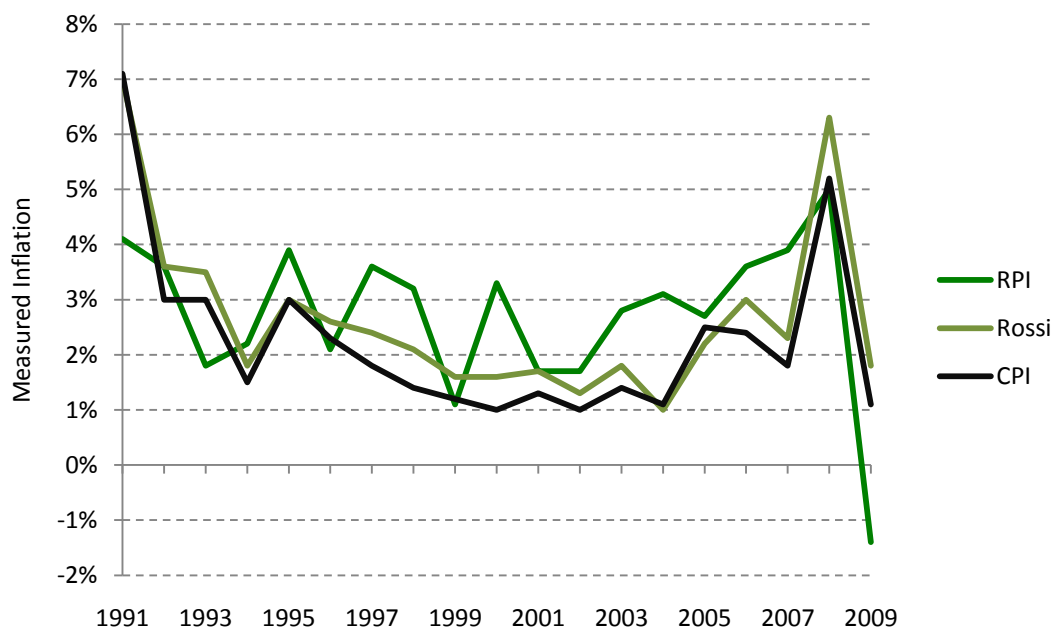
Source: Department for Work and Pensions, Office for National Statistics.

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[17] For more technical details of the way the CPI is calculated and how this compensates for what economists call "substitution bias" see Appendix D.

[18] *Differences between the RPI and CPI measures of inflation*, Office for National Statistics, available at http://www.statistics.gov.uk/downloads/theme_economy/cpi-rpi-information-note.pdf

Aside from its fiscal impact, the Government argued that the CPI offered a more appropriate "measure of benefit and pension recipients' inflation experiences than RPI".[19] The Government gave two reasons for this:

1) The difference in the way the CPI was calculated makes it a better measure of inflation;

2) The CPI's coverage better reflects the spending of those receiving benefits.[20]

The first argument relates to the 'formula effect' described above; the formula used to calculate the CPI effectively accounts for the fact that consumers can protect themselves from price increases by substituting towards relatively cheaper goods. This is a sound rationale for the switch. Indeed, there is good reason for the government to use this methodology (if not necessarily the coverage of the CPI) for all indexation rules used by the government, including the uprating of tax thresholds.[21]

The validity of the second argument is an empirical question. In the rest of this chapter, we test the extent to which the coverage of the CPI is more appropriate than the RPI and Rossi for households receiving benefits by looking at the proportion of recipient households who are "insulated" from changes in mortgage interest and Council Tax payments (the costs excluded from the CPI compared to the RPI) and who are insulated from changes in rents (included in the CPI but excluded from Rossi).[22] We make this assessment separately for households receiving means tested benefits, households receiving other benefits, and, as a reference, households not receiving any benefits. The next sub-section details how we do this in practice.

5.3.   Data and assumptions

Table 5.1 divides benefits into whether they are typically uprated using Rossi or the RPI. The Basic State Pension and Pension Credit are not considered here since they will not in future be linked to the CPI. The Pension Credit will increase with earnings, while the Basic State Pension will be adjusted according to the Government's "triple lock" from April 2011, which means that in practice it would have been uprated with the RPI only infrequently, since earnings tend to rise more quickly than prices. We also include Child Benefit, though this has been frozen for 3 years from April 2011, in order to compare the current system of indexation with one where all benefits except pensions are indexed to the CPI.

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[19] HM Treasury, *June Budget 2010*, June 2010.

[20] The Government also pointed out that this change would "ensure consistency with the measure of inflation used by the Bank of England".

[21] Something the Government has said it will look into, see HM Treasury, *June Budget 2010*, June 2010.

[22] Mortgage interest and Council Tax payments are likely to be the most important non-formula-effect differences between the CPI and RPI.

Table 5.1: Classification of benefits by indexation rule

Rossi	RPI
Council Tax Benefit	Attendance Allowance
Employment and Support Allowance	Carer's Allowance
Housing Benefit	Child Benefit
Incapacity Benefit	Child Tax Credit
Income Support	Disability Living Allowance
Jobseekers' Allowance	Industrial Injuries Benefits
Severe Disablement Allowance	Guardian's Allowance
	Maternity Allowance
	Statutory Adoption Pay
	Statutory Maternity Pay
	Statutory Paternity Pay
	Statutory Sick Pay
	War Disablement Pension
	Widows' Benefits
	Working Tax Credit

The next step is to consider which households are insulated from mortgage interest, Council Tax and rent payments. To do this we take data from the 2008 Living Costs and Food Survey. Owing to differences in the system of local taxation in Northern Ireland, we looked at households in Great Britain only. Our rules for classifying households were as follows:

Households insulated from changes in mortgage interest payments. We consider two ways of identifying households who are insulated from changes in mortgage interest payments. The first includes those who rent or own their homes without a mortgage, report paying no mortgage interest, or receive Pension Credit.[23] The second also includes those households in receipt of any means tested benefit, as some of them may be eligible for their mortgage payments to be covered by the government.[24]

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[23] We do not observe those receiving the Savings Credit of Pension Credit and the Guarantee Credit separately in our data. The Guarantee Credit passports recipients onto other benefits. Throughout, we assume that all recipients of the Pension Credit are receiving the Guarantee Credit. In reality, around one fifth of those on Pension Credit receive only the Savings Credit (see DWP tabtool available at http://83.244.183.180/100pc/pc/pctype/cnage/a_carate_r_pctype_c_cnage_feb10.html).

[24] The 'applicable amounts' of Income Support, Income-based Jobseeker's Allowance and Income-based Employment and Support Allowance, and the 'additional amounts' of the Minimum Income Guarantee of the Pension Credit are adjusted according to housing costs (including mortgage interest costs). For all of these benefits, mortgage interest payments are subject to a cap and, for all the benefits except Pension Credit, to a waiting period of 13 weeks. Since the waiting limit does not apply to those on the Guarantee Credit of the Pension Credit we include recipients of Pension Credit in both definitions of those insulated.

Households insulated from Council Tax changes. Benefit recipient households are assumed to be insulated from Council Tax if they receive Council Tax Benefit in the data or report a net Council Tax bill of zero.[25]

Households insulated from rent changes. Non-renters, those who pay zero rent and those renters who receive Housing Benefit are assumed to be unaffected by rent increases; the latter because, in many cases, any increases in rent will be matched, in whole or in large part, by increases in benefit payments.[26]

When interpreting our results below it is important to bear in mind that our estimates of those insulated depend both on the data we are using and the assumptions we have made. In particular, we highlight the following caveats:

- For both rent and Council Tax, there is reason to believe that our assumptions are likely to *overstate* the extent to which households are insulated, since Council Tax Benefit and Housing Benefit may only be partial if a household contains one person receiving Housing Benefit or Council Tax Benefit and another who is not eligible.[27] This may lead us to understate the degree to which households are affected by these costs and so to overstate the numbers insulated.
- Our estimates rely largely on household survey responses to questions about receipt of various benefits. If households systematically mis-reported receipt of certain benefits, then our estimates of the proportions of households insulated may be biased (this is the reason we look at multiple pieces of information within the data to derive our classification of households). This has a number of implications.
  - o One of the ways we identified those insulated from changes in mortgage interest costs was to assume that all those receiving means tested benefits are insulated. If there were a tendency to under-report means

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[25] Recipients of Income-based Jobseeker's Allowance, Income Support, Income-based Employment and Support Allowance, and the Guarantee Credit of the Pension Credit are automatically entitled to maximum Housing Benefit and Council Tax Benefit. A Some households (81) who receive these benefits do not report receipt of Council Tax Benefit in the data. We include them as insulated from changes in Council Tax.

[26] 30 households in the data who receive the benefits listed in footnote 25 do not report receiving Housing Benefit. We also include these as insulated from changes in rent.

[27] We estimate that around 3.5% of recipient households contain more than one "benefit unit" and so are potentially in this situation.

tested benefits (relative to other benefits),[28] we would therefore understate the proportion of benefit recipients who are insulated from changes in mortgage interest costs. However, the largest Rossi-linked benefit, Council Tax Benefit, appears to be reported well.[29]

o Our definition of those insulated from changes in Council Tax includes those who should be entitled to receive this benefit and includes those who do not report receiving it but pay a net Council Tax bill of zero. With these assumptions we estimate around 5.8 million households receive Council Tax Benefit – slightly higher than the figure reported by the Department for Work and Pensions for December 2008 (see footnote 29). We may consequently be overestimating the degree to which households are insulated from changes in Council Tax.

o Our estimate of the total numbers receiving Housing Benefit (those renting who report receipt of housing benefit or another benefit that passports them onto Housing Benefit) is 3.6 million, versus a figure of 4.2 million for December 2008 reported by the DWP. This means we may be underestimating the degree to which households are insulated from changes in rent.

5.4. Results: the proportions of households insulated from changes in the cost of mortgage interest payments, Council Tax, and rent

Our main results are in Table 5.2, which shows the proportion of benefit recipient households insulated from mortgage interest and Council Tax costs (i.e. those costs excluded from the CPI but included in the RPI) under different assumptions about whether those on means tested benefits are insulated from higher mortgage interest costs, and the proportion insulated from rental payments (included in the CPI but excluded from Rossi). We report figures for all households and then separately for pensioner and non-pensioner households.[30] The results are also split by households receiving only RPI-linked benefits, those receiving only Rossi-linked benefits and then those receiving any benefit (excluding pensions).

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[28] RPI-linked benefits appear to be reported reasonably accurately. For example, we estimate from the LCFS data that just under 7.1 million households received the largest RPI benefit, Child benefit, in 2008, versus an estimate from HMRC of 7.35 million for Great Britain in 2008. Source: HMRC, *Child Benefit Statistics, August 2008* http://www.hmrc.gov.uk/stats/child_benefit/chb-geog-aug08.pdf

[29] The LCFS suggests that 4.9 million households receive this benefit compared to estimates from DWP estimates of 5.2 million for December in 2008. http://statistics.dwp.gov.uk/asd/index.php?page=hbctb.

[30] Pensioner households are defined as those where the household head or their spouse is of pensionable age. The reason we present this split is that the change to the CPI is likely to more relevant for working age households than pensioners – owing to the fact that a large proportion of pensioners' benefit incomes will be increased with the government's "triple lock", which will only infrequently depend on the measure of inflation used.

Table 5.2 Proportions of benefit recipients insulated from changes in mortgage interest payments, Council Tax and rent

	RPI-linked benefits only	Rossi-linked benefits only	All benefit recipients	No benefits
All Households	(1,424)	(595)	(2,670)	(2,599)
Insulated from MIPs and CT	1.3%	82.8% [86.9%]	39.2% [42.2%]	3.3%
Insulated from Rent Changes	82.4%	93.4%	88.1%	82.2%
Non-Pensioner Households	(1,269)	(226)	(1,998)	(1,501)
Insulated from MIPs and CT	0.94%	69.0 % [77.3%]	28.1% [31.5%]	3.3%
Insulated from Rent Changes	80.9%	90.3%	85.6%	76.4%
Pensioner Households	(155)	(369)	(672)	(1,098)
Insulated from MIPs and CT	4.4%	91.3% [92.8%]	70.9% [72.8%]	3.2%
Insulated from Rent Changes	94.3%	95.3%	95.4%	91.5%

Note: Sample sizes in round brackets. Figures assuming all those on means tested benefits are fully insulated from mortgage interest payments, where relevant, in square brackets. Households in the category "no benefits" may still be receiving benefits we do not consider here such as the Basic State Pension and Pension Credit.

Between 39% and 42% (depending on the assumption we make when identifying households receiving mortgage interest support) of all benefit recipients are fully insulated from changes in mortgage interest and Council Tax costs, the main items in the RPI but excluded from the CPI. This implies, then, that a majority of all benefit recipients are *not* insulated from these costs.[31] Amongst working-age households, only 28–32% of benefit recipients are fully insulated from changes in mortgage interest and Council Tax, whereas the majority of pensioner households receiving non-pension benefits are insulated.

Overall, then, we find that the move to CPI-uprating is not clearly justified by the coverage of the CPI being more appropriate for all benefit recipients, particularly for

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[31] We estimate that spending on these items (plus dwelling insurance, a third item excluded from the CPI relative to RPI), accounts for around 11% of recipients' total expenditure on average, compared to an average across all households of 13%.

those of working age. Nor do our results suggest that the switch from RPI to CPI as part of the triple lock guarantee for the basic state pension was obviously justified on coverage grounds: whilst we find the majority of pensioners in receipt of other benefits are insulated from the costs excluded from the CPI, if we include state pension recipients as well, the proportion insulated falls to between 31.5 % and 32.2% of pensioner households, similar to the proportions insulated for working age households.

If we look at households who receive only RPI-linked benefits (mainly those households who receive no means tested benefits but do receive Child Benefit), the coverage of the CPI appears particularly inappropriate: only around 1% of them are insulated from mortgage interest and Council Tax costs. Including these costs in the index used to uprate the benefits received by these households therefore seems sensible if we want to accurately capture their inflation experience.

Table 5.2 shows that between 83% and 87% of households receiving Rossi-linked benefits are insulated from changes in mortgage interest and Council Tax, and 93% are insulated from changes in rent. This suggests that the Rossi index, which excludes these three items, is well-designed for capturing the inflation experience of recipients of these benefits. By moving from Rossi to the CPI, these benefits will now be influenced by changes in rents, despite the fact that rent payments affect very few households in this group. In this respect, the coverage of the CPI seems less appropriate than the coverage of Rossi given the current benefit system.

However, one of the changes announced in the June 2010 Budget was that, from April 2013, Local Housing Allowance (LHA) rates will be increased with the CPI, breaking the link between LHA and local rental costs. The cap for LHA is currently set according to the median of local rents.[32] To examine the impact of this change, we re-classified those receiving Housing Benefit in private sector accommodation as *not* being insulated from changes in rent.[33] The results of this exercise are presented in Table 5.3. Once we take out those living in private sector accommodation, the proportion of households receiving only Rossi-linked benefits that are insulated from changes in rent falls from 93% to 85%, in line with the national average. This suggests that, as a result of the changes due to be implemented in 2013, the inclusion of rents in the index used to uprate means tested benefits may be justifiable from that date– as those currently receiving Rossi-linked benefits will be more likely to be affected by these costs than they were in the past.

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[32] LHA is the name for Housing Benefit for recipients in the private rental sector. Preceding this change, from October 2011 the basis for setting LHA rates will be changed from the median to the 30th percentile of local market rents.

[33] Of course, some of those in private sector accommodation will remain insulated, provided that their rent is far enough below the maximum rent covered in their Local Authority, so our results should be treated as a lower bound.

Table 5.3 Proportions of benefit recipients insulated from changes in rent: those in private sector accommodation not insulated.

	RPI-linked benefits only	*Rossi-linked benefits only*	*All benefit recipients*	*No benefits*
All Households	(1,424)	(595)	(2,670)	(2,599)
Insulated from Rent Changes	82.4%	85.2%	83.3%	82.1%

Note: Sample sizes in brackets. Households in the category "no benefits" may still be receiving benefits we do not consider here such as the Basic State Pension and Pension Credit.
Source: Author's own calculations using LCFS data.

Overall, then, these results suggest that the coverage of the RPI is more suitable for households not receiving means tested benefits than the coverage of the CPI. For those receiving means tested benefits (for whom benefits are likely to represent a larger share of their income) the answer is more ambiguous: currently, the fact that rents are included in the CPI arguably makes it less appropriate in terms of coverage than the Rossi index. However, as a result of the changes in the Budget, in the future it may be more appropriate to include rents in the index used to uprate means tested benefits.

5.5. Proportions insulated by income decile

We might be most concerned that the index to which benefits are linked reflects the inflation experience of low income households, for whom benefits make up a larger share of total income. For example, it could be argued that the switch to the CPI is more appropriate if those benefit recipients who are *not* insulated from the costs excluded from the CPI relative to the RPI are largely richer households, say, who receive Child Benefit but no other benefit payments.

Figure 5.2 shows the proportion of benefit recipient households insulated from mortgage interest costs and Council Tax according to their household income decile. These results are restricted to non-pensioner households (for whom we believe the switch to uprating using the CPI to be more significant) and assume that all means tested benefit recipients are insulated from mortgage interest costs. Households are allocated to decile groups according to their position within the overall income distribution (i.e. the distribution including households who do not receive any benefits and pensioner households). It shows that poorer households who receive benefits are much more likely to be insulated from both mortgage interest and Council Tax: just over 85% of non-pensioner households receiving benefits in the first decile are insulated, compared to 59% in the second decile and just 5.5% in the richest decile. If we are primarily interested in capturing the inflation experience of the poorest households receiving benefits, then it seems appropriate to exclude mortgage interest and Council Tax from the measure of inflation used to uprate them. But this currently happens anyway, since the poorest households tend to receive income-related benefits which are linked to the Rossi index.

Figure 5.2: Proportion of benefit recipients insulated from changes in mortgage interest payment and Council Tax by income decile group: non-pensioner households
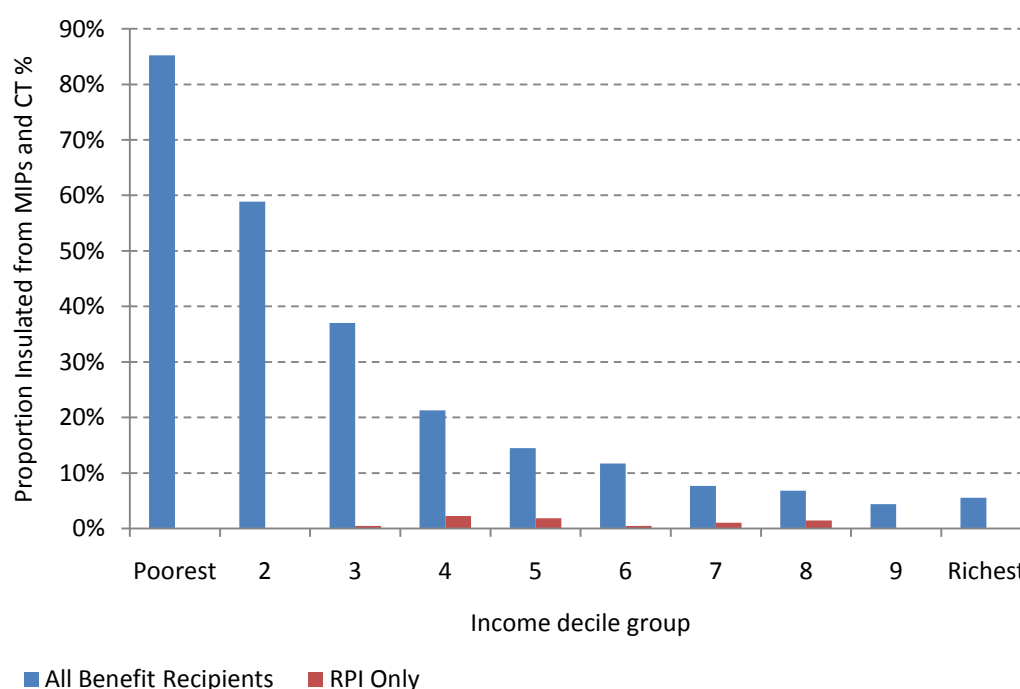
Note: Income decile groups are derived by dividing all households into 10 equal-sized groups according to income adjusted for household size using the McClements equivalence scale. Decile group 1 contains the poorest tenth of the population, decile group 2 the second poorest, and so on up to decile group 10, which contains the richest tenth. *The proportions of those insulated in higher income decile groups of those receiving RPI only benefits in particular should be treated with caution owing to small sample sizes in these groups. These figures refer to non-pensioner households and assume that all those on means tested benefits have their mortgage interest payments met in full.*
Source: Author's calculations from 2008 Living Cost and Food Survey.

Very few households who receive only RPI-linked benefits are insulated from housing costs in any income group.

5.6 Summary of conclusions

To summarise, the fact that it accounts for consumers' ability to substitute between goods and services favours the CPI over the RPI and Rossi. For those on universal benefits, the coverage of goods and services in the RPI is superior to the CPI. For those on means-tested benefits, with whom we may be more concerned, the Rossi's coverage of goods and services is superior to the CPI's given the current benefit system, but the case against the CPI may weaken, once currently announced changes to the housing benefit system take full effect.

6. Conclusion

It is clear that the measures introduced in the June 2010 Budget are regressive overall. Once we consider all reforms to be introduced by April 2014, the cash losses are smallest for the seventh, eighth and ninth income decile groups, and are very similar for all of the bottom seven expenditure decile groups. The progressive nature of the pre-announced measures is not sufficient to offset this, so the overall package of tax and benefit reforms is also slightly regressive, at least within the bottom nine income decile
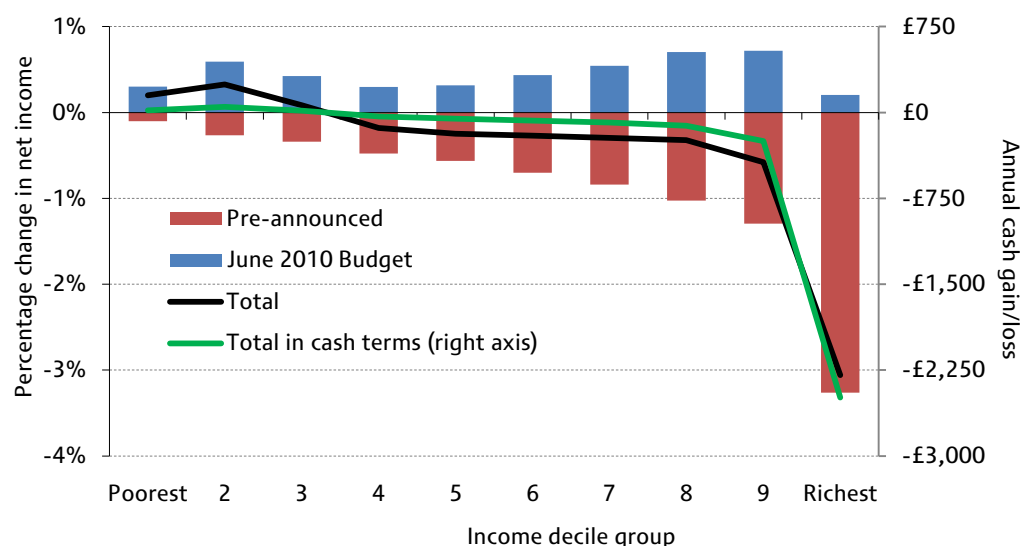
groups. The biggest losers from the June 2010 Budget are low income households of working age, while better off working-age households without children lose the least. Low-income pensioners are less affected than other poor groups from the welfare cuts in the Budget, but richer pensioners lose more than richer households of working age from the Budget as they do not benefit from the increased personal allowance.

The biggest change to benefit policy in the June 2010 Budget in terms of the long-run saving to the government was the decision to link benefits with the Consumer Price Index (CPI) rather than the Retail Prices Index (RPI) or Rossi index from April 2011. This is very likely to mean less generous benefits in the years ahead. The Government argued that the CPI is a better measure of inflation than the indices to which benefits are currently linked because the way it is calculated allows for the fact consumers are able to protect themselves from price changes by substituting towards relatively cheaper goods, and because the goods and services it covers better reflect the "inflation experience" of households receiving benefits. We find the first of these arguments to be sound whereas the second is more questionable.

Appendix A: Distributional analysis excluding tax and benefit changes that are difficult to precisely allocate to households

Figure A.1 performs the same analysis in Figure 2.1 excluding the effects of cuts to housing benefit, DLA and tax credits that are difficult to assign to particular households.

Figure A.1: The effect of direct tax and benefit reforms to be introduced between June 2010 and April 2012 by household income decile group, excluding some benefit changes


Notes: Income decile groups are derived by dividing all households into 10 equal-sized groups according to income adjusted for household size using the McClements equivalence scale. Decile group 1 contains the poorest tenth of the population, decile group 2 the second poorest, and so on up to decile group 10, which contains the richest tenth. Assumes increases in employer NICs are passed on to employees in the form of lower wages.
Sources: Authors' calculations using TAXBEN run on the 2007–08 Family Resources Survey.

Comparing the figure above with figure 2.1, we can see that the measures initially excluded from the analysis disproportionately affect low-income households. The bottom four decile groups of the income distribution lose out as a result of the June 2010 Budget reforms on average rather than gaining once these additional measures are taken into account.

Figure A.2 performs the same analysis for reforms to be introduced between June 2010 and April 2014, again excluding those benefit changes that are difficult to precisely assign to particular households.

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Figure A.2: The effect of direct tax and benefit reforms to be introduced between June 2010 and April 2014 by household income decile group, excluding some benefit changes
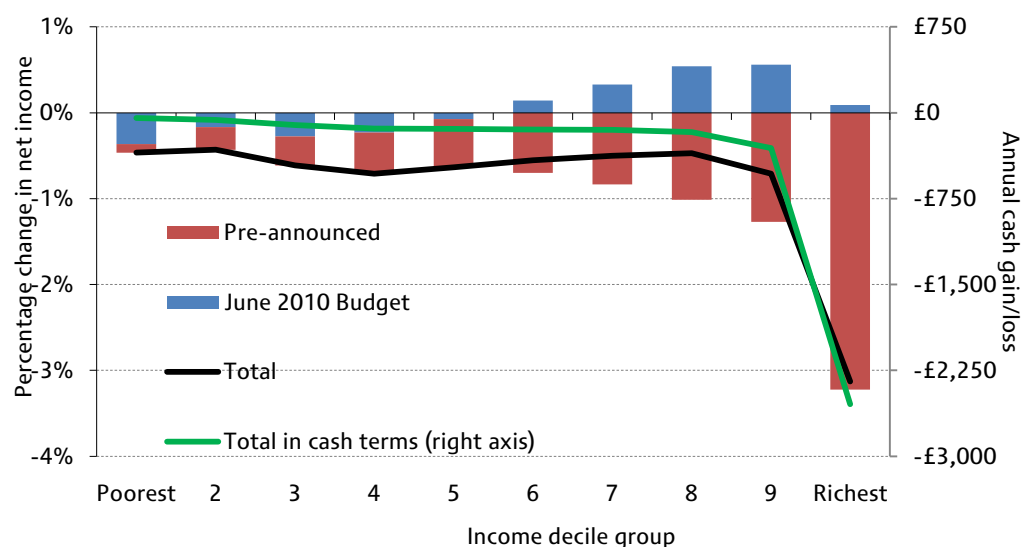
Notes: As for Figure A.1.
Sources: As for Figure A.1.

We can see that the direct tax and benefit reforms announced in the June 2010 Budget appear regressive even without attempting to model the effects of those benefit changes that are difficult to precisely allocate to particular households. The overall loss from direct tax and benefit changes excluding those that are difficult to allocate to particular households is approximately the same as a percentage of income for each of the bottom nine decile groups.

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Appendix B: Methodology for assigning losses from changes to housing benefit, disability living allowance and tax credits to particular households

In this appendix, we document the methodology for assigning losses from each change to housing benefit, DLA and tax credits to particular households that cannot be precisely allocated using the IFS tax and benefit microsimulation model, TAXBEN.

Not allowing LHA payments to exceed actual rent

The Department for Work and Pensions document[34] shows that around half of households claiming LHA lose an average of £11 a week as a result of this policy, and that those with larger properties are more likely to lose. We randomly assign the average loss within each room band to the appropriate number of households in each band.

Capping local reference rents at the 4-bedroom rate

The DWP document shows that 69% of those renting 5 bedroom properties lose from this policy, and these households lose an average of £75 a week, equivalent to 29% of their weekly rent. We reduce housing benefit payments by 29% of rent for this group, and then scale the losses so to match the total amount saved (around £21 million a year).

Imposing maximum weekly caps on rents

We reduce housing benefit awards by the amount by which rents exceed these caps (£250 for a 1-bedroom property, £290 for a 2-bedroom property, £340 for a 3-bedroom property and £400 for a 4-bedroom property) and then scale the losses for each household so that the total saving (around £60 million a year) is correct.

Setting local reference rents at the 30th percentile of local rents

The DWP document shows that the proportion of households that lose from this policy reduces household size but the average loss increases. We randomly the assign the average loss for each room band to ensure that the number of losers in each room band is correct.

Reducing housing benefit for those of working age under-occupying social housing

We identify those in social housing who are of working age and under-occupying their current property and calculate the total housing benefit they receive. We reduce these households' housing benefit awards by the same percentage so that the total saving from the policy (£490 million in 2014–15) is correct.

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[34] http://www.dwp.gov.uk/docs/impacts-of-hb-proposals.pdf.

Reducing housing benefit awards by 10% for those who have been on JSA for 12 months or more

We identify individuals in the data who are calculated as being eligible for JSA and who say that they have been claiming for at least 12 months, and reduce their HB awards by 10%.

Indexing local reference rents with the CPI rather than local rents

Losers from this policy will be those who live in areas where rents increase faster than the CPI after 2013. Since there is no way of identifying these households, we simply reduce all housing benefit awards by the same percentage amount so that the total amount saved from the policy is correct (around £390 million in 2014–15).

Disability Living Allowance

The Budget policy costings document says that the effect of this reform will be to remove DLA from around 20% of claimants. We randomly remove entitlement to DLA from the appropriate number of claimants in order to match the long run saving from this policy (around £1.4 billion).

Tax credit reforms

There is no way to identify those who will be affected by changes to the way in-year awards are calculated so we simply reduce all tax credit awards by the same percentage amount so that the total amount saved from the policy is correct (around £1 billlion).

Appendix C: A more detailed look at the effect of reforms by income decile group and household type

Tables C.1–C.3 show the effect of all reforms, and the split between pre-announced and Budget measures, to be introduced between June 2010 and April 2014 by income quintile and family type as a percentage of net income.

Table C.1: The effect of all tax and benefit reforms to be introduced between June 2010 and April 2014 by income quintile and household type

Household type	Income quintile				
	Poorest	2	3	4	Richest
Single, not working	-7.2%	-6.5%	-8.1%	-6.7%	-2.2%
Single, working	-4.7%	-1.4%	-0.8%	-1.1%	-2.8%
Lone parent, not working	-6.3%	-7.2%	-7.6%	-6.6%	N/A
Lone parent, working	-3.8%	-3.8%	-3.6%	-4.1%	-4.4%
0-earner couple without children	-5.4%	-6.9%	-5.9%	N/A	N/A
0-earner couple with children	-8.6%	-8.6%	-10.1%	-5.9%	-1.4%
1-earner couple without children	-4.5%	-2.8%	-2.3%	-2.5%	-3.4%
1-earner couple with children	-4.5%	-4.7%	-5.4%	-4.7%	-3.8%
2-earner couple without children	-2.9%	-0.5%	-0.1%	-0.6%	-2.2%
2-earner couple with children	-3.7%	-3.2%	-3.3%	-3.0%	-3.5%
Single Pensioner	-2.4%	-2.2%	-2.9%	-3.4%	-3.6%
Couple Pensioner	-2.4%	-2.7%	-3.0%	-2.4%	-2.9%
Multi-family household, no children	-2.9%	-2.3%	-1.5%	-1.3%	-2.5%
Multi-family household, children	-4.2%	-2.9%	-2.7%	-2.4%	-3.0%

Notes: Income quintile groups are derived by dividing all households into 5 equal-sized groups according to income adjusted for household size using the McClements equivalence scale. Quintile group 1 contains the poorest fifth of the population, quintile group 2 the second poorest, and so on up to quintile group 5, which contains the richest fifth. Assumes increases in employer NICs are passed on to employees in the form of lower wages. Losses expressed as a percentage of net income. The sample size non-working lone parents and 0-earner couples with children in higher income quintiles is too small for results to be shown for these groups.
Sources: Authors' calculations using TAXBEN.

Table C.2: The effect of pre-announced tax and benefit reforms to be introduced between June 2010 and April 2014 by income quintile and household type

Household type	Income quintile				
	Poorest	*2*	*3*	*4*	*Richest*
Single, not working	-0.89%	-1.16%	-1.03%	-1.08%	-0.42%
Single, working	-0.17%	-0.60%	-0.97%	-1.23%	-1.96%
Lone parent, not working	-0.23%	-0.23%	-0.81%	-0.55%	N/A
Lone parent, working	-0.44%	-0.52%	-0.76%	-1.18%	-1.79%
0-earner couple without children	-0.95%	-0.96%	-0.94%	N/A	N/A
0-earner couple with children	-0.39%	-0.57%	-0.55%	-0.55%	-0.64%
1-earner couple without children	0.20%	-1.05%	-1.05%	-1.29%	-1.80%
1-earner couple with children	-0.51%	-0.81%	-1.41%	-1.96%	-2.36%
2-earner couple without children	-0.28%	-0.57%	-0.65%	-1.01%	-1.73%
2-earner couple with children	-0.57%	-0.66%	-1.04%	-1.41%	-2.41%
Single Pensioner	-1.05%	-0.83%	-0.91%	-0.83%	-2.46%
Couple Pensioner	-0.66%	-0.66%	-0.60%	-0.53%	-1.26%
Multi-family household, no children	-0.52%	-0.70%	-0.75%	-1.06%	-1.86%
Multi-family household, children	-0.54%	-0.61%	-0.88%	-1.29%	-1.87%

Notes: As for Table C.1.
Sources: As for Table C.1.

Table C.3: The effect of tax and benefit reforms announced in the June 2010 Budget to be introduced by April 2014 by income quintile and household type

Household type	Income quintile				
	Poorest	*2*	*3*	*4*	*Richest*
Single, not working	-6.27%	-5.34%	-7.08%	-5.62%	-1.74%
Single, working	-4.52%	-0.82%	0.16%	0.13%	-0.86%
Lone parent, not working	-6.06%	-6.94%	-6.84%	-6.09%	N/A
Lone parent, working	-3.37%	-3.24%	-2.85%	-2.91%	-2.57%
0-earner couple without children	-4.45%	-5.98%	-4.92%	N/A	N/A
0-earner couple with children	-8.18%	-7.98%	-9.52%	-5.38%	-0.77%
1-earner couple without children	-4.74%	-1.77%	-1.29%	-1.19%	-1.58%
1-earner couple with children	-4.00%	-3.87%	-4.04%	-2.70%	-1.41%
2-earner couple without children	-2.66%	0.04%	0.60%	0.41%	-0.48%
2-earner couple with children	-3.13%	-2.57%	-2.21%	-1.55%	-1.13%
Single Pensioner	-1.32%	-1.34%	-2.01%	-2.57%	-1.17%
Couple Pensioner	-1.78%	-2.07%	-2.40%	-1.92%	-1.63%
Multi-family household, no children	-2.38%	-1.56%	-0.79%	-0.27%	-0.59%
Multi-family household, children	-3.66%	-2.24%	-1.81%	-1.15%	-1.12%

Notes: As for Table C.1.
Sources: As for Table C.1.

Appendix D: Calculation of indices and 'substitution bias'

In this appendix, we will look at the reasons behind the difference in the way the Consumer Prices Index is calculated.

At each level of aggregation in the Retail Prices Index, average prices are calculated by taking the weighted arithmetic mean (AM) of the prices of different categories of goods.[35] In the Consumer Prices Index, by contrast, at the lowest level of aggregation a weighted geometric mean (GM) of prices is taken, though at subsequent, more aggregate stages a weighted AM is used as with the RPI.

A simple example will illustrate the effect of this on the measured rate of inflation. Imagine two indices of two goods, 1 and 2, one calculated with a weighted AM and one with a weighted GM. Suppose we want to compare how prices have change between period t=1 and period t=2.

Let the prices of these goods in period t be p_{1t} and p_{2t} and the weights for these goods be θ_{1t} and θ_{2t}. The weights represent the share of expenditure on each good and sum to 1 in each period. Assume the weights applied to calculate the price indices are the period 1 weights.

The AM measure of inflation is simply:

$$AM = \theta_{11}\left(\frac{p_{12}}{p_{11}}\right) + \theta_{21}\left(\frac{p_{22}}{p_{21}}\right)$$

whereas the GM measure of inflation is:

$$GM = \sqrt[2]{\left(\frac{p_{12}}{p_{11}}\right)^{\theta_{11}} \times \left(\frac{p_{22}}{p_{21}}\right)^{\theta_{21}}}$$

These two indices are not equivalent. In fact, the GM measure of inflation will always be less than or equal to the AM measure of inflation.[36]

Ideally, the index should measure changes in the 'cost of living': that is, how much more consumers need to spend in period 2 than they do in period 1 to attain the same level of welfare in both periods. The AM and GM indices achieve this only under very certain assumptions about consumer preferences and behaviour.

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[35] Technically speaking, one of two different averages is taken depending on the category of good, the "Average of Ratios" (AR) or "Ratio of Averages" (RA). For more on this see p. 12 of the CPI Technical Manual (http://www.statistics.gov.uk/downloads/theme_economy/CPI_Technical_manual-2010.pdf)

[36] A "ratio of averages" index can, under some circumstances, give a lower measure of inflation than the GM index. This means it is not necessarily true that if the RPI were calculated using a geometric mean it would give a lower measure of inflation, though in practice this is quite likely to be the case.

The AM index, which is the way the RPI is calculated, assumes that consumers do not adjust the ratio of the quantity of goods they buy if relative prices change. It is assumed that they could only achieve the same level of welfare in period 2 as in period 1 by purchasing at least as much of each good as before. This is clearly unrealistic. In the face of relative price changes, most consumers would be willing to substitute some goods for others, particularly for quite closely related items. If so, the impact of changing prices on consumer welfare is less than that implied by the AM index. Economists call this overestimation of the 'true' rate of inflation 'substitution bias'.[37]

With a GM index, the measured rate of inflation does reflect the fact that the consumer may substitute some goods for others - which explains why it will be lower than the AM index given the same price changes. However, consumers are assumed to respond in a very particular way: demand for a good is assumed to fall in the same proportion as the increase in price, leaving total expenditure on the good, and thus the share of the budget allocated to it, unchanged.

This implies a very large response to price changes on the part of consumers. Since the geometric mean is only applied at the lowest level of aggregation this may be appropriate, since the goods used at this stage are likely to be very close substitutes for one another (e.g. different brands of a particular product).

Because GM indices address substitution bias, albeit in an imperfect way, they are widely believed to give a better measure of the 'true' rate of inflation.

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[37] See Blow, L. and Crawford, I., 2001, *The Cost of Living with the RPI: Substitution Bias in the U.K Retail Prices Index,* The Economic Journal, Vol. 111, June.

Appendix E: Revisions since original publication

Section 5 of the briefing note has undergone substantial revisions since the initial publication of the briefing note. These changes do not affect our assessment of the Budget's progressivity/regressivity in sections 1–4.

These changes include:

1) the construction of a more accurate measure of Housing Benefit receipt in the Living Costs and Food Survey (LCFS) data (the definition used in the previous version, which was taken from the derived measure of benefit receipts in the LCFS, included only those entitled to maximum Housing Benefit whereas now we use the raw data to include those on partial benefit as well);

2) definitional changes to the list of benefits uprated currently by RPI or Rossi: we now exclude the Basic State Pension from our list of RPI-linked benefits, since this will be uprated not by the CPI but rather according to the Government's "triple lock", we include Statutory Adoption Pay, Statutory Paternity Pay and War Pensions among RPI-linked benefits, and we include Council Tax Benefit in our list of Rossi-linked benefits;

3) the inclusion of some households who do not report receiving Housing Benefit but who are likely to receive it as they report receiving Income-Based Jobseekers' Allowance, Income Support, and Income-Based Employment and Support Allowance among those insulated from rent which entitle recipients to maximum Housing Benefit (where they were not already included for meeting other criteria);

4) the use of reported receipt of Council Tax Benefit in the data to determine who is insulated from Council Tax rather than assuming that all those receiving means tested benefits are eligible (where household do not report receiving Council Tax Benefit but receive benefits that should entitle them to it we count them as insulated);

5) the inclusion of those households who do not report receiving Council Tax Benefit or Housing Benefit but receiving the Pension Credit in our definition of those insulated from changes in Council Tax, rent and mortgage interest costs; this is because those receiving the Guarantee Credit of the Pension Credit should be entitled to maximum Housing Benefit, Council Tax Benefit and for some of the mortgage interest payments to be paid through the Pension Credit;

6) the correction of a coding error that meant that those who owned their homes were not considered to be insulated from changes in rent;

7) the presentation of results under the assumption that all those who receive means tested benefits are insulated from changes in mortgage interest costs as well as under our original assumption that none were eligible for this relief;

8) consideration of the impact of a change introduced in the June 2010 Budget to the way Local Housing Allowance (LHA) rates will be set that reduces the number of those on means tested benefits who are insulated from rental costs.

Here, for comparison with the revised results, we reproduce Table 5.2 from the original version of the briefing note. The primary differences with the tables presented above are that 1) the numbers of those insulated from changes in rent in all groups is higher. This does not alter our conclusions since the CPI includes rent and the proportion of households receiving Rossi-linked benefits who are rent insulated is still high relative to the general population 2) The numbers receiving Rossi-linked benefits are much higher owing to the inclusion of Council Tax Benefit as a Rossi-linked benefit and the inclusion of households receiving partial Housing Benefit as well as those entitled to maximum Housing Benefit. 3) The numbers of those receiving RPI-linked benefits is lower since we now exclude the Basic State Pension from our list of RPI-linked benefits (though we now include some smaller benefits such as Statutory Paternity Pay, Statutory Adoption Pay and War Pensions in this list). 4) The number of all benefit recipients who are considered insulated from mortgage interest and Council Tax is now much higher owing to the fact that a greater proportion of benefit recipients are now considered to be receiving Rossi-linked benefits and because we now treat those receiving Pension Credit as being insulated from changes in mortgage interest and Council Tax costs.

Table E.1 Proportions of benefit Recipients Insulated from mortgage interest payments, Council Tax and rent (original version of table 5.2)

Proportion	RPI-linked benefits only	Rossi-linked benefits only	All benefit recipients	No benefits
Insulated from MIPs and CT	8.8% (3,043)	85.3% (172)	23.1% (3,682)	4% (1,587)
Insulated from Rent increases	15.8% (3,043)	56.3% (172)	24.5% (3,682)	7.1% (1,587)

Note: Sample sizes in brackets.
Source: Author's own calculations using LCFS data.

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