HM Treasury

Impact on households:

distributional analysis to accompany Autumn Statement 2014

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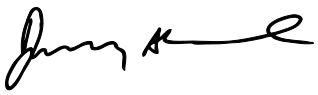
Foreword

Since the coalition government came into office in May 2010, we have placed fairness at the heart of our strategy to restore the public finances. We made a commitment that those with the broadest shoulders would bear the greatest burden in reducing the deficit, while the most vulnerable in our society would be protected. To ensure that the public could hold us to account, we made a decision at the start of the Parliament to be more transparent than ever before about the implications of the government's policies for households. Therefore, since 2010, the government has published distributional analysis of this government's tax, welfare, and public spending decisions at every fiscal event, as we do again here today.

This analysis represents the most complete, rigorous, and detailed record of the impact of this government's policies on households. Unlike other analyses, it looks not only at the effect of tax and welfare decisions, but also the effects of changes to the vital public services on which so many rely. By taking this broader approach, we are able to consider the range of ways we provide support to the poorest and most vulnerable families. It considers the government's policies across this parliament, from taxes to necessary savings on welfare or the above inflation increases to the state pension, to our measures to reduce tax avoidance, and the protections to the NHS and schools spending

The analysis is clear: we have once again met our commitment to reduce the deficit in a fair way. The richest households have made the largest contribution to reducing the deficit: a fact that is as true at Autumn Statement 2014 as it was when the government first published this analysis, at the beginning of the Parliament. In fact, by 2015-16, the net cash contribution to reducing the deficit of the richest 20% will be larger than the net contribution of the remaining 80% put together. Those on lower incomes have been helped by our decision to increase the tax-free personal allowance from £6,475 in 2010 to £10,000 now, with a further rise to £10,600 announced in Autumn Statement 2014. And they have benefitted from policies such as the pupil premium, which provides extra funding to schools to help raise the attainment of disadvantaged students, from the extension of free childcare, and from the triple lock on the basic state pension.

Fairness is at the heart of our approach to reducing the deficit. The analysis in this document shows how that commitment to fairness is not a matter of rhetoric: it is reflected in the policy choices we have made.



George Osborne MP

Chancellor of the Exchequer

Danny Alexander MP

Chief Secretary to the Treasury

1 Introduction

1.1 The government has published regular distributional analysis of the impact on households of its reforms to tax, welfare, and public service spending. This document updates the distributional analysis that was published at Budget 2014. It analyses the effects of the government's policies on a cumulative basis, which means that it includes measures from all fiscal events since June Budget 2010, up to and including Autumn Statement 2014. It also includes changes that were announced before June Budget 2010 that have been implemented by this government.

1.2 As at Budget 2014, this analysis is being published online as a supplementary document to Autumn Statement 2014.

Measuring distributional impacts

1.3 The government uses a wide range of modelling tools and data to assess the impact of individual measures on households. Considering the impact of these measures on a combined basis presents a trade-off between how accurately a single source of analysis can show the cumulative impact of policy changes and how complete a picture it can provide. This document recognises this trade-off by presenting two levels of analysis:

- decile analysis of changes to taxes and welfare that carry a quantifiable cash impact on household income or expenditure
- quintile analysis, that offers more comprehensive, but less precise, analysis of changes to public service spending, taxes, and welfare that directly affect households. The quintile analysis includes estimates of the impact of benefits in kind from public service spending, and therefore does not translate to a direct cash impact on households

1.4 The decile analysis in Chapter 2 is presented on the basis of both household income and household expenditure. Grouping households by their income is recognised as the standard approach to distributional analysis, as income provides a good indication of households' standard of living, but can be complemented by also grouping households according to their expenditure. Analysis on an expenditure basis is useful as some households lower down the income distribution have low incomes only temporarily, for example those containing students, self-employed or unemployed individuals. During periods of temporary low income such households may maintain their standard of living by funding their expenditure from savings or borrowing, thereby smoothing their lifetime consumption. In the context of distributional analysis, a low-income household's expenditure may therefore be a better indicator of its standard of living.[1]

1.5 To create deciles, households are ordered by their net income, or alternatively their expenditure, and then divided into 10 equally sized groups. The first decile contains the poorest (or lowest spending) tenth of households while the top decile contains the richest (or highest spending) tenth. Analysis by income quintiles is on the same basis but divides households into 5 rather than 10 groups.

[1] For example, see 'Least well-off in society better identified by low spending than low income,' (Institute for Fiscal Studies Press Release, March 2011) which states that "[t]hose with the lowest reported income are not those with the lowest spending or those living in the most severe forms of deprivation."

1.6 In both approaches, a standard process called equivalisation is used to ensure that households of different sizes are compared on a consistent basis. The effects of changes on these groups are presented in both cash and percentage terms.

1.7 To model changes in welfare spending, direct taxes and indirect taxes on a consistent basis, and to present analysis on the basis of household expenditure, this analysis uses the Living Costs and Food Survey (LCF) produced by the Office for National Statistics. The LCF is a cross-sectional survey which takes a snapshot of households' incomes and expenditure at a moment in time. The analysis in this document captures the incomplete take-up of benefits, meaning that increases and reductions to welfare are only shown to be passed on to those households that are in receipt of these benefits.

1.8 Explanations of the data sources, methodologies and equivalisation process used to produce this analysis can be found in Chapter 3 of this document. Chapter 3 also sets out the average gross income within each decile.

1.9 This analysis captures around 90% of all changes to taxes and welfare made by this government. Tax and welfare measures are excluded from the analysis where there is insufficient data to reasonably estimate the distributional impacts through microsimulation modelling, and where the cost or saving to the Exchequer is less than £300 million in 2015-16. Operational measures, such as additional funding to reduce fraud and error, do not affect an individual's entitlement to welfare receipt, and are excluded from this analysis. The analysis of changes to public service spending captures the impact of changes to the frontline public services from which households benefit, but does not cover capital investment, public goods or administration costs.

1.10 Although changes to regulation can often affect household incomes, they have more complex effects on the public finances and are therefore out of scope for this analysis. Therefore, the distributional analysis presented here shows the impact of changes in government fiscal policy with a direct impact on tax or public spending, but not of all government decisions. Presenting only the impact of changes to tax and government spending allows the fairness of changes to tax and spending policy to be assessed independently of changes to regulatory measures and the wider economy.

Methodological developments

1.11 HM Treasury continues to update and develop its distributional analysis to allow for a more accurate and complete estimate of the distributional impact of the government's decisions across households.

1.12 HM Treasury has developed a new microsimulation model to estimate the distributional impact of the benefits in kind provided by spending on public services, which is used for the first time this Autumn Statement. A microsimulation-based approach allows for the beneficiaries of public spending to be identified at the level of the individual household. Charts 2.B, 2.H and 2.I are based on this new approach, which integrates the modelling of public services into the analysis alongside the modelling of the tax and welfare system. The new methodology is described in more detail in Box 1.A.

1.13 In addition, the analysis is now able to capture the distributional impacts of Stamp Duty Land Tax (SDLT) paid on household main residence purchases. Due to data limitations, SDLT paid on second homes, and other non-main residence property transactions, is not included in this analysis.

1.14 As at previous fiscal events the analysis has been updated to incorporate the latest round of Office for Budget Responsibility (OBR) economic assumptions. The revisions to national accounts, including the updates to reflect the European System of Accounts 2010 (ESA10) have

affected the OBR's assumptions for the entire modelling period, 2010-11 to 2015-16. Further detail on this is set out in Box 1.A in the main Autumn Statement document.

Box 1.A: Estimating the distributional impact of public spending

Whilst distributional analysis of the impacts of tax and welfare policy has a long history, distributional analysis of the benefits in kind to households through public service spending is a relatively new development. Since the Impact on Households publication that accompanied Spending Review 2010, the government has included analysis of the distributional impacts of changes to public spending alongside analysis of changes to tax and welfare policy. At this Autumn Statement, a significant improvement has been made to the methodology. For the first time, public services have been analysed in HM Treasury's microsimulation model, which was previously only used for tax and welfare analysis. This makes the analysis underpinning the charts more consistent and accurate.

To estimate the distributional impact of public spending, it is first necessary to understand who is likely to use a public service. For some types of public services, such as schools, the households using the service can be identified directly in the data used in HM Treasury's model. However, this data does not contain information on all public services. This makes the analysis more complicated, requiring separate data to first identify how likely households are to use the service depending on their characteristics and circumstances before applying this information in HM Treasury's model.

From this, total spending on the public service is allocated in proportion to the likelihood of use of the service. For example, if the modelling predicts that households containing older adults are more likely to visit a GP, then the distribution of expenditure on GP services will be skewed towards this group. It is the cash amount of the benefit in kind provided that is allocated to households. This analysis is carried out both for spending in 2015-16 (expressed in 2010-11 prices) and for spending in 2010-11. The results are then compared to understand how changes in spending impacts on individual households.

This innovation marks a significant improvement in understanding who benefits from spending on public services. Instead of analysing each public service separately, using a wide range of models, the analysis is brought together in HM Treasury's microsimulation model with standardised definitions of income, improving coherence and consistency across all HM Treasury's distributional analysis.

To use the relationship between service use and household characteristics and circumstances there must be comparable measures of this information in the data used to identify service use and HM Treasury's model. For example, in order to use age as an important factor in explaining the use of GP services, then there must be a comparable measure of age in the two datasets. The quality of the distributional analysis will depend on the availability and quality of such factors used for linking. While the modelling has been validated to ensure it is as robust as possible, the quality of factors used for linking varies by spending area. As new datasets are made available by the ONS and other organisations, HM Treasury will seek to use this data to further improve the modelling over time.

Further technical information on the new approach can be found in Chapter 3 at the end of this document.

The counterfactual

1.15 To analyse the effect of the government's measures, assumptions have to be made about what would have happened in their absence. These assumptions are known as 'the counterfactual'. In this document, the effects of the government's measures are assessed against a counterfactual assumption that the previous government's policies would have continued into the future without any further fiscal consolidation. This includes the indexation of tax thresholds, tax credits, the state pension and other welfare spending.

1.16 In line with this approach, analysis presented in this document shows the impact on households of the government's uprating policy for tax and welfare, compared to the uprating policy of the previous government. In many cases the previous government's policy was to link benefit rates and tax thresholds to the Retail Prices Index (RPI). However, the UK Statistics Authority announced in March 2013 that the formula used to produce the RPI does not meet international standards and as such it will no longer be designated a National Statistic.[2] In the absence of knowing how the previous government would have responded to this announcement it is assumed the RPI would have continued to be used, which has implications for the modelled household impacts in this analysis.

Chart 1.A: Cumulative changes in RPI, RPIJ, and CPI measures of inflation between September 2009 and September 2014

Source: Office for National Statistics

1.17 Chart 1.A illustrates the cumulative changes in the RPI, Consumer Prices Index (CPI) and new RPIJ index between September 2009 and September 2014.[3] RPIJ is an improved variant of the RPI calculated using formulae that meet international standards. The chart shows that, at

[2] See 'Assessment Report 246 – The Retail Prices Index', UK Statistics Authority, March 2013

[3] The September 2009 RPI index was used to uprate many benefit rates and tax thresholds, where these rates would have increased in April 2010. At the June Budget 2010, the government took the decision to increase benefits in line with CPI, rather than RPI, meaning that the CPI index from September 2010 was used to increase benefit rates in April 2011. Therefore, this chart shows cumulative changes in these inflation indices since September 2009, as that was the last data point used by the previous government in uprating policy.

September 2014, the RPI was 3.2% higher than RPIJ and 3.9% higher than the CPI. This means that the impact of the government's changes to welfare uprating policy appear bigger in this analysis than it would had the RPI been calculated in line with the new ONS methodology.

1.18 The UK Statistics Authority has launched a review of the changes needed to the range of consumer price statistics produced for the UK to best meet current and future user needs.[4] This is due to report in January 2015 and so this issue will be kept under review for future publications.

1.19 Government debt would have been higher if the government had not taken action to control the unsustainable deficit that it inherited. The analysis in this document does not show what the consequences for households would have been had the government not taken action to reduce the structural deficit. To meet the costs of higher debt these consequences could have included higher future taxes, lower spending on public services or welfare, or a combination of all three.

[4] See 'Review of Range of Prices Statistics Terms of Reference', UK Statistics Authority, May 2013

2 Impact on households

Wider economy

2.1 The analysis in this chapter (Charts 2.B to 2.I) focuses on the impact of government tax and spending policy across the distribution of household income or expenditure. It uses income and expenditure – but not the stock of wealth – to represent the relative standard of living of the household. In addition, this analysis does not consider changes in the wider economy that have also affected household incomes. It is therefore important to consider these tax and spending decisions within the wider economic context, and to do this Chart 2.A shows how household incomes before benefits and taxes have been impacted by inflation and earnings growth between 2007-08 and 2012-13.[1] Economic data after 2012-13 is not currently available by decile, but this earlier story of real household incomes provides the backdrop for the government's tax and spending decisions presented in the rest of this document.

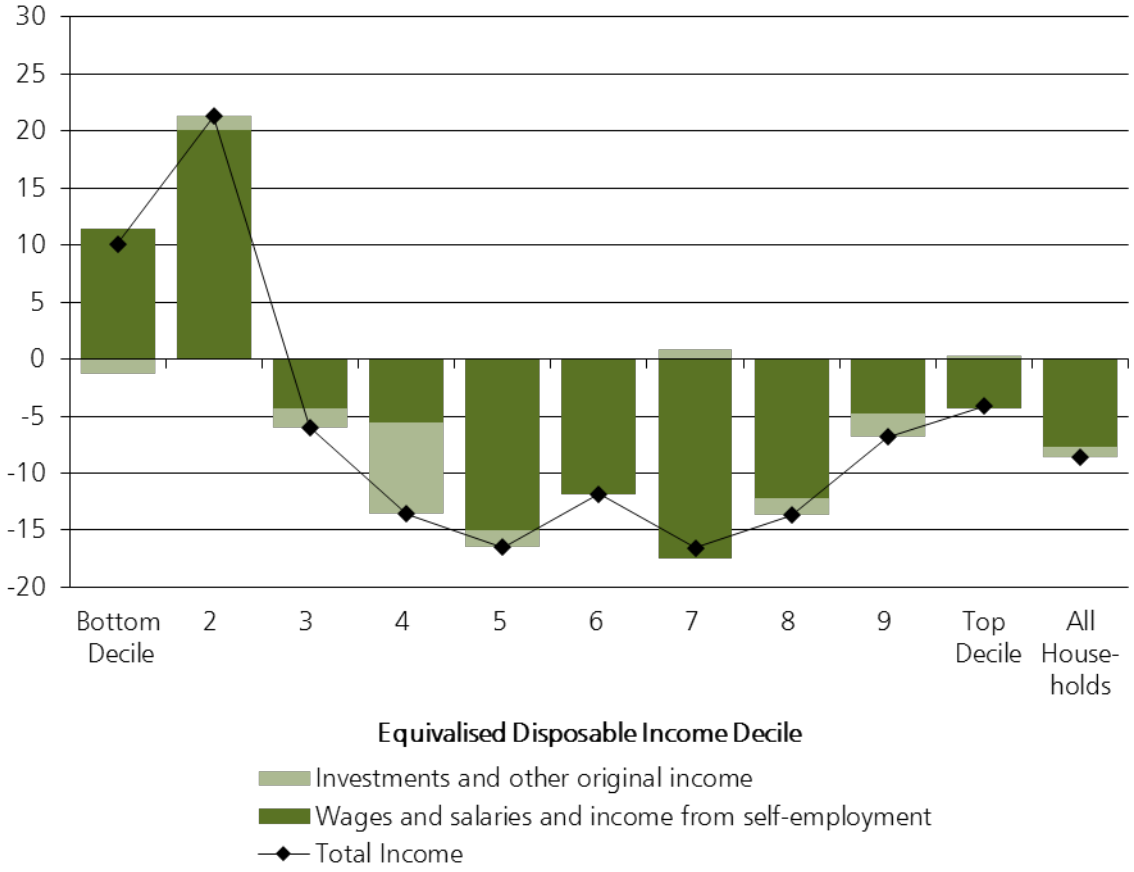
2.2 The data source used to produce Chart 2.A is different from those used elsewhere in this document. For this reason, the population within each decile group will not be identical to the population in the corresponding decile in the other charts in this document.

2.3 Chart 2.A shows that:

- on average, households in the middle of the income distribution saw the largest reductions in real original income between 2007-08 and 2012-13
- on average, households in the bottom two deciles saw their incomes protected against the effects of inflation

[1] In line with Office for National Statistics analysis, figures in this chart are adjusted using the implied household deflator for all deciles to adjust to real terms. Government policy may sometimes affect original household incomes, such as pay for public sector workers, individuals paid at the National Minimum Wage, or the regulation of private pensions.

Chart 2.A: Contributions to real-term changes in original income before benefits and taxes, 2007-08 to 2012-13, as a percentage of 2007-08 original income[2]



Source: Office for National Statistics, The Effects of Taxes and Benefits on Household Income, 2007-08 to 2012-13

Overall level of tax, welfare, and public service spending

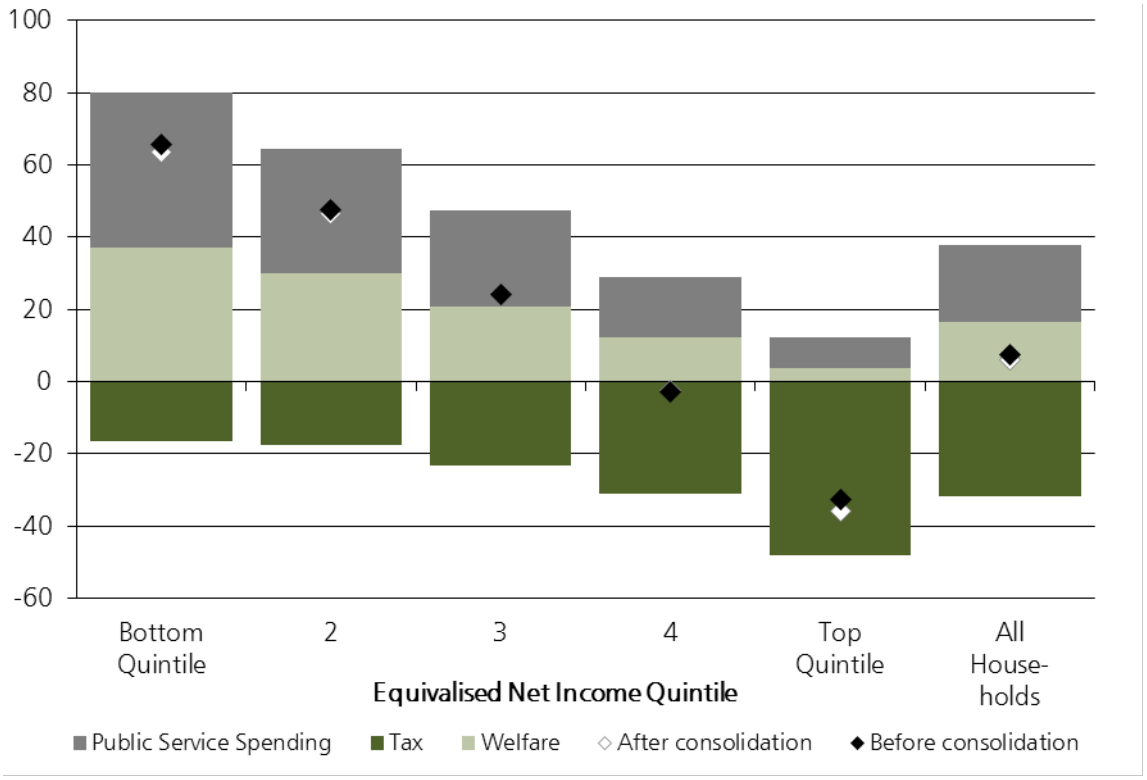
2.4 To illustrate how the effects of government intervention and redistribution differ across the income distribution, Chart 2.B shows the overall level of households' receipt of welfare and public service spending, after tax, before and after the government's changes to tax, welfare and public service spending. For the first time, public service spending has been modelled alongside tax and welfare in the integrated microsimulation model. The chart shows that:

- on average, the 20% of households with the lowest income receive almost five times as much support from public spending as they contribute in tax
- before consolidation, the 20% of households with the highest income contributed three and a half times as much in tax as they received from public spending – this has now increased to almost four times as much
- on average, only the 20% of households with the highest income contribute significantly more to the state than they consume in public spending

[2] Original income is comprised of: wages and salaries, income from self-employment, income from investments and savings, income from private pensions and annuities, and imputed private income from benefits in kind, such as company cars and subsidised meals.

- the profile across the quintiles at this stage of consolidation remains similar to the profile before consolidation

Chart 2.B: Overall level of welfare and public service spending receipt, after tax, of households in 2015-16 as a percentage of 2010-11 net income (including households' benefits in kind from public services), before and after consolidation



Source: HM Treasury modelling

Distributional impact on households of tax, welfare and public service spending changes

Decile analysis of modelled tax and welfare changes

2.5 This section presents detailed distributional analysis of those changes to the tax and welfare system that are possible to model in detail at a household level within HM Treasury's tax and benefit microsimulation model. These charts do not include the distributional impact of changes to public service spending: these are presented in the quintile analysis in Charts 2.H and 2.I. The decile analysis captures the direct cash impact of tax and welfare decisions. Analysis is presented by both income and expenditure decile. The average gross income for each income decile is set out in Chapter 3.

2.6 This analysis is all presented for the year 2015-16. The distributional impacts shown in Charts 2.C to 2.F are driven mainly by the impacts on households in 2015-16 of policy changes made since 2010, including those announced at Autumn Statement 2014. Basing the analysis in 2015-16 allows for the cumulative impact of this government's changes to tax and welfare and public spending policy to be assessed.

2.7 The Autumn Statement measures captured in the decile charts include:

- Stamp duty land tax reform: new marginal rate system

- Personal Allowance: increase to £10,600 in 2015-16 with full gains to higher rate taxpayers
- Pension credit passthrough

2.8 However, these charts are not directly comparable to their equivalents at Budget 2014, in part due to being presented for a later year, but also due to the methodological developments outlined in paragraphs 1.11 and 1.12. As such, comparing these charts with those in previous publications would not show the impact of Autumn Statement decisions alone.

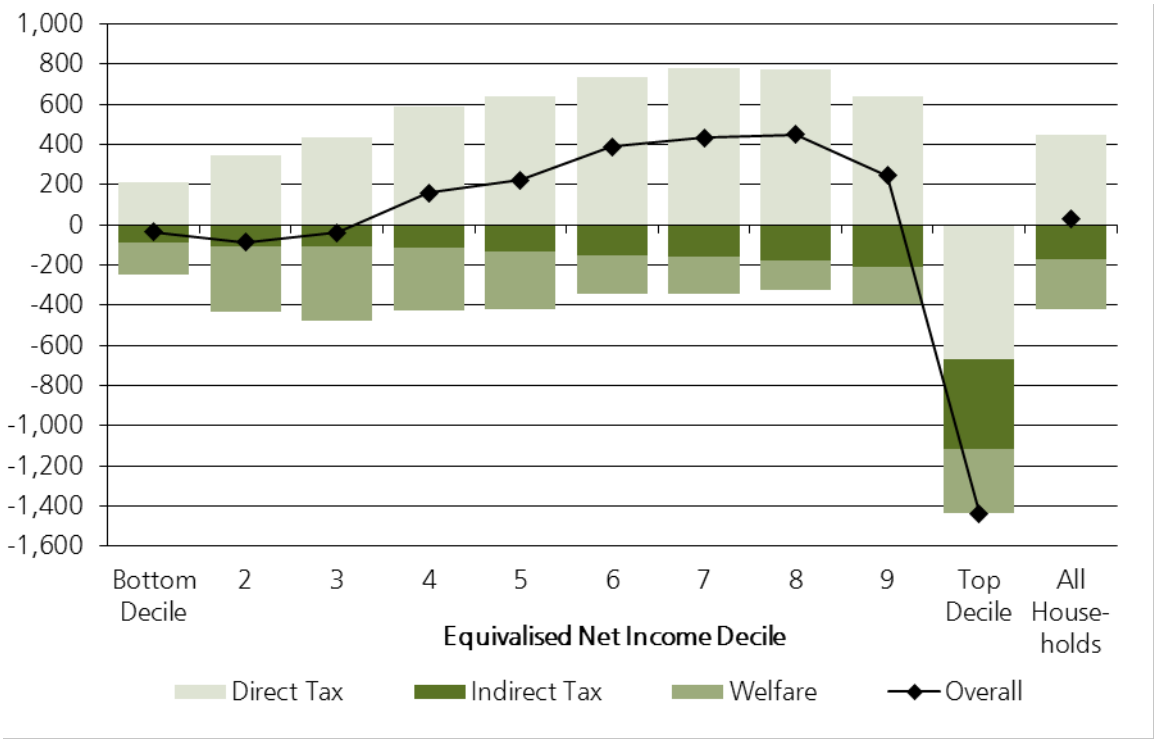
Impact analysis by income distribution

2.9 Charts 2.C and 2.D show the impact of modelled tax and welfare changes since June Budget 2010, including measures announced at Autumn Statement 2014, across the income distribution. Chart 2.C shows the impact in cash terms and Chart 2.D shows it as a percentage of household net equivalised income. The net impact for each decile is given by the black line, and the bars show how this net impact is composed of changes to direct tax, indirect tax, and welfare separately.

2.10 The charts show that, as has been the case throughout this parliament, households in the top income decile make the greatest contribution towards reducing the deficit, both in cash terms and as a percentage of their income.

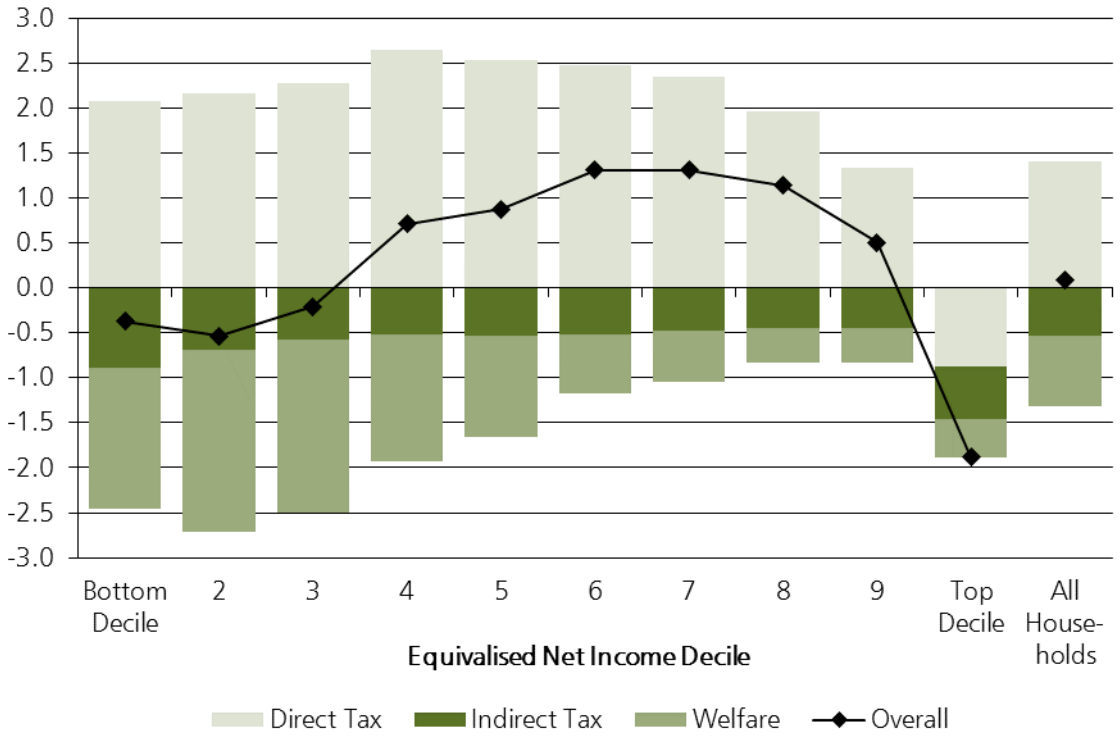
2.11 The charts also show that, when tax and welfare measures are considered together, the average benefit to households is close to zero. However, as Charts 2.H and 2.I show, it is also important to consider the impact of wider public spending when assessing the impact of government policy on households.

Chart 2.C: Cumulative impact of modelled tax and welfare changes on households in 2015-16 in cash terms (£ per year), in 2015-16 prices, by income decile



Source: HM Treasury microsimulation model

Chart 2.D: Cumulative impact of modelled tax and welfare changes on households in 2015-16 as a percentage of 2015-16 net income, by income decile



Source: HM Treasury microsimulation model

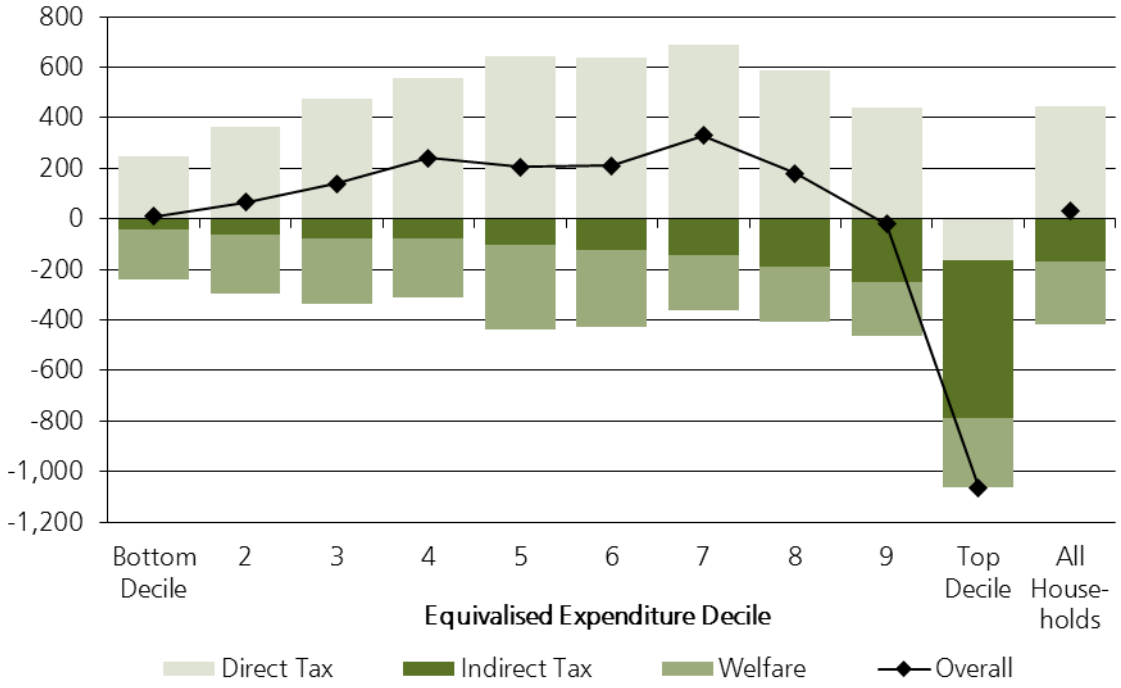
Impact analysis by expenditure distribution

2.12 Charts 2.E and 2.F show the impact of modelled tax and welfare changes since June Budget 2010, including measures announced at Autumn Statement 2014, across the expenditure distribution. The net impact for each decile is given by the black line and the bars show how this net impact is composed of changes to tax and welfare separately.

2.13 Grouping households according to their expenditure can be a useful complement to grouping households by their income. Analysis on an expenditure basis is useful as some households lower down the income distribution have low incomes only temporarily, for example those containing students, self-employed or unemployed individuals. During periods of temporarily low income such households may maintain their standard of living by funding their expenditure from savings or borrowing, thereby smoothing their lifetime consumption. For distributional analysis, a low income household's expenditure may therefore be a better indicator of its standard of living.

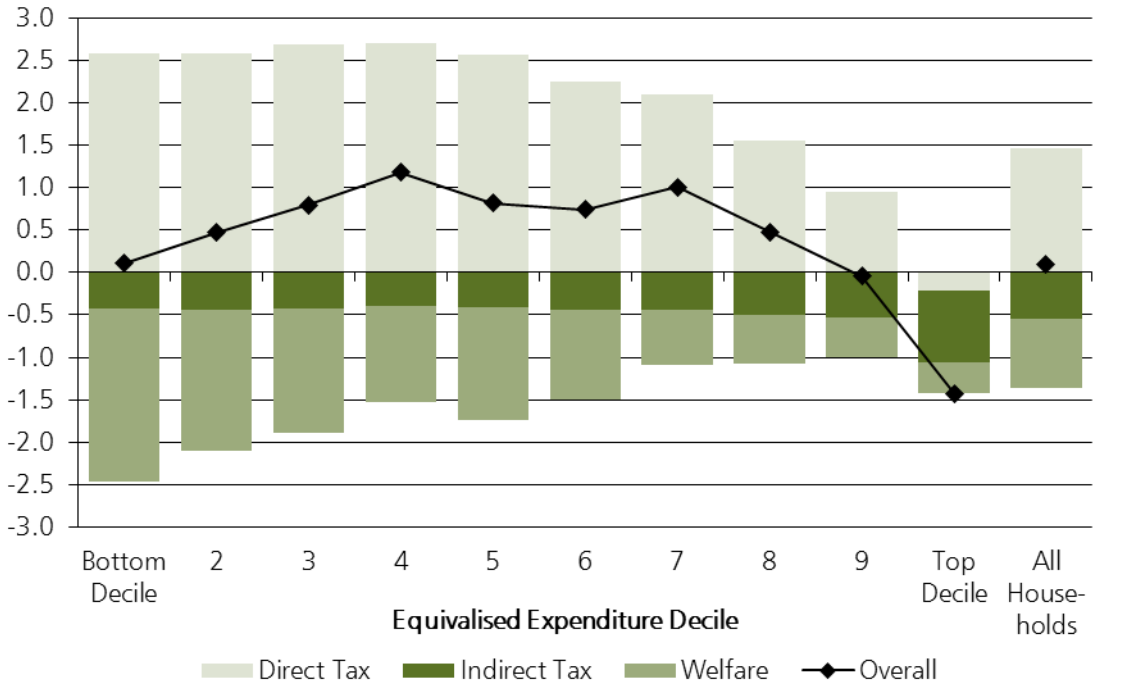
2.14 Chart 2.E shows the impact in cash terms, and Chart 2.F shows it as a percentage of equivalised household expenditure. The charts show that, as seen since the start of this parliament, households in the top expenditure decile make the greatest contribution towards reducing the deficit, both in cash terms and as a percentage of their expenditure.

Chart 2.E: Cumulative impact of modelled tax and welfare changes on households in 2015-16 in cash terms (£ per year), in 2015-16 prices, by expenditure decile



Source: HM Treasury microsimulation model

Chart 2.F: Cumulative impact of modelled tax and welfare changes on households in 2015-16 as a percentage of 2015-16 expenditure, by expenditure decile



Source: HM Treasury microsimulation model

Universal Credit

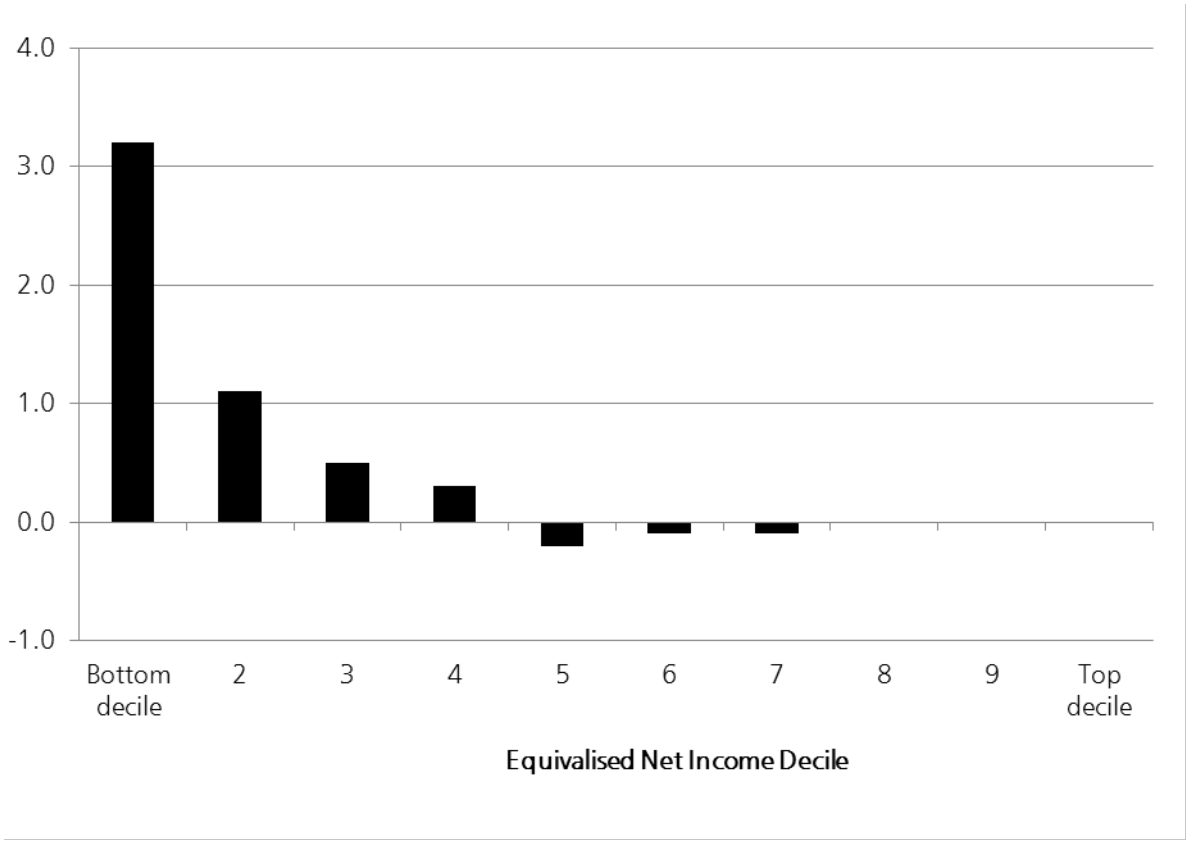
2.15 As at Budget 2014, the impact of Universal Credit is not included in the decile analysis above. Universal Credit will be phased in over a number of years to simplify the means-tested benefit and tax credit system, improve work incentives, and ensure that is always pays to work. It will be available to claimants who are both in and out of work, and will include additional elements to support costs in respect of housing, disability, and children.

2.16 Given the methodological complexities of modelling the period of transition from the existing system, the analysis in Charts 2.C to 2.F does not include any of the impacts of Universal Credit. The distributional impacts of the transition from the legacy system to Universal Credit are instead captured in the broader quintile analysis, where it is possible to make carefully considered assumptions about where the impacts of Universal Credit will fall. In addition, the impact of a fully rolled out 'steady state' Universal Credit has been modelled in the year 2014-15. This is shown in Chart 2.G.

2.17 Like other analysis in this document, Chart 2.G assumes incomplete take-up of income-related benefits and tax credits. The modelled impact therefore includes the effect of higher take-up of claimants' entitlements expected under Universal Credit, due to its relative simplicity and integrated nature. Details of the modelling approach are laid out in Chapter 3 of this document.

2.18 The chart shows that most Universal Credit gains accrue to low income households. Those with the lowest incomes benefit the most on average while relatively higher income households see, on average, either no change or a reduction in their net income. Transitional protection is in place so there will be no cash losers at the point someone moves onto Universal Credit where their circumstances remain the same.

Chart 2.G: Average impact of Universal Credit in 'steady state' by income decile (modelled in 2014-15), as a percentage of 2014-15 net income, by income decile, Great Britain



Source: Department for Work and Pensions Policy Simulation Model. This reflects key entitlement changes and expected increases in take-up, but excludes anticipated reductions in the levels of fraud, error and overpayments.

Quintile analysis of modelled tax, welfare, and public service spending changes

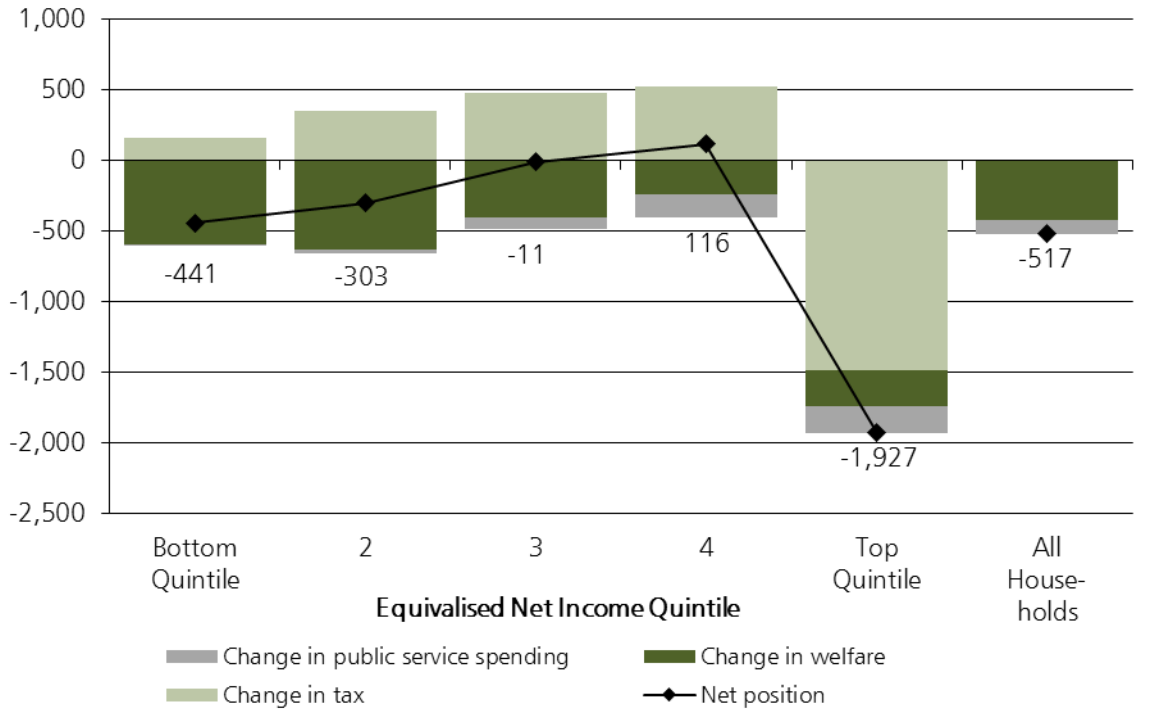
2.19 Charts 2.H and 2.I show the combined impact on households of changes to public service spending, tax and welfare since June Budget 2010, including measures announced at Autumn Statement 2014. Unlike Charts 2.C to 2.F, this chart includes the benefits in kind provided by public service spending, and therefore the figures presented in the quintile analysis do not translate to direct cash transfers to households. Chart 2.H shows the impact in cash terms and Chart 2.I shows it as a percentage of household net equivalised income, including benefits in kind from public services. The net impact for each quintile is given by the black line, and the bars show how this net impact is composed of changes tax, welfare, and public service spending separately.

2.20 This analysis is broader than the decile analysis presented in Charts 2.C to 2.F. It includes benefits in kind from public services, such as health and education, and it therefore provides the fullest assessment of the effects of all government interventions that have a direct impact on households. It also includes tax and welfare measures where the cost of saving to the Exchequer is above £300 million and which, due to data limitations, cannot be attributed to individual households but where the aggregate impact can be attributed across each income quintile.

2.21 For the first time, public services have been modelled alongside tax and welfare in HM Treasury's integrated microsimulation model. This modelling improvement makes the analysis of public services consistent with the tax and welfare analysis and increases the accuracy of the results. Box 1.A describes the new approach in more detail.

2.22 The new approach to modelling public services has had an impact on Charts 2.H and 2.I. For example, by microsimulating household incomes through the new modelling of public service spending, households using a certain public service may tend to have higher incomes than previously modelled. This means changes in public service spending have a smaller impact on the bottom quintile and a larger impact elsewhere in the income distribution. Moreover, in the new model the sum of incomes and benefits in kind are lower on average for the bottom quintile and higher for the other quintiles. This makes changes in tax, welfare and public service spending, when expressed as a proportion of the mean income and benefits in kind from public services (as in Chart 2.I), appear larger for the bottom quintile but smaller in other income quintiles than in previous modelled estimates.

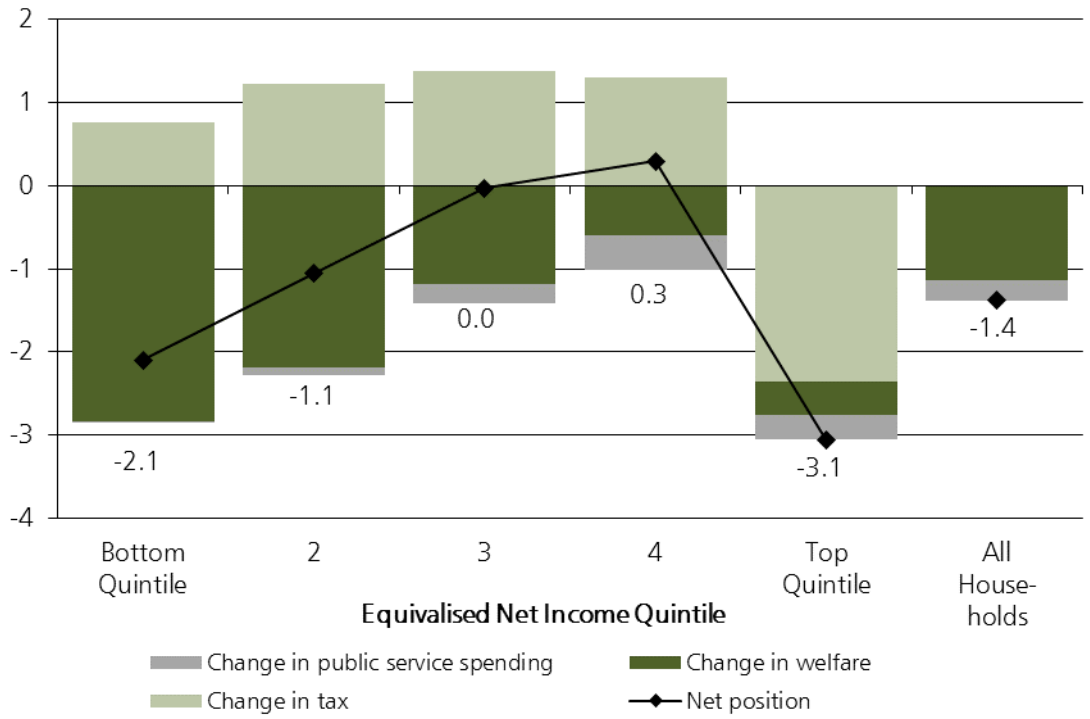
Chart 2.H: Cumulative overall impact of public service spending, tax, and welfare changes on households in 2015-16 in cash terms (£ per year), in 2010-11 prices, by income distribution[3]



Source: HM Treasury modelling

[3] The impact of public service spending measures in the bottom income quintile, and the impact of tax measures overall, are close to zero, and have little net effect on Charts 2.H and 2.I. In these cases, whilst certain measures have positive and negative effects on household incomes, the cumulative effect of these measures are close to zero on average.

Chart 2.I: Cumulative overall impact of public service spending, tax and welfare changes on households in 2015-16 as a percentage of 2010-11 net income (including households' benefits in kind from public services), by income distribution



Source: HM Treasury modelling

2.23 Charts 2.H and 2.I show that, as at previous fiscal events, households in the top quintile make the greatest contribution towards reducing the deficit, both in cash terms and as a percentage of their income and benefits in kind from public services. They also make the biggest contribution overall to funding public spending as shown in Chart 2.B. The figures in Chart 2.H bring together the impact of changes to tax and benefits with the changes to public service spending as benefits in kind to households.

2.24 The distributional impacts shown in the charts are driven mainly by policy changes made since June Budget 2010, including those announced at Autumn Statement 2014. In addition to those in the decile charts above, the Autumn Statement measures captured in the quintile charts include:

- Additional spending on the NHS, including on mental health services
- Additional spending on Adult Community Learning
- Three measures funded through the Department for Education: a pilot to trial a new approach to ensure that the most effective early intervention actions are taken during a child's very youngest years to prevent avoidable problems later, careers service for 12 to 18 year olds, and help for the best academy chains to expand
- The extension of the freeze on regulated fare rises (at RPI + 0%) for a further year
- Universal Credit: updated delivery schedule
- Personal Independence Payment: updated delivery schedule

2.25 In order to be as comprehensive as possible, this analysis makes some carefully considered assumptions where there is limited data on the effects of measures. This applies to large tax and welfare measures, with a scorecard impact of more than £300 million in 2015-16 and which directly affect households, but where the precise impact on individual households cannot be microsimulated. For these measures the Exchequer impact is apportioned by quintile, where it is possible to make reasonable assumptions about how households in different quintiles will be affected. Those tax and AME measures which cannot be microsimulated and have a scorecard impact of less than £300 million in 2015-16 are not included in the analysis.

2.26 This approach allows for the broad impact throughout the income distribution to be demonstrated, but does not allow for the more precise assessment of the effects of the government's policies that is shown in Charts 2.C to 2.F.

2.27 As in all publications since Spending Round 2013, the quintile analysis is presented for the year 2015-16, as the Spending Round set departmental budgets for 2015-16, building on the programme of reforms which this government began in 2010. It is presented in 2010-11 prices for consistency with each HM Treasury distributional analysis publication since 2010.

2.28 Charts 2.H and 2.I are not directly comparable to their equivalents at Budget 2014, due to the methodological developments outlined in paragraphs 1.11 and 1.12. As such, comparisons do not show the impact of Autumn Statement 2014 decisions alone. In addition, the impact of the revisions to national accounts through the OBR's economic assumptions is to reduce the modelled impact of public spending changes on households in every quintile.

3 Data sources and methodology

3.1 In line with the government's commitment to transparency, the tables below explain in detail the data source and methodology used to produce each of the charts presented in this document. All figures in this document are calculated as economic estimates, including the effects of assumptions and results from economic analyses that have a material impact. They are therefore outside the domain of official statistics.

Table 3.A: Data sources and methodology

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Paragraph 1.6 (Equivalisation methodology)	Equivalisation is a process that adjusts a household's net income to take into account the size and composition of the household. This reflects the fact that larger households will require a higher net income to achieve the same economic well-being and standard of living as a household with fewer members. Net incomes are adjusted in comparison to a couple with no children, whose equivalised income is normalised at the same level as their unequivalised income. To calculate the net equivalised income for a household, each person is given a factor based on the position in the household relative to the head of the household and their age. The equivalence factors used in the analysis are the modified OECD factors (as used in the Department for Work and Pension's Households Below Average Income publication). These factors are shown in the table below. Each household is given an overall factor by adding the factors for each person. The net income for the household is then divided by this factor to produce the net equivalised income figure for this household. Equivalisation factors: Single or cohabiting head of household 0.67 Partner/spouse 0.33 Other second adult 0.33 Third adult 0.33 Subsequent adults 0.33 Child aged under 14 years 0.20 Child aged 14 years and over 0.33 For example, a household with a combined net income of £25,000 containing a couple and two children aged 7 and 15 years old will have a net equivalised income of around £16,340. This is calculated as follows: Factor: 0.67+0.33+0.20+0.33 = 1.53 Net equivalised income: £25,000 / 1.53 = £16,340
Chart 1.A	Source: Office for National Statistics. Data available online at: www.ons.gov.uk
Chart 2.A	Source: Office for National Statistics, The Effects of Taxes and Benefits on Household Income (2007-08 to 2012-13).
Chart 2.C, 2.D, 2.E and 2.F (Decile charts)	Charts are on a United Kingdom basis, and cover the tax and welfare system in the UK. Where tax or welfare policy is devolved – such as where council tax is

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	devolved – the current policy of the devolved government is reflected, but not shown as a change in the charts. Not all measures can be reliably modelled due to data and/or modelling constraints. Tax and welfare changes that can be modelled robustly at a household level are derived using HM Treasury's tax and benefit static microsimulation model as described below. Income quintile and decile analysis has been simulated using HM Treasury's tax and benefit static microsimulation model. The model uses data from the Living Costs and Food Survey (LCF) collected between April 2008 and March 2011. The small sample size of the LCF means that to be able to produce robust analysis three years of data have been pooled together. This data is then projected forward to reflect the tax year being modelled, using historical Annual Survey of Hours and Earnings (ASHE) data on earnings growth at different points across the distribution as well as the latest round of OBR average earnings and inflation forecasts. Individual employees are assumed to be paid at least the National Minimum Wage (NMW), which has been projected to 2015-16 in line with the OBR average earnings forecast. The model makes no changes to the underlying employment levels or expenditure patterns in the base data. This dataset is used to model each household's net income under a given and alternative tax and benefit system. The difference between the two results produces the change in net income for each household. Households are then allocated into deciles and the average (mean) change in net income for all the households in each decile is calculated. Allocation across quintiles is conducted on the basis of income before the effect of this government's measures. The model assumes no behavioural changes affecting employment, income or spending choices. Incomes are estimated on a before housing cost basis. Expenditure analysis uses a measure of expenditure which includes a range of housing costs. However, no deduction is made from housing expenditure for households receiving housing benefit to reflect the fact that the housing benefit received is intended to cover this housing expenditure. The model assumes incomplete take-up of welfare. A fuller description of the methodology for modelling incomplete take-up was set out in detail as part of HM Treasury's Spending Round 2013 analysis, in Chapter 3 of 'Impact on households: distributional analysis to accompany Spending Round 2013', available at www.gov.uk. Changes in indirect tax assume that the same quantity of goods and services are purchased and that all of the increase in indirect tax is passed through to consumers. The following measures have been included in the analysis for Charts 2.C, 2.D, 2.E and 2.F, in addition to those modelled at Budget 2014. Only those measures with a scorecard impact in 2015-16 are included in the decile analysis: • Stamp duty land tax reform: new marginal rate system • Personal Allowance: increase to £10,600 in 2015-16 with full gains to higher rate taxpayers

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	• Pension credit passthrough In addition, the scope of the analysis has been expanded to include the impact of Stamp Duty Land Tax (SDLT) on household main residence purchases, in Great Britain only. This has been done by using data in the ONS's Wealth and Assets Survey (WAS) and English Housing Survey (EHS, produced by the Department for Communities and Local Government) to impute in the LCF estimates of the value and proportion of main residences bought in a given year, and calculating SDLT liabilities accordingly. SDLT paid on non-residential properties, and residential properties that are not main residences, is excluded from the analysis.
Chart 2.G (Universal Credit)	This analysis considers the impact of Universal Credit by income decile by comparing simulated incomes under Universal Credit with incomes under the current system of benefits and tax credits. The two simulations take into account all policies announced prior to this Autumn Statement that take place before and during the introduction of Universal Credit. Compared to the analysis published at Budget 2014, the impact of Universal Credit on net incomes (as if it were fully implemented in 2014-15) published here show small changes mainly due to policy updates and improved modelling. A fuller description of the methodology behind this chart was set out as part of HM Treasury's Autumn Statement 2013 analysis, in Chapter 3 of 'Impact on households: distributional analysis to accompany Autumn Statement 2013', available at www.gov.uk.
Charts 2.B, 2.H and 2.I (Quintile charts)	Charts are on a United Kingdom basis, but only include resource DEL (RDEL) spending in England. RDEL spending is the current budgetary constraint set for departments, within which they provide public services. Other RDEL spending is devolved to the governments in Scotland, Wales, and Northern Ireland, and is not reflected in this analysis. The quintile charts include around 90% of changes to tax and welfare that will have an impact on households in 2015-16. They include over 60% of RDEL spending in England in 2015-16, as the analysis does not include administrative spending or spending on public goods because these do not benefit specific households directly. Tax and welfare changes that can be modelled robustly at a household level are derived using HM Treasury's tax and benefit static microsimulation model, as described above for Charts 2.C to 2.F. Other additional tax and welfare measures are modelled by apportioning to quintiles the Exchequer costs or savings from the measures, based on carefully considered assumptions about where the impacts are likely to fall. This applies to those tax and welfare measures which have a scorecard impact of more than £300 million in 2015-16, and where it is possible to make reasonable assumptions about how households in different quintiles will be affected. For example, for pensions tax relief it is assumed that the impact of the reform falls only on households in the top quintile. For reforms to Employment Support Allowance and Disability Living Allowance, where changes relate primarily to eligibility, this has been done on the basis of the distribution of benefit claimants. Those tax and AME measures which cannot be microsimulated and have a scorecard impact of less than £300 million in 2015-16 are not included in the analysis.

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	The analysis of RDEL spending compares spending in 2010-11 and 2015-16 in real terms, by deflating 2015-16 spending figures to 2010-11 prices using the OBR's latest forecasts for the GDP deflator. The distributional analysis makes no distinction between the different ways public service spending changes are implemented. For example, a spending cut implemented through salary restraints could in in many cases have a smaller impact than if it was implemented through a workforce reduction. The available data is not detailed enough to make such distinctions in the modelling. This is explained in detail in the Impact on Households document that accompanied Spending Review 2010. For the first time, public services have been modelled alongside tax and welfare in HM Treasury's integrated microsimulation model. There are two general approaches to the modelling of RDEL depending on whether service use is reported in the Living Costs and Food Survey (LCF), which underpins the modelling. Where this is the case, no additional data is required and the approach is similar to that used for most tax and welfare modelling. An example of this is spending on schools, which can be modelled directly because the LCF contains information on the number of children by age in each household who attend a state-funded school. Where the LCF does not contain information about use of the service, additional data sources are required. This additional data is used to identify characteristics associated with the use of the service and then to derive probabilities of service use conditional on these characteristics. This could include a wide range of characteristics, although the variables considered must be common to both the additional data and the LCF data used in the microsimulation model. For example, use may vary by age, income, family composition and geographic location. The additional data sources that underpin the new modelling of public spending are: English Housing Survey; Crime Survey for England and Wales; Taking Part Survey; Labour Force Survey; British Household Panel Survey; General Lifestyle Survey; Personal Social Services Research Unit Admissions Data; Civil and Social Justice Survey for England and Wales; Wealth and Assets Survey; and the Census. Where possible conditional probabilities are estimated in a regression model. However, because of data limitations, this is not always possible and many probabilities have instead been estimated through cross-tabulations. These probabilities are then applied to the LCF data in the microsimulation model. Total spending (both actual and for the baseline) is then allocated according to each household's relative likelihood of using the service. Impacts of changes in RDEL spending are calculated alongside tax and welfare and presented across the income distribution. The overall distribution of public service spending (See Chart 2.B) is only marginally different in the integrated microsimulation model compared to previous analysis. This is because the majority of RDEL spending goes to a relatively small number of areas (for example, health and schools spending comprises over 70% of spending covered by the model), where distributional analysis was relatively well established[1] even before the development of the

[1] See, for example, the annual publication 'The Effects of Taxes and Benefits on Household Income', ONS: http://www.ons.gov.uk/ons/rel/household-income/the-effects-of-taxes-and-benefits-on-household-income/historical-data--1977-2012-13/index.html

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	integrated microsimulation model and where the modelled impact has changed very little. The integrated microsimulation model has a more visible impact on Charts 2.H and 2.I, which show impacts of tax and spending changes across the income distribution. Because the services for which distributional analysis was already well established have experienced little change in spending – mainly due to the protection of the NHS and schools budgets – the changes to spending made by this government and shown in these charts are concentrated in services for which distributional analysis was less well developed and where the new, more accurate modelling has had the biggest impact. This means that the new charts provide a more robust picture of the distributional impact of this government's changes to public service spending. This new improved modelling of public services impacts on the charts in two key ways. Firstly, because the RDEL analysis is carried out in a single integrated model, the definition of income used to identify where, in the income distribution, households appear is now consistent with the tax and welfare analysis. Moreover, the LCF captures incomes in a very detailed and comprehensive way, so quintile analysis can be carried out with much more accuracy in the new integrated model, compared to previous analyses, which relied on a number of data sources and models. For example, some of the data sources used in the past contained less detailed information about benefit incomes than the LCF or captured personal, but not comprehensive household, incomes and relied on more assumptions. Thus, the latest quintile analysis shows that, when considering household incomes more comprehensively, which has only been possible in the new model, the affected households are in some cases higher up in the distribution than previous analysis suggested. Secondly, where changes are expressed as a proportion of mean household incomes and benefits in kind from public services (Chart 2.I), incomes and benefits in kind, which form the denominators, are now derived from the integrated model. These denominators are on average slightly greater than the denominators used in previous publications, particularly at the top of the distribution, therefore reducing the average impact. The bottom quintile is an exception, where the denominator has reduced very slightly. Note that this does not affect the decile analysis of tax and welfare, which has always been produced in HM Treasury's microsimulation model. The RDEL analysis covers many of the services delivered by the Department of Health, the Department for Education, the Department for Work and Pensions, the Department for Communities and Local Government, the Department for Business, Innovation and Skills, the Department for Transport, Local Government, the Ministry of Justice, the Department for Energy and Climate Change, the Department for Culture, Media and Sport, and HM Treasury. The modelling does not include spending by the Ministry of Defence, the Home Office, the Cabinet Office, the Foreign and Commonwealth Office, the Department for International Development, HM Revenue and Customs, the Department for Environment, Food and Rural Affairs, the Law Officers' Department and Independent Bodies. In many cases the nature of the services provided by these departments means it is not possible to identify specific end-users, as they benefit the population as a whole; in others, the services do not directly affect households. The revisions to national accounts, including the updates to reflect the European System of Accounts 2010 (ESA10), have resulted in lower OBR

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	estimates of inflation as measured by the GDP deflator for the entire modelling period, 2010-11 to 2015-16. This has reduced changes to public service spending in real terms. In addition to those measures modelled at Budget 2014, the quintile charts include the following measures: • Additional spending on the NHS, including on mental health services, all allocated in the model to households in line with overall NHS spending • Additional spending on adult community learning specifically for the provision of courses to help adults experiencing mild to moderate depression, anxiety, and sleep disorders in England. Spending on this measure has been allocated in line with Skills for Life spending • Three measures all funded through the Department for Education: A pilot to trial a new approach to ensure that the most effective early intervention actions are taken during a child's very youngest years, to prevent avoidable problems later; careers services for 12 to 18 year olds; and help for the best academy chains to expand. The benefits from the early intervention pilot are allocated in the model to households using spending on children's centres as a proxy. The other two measures have been allocated in line with schools spending • The extension of the freeze on regulated fare rises (at RPI + 0%) for a further year, allocated in line with the rail subsidy • Universal Credit: updated delivery schedule • Personal Independence Payment: updated delivery schedule Spending funded through the reserve is not captured in this analysis. As at Autumn Statement 2013 and Budget 2014, the quintile charts include measures aimed at reducing tax avoidance where these measures represent a substantive change in tax policy. No additional measures aimed at reducing tax avoidance have been included since the Budget 2014 publication. The avoidance accelerator, which relates to tax liabilities which accrue in different years to when the tax is paid, continues to be excluded from this analysis. A fuller description of the methodology and criteria used to include these measures was set out in detail as part of HM Treasury's Autumn Statement 2013 analysis, in Chapter 3 of 'Impact on households: distributional analysis to accompany Autumn Statement 2013', available at www.gov.uk. Chart 2.B is constructed using the same modelling inputs and assumptions as Charts 2.H and 2.I. They include all taxes, transfer payments, and public service spending captured elsewhere in HM Treasury's analysis. By construction, the differences between the 'before consolidation' and 'after consolidation' data points in Chart 2.B equate to the percentage changes in Chart 2.I. The income denominator for Chart 2.B analysis is household income after taxes and benefits, including benefits in kind from public service spending. This was chosen for consistency with Charts 2.H and 2.I. In all charts, households are ranked according to their income, following deductions for direct tax, and additions through welfare. Benefits in kind from public services are not used in the calculation to determine a household's position on the income distribution. For Charts 2.B and 2.I, where change is expressed as a proportion of income, that income does include the income from benefits in kind from public services, plus an additional amount of

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	income to adjust for the fact that our survey data may not fully capture the amount of income that is available to households through tax avoidance. Chart 2.B shows that on average, households receive more from welfare than they contribute in tax. This is in part because the chart only captures the tax taken from households (not businesses), whereas transfer payments and public services are funded by all taxes (including those paid by businesses).

3.2 Table 3.B below shows the median gross income (private income, including earnings, private pensions, savings and investments, plus benefit income) for different household types in each net equivalised income decile.

3.3 The incomes in HM Treasury's analysis are calculated on a net equivalised income basis (after tax and benefits) to better capture households' standard of living. However, many people think about their household income, particularly annual salaries, in gross rather than net terms. The table below shows median gross (pre-tax) incomes within each decile, which gives a less precise estimation of a household's position on the income distribution than net income, but is easier to understand.

3.4 Table 3.B should therefore be used to approximate where a household will be found in the income distribution. For example, if a household consisting of two adults earns £27,600 per year between them, there is a high likelihood that this household will be found in the fifth income decile. However, this is not guaranteed, because different gross household incomes can result in different net household incomes, depending on how many earners there are in the household, the size of the household, and which benefits the household qualifies for.

Table 3.B: Median gross income for each decile (£ per year, 2015-16) for different household compositions

Median gross income of households in decile	One adult (£)	One adult and one child (£)	Two adults (£)	Two adults and one child (£)	Two adults and two children (£)
Top decile	59,600	76,200	87,900	112,900	152,200
Ninth decile	40,000	49,700	58,400	75,100	89,800
Eighth decile	31,100	42,600	46,600	60,100	70,300
Seventh decile	25,000	31,200	38,300	49,400	60,100
Sixth decile	21,200	27,200	32,400	42,400	51,800
Fifth decile	17,700	24,300	27,600	36,100	44,700
Fourth decile	15,300	21,000	23,300	31,000	37,500
Third decile	13,400	17,500	20,200	26,700	32,300
Second decile	11,400	14,700	17,400	21,900	27,100
Bottom decile	8,800	10,900	13,500	15,500	20,100

Source: HM Treasury microsimulation model

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This document can be downloaded from www.gov.uk

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