Institute for Fiscal Studies

Recessions, income inequality and the role of the tax and benefit system

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Nuffield Foundation

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Preface

The Nuffield Foundation is an endowed charitable trust that aims to improve social well-being in the widest sense. It funds research and innovation in education and social policy and also works to build capacity in education, science and social science research. The Nuffield Foundation has funded this project, but the views expressed are those of the authors and not necessarily those of the Foundation. More information is available at www.nuffieldfoundation.org. Co-funding from the ESRC-funded Centre for the Microeconomic Analysis of Public Policy at IFS (grant number ES/M010147/1) is also gratefully acknowledged.

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Executive summary

The effect of past recessions on income inequality

Across most of the population, income inequality fell significantly during and immediately after the Great Recession.

Looking at those aged under 65, net equivalised household income was essentially unchanged in real terms between 2007–08 and 2011–12 at the 20th percentile, but fell by 3.5% at the 80th percentile.

This is in stark contrast to previous recessions – income inequality rose sharply during and after the early 1980s and early 1990s recessions.

For example, again excluding those aged 65 or over, real incomes fell by 5.6% at the 20th percentile between 1979 and 1982, but were almost unchanged at the 80th percentile.

Differences in the nature of the labour market downturns between different recessions explain most of the differences in the path of income inequality.

The early 1980s and early 1990s recessions were characterised by large falls in employment, which acted to increase inequality; in contrast, the large falls in real earnings among those in work after the Great Recession acted to reduce inequality.

The role of the tax and benefit system

The tax and benefit system played an important role in reducing income inequality during and immediately after the Great Recession.

The existence of in-work benefits dampened the effect of falling real earnings on the incomes of low-income working households – there was a 12% fall in household earnings at the 10th percentile but that led to a fall of less than 5% in net household income at the 10th percentile among working households. At the same time, increases in the generosity of some benefits during the recession boosted the incomes of low-income households.

Over the past few decades, the insurance provided by the tax and benefit system has shifted away from insurance against employment falls towards insurance against earnings falls for those in work.

Falls in the value of out-of-work benefits relative to earnings mean households have less insurance against employment falls; but the introduction of tax credits has maintained the insurance that working households have against earnings falls.

As a result, the public finances are less sensitive to a fall in employment than under previous systems, but no less sensitive to earnings falls.

If the employment falls seen in the early 1980s reoccurred today, 55% of the impact on pre-tax earned income would be passed through to households' net income (with the other 45% borne by the public finances through lower taxes or higher benefits). Under the 1979 system (with all parameters increased in line with earnings), the split would be 50:50.

The current system provides the most insurance to low-income households and those with three or more children.

These groups are least likely to be able to maintain their spending in the face of a fall in net income (they are the most credit constrained), which means, all else equal, there is a stronger case for the state providing insurance. But the flip side of the stronger insurance is that these groups face the weakest financial work incentives.

The impact of planned tax and benefit reforms

Looking forward, further cuts to working-age benefits will significantly reduce the insurance the tax and benefit system provides against future recessions.

By reducing the generosity of working-age benefits, changes that are planned or currently being rolled out will reduce the amount of lost earnings that would be offset by higher benefits in the event of a recession.

The falls in insurance will be most pronounced for low-income households and those with three or more children.

If the earnings falls seen during the Great Recession were repeated today, the poorest 30% of households would only see 39% of those falls passed through to their net income. If all future reforms were fully in place, that pass-through rate would be 53%.

1. Introduction

It is now around a decade since the financial crisis that triggered the Great Recession of 2008–09. In many respects, the impacts of this recession on the living standards of UK households have been unusually severe. Median household income is now around 15% below its long-run trend, having grown by only around 5% over the past decade. Once those aged 65 and over are excluded, the picture is even worse, with median income growth of just 3% since 2007–08.[1] Average earnings remain around 5% below pre-crisis levels, and the Office for Budget Responsibility (OBR) forecasts that they will still be below their 2007–08 level at the end of the current decade.[2]

However, one dimension in which the Great Recession has not had a deleterious impact is income inequality. Across the vast majority of households, income inequality remains slightly lower than it was 10 years ago, as a result of falling inequality during the recession itself and in its immediate aftermath. This trend stands in stark contrast to that seen during previous UK recessions: income inequality rose significantly during both the early 1980s and early 1990s recessions.

In Chapter 2 of this report, we seek to understand why past recessions have had such different effects on income inequality. In particular, we separate out the impact of the nature of the labour market downturn, the role of the tax and benefit system and the effect of the characteristics of the household population. In doing so, we focus on how changes in the tax and benefit system have affected the 'insurance' the system provides to households against different kinds of labour market downturn.

In Chapter 3, we turn from examining the impact of past recessions on income inequality to consider the potential impact of the next labour market downturn on the distribution of household incomes. Unfortunately, there is a substantial chance that we will not have to wait particularly long for this next downturn – the Office for Budget Responsibility (2017) states that 'the chance of a recession in any five-year period is around one in two'. We document how the insurance offered by the current tax and benefit system varies across different kinds of households. We also look at how this relates to different households' ability to insure themselves: maintaining their spending in the face of falling labour market incomes by saving less, drawing down on savings or borrowing. Finally, we show the long-run impact of the significant cuts to working-age benefits that are being rolled out and are planned for the next few years on the insurance the tax and benefit system will offer against the next recession.

Chapter 4 concludes.

[1] Hood and Waters, 2017.

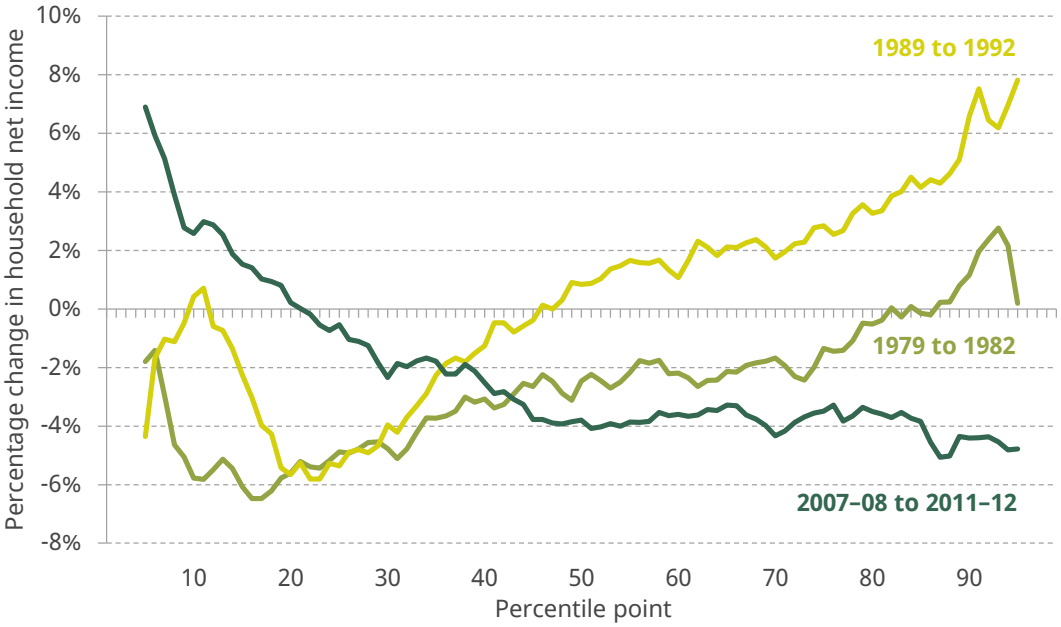
[2] Cribb, 2017.

2. Understanding changes in inequality during past recessions

In this chapter, we examine the impacts of the last three recessions in the UK (the early 1980s recession, the early 1990s recession and the Great Recession) on the income distribution and seek to disentangle the role of different factors in explaining the changes in income inequality that occurred.

As Figure 2.1 shows, the past three recessions in the UK saw very different changes in the distribution of household incomes. The figure plots the change in real net equivalised household income at each percentile point of the distribution of household income during the past three recessions (individuals aged 65 and over are excluded).[3] It reveals a marked difference between the change in income inequality seen during the early 1980s and early 1990s recessions and that seen during the Great Recession. Between 1979 and 1982, real incomes fell by 5.6% at the 20th percentile, but were almost unchanged at the 80th percentile – a significant rise in inequality. Similarly, between 1989 and 1992, real incomes fell by 5.7% at the 20th percentile, but actually rose by 3.3% at the 80th percentile. By contrast, between 2007–08 and 2011–12, real incomes were essentially unchanged at the 20th percentile, but fell by 3.5% at the 80th percentile – a significant fall in inequality.

Figure 2.1. Real income growth by percentile point during the past three recessions



Note: Incomes are measured after taxes and benefits but before housing costs, adjusted for household size and adjusted for inflation using a variant of the Consumer Prices Index that incorporates mortgage interest payments. Figures for early 1980s and early 1990s recessions are for Great Britain only, as data on Northern Ireland are not available. The figure excludes individuals aged 65 and over.

Source: Authors' calculations using the Family Expenditure Survey and Family Resources Survey, various years.

[3] This measure of income follows the methodology behind official government statistics on the income distribution (the Households Below Average Income series). For more details, see appendix A of Cribb et al. (2017).

The rest of this chapter aims to explain why past recessions have seen such different changes in income inequality. In Section 2.1, we illustrate differences across recessions in the three key factors that drive their impact on the household income distribution: the nature of the labour market downturn, the tax and benefit system that was in place at the time, and the characteristics of the household population. Section 2.2 focuses on the impact of the tax and benefit system – both its role as an 'automatic stabiliser' when incomes from employment fall, and the impact of tax and benefit reforms during recessions themselves. Finally, Section 2.3 provides a quantitative assessment of the relative importance of the three key factors listed above in explaining the different impact on inequality of the past three recessions.

2.1 Differences between recessions

In this section, we illustrate three key potential reasons for the differences in the impact of past recessions on the income distribution:

- *The nature of the labour market downturn.* Different downturns saw very different trends in employment and workers' earnings, and the size of employment and earnings falls also varied dramatically between different subgroups of the population. All of these differences affect the impact of a downturn on the distribution of household incomes.

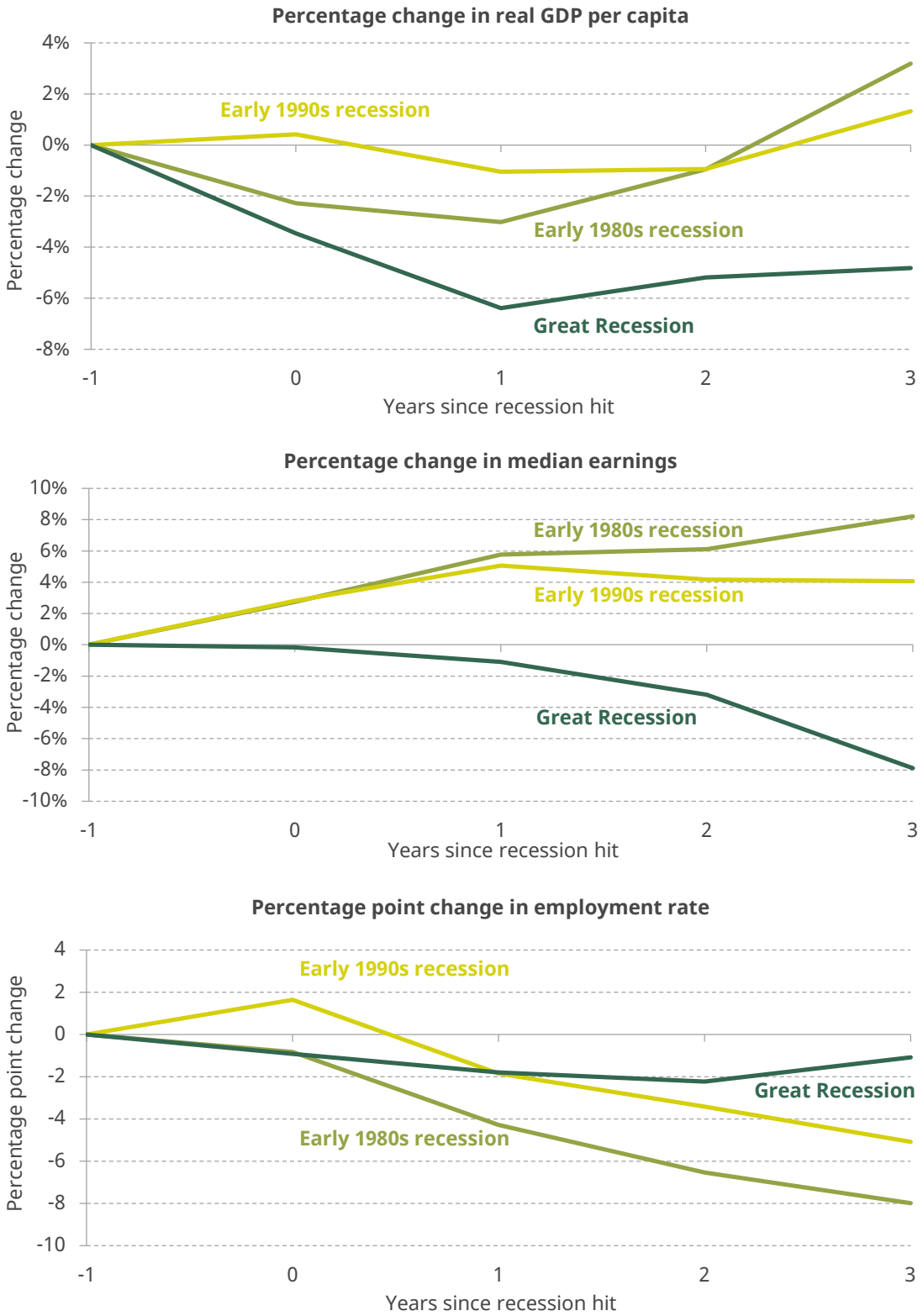
- *The tax and benefit system in place at the time.* There were very significant changes to the generosity and structure of the tax and benefit system in the decades between the past three recessions – for example, the introduction of the tax credits system in its current form. These changes matter for the impact of labour market downturns on income inequality, because they determine both how dependent on employment income different groups are and the extent to which lower taxes and higher benefits automatically respond to cushion falls in labour market incomes.

- *The characteristics of the household population at the point a recession hits.* In particular, how employment is distributed across households will affect where households affected by a rise in unemployment or a fall in earnings are in the overall income distribution and also the share of household income lost when an individual loses their job or sees their earnings fall.

Figure 2.2 reveals the stark differences in the nature of the labour market downturns associated with the last three recessions. The top panel plots the percentage change in real GDP per capita through the last three recessions, relative to its level in the year before the recession hit (1979, 1989 and 2007–08 respectively). It shows that the Great Recession saw a bigger and more sustained fall in national output than either the early 1980s or early 1990s recessions.[4]

[4] The rise in real GDP per capita in 1990 is explained by the fact that the recession hit only in the third quarter of that year.

Figure 2.2. GDP, earnings and employment through the last three recessions



Note: Both median earnings and employment rates are calculated among adults aged under 65. Earnings include income from self-employment and are adjusted for inflation using a variant of the Consumer Prices Index that incorporates mortgage interest payments. Figures are for Great Britain only.

Source: Authors' calculations using the Family Expenditure Survey and Family Resources Survey, various years.

This difference is reflected in the second panel, which plots the percentage change in median earnings through the last three recessions. Neither the early 1980s recession nor the early 1990s recession led to falls in median earnings among workers. In 1983, four years after the pre-recession peak in GDP, median earnings were around 8% higher than in 1979, while in 1993 median earnings were 4% higher than in 1989. By contrast, in 2011–12, four years after the pre-recession peak in GDP, median earnings were 8% lower than before the recession. As discussed in detail in chapter 3 of Cribb et al. (2017), this large fall in average earnings acted to reduce income inequality significantly – higher-income households get a larger share of their income from earnings on average and so saw larger falls in their income than those towards the bottom of the distribution.

The final panel of Figure 2.2 shows the change in the employment rate through the last three recessions. In 2011–12, four years after the pre-recession peak in GDP, and despite a significant decline in GDP per capita, the employment rate was less than 2 percentage points (ppts) below its pre-recession level (though there was also a fall in the average hours worked by low-paid workers).[5] At the same stage after the early 1980s and early 1990s recessions, the employment rate was down 8ppts and 5ppts respectively, despite the recovery in output. These large falls in employment acted to raise inequality, by increasing the number of workless households in the population.[6] Their impact on inequality was particularly large because the falls in employment were concentrated among low-educated individuals (as is fairly typical in recessions), whose incomes hence fell further behind those of the rest of the population.

A second potential reason for the different impact of past recessions on the income distribution is changes in the extent to which the tax and benefit system provides 'insurance' against labour market downturns, and how that insurance varies across the population. One measure of this insurance is the 'pass-through rate' – what proportion of a change in employment income (resulting from job loss or a change in earnings) is passed through to net income, rather than being offset by lower tax payments or higher benefit entitlements. The higher the pass-through rate, the less insurance the tax and benefit system is providing against labour market downturns.

To illustrate the point, Figure 2.3 plots pass-through rates for two example families (one-earner couples with and without children) under the tax and benefit systems in place on the eve of the last three recessions. In each case, the figure shows both the employment pass-through rate (the proportion of lost earnings that would be passed through to net income were the worker to lose their job) and the earnings pass-through rate (the proportion of a 5% fall in earnings passed through to net income).

Looking at the first example (a one-earner couple with no children, where the worker earns the median amount in that year), the key thing to note is the clear increase in the employment pass-through rate over time, from 42% in 1979 to 52% in 2007. This reflects falls in the generosity of out-of-work benefits relative to average earnings, which mean that the tax and benefit system now offers less insurance against job loss for this kind of family than in the past. By contrast, the earnings pass-through rate is little changed,

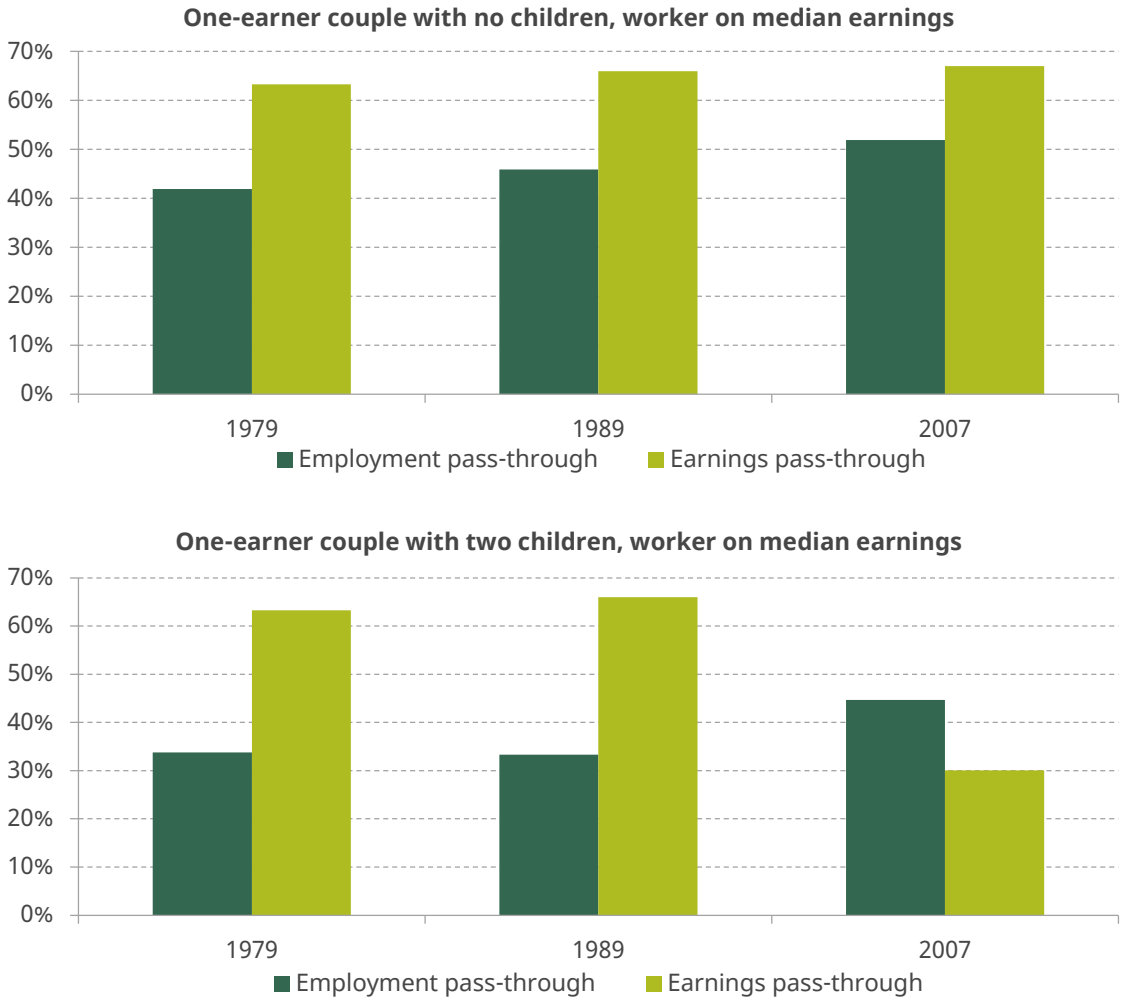
[5] See figure 3.15 in Belfield et al. (2016).

[6] Of course, trends in employment and earnings during recessions are likely to be related. For example, one reason for the relatively strong growth in average earnings through the early 1980s and early 1990s recessions may have been that many of the lowest earners lost their jobs.

reflecting the fact that the marginal tax rate faced by this type of family was only slightly lower in 2007 than in 1979 (33% compared with 36.5%).

Turning to the second example (identical to the first, except that the couple has two children), a rise in the employment pass-through rate is again evident. The notable difference is that the earnings pass-through rate falls sharply between 1989 and 2007, from over 60% to 30%. This is the result of the fact that this family is entitled to tax credits under the 2007 system, and so a fall in earnings would be offset not just by lower tax payments but also by higher tax credit entitlement. This illustrates a more general trend – the growth in the role of means-tested in-work benefits over time has acted to increase the 'insurance' offered by the state against earnings falls (something we return to in Section 2.2).

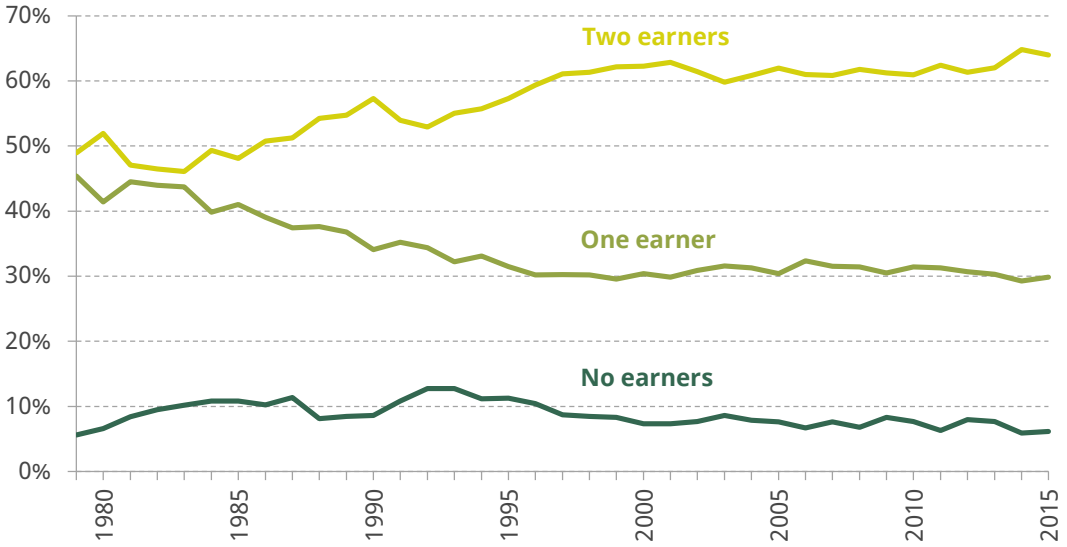
Figure 2.3. Employment and earnings pass-through rates for example families: 1979, 1989 and 2007



Note: Calculations exclude housing benefit, council tax and council tax benefit.

Source: Authors' calculations using TAXBEN, the Family Expenditure Survey (1979 and 1989) and the Family Resources Survey (2007–08).

Figure 2.4. Employment patterns among couples with children, 1979 to 2015–16



Note: Years refer to calendar years until 1993 and financial years thereafter. Figures are for Great Britain only.

Source: Authors' calculations using the Family Expenditure Survey and the Family Resources Survey, various years.

A third reason for the different effects of past recessions on the income distribution is changes in the characteristics of the population. One potentially important change is shown in Figure 2.4, which plots the proportions of couples with children where both members of the couple are in paid work, one member of the couple is in paid work and neither member is in paid work. There are two key trends to note from the figure. First, between the early 1980s and the mid 1990s, there was a clear shift from one-earner to two-earner couples: the proportion of couples with children where both members were in paid work rose from 46% in 1983 to 61% in 1997–98. This shift has particular implications for the impact of falls in employment on the household income distribution. A rise in the number of two-earner couples makes it less likely that any given job loss creates a workless household, and hence reduces the impact of rising unemployment on inequality in household income. In this respect, the trend towards two-earner couples has been offset to some extent by the rise in the number of lone-parent households over time, for whom a job loss does create a workless household.

The second trend to note from Figure 2.4 is the rise and fall in the proportion of couples with children where neither member is in paid work – from 6% in 1979, up to a high of 13% by 1992, before returning to 6% in 2015–16. As noted earlier, the share of workless households matters because it governs the extent to which a labour market downturn affects those towards the very bottom of the distribution. The greater the share of households that are workless going into a recession, the more insulated the lowest-income households are from falls in earnings and employment and hence, all else equal, the smaller the impact of the recession on income inequality. Of course, a high share of workless households also increases the *level* of income inequality in an economy – the point here is just that it also reduces the sensitivity of income inequality to a labour market downturn.

Of course, there were other important changes in demographics between the last three recessions. Perhaps most important, besides the changes in employment patterns and

household structures, is the fact that the working-age population in 2007 had much higher education levels than was the case in 1979. To the extent that being more highly educated leaves individuals less vulnerable to losing their job in the event of a recession, this may play a role in explaining the different effects of past downturns on the distribution of household incomes.

2.2 The role of the tax and benefit system

Having documented important differences in labour market downturns, tax and benefit systems and population characteristics across the past three recessions, we now focus on the role of the tax and benefit system in determining the impact of recessions on income inequality. In particular, we assess the extent to which the tax and benefit system can be credited with helping to bring about the fall in inequality that accompanied the Great Recession.

In the following analysis, we explore how actual and counterfactual tax and benefit systems shaped, or would have shaped, the impact of past labour market downturns on net household incomes. The methodology we employ is to characterise each labour market downturn by computing the changes that occurred in average earnings, inequality in earnings and employment rates within a number of subgroups of the population (defined by age, sex and education) during that downturn (using the Family Expenditure Survey and the Family Resources Survey). We can then simulate those same changes within the population that existed at a different point in time (e.g. at the start of a different recession), under a different tax and benefit system (using TAXBEN, the IFS tax and benefit microsimulation model), and see what would have happened to inequality in household incomes in that case. Details of the characterisation and the simulation procedure are given in Appendix A.

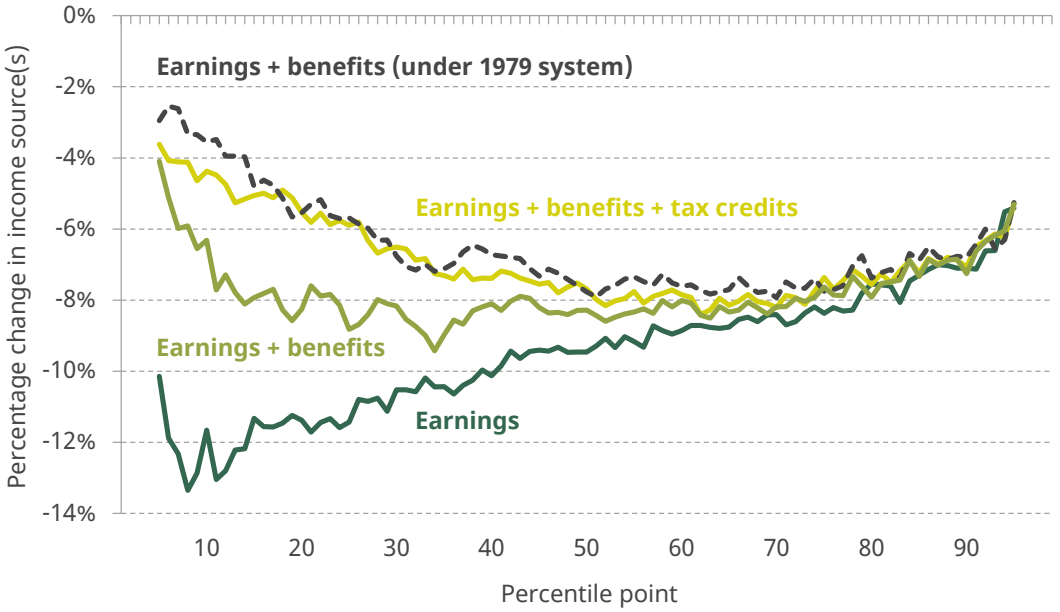
There are two distinct ways in which changes to the tax and benefit system can affect how the distribution of household incomes changes during a recession. The first is that changes to the tax and benefit system between recessions alter the extent to which the system acts to stabilise the incomes of different kinds of households when their employment incomes fall – for example, through lower tax payments. The second is that reforms to the tax and benefit system during the recession itself have a direct impact on household incomes – for example, by increasing or reducing benefit entitlements for low-income households.

The insurance provided by the tax and benefit system

Figure 2.5 explores how the tax and benefit system shaped the impact on income inequality of the large falls in household earnings seen during and immediately after the Great Recession. The dark green line plots the (simulated) change in household earnings at each percentile point of the distribution, for working households (i.e. those with some earnings) only.[7] It shows that the changes in household earnings between 2007–08 and 2011–12 were regressive across working households, with the largest falls for low-earning households. Household earnings fell by around 12% in real terms at the 10th percentile, but by only around 7% at the 90th percentile. However, once benefits and tax credits are added to the incomes of these working households, the changes in income switch from

[7] This is extremely similar to the observed change in household earnings by percentile point over this period.

Figure 2.5. The impact of the tax and benefit system on real income sources among working households, 2007–08 to 2011–12



Note: The figure excludes individuals aged 65 and over.

Source: Authors' calculations using the Family Resources Survey 2007–08 and 2011–12, TAXBEN and the simulation methodology described in Appendix A.

being regressive to progressive, with smaller falls in incomes across the lower-earning half of working households. Total income from earnings, benefits and tax credits for working households (shown by the yellow line) fell by around 4% at the 10th percentile, compared with 7% at the 90th percentile. There are two reasons the benefit system transformed a regressive change in household earnings into a progressive change in the household incomes of working households (tax payments had little effect on inequality). First, the benefit system provided an important source of income to low-earning households that was unaffected by the downturn (e.g. child benefit). Second, the entitlement of low-earning households to means-tested benefits (e.g. tax credits) rose as their earnings fell. This latter effect also had an impact on the public finances, as government spending on benefits rose as an automatic response to the falls in household incomes.

The role of the tax and benefit system thus provides a potential explanation for the different change in inequality seen during the Great Recession compared with previous downturns. Is the presence of tax credits – which barely existed during previous recessions – a key reason why inequality fell during the Great Recession? Figure 2.5 shows that tax credits did play an important role – without them, total income from earnings and benefits for working households would have fallen by 8.3% rather than 5.5% at the 20th percentile (compared with a fall in earnings of 11.4%).

But it turns out that the additional insurance provided by tax credits has only offset declines in the insurance provided by the rest of the system over the past few decades. This is revealed by the dotted black line on Figure 2.5, which shows how total income from earnings and benefits would have changed for working households had the 1979 tax and

benefit system still been in place in 2007. Box 2.1 outlines the methodological choices we have made when comparing different tax and benefit systems. For reasons it describes, in this counterfactual we imagine not that nominal benefit rates remained the same since 1979 but instead that all benefit rates increased in line with average earnings over the intervening period.

Perhaps surprisingly, Figure 2.5 shows that this 'uprated' 1979 system would, on average, have led the net incomes of working households at each point in the distribution to

Box 2.1. Comparing tax and benefit systems over time

As part of our attempts to disentangle the role of different factors in explaining the changes in income inequality observed through past recessions, we analyse how incomes would have changed if tax and benefit systems were 'swapped' across recessions – for example, what would have happened if the 1979 tax and benefit system were still in place in 2007 (i.e. if there had been no reforms in the interim)?

To answer this question requires us to take a view as to what 'no reforms' means. In this report, when comparing tax and benefit systems across recessions, we take the view that 'no reforms' consists of keeping benefit rates and tax thresholds the same relative to the level of average earnings. In other words, an unreformed 1979 system would simply have been uprated in line with average earnings since 1979. There are two reasons for taking this to be the 'baseline', rather than, say, price-uprating (though both options are certainly reasonable). First, when comparing tax and benefit systems across decades, it seems more appropriate to define the default as being that the benefits paid to those out of work maintain their relativity to the earnings of those in work, rather than falling dramatically relative to earnings over time as real earnings rise. Second, our particular focus is on the insurance provided by the tax and benefit system against labour market downturns. In that context, earnings-uprating is the natural 'baseline', as increasing the parameters of the system in line with average earnings will leave the degree of insurance it provides roughly unchanged.

As well as comparing tax and benefit systems across recessions, we also isolate the effect of reforms during each recessionary period (as in Figure 2.7). When looking at reforms during each recession, we define 'no reforms' as being increasing all benefit rates and tax thresholds in line with prices (as measured by the Consumer Prices Index, CPI). While this has the disadvantage of being inconsistent with our approach when comparing tax and benefit systems across recessions, it is natural to define price-uprating as the default over the short run as it is the legislated government policy for almost all parts of the working-age tax and benefit system. Moreover, during periods of falling earnings (as occurred during the Great Recession), it might be counterintuitive to think of real cuts to benefit rates and tax thresholds as 'no reforms'.

As well as adjusting rates and thresholds when comparing tax and benefit systems over time, we also make further adjustments to allow the modelling of disability benefits over time; details are given in Appendix B.

For further discussion of all these issues, see Adam and Browne (2010).

change in a way very similar to the changes actually seen in the Great Recession. This is despite the fact that, for example, there were no tax credits in 1979. The explanation is that most other benefits have risen much more slowly than average earnings since 1979, offsetting the additional insurance that tax credits provide against earnings falls. For example, child benefit – a benefit available to low-income working households in both 1979 and 2007 – fell dramatically in value relative to earnings over the period. Less obviously, the decline in the value (relative to earnings) and importance of contributory unemployment benefits also played an important role – many low-income households with someone in work in 1979 also contained an individual entitled to contributory out-of-work benefits.

However, if one turns to consider the automatic stabilisation provided by the tax and benefit system against falls in *employment*, tax credits do not fully offset the falls in the rates of other benefits relative to earnings, and so the tax and benefit system provides less insurance than it did in the past. When looking at the insurance the tax and benefit system provides against falls in earnings, means-tested tax credits almost always act to increase insurance, by ensuring that some of any lost earnings are replaced by higher tax credit entitlement.[8] But when one looks at the insurance provided against falls in employment, the effect of tax credits is ambiguous – losing one's job can mean losing entitlement to working tax credit, meaning that the tax and benefit system provides less insurance overall against job loss (as the fall in earnings is compounded by the loss of working tax credit).

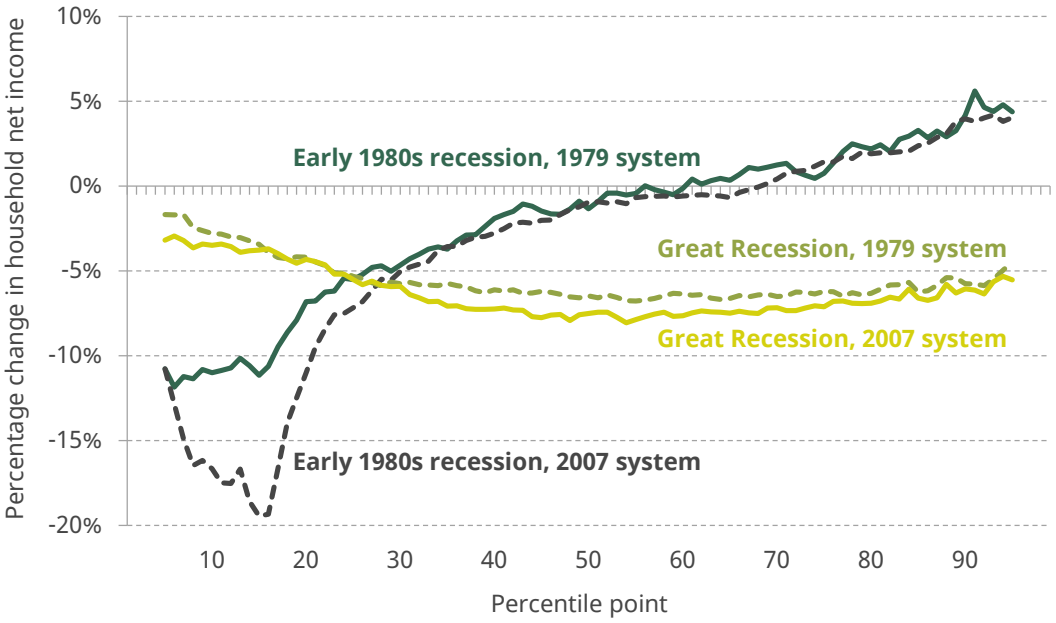
Figure 2.6 draws this point out by comparing the insurance the 1979 and 2007 tax and benefit systems provide against an employment-driven downturn (the early 1980s recession) and an earnings-driven downturn (the Great Recession). The figure plots the impact of these downturns on the distribution of net household incomes (including non-working households) and then shows the impact of 'swapping' the tax and benefit systems across the two downturns.

As one would expect given Figure 2.5, if one examines the impact of the labour market downturn associated with the Great Recession on household incomes, and compares its impact under the 2007 system that was actually in place with the impact it would have had under the 1979 system (scaled up by earnings growth), the impacts look quite similar – inequality falls slightly in both cases. This is because, as discussed above, the insurance provided against the large falls in real earnings that characterised the Great Recession is similar under both systems – the introduction of tax credits roughly offsetting the falls in other benefits relative to earnings between 1979 and 2007.

However, if one compares the impact of the labour market downturn seen during the early 1980s on household incomes under the 1979 system and the 2007 system (scaled down by earnings growth), a significant difference emerges. Given the system that was actually in place (the 1979 system), the sharp fall in employment shown in Figure 2.2 reduced net income at the 10th percentile by 11%. But if the 2007 system had been in place instead, that fall would have been 17%. This reflects the fact that the generosity of out-of-work benefits fell relative to earnings between 1979 and 2007, and so the 2007 system offers less insurance against job loss.

[8] The only exception is if a fall in earnings is the result of lost hours, in which case the individual concerned might lose eligibility for working tax credit.

Figure 2.6. The impact of the early 1980s and late 2000s labour market downturns on real income at each percentile point, before and after 'swapping' the 1979 and 2007 tax and benefit systems



Note: Incomes are measured after taxes and benefits but before housing costs, adjusted for household size and adjusted for inflation using a variant of the Consumer Prices Index that incorporates mortgage interest payments. The figure excludes individuals aged 65 and over. It assumes full take-up of all benefits.

Source: Authors' calculations using the Family Expenditure Survey 1979 and 1982, the Family Resources Survey 2007–08 and 2011–12, TAXBEN and the simulation methodology described in Appendix A.

To bring all this together, the last few decades have seen a relative shift in the insurance provided by the tax and benefit system, from insurance against employment falls to insurance against earnings falls. One might therefore conclude that households were 'lucky' that the recent recession was characterised by large falls in earnings rather than by large falls in employment. That said, the relationship between the change in insurance and the nature of the labour market downturn may not be entirely coincidental. For example, it could be that unionised workers prefer to take wage cuts or reductions in average hours (both seen during the Great Recession) rather than job losses when there is more insurance against the former and less against the latter. This potential causal relationship between the insurance the tax and benefit system offers and the nature of labour market downturns is beyond the scope of this report, but worthy of future research.

The role of tax and benefit reforms

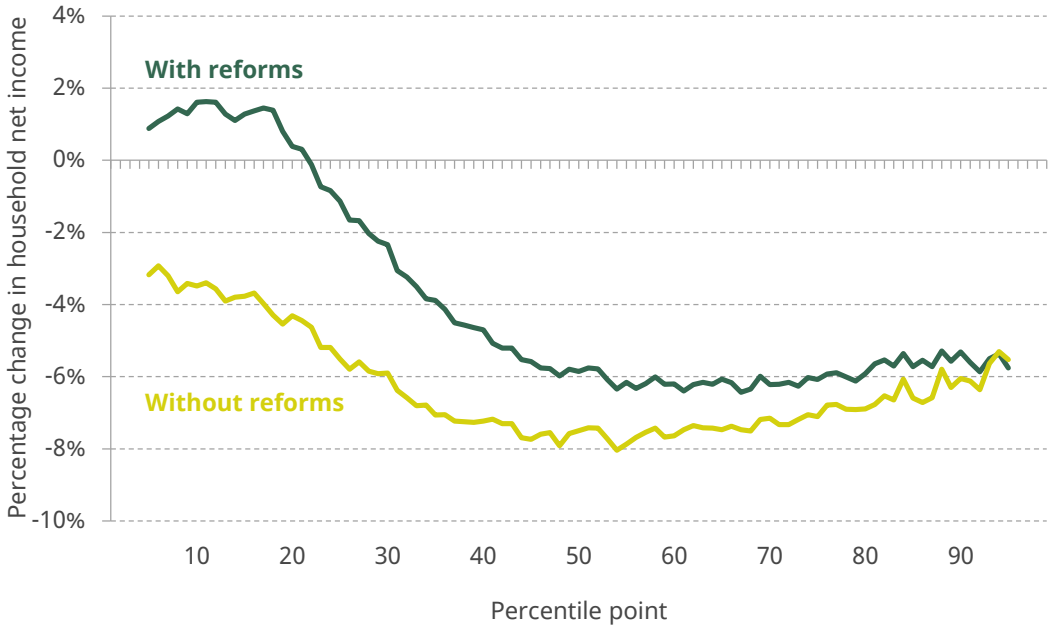
The automatic stabilisation provided by the benefit system can explain why incomes fell less for low-income working households than high-income households (despite larger proportional falls in their earnings) during the Great Recession and its aftermath, but it cannot explain the rise in household incomes towards the bottom of the distribution actually observed (and shown in Figure 2.1).

The reason for this growth in incomes towards the bottom of the distribution was reforms to the tax and benefit system during the recession, as shown by Figure 2.7. The yellow line

is identical to that on Figure 2.6, showing the impact of the labour market changes seen between 2007–08 and 2011–12 on real net household income at each percentile point given the 2007 tax and benefit system. The dark green line shows the combined impact on household incomes of the labour market changes and tax and benefit reforms seen between 2007–08 and 2011–12.[9] As discussed in Box 2.1, 'reforms' are defined simply as any deviation from increasing all tax and benefit parameters in line with the CPI.

Figure 2.7 shows that, relative to that baseline, reforms between 2007–08 and 2011–12 acted to increase net household incomes across the distribution. However, these giveaways were not evenly spread, but rather largely benefited lower-income households, and hence acted to reduce income inequality substantially. Tax and benefit changes transformed a 3.5% fall in net household income at the 10th percentile into a 1.6% rise, while the 6.1% fall in income at the 90th percentile was only ameliorated slightly (to 5.3%). The large gains from reforms for low-income households are explained by real increases in benefit rates. Many benefits rose slightly in real terms, as default uprating was higher than inflation over this period – both because of the use of the (inaccurate) Retail Prices Index (RPI) rather than the CPI and because benefit rates did not fall when prices (as measured by the RPI) fell in 2009–10. Moreover, some important benefits saw significant discretionary increases – for example, the real value of the child element of child tax credit

Figure 2.7. The impact of labour market changes between 2007–08 and 2011–12 on real income at each percentile point, with and without tax and benefit reforms



Note: Incomes are measured after taxes and benefits but before housing costs, adjusted for household size and adjusted for inflation using a variant of the Consumer Prices Index that incorporates mortgage interest payments. The figure excludes individuals aged 65 and over. It assumes full take-up of all benefits.

Source: Authors' calculations using the Family Resources Survey 2007–08 and 2011–12, TAXBEN and the simulation methodology described in Appendix A.

[9] This is similar to the change in household income at each percentile point that actually occurred, as a comparison of Figures 2.1 and 2.7 reveals.

increased by 24% between 2007–08 and 2011–12. The gains for higher-income households are largely due to the increase in the income tax personal allowance over this period, which was nearly 30% higher in real terms in 2011–12 than in 2007–08. Of course, while these reforms boosted household incomes, they also weakened the public finances – though that was at least in part an intentional effort to stabilise demand in the midst of the Great Recession.

Summary

There are two important ways in which the tax and benefit system acted to reduce inequality during the Great Recession and its aftermath. First, the automatic stabilisation offered by the benefit system transformed an increase in household earnings inequality (as earnings fell furthest for low-income households) into a fall in household income inequality. This stabilisation took two forms – the 'insurance' offered by means-tested benefits that rise when earnings fall, and the simple fact that benefits provide low-income households with a source of income that is unaffected by labour market downturns. Second, real changes in tax and benefit parameters between 2007–08 and 2011–12 did more to boost the incomes of low-income households than higher-income households, further reducing inequality.

However, it is not the case that the tax and benefit system in place in 2007 did more to reduce inequality than the systems in place during previous recessions would have done. In fact, the 1979 system (with all parameters increased by earnings growth since 1979) would have provided a similar amount of insurance against the labour market downturn associated with the Great Recession to that which was in fact provided (by the 2007 system). That is because of two offsetting changes to the tax and benefit system over the intervening period. First, the introduction of tax credits created additional insurance against falls in earnings (as entitlements rose, partially compensating for lost earnings). Second, however, the sharp decline in the generosity of most working-age benefits relative to earnings over the period reduced the insurance offered by the tax and benefit system.

If the economy were to be hit by a labour market downturn characterised primarily by falls in employment rather than earnings (like that seen during the early 1980s recession), the second of these two changes to the shape of our tax and benefit system would become the more important one. As a result, the insurance provided by the tax and benefit system against such a downturn would actually be lower than that under tax and benefit systems from previous decades. The key reason is the decline in the value of most working-age benefits relative to earnings – meaning that people losing their jobs would find that benefits replaced a smaller share of their previous earnings on average than was the case during the early 1980s recession, for example.

2.3 Decomposing the different changes in inequality during past recessions

Having examined the role of the tax and benefit system in explaining the fall in inequality seen during the Great Recession, we now seek to quantify the contribution of all three key factors to the different trends in inequality seen during the past three recessions – the nature of the labour market downturn, the role of the tax and benefit system, and the characteristics of the household population. The methodology we employ is to use

simulation techniques to 'swap' these factors across recessions, and then look at the effect on the impact of each recession on income inequality. We exclude the effect of tax and benefit reforms implemented during each recession and we measure income inequality using the Gini coefficient (after excluding households below the 5th and above the 95th percentiles of the household income distribution).

For example, the impact of the Great Recession was to reduce the Gini coefficient by 0.2 percentage points, while the impact of the early 1980s recession was to increase the Gini coefficient by 2.3ppts. Starting with the Great Recession, we 'swap in' factors from the early 1980s recession sequentially to understand what drives this difference. First, if we swap in the tax and benefit system, and calculate what the impact of the Great Recession would have been had the uprated 1979 system been in place, we find that the Gini coefficient would have fallen by 0.3ppts: swapping the tax and benefit systems would have made little difference. Second, if we swap in the labour market downturn, and calculate the impact of the early 1980s downturn under the 1979 system (but hitting the 2007 population), we find that the Gini coefficient would have risen by 2.2ppts: swapping in the labour market downturn explains almost all of the difference. Finally, we swap in the population, taking us to the actual impact of the early 1980s recession, and uncover that demographic changes made little difference.

However, the order in which we 'swap' factors across recessions matters for their measured contribution. For example, if we take the same two recessions as above, but start with the early 1980s recession instead, we find that swapping the tax and benefit system first (i.e. calculating the impact of the early 1980s recession on the early 1980s population had the downrated 2007 tax and benefit system been in place) means the Gini coefficient would have risen by 2.9ppts (rather than 2.3ppts): swapping the tax and benefit system makes an important difference. The explanation is that, as discussed above, the 2007 system provides less insurance against an employment fall (such as that seen during early 1980s recession) than the 1979 system, but no less insurance against an earnings fall (such as that seen during the Great Recession).

Below, we use a formal decomposition to identify the contributions of differences in each of the three factors to the different impacts of past recessions on income inequality in a way that accounts for the fact that the order in which we 'swap' factors across recessions matters (the precise methodology behind this decomposition is laid out in Box 2.2).

Table 2.1 shows the results of this decomposition. We decompose the difference between the impact on inequality of the Great Recession and the impact on inequality of the two prior recessions (the early 1980s and early 1990s recessions). The first two rows of the table focus on the impact of the different recessions on inequality (after stripping out the effects of tax and benefit reforms during those recessions, which we do not include here as part of the 'impact of the recession'). They show that, as described above, while the early 1980s recession acted to increase the Gini coefficient by 2.3ppts, the Great Recession actually acted to reduce inequality on that measure by 0.2ppts – a difference in impact of 2.5ppts. Similarly, the 1990s recession acted to increase inequality by 1.4ppts – creating a difference of 1.6ppts with the impact of the Great Recession.

The bottom part of the table decomposes this difference between the three explanatory factors – differences in the labour market downturn, the underlying tax and benefit system, and the characteristics of the population. It shows that whether one compares the

Box 2.2. Decomposition methodology

In order to decompose the differences in the effects of past recessions on income inequality into the contribution of differences in the labour market downturn, the underlying tax and benefit system, and the characteristics of the household population, we proceed as follows:

1. We characterise each labour market downturn as changes in the distribution of earnings and in employment within population subgroups (defined by age, sex and education). Details of this characterisation and tests of its validity are shown in Appendix A.

2. We apply this characterised downturn to the household population at the start of the recession, under the tax and benefit system in place at that time. This allows us to calculate the impact of each downturn on income inequality, given the population and tax and benefit system in place at the time and excluding the impact of tax and benefit reforms during the recession. We measure this impact using the change in the Gini coefficient, excluding households below the 5th and above the 95th percentiles.

3. We then simulate the change in the Gini coefficient after 'swapping' labour market downturns, tax and benefit systems, and population characteristics across recessions. The difference between the change calculated in these simulations and the change from step 2 allows us to identify the contribution of each factor. For example, we calculate the change in the Gini coefficient that would have occurred had the 2007 population, under the 2007 tax and benefit system, been hit by the labour market downturn that occurred in the early 1980s recession, i.e. if each age, sex and education group had experienced the changes in earnings and employment that that group experienced in the early 1980s. The difference between this calculated change and the impact of the Great Recession calculated in step 2 provides a measure of the contribution of differences in the labour market downturn to the different impacts of the Great Recession and the early 1980s recession on income inequality.

4. We repeat step 3 for every possible combination of labour market downturn, tax and benefit system, and household population. This allows us to calculate the effect of 'swapping' each component, given every possible combination of the other two components. For example, we can estimate the effect on inequality of 'swapping' labour market downturns between the early 1980s recession and the Great Recession with each combination of tax and benefit system and population from the two periods. This is important because the effect of 'swapping' labour market downturns depends on, for example, the tax and benefit system in place. We have already seen that the recent labour market downturn looks more benign for levels of inequality when combined with a tax and benefit system that is relatively good at insuring against falling earnings (as opposed to falling employment).

5. Our decomposition results present the average estimated contribution of each factor in each of the different scenarios modelled in step 4. In technical terms, we are presenting results from a Shapley–Shorrocks decomposition, as described in Shorrocks (2013).

Table 2.1. Decomposition of the different impacts on inequality of the past three recessions

	Early 1980s versus Great Recession		Early 1990s versus Great Recession	
	Early 1980s recession	Great Recession	Early 1990s recession	Great Recession
Impact on income inequality (ppt change in Gini)	+2.3	–0.2	+1.4	–0.2
Difference	2.5		1.6	
Explained by:				
Labour market downturn	100%		95%	
Tax and benefit system	–13%		2%	
Population characteristics	13%		3%	

Source: Authors' calculations using the Family Expenditure Survey 1979, 1982, 1989 and 1992, the Family Resources Survey 2007–08 and 2011–12, TAXBEN and the simulation methodology described in Appendix A.

early 1980s or the early 1990s recession with the Great Recession, the result is the same – essentially all of the difference in what happened to inequality can be attributed to differences in the nature of the labour market downturn.

Why did the different labour market downturns have such varying effects on inequality? Much of the answer is the dramatic differences in trends in employment and average earnings during each recession shown in Figure 2.2, and their implications for income inequality: falls in employment tend to increase inequality, whereas falls in average earnings tend to reduce it. However, the different effects of the different labour market downturns also partly reflect different changes in the earnings distribution. During the Great Recession, falls in earnings were slightly larger for low-earning households than for high-earning ones. But during the early 1980s and early 1990s recessions, differences in earnings growth across the income distribution were much more significant – during the early 1980s downturn, for example, household earnings fell by more than 5% towards the bottom of the distribution, but rose by more than 5% at the top of the distribution. It was the combination of falling employment, rising average earnings and rising earnings inequality that made the early 1980s and early 1990s recessions so much more regressive than the Great Recession.

Table 2.1 also confirms the contribution of changes to the tax and benefit system illustrated by Figures 2.5 and 2.6 and discussed above. When faced with a large fall in earnings, the 2007 system did no more to provide insurance than an earnings-uprated 1979 system would have done. And faced with a large fall in employment, it would have provided significantly less insurance than the 1979 system. Averaging over these two comparisons leads to the conclusion that the difference in the effects of the two downturns would have been even larger had the tax and benefit system remained the same (giving rise to the negative contribution shown in the table). Comparing the early 1990s recession with the Great Recession, changes to the tax and benefit system explain almost nothing of the difference in impact of the two downturns on inequality.

The fact that differences in the nature of the labour market downturn can explain so much of the different impacts of past recessions on the income distribution, while changes in the underlying tax and benefit system can explain so little, is an important lesson for policymakers. If they are concerned about avoiding a rise in inequality, pursuing policies that reduce the probability of a large increase in unemployment is extremely important. However, that should not lead to the conclusion that tax and benefit policy does not matter for determining the impact of recessions on the income distribution. As shown in Figure 2.7 earlier, reforms to the tax and benefit system can have an important impact on how incomes change through the recession, as governments respond to the impact of labour market downturns on household incomes by changing the rules of the system. Moreover, the small contribution of changes in the underlying tax and benefit system to the different impacts of past recessions on inequality masks the fact that, in the face of certain kinds of downturns, tax and benefit reforms in recent decades (relative to earnings-uprating) have reduced the insurance the system would provide. In particular, the falling generosity of out-of-work benefits relative to average earnings means the system provides less insurance against falls in employment than in the past. This is something we pick up in the next chapter, as we move from understanding the impact of past recessions on income inequality to assessing the insurance the tax and benefit system might provide against the next recession.

3. The insurance provided by the tax and benefit system

In the previous chapter, we examined how income inequality changed through the past three recessions in the UK, and what drove those changes. Part of the explanation was the role of the tax and benefit system in providing different amounts of 'insurance' to different kinds of households when incomes from work fall. That insurance takes two forms: lower tax payments and higher benefit entitlements when earnings fall, and the fact that benefits provide some households with a source of income that is not directly affected by labour market conditions.

In this chapter, we look at the insurance the current tax and benefit system would provide against the next labour market downturn – both to the population as a whole and to different subgroups (defined by income, age and number of children in the household) – and how tax and benefit reforms currently being rolled out and planned for the next few years will affect the degree of insurance offered by the system.

To do so, we simulate the current UK household population being hit by two different kinds of labour market downturn – the falls in employment seen during the early 1980s recession and the falls in earnings seen during the Great Recession. We use the same methodology outlined in Section 2.2 and described in more detail in Appendix A. As discussed in Chapter 2, the insurance provided by the tax and benefit system against a rise in unemployment can be importantly different from the insurance it provides against a fall in earnings.

Throughout, we document two different measures of the insurance offered by the tax and benefit system. The first is the 'pass-through rate' (described in Section 2.1). This is calculated as the proportion of a change in earned income (resulting from job loss or a change in earnings) that is passed through to net income, rather than being offset by lower tax payments or higher benefit entitlements. The second is the sensitivity, in *proportional* terms, of net income to changes in earned income (hereafter 'sensitivity of net income'). This is calculated as the percentage change in net income for a given percentage change in employment income. The conceptual difference between the two measures is illustrated in detail in Box 3.1, but the key distinction is that the sensitivity of net income captures the insurance provided by benefit (or other) income that is unaffected by a labour market downturn, while the pass-through rate does not. In this chapter, we discuss these measures of insurance in the context of aggregate labour market downturns, but they could equally well be used to characterise the insurance the tax and benefit system provides to individuals who see earnings falls or lose their job in 'normal' macroeconomic times.

It is important to bear in mind throughout this chapter that the insurance the tax and benefit system offers is only one aspect of the broader set of trade-offs that governments face when designing the welfare system. Often, these trade-offs are characterised primarily in terms of redistributive objectives and the impact of taxes and benefits on financial work incentives: broadly speaking, the more redistribution a government seeks to achieve through the tax and benefit system, the weaker the financial work incentives that result. In the context of this chapter, it is important to bear in mind two other aspects of the trade-offs.

First, there is a direct conflict between providing insurance to households through the tax and benefit system and strengthening their financial work incentives. For example, a higher pass-through rate means that households are less insured against labour market downturns, but it also means they have a stronger financial incentive on average to increase their earnings, as more of any increase is 'passed through' to their net income rather than lost to higher taxes or lower benefit entitlements. For discussions of these

Box 3.1. The pass-through rate and the sensitivity of net income

In this chapter, we use two different measures of the insurance provided by the tax and benefit system:

- the 'pass-through rate': what percentage of a fall in earned income is passed through to net income?

- the 'sensitivity of net income': what is the percentage change in net income for a given percentage change in earned income?

The pass-through rate will be lower the more that tax liabilities fall, or benefit and tax credit entitlements rise, to offset falls in earned income. The sensitivity of net income will also be lower the lower the pass-through rate, all else equal. However, it will also be lowered wherever there is a portion of net income that is simply insensitive to changes in earnings (e.g. a non-means-tested benefit or other unearned income).

To illustrate with an example, consider a fictional low-income household with a total net household income of £200 a week. The household earns £150 a week before tax, pays £50 in tax (yielding net earnings of £100 a week) and has income from disability benefits of £100 a week. Suppose now that the household's pre-tax earnings fell by £15 a week, and its tax payments fell by £5 as a result (leaving it with a net income of £190). What do the two measures tell us about the insurance provided by the tax and benefit system?

The 'pass-through rate' is 67%, since the £10 fall in net income is 67% of the £15 fall in earnings. It captures the role of lower taxes in insuring the household against earnings falls, but is completely insensitive to the amount of disability benefits the household receives. The 'sensitivity of net income' in this example is only 50% – earnings fell by 10%, but net household income fell by 5%. This measure is affected both by the tax system and by the amount of disability benefits the household receives, since the latter affects the percentage change in net income resulting from the fall in earnings.

In that sense, the sensitivity of net income is a broader measure of the insurance the tax and benefit system provides than the pass-through rate. Both capture the 'offsetting' insurance resulting from the fact that tax payments and benefit entitlements respond to earnings, but only the sensitivity of net income captures the 'diluting' insurance resulting from the fact that benefits provide a source of income that is unaffected by labour market downturns.

measures of financial work incentives, and how and why they have changed over time, see Adam and Browne (2010) and Adam and Browne (2016).[10]

Second, the more insurance the tax and benefit system provides to households, the greater the impact of labour market downturns on the public finances. The more of a fall in earnings that is offset by changes in taxes and benefits, the better insured households are, but the greater the impact on tax receipts and benefit spending. Of course, some cyclicality in the public finances is likely to be desirable, as the government is better placed than households to borrow in order to smooth resources over time. But it is something policymakers need to bear in mind when considering the design of the tax and benefit system.

Along with the insurance provided by the tax and benefit system against labour market downturns, we also consider the extent to which different households are able to maintain their spending levels in the face of an economic downturn, by saving less, drawing down existing savings or borrowing. This is of interest for two related reasons. First, one might think the government should be most concerned with providing insurance to those households least able to insure themselves through saving and borrowing (or other means) – in other words, to those households that are 'credit constrained'. Second, economic theory suggests that if the impact of a downturn on household incomes is temporary (and understood to be so by households), the only households whose spending will fall appreciably as a result of the downturn will be those that are credit constrained; hence, the interaction between which households see an impact on their net incomes and which are credit constrained would determine the effect of the downturn on household spending.[11] (If, however, the impact of a downturn on incomes is permanent (or believed to be so by households), the spending of other households is also likely to fall in response, though perhaps to a lesser extent.[12]) We define households as being credit constrained if they report that they would not be able to pay an unexpected expense of £750, and have less than £1,500 in financial assets (i.e. excluding property and pension wealth); information on both components of this measure is available for households in the Family Resources Survey.[13]

The rest of this chapter proceeds as follows. In Section 3.1, we first document how the insurance provided by the tax and benefit system against falls in earnings and employment has evolved over time. We then examine how the insurance provided by the current tax and benefit system varies by income, age and number of children, and how that variation relates to differences in the extent of credit constraints across these subgroups of the population. Section 3.2 focuses on the impact of tax and benefit reforms

[10] Our measures of insurance do not, however, correspond directly to standard measures of financial work incentives such as the participation tax rate and the effective marginal tax rate. Most significantly, we focus only on the insurance the tax and benefit system provides to those who currently have some earnings, whereas analysis of financial work incentives often includes the impact of reforms on the incentives facing non-workers.

[11] For an analysis that proceeds on this basis, see Dolls, Fuest and Peichl (2012).

[12] See Blundell, Pistaferri and Preston (2008) for a detailed analysis, using data from the United States, of the extent which households are insured against both temporary and permanent shocks to their income.

[13] To be precise, we observe whether each 'benefit unit' (defined as an individual, any partner and any dependent children) within a household has financial assets of £1,500. In households with multiple benefit units, we define the household as being credit constrained if none of the benefit units has financial assets of £1,500 and the household reports being unable to afford an unexpected expense of £750.

that are planned or currently being rolled out on the insurance the system provides, both overall and to specific groups.

3.1 The insurance provided by the current tax and benefit system

Evolution over time

Before looking in detail at the insurance the current tax and benefit system would provide against labour market downturns of different kinds, we put the properties of the current system in their historical context. Figure 3.1 plots the simulated economy-wide pass-through rates to net income of the early 1980s employment downturn and the Great Recession earnings downturn, if they were to hit the current household population under different historical tax and benefit systems. All the rates and thresholds of past tax and benefit systems are increased by average earnings growth between the time they were in place and 2017. (The rationale for this is discussed in detail in Box 2.1.)

Looking at tax and benefit changes over the last 20 years, there is a clear contrast between their effects on the insurance the tax and benefit system provides against earnings falls and the insurance it provides against employment falls. Changes to the tax and benefit system since 1997 have increased the insurance the system provides against falls in earnings for those in work, but reduced insurance against falls in employment. For the Great Recession, which was largely a hit to earnings for those in work, the pass-through rate is 64% under the (earnings-uprated) 1997 system, compared with 61% under the 2007 and 2017 systems. This fall in the pass-through rate is explained by the growing importance of in-work benefits, and particularly tax credits (which automatically rise when

Figure 3.1. Pass-through rates under different historical tax and benefit systems

Note: The figure excludes households containing an individual aged 65 or over. Pass-through rates are economy-wide averages.

Source: Authors' calculations using the using the Family Expenditure Survey 1979 and 1982, the Family Resources Survey 2007–08, 2011–12 and 2015–16, TAXBEN and the simulation methodology described in Appendix A.

earnings fall). By contrast, for the falls in employment associated with the early 1980s recession, the pass-through rate has risen from 53% in 1997 and 2007 to 55% in 2017, reflecting the further decline in the value of out-of-work benefits relative to earnings.[14] This reduction in insurance against falls in employment continued a longer-run trend, with the employment pass-through rate rising from 50% to 53% between 1979 and 1997. All of these trends are the same if one looks at the sensitivity of net income rather than the pass-through rate.

Of course, here we are only capturing changes in the *financial* insurance the government provides to individuals in the face of falling earnings or employment. One could argue that 'active labour market policies' introduced over recent decades, such as the support and conditionality regime applied to jobseekers' allowance (JSA) claimants, also act as a form of insurance by helping people back into work.[15] Such changes are not captured in the analysis in this section.

As mentioned above, these trends in the insurance provided to households could equally well be described as changes in the share of a downturn borne by the public finances. Tax and benefit reforms since 1979 have made little difference, on average, to the amount of an earnings downturn passed through to the public finances (stable at around 40%). But they have decreased the cyclicality of the public finances with respect to an employment downturn, with the share of the cost borne by the public finances falling from 50% to 45%.

Variation by income, age and number of children

We now focus on the insurance provided by the tax and benefit system to different groups against a fall in earnings.

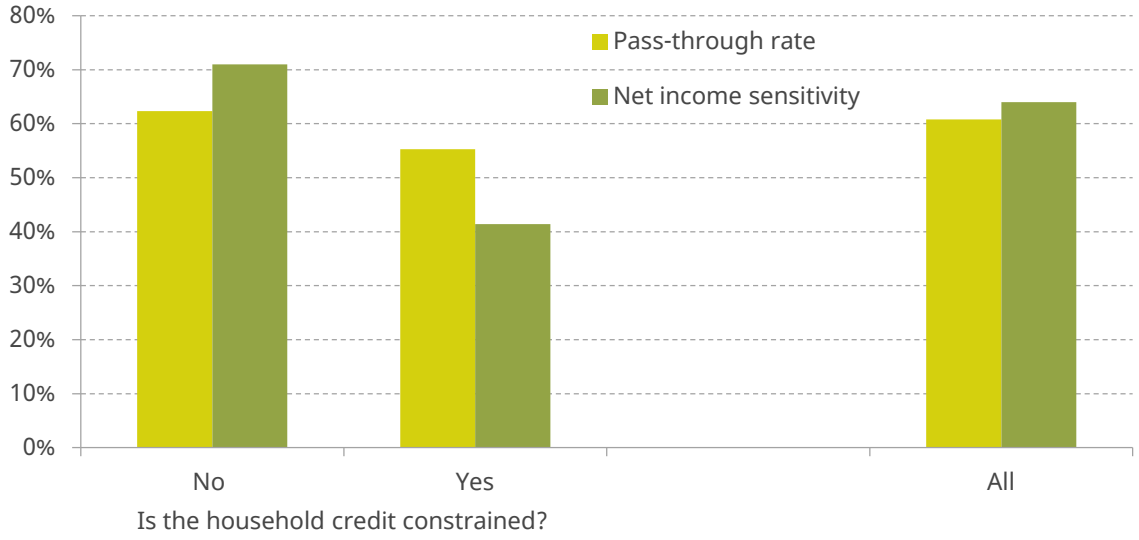
All else equal, a government might be more concerned with providing insurance to those unable to insure themselves (and hence who would otherwise reduce their spending in response to even a temporary downturn). Figure 3.2 shows that that is in fact the case under the current tax and benefit system. We split households by whether they are credit constrained according to our measure (defined in the introduction to this chapter) and we plot the pass-through rate and sensitivity of net income for each group (calculated at the group level, rather than as the average of household-level calculations). According to both measures, the tax and benefit system provides more insurance on average to credit-constrained households than to the rest of the population – their pass-through rate is 55% (compared with 62% for the rest of the population) and their sensitivity of net income is 41% (compared with 71% for the rest of the population). The greater discrepancy in the sensitivity of net income across the two groups partly reflects the fact that credit-constrained households get more of their income from unearned sources (in particular, benefits), as well as seeing lower taxes and higher benefits offset more of any fall in earnings.

Figure 3.3 looks at how state insurance and self-insurance against a fall in earnings vary across the income distribution, plotting for each income decile the pass-through rate,

[14] This is similar, but not identical, to saying that over the past 20 years, average marginal effective tax rates have risen but average participation tax rates have fallen.

[15] These also provide another potential causal link between changes in insurance and the nature of labour market downturns. If, for example, money is shifted from providing financial insurance against employment falls to helping those affected return to work quickly, that might have implications for the size of employment effects observed.

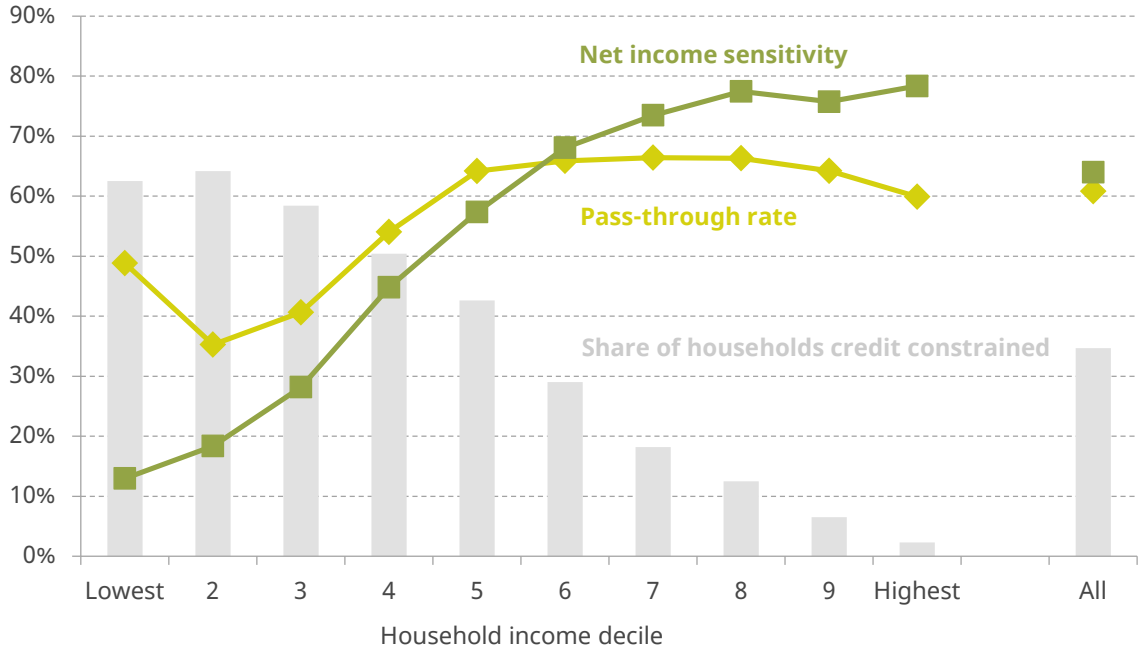
Figure 3.2. Earnings pass-through rates and sensitivity of net income, by whether the household is credit constrained



Note: The figure excludes households containing an individual aged 65 or over. The pass-through rate and sensitivity of net income are calculated at the credit-constraint-group level.

Source: Authors' calculations using the 2015–16 Family Resources Survey, TAXBEN and the simulation methodology described in Appendix A.

Figure 3.3. Earnings pass-through rates, sensitivity of net income and credit constraints, by income decile



Note: The figure excludes households containing an individual aged 65 or over. Households are divided into 10 equally sized groups according to net equivalised household income. The pass-through rate and sensitivity of net income are calculated at the decile level.

Source: Authors' calculations using the 2015–16 Family Resources Survey, TAXBEN and the simulation methodology described in Appendix A.

sensitivity of net income (both calculated at the decile level, rather than as the average of household-level calculations) and proportion of households that are credit constrained. Looking first at the pass-through rate, it is clear that, on this measure, the state provides significantly more insurance to lower-income households than to those with higher incomes (this is also true when looking at insurance against falls in employment). The pass-through rate of a fall in earnings to net household income is around or below 40% in the second and third income deciles, compared with 66% across most of the upper half of the distribution. This reflects the importance of means-tested in-work benefits (such as tax credits) to households towards the bottom of the income distribution – for many of these households, a fall in earnings leads not just to lower tax payments (an insurance mechanism also available to higher-income households) but also to higher entitlements to means-tested benefits. Of course, while this greater degree of insurance may be welcome, it is concomitant with the weak financial work incentives faced by this group (relative to higher-income households). The variation in the sensitivity of net income to an earnings fall by income decile is even more pronounced. In particular, the sensitivity of net income to earnings falls is significantly lower than the pass-through rate for low-income households: for those in the lowest income decile, the percentage change in their net income is just around 10% of the percentage change in their earnings. This is because earnings make up only a part of income for households in this part of the distribution (with benefits being an alternative source of income), and so a fall has a limited impact on their overall net household incomes.

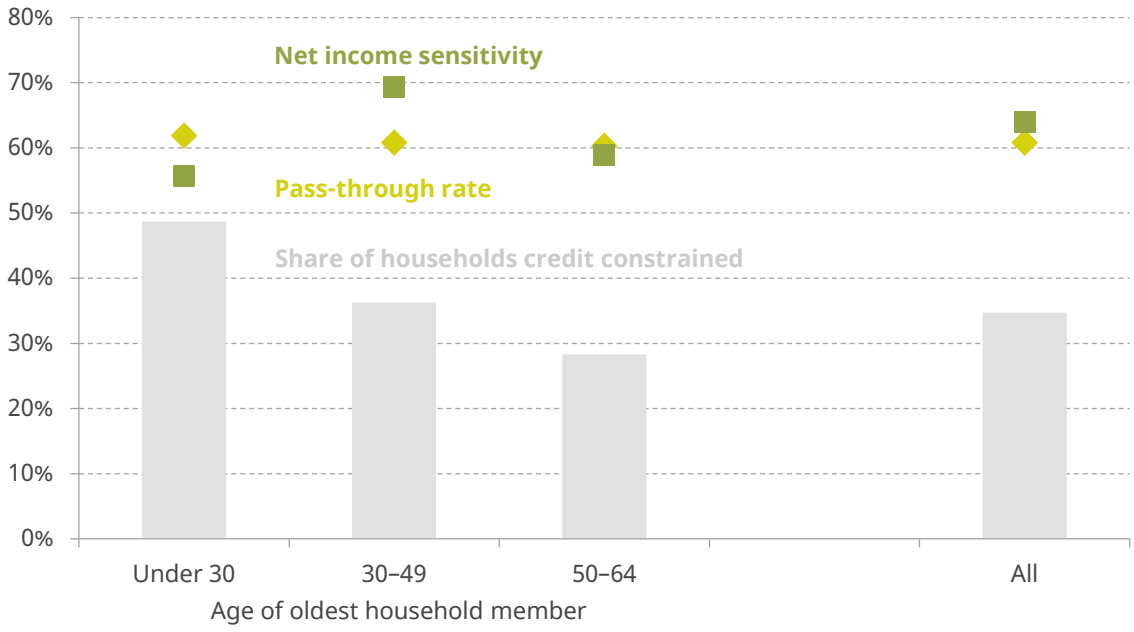
The figure shows that, when comparing income groups, the tax and benefit system targets insurance to those households that are less likely to be able to insure themselves, by saving less, drawing down on savings or borrowing in order to maintain their spending. Across the bottom three deciles of the income distribution, around 60% of households are credit constrained on our measure, compared with less than 10% of households in the top two income deciles. So those whose spending would most likely have to fall if their net incomes fell see their net incomes most protected by the tax and benefit system, while those most able to 'smooth out' a fall in their net income receive the least protection.

Figure 3.4 looks at exactly the same outcomes as Figure 3.3, but the household population is split according to the age of the oldest member of the household. The key thing to take from the figure is that the tax and benefit system does not act to offset large differences in credit constraints (and hence the ability to self-insure against earnings falls) between households of different ages. Among those households where all members are under 30, 49% are credit constrained. This proportion falls to 36% of households where the oldest member is between 30 and 49, and 28% of households where the oldest member is between 50 and 64. Hence, older households are better able to maintain their spending when their net income falls. But whether one considers the pass-through rate or the sensitivity of net income, the tax and benefit system does not provide more insurance to younger households than to older ones, offsetting differences in their ability to self-insure. (This is also the case when one looks at insurance against employment falls.) Hence, in the event of a downturn with a temporary impact on earnings, the proportion of the impact passed through to spending would be likely to be larger for younger households than for older ones. This failure of the system to offset differences in the ability to self-insure across age groups is not necessarily ill advised – to determine that, one would also need to consider the long-run effects of creating different financial incentives for younger and

older adults.[16] However, it is the case that, *all else equal*, there is a stronger case for the state to provide insurance to those households (or groups of households) that are less able to insure themselves.

Figure 3.5 looks at how the insurance offered by the tax and benefit system, and the availability of self-insurance, vary according to the number of children in the household (none, one or two, and three or more). It shows that the tax and benefit system provides significantly more insurance against earnings falls to households with children (the same is true of insurance against employment falls). For example, the pass-through rate is 64% for households with no children, 57% for households containing one or two children, and just 45% for families with three or more children. As with the variation in state insurance across the income distribution, these differences counteract differences in the extent of credit constraints across different groups. While households with three or more children receive the most insurance from the tax and benefit system, they are also the most likely to be credit constrained (56%, compared with 30% of households with no children). As a result, one might expect the proportion of an earnings fall that would be passed through to spending to be relatively similar across these groups. Households without children would tend to see a relatively large share of the fall in earnings passed through to their net household income, but would also tend to be better able to mitigate the impact of falling net income on their spending; and vice versa for households with children.

Figure 3.4. Earnings pass-through rates, sensitivity of net income and credit constraints, by age of oldest household member

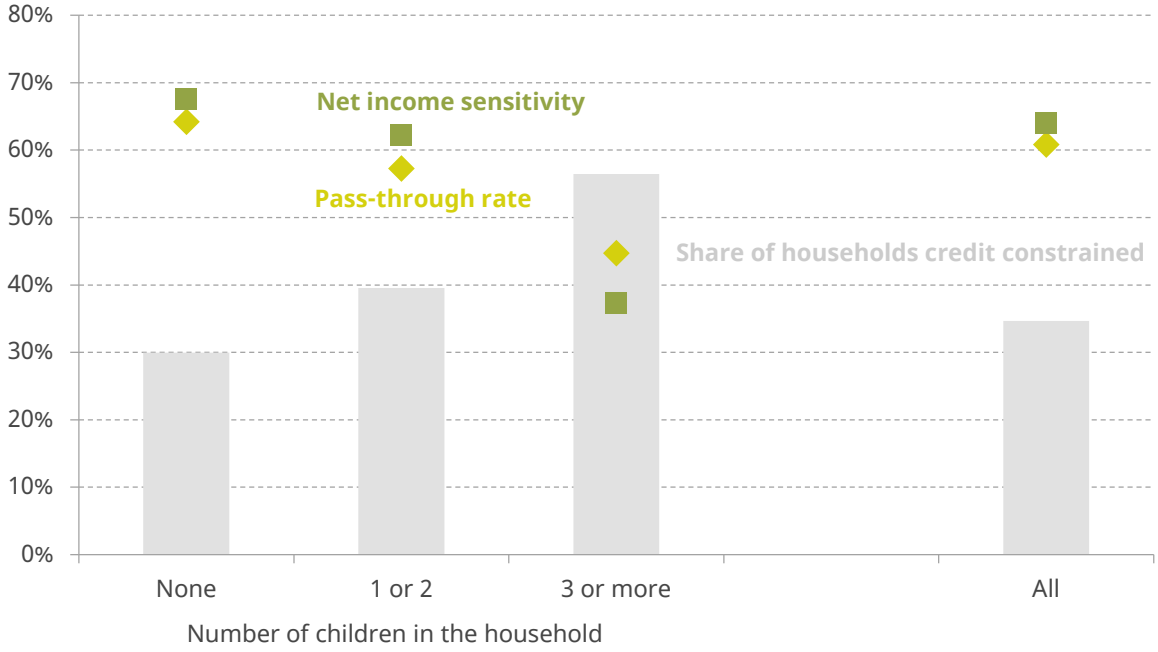


Note: The figure excludes households containing an individual aged 65 or over. The pass-through rate and sensitivity of net income are calculated at the age-group level.

Source: Authors' calculations using the 2015–16 Family Resources Survey, TAXBEN and the simulation methodology described in Appendix A.

[16] See section 6.6 of Banks and Diamond (2011) for a review of the literature addressing this question.

Figure 3.5. Earnings pass-through rates, sensitivity of net income and credit constraints, by number of children in the household



Note: The figure excludes households containing an individual aged 65 or over. The pass-through rate and sensitivity of net income are calculated at the demographic-group level.

Source: Authors' calculations using the 2015–16 Family Resources Survey, TAXBEN and the simulation methodology described in Appendix A.

3.2 The insurance provided by the future tax and benefit system

There are a number of significant cuts to working-age benefits that are planned or are currently being rolled out, in order to deliver the £12 billion cut in annual spending on working-age benefits pledged in the 2015 Conservative manifesto. In this section, we look at the long-run impact of those cuts on the insurance provided by the tax and benefit system to different households.

We continue to compare the impacts of the employment downturn of the early 1980s, and the falls in earnings during the Great Recession, on the current household population under different tax and benefit systems. The systems that we now turn our attention to are the current system and the system that we will have once all cuts that are planned or being rolled out are fully in place. By 'fully in place' we mean that all reforms apply to all households (rather than, for example, to new claimants only) and that there is no remaining 'transitional protection' from any losses arising from reforms.

A full list of the reforms we examine here is given in Appendix C. But the majority of the impact on household incomes is explained by three planned benefit cuts:

- *The continued freeze in most working-age benefit rates until March 2020*. Under the latest inflation forecasts from the Office for Budget Responsibility, this will reduce the real value of these benefits by 5% between now and 2020, and reduce government spending by over £3 billion a year.

- *The roll-out of universal credit*, which is less generous on average than the benefits it is replacing. This is expected to reduce government spending by around £5 billion a year in the long run.

- *Cuts to the generosity of tax credits for families with children* – limiting entitlement to two children and removing the 'family element'. These are expected to reduce government spending by around £5 billion a year in the long run.[17]

Figure 3.6 shows the impact of tax and benefit changes that are planned or being rolled out on the overall insurance provided by the tax and benefit system. As one would expect, reductions in the generosity of means-tested benefits will increase the rate at which falls in earned income are passed through to net income. (Unsurprisingly, they will also increase the sensitivity of net income to falls in earned income, not shown here.) Planned tax and benefit reforms would increase the pass-through rate of an employment downturn from 55% to 58% and the pass-through rate of an earnings downturn from 61% to 63%. These might seem like small changes in the extent of insurance offered by the tax and benefit system, but they are significant when compared with past changes in this measure of insurance. For example, the (2.3 percentage point) impact of planned reforms on the pass-through rate of an earnings downturn is of a comparable size to the impact of tax and benefit reforms between 1997 and 2007 (3.0 percentage points), a period that saw the introduction of the current system of tax credits.

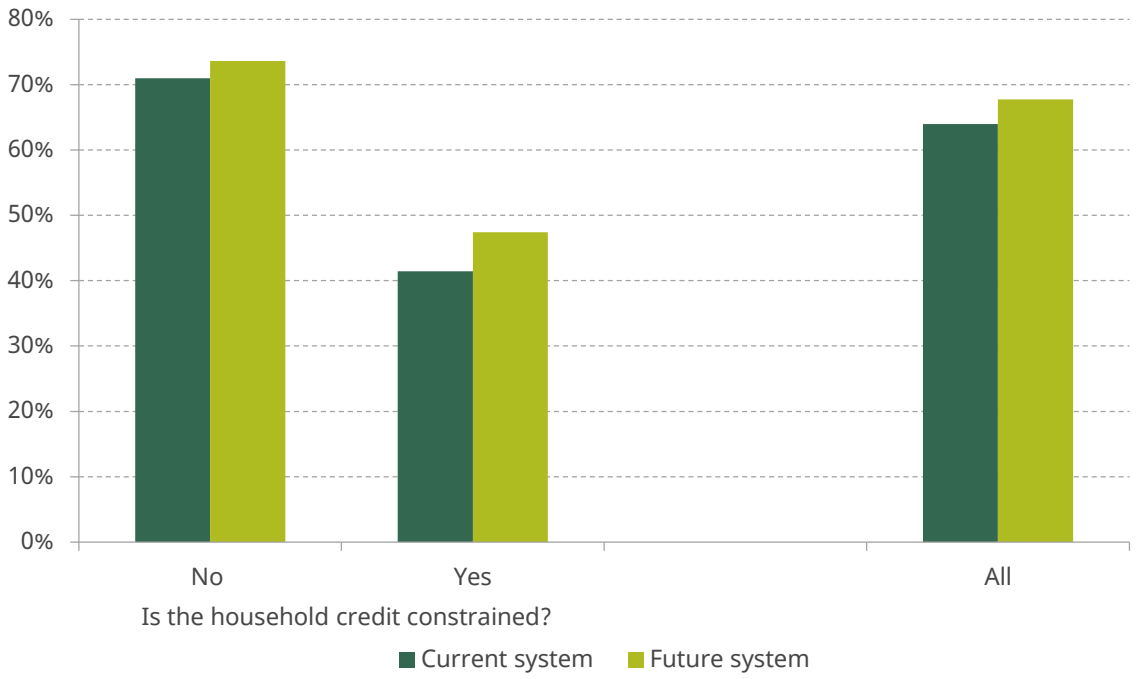
Figure 3.6. The impact of planned tax and benefit reforms on pass-through rates

Note: The figure excludes households containing an individual aged 65 or over. Pass-through rates are economy-wide averages.

Source: Authors' calculations using the 2015–16 Family Resources Survey, TAXBEN and the simulation methodology described in Appendix A.

[17] All reductions in government spending calculated using the 2015–16 Family Resources Survey and TAXBEN.

Figure 3.7. Sensitivity of net income to an earnings downturn, by whether the household is credit constrained, before and after planned tax and benefit reforms



Note: The figure excludes households containing an individual aged 65 or over. The sensitivity of net income is calculated at the credit-constraint-group level.

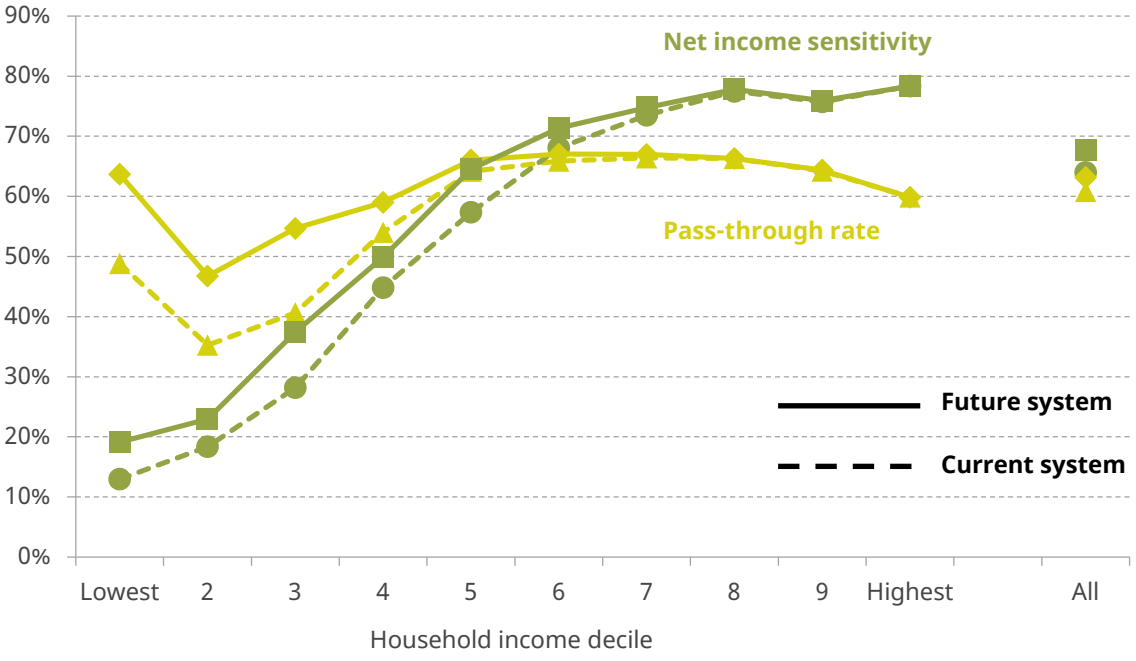
Source: Authors' calculations using the 2015–16 Family Resources Survey, TAXBEN and the simulation methodology described in Appendix A.

As before, this decrease in the insurance offered to households can also be described as a reduction in the sensitivity of the public finances to labour market downturns. The share of an earnings downturn borne by the public finances will fall from 39% to 37%, with the share of an employment downturn borne by the public finances falling from 45% to 42%.

Figure 3.7 shows that the reduction in insurance against earnings falls provided by the tax and benefit system will be focused on those households less able to insure themselves. It documents the impact of planned reforms on the sensitivity of net income, splitting households according to whether they are credit constrained according to our measure. While the sensitivity of net income only rises slightly on average for those households that are not credit constrained (from 71% to 74%), the proportional impact on the average sensitivity of net income among households that are credit constrained is more substantial – an increase from 41% to 47%.

One reason for this difference is that the effects of reforms are focused on households towards the bottom of the income distribution, which (as shown in Figure 3.3) are more likely to be credit constrained. This is illustrated by Figure 3.8, which shows the impact of planned reforms on the insurance the tax and benefit system provides against an earnings downturn to households in each household income decile, as measured by the pass-through rate and as measured by the sensitivity of net income. Both measures show that the reduction in the insurance offered by the tax and benefit system is focused on the lower half of the income distribution. The pass-through rate, for example, is almost unchanged across the higher-income half of households, but across the poorest 30% of

Figure 3.8. Earnings pass-through rates and the sensitivity of net income, by income decile, before and after planned tax and benefit reforms



Note: The figure excludes households containing an individual aged 65 or over. Households are divided into 10 equally sized groups according to net equivalised household income. The pass-through rate and sensitivity of net income are calculated at the decile level.

Source: Authors' calculations using the 2015–16 Family Resources Survey, TAXBEN and the simulation methodology described in Appendix A.

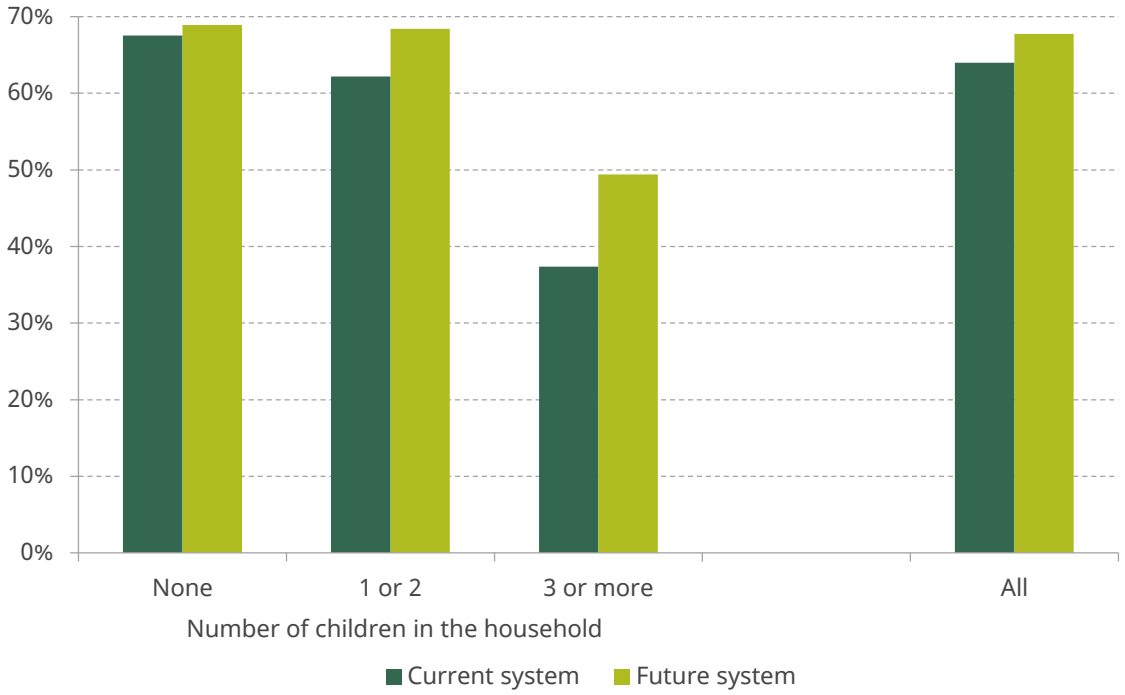
households it rises from 39% to 53% on average. Most of this increase is accounted for by the introduction of universal credit, which reduces the rates at which benefits are withdrawn as earnings rise (or rise as earnings fall) for many low-income renters and will lead to some other low-income households no longer being entitled to benefits.[18] The sensitivity of net income to falls in earnings also rises across the lower half of the distribution, by between 5 and 10 percentage points in each of the bottom five deciles.

The insurance against earnings downturns offered to high-income households is almost unaffected on either measure, reflecting the facts that almost none of them are entitled to benefits and that there are almost no planned changes to direct taxes. Note, however, that benefit cuts do affect the insurance the tax and benefit system provides to higher-income households against job loss. Particularly for those households with one adult in paid work, which would therefore be reliant on benefit income in the event of that individual losing their job, cuts in the generosity of support for families with no earned income (such as the move to universal credit and cuts to child tax credit) reduce the insurance they have against an employment downturn.

Figure 3.9 shows the impact of tax and benefit reforms planned and being rolled out on the sensitivity of net income of households with different numbers of children to an earnings downturn (the patterns are very similar for an employment downturn). The

[18] Again, note that a reduction in insurance leads to a corresponding strengthening of financial work incentives.

Figure 3.9. Sensitivity of net income to an earnings downturn, by number of children in the household, before and after planned tax and benefit reforms



Note: The figure excludes households containing an individual aged 65 or over. The sensitivity of net income is calculated at the demographic-group level.

Source: Authors' calculations using the 2015–16 Family Resources Survey, TAXBEN and the simulation methodology described in Appendix A.

figure shows that the sizeable cuts in the generosity of working-age benefits that are planned and being rolled out make little difference to the insurance offered by the tax and benefit system to households without children, with the sensitivity of net income to a fall in earned income rising just from 68% to 69%. By contrast, planned cuts significantly reduce the insurance the system provides to families with three or more children – the average sensitivity of net income to a fall in earned income among this group rises from 37% to 49%. If we look just at families with three or more children with less than the median household income, the increase is even more dramatic in proportional terms: the sensitivity of net income rises from 21% to 33%.

This is the combined effect of two distinct ways in which planned cuts, and in particular the limiting of the child element in tax credits and universal credit to the first two children, have reduced the insurance the tax and benefit system provides to these households. First, by substantially reducing maximum benefit entitlements, reforms will lead to fewer of these households receiving any benefits. If these households then saw a fall in their earnings, that would not be counteracted (to the same extent) by rising benefit entitlement, reducing the 'offsetting' insurance the tax and benefit system provides. Second, those households still receiving benefits will receive less relative to their earnings. As a result, the 'diluting' insurance provided by the tax and benefit system will also be reduced; benefits, a source of income unaffected by labour market downturns, will become less important. It is important to bear in mind that, as Figure 3.9 shows, households with three or more children will continue to be better insured by the tax and

benefit system against labour market downturns than other groups, even after all these reforms have taken full effect. On the other hand, Figure 3.5 showed that these households are more likely than average to be credit constrained according to our measure, and hence less able to insure themselves.

In summary, tax and benefit reforms that are planned or currently being rolled out will reduce the insurance the system provides to the population on average, with particularly large reductions for groups for whom the benefit system is an important component of the insurance provided – households towards the bottom of the income distribution and those with three or more children. However, it is important to remember that this reduction in insurance implies a strengthening of the financial work incentives facing some individuals in these households. The point is that policymakers should bear in mind all three of redistribution, incentives and insurance when designing and reforming the tax and benefit system.

4. Conclusions

Income inequality fell significantly during and immediately after the Great Recession, in stark contrast with the sharp rises in inequality seen during the early 1980s and early 1990s downturns. The key reason for the different impacts of past recessions on inequality is differences in the nature of the labour market downturn. The early 1980s and early 1990s saw dramatic falls in employment and continued real earnings growth – an inequality-increasing combination. On the other hand, the Great Recession was characterised by large falls in real earnings, which hit higher-income households harder, and falls in employment were much less dramatic.

Along with the nature of the labour market downturn, a second important reason for the decline in inequality seen during and immediately after the Great Recession was the role of the tax and benefit system. Tax credits and other in-work benefits supported the incomes of low-income working households as their real earnings fell, with the result that falls in household income were larger towards the top of the distribution, despite the fact that falls in household earnings were biggest towards the bottom. On top of that automatic effect of the system already in place at the onset of the recession, increases in the generosity of some benefits during the recession itself boosted the incomes of low-income households, further reducing income inequality.

However, it is not the case that the tax and benefit system we have in place now does a better job than in the past at insuring households against labour market downturns. In fact, falls in the generosity of out-of-work benefits relative to earnings mean that the state provides less insurance against job loss than in previous decades. Insurance against earnings falls is broadly unchanged, as falls in the value of most benefits relative to earnings have been offset by the introduction of tax credits.

As a result, there has been a relative shift in the insurance the tax and benefit system provides, away from employment falls and towards earnings falls. While this shift in the type of insurance provided by the system is the result of deliberate decisions to expand tax credits while only price-indexing out-of-work benefits, it is perhaps an accidental side effect of those decisions – which were really more about strengthening the incentive for households to have someone in paid work, while worrying less about their incentives to increase their earnings. It is, of course, important for policymakers to be aware of all of the consequences of the choices they make over benefit design.

Looking forward, cuts to working-age benefits are set to reduce significantly the insurance the tax and benefit system provides against future recessions – changes planned and being rolled out will have a larger impact on average insurance against employment falls than the net effect of all tax and benefit reforms over the last 20 years. Unsurprisingly, the falls in the insurance the tax and benefit system provides will be focused on those groups for whom benefit income is most important – low-income households and especially those with three or more children. These groups of households are the groups that are currently most insured against labour market downturns – both because lower earned income would be offset by higher benefits as well as lower tax payments, and because benefits provide a source of income that is not directly affected by downturns. But they are also the groups of households least able to ‘self-insure’ by saving less, drawing down on savings or borrowing, in order to maintain levels of spending after a fall in earned income. Of course, when designing and reforming the tax and benefit system, the insurance it

offers households against labour market downturns is only one of many factors to be considered. But it is important that this role of the tax and benefit system is not neglected entirely.

Appendix A. Simulating labour market downturns

In order to isolate the impact of labour market downturns on household incomes, and to allow us to simulate the impact of a given downturn hitting UK households at a different point in time, we need to characterise the impact of a given downturn on employment and earnings in a parsimonious way. We do so as follows.

Employment

In order to simulate the impact of changes in employment on household incomes, we first divide individuals into 12 subgroups: three age groups (under 30, 30–49 and 50–64) interacted with two education groups (compulsory and post-compulsory education) and split by sex. Within each of these 12 groups, we calculate the change in the full-time and part-time employment rates seen during a given downturn (part-time is defined as working fewer than 30 hours a week). We also calculate the change in the proportion of households with someone in work, splitting households into single adults, lone parents, households with two or more adults and no children, and households with two or more adults and at least one child.

We then use reweighting techniques to adjust the relevant year of data for these calculated changes in employment rates. Throughout, we hold the participation rate in each subgroup fixed, to ensure that the number of unemployed individuals and households rises in our simulation (rather than the number of individuals and households not participating in the labour market).

Earnings

In order to simulate the impact of changes in earnings on household incomes, we first divide individuals with positive earnings into 18 subgroups. These subgroups are the 12 subgroups used to simulate the impact of employment, but with the subgroups further divided into those working part time and those working full time in the six cases where the sample size is large enough to do so (low-educated men aged 30–49 and all female subgroups except high-educated women aged 50–64). For each of these 18 subgroups, we calculate the change in the mean and the variance of the natural logarithm (log) of earnings. Under the assumption that earnings within each group are log-normally distributed, the change in the mean and the variance fully captures the change in the distribution of earnings.

We can then apply this change in the distribution of earnings to any given year of data in the following way. Within each subgroup, we take the log of each individual's earnings and calculate the difference between that value and the mean of log earnings in the subgroup. We then simulate the log earnings of that individual after the downturn as the new subgroup mean, plus the difference between the original value and the old mean scaled in line with the change in the standard deviation of log earnings in the group. Finally, we take the exponential to recover the earnings of the individual in question.

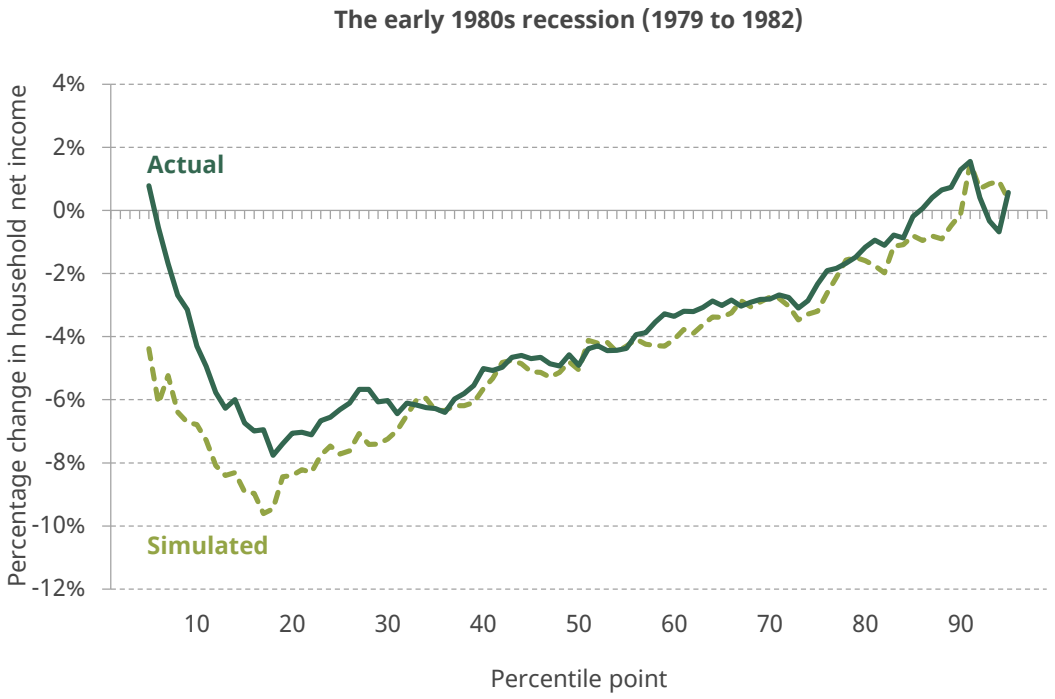
Assessing accuracy

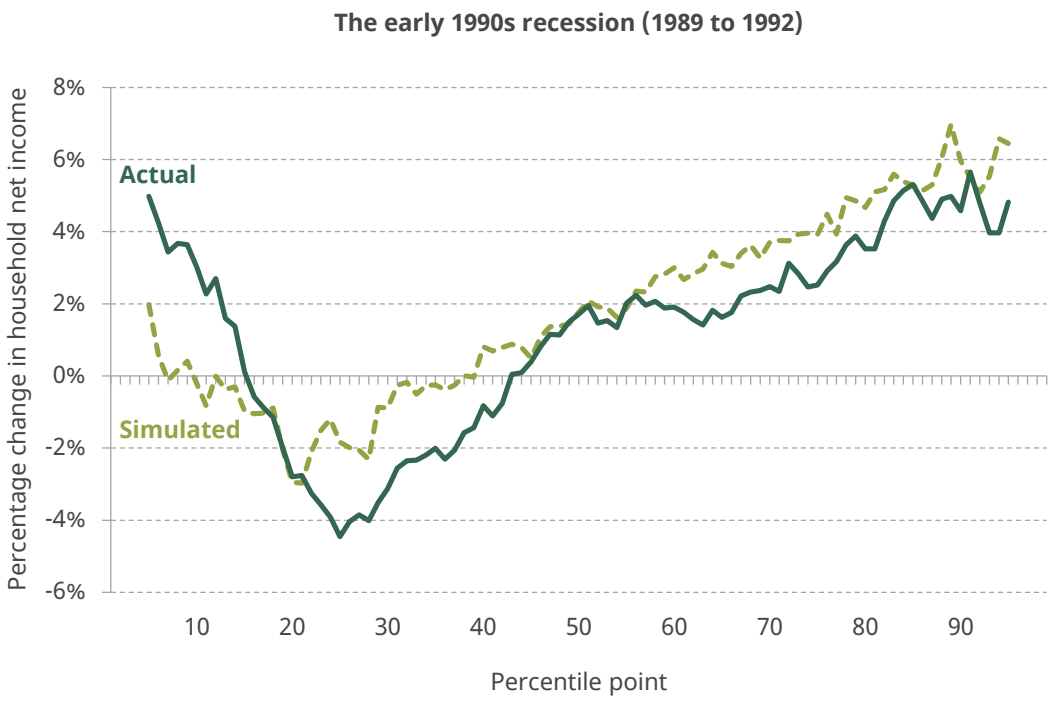
The key objective of this simulation technique is to reduce the full distribution of changes in employment and earnings at the household level to a relatively simple characterisation of the labour market downturn while maintaining an accurate impression of the impact of the downturn on the distribution of household incomes. The most straightforward way to assess the accuracy of this methodology in that respect is to apply the simulated downturn to the same household population that actually faced the true downturn, and compare the results.

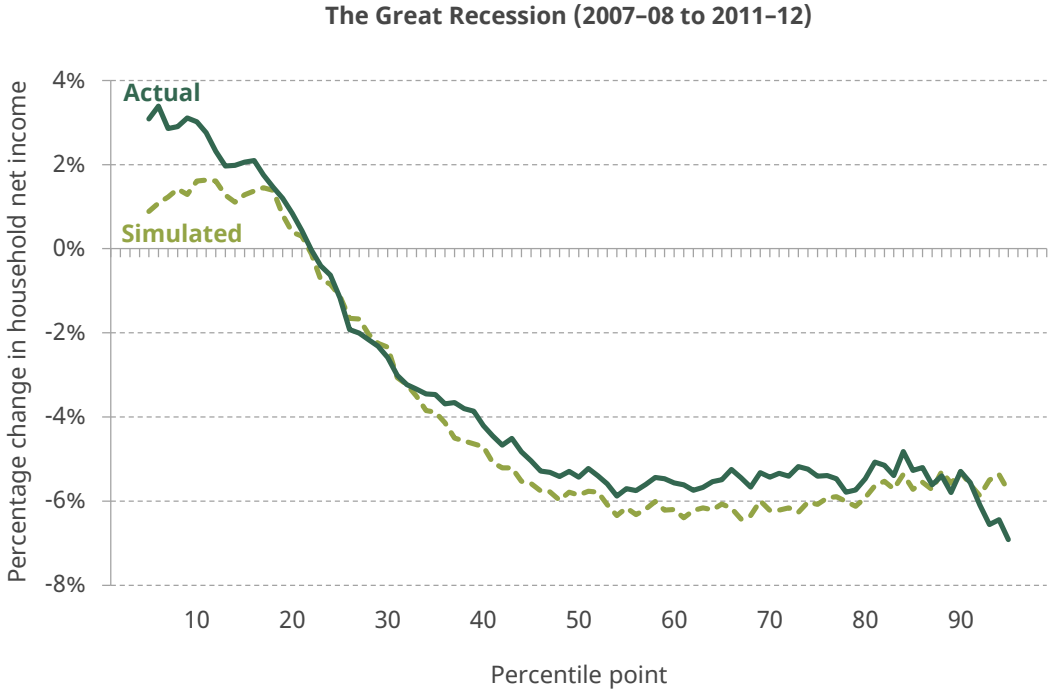
The results of this exercise are shown in Figure A.1. For each of the three downturns analysed in the report, the figure shows the actual impact of the labour market downturn. This is calculated by comparing net household incomes in the year prior to the downturn with those actually observed at the end of the downturn, after using reweighting techniques to control for other demographic changes during the period. Alongside this actual impact, the figure shows the combined 'simulated' effect of each recession and tax and benefit changes during the recession in question. This is simply calculated by comparing net household incomes in the year prior to the downturn (under the tax and benefit system in place in the year prior to the recession) with incomes after the simulated downturn has been applied (under the tax and benefit system in place at the end of the recession).

The figure shows that, in each case, the impacts of the actual and 'simulated' downturns on the distribution are very similar, providing reassurance that the methodology is accurately capturing the factors that determine the impact of a labour market downturn on the distribution of net household incomes.

Figure A.1. Actual and simulated impacts of labour market downturns on real income at each percentile point







Note: Incomes are measured after taxes and benefits but before housing costs, adjusted for household size and adjusted for inflation using a variant of the Consumer Prices Index that incorporates mortgage interest payments. The figure excludes individuals aged 65 and over. It assumes full take-up of all benefits.

Source: Authors' calculations using the Family Expenditure Survey, 1979, 1982, 1989 and 1992, Family Resources Survey 2007–08 and 2011–12, TAXBEN and the simulation methodology described in this appendix.

Appendix B. Modelling the receipt of disability benefits

The system of disability benefits changed significantly between 1979 and 2007, in terms of the relationship between medical conditions and eligibility for benefits. Of particular note were the introduction of disability living allowance (DLA) in 1992 and the replacement of invalidity benefit with incapacity benefit in 1995. When applying counterfactual tax and benefit systems to a given household population, we know only what disability benefits each adult in the data was entitled to under the system actually in place. We therefore assume that under the counterfactual system being considered, individuals would be entitled to the nearest equivalent available under that system.

When applying the 1979 or 1989 tax and benefit system to the 2007 household population, we assume that:

- all individuals who report entitlement to statutory sick pay would have been entitled to sickness benefit;
- all individuals entitled to incapacity benefit would have been entitled to invalidity benefit;
- all individuals entitled to the care component of DLA at the middle rate or above would have been entitled to attendance allowance;
- all individuals entitled to the higher rate of DLA mobility would have been entitled to mobility allowance.

When applying the 2007 tax and benefit system to the 1979 and 1989 household populations, we assume that:

- all individuals who report entitlement to sickness benefit would have been entitled to statutory sick pay;
- all individuals entitled to invalidity benefit would have been entitled to incapacity benefit;
- all working-age individuals entitled to attendance or mobility allowance would have been entitled to the relevant components and rates of DLA.

Appendix C. Modelled reforms

Tax and benefit reforms directly modelled in Section 3.2:

- local housing allowance (LHA) rate freeze in April 2018 and April 2019;
- applying LHA rates to the housing benefit entitlements of those in the social rented sector;
- the switch from disability living allowance (DLA) to personal independence payment (PIP);
- freeze on most working-age benefits in April 2018 and April 2019;
- abolition of the work-related activity group premium;
- council tax precept of 2%;
- abolition of Class 2 National Insurance contributions (NICs);
- transition from the legacy system to universal credit (UC);
- cut in the work allowances and taper rate of UC;
- the two-child limit in tax credits and UC;
- removal of the family element in tax credits and family premium in housing benefit;
- switch of support for mortgage interest from a benefit to a loan.

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