Resolution Foundation

Closer to the edge?

Debt repayments in 2018 under different household income and borrowing cost scenarios

Matthew Whittaker

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E: info@resolutionfoundation.org T: 020 3372 2960 F: 020 3372 2999

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Acknowledgements

The analysis in this report is primarily based on internal modelling using the *Living Costs and Food Survey*: Office for National Statistics and Department for Environment, Food and Rural Affairs, *Living Costs and Food Survey, 2011* [computer file]. Colchester, Essex: UK Data Archive [distributor], June 2013. SN: 7272.

An earlier version of this research relating to 2017 was published on the Resolution Foundation website and presented at a launch event. I am grateful to Kate Barker, David Miles, Stephanie Flanders and Gillian Tett for their involvement in that event and their comments on the day, and to those which have followed from a range of individuals and organisations. This version of the research includes some additions and minor changes reflecting those comments along with larger changes associated with moving the forecast horizon out by a year to 2018 and with revisions to the OBR's projections presented alongside the 2013 Autumn Statement. Any errors remain my own.

Summary

When interest rates rise…

Recent signs that Britain's economy may finally be on the road to recovery have refocused attention on when the Bank of England will start raising interest rates. The Bank's governor, Mark Carney, has moved quickly to dampen expectations of an imminent increase. Unless inflation expectations rise significantly, or economic stability is threatened, we should not expect the base rate to rise until unemployment falls below 7 per cent, something the Bank does not forecast happening until at least 2015. Even then the Monetary Policy Committee (MPC) will be under no obligation to raise rates; rather it is the point at which it will once again consider the efficacy of a change in policy.

Nevertheless, for the Bank the dilemma is clear: how to keep the cost of borrowing low long enough that the recovery is not choked off before it really gets underway, while simultaneously sticking with its mandate to keep a lid on inflation and ensure economic stability.

Millions of borrowers remain vulnerable

Compared with earlier downturns, the numbers of households falling behind on their debt repayments has remained relatively low since the 2008 financial crisis. Yet when interest rates start to rise, millions of British households will still be servicing very high levels of debt. Though the proportion of disposable income the average UK household spends on debt repayment has fallen from its 2008 peak, not all households have been able to take advantage of the breathing space afforded by low borrowing costs. The averages also mask large parts of the population where debt repayment-to-income ratios remain far higher.

In our *Deconstructing Debt* project the Resolution Foundation has set about analysing just how far the shadow of debt stretches across Britain, and in doing so considering options for deleveraging that serve both individual families and a sustainable economic recovery. In the project's first phase we identified some 3.6 million 'debt loaded' households, spending more than one-quarter of their income on repayments. While many families might be expected to maintain such repayment levels with little difficulty, we argued that the total would include a significant number of 'at risk' households who are vulnerable to future interest rate rises, along with changes in earnings, house prices and forbearance practices.

This new paper goes further. In what follows, we provide the first detailed study into the vulnerability of households to interest rate rises in the coming years. We estimate that, if rates increase to 5 per cent by 2018 – an adverse though plausible possibility – and household income growth is slow and uneven in the recovery, the number of households spending more than one-half of their disposable income on repaying debt (a position we term 'debt peril') could rise from 600,000 today to around 2 million. Even if rates rise much

more slowly and incomes outperform current projections, the number in 'debt peril' would still rise.

The human and social cost of that would be huge. But our findings also have profound implications for monetary policy and the sustainability of any economic recovery. If future economic growth does not translate into broad-based increases in incomes, Carney and the MPC will have little room for leeway. Despite repeated calls to grow export markets and raise investment, Britain's economy remains markedly dependent on the spending power of the domestic consumer, who still accounts for around two-thirds of GDP. If a rise in the cost of borrowing leaves many struggling under the burden of debt, it will put both financial stability, and the sustainability of the recovery itself, at risk

What might the future hold?

Prospects for those retaining a large debt hangover from the pre-crisis years are clearly dependent on the timing and pace of changes in the cost of borrowing, but they will also be tied to the extent to which economic recovery translates into growth in incomes.

To understand the impact of rising rates on debt affordability we have created six different *what if?* 'scenarios' under which the path of household income growth and interest rates are varied. We distinguish between 'good' income growth – growth that is strong and shared – and 'bad' income growth – growth that is weak and uneven. All scenarios assume a return to GDP growth; where they differ is over how this growth feeds through into household incomes.

We combine these outlooks for income growth with three trajectories for the base rate: that it rises in line with market expectations and reaches 3 per cent in 2018; that it rises by an extra 1 percentage point to 4 per cent; and, finally, by an extra 2 percentage points to 5 per cent.

In creating our *what if?* scenarios, we are making assumptions about what the cost of borrowing and household income might look like in the year 2018. Therefore, it is important to stress that our resulting findings describe the implications of stylised assumptions – they are not predictions of what we expect to happen in the coming years, although they are based on central case GDP growth, overall debt and saving level projections and grounded in recent experience.

The table below provides a summary of outcomes under each of our six scenarios, along with a comparison with the position in the base year of 2011 and the immediate pre-financial crisis year of 2007.

Number and proportion of households spending more than 50% of their disposable income on debt repayments	Actual/projected base rate *(5.5% in 2007; 0.5% base; 3.0% in 2018)*	Base rate + 1ppt *(1.5% base; 4.0% in 2018)*	Base rate + 2ppt *(2.5% base; 5.0% in 2018)*
2007 *(pre-crisis peak)*	870,000	*Number of households*	
	3%	*as a proportion of all households*	
	6%	*as a proportion of all households with outstanding debts*	
2011 *(baseline)*	600,000	830,000	1,020,000
	2%	3%	4%
	4%	6%	8%
2018 *('good' income growth scenario)*	1,120,000	1,420,000	1,740,000
	4%	5%	6%
	8%	10%	12%
2018 *('bad' income growth scenario)*	1,420,000	1,730,000	2,040,000
	5%	6%	7%
	10%	12%	14%

Our key findings:

- Even under 'good' income growth, the number of households with perilous levels of debt rises from 600,000 in 2011 to 1.1 million in 2018. With sharper increases in borrowing costs, the number rises to 1.4 million and 1.7 million – exceeding both its pre-crisis peak and the level set in the early-1990s recession.

- If the squeeze on household incomes continues, the number in debt peril reaches 1.4 million, 1.7 million and 2 million under each of the interest rate rises. Our 'worst case scenario' implies a tripling in the number of affected families from 2011, equating to one in every 14 households.

- Those in the poorest 20 per cent are much more likely to be in 'debt peril'. The percentage of 'debt peril' households in the bottom quintile rises from 5 per cent in 2011 to as high as 9 per cent under our worst case scenario.

- Yet a large proportion of lower income households have no debt. Perhaps most startlingly, if we focus just on those households in the bottom quintile who *do* have debt, the proportion in 'debt peril' jumps to as high as 27 per cent under a good growth scenario and to 28 per cent in our worst case scenario.

Can we head off a crisis?

The findings of this paper highlight the potential for interest rate rises to spark a repayments crisis if GDP growth does not feed through into broad-based household income growth and nothing is done to lower the volume of outstanding debt held by the most vulnerable. For lower income borrowers, any repayments crisis will likely bite hardest.

The scenarios, while grounded in reality, are not predictions of what will happen in the coming years. Crucially, they are based on an assumption that the distribution of debt across households remains much the same in 2018 as today, even as the amount of borrowing in the economy rises.

Things may work out differently – for the better or for the worse – but the outcomes we observe will have profound implications for borrowers, the financial sector and the ability of consumers to contribute to an economic recovery. By raising the possibility of a significant increase in the number of households spending more than one-half of their income on debt repayments, our results demonstrate that there is a need to look seriously at ways of heading off a future repayment crisis. Ultra-loose monetary policy has significantly reduced default and arrears numbers since the financial crisis; it is likely to remain in place for some time. And yet many households have not brought down their debts to levels that are manageable in a higher rate environment.

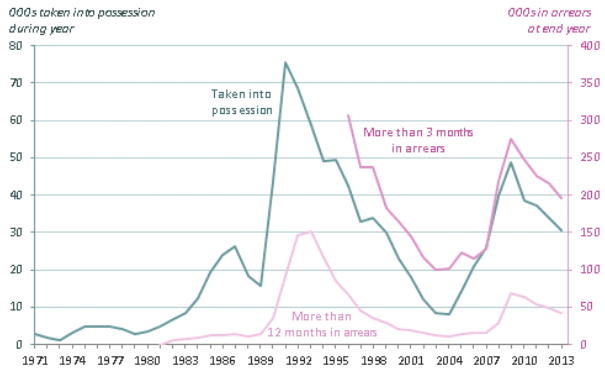
Policy recommendations are beyond the scope of this paper. We leave that to the third and final phase of the project, where we will analyse potential policy responses designed to take advantage of the current breathing space, thereby reducing the risk of pushing households – and the economic recovery itself – over the edge.

Introduction

Painful and prolonged though the economic downturn sparked by the 2008 financial crisis has been, it has not produced the wave of defaults and repossessions that many feared.

That's not to say there haven't been casualties: as Figure 1 shows, there was a clear spike in mortgage arrears and possessions in 2008 and 2009. But repossessions never reached the levels recorded during the recession of the early-1990s, and they have been falling relatively steadily over the past four years, even as the economic recovery has stalled.

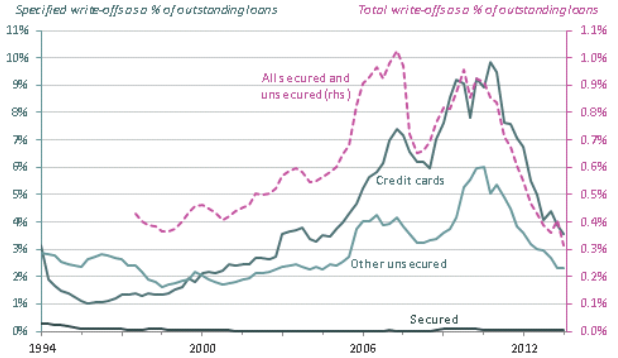
Figure 1: Housing possessions and mortgage arrears: UK 1971-2013



Source: Council of Mortgage Lenders, *Tables AP1 & AP4*

Figure 2 presents a similar picture in relation to bad debt write-offs. The proportion of credit card debt written off by UK financial institutions grew steadily over the course of the 2000s, before peaking at around 10 per cent following the financial crisis. Other unsecured loans followed a similar pattern, but at a lower level. Unsurprisingly, write-off rates on secured loans remained very low throughout (borrowers forfeit their collateral to the bank if the loan cannot be repaid and rising house prices have reduced the amount of debt outstanding after property is possessed and sold).

Figure 2: Write-offs on sterling lending to individuals by UK-resident financial institutions: 1994-2013



Source: Bank of England, *Bankstats*

Although these data series only stretch back to 1994, earlier research from the Bank of England[1] suggests that the overall write-off rate on secured and unsecured lending to individuals peaked in 1992 at a similar level – around 1 per cent of outstanding loans – to that observed in 2007. Once again however, it is noticeable how sharply these write-off rates have declined since 2010, despite the relatively poor performance of the UK economy.

In our first report in this project – *On Borrowed Time?* – we argued that this surprisingly benign outcome rested on four mitigating factors: ultra-loose monetary policy; lender forbearance; stronger than expected employment levels; and a relatively small house price

correction.[2] However, we also noted the uncertainty surrounding the sustainability of each of these factors in the coming years. The report identified some 3.6 million 'debt-loaded' households who were spending more than one-quarter of their income on debt repayments at the end of 2012. Although this number had fallen since 2008, it is still high given the historically low level of the Bank of England's base rate. Household deleveraging looks to have been relatively limited.

This second report asks what could happen next: once interest rates start to increase, will 'debt loaded' households, vulnerable to changes in borrowing costs, find themselves pushed closer to the edge? To consider this question, we run a number of *what if?* 'scenarios' using microdata from the *Living Costs and Food Survey*. These are not predictions about the future, but rather evaluations of the potential implications of six plausible trajectories for household income growth and for the cost of borrowing. Taking 2018 as our end-point, we set out the number of households in 'debt peril' – those that spend more than one-half of their disposable income on debt repayment – under each scenario, and provide comparisons with earlier periods.

- In Section 1 we begin by setting out the Office for Budget Responsibility's (OBR) central case projections for household debt in the period to 2018.
- In Section 2 we set out the six scenarios, detailing the different combinations of income growth and interest rate trajectories, along with an overview of the methodology.
- The results are presented in Section 3, showing how the number of 'debt loaded' and 'debt peril' households has changed since 1989 and how these numbers vary in 2018 under each of the six scenarios.
- In Section 4 we briefly consider how the profile of the 'debt peril' population changes relative to our 2011 baseline under a selection of the scenarios, focusing on the impact on those on lower incomes, the young and families.
- We reflect on the implications of our findings and set out our plans for the third and final phase of this project in the Conclusion.
- We provide full methodological details in the Technical Annex.

1 The projected household debt landscape in 2018

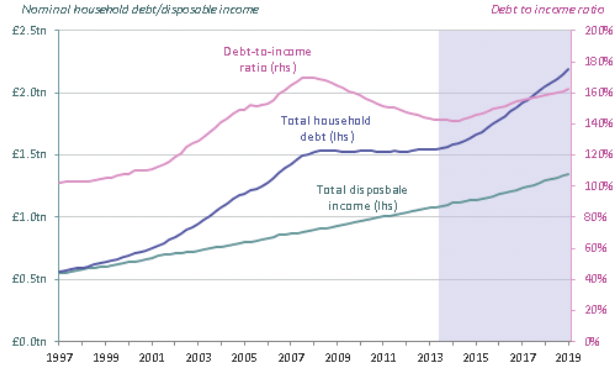
After years of increasing borrowing by more than their incomes were rising, Britons entered the 2008 financial crisis among the most indebted in the developed world. While many have reduced their debts since the crisis, the average household still faces a debt-to-income ratio of about 140 per cent, the same as in 2004.

Before setting out the different scenarios we wish to test, in this section we consider the OBR's central case projections for household debt and its affordability in the period to 2019.

Debt levels rose rapidly pre-crisis

Figure 3 sets out outturn data from 1997 and projections to 2019 for overall levels of after-tax income and debt. Having started the period at roughly the same level (£550bn), total debt rose broadly in line with incomes through to 2000. It subsequently significantly outpaced income growth, with the ratio of debt to income reaching a peak of 170 per cent at the start of 2008.

Figure 3: Household debt and incomes: UK 1997-2019



Sources: ONS, *National Accounts*
OBR, *Economic and Fiscal Outlook*, Dec2013

Since the financial crisis, household debt has fallen relative to after-tax incomes while savings rates have increased. This is a product of both tight credit conditions – an increase in the minimum deposit required for buying a house, for example – and low credit demand owing to household uncertainty about future economic prospects. More recently, the savings ratio has fallen and the OBR now projects that household debt levels will resume their upwards trajectory from this year, surpassing £2tn by the end of the forecast period.

Household deleveraging coming to an end

With this growth once more outpacing increases in incomes, the OBR is effectively signalling the end of the period of household deleveraging, with the debt-to-income ratio never falling below its 2005 level.

Crucially, however, the OBR expects the repayments associated with this increase in debt to remain affordable in the medium term. Following the decision to cut the Bank of England base rate to an historic low of 0.5 per cent in 2009, the repayment-to-income ratio fell sharply, from a peak of 11 per cent in 2008 to less than 6 per cent earlier this year. While it doesn't provide a specific projection in its latest outlook, the OBR states that it expects "the cost of servicing debt as a share of average household disposable incomes to rise, but to remain well below pre-crisis levels for most of the forecast period".[3]

These projections appear to suggest that we therefore have no reason to fear a sudden correction and associated repayment crisis in the coming years, even as the stock of debt starts to rise once more.

No room for complacency

Reassuring though this might appear, there are two potentially complicating factors: the uncertainty inherent in all economic forecasts and differences in income growth and debt profiles across the income distribution. The first of these factors raises the possibility of alternative outcomes for households as a whole in relation to debt. The second implies that, even if the central case projections *do* hold at the aggregate level, households across the distribution might face very different prospects.

In discussing the future shape of the economy, most attention is understandably given to the outcomes considered most likely. However, good policymaking needs to understand the risks associated with different outcomes. As we have seen in this section, debt-to-income levels are still relatively high and forecast to start rising again from 2014. Given this backdrop it is worth asking: how well prepared are we if interest rates rise faster, or incomes fall further, than expected; and how might we mitigate against a repayment crisis for parts of the distribution, even if the aggregate picture appears benign?

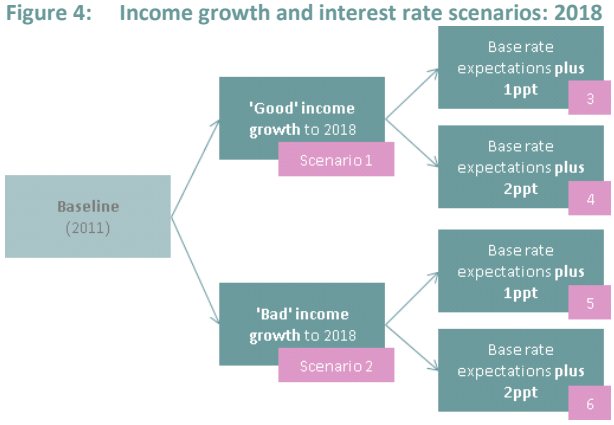
In the next section, therefore, we set out the six scenarios which we wish to test to understand the potential vulnerability of households to changes in interest rates and income.

2 Scenario building

Economic forecasts are fraught with uncertainty, even more so since the financial crisis. Since 2008 GDP has consistently underperformed against expectations, resulting in the regular downgrading of projections and a good deal of head scratching about the direction of the UK economy. Adding to the uncertainty for families, recent experience suggests that even if the economy does recover it will not automatically translate into rising household income.[4] Estimating the future path of interest rates does not look much easier. Despite the MPC's commitment to keep rates low for the foreseeable future, inflationary pressures and economic instability could quickly force it to change tack.

Therefore, rather than try and forecast the future, we have created six different *what if?* 'scenarios' to explore the potential implications of variations from the current core projections for income growth and debt levels in the years ahead, as seen in Figure 4.

Figure 4: Income growth and interest rate scenarios: 2018



These scenarios are not predictions, but stylised assumptions about the trajectories of two variables out to 2018: household income growth and the cost of borrowing.

In this section we explain the assumptions used to build our household income and base rate trajectories, before turning to the results of our scenarios in Section 3. Box 2.1 at the end of this section explains our basic methodological approach, with more detail in the *Technical Annex*.

Building our six scenarios

In all instances, we take the OBR's December 2013 projections for overall economic growth, total levels of household debt and of savings as given. Our primary distinction is between 'good' and 'bad' household income scenarios in 2018, taking account of both the potential *strength* of income growth from 2011 and the *distribution* of these gains.

- **'Good' income growth**, in which we assume household income growth is both "strong" (rising broadly in line with the OBR's projection for GDP growth, as happened during the late-1990s) and "shared" (distributed across households in line with the ratios observed during the growth years from 1991 to 2008).

- In contrast, **'bad' income growth**, in which we assume household income growth is both "weak" (still growing, but more slowly than GDP, as happened during the mid-

2000s) and "skewed" (with those at the top of the income distribution experiencing much faster growth than those at the bottom, as happened during the growth years of the 1980s).

We then combine these trajectories for income growth with three paths for interest rates out to 2018:

- Our **default approach** simply follows the March[5] market expectations for the Bank's base rate in the period to 2018, resulting in a rate of **3 per cent** at the end of the period.
- Our first variation on this approach assumes that the base rate remains flat into 2015 – in line with the default trajectory – but that it subsequently rises a little quicker, ending the period **1 percentage point higher** (at 4 per cent).
- Our second variation follows the same pattern, but the base rate stands at 5 per cent in 2018, **2 percentage points higher** than market expectations.

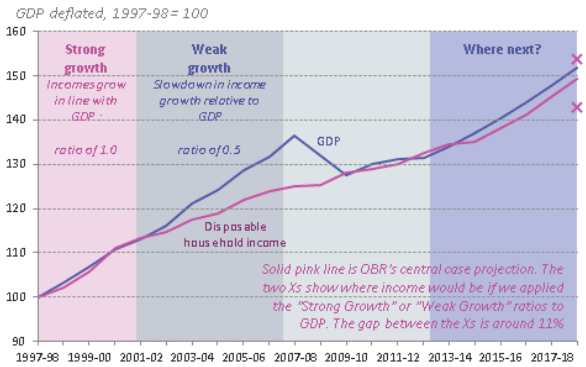
Step 1: Building the income growth scenarios

Our 'good' and 'bad' income growth scenarios are the product of a two-stage process. First we consider the extent to which household incomes might match GDP growth, and second we vary the distribution of the overall increase across household income deciles. In describing this approach in this section, we detail real-terms trends for the purposes of illustration. It should be noted however that our scenarios are in truth based on the equivalent nominal data (see the *Technical Annex* for more detail).

Figure 5 details the relationship between GDP growth and aggregate household disposable income in the period from 1997-98.

Prior to the financial crisis of 2008, we can identify two distinct periods. We label the years between 1997-98 and 2001-02 – when incomes rose more or less in line with GDP – as representing "strong growth" in incomes.

Figure 5: Indices of growth in GDP and disposable household income: UK 1997-98 to 2018-19



Source: ONS, *National Accounts*
OBR, *Economic and Fiscal Outlook*, Dec 2013

In contrast, we consider the period between 2001-02 and 2007-08 to be one of "weak growth" in incomes: while aggregate disposable income *did* increase, it was at about half the pace of GDP growth.

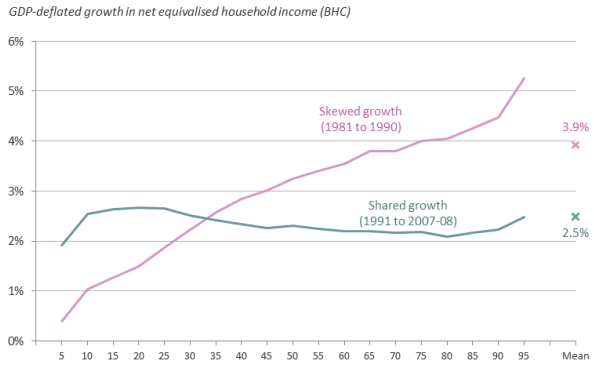
From 2013-14 onwards, we set out the OBR's projections for GDP and disposable income, with the GDP index standing at 151.9 by 2018-19 (52 per cent higher than in 1997-98 in real terms) and the disposable income index reaching 149.2. By applying the disposable income-to-GDP ratios recorded in the two pre-crisis periods to the GDP projection, we can establish two alternative levels of aggregate disposable income in 2018-19. Using the "strong growth" ratio, we see the disposable income index ending the period at 153.8 – somewhat higher than the OBR's central case figure. Using the "weak growth" ratio the index reaches just 142.9 – somewhat lower than the OBR figure.[6]

The second step in building the 'good' and 'bad' income growth scenarios involves applying differing growth rates across the income distribution. As with the first stage, we again ground our alternatives in recent experiences.

Figure 6 presents the distribution of after-tax income growth during two broad periods of economic growth.

Between 1981 and 1990, household incomes grew at an average annual real-terms rate of 3.9 per cent, but with a significant variation across the distribution. Households at the 5th percentile experienced average annual growth of just 0.4 per cent, while those at the 95th percentile recorded growth of 5.3 per cent a year.

Figure 6: Annual average growth in net household income, by selected percentile points: UK 1981 to 2007-08



Source: IFS, *Poverty and inequality in the UK: 2013*

In contrast to this period of "skewed growth", the years of "shared growth" from 1991 to 2007-08 produced smaller average gains in disposable incomes (2.5 per cent a year), but with a much lower spread. While those at the top again did better than those at the very bottom the difference was small, and the largest gains were made by households between the 10th and 30th percentiles.

Figure 7 offers some clues as to why this part of the distribution may have fared a little better in this period. It shows the breakdown of family types within each income decile in 2010-11, and makes clear the concentration of two family types in particular in deciles 2-4: pensioners and single parents. Both groups were the target of policies designed to help reduce poverty rates during the 1990s and early-2000s.

Benefits for pensioners and children regularly outstripped inflation in this period, while the introduction and development of tax credits during the 2000s provided strong work incentives for single parents and was associated with significant increases in employment rates. In addition, a number of families in this part of the income distribution are likely to have benefitted from the introduction of the National Minimum Wage (NMW).

Figure 7: Distribution of family types across income groups: UK 2010-11

Source: DWP, *Households Below Average Income*

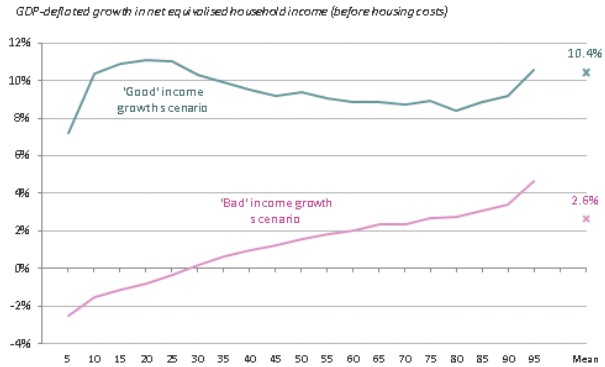
With benefits and tax credits facing substantial cuts as part of the government's austerity programme and with the NMW falling in real terms in recent years, we are perhaps unlikely to see such a distribution of income gains in the coming years.

Nevertheless, for the purpose of building our six scenarios, we assume that overall income gains are distributed in accordance with the experiences of either the "skewed" or "shared" periods of growth.

Figure 8 sets out what these two combinations mean for disposable income growth across the distribution in the period to 2018-19. It shows that the 'good' scenario results in average real-terms income growth of 10.4 per cent over the seven year period, with relatively little difference between households at the bottom of the distribution (7.2 per cent) and those at the top (10.6 per cent).

In contrast, the 'bad' scenario implies lower overall growth (a cumulative real-terms average of just 2.6 per cent) and a much more uneven distribution of gains. While those at the bottom experience a 2.5 per cent *fall* in incomes, those at the top record a 4.7 per cent rise.

Figure 8: Cumulative growth in net household income under two scenarios: UK 2011-12 to 2018-19



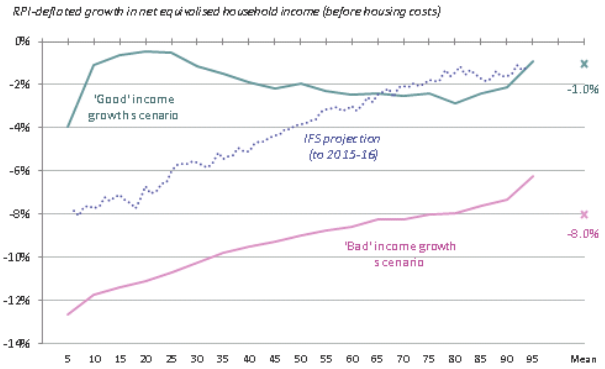
Note: For the first year of this period (2011-12 to 2012-13) we use outturn data for overall disposable income and apply a distributional cut based on the average shares of incomes recorded in the entire period (1981 to 2007-08). These growth rates are therefore identical under both the 'good' and 'bad' scenarios. We apply differing growth rates from 2013-14 onwards.

Source: RF analysis of OBR, *Economic and fiscal outlook*, Dec 2013

For the purposes of consistency with the other numbers presented in this report, the data in Figure 8 is adjusted into real-terms using the GDP-deflator. It is worth noting, however, that the picture looks much worse if we instead use a measure of consumer inflation that is more relevant to changes in living standards faced by households.

Figure 9 presents the same data deflated using the Retail Prices Index (RPI). On this measure, we see falling incomes across the period in all parts of the income distribution, even under the 'good' income growth scenario. The implication of this squeeze on incomes is that, for any given level of repayment-to-income ratio, households will find their remaining funds going less far in 2018 than in the 2011 baseline.

Figure 9: Cumulative growth in net household income under two scenarios: UK 2011-12 to 2018-19



Note: IFS data is originally presented deflated by CPI. We convert it to RPI using the OBR's most recent inflation projections.

Sources: Scenarios based on RF analysis of OBR, *Economic and fiscal outlook*, Dec 2013
IFS projection taken from IFS, *Living Standards, Poverty and Inequality in the UK: 2013*, Figure 3.16

By way of context, it is worth noting that recent IFS modelling (which, unlike the scenarios we have created here *is* a projection of what is likely to happen in the coming years) suggests that the shape of real-terms income growth between 2011-12 and 2015-16 is likely to be even more skewed in appearance than our 'bad' income growth scenario, albeit with overall growth (to 2015-16 rather than 2018-19) appearing somewhat stronger.

Step 2: Building the interest rate scenarios

Since 2008, the Bank of England has maintained an unprecedentedly loose monetary policy stance, holding interest rates at a record low of 0.5 per cent and pumping £375 billion into the economy through its quantitative easing programme. This is despite CPI inflation spending much of the period significantly higher than the Bank's 2 per cent target.

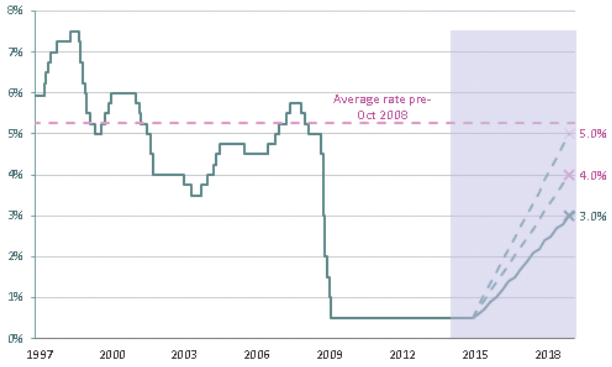
In tolerating above-target inflation, the Bank has argued that the rise in inflation has been driven primarily by *global*, rather than *domestic* cost and price pressures, and that it is essentially a temporary, albeit protracted, state of affairs. This approach is centred on the belief that monetary tightening would risk derailing the UK's economic recovery and produce an under-shooting of the inflation target in the medium term.

In the same vein, the new Governor has moved quickly to disabuse market expectations of an imminent increase in base rates through his 'forward guidance', committing the Bank to hold off tightening until unemployment has fallen sufficiently and the economy's recovery appears sustainable. Given this backdrop, and with little to suggest that domestic inflationary pressures show any sign of building while economic recovery – and in particular income growth – remains weak, we might reasonably expect interest rates to remain low for some time to come.

Figure 10 details the path implied by market expectations at the time of the OBR's last *Economic and Fiscal Outlook* in December 2013.

It shows that rates are expected to remain broadly unchanged through 2014, before rising slowly from 2015, reaching 3 per cent by the end of the period – still significantly lower than the pre-2008 average.

Figure 10: Alternative base rate scenarios: UK 1997-2018



Source: RF analysis of OBR, *Economic and fiscal outlook*, Dec 2013

No one can accurately predict quite where interest rates will be by 2018, and implications of relatively small movements could be significant. As shown in Figure 10, we consider two simple alternatives in our scenarios: one in which the base rate reaches 4 per cent by 2018; and one in which it stands at 5 per cent. In both instances, we assume no movement until 2015, followed by a linear increase to the end point.

In considering the feasibility of our interest rate outcomes, it is worth repeating the Bank of England's current position. Despite its commitment to keep rates low until the economy's spare capacity has been significantly reduced, the central bank has also permitted itself a certain amount of leeway – a recognition of how unpredictable the current climate is for policymaking. This leeway – or 'knockout' provisions as they are known – allows the Bank to ignore its unemployment target and raise rates if inflation expectations grow too quickly or financial and economic stability is threatened.

Although the MPC has tolerated above-target inflation in the past two years, it remains committed to its core mandate: keeping inflation at 2 per cent. Under our 'good' growth scenario, in which household incomes across the board rise more quickly than the OBR is projecting, domestic inflationary pressures could well rise.

The lower than projected increases in household incomes incorporated in our 'bad' income growth scenario might, in contrast, be expected to *reduce* domestic inflation, but it is not implausible that skewed household income growth could lead to an outcome in which higher prices are driven by spending by affluent households. One specific source of

inflationary pressure that cannot be discounted is the development of a new house price spiral. The market has rebounded strongly in recent months, and the average house price now exceeds its pre-crisis peak. The early launch of the second phase of the Government's Help to Buy scheme – a new mortgage guarantee for high loan-to-value purchases – is likely to further stimulate activity.

Even our worst case scenario, in which the base rate reaches 5 per cent in 2018, would leave interest rates below a 'normalised' level. Therefore, it is worth at least considering the implications of such movements. The outcomes give us an important understanding of the room for manoeuvre that the MPC might face should inflationary pressures build over the coming years.

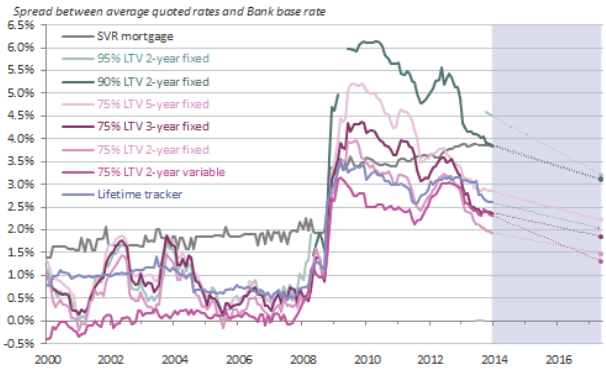
Step 3: Passing on the cost to borrowers

A complicating factor in establishing these interest rate scenarios is determining how much of any base rate increase would be passed onto borrowers.

As Figure 11 shows, the spread between the base rate and a variety of quoted mortgage rates spiked significantly in the immediate aftermath of the financial crisis, as the credit crunch hit and lenders faced increases in funding costs.

More recently however, these costs – and therefore spreads – have been falling. With credit markets slowly mending themselves and with Funding for Lending scheme offering banks another source of cheaper funds set to last until at least 2015, we might expect these downward trends to continue in the coming years.

Figure 11: Spread between selected average mortgage rates and the Bank of England base rate: UK 2000-2018



Source: RF analysis of Bank of England, *Quoted rates*

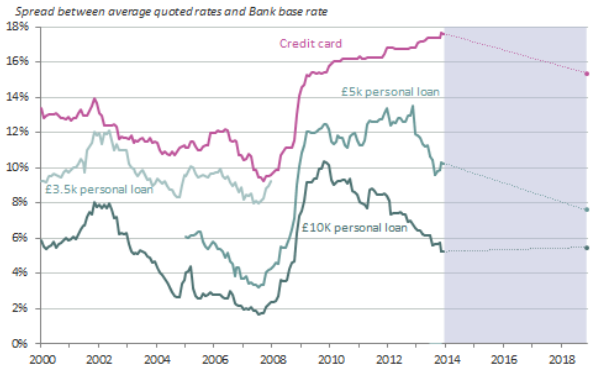
To this end, our scenarios include an assumption that spreads fall from their current levels. Specifically, we alter all spreads such that they fall halfway back towards their pre-crisis averages. So, taking the example of a 75 per cent three-year fixed mortgage, the average spread pre-financial crisis was 0.9 percentage points, yet by the middle of 2009 this figure had peaked at 4.4 percentage points. By November 2013, the spread had fallen back to 2.4 percentage points. This is 1.5 percentage points higher than the pre-crisis average, so our assumption reduces the spread by half this amount, leaving it at 1.6 per cent by 2018.

These assumptions are necessarily arbitrary. They might understate the extent to which spreads continue to fall, but equally they could *over*state the true improvement in borrowing costs. Banks face both the introduction of tougher capital requirement ratios (the

amount of capital they must hold against their loan books) and increases in regulatory costs emanating from the Bank of England's Prudential Regulation Authority (PRA) and in advance of the introduction of Basel III framework. This could lead banks to choose to *increase* spreads once more.

The uncertainty of our spread assumption is even more apparent when looking at unsecured credit products. Figure 12 shows that there is much less consistency of movement in recent months in the spreads applying to credit cards and loans: while there appears to have been a reduction in costs for loans of £10,000 and – more sharply – for those of £5,000, credit card spreads have been *increasing*.

Figure 12: Spread between selected average unsecured credit rates and the Bank of England base rate: UK 2000-2018

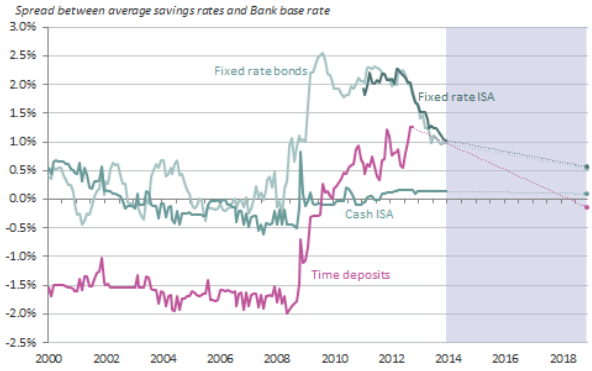


Source: RF analysis of Bank of England, *Quoted rates*

Nevertheless, we apply the same assumption, namely that spreads move halfway back towards their pre-crisis averages over the course of the projection period. In the case of the average rate on a £10,000 loan, this assumption implies a slight *increase* in the spread over the period.

For completeness, we follow the same approach on savings products. Figure 13 details an increase in spreads on ISAs, bonds and time deposits from 2008, as banks competed for funds even as the base rate was slashed. Our assumption of a partial reversal in the coming years would go some way to offsetting the reduction in revenues to banks (and gains for consumers) associated with reduced spreads on borrowing.

Figure 13: Spread between selected average savings rates and the Bank of England base rate: UK 2000-2018



Source: RF analysis of Bank of England, *Quoted rates*

Given the uncertainty around future spreads, our interest rate scenarios can be considered to reflect not just the possibility that the base rate does not follow its expected path, but also that spreads do not fall as quickly as we have assumed. For example, a scenario in which the base rate reaches 4 per cent in 2018, 1 percentage point higher than current market expectations, could just as easily be considered indicative of a scenario in which interest rates follow their expected path, but spreads remain broadly in line with their current level (rather than falling as we assume).

As with our income growth scenarios, the *Technical Annex* details how the illustrative examples set out in Figure 11 translate into modelling inputs.

The six scenarios

As described in Figure 4, we combine these income growth and interest rate outcomes to create six scenarios in 2018. To recap, those scenarios are:

- **'Good' income growth, with market-expected base rate trajectory** (3 per cent)
- **'Good' income growth, plus 1ppt base rate 'shock'** (4 per cent)
- **'Good' income growth, plus 2ppt base rate 'shock'** (5 per cent)
- **'Bad' income growth, with base rates following market expectations** (3 per cent)
- **'Bad' income growth, plus 1ppt base rate 'shock'** (4 per cent)
- **'Bad' income growth, plus 2ppt base rate 'shock'** (5 per cent)

Box 2.1 presents an overview of the methodology and more detail is provided in the *Technical Annex*.

Box 2.1 An overview of the scenario methodology

1. Using the *Living Costs and Food Survey 2011* we establish after-tax incomes, debt levels, debt repayments and savings for a representative UK sample of households
2. We allocate each household to an equivalised income decile and to a debt repayment-to-income band, allowing us to identify the number of UK households in 'debt loaded' or 'debt peril' positions in our 2011 baseline
3. For each of our 2018 scenarios, we increase each household's debt and savings levels in line with OBR projections for overall growth in (per) household liabilities and financial assets
4. After-tax incomes are increased on a decile by decile basis in accordance with either the 'good' or 'bad' income growth scenarios
5. The rates of interest charged on debt products and received on savings are amended to their assumed 2018 level (or an appropriate earlier year reflecting the age of the loan) in accordance with the base rate either following market expectations, rising by an additional 1 percentage point or rising by an additional 2 percentage points
6. Using this information, we recalculate debt repayments and income from savings for all households and thereby establish new debt repayment-to-income ratios under each of the six scenarios

3 Alternative debt pictures in 2018

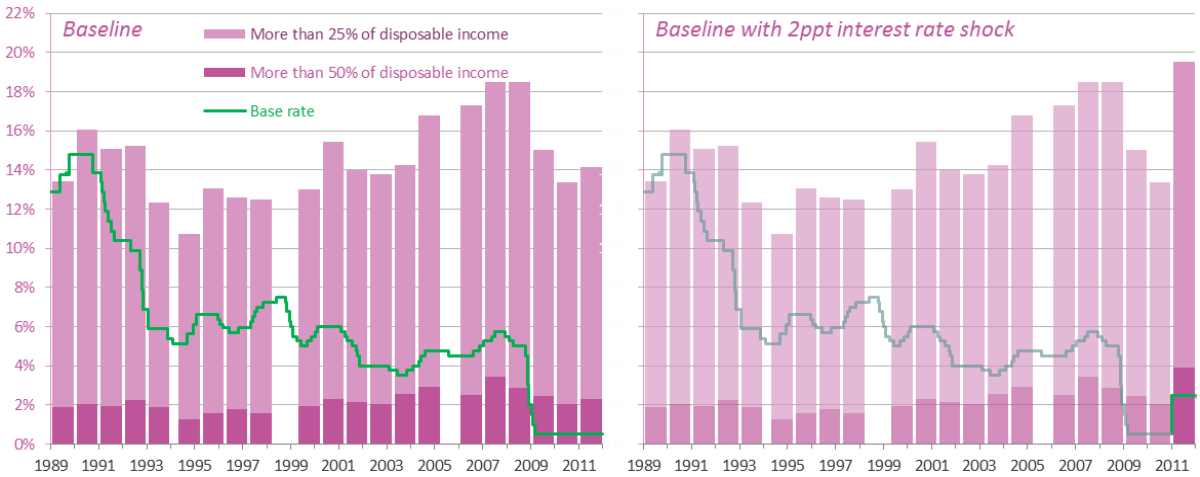
The affordability of debt repayment depends on a variety of factors: the cost of the debt, its total size, and the personal circumstances and income of the debtor. Because of this, we cannot say for sure when a household might face the imminent prospect of default, but we can point to potential repayment difficulties. Spending more than half of one's disposable income on debt repayment provides a useful proxy. When taken alongside arrears data and information about the extent to which households find repayments to be a burden, it is often considered an important indicator of potential over-indebtedness.

That is not to say that *all* households with such high income-gearing levels can be considered to be in imminent danger of default, but clearly it is likely to be a difficult position to sustain. Lower income borrowers with little discretionary income are particularly likely to struggle. In this section we estimate the number of households falling into 'debt peril' in 2018 under our different scenarios. By doing so, we can judge the impact of different household income and interest rate scenarios on families' ability to repay.

From debt loaded to debt peril

Before comparing the number of households in 'debt peril' in 2018 under each of our scenarios, we consider first how the number of 'debt loaded' households – those paying one-quarter of their disposable income on debt repayment – and the number in 'debt peril' in our 2011 baseline would be affected by an overnight 2 percentage point increase in the base rate. For context, Figure 14 shows how these numbers have varied since 1990, when the base rate was around 30 times its current rate.

Figure 14: Trends in the proportion of households considered to be 'debt loaded' or in 'debt peril': 1989 to 2011 under two different base rate options



Note: Figures are un-weighted prior to 1996-97. Income includes benefits and is net of income tax, NICs and local taxes. For the years 1990 to 1994-95, an average local tax amount is imputed for all households based on the average values either side of this period, because the survey data doesn't include directly recorded values. Comparisons before and after these dates should therefore be treated with caution.

Sources: 1989-2001: *Family Expenditure Survey*; 2001-2011: *Expenditure and Food Survey/Living Costs and Food Survey*

The left-hand panel shows that the proportion of household in 'debt peril' remained relatively constant between 1989 and 1997-98, falling slightly as the base rate halved from its peak. Over the same period, the broader 'debt loaded' population fell more noticeably, from a peak of 16 per cent in 1990 to just over 12 per cent in 1997-98. It might appear surprising that the 'debt peril' numbers were not higher in 1990 and 1991 as the recession pushed significant numbers of families into default and possession, but it is worth remembering that those who found themselves in this position were effectively removed from the data – they no longer had repayments to make.

Over the course of the 2000s, the proportion of both 'debt loaded' and 'debt peril' households increased relatively steadily, even as the base rate continued to fall slightly, reflecting both the extent of the growth in the stock of debt and an increase in high loan-to-value and riskier lending. As such, immediately prior to the financial crisis in 2007, the overall proportion of 'debt loaded' households stood at 19 per cent, with those in 'debt peril' amounting to over 3 per cent.

Clearly, in the absence of the swift subsequent reduction in interest rates, significant numbers of households would have faced repayment difficulties – potentially more than was observed in the early-1990s. The importance of today's loose monetary stance is therefore obvious. Despite being slashed from 5.8 per cent in December 2008 to just 0.5 per cent today, the proportion of 'debt loaded' and 'debt peril' households remains comparable to the levels recorded in the early-2000s.

As a means of illustrating just how sensitive household debt is to monetary policy, the right-hand panel sets out what would happen to 'debt loaded' and 'debt peril' rates if base rates stood at 2.5 per cent in 2011, rather than 0.5 per cent. Under such circumstances, the overall 'debt loaded' figure jumps from 14 per cent to 20 per cent, and the proportion in 'debt peril' would increase from just over 2 per cent to just short of 4 per cent. In truth of course, such an outcome would be likely to translate instead into higher rates of defaults and repossessions.

With the fall in spreads we described in the previous section, we might expect the situation to have improved a little since 2011, yet clearly there will still be significant numbers of households whose ongoing solvency is dependent on the maintenance of ultra-loose monetary policy. This is perhaps unsurprising, but it serves as a reminder of just how little room for manoeuvre the MPC currently has.

Figure 15: Trends in the proportion of households considered to be 'debt loaded' or in 'debt peril': 1989 to 2018 under six scenarios

Note: See notes to Figure 14.

Sources: 1989-2001: *Family Expenditure Survey*; 2001-2011: *Expenditure and Food Survey*/*Living Costs and Food Survey*; 2018: RF scenario modelling

What might the picture look like in 2018?

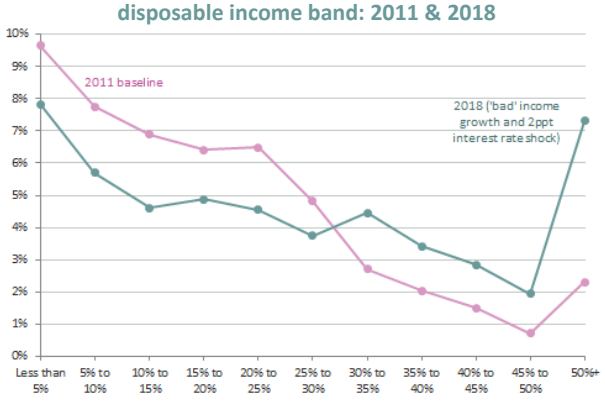
Turning next to our 2018 scenarios, Figure 15 sets out the proportion of households considered to be 'debt loaded' or in 'debt peril' under each of the six combinations of income growth and cost of borrowing changes. Not surprisingly, the outcomes look worse under the 'bad' income growth scenario and worse again when we apply 1 and 2 percentage point interest rate increases.

It is noticeable how quickly the proportions in 'debt peril' approach or surpass those recorded either at the height of the early-1990s period of defaults or in the immediate pre-financial crisis years. In particular, the charts highlight the continued sensitivity to future interest rate increases.

Even under the 'good' income growth scenario – in which incomes rise more quickly than the OBR projects, and in a much more equitable way than the IFS expects – an additional 2 percentage point increase in the base rate would leave around 6 per cent of households in 'debt peril', up from 2 per cent in our 2011 baseline and higher than at any point in the preceding 25 years. A decade on from the financial crisis, monetary policy appears likely to remain severely constrained by the ongoing debt overhang. If such an interest rate outcome is instead combined with a 'bad' income growth scenario, the proportion in 'debt peril' reaches 7 per cent.

One difficulty with using such broad repayment-to-income bands is that our analysis could mask a bunching of households just above or below our specified thresholds. To test this possibility, Figure 16 compares the distribution of households across much narrower repayment-to-income bands in the 2011 baseline and in 2018 under the 'bad' income growth and 2 percentage point interest rate 'shock' scenario.

Figure 16: Distribution of households by repayment-to-disposable income band: 2011 & 2018



Source: RF analysis of *Living Costs and Food Survey* and scenario modelling

It shows that this 'worst case scenario' produces a shallower distribution of outcomes, with reductions in the proportions located in low-gearing bands and increases in high-gearing bands. Although not shown here, the application of the other five scenarios result in similar – if less pronounced – shifts. The implication of these patterns seems to be that the findings represent a significant movement in repayment-to-income ratios, rather than a relatively small movement of households from one side of the 25 per cent and 50 per cent thresholds to the other.

Figure 17 provides a summary of the 'debt peril' numbers in 2007, 2011 and under each of the six scenarios in 2018. Alongside collating the proportions set out in Figure 15, it presents both absolute numbers of households affected and shares as a proportion of just those households holding some form of debt.

Figure 17: Households considered in 'debt peril' in 2007, 2011 & 2018 under six scenarios

Number and proportion of households spending more than 50% of their disposable income on debt repayments	Actual/projected base rate *(5.5% in 2007; 0.5% base; 3.0% in 2018)*	Base rate + 1ppt *(1.5% base; 4.0% in 2018)*	Base rate + 2ppt *(2.5% base; 5.0% in 2018)*
2007 *(pre-crisis peak)*	870,000 3% 6%	*Number of households* *as a proportion of all households* *as a proportion of all households with outstanding debts*	
2011 *(baseline)*	600,000 2% 4%	830,000 3% 6%	1,020,000 4% 8%
2018 *('good' income growth scenario)*	1,120,000 4% 8%	1,420,000 5% 10%	1,740,000 6% 12%
2018 *('bad' income growth scenario)*	1,420,000 5% 10%	1,730,000 6% 12%	2,040,000 7% 14%

Source: RF analysis of *Living Costs and Food Survey* and scenario modelling

Having stood at around 870,000 in 2007, just prior to the financial crisis, the number of households in 'debt peril' had fallen to 600,000 in 2011, which we take as our baseline. A theoretical increase in the base rate in 2011 would significantly increase this number – pushing it over one million in the case a 2 percentage point increase – underlining the importance of the monetary policy response.

What is telling is that, even under the 'good' income growth scenario, and with no increase in base rates beyond what the market already expects, the number of households in 'debt peril' is found to double from its current level to around 1.1 million in 2018. If the base rate increased by an additional 1 percentage point, this number would reach 1.4 million and a 2 percentage point rise would result in the number topping 1.7 million.

Clearly, things look somewhat worse again under the 'bad' income growth scenario. In the absence of any unexpected increases in the base rate, the number in 'debt peril' rises to 1.4 million in 2018, with this figure climbing to 1.7 million and 2 million under the two interest rate 'shock' scenarios.

An unresolved crisis?

As discussed in Section 1, while any household is likely to find spending more than half of its income on debt repayments to be a difficult position to sustain, it does not follow that all households in 'debt peril' face imminent default. Nevertheless, these results underline the sensitivity of indebted households to changes in monetary policy. Far from having resolved a potential repayments crisis, the low borrowing costs in place in recent years appear to have merely reduced households' current outlay on debt repayment. In this section we have

seen that even if rates rise in line with market expectations and economic growth is both strong and shared, the number in debt peril rises. Any outcome less benign than this one and the number heads higher, exceeding 1.5 million households for three of our six scenarios.

In Section 4 we briefly consider the composition of this group, and how it varies under a selection of our scenarios. We focus in particular on the prevalence of 'debt peril' across the income distribution.

4 The changing face of debt?

Rising interest rates and low levels of household income growth could, according to our modelling, leave as much as 8 per cent of the population with perilous levels of debt by the year 2018. Yet this average masks the possibility of a much graver repayments crisis among particular parts of the population. Years of squeezed wages, and the relative ease of access to credit, encouraged high levels of indebtedness among some low to middle income households before the downturn; other groups, such as the home-seeking young, also borrowed heavily in the run-up to the crisis.

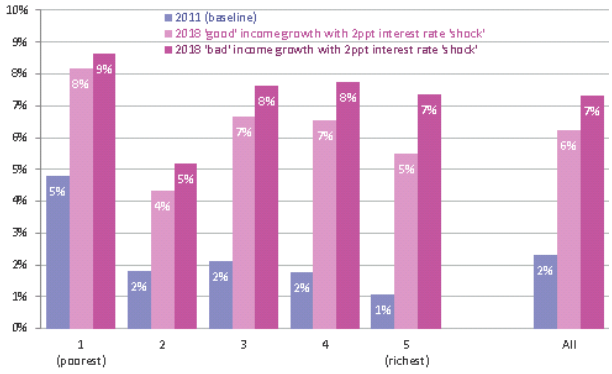
In this section we briefly consider three splits: income, family composition and age. Attempting to drill further into the 'debt peril' group is hindered to some extent by limited sample sizes in the LCFS, and we should be cautious about reading too much into our findings. Nevertheless, it is worth considering some of the broad characteristics we observe under the various scenarios. By doing so, we offer some preliminary insights that can inform potential policy proposals to mitigate a future repayments crisis.

'Debt peril' across the income distribution

Figure 18 compares the proportion of households in 'debt peril' within each equivalised after-tax income quintile in the 2011 baseline and under two of our scenarios: 'good' income growth with an additional 2 percentage point increase in the base rate; and 'bad' income growth with an additional 2 percentage point increase in the base rate.

It makes clear the extent to which 'debt peril' is consistently more prevalent among lower income households, with 5 per cent of households in the bottom quintile being in such a position in the baseline compared with an average of 2 per cent across all households.

Figure 18: Proportion of households in 'debt peril' by position in equivalised after-tax income distribution: 2011 & 2018 under two scenarios



Sources: RF analysis of *Living Costs and Food Survey* and scenario modelling

Under both of the 2018 scenarios considered, this broad distributional pattern remains in place, although it is noticeable that some of the biggest jumps in 'debt peril' occur in the higher income quintiles, reflecting perhaps the fact that debt levels rise rapidly with income.

While Figure 18 only sets out results for two of our scenarios, Figure 19 presents results for all six, but limits these to the bottom quintile of households. Again it includes absolute

numbers of households, as well as the share of debtor households who can be considered to be in 'debt peril'. This latter statistic is perhaps most startling: it highlights the extremely high prevalence of potential repayment difficulties among lower income borrowers.

Figure 19: Households in the bottom quintile considered in 'debt peril' in 2007, 2011 & 2018 under six scenarios

Number and proportion of households spending more than 50% of their disposable income on debt repayments	Actual/projected base rate *(5.5% in 2007; 0.5% base; 3.0% in 2018)*	Base rate + 1ppt *(1.5% base; 4.0% in 2018)*	Base rate + 2ppt *(2.5% base; 5.0% in 2018)*
2007 *(pre-crisis peak)*	370,000	*Number of households*	
	7%	*as a proportion of all households*	
	22%	*as a proportion of all households with outstanding debts*	
2011 *(baseline)*	250,000	300,000	330,000
	5%	6%	6%
	16%	19%	21%
2018 *('good' income growth scenario)*	360,000	410,000	450,000
	7%	7%	8%
	21%	24%	27%
2018 *('bad' income growth scenario)*	410,000	450,000	480,000
	7%	8%	9%
	24%	27%	28%

Source: RF analysis of *Living Costs and Food Survey* and scenario modelling

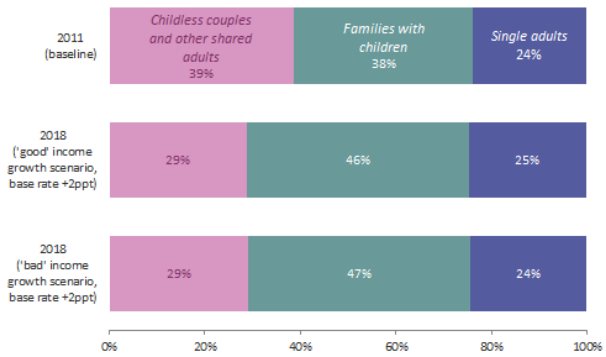
In the 2011 baseline, 16 per cent of such households record repayment levels that suggest they are in 'debt peril'. Under a 'good' income growth scenario, this proportion rises to 21 per cent in 2018; under a 'bad' income growth scenario it reaches 24 per cent. As we increase the base rate above current market expectations, these figures rise rapidly such that, under our 'worst case scenario' more than one-in-four (28 per cent) of lower income households with any debt are found to be in 'debt peril'.

'Debt peril' by household composition

In Figure 20 we once again look at *all* households spending more than one-half of their income on debt repayments under our 2011 baseline and under scenarios three and six, but this time we provide a split by household composition.

Compared to the baseline, in which childless couples and other sharing adults accounted for 39 per cent of the 'debt peril' population, families with children made up 38 per cent and single adults comprised 24 per cent of the total, both of the scenarios shown here imply a significant increase in the proportion of affected households who have children. Although less marked, similar trends are evident in relation to the remaining four scenarios.

Figure 20: Proportion of households in 'debt peril' by household composition: 2011 & 2018 under two scenarios



Sources: RF analysis of *Living Costs and Food Survey* and scenario modelling

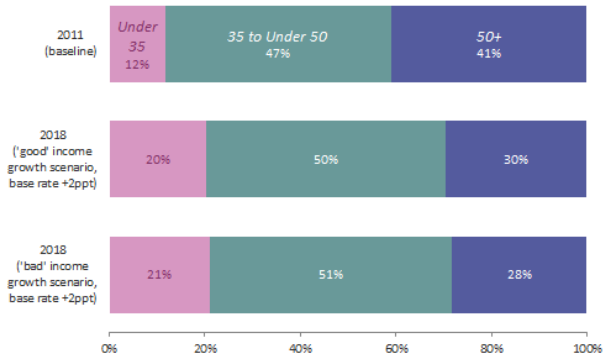
While the reason for this pattern is unclear, it could reflect lifecycle patterns, with families with children reporting a higher prevalence of mortgage debt.

'Debt peril' by age

We might reach a similar conclusion when considering changes in the age profile of the 'debt peril' population under the same set of scenarios.

As Figure 21 shows, while the absolute numbers in 'debt peril' would increase across all ages under scenarios three and six, as a share of the total, the biggest increases would occur among households headed by younger (under 35) individuals. This may be because much of the money pouring into housing in the first half of the 2000s was being transferred from buyers (younger households taking out mortgage debt) to sellers (older households downsizing for retirement).

Figure 21: Proportion of households in 'debt peril' by age of household head: 2011 & 2018 under two scenarios



Sources: RF analysis of *Living Costs and Food Survey* and scenario modelling

These figures require further investigation and should be treated with some caution given the relatively small sample sizes discussed above. Nevertheless, the findings detailed in this section raise the prospect that – in the event that borrowing costs rise more quickly than expected – any associated debt repayment crisis could fall particularly on lower income and younger borrowers, and on parents.

Conclusions and next steps

Far from being resolved, Britain's personal debt problem remains a cause for real concern. The results from our analysis suggest that there is a need to look seriously at ways of heading off a future repayment crisis. A significant increase in the number of households spending more than one-half of their income on debt repayments by 2018 would have profound implications for borrowers, the financial sector and the ability of consumers to contribute to economic recovery.

While record low interest rates have reduced current repayment costs, fewer people than hoped have used this breathing space to pay off their debts. We previously identified 3.6 million households paying more than one-quarter of their income on debt repayment. In 2011, 600,000 of these were already putting more than *one-half* of their disposable income – a perilous level – into paying off debt. When rates go up, the number in 'debt peril' could increase to anywhere between 1.1 million and 2 million, depending on the speed at which borrowing costs rise and the nature of any economic recovery. The larger number equates to 1-in-14 households.

Furthermore, lower income households look particularly vulnerable. Under our worst case scenario, more than one-in-four lower income borrowers could face perilous levels of debt in just five years' time.

The scenarios set out here are grounded in reality but in no way form a prediction of what will happen in the coming years. Instead, they help us to understand the magnitude of difficulties that individual households, and the economy more generally, might face if certain, plausible, variations from the central case were to develop out to 2018.

Things may not develop in the ways considered here. Outcomes could be better – GDP and incomes might rise more quickly – but they could also be worse – a house price boom could put increased pressure on interest rates for instance, and we've taken no account of the unravelling of existing forbearance arrangements.

Policy makers and lenders should use this period of record low borrowing costs to tackle debt problems rather than simply waiting for them to get worse. Strategies could include measures designed to lock-in cheap borrowing for vulnerable debtors as a means of protecting them against future base rate increases. Broader still, the potential debt hangover provides government with even more reason to try to secure a strong, sustainable and equally-shared economic recovery. This analysis highlights the potential problems that face us in the years ahead. The next phase of this work will build on this insight by working with a range of experts to develop potential policy responses that reduce the risk of pushing households – and the economic recovery itself – over the edge.

Technical annex

In this section we provide further details of the methodology and assumptions underpinning the scenario analysis set out in this report. We begin with an outline of the basic approach, before looking in more detail at the steps we take to create the income growth and interest rate scenarios.

The basic approach

To establish each of the six scenarios set out in this report, we adjust microdata taken from the *2011 Living Costs and Food Survey* (LCFS). This approach allows us to produce outputs relating to the distribution of debt repayment-to-income ratios across households. Specifically, we focus on the proportion of households facing repayments (of debt interest and principal) equivalent to more than one-half of their disposable income (placing them in 'debt peril').

For context, we use earlier versions of the LCFS and its predecessors (*Family Expenditure Survey* and the *Expenditure and Food Survey*) to identify trends in 'debt peril' from 1989 onwards. In each of these outturn years, we use directly reported data on debt repayments (with the survey including separate data in relation to each mortgage, loan, hire purchase agreement and credit card held by the household). After-tax income (that is, earnings, plus income from investments, plus income from benefits and tax credits minus income tax and NICs) is also directly reported in the survey, although we apply an adjustment by including Housing Benefit receipts and removing net Council Tax (or rates in Northern Ireland) payments. We do this in order to make the disposable income measure more comparable with the definition used in the DWP's *Family Resources Survey*.

The outcome scenarios we create for 2018 are underpinned by a number of consistent assumptions in relation to GDP growth, inflation, debt levels and savings:

- We use the debt repayment figures in the 2011 baseline along with directly reported or assumed information about payment periods and product-specific interest rates to imply levels of outstanding debts. In all of our 2018 scenarios we assume that these 2011 debt levels increase in line with the OBR's December 2013 central case projections for aggregate debt levels (adjusted for projected population growth to determine the appropriate *per household* rate of increase). We are therefore implicitly assuming that, while the total level of debt increases between 2011 and 2018, the distribution of this debt does not change.[7]

- We adopt a similar approach in relation to household financial assets. The 2011 baseline contains information for each household about income received from savings and we use an assumed interest rate to determine the associated stock of savings/assets. We then uprate this to 2018 in line with the OBR's projection for

total household asset growth (adjusted for population growth). Once again, while the overall level of savings increases between 2011 and 2018, the distribution of these savings does not change.

These are important assumptions. If the OBR's projected increase in debt is instead concentrated among households that currently face low servicing costs – while those who are close to the edge continue to pay down their debt levels – then the incidence of 'debt peril' is likely to be lower than the figures in this report suggest.

In order to create the six scenarios, we apply differing stylised assumptions regarding both nominal growth in household disposable incomes and the future trajectory of the Bank of England base rate:

- We distinguish between 'good' and 'bad' household income growth. Both approaches are underpinned by an assumption that GDP grows in line with the OBR's latest projections. Under the 'good' scenario we assume that total household income grows broadly in line with GDP (as it did in the late-1990s) and that the aggregate pot is relatively evenly shared across the income distribution (as it was during the growth years from 1991 to 2008). Under the 'bad' scenario we assume that the relationship between household incomes and GDP is weaker: household incomes still grow, but less quickly (reflecting the ratio between incomes and GDP recorded in the mid-2000s). We assume also that this smaller aggregate pot is shared much more unevenly across the distribution (as it was during the 1980s).

- Under both the 'good' and 'bad' income growth approaches, we consider three different interest rate scenarios: one in which the base rate rises in line with the market expectations set out in the OBR's December 2013 projections, reaching 3 per cent in 2018; one in which the rate is 1 percentage point higher at the end of the period; and one in which the rate increases by an additional 2 percentage points, reaching 5 per cent in 2018.

Under each of these six combinations, we model changes in incomes, returns on savings and debt repayments for each of the households contained in the 2011 LCFS in order to establish new debt repayment-to-income ratios.

We assume that the changes we apply in each scenario have no behavioural or broader economic effect. For example, we assume that both the 'good' and 'bad' income growth scenarios are compatible with the central case GDP projection and have no additional impact on levels of borrowing or price inflation. Clearly such interaction is possible, but we exclude it in order to isolate the impact of the specific changes we wish to consider.

The income growth scenarios

Our two income scenarios are developed via a two-stage process.

- First, we consider the extent to which overall disposable household incomes grow in line with GDP, using *National Accounts* data as our source. We identify two distinct periods: "strong growth" (1997-98 to 2001-02) during which time incomes grew more or less in line with overall economic output; and "weak growth" (2001-02 to 2007-08) when incomes grew (in real terms) at about half the pace of GDP (the ratio is 0.7 when nominal figures are used – and it is this ratio which we apply in the model).

- Secondly, we consider the extent to which the overall pot of disposable household income is shared across the distribution. Using data from the DWP's *Households Below Average Income*, we again identify two distinct periods,: "shared growth" (1991 to 2007-08) when average annual real-terms growth varied by less than 1 percentage point across the equivalised income scale (excluding the far extremes above the 95th percentile and below the 5th); and "skewed growth" (1981 to 1990) when the spread in average annual growth was closer to 6 percentage points. In each instance, we compare nominal growth at the decile median[8] with mean growth to establish a ratio for future application.

In increasing the incomes of households in the LCFS sample to their assumed 2018 level, we apply either the 'good' or 'bad' income growth rates, which vary by income decile. Because outturn data is already available for aggregate disposable income growth in 2012-13, the first year of the uprating is identical under both income growth scenarios. That is, we take the actual level of (per household) income growth reported in the *National Accounts*. In this instance, we share the total pot across deciles in line with the historic distributions recorded over the entire pre-2011 period (from 1981 onwards). We then apply differing rates under the 'good' and 'bad' approaches from 2013-14 onwards.

In our 'good' income growth scenario, we apply the "strong growth" ratio to the OBR's GDP projections, and then apply the "shared growth" ratios to the overall income growth figure, producing separate average annual growth rates for each decile. In our 'bad' income growth scenario we similarly combine the "weak growth" and "skewed growth" approaches.

This approach produces decile-specific cumulative growth rates for the period 2011-2018. Because these rates relate to *equivalised* incomes, we apply an adjustment for each household based on its equivalisation factor to establish the change in their *actual* disposable income. It is this figure which forms the denominator in the repayment-to-income calculation.

The cost of borrowing scenarios

Our default base rate position in 2018 is based on the trajectory of market expectations for rates set out in the OBR's December 2013 *Economic and Fiscal Outlook*. In plotting our two alternative base rate scenarios: namely that the rate reaches 4 per cent or 5 per cent in 2018 (rather than the 3 per cent implied by current expectations), we assume (in line with the default trajectory) that there is no change in the rate until 2015. We then apply simple linear growth rates.

The crucial element of these scenarios is understanding just what base rate moves mean for the rates borrowers pay (and savers receive) in each of the scenarios. Our approach varies on a product-by-product basis.

In relation to **repayment mortgages**, the LCFS data contains information relating to the level of mortgage outstanding and to repayments – split by principal and interest. We use this data along with an assumption about interest rates in order to imply the remaining term of the mortgage. Rather than attempting to apply different interest rates for different mortgage products (we don't have information about whether households are using fixed or variable mortgages), our baseline assumes weighted average quoted interest rates. These averages take account not just of the range of mortgage rates that are available, but also of the volume of loans outstanding at each separate rate, and stood at around 3.4 per cent in the 2011 baseline. Few, if any, of the households in the LCFS sample will be paying the assumed rate, but across the survey as a whole, this assumption should most closely approximate the actual repayment position of households.

We then uprate the directly reported outstanding mortgage figure to 2018 in the way described in the first bullet on p31. Because a significant minority of households in 2011 are reported to have been in some form of forbearance on their credit commitments, the stated repayment figures are likely to understate the true value of outstanding debt: we make no adjustment for this, with the implication being that we are assuming no change in forbearance practices in 2018. Having established a new level of outstanding mortgage debt in 2018, we then apply a new assumed weighted average mortgage rate to estimate future repayments.

The new rate is a product of movements in the base rate and our assumption about what happens to spreads between the base rate and quoted mortgage rates. We make no assumption about the changing mix of fixed and variable rate loans over the scenario. Of course, we might expect households to seek to increasingly move towards fixed rate deals as a means of protecting themselves against future rate rises. However, such deals are typically more expensive than variable rates in the period prior to any rate increase, meaning that our approach is likely to understate the repayment rates faced by households in 2018.

Given that we are using weighted average rates, we apply the values that would prevail in 2018 under each of the three base rate approaches. In the default approach, where the base rate rises from its baseline level of 0.5 per cent to a 2018 level of 3 per cent, we therefore assume a 2.5 percentage point increase in rates. These increases are then reduced to reflect our assumption that spreads continue to fall over the period. Because we assume that they fall from their reported 2013 level halfway back towards their pre-crisis averages, this implies a reduction of 1.1 percentage points from their 2011 level, meaning that our weighted average rate increases by just 1.4 percentage points (to 4.9 per cent) between 2011 and 2018 in the default approach.

In relation to **interest-only mortgages**, the base information in the LCFS (covering the amount of mortgage outstanding and the value of repayments) is sufficient to allow us to imply the *actual* levels of interest being paid in the baseline (rather than using an assumed level as we do in relation to repayment mortgages). In this instance it is these actual rates which we adjust in the 2018 scenarios, in the same way as described above.

In relation to **loans and hire purchase agreements**, we distinguish between rates for lower value (<£7,500) and higher value advances (>£7,500). Because of the magnitude of reductions in spreads since 2011, the default base rate approach implies a *reduction* in average rates on loans by 2018, from 13.2 per cent to 11.5 per cent for smaller loans and from 9.2 per cent to 8.5 per cent for larger loans. Even under the scenario in which the base rate rises by 1 percentage point above expectations, the assumed rate on smaller loans remains below its 2011 level in the 2018 modelling.

Unlike mortgages, we assume that all rates are fixed over the course of the loan. We therefore use the data recorded in the baseline LCFS about the age of the loan to apply the average product-specific interest rate that prevailed when it was taken out. To capture future changes in interest rates we simply change the base year. That is, for a loan that is 24 months old, we assume that it was advanced in 2009 when working with the baseline and in 2016 when considering the 2018 scenarios.[9]

In relation to **credit cards**, we take the weighted average rate for *interest-bearing* (i.e. those on which interest is charged) credit cards. We assume all rates are variable and therefore increase the weighted average in line with changes in the base rate and our spread assumptions, as with mortgages. Once again, the 2018 rates are lower than in the 2011 baseline under two of our three base rate approaches (falling from 18.6 per cent to 17.5 per cent and 18.5 per cent, and rising marginally to 19.5 per cent under the 2 percentage point interest rate 'shock' scenario). Unlike each of the other loan products, our figures for credit cards relate to interest charges only, thereby avoiding the inclusion of payments which simply represent deferred spending within the month.

In relation to **savings**, we assume that all income derived from such products is subject to the average rate for all time deposits (2.7 per cent in 2011). Under the default base rate approach, this figure rises to 3.8 per cent in 2018 (rising to 4.8 per cent and 5.8 per cent under the two alternatives). We assume that any increase in savings returns under the default interest rate approach is captured within our overall income growth approach. Where we model outcomes associated with the base rate rising more steeply, we calculate the difference between the returns on savings that would apply under the default approach with those which are now in place, and we add this additional income to each household's total. We make no assumption about tax, meaning that incomes are boosted by the full gross increase in savings returns.

[1] A Cattermole, "UK banks' write-offs of bad debt", *Monetary and Financial Statistics*, Bank of England, Sep 2004

[2] M Whittaker, *On borrowed time? Dealing with household debt in an era of stagnant incomes*, Resolution Foundation, Dec 2012

[3] OBR, *Economic and Fiscal Outlook*, December 2013, para 3.107

[4] See for example, J Plunkett, *Growth without gain: the faltering living standards of people on low to middle incomes*, Resolution Foundation, 2011.

[5] While market expectations have evolved since March, they currently stand little altered from the position set out in the OBR's *Economic and Fiscal Outlook*. Increasing expectations of sharper rises were quickly reversed by comments from the new Bank of England Governor. More recently, the introduction of forward guidance appears to have had little material impact.

[6] Although we set out GDP-deflated ratios and indices in this explanation, in the modelling itself we use nominal data.

[7] To illustrate this, imagine that there are only two households in our 2011 baseline. Household one has £10,000 of debt and household two has £200,000. If the OBR figures were to project a doubling in per household debt levels by 2018, our modelling would imply increases in debts to £20,000 in household one and £400,000 in household two. The overall level increases, but the distribution does not.

[8] We use the median rather than the mean because the IFS data that underpins this calculation is presented for each 5th percentile of the distribution. Hence we can use percentile 5 to cover decile 1, percentile 15 for decile 2 etc.

[9] By way of illustration, imagine a household that reports having a £5k loan in the 2011 baseline which is two years old. We assume that the rate of interest charged on that loan was fixed when it was taken out (in 2009) at the average rate prevailing for £5k loans at that time. When moving to the 2018 scenarios, we uprate the £5k in line with overall assumptions about increases in average debt levels but continue to assume the rate of interest is fixed at the point at which it is taken out – which we now take to be 2016, i.e. two years prior to2018. We use the assumed rate of interest on such a loan that is contained in our interest rate scenarios.