Resolution Foundation

Mortgaged Future

Modelling household debt affordability and access to re-financing as interest rates rise

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May 2014

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Summary

Despite interest rates being at historic lows, with some households having benefited from a considerable mortgage windfall over the past five years, around one-in-five mortgagors (19 per cent) reported having difficulty meeting their monthly repayments in 2013, up from one-in-ten (11 per cent) in 2004. The relatively limited scale of deleveraging exhibited by British households since the onset of the financial crisis has left a significant number vulnerable to future rate rises.

Such increases are set to be gradual and are not expected to begin until 2015. But the continued debt exposure of many households, along with relatively modest expectations for income growth in the coming years, means that even modest rate rises could spark significant affordability pressures for some. To better understand the potential scale of the problem and the scope for mitigating it, we identify in this paper two groups of potentially stretched mortgagors:

- Those who spend one-third or more of their after-tax income on mortgage repayments in 2014 and, more relevantly, in 2018 – who we describe as being **highly geared**[1]

- Those who find themselves unable to access credit in 2014 in the same way they did before the financial crisis – who we describe as '**mortgage prisoners**'

Specifically, we create a proxy for 'mortgage prisoners' including those with very low levels of equity (with outstanding mortgages equivalent to 95 per cent or more of the current value of their property) and those with higher levels of equity who have other non-standard circumstances such as interest only borrowers and the self-employed.

On all measures we derive our data from modelling based on the *Family Resources Survey*. We make no attempt to forecast the future; instead we simply set out what would happen if the specific conditions we assume were to hold. The results are therefore indicative rather than definitive, but they provide us with a better sense than we have to date both of the numbers at risk and what these households might look like.

While all of those who face a potential affordability problem in 2018 can be considered at risk, those who additionally display mortgage prisoner characteristics in 2014 are perhaps

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[1] There is no commonly accepted definition of what constitutes an affordable level of housing costs, but DCLG's *Strategic Housing Market Assessment Guidance* of 2007 stated that households could afford a shared equity property where the rent and mortgage costs were no more than 30 per cent of *gross* income. More recently, Shelter has used a metric of 35 per cent of *net* household income, arguing that "this is at the top end of income to housing cost ratios suggested by previous research, and practice in other countries" (*London Rent Watch: Rent inflation and Affordability in London's private rental market*, Shelter, 2012).

most exposed. In the absence of re-mortgaging options, they are less likely than others to be able to protect themselves from the uncertainty of future rate rises. Instead, they face the prospect of remaining on their current lender's standard variable rate (SVR) indefinitely.

Around 2.3 million households might face affordability problems by 2018, with around 770,000 being further disadvantaged by potential prisoner status

Our modelling suggests that **around 13 per cent (1.1 million) of mortgagor households are highly geared in 2014**. The combination of relatively modest increases in the cost of borrowing and steady but unspectacular increases in household incomes results in this figure **more than doubling to 27 per cent (2.3 million) by 2018**, based on the OBR's latest (March 2014) projections and market expectations that the Bank of England base rate reaches 2.9 per cent by the end of 2018.

This is a significant increase, and points to the potential scale of future repayment difficulties we might face. However, **around one-third of the 2.3 million households we identify as highly geared in 2018 also sit within our proxy group for re-mortgaging restrictions**. This means that around one-in-ten (770,000 or 9 per cent of all mortgagor households) might struggle to prepare for a rising interest rate environment by accessing market-based solutions.

It is worth remembering that many households outside of this group are likely to face affordability problems *even after* they take action to find the best mortgage deal. But the 9 per cent of mortgagor households we identify may not have that option; for them, preparing for interest rises appears much more difficult.

Affordability is a bigger issue in London and the South East, but potential prisoner status is most pronounced in Northern Ireland

Not surprisingly, mortgagors in London and parts of the South appear to be most exposed to affordability risk. **In 2018, 35 per cent of mortgagors in both London and the Eastern regions appear to be highly geared**, as do 31 per cent in the South East. In contrast, the figure stands at 18 per cent in Scotland and 19 per cent in Yorkshire and the Humber.

Reflecting very different house price trends around the country over recent years, **the numbers affected by very low levels of equity varies considerably**, with around one-third (35 per cent) of mortgagor households in Northern Ireland in this position, compared with just 2 per cent in London.

An apparent inverse relationship between gearing and prisoner status across regions means that **the proportion sitting within the combined group** (highly geared in 2018 and potential prisoners in 2014) **varies relatively little across much of the country**. The **two key exceptions are Northern Ireland and London**, where 16 per cent and 13 per cent of mortgagor households respectively face the potential double hit.

Lower income mortgagors are most exposed, but the affordability issue is set to stretch up the income distribution as rates rise

Around 61 per cent of mortgagors located in the bottom 10 per cent of the income distribution (ranked across all households – mortgagors and non-mortgagors) **are highly geared in 2014.** In decile 2, the figure is 27 per cent and the proportion falls over the rest of the income distribution, standing at **just 5 per cent in both deciles 9 and 10**. Of course, in absolute terms there are fewer households with mortgages in lower parts of the income distribution. Nevertheless, **one-quarter (25 per cent) of the highly geared are found in the bottom decile in 2014**.

As interest rates rise, mortgagors in all deciles are affected, but the overall problem of affordability appears to become more main-stream. **By 2018, those in the bottom decile account for a smaller share (15 per cent)** of the overall highly geared population.

The proportion of mortgagors within each decile who display potential prisoner characteristics in 2014 is flatter. **Taking the highly geared in combination with the prisoner proxy however, there is a clear distributional trend**. Four-in-ten mortgagors (40 per cent) in decile 1 face both potential affordability and re-structuring problems, as do one-quarter (23 per cent) of those in decile 2. In contrast, just 4 per cent of borrowers in decile 9 and 3 per cent in decile 10 face this dual risk.

There is a need to make efforts to free mortgage prisoners where possible and protect them from the risk of unreasonable rate increases where necessary

The figures set out in this report are designed to be indicative of the potential scale of repayment problems that may yet follow as interest rates rise. With most forecasts suggesting that such rate rises won't occur until 2015, **there is still time for households, lenders, regulators and the government to take action to prepare for the changing environment**.

For many borrowers, the first response will be to ensure they are getting the best deal possible on their mortgage, locking-in today's low rates and taking advantage of a competitive mortgage market where possible.

However, some will be unable to access such solutions. We have identified around one-in-ten mortgagor households who face the potentially toxic combination of affordability pressures and a lack of access to re-mortgaging. These borrowers face an uncertain future: stuck on the SVR and therefore vulnerable to rate rises linked both to increases in the Bank of England's base rate and to separate commercial decisions by their lender.

Our final report – due in June – will set out in detail some of the potential responses that might help to support borrower households in a variety of circumstances, and the economic recovery more generally, during the eventual deconstruction of the debt overhang.

A crisis averted, or delayed?

Despite a severe downturn, we haven't seen the mortgage crisis many expected

With the onset of the global financial crisis in 2007-08, so came predictions of a serious fall-out among Britain's homeowners.

Yet as Figure 1 shows, while the number of mortgages in arrears and the number taken into possession *did* rise sharply, they did not reach the levels recorded during the last major housing crisis at the start of the 1990s, despite the fact that the economic downturn was significantly deeper and longer-lasting this time around.

And, while still elevated, the numbers in these positions have fallen steadily over the last few years.

Figure 1: Mortgage arrears and home repossessions: UK 1971-2013

Source: Council of Mortgage Lenders

With economic growth having returned and increases in average wages at last matching inflation again, we might expect this improvement to continue over the coming years.

The lack of crisis reflects policy reactions and interest rate cuts in particular

The relative lack of upheaval is likely to owe much to the particular nature of the UK housing market and to policy responses which are set to unwind to some degree as economic output picks up. With many households facing apparent difficulties in meeting the cost of their accommodation even in this relatively favourable environment, the question is whether the mortgage repayment crisis has not been averted, but simply delayed?

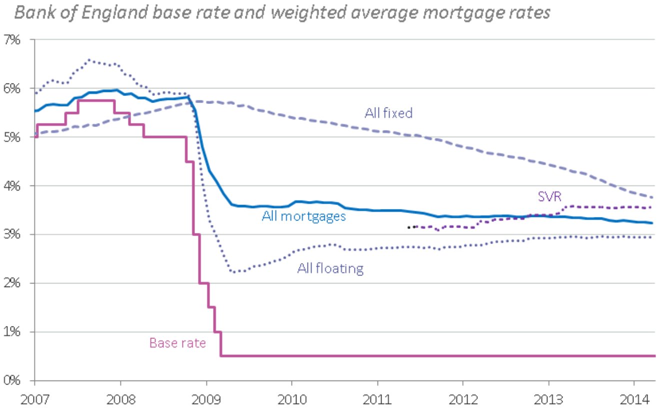
In previous work, we've argued that the repercussions of the financial crisis on mortgage repayments have been limited to date by four factors: the relatively mild house price correction experienced in the UK; the surprisingly strong performance of employment during the downturn; loose monetary policy; and extensive lender forbearance. [2] Of all of these factors, the slashing of the Bank of England base rate has perhaps been the most important.

[2] M Whittaker, *On Borrowed Time? Dealing with household debt in an era of stagnant incomes*, Resolution Foundation, December 2012

Figure 2 compares changes in the base rate with movements in the average rates recorded across various forms of mortgage. Over the course of just five months from October 2008, the base rate was cut from 5 per cent to a historic low of 0.5 per cent.

With many fixed rate borrowers tied into pre-existing deals, the average charge across such mortgages fell much more slowly, but it has been a clear downward trajectory.

Figure 2: Base rate and weighted interest rates for mortgage stock: UK 2007-2014



Source: Bank of England

By March 2014, the weighted average across all fixed rates had fallen to 3.8 per cent, down from 5.7 per cent in 2008.

Not surprisingly, the average charge on new and existing floating rates fell more rapidly as the base rate was cut (though it didn't fall as far as the base), from 5.9 per cent to 2.2 per cent. It has since edged back up to the 3 per cent mark. This appears to reflect two trends.

First, as Figure 2 shows, the SVR has risen since 2011, providing a direct upwards effect. Secondly, there is likely to have been a compositional shift within the 'all floating' group. That is, a growing number of mortgagors are likely to have remained on the SVR at the end of their fixed rate period, rather than switching immediately to new fixed rate deals. Because SVRs tend to be higher than the tracker rates which comprise the rest of the 'all floating' group, the effect is to increase the weighted average within this group.

Taking all new and existing fixed and floating mortgage rates together, the impact of the loosening of monetary policy is clear to see. By way of illustration, the fall shown in the 'all mortgages' average rate from 5.8 per cent in October 2008 to 3.2 per cent in March 2014 is equivalent to a reduction in payments on a mortgage of £100,000 of around £150 a month, from £630 to £485 – close to a one-quarter cut.

Borrower experiences have been highly variable

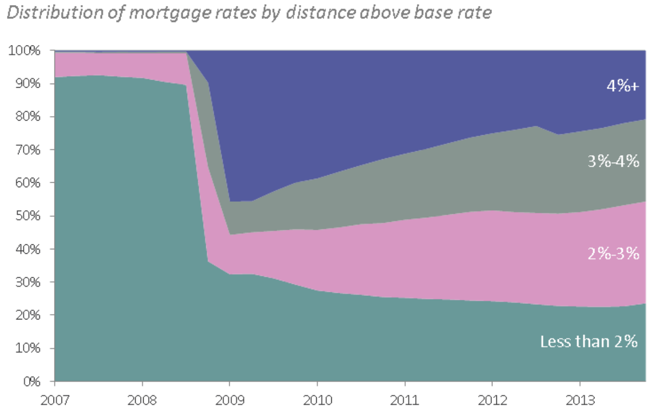
However, some borrowers have fared less well due to the nature of their mortgage deals. And for many, any mortgage windfall has been offset to a greater or lesser extent by falling wages and incomes.

As noted above, those holding fixed rate deals that were taken out prior to the financial crisis – around half the mortgage stock was fixed in 2008 – were unlikely to benefit immediately from the sharp fall in the base rate. And in the face of commercial and regulatory pressures, lenders have tended not to pass on the full extent of the cuts to customers – with spreads on variable mortgages and new fixed rate offers tending to rise.

As Figure 3 shows, in the immediate aftermath of the base rate cuts, the proportion of outstanding mortgages that were 4 per cent or more above the base rate jumped from zero to nearly half (46 per cent).

Although the picture subsequently improved, one-in-five mortgages (21 per cent) remained in this position at the end of 2013, with a further one-quarter (25 per cent) being between 3 per cent and 4 per cent above the base rate – an unheard of situation prior to the financial crisis.

Figure 3: Distribution of mortgage spreads above the base rate: UK 2007-2013



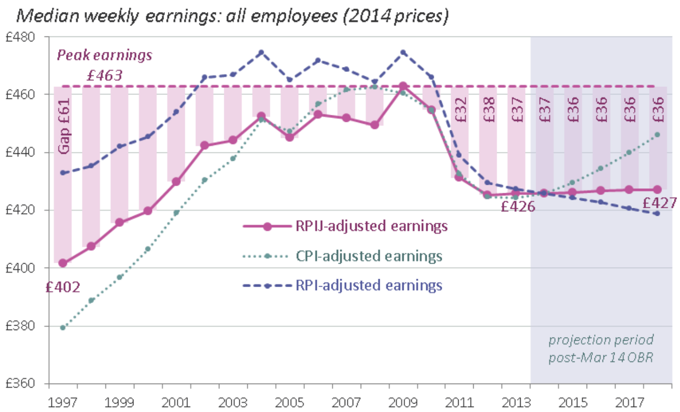
Source: Council of Mortgage Lenders

And even for those households who *have* benefited from a significant reduction in their monthly mortgage costs, overall incomes have in many cases still fallen because of pressures associated with unemployment, under-employment, falling wages and cuts to state support. Box 1 provides some pen portraits for stylised families.

Taking the experience of pay as one example, Figure 4 sets out median weekly earnings adjusted for various measures of inflation.

Using RPI-J, (which – unlike the more widely-used CPI – includes mortgage interest costs), median wages were some £37 a week lower in 2013 than at their peak in 2009. In monthly terms, this is equivalent to around half of the mortgage saving set out in the example above, meaning a household with two median earners would see any gains wiped out.

Figure 4: Median weekly earnings outturn and projections: UK 1997-2018



Note: Projections are calculated with reference to OBR projections for average earnings. That is, the OBR figure is adjusted to reflect how closely median wage growth tracked average earnings in the economic growth years of 1997-2007.

Source: RF modelling using ONS, *Annual Survey of Hours and Earnings* and OBR, *Economic and Fiscal Outlook*

Box 1: Selected pen portraits of variations in the impact of mortgage windfalls since 2007

Rebecca & John: £75k mortgage

	Gross earnings 1	Net earnings 1	Gross earnings 2	Net earnings 2	Mortgage type	Annual rate	Annual payment
2007	£36,818	£27,389	£30,682	£23,155	Tracker	6.0%	£5,799
2008	£36,818	£27,545	£30,682	£23,311	Tracker	5.0%	£5,261
2009	£36,818	£27,636	£30,682	£23,402	Tracker	2.0%	£3,815
2010	£36,818	£27,564	£30,682	£23,330	Tracker	2.0%	£3,815
2011	£36,818	£27,865	£30,682	£23,631	Tracker	2.0%	£3,815
2012	£36,818	£27,682	£30,682	£23,509	Tracker	2.0%	£3,815
2013	£36,818	£27,908	£30,682	£23,735	Tracker	2.0%	£3,815
2014	£36,818	£27,991	£30,682	£23,818	Tracker	2.0%	£3,815

Rebecca & John have both remained in their jobs over the course of the downturn, receiving inflation-linked pay rises each year. Increases in the personal tax allowance mean that their after-tax earnings have therefore risen slightly in real terms, supplementing an already sizeable mortgage windfall.

Cumulative gain since 2007: £17,560

Andrew & Wendy: £100k mortgage

	Gross earnings 1	Net earnings 1	Gross earnings 2	Net earnings 2	Mortgage type	Annual rate	Annual payment
2007	£24,546	£18,921	£20,864	£16,380	3-year fixed	5.1%	£7,085
2008	£24,546	£19,077	£20,864	£16,537	3-year fixed	5.1%	£7,085
2009	£24,546	£19,168	£20,864	£16,627	3-year fixed	5.1%	£7,085
2010	£23,752	£18,549	£20,190	£16,090	SVR	4.0%	£6,334
2011	£22,740	£18,151	£19,329	£15,797	SVR	4.0%	£6,334
2012	£22,111	£17,681	£18,794	£15,425	SVR	4.5%	£6,670
2013	£21,783	£17,684	£18,516	£15,462	3-year fixed	4.9%	£6,945
2014	£21,591	£17,636	£18,352	£15,434	3-year fixed	4.9%	£6,945

Andrew and Wendy's mortgage payments were initially fixed, but fell once this deal ended. When their lender hiked the SVR in 2012 they took out a new fixed deal, though low equity meant they couldn't get the best rate. Because they both work in the public sector, their relatively modest mortgage windfall was more than offset by real-terms pay cuts.

Cumulative loss since 2007: -£5,595

Simon & Iris: £150k mortgage

	Gross earnings 1	Net earnings 1	Gross earnings 2	Net earnings 2	Mortgage type	Annual rate	Annual payment
2007	£46,637	£34,164	£44,182	£32,470	5-year fixed	5.1%	£10,628
2008	£7,106	£7,044	£44,182	£32,626	5-year fixed	5.1%	£10,628
2009	£17,396	£14,235	£44,182	£32,717	5-year fixed	5.1%	£10,628
2010	£17,396	£14,162	£42,754	£31,660	5-year fixed	5.1%	£10,628
2011	£17,396	£14,463	£40,931	£30,703	SVR	4.0%	£9,491
2012	£17,396	£14,474	£39,800	£29,709	SVR	4.0%	£9,491
2013	£30,570	£23,659	£39,209	£29,534	SVR	4.0%	£9,491
2014	£30,300	£23,559	£38,863	£29,382	SVR	4.0%	£9,491

Simon and Iris received a mortgage windfall of around £4,500, once their initially fixed rate deal reverted to the SVR. This was dwarfed by a drop in earnings associated with Simon losing his job in IT however. He was able to replace part of his earnings by working on freelance basis but the cumulative impact was substantial, particularly as Iris's pay also fell in real-terms.

Cumulative loss since 2007: -£133,964

These pen portraits focus entirely on wages and mortgage payments and take no account for changes in benefit and tax credit receipts. Nor are fixed costs associated with re-mortgaging included. We deflate earnings using the CPI and present them in 2014 prices, to reflect the fact that we are capturing the impact of mortgage interest costs separately.

Perhaps more troublingly, our projections – again based on OBR data – suggest that any recovery in pay is likely to be gradual at best. Although average wages have finally matched CPI inflation in recent months, we appear to be a long way from returning to pre-crisis norms. In the economic growth years of the 1990s and 2000s, median pay consistently grew more slowly than the mean. Simply applying the historic ratio between the median and the mean to the OBR's projections for average wages in the coming years, Figure 4 suggests that typical wages are set to be flat through to 2018 when measured against RPI-J inflation.

Add in the fact that government austerity is set to continue through to the end of the decade, with further cuts in benefits and tax credits, and the prospects for income growth in many low and middle income households appear highly uncertain.

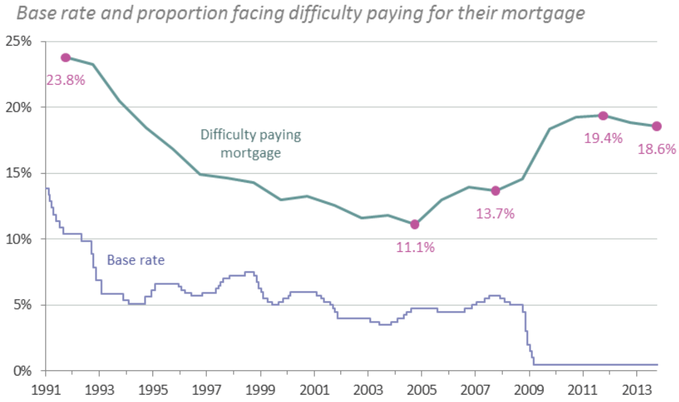
Even in this favourable environment, exposure to debt remains high

So, while many households have received a mortgage windfall in recent years, large numbers remain close to the edge.

Figure 5 shows that the proportion of mortgagor households reporting having difficulty paying for their accommodation increased from a low of 11 per cent in 2004 to 14 per cent just before the financial crisis and to a peak of 19 per cent in 2011.

Despite the reduction in mortgage costs experienced by many homeowners – particularly as spreads narrowed and existing fixed rate deals came to an end from 2011 onwards – there has been very little improvement in the number experiencing problems since that point.

Figure 5: Households facing difficulty paying their mortgage: GB 1991-2013



Source: Bank of England, *NMG Survey*

So, while the proportion struggling to meet their mortgage payments has remained some way short of the levels recorded in the early 1990s, it appears highly elevated relative to the level of the base rate.

Falling borrowing costs have provided a window of opportunity during which heavily burdened households can pay down some debt. But for many, the reality of the last few years – in an environment of high unemployment and under-employment, falling wages and fiscal consolidation – is such that they have been unable to take advantage of this window.

High debt signals potential problems as the economic backdrop changes

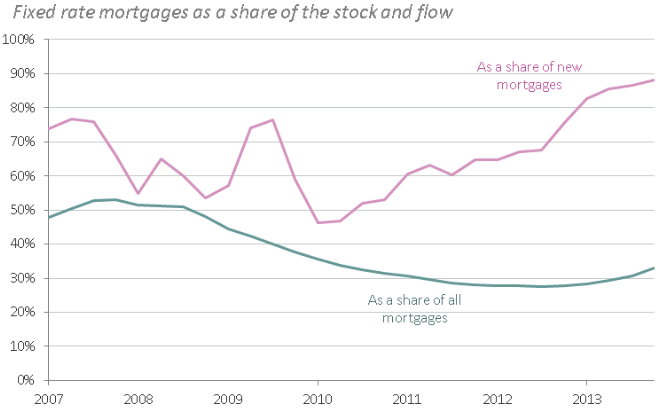
This continued mortgage exposure matters because better news on a number of economic fronts – output and employment, along with sharp rises in house prices (especially in London) – increases pressure on the Bank of England to bring an end to the mortgage party via monetary tightening.

And a majority of borrowers are exposed to such tightening because they are on some form of variable rate. Figure 6 shows that, perhaps not surprisingly, there is a clear preference for fixed deals among those taking out new mortgages, with nine-in-ten opting for such products at the end of 2013.

Looking at the stock of mortgages however, just under one-third are fixed. As Figure 2 showed, variable rates – including SVRs – have been significantly lower than fixed rates over recent years, reducing the incentive for borrowers to move onto fixed rates as their original deals expired.

And of course, some of those currently paying a fixed rate might still face affordability pressures in the future as their deals come to an end and they are forced to re-mortgage at a higher rate.

Figure 6: Fixed rate deals as a share of the stock and flow: UK 2007-2013



Source: Council of Mortgage Lenders

Indeed, an unlucky few may find that they are paying a premium today for having a fixed rate that then expires just before base rate rises start feeding through in a more significant way to lenders' pricing decisions.

Increases in the cost of borrowing are set to be gradual, and there is likely to be some room for lenders to absorb some of the increase in the base rate via tightening their spreads a little further. However, the weakness of the prospects for many households' incomes, the magnitude of their remaining debt and the fact that so many borrowers are exposed to movements in mortgage rates mean that even modest rises could spark significant affordability pressures.

Faced with a potential spike in repayment problems as rates rise, there are three broad, and complimentary, courses of action we might consider:

- ***Extend the window of opportunity***, by maintaining low interest rates until there is clear evidence of sustainable, broad-based recovery not just in output but in household incomes too;
- ***Prepare for the eventual closing of this window***, by being pro-active in ensuring that households can and do make appropriate re-financing decisions in order to lock-in today's low rates for a defined future period; and
- ***Support those households who find themselves in debt crisis***, by ensuring there is sufficient capacity among debt advisers and reviewing mechanisms for minimising the social and economic upheaval associated with exits from the housing market.

We will set out a range of policy recommendations across these three broad areas in our final report in June. In this paper however, we are primarily concerned with understanding more about the magnitude of the potential affordability problem and the characteristics of those households most at risk.

Re-financing options are limited

Looking within the second of our three themes in particular, we consider whether future repayment difficulties might be made worse for some families by the fact that they face restrictions today in their ability to access market-based re-financing options.

In the wake of the financial crisis, lenders and policy-makers alike have sought to learn the lessons of the past and avoid the worst excesses of easy credit that characterised the mid-2000s. The subsequent tightening of credit supply is designed to help with the *flow* of new mortgages by establishing new affordability checks and penalties for reckless behaviour. It brings with it potential challenging consequences for some parts of the existing *stock* of mortgages however. Two groups in particular are likely to find it more difficult to re-structure their loans in the new environment:

- Those with **very low (or negative) levels of equity** in their home; and
- Those in **non-standard circumstances**, including borrowers with interest only mortgages and those who have difficulty proving that they have a stable income.

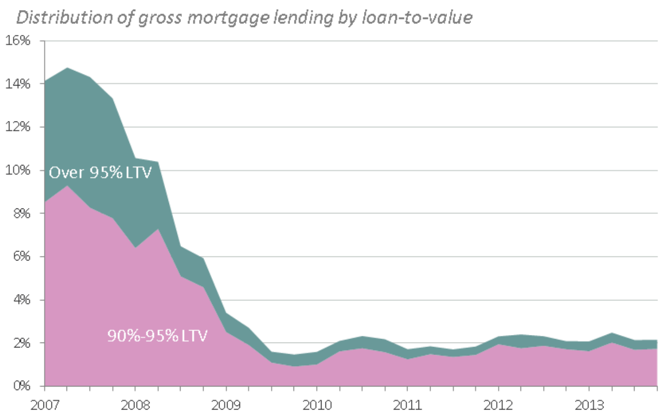
Those with low levels of equity are likely to be particularly disadvantaged

Figure 7 shows that close to 15 per cent of gross mortgage lending in the middle of 2007 was advanced to borrowers with loan-to-values (LTV) of 90 per cent or higher.

Following the onset of the credit crunch this figure fell sharply, reaching a low of 1.5 per cent at the end of 2009. It has been little changed since and, to the extent that the proportion has picked up very slightly, it has been entirely due to a small increase in advances at 90-95 per cent LTV.

Existing borrowers with less than 10 per cent equity in their home are therefore likely to have difficulty sourcing a re-mortgage.

Figure 7: Proportion of new mortgages advanced with a high loan-to-value: UK 2007-2013



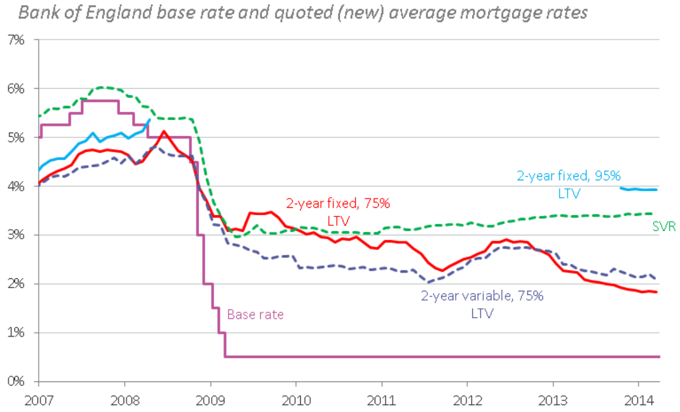
Source: Council of Mortgage Lenders

The Help to Buy mortgage guarantee programme, introduced by the government from October 2013, could result in new options for some of these borrowers by encouraging lenders to restore higher LTV mortgages to the market. But it is capped at 95 per cent LTV so will not affect those with the very lowest levels of equity.

And, even where low equity borrowers *are* able to access new deals, there is a significant premium in place.

While Figure 2 set out average rates across different parts of the mortgage stock, Figure 8 focuses on the flow – detailing average rates quoted on new mortgage offers. Data for two-year fixed mortgages at 95 per cent LTV has only recently been restored, due to the absence of such deals in the aftermath of the financial crisis.

Figure 8: Base rate and weighted quoted interest rates for mortgage flow: UK 2007-2014



Source: Bank of England

As at March 2014, the average rate for such products stood at 5.1 per cent. In contrast, two-year fixed deals at 75 per cent LTV stood at just 2.4 per cent. This difference amounts to around £1,760 a year in repayment costs on a mortgage of £100,000. Yet back in 2007, the prices of these two products were almost identical.

Interest only mortgagors and the self-employed might also face limited options

In addition to those finding themselves excluded from the market as a result of a lack of equity, some existing borrowers might face difficulties associated with the tighter regulatory regime set out in the FCA's new Mortgage Market Review (MMR).

The review raises particular issues for those borrowers who accessed a self-certified or an interest only mortgage pre-crisis. It both shifts the responsibility for income verification squarely to the banks and stipulates that affordability criteria for interest only mortgages must now be assessed on an interest *and* principal basis unless there is a clear repayment vehicle in place. Faced with the prospect of penalties if they fail to comply with these new regulations, many lenders have opted either to withdraw from the interest only and self-certification markets entirely or to offer only severely restricted access to these products for new borrowers.

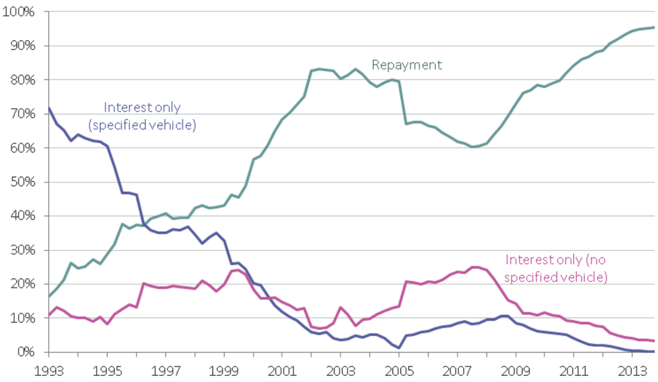
Figure 9 charts the mortgage types advanced each year in the period since 1993. It shows that interest only mortgages with specified savings vehicles to cover the principal – endowment mortgages – were the most common means of repayment in the mid-1990s.

They subsequently declined in popularity, though an increasing number of new mortgages in the 2000s were advanced on an interest only basis – frequently with no specified repayment vehicle.

Interest only mortgages of all forms represented around one-third of all new mortgage advances immediately prior to the financial crisis and continue to account for around one-quarter of the stock. Yet new interest only deals covered just 3 per cent of the flow of new mortgages in 2013.

Figure 9: Types of mortgages advanced: UK 1993-2013

Share of mortgage advances by type of repayment



Source: Council of Mortgage Lenders

Existing interest only mortgagors are therefore faced with a potentially difficult choice. They can retain their interest only deal, but will then face the uncertainty of being on their lender's SVR indefinitely, with some struggling to keep up with payments as these rates rise over the coming years. Alternatively they can seek out a new deal on a repayment basis, but often this will increase their monthly repayment level significantly and they may find such an option barred because they don't meet the lender's affordability criteria. For a minority, the only viable choice might be to release equity or leave the housing market altogether.

Separately, the FCA has encouraged lenders to make contact with those interest only borrowers whose mortgages are set to mature before 2020, amid fears that some do not have adequate payment plans in place to meet the capital payment required at maturity. The Council of Mortgage Lenders (CML) has reported that lender contact is going well, with the stock of interest only borrowers falling by around 390,000 since the programme began 12 months ago.[3]

Among those remaining on such deals, the CML also reports an improvement in LTVs, suggesting that the stock is somewhat healthier than it was. Nevertheless, for those interest

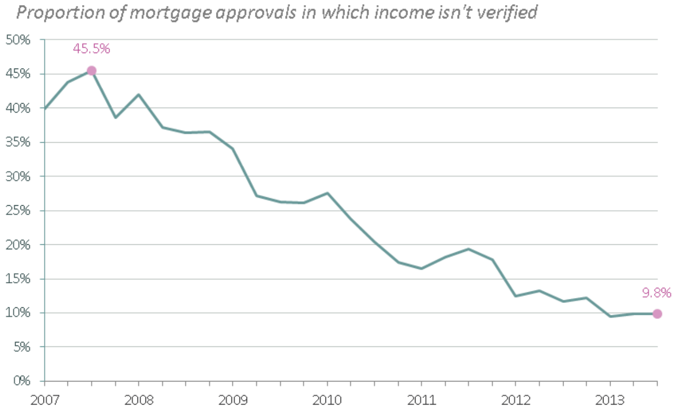
[3] CML press release, "Interest-only contact strategy is working as intended, CML reports", 1 May 2014

only borrowers facing potentially affordability issues, the reduced re-financing options available to them are likely to pose problems.

Figure 10 charts a similar decline in the provision of self-certification mortgages since the financial crisis.

Towards the end of 2007, just under half of all mortgages were advanced without any verification of the borrower's income. With lenders taking on responsibility for income verification however, this proportion subsequently fell sharply. It stood at just one-in-ten towards the end of 2013.

Figure 10: Income verification in new mortgage advances: UK 2007-2013



Source: Council of Mortgage Lenders

While for many the reduced availability of non-verified mortgages will be no more than a justifiable inconvenience – requiring them to provide more paperwork when they come to take out another mortgage – it is likely to create more fundamental difficulties for some. The self-employed, whose income is typically more irregular and less easy to prove than employees, might be particularly affected.[4]

It is certainly the case that the self-employed find it harder to access mortgages than other workers do, with a recent poll showing that one-in-five reported being prevented from accessing home loans because of their work status.[5] The MMR provides scope for lenders to side-step some of the affordability test for existing borrowers, but it is an open question as to whether lenders will utilise these contingencies in practice.

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[4] We might expect the unemployed to be similarly affected but, given that the survey data that underpins our modelling relates to the *Family Resources Survey* of 2011-12 – when unemployment was significantly higher than today – we have chosen not to focus on this group because it would potentially overstate the problem. Given the very considerable increase in self-employment in recent months, we are likely instead to understate the extent of the issue. Households with irregular income for some other reason will also be restricted due to the lack of availability of self-certification mortgages, but we have no way of identifying such households from the FRS.

[5] Resolution Foundation analysis of Ipsos MORI survey data in C D'Arcy & L Gardiner, *Just the job – or a working compromise? The changing nature of self-employment in the UK*, Resolution Foundation, May 2014. Similarly, 24 per cent of self-employed people (who weren't already homeowners) surveyed in the Bank of England's *NMG Survey 2013* reported that they were unable to obtain a mortgage due to their personal circumstances compared with just 5 per cent of employees.

A sizeable group of potential 'mortgage prisoners'

We can state with some confidence that those borrowers who have less than 5 per cent equity in their home are likely to be excluded from accessing new mortgage deals in the current market (and indeed that those with between 5 per cent and 10 per cent equity will be considerably restricted), meaning that they have little option but to remain on their lender's SVR and hope that the rate doesn't rise too dramatically in response to base rate increases or the whim of their lender.[6] To some degree at least, they are 'mortgage prisoners'.

We have no such way of knowing what proportion of the non-standard group of borrowers are genuine 'mortgage prisoners,' however. Some interest only borrowers will have sufficient equity in their home and flexibility in their budgets to be able to switch to a repayment mortgage or extend their term without facing any affordability problems. Likewise, some self-employed workers will have very significant incomes, or will have certain and verifiable earnings.

The portion of potential mortgage prisoners whom are particularly 'at risk'

By no means will all of those captured by our mortgage prisoner proxy measure feel trapped with their current provider. In order to provide an indication of the potential scale of the problem – rather than deriving a definitive number – we therefore focus on identifying a much narrower 'at risk' group in the modelling we undertake in the next section: namely, **those who face a potential affordability problem linked to rate rises** (that is, those who are at risk of being highly geared in 2018) **who also display mortgage prisoner characteristics** (those who, in 2014, have very low equity, are self-employed or hold an interest only mortgage).

To be clear, *all* of those who display affordability issues can be considered at risk, but members of this 'combined' group are particularly exposed because of their inability to access market-based options for re-structuring in order to better insulate themselves from rising interest rates.

We set out the basic methodology and the results in the next section. Alongside national-level figures, we also look at the spread of this 'at risk' group across the regions and nations of the UK and within different parts of the household income distribution.

[6] For example, Bank of Ireland increased its SVR by 50 per cent over the course of four months in 2012, even though the base rate remained unmoved. A number of other lenders including Halifax and Santander also increased their SVRs in 2012.

Identifying today's 'at risk' mortgage prisoners

Measuring affordability and capturing prisoners

In order to identify those borrowers facing a potential affordability problem as interest rates rise, we need to consider the repayment position of households at a given point in the ***future***. We can then trace this group back to determine how many might be particularly exposed because of restricted access ***today*** to market-based options for re-financing.

To measure **affordability** we focus on the level of 'gearing' faced by mortgagors – that is, how much of their after-tax income they allocate to mortgage repayments. The extent to which a household is stretched will of course depend on how high their income is: many households would be comfortable with a gearing level of 25 per cent (the average across all mortgagors), others would struggle. Affordability in housing is typically considered to become an issue once the 33 per cent level is breached however. **We therefore consider those mortgagors with a repayment ratio of one-third or more to be 'highly geared'**.

We establish a broad proxy for potential **'mortgage prisoners'** on the basis of three criteria: those with **very low equity** – that is, where the outstanding mortgage accounts for 95 per cent or more of the current value of their home; those who hold an **interest only mortgage**; and those who derive at least part of their income from **self-employment**. While not all households in this sizeable group will be genuine mortgage prisoners,[7] these characteristics provide additional risk factors for those who also face potential affordability problems.

By linking today's potential prisoners with tomorrow's highly geared households we focus on a smaller group, providing a sense of the scale of those **borrowers who are exposed to future repayment difficulties *and* have limited options for re-structuring their loans today in order to insulate themselves from rising rates**.

In simple terms, we adopt a two-step process in our modelling:

- First, we **use large-scale household level microdata from the DWP's *Family Resources Survey 2011-12*** (FRS) to determine the most up-to-date estimate of the position of the UK's mortgagor population in relation to affordability and equity. We uprate this data on the basis of outturn figures for incomes, regional house price growth, household debt levels and mortgage interest rates to create a **2014 baseline**, establishing levels of gearing, equity and broader mortgage prisoner status.

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[7] And of course, there will be other prisoner households that we do not capture – such as those who are out of work or have had a significant drop in their income for some other reason.

- Secondly, we **cast forward to 2018** in order to establish which households might face affordability pressures as interest rates rise. To be clear: we make no attempt to predict or forecast the future – instead we simply set out what would happen if the specific conditions we assume were to hold.

In undertaking this second step, we take as given the OBR's latest (March 2014) projections for economic growth, house prices, household debt and incomes between 2014 and 2018. In relation to borrowing costs, we base our model on recent market expectations for the base rate – that it reaches 2.9 per cent by the end of 2018 – along with an assumption that spreads between the base rate and mortgage rates continue to fall. We make one further adjustment in relation to household incomes, where we vary the given average growth outturn/projection across the income distribution in line with patterns of inequality in income growth that prevailed in the decades running up to the financial crisis.

Full details of the methodology are provided in the Technical Annex.

Around 2.3 million households might face affordability problems by 2018, with around 770,000 of these being disadvantaged by potential prisoner status today

Looking first at the 8.4 millionmortgagor households in our 2014 baseline, Figure 11 shows that around 1.1 million (or 13 per cent) are highly geared. [9] Under our simple income and interest rate scenario this number approximately doubles to 2.3 million (or 27 per cent) in 2018.[10] While we make no attempt to put a number on how many people might fall into specific difficulties – in terms of arrears or repossession for instance – the scale of this increase highlights the potential future spike in repayment problems that might occur if interest rate rises outpace household income growth.

Returning to the 8.4 million mortgagor base, we estimate that around 0.8 million households have very low equity and a further 2.8 million display other non-standard circumstances. While a highly imperfect means of capturing the mortgage prisoners, the two-in-five (42 per cent) mortgagor households identified in this proxy measure provide some sense of the unintended challenges potentially posed to the stock of existing mortgagors by today's tighter credit conditions.

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[9] This number is lower than some estimates of the mortgagor population might suggest, but is derived directly from reporting in the *Family Resources Survey*. Part of the difference is likely to relate to some households holding more than one mortgage. Where we report absolute numbers in this paper, it is with reference to this 8.4 million figure.

[10] Looking just at those spending more than half of their income on repayments, the number rises from 390,000 (5 per cent) to 740,000 (8 per cent).

Figure 11: Affordability and access to re-financing among all UK mortgagor households: 2014 & 2018

Affordability	Highly geared households in 2014 (base rate at 0.5%)	1,130,000 13%	*Even in the current low interest rate environment, 13% of mortgagor households are spending more than one-third of their after-tax income on repayments*
	Highly geared households in 2018 (base rate at 2.9%)	2,330,000 27%	*Modest increases in the cost of borrowing could result in that number more than doubling by 2018, even if we assume spreads continue to narrow*
Re-financing	Very low equity households in 2014	760,000 9%	*The 9% of today's mortgagor households with very low equity (<5%) are likely to find it particularly difficult to re-finance and protect themselves from future rate rises*
	Other non-standard circumstances in 2014	2,760,000 33%	*As are an unknown portion of those with more equity but with non-standard circumstances (interest only mortgages or self-employment for example)*
At risk	Highly geared in 2018 and potential mortgage prisoners in 2014	770,000 9%	*The most 'at risk' group comprises those facing an affordability problem in 2018 in our modelling who are potentially limited in their re-financing options today*

Notes: All figures are shown as a proportion of the total population of households with mortgages. 'Highly geared' covers those spending 33% or more of their income on repayments. Modelling is based on the assumption that the Bank of England base rate rises in line with current market expectations (reaching 2.9% by 2018) and that household incomes rise in line with OBR projections, but with variation across the income distribution. 'Very low equity' covers those with outstanding loans of 95% or more of the value of the property (including those in negative equity). Other households with non-standard circumstances include those who have more than 5% equity in their property but who have an interest only mortgage and/or some income from self-employment. See Technical Annex for full methodology.

Source: Resolution Foundation modelling using DWP, *Family Resources Survey* and OBR, *Economic and Fiscal Outlook March 2014*

By matching the two datasets, we can identify how many of the 2.3 million highly geared households in 2018 fall within the potential prisoner group in 2014. The findings suggest that around one-third (770,000 of the 2.3 million, or 9 per cent of all mortgagors) of those exposed to future affordability problems might find their ability to prepare for this eventuality compromised somewhat by a lack of access to the re-mortgage market.

It is worth remembering that *all* of the one-in-four mortgagor households we identify as being highly geared in 2018 are liable to face affordability pressures. The doubling of this figure gives a sense of the scale of the repayment challenge that may yet await us as interest rates rise. But for those in the 9 per cent, the outlook appears tougher still, pointing to the need for solutions that go beyond a reliance on a competitive mortgage market.

Box 1: Testing the sensitivity to interest only switches

Lenders have made concerted efforts over the past year to contact and support many of their interest only customers. With these efforts continuing, we might expect the potential prisoner group to shrink somewhat in the coming months. However, there is a clear affordability trade-off for those switching to repayment mortgages.

To test the sensitivity of our findings to such shifts, we consider the extreme approach (set out in Figure 12) in which all existing interest only mortgages are converted into repayment mortgages at their prevailing level of interest. In this scenario, we can no longer consider the previously interest only borrowers to be potential prisoners (unless they also have very low equity or are self-employed), but the trade-off for this is an increase in the number with affordability problems associated with higher repayments.

Taking this approach, the proportion of highly geared mortgagor households rises to one-quarter (25 per cent) in 2014 and to two-fifths (40 per cent) under the 2018 income and interest rate scenario. The potential prisoner group is somewhat smaller, at just one-quarter of the mortgagor population. But we identify a higher number falling into the combined group, with 950,000 (11 per cent) facing both an affordability problem in 2018 and a re-structuring one in 2014.

Clearly this is an extreme example and other options exist for interest only borrowers, including term extensions, trading down and selling their property. It reinforces the tough choices facing many interest only borrowers though, and highlights the inevitable limits to any policy of encouraging conversion to repayment mortgages.

Figure 12: Affordability and access to re-financing among all UK mortgagor households where all mortgages are on a repayment basis: 2014 & 2018

Affordability	Highly geared households in 2014 (base rate at 0.5%)	2,080,000 25%	*Switching all interest only mortgages to a repayment basis would raise the proportion of highly geared households to one-quarter even with rates on the floor*
	Highly geared households in 2018 (base rate at 2.9%)	3,470,000 40%	*Following modest increases in the cost of borrowing, this proportion would be closer to four-in-ten by 2018*
Re-financing	Very low equity households in 2014	760,000 9%	*The proportion with very low equity (<5%) in 2014 is unchanged in this scenario*
	Other non-standard circumstances in 2014	1,360,000 16%	*But the 'non-standard' group shrinks because of the removal of interest only products. The group now comprises self-employmed mortgagors with more than 5% equity*
At risk	Highly geared in 2018 and potential mortgage prisoners in 2014	950,000 11%	*Taking this approach, 0.9 million of the 3.5 million facing affordability issues in 2018 can be considered most 'at risk' due to a potential absence of re-mortgaging options*

Notes: All figures are shown as a proportion of the total population of households with mortgages. Mortgage payments for those who currently have an interest only mortgage are converted to a repayment basis on the assumption that the prevailing interest rate is unchanged. 'Highly geared' covers those spending 33% or more of their income on repayments. Modelling is based on the assumption that the Bank of England base rate rises in line with current market expectations (reaching 2.9% by 2018) and that household incomes rise in line with OBR projections, but with variation across the income distribution. 'Very low equity' covers those with outstanding loans of 95% or more of the value of the property (including those in negative equity). Because of the conversion of all interest only mortgages in this exercise, the group of other households with non-standard circumstances is entirely comprised of those who have more than 5% equity in their property and some income from self-employment. See Technical Annex for full methodology. See Technical Annex for full methodology.

Source: Resolution Foundation modelling using DWP, *Family Resources Survey* and OBR, *Economic and Fiscal Outlook March 2014*

Figure 13: **Affordability and access to re-financing among mortgagor households, by region: 2014 & 2018**

		NI	SW	London	SE	WM	NW	Eastern	EM	YH	Scotland	NE	Wales
Affordability	Highly geared households in 2014 (base rate at 0.5%)	30,000 15%	90,000 13%	180,000 19%	230,000 18%	80,000 13%	90,000 10%	120,000 14%	80,000 13%	80,000 10%	70,000 9%	40,000 11%	40,000 11%
Affordability	Highly geared households in 2018 (base rate at 2.9%)	50,000 26%	210,000 28%	350,000 35%	400,000 31%	180,000 27%	230,000 24%	300,000 35%	140,000 22%	150,000 19%	140,000 18%	80,000 22%	90,000 22%
Re-financing	Very low equity households in 2014	70,000 35%	50,000 6%	20,000 2%	30,000 3%	60,000 10%	120,000 13%	50,000 6%	60,000 10%	100,000 13%	100,000 13%	60,000 17%	30,000 7%
Re-financing	Other non-standard circumstances in 2014	50,000 23%	270,000 38%	420,000 44%	540,000 44%	200,000 29%	230,000 25%	290,000 35%	180,000 28%	200,000 26%	210,000 27%	80,000 22%	110,000 28%
At risk	Highly geared in 2018 and potential mortgage prisoners in 2014	30,000 16%	70,000 10%	120,000 13%	130,000 10%	70,000 10%	70,000 8%	80,000 10%	50,000 7%	50,000 7%	40,000 6%	30,000 7%	20,000 5%

Notes: All figures are shown as a proportion of the total population of households with mortgages within the specified region. 'Highly geared' covers those spending 33% or more of their income on repayments. Modelling is based on the assumption that the Bank of England base rate rises in line with current market expectations (reaching 2.9% by 2018) and that household incomes rise in line with OBR projections, but with variation across the income distribution. 'Very low equity' covers those with outstanding loans of 95% or more of the value of the property (including those in negative equity). Other households with non-standard circumstances include those who have more than 5% equity in their property but who have an interest only mortgage and/or some income from self-employment. See Technical Annex for full methodology.

Source: Resolution Foundation modelling using DWP, *Family Resources Survey* and OBR, *Economic and Fiscal Outlook March 2014*

Affordability is a bigger issue in London and the South East, but potential prisoner status is more pronounced in Northern Ireland

If significant enough in magnitude, the presence of exposed households can have implications that extend beyond those directly affected into the wider community. At a certain point the very sustainability of economic recovery might be called into question, with a sizeable debt overhang weighing on the ability of consumers to support growth. This is true at the national level and at the level of local economies too. A concentration of difficulties in certain areas could lead to uneven economic growth rates across the regions.

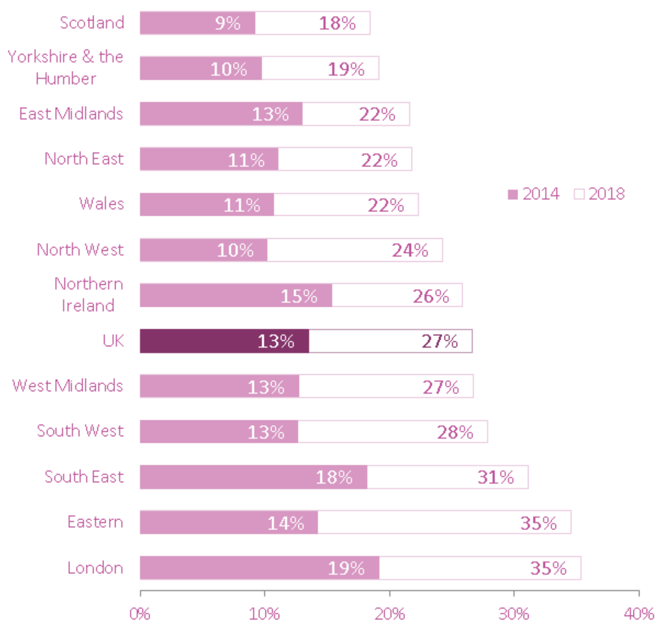
To test variations in potential exposures to base rate rises, we can break down the data set out above across the constituent regions and nations of the UK. Figure 13 provides a summary of the affordability and potential mortgage prisoner position of each region.

Figure 14 focuses on affordability in 2014 and 2018, and shows that the scale of the potential problem jumps considerably across all regions. Not surprisingly however, London and parts of the South appear to be most exposed.

Reflecting very different house price trends around the country over recent years, the numbers affected by very low levels of equity varies considerably, with around one-third (35 per cent) of mortgagor households in Northern Ireland in this position, compared with just 2 per cent in London.

Figure 14: Distribution of highly geared mortgagor households by region: UK 2014 & 2018

Proportion of highly geared mortgagor households in 2014 and 2018



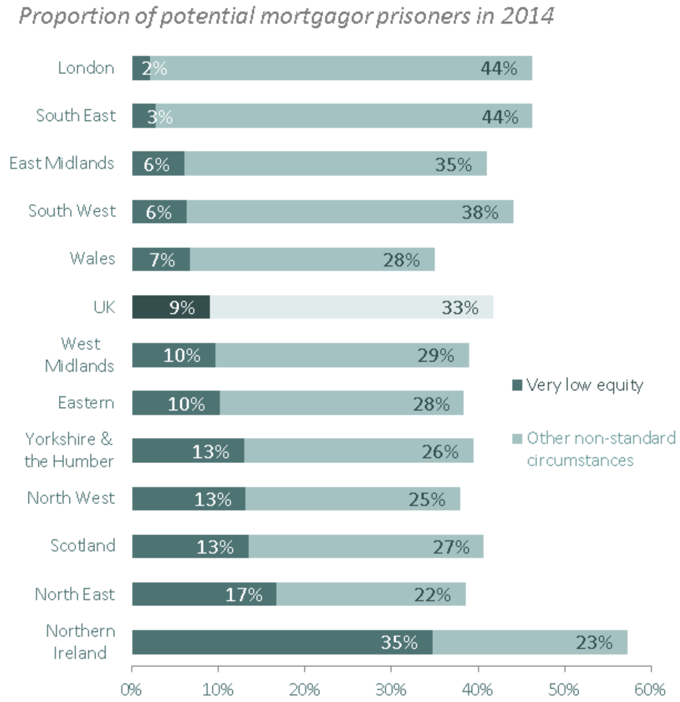
Notes: See notes to Figure 13.
Source: Resolution Foundation modelling

However as Figure 15 highlights, there is much less variation in the overall size of the mortgage prisoner proxy across areas. Those with the lowest proportions of very low equity mortgagors appear to have a disproportionate number of households with other non-standard circumstances.

In part this might reflect the importance of housing equity to decisions around self-employment. For example, a prospective trader might use housing wealth as a form of collateral against a business loan, or simply drawn down on existing equity.

Tellingly, the number of individuals working on a self-employed basis increased sharply across most regions between 2008 and 2013, rising by 108,000 in London and by 98,000 in the South East for example. The only region in which such employment fell was Northern Ireland (down by 6,000).

Figure 15: Distribution of potential mortgagor prisoners by region: UK 2014



Notes: See notes to Figure 13.
Source: Resolution Foundation modelling

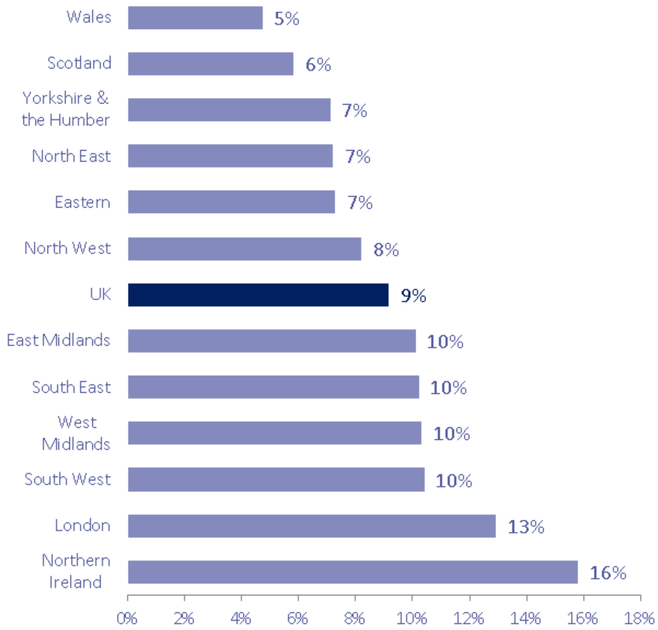
Despite the two elements of the prisoner proxy measure appearing to offset each other to some degree, the combined level remains by far the highest in Northern Ireland (57 per cent of all mortgagor households) due to the scale of the low equity problem. It is however, also above the national average in London (46 per cent), the South East (46 per cent) and the South West (44 per cent).

So, affordability may be more of an issue in London, the East and the South East, where property price-to-income ratios mean that gearing is higher, but many of the most stretched households in these areas should at least be able to access refinancing options. At the extreme, they should also be able to clear their debts by selling their property.

Looking at the proportions of mortgagor households within each region who face the potentially toxic combination of an affordability problem in 2018 and a lack of re-financing options today, Figure 16 suggests that situation looks bleakest in Northern Ireland and London, with other regions tending to sit closer to the national average.

Figure 16: Distribution of most 'at risk' mortgagors by region: UK 2014

Proportion of highly geared mortgagor households in 2018 who are also potential prisoners in 2014



Notes: See notes to Figure 13.
Source: Resolution Foundation modelling

Lower income mortgagors are most exposed, but the affordability issue is set to stretch up the income distribution as rates rise

Figure 17 repeats the decomposition of the mortgagor population, but this time by income. Mortgagor households are ranked on the basis of their overall equivalised household income decile[11] (that is, within the distribution of *all* households, not just mortgagor ones).

It highlights the exceptionally high exposure to affordability problems for mortgagors in the lowest income decile, with 61 per cent of such borrowers spending one-third or more of their after-tax income on repayments in 2014, rising to 77 per cent in 2018. High gearing falls across the rest of the income distribution, with just 12 of borrowers in the highest decile being in this position in 2018.

[11] Equivalisation adjusts household incomes for household size, given that a single person household is likely to enjoy a higher standard of living than a family of four for any given level of income.

Figure 17: Affordability and access to re-financing among mortgagor households, by income decile: 2014 & 2018

		Decile 1	Decile 2	Decile 3	Decile 4	Decile 5	Decile 6	Decile 7	Decile 8	Decile 9	Decile 10
Affordability	Highly geared households in 2014 (base rate at 0.5%)	290,000 61%	110,000 27%	90,000 18%	110,000 18%	100,000 14%	100,000 11%	100,000 9%	110,000 9%	70,000 5%	70,000 5%
	Highly geared households in 2018 (base rate at 2.9%)	370,000 77%	170,000 41%	170,000 34%	210,000 34%	210,000 28%	260,000 28%	230,000 22%	280,000 24%	250,000 18%	180,000 12%
Re-financing	Very low equity households in 2014	50,000 10%	50,000 10%	60,000 15%	60,000 13%	60,000 10%	80,000 11%	90,000 10%	100,000 10%	80,000 7%	110,000 8%
	Other non-standard circumstances in 2014	200,000 42%	150,000 39%	170,000 35%	200,000 34%	230,000 31%	280,000 31%	300,000 29%	300,000 26%	380,000 29%	560,000 40%
At risk	Highly geared in 2018 and potential mortgage prisoners in 2014	190,000 40%	90,000 23%	80,000 16%	80,000 13%	70,000 9%	70,000 8%	60,000 6%	50,000 5%	50,000 4%	40,000 3%

Notes: All figures are shown as a proportion of the total population of households with mortgages within the specified income decile, with the ten groups being defined on the basis of equivalised net household income. 'Highly geared' covers those spending 33% or more of their income on repayments. Modelling is based on the assumption that the Bank of England base rate rises in line with current market expectations (reaching 2.9% by 2018) and that household incomes rise in line with OBR projections, but with variation across the income distribution. 'Very low equity' covers those with outstanding loans of 95% or more of the value of the property (including those in negative equity). Other households with non-standard circumstances include those who have more than 5% equity in their property but who have an interest only mortgage and/or some income from self-employment. See Technical Annex for full methodology.

Source: Resolution Foundation modelling using DWP, *Family Resources Survey* and OBR, *Economic and Fiscal Outlook March 2014*

The share of potential prisoners within each decile is less skewed, though again it tends to fall as incomes rise, with the top decile proving the main exception.

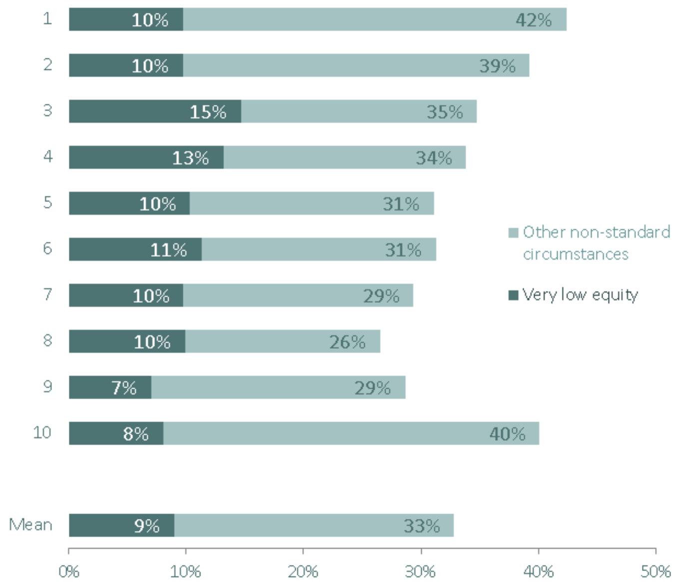
Figure 18 shows that the prevalence of very low equity is broadly flat across the distribution, with slightly higher proportions recorded in deciles 2 and 3. The trend for the overall proxy measure is instead driven by higher levels of non-standard circumstances towards the bottom and at the top of the income distribution. It is a trend due in equal part to elevated rates of both self-employment and interest only mortgages among households at the extremes of the distribution.

Taking the affordability and prisoner figures together, Figure 19 makes clear the extent to which the most vulnerable of today's mortgagors are to be found among low to middle income households.

Four-in-ten (40 per cent) of borrowers in the bottom decile are set to face an affordability issue in 2018 (indeed many in this group are already dealing with such difficulties), yet have limited options for re-structuring their loans in anticipation. In contrast, just 3 per cent of mortgagors in the top decile are in this position.

Figure 18: Distribution of potential mortgagor prisoners by income decile: UK 2014

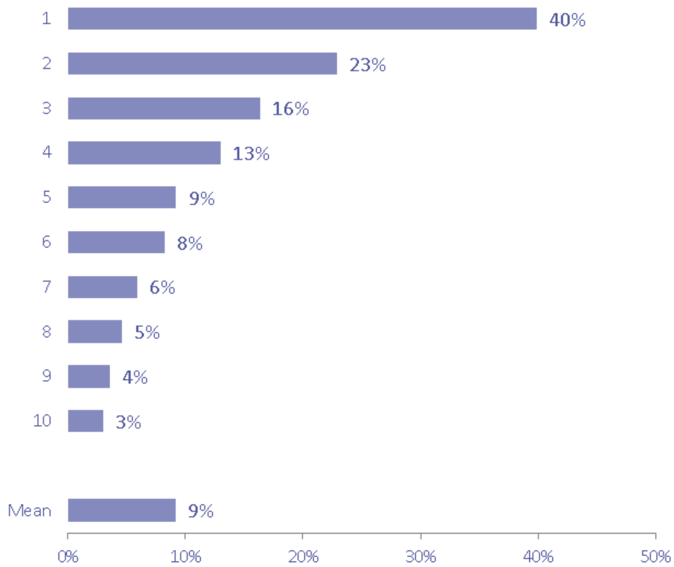
Proportion of potential mortage prisoners in 2014



Notes: See notes to Figure 17.
Source: Resolution Foundation modelling

Figure 19: Distribution of most 'at risk' mortgagors by income decile: UK 2014

Proportion of highly geared mortgagor households in 2018 who are also potential prisoners in 2014



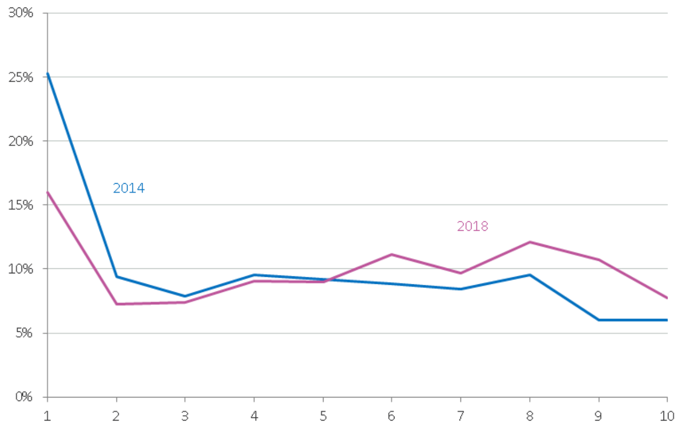
Notes: See notes to Figure 17.
Source: Resolution Foundation modelling

Of course, the absolute number of households who hold a mortgage rises across the income groups, so the spread of households facing a potential mortgage affordability problem is less starkly skewed than these *within* decile figures might suggest.

Nonetheless, Figure 20 shows that around one-quarter of the highly geared group is located in the bottom 10 per cent in 2014, though this proportion falls in 2018 as the potential affordability problem spreads across the distribution.

Figure 20: Distribution of most 'at risk' mortgagor population across deciles: UK 2014 & 2018

Distribution of all highly geared mortgagors across income deciles



Notes: See notes to Figure 17.
Source: Resolution Foundation modelling

In essence, in today's low rate environment, the most exposed households are predominantly on low or middle incomes. Once rates rise, the pressures are set to be more broadly felt, though we might still expect those with the lowest incomes to be least-well placed to cope with such pressures.

Findings highlight the need to make efforts to free mortgage prisoners where possible and protect them from market abuse where not

These indicative – rather than definitive – findings suggest that modest interest rate rises in the coming years are set to significantly increase the number of households facing difficulty keeping up with their mortgage payments. This raises a considerable challenge for those affected, for banks and for government.

The most obvious response will be to ensure that borrowers are getting the best deal possible on their mortgage, locking-in today's low rates and taking advantage of a competitive mortgage market where possible. Even after taking such action, many will still find their higher mortgage payments difficult to deal with, but at least they will have some certainty about how high these costs might rise.

But, around one-third of the 2.3 million mortgagor households set to be spending more than one-third of their after-tax income on repayments by 2018 – 770,000 – face potential barriers to market-driven responses due to some combination of low equity, self-employment and interest only borrowing. It is a significant minority for whom the market may not provide a ready solution.

Not all of these will be genuine ‘mortgage prisoners’ (and others outside of the group we have identified should perhaps be included for a variety of other reasons), but our modelling provides a sense of the scale of the challenge at hand. What is clear is that these one-in-ten mortgagor households – and the economy more generally – would benefit from efforts to both release prisoners through the extension of additional re-structuring options and, where needed, protect them from unreasonable rate increases where such release proves impossible. We will consider potential solutions along these lines in our final report in June.

Technical annex

In this section we provide further details of the methodology and assumptions underpinning the analysis set out in this report.

Establishing the 2014 and 2018 datasets

To generate outputs for 2014 and 2018 we adjust microdata taken from the *Family Resources Survey 2011-12* (FRS). We use directly reported data to establish a 2011-12 baseline, which we then uprate according to a combination of outturns and scenario assumptions to create 2014 and 2018 versions. Taking the approach step-by-step:

- The **2011-12 baseline** contains directly reported data on after-tax incomes, mortgage repayments, outstanding mortgage debts and payment periods. In addition, we can derive information about how much longer the mortgage has to run. Using these variables we are able to calculate mortgage interest rates faced by each household. House values at the time of purchase are also directly reported by respondents.

- In both our **2014 and 2018 scenarios** we assume that the 2011-12 mortgage **debt levels** increase in line with outturn levels for total household debt up to 2013, and in line with the OBR's March 2014 central case projections for aggregate debt levels thereafter (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 2011-12 and 2018, the distribution of this debt does not change – either across households or between secured and unsecured credit products.[12] In truth secured debt increased more rapidly than unsecured in the period between 2011-12 and 2013, so it is likely that we are understating the projected level of mortgage debt in 2014 and 2018 to some extent.

- We uprate the given **house valuations** according to regional-specific house price inflation up to 2014.

- We take the OBR's March 2014 projection for disposable per capita household income as the starting point for our **after-tax income** uprating. We vary the growth rate by

[12] 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. In addition, this approach implies that there is no change in the split between secured and unsecured debt. That is, we assume mortgage debts rise at the same pace as the unsecured debts.

income decile however, to reflect the extent to which different deciles have kept pace with mean growth in the period 1981 to 2007-08. That is, for every 1 per cent annual increase in mean income in that period, incomes rose by between 0.75 per cent in the poorest 10 per cent of households and 1.07 per cent in the richest 10 per cent, and we assume that these same ratios hold in the next few years.

- We assume that the directly-derived **rates of interest** established for each mortgagor household in the 2011-12 baseline move in line with changes in the weighted-average interest rate for all new and existing mortgages in the period between April 2012 and January 2014. Beyond that point, we consider movements in the Bank of England base rate, less an adjustment to account for falling spreads between mortgage rates and the base. We assume that the base rate rises in line with current market expectations, meaning that it rises by 2.4 percentage points to reach 2.9 per cent in 2018. Consistent with previous modelling we assume that the spread between the base rate and the weighted average rate falls from its January 2014 level (2.8 per cent) half way back to its historic norm (0.9 per cent).[14] In practice, this means that each household's interest rate is 0.3 percentage points lower in 2014 than in the 2011-12 baseline and 1.4 percentage points higher by 2018.[15]

Capturing the results

Having established a new baseline dataset for 2014, we run a series of calculations to determine levels of gearing and equity. We compare uprated house valuations with uprated mortgage debts to determine the level of equity held by each household, and compare monthly mortgage repayments with monthly after-tax incomes to determine gearing levels.

- In terms of gearing, we consider those who spend 33 per cent or more of their income on mortgage repayments to be **'highly geared'**.
- In terms of equity, we describe those with outstanding loans equivalent to 95 per cent or more of the current value of their home as holding **'very low equity'**.
- In addition, we identify mortgagor households outside of the very low equity group who might still face restrictions on their ability to re-mortgage due to having **'non-standard circumstances'**. While there is no way of accurately capturing genuine 'mortgage

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[14] M Whittaker, *Closer to the Edge? Debt repayments in 2018 under different household income and borrowing cost scenarios*, Resolution Foundation, December 2013

[15] It is worth noting that our figures on affordability in 2018 would look somewhat worse if we assumed that spreads remained at today's level, though similarly the findings would improve if spreads fell more rapidly.

prisoners' we focus on two identifiers to establish a proxy: the self-employed and those who hold interest only mortgages.

We repeat the affordability calculations in our 2018 dataset, once again uprating mortgage debts and household incomes. We link the newly established highly geared households back to the 2014 dataset to determine how many of them additionally display potential mortgage prisoner characteristics.

Why the modelling is inevitably wrong

As with all economic modelling and scenario building, the results generated will inevitably be wrong. They are not forecasts or predictions, but rather indications of potential outcomes under specific circumstances.

In addition to the uncertainties that underpin the OBR's numbers, the key areas of doubt in relation to our approach include the treatment of:

- Variations in house price increases *within* regions between 2011-12 and 2014. Not all properties will appreciate in value at the same rate within any given region and, when looking at individual households in the FRS, we have no way of identifying where seemingly disproportionate mortgage debts in fact reflect investment in the property, in the form of home improvements for example.
- Changes in the labour market status of household members between 2011-12 and 2014, particularly in relation to the recent surge in self-employment. This change is likely to have increased the number of people who will face re-mortgaging problems associated with the lack of self-certification loans relative to the baseline sample, though we have no way of knowing if this trend will continue or reverse between 2014 and 2018.
- The distribution of debt in 2014 and 2018. We assume that this is unchanged from 2011-12, so that all households in the sample have their outstanding mortgage levels increased by the same factor (in line with the OBR's figure for overall household debt per capita). In truth, we have no way of knowing if this will hold true or if the OBR's future debt will be more or less concentrated in certain regions, income groups and family types.

Nevertheless, the scale of the increase in our measure of high gearing – namely a doubling – is broadly in line with previous modelling we have carried out in relation to household debts more generally, and we have deliberately erred on the side of caution in order to avoid presenting an alarmist picture.

The Resolution Foundation

The Resolution Foundation is an independent research and policy organisation. Our goal is to improve the lives of people with low to middle incomes by delivering change in areas where they are currently disadvantaged. We do this by:

- undertaking research and economic analysis to understand the challenges facing people on a low to middle income;
- developing practical and effective policy proposals; and
- engaging with policy makers and stakeholders to influence decision-making and bring about change.

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