

# The Balancing Act: Household Indebtedness Over the Lifecycle

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## Abstract

This article examines household indebtedness immediately after the Global Financial Crisis by comparing Ireland, the UK, the US, and the Euro Area. The article focuses on patterns of indebtedness across age-groups. The paper is the first to carry out this type of cross-country analysis of household debt burdens and its distribution across different household types. Compared to all other countries, Irish borrowers born from the mid-1960s through to the very early-1980s have substantially higher levels of debt – both in absolute terms and relative to their incomes. However, the low interest rate environment that has prevailed since 2008 has been particularly beneficial to these highly indebted Irish households, resulting in a debt-service burden (the ratio of debt repayments to income) that is broadly in line with that in other countries. However, in relative terms, a far greater proportion of Irish borrowers on variable rate loans are also exposed to potential interest rate rises in the future. We show that a 1 to 2% interest rate rise reduces the disposable income after debt repayments of a typical borrower by between 2 and 4%, with larger impacts for younger borrowers. As well as the impact on household spending from lower disposable incomes, there could also be financial stability implications, depending on how increases in the debt service burden affect households' ability to repay debt.

## 1. Introduction

One of the costliest lessons of the recession in Ireland is the negative economic consequences that result from having too much household debt. In the run-up to the housing market collapse, rising household debt helped to stoke house prices and consumption to unsustainable levels, creating imbalances in the economy. In the aftermath of the financial crisis, the overhang of household debt also proved to be a significant destabilising factor. Household debt reduction has been a constant feature since 2008, with household credit falling by between 2 and 6% year-on-year since the end of 2008. In this article we show that in aggregate, debt reduction is likely to continue in the short term with the return to debt accumulation in the medium term likely to occur only slowly. We see two reasons for this scenario. First, borrowers that took out mortgage debt during the peak years of the housing bubble remain highly indebted, both relative to their own incomes and when we compare them with patterns of household indebtedness in other countries. For the typical borrower in this group, the remaining loan-term is around 25 years, meaning that a large share of mortgage repayments is still going towards interest payments as opposed to reducing the size of the initial mortgage debt (the principal amount of the mortgage). Second, the flow into indebtedness from younger borrowers remains very low by comparison, both as a result of fewer households becoming mortgaged homeowners compared with earlier years and much smaller mortgages due to the fall in house prices and tighter lending standards.

Previous Central Bank articles by Cussen and Phelan (2011) and Lawless, Lydon and McIndoe-Calder (2015) highlight the rapid expansion of household debt in the early 2000s, when house-price growth outstripped disposable income growth by a factor of three-to-one.<sup>1</sup> We expand on this work by comparing the financial situation of Irish, UK,

US and European households, focusing on patterns of indebtedness across age groups. For European comparisons, we draw on the latest wave of the *Household Finance and Consumption Survey*, which was released in December 2016. We combine this with household survey data from the US and UK to create a harmonized database with information on debt, assets and incomes covering the period 2012-14. These comparisons show that whilst in all countries debt-levels are concentrated in the mid/late-30s to early-50s age-group, in Ireland the levels of debt for these key age cohorts are especially high – that is, households where the head of household was born between the mid-1960s and the very early-1980s that borrowed to buy housing at the peak of the market.

The level and the distribution of household debt is important for monetary policy, financial stability and the real economy. Household debt and its distribution is likely to affect the economy's recovery path through different channels. There is already a vast literature covering all of these areas including, for example, Eggertson and Krugman (2012) on monetary and fiscal policy; Minsky (1992) on financial stability; and Fisher's (1933) seminal 'Debt Deflation' work. The effects of accumulated household debt on economic activity have been extensively discussed in the empirical literature in the light of the Global Financial Crisis. Dynan (2012) and Mian and Sufi (2013) show that highly indebted US households reduced their spending by significantly more during the recession, even after controlling for differences in the income shocks households experienced. For the UK, Bunn and Rostom (2015) also show that indebted households saw larger cuts in spending following the financial crisis. For Ireland, Lydon (2013) shows that over-indebted households (households in mortgage arrears) spend significantly less on average compared to households with no debt.

<sup>1</sup> In real terms, average house prices grew by 73% between 2000 and 2007, compared to just 27% for personal disposable income.

Highly indebted positions also leave households vulnerable to monetary policy shocks such as interest rate increases, especially in countries such as Ireland and the UK where mortgagors have predominantly variable rate contracts (i.e. tracker and SVR mortgages), see DeBelle (2004). To quantify this, one of the exercises we carry out for this article is to simulate the impact of interest rate rises on mortgage repayments and discuss the implications for household spending and the debt-service burden (the ratio of mortgage repayments to income).

Our primary interest in this article is household indebtedness over the lifecycle, and specifically understanding how the age-indebtedness profiles of Irish households compares with those in other countries. This article contributes to the growing literature on 'life-cycle portfolio facts' with a focus on liabilities.<sup>2</sup> To a certain extent, we would expect Ireland to be most like the UK because both countries share common cultural and policy backgrounds for example, tax treatment of owner-occupied housing; and similar rental markets, largely delivered privately, with relatively little legislative certainty for renters. These commonalities encourage home-ownership and retention of homes as a major asset for both consumption and investment reasons. In Ireland, when compared to other countries including the UK, the high concentration of debt within some groups stands out largely as a consequence of the property boom of the mid-2000s. The boom in Ireland occurred however, in conjunction with several key phenomena which may have amplified the accumulation of household debt here versus the levels achieved in comparator countries. For example, homeownership was expanding, facilitated not only by credit expansion and a construction boom but also by an expanding labour force (in turn due to increases in domestic labour force participation and net inward migration in the prime working age cohorts); rapidly growing incomes (themselves largely the result of a long awaited convergence with other European countries)

and expansionary monetary policy in a growing economy (Honohan, 2009).

The remainder of the article proceeds as follows. Section 2 describes the data. Section 3 explores several important aspects of the age-indebtedness profiles across the countries/regions. Section 4 examines the risks in Ireland associated with high household debt levels concentrated in one main form of debt (property). Section 5 concludes.

## 2. Data

This article uses data from the Household Finance and Consumption Survey (HFCS) for the Euro Area (HFCN, 2016), the Wealth and Asset Survey for the UK (ONS, 2016), and the Survey of Consumer Finances (SCF) for the USA (Bricker et al, 2014).

The HFCS is a large survey representative of the national populations in European economies with detailed information on households' balance sheets. In this article we use the data from the second wave, published in December 2016. The data in the survey refers to 2014 for the majority of countries. Table 2.1 provides an overview of the data sources.

The UK Wealth and Assets Survey is a longitudinal household survey in which UK households are interviewed every two years. Each wave comprises over 20,000 households and for this exercise we employ the latest available wave that corresponds to the period from July 2012 to June 2014 (ONS, 2016).

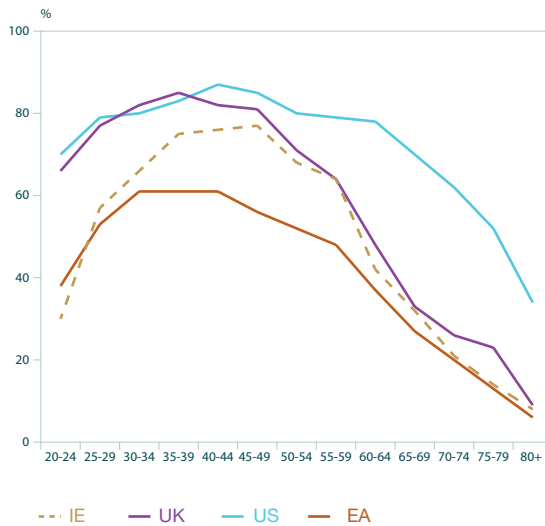
Lastly, the Survey of Consumer Finances for the US is a triennial cross-sectional survey of US households that includes information on the balance sheets of over 6,000 households conducted by the Federal Reserve Board (Bricker et al, 2014). By construction, the three surveys ask interviewees different questions, leading to slightly different categorisations of the household balance

<sup>2</sup> While there is extensive work on asset allocation and efficient portfolio choice over the life-cycle (Ameriks and Zeldes, 2004; Fagereng et al, 2015), the composition of the liabilities side of the households' balance sheet is still a relatively understudied research area, recent contributions include Bankowska et al. (2015), Iacoviello and Pavan (2013) and McIndoe-Calder (forthcoming). Other research on cross-country differences in balance sheet composition using survey data include Sierminska and Doorley (2012), Christelis, Georgarakos and Haliassos (2013), Badarizna (2016) and Christelis, Ehrmann and Georgarakos (2015).

**Table 2.1:** Overview of survey used

	HFCS Wave 2	WAS Wave 4	SCF
Fieldwork	Belgium (2014-15), Germany (2014), Estonia (2013), Ireland (2013), Greece (2014), Spain (2011-12), France (2014-15), Italy (2015), Cyprus (2014), Latvia (2014), Luxembourg (2014), Hungary (2014), Malta (2014), Netherlands (2014-15), Austria (2014-15), Portugal (2013), Slovenia (2014), Finland (2014)	Great Britain (2012 – 2014)	United States (2013)
# Households in survey	74,935 (between 999 and 12,035 per country)	20,241	6,026

**Chart 3.1:** Proportion of households with any debt, by age (per cent)



Source: HFCS, SCF, WAS.  
 Note: Euro Area households excludes Ireland.

sheets in the raw datasets. We performed appropriate transformations in all three surveys to make the samples as comparable as possible. All monetary values have been converted, where appropriate, to nominal Euros. All the calculations use sampling weights to ensure the data represent the countries’ populations.

### 3. Age-indebtedness profiles

In many developed economies, household leverage grew substantially in the years prior to the financial crisis. The life-cycle model predicts an inverted U shape of asset accumulation as households age. Households’

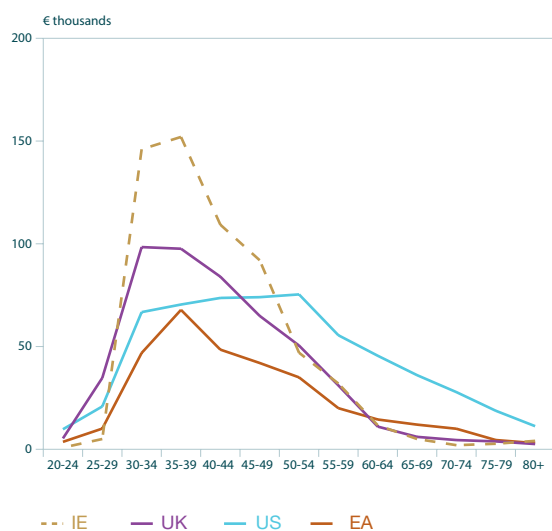
savings rates tend to be lower for younger households, increase with productivity and income in the middle of the age distribution, and decrease in old age when households run down their assets to support consumption in retirement. Thus, in the early stages of their life, it might be rational for households to borrow against future income in order to smooth their consumption or undertake investment decisions (Modigliani and Brumberg, 1954; Tobin, 1967).

Figure 3.1, which plots the share of households in a given age category with any debt, shows that the likelihood of holding debt rises from young to middle age, declining in older-age. There are, however, significant differences across countries. For example, across almost every age-group, Euro Area households (excluding Ireland) are *significantly* less likely to hold debt. Irish households look similar to UK households, with the exception of under-35s, where Irish households look more similar to their Euro Area counterparts. For young (under-35) households the US is similar to the UK, however older US households are substantially more likely than European households to hold debt, over half of households headed by someone over-65 hold some debt.<sup>3</sup>

Ireland, the UK, and the USA, are three developed economies with relatively comparable consumer credit markets, who have all been exposed in one way or another to the financial crisis. In all three countries, the decline in the property market was

<sup>3</sup> The reason for the apparent ‘graying of American debt’ has been discussed in several articles; see for example Brown et al. (2016). Generational explanations around the aging of the original baby-boomers – a group who have grown-up with the financial liberalisation which expanded consumer credit in the US – and the declining size of the more debt-averse Great Depression generation are often cited. Although, this does not necessarily explain the cross-country differences we observe.

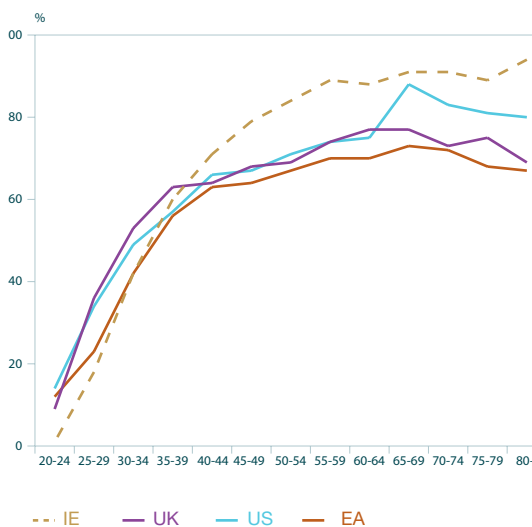
**Chart 3.2:** Median value of total debt, conditional on holding debt, by age (€)



Source: HFCS, SCF, WAS.

Note: Euro Area households excludes Ireland.

**Chart 3.3:** Home-ownership rate, by age (per cent)



Source: HFCS, SCF, WAS.

Note: Euro Area households excludes Ireland.

preceded by a credit-fuelled property boom, which left considerable portions of their populations indebted and often in negative net worth.<sup>4</sup> Notwithstanding these similarities, the composition of debt varies remarkably from country-to-country. For instance, whilst younger households in both the UK and US face a growing student debt burden, it is slightly older and middle-aged Irish households that really stand out. The differences are largest when we compare average euro-values of debt. However, even after controlling for income differences across the age distribution – both within and across countries – the relatively high levels of household indebtedness amongst Irish borrowers between the ages of 35 and 50 (in 2013) are remarkable.

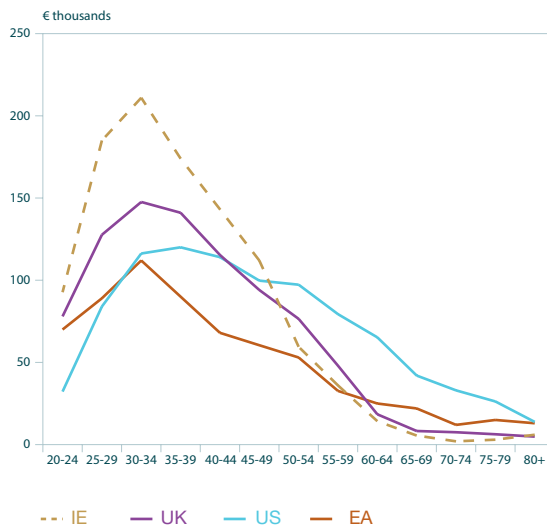
Figure 3.2 shows the median value of all debt (in thousands of euro) across age groups, *conditional on holding debt*. Borrowers aged between 35 and 50 in 2013 – or alternatively, born from the mid-1960s through to the early-1980s – stand out with debt levels 40 per cent higher than their next closest comparator households, in the UK. The relatively higher levels of debt in Ireland result from a combination of higher home-ownership rates (Figure 3.3) and larger mortgages secured against these properties (Figure

3.4) in comparison to European, British, or US households. Home-ownership rates for 40 to 55 year-olds in Ireland range from 70 to 90%, compared to around 65 to 75% in the Euro Area. It is however notable that home-ownership rates amongst under-35s are actually *lower* in Ireland, when compared with the UK and US. This represents a sharp reversal of the situation less than 10-years earlier. In the 2005 *Household Budget Survey* (CSO, 2007) homeownership rates amongst under-35s were significantly higher, in the region of 40-50% and broadly in-line with what we see for the UK and US in 2013/14. If the lower-level of home-ownership rates amongst under-35s persist – which depends on a whole range of inter-related factors including preferences, supply in the rental market and credit supply and demand – then we can expect to see *significantly* lower levels of indebtedness into the future for Irish households.

Debt holdings typically comprise of a range of loan types. For households where the value of their assets is greater than their debts (positive equity, or “A>D” in Figures 3.5 and 3.6), across all four comparator regions, over 50% of debt is related to property (Figure 3.5), including Household Main Residence (HMR) mortgages.

<sup>4</sup> See Fitzpatrick and McQuinn (2007) for evidence on the mutually reinforcing relationship between property prices and mortgage credit in an Irish context.

**Chart 3.4:** Median value of total debt, conditional on holding debt and being a homeowner, by age (€)



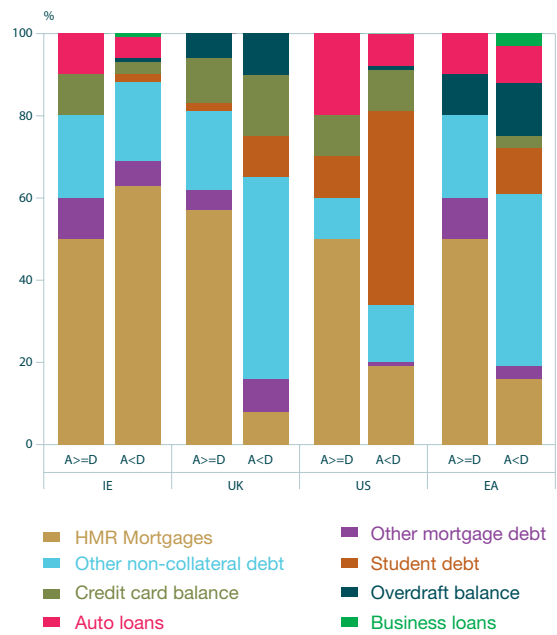
Source: HFCS, SCF, WAS.

Note: Euro Area households excludes Ireland.

Where the value of a household's debt is greater than that of its assets (negative equity, or "A<D") however, the composition of debt is more concentrated in Ireland, with over 70% in property loans; and more varied for the UK, US and Euro Area where property accounts for less than one fifth of debt holdings while student debt, credit cards, overdrafts and other non-collateralised loans make up large shares. In the UK and the Euro Area, non-collateralized debt, including different forms of arrears, account for the lion's share of debt held by households with negative net wealth. In the US, for those households where debt exceeds the value of assets, student debt is by far the biggest share of total debts, a finding that echoes expected life cycle behaviour, with young households acquiring debt to increase their income prospects (via human capital investment). The variation across countries implies different banking norms but also variations in demand for different debt types, for example, a much lower demand for education related debt in Europe than in the US.

In all four countries/regions, we observe the proportion of households with negative net worth declining with age (Figure 3.6a). This is not surprising, as young households with

**Chart 3.5:** Composition of debt, by age and country/region (per cent)



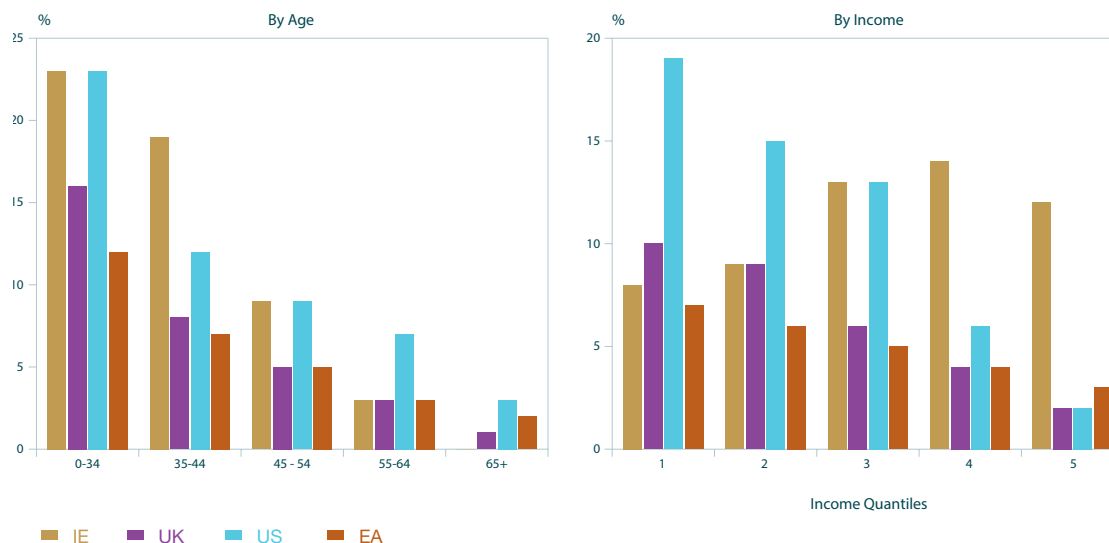
Source: HFCS, SCF, WAS.

Note 1: Euro Area households excludes Ireland.

Note 2: Due to discrepancies between the construction of the various surveys we did not include business loans explicitly in the cases of the UK and the US. Instead, they are considered within the categories of "other mortgage debt" and "other non-collateral debt", depending on the presence of collateral. Similarly, no auto loans are specified explicitly in the UK, but are instead included in the "other non-collateral debt" category.

low assets but expectations of strong income growth become indebted with the anticipation of reducing their debt using their higher incomes later in life. Where Irish households do differ quite substantially from all other countries is in the proportion of negative net wealth households by income (Figure 3.6b). Whilst in most countries the incidence of negative net wealth declines as household incomes increase, in Ireland it broadly rises with income. Once again, this reflects the fact that negative net wealth in the Irish case in 2013 is largely a property-related phenomenon.

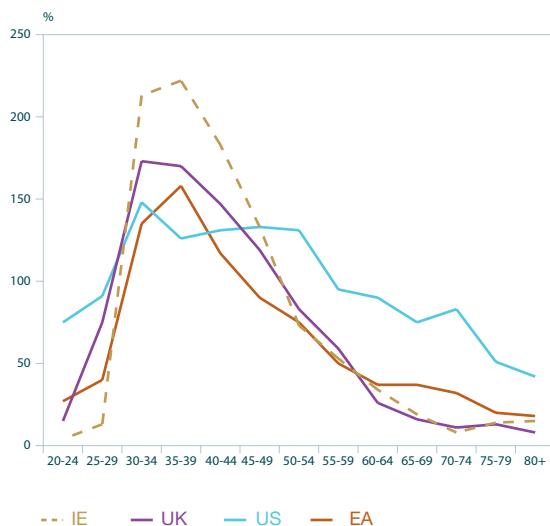
Figure 3.7 plots debt-to-(gross) income ratios. Here the differences narrow slightly for Irish, UK and Euro Area households. In fact, the standout pattern here is that older American households hold relatively high levels of debt, even controlling for income.

**Chart 3.6:** Share of households with negative net assets, by age and income (per cent)

Source: HFCS, SCF, WAS.

Note: Euro Area households excludes Ireland.

Despite holding such high levels of debt, the median debt service burden for households with a mortgage (ratio of debt repayments

**Chart 3.7:** Median debt-to-income ratio, conditional on holding debt, by age (per cent)

Source: HFCS, SCF, WAS.

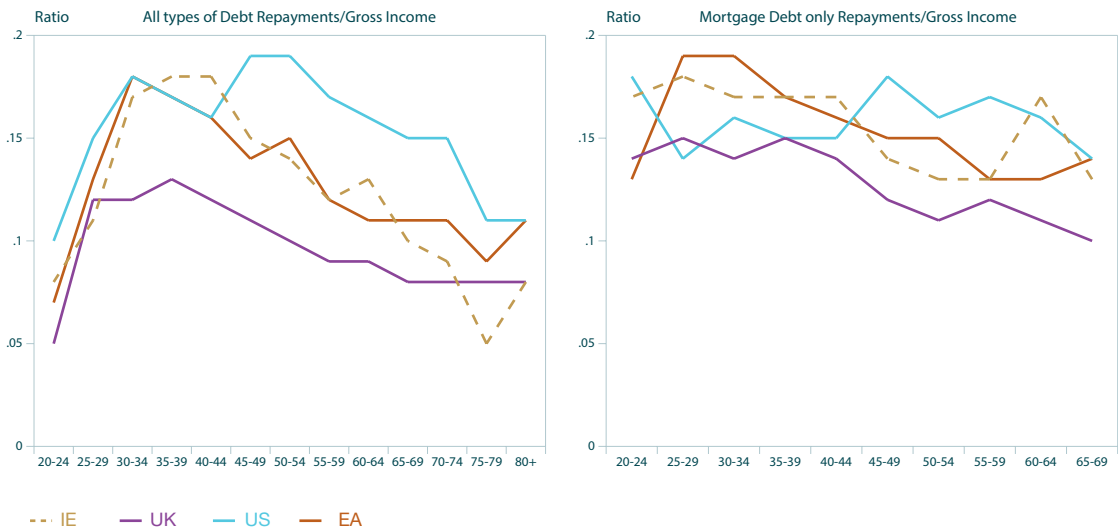
Note: Euro Area households excludes Ireland.

to gross income) of Irish and Euro Area households is remarkably similar, even for very high debt households (Figure 3.8). Again, the debt-burden for older US households stands out when compared with the other countries.

There are three reasons why the debt service burdens are so closely aligned in Ireland and the Euro Area, despite such vastly higher debt levels in the former. Firstly, median gross incomes for those holding mortgage debt are significantly higher in Ireland, when compared with the rest of the Euro Area (Figure 3.9a). Second, for a given stock of debt, the value of repayments is declining in the loan-term and Irish households tend to have significantly longer loan-terms (Figure 3.9b). Indeed, both structure and maturity in Ireland have changed considerably over the boom years. For instance, Connor et al. (2012) show that long maturity loans - over 30 years - jumped from 10% to 35% between 2004 and 2007.

Third, during this period, Irish borrowers have significantly lower interest rates, when compared with their Euro Area counterparts (Figure 3.10a). This is due in part to tracker

Chart 3.8: Median debt-service (debt repayments/gross income), conditional, by age (ratio)



Source: HFCS, SCF, WAS.  
Note: Euro Area households excludes Ireland.

interest rate products in Ireland, i.e. 100% pass through from ECB base rate to the mortgage interest rate. During the 2004-2007 period, characterised by persistently low interest rates, the portion of trackers, as opposed to fixed or Standard Variable Rate (SVR) products, expanded. This is illustrated starkly in Figure 3.10b, which shows that, in 2013/14, almost 40% of Irish borrowers aged between 30 and 50 have an interest rate of less than 2%, compared with just 10% of households in the Euro-area.

The high proportion of fixed-rate loans amongst Euro area households, where pass-through from base rates to retail rates is typically lower, is the main reason for the difference between Ireland and the Euro Area in Figure 3.10. After 2013 however, mortgage interest rates in the Euro Area did decline. Tracker rate products in Ireland on new mortgages were not available from the onset of crisis. Since 2008 SVR and, to a lesser extent, fixed rate products have accounted for all new mortgages in Ireland. Further, the spread between the ECB policy rate and mortgage rates (both SVR and fixed) for new borrowers

in Ireland is higher than in the Euro Area. In January 2017 for example, the average interest rate on new lending for house purchase in the Euro Area was 1.77%. For Ireland, the interest rate was 3.19%.<sup>5</sup> Trackers, although facing significantly lower interest rates for higher value loans over longer maturities, were found to pay similar instalments on their loans when compared to non-tracker mortgagors (Kelly et al, 2015).

#### 4. Prospects for high debt households

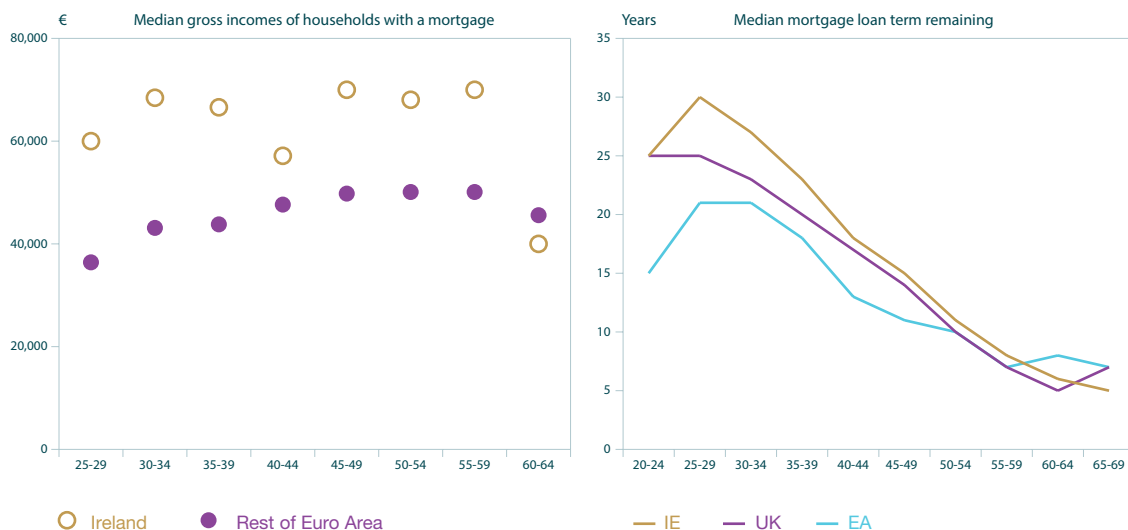
Although this article has enhanced our understanding of the characteristics of high debt households in Ireland relative to their European and US counterparts, at least two questions remain:

- (1) Over what sort of time-frame will these high levels of indebtedness dissipate, and what are the implications for the overall stock of credit?

<sup>5</sup> Data from the [ECB Statistical Data Warehouse](#), series MIR.M.U2.B.A2C.A.R.A.2250.EUR.N and MIR.M.IE.B.A2C.A.R.A.2250.EUR.N.



Chart 3.9: Incomes and loan terms of mortgaged households, by age (€, years)



Source: HFCS, WAS.

Note: Euro Area households excludes Ireland. These charts use sampling weights and are also weighted by loan size. If we do not weight by loan size, the relative differences between Ireland and the Euro are unchanged, but the lines shift down marginally because households with larger loans also tend to have higher incomes.

(2) What are the medium-term risks, both for the households concerned and the wider economy, of the on-going high debt levels in these key demographics?

#### 4.1 Will the problem dissipate (soon)?

Despite substantial and on-going debt reduction in Ireland, it is unlikely that the high debt levels for boom-time borrowers will fall significantly in the near-term. As we show above, these debts have long loan terms (many of which were modified term extensions during the crisis). This means that aggregate debt levels for this cohort will change only slowly over time.

Using the simulation methodology<sup>6</sup> developed in Lydon and McIndoe-Calder (2017), we estimate that the median (average) HMR mortgage debt for the high debt cohort declined by around €17,000, from €150,000 (€167,000) to €133,000 (€150,000), between 2013 and end-2016. Applying the same methodology to all HMR mortgages and

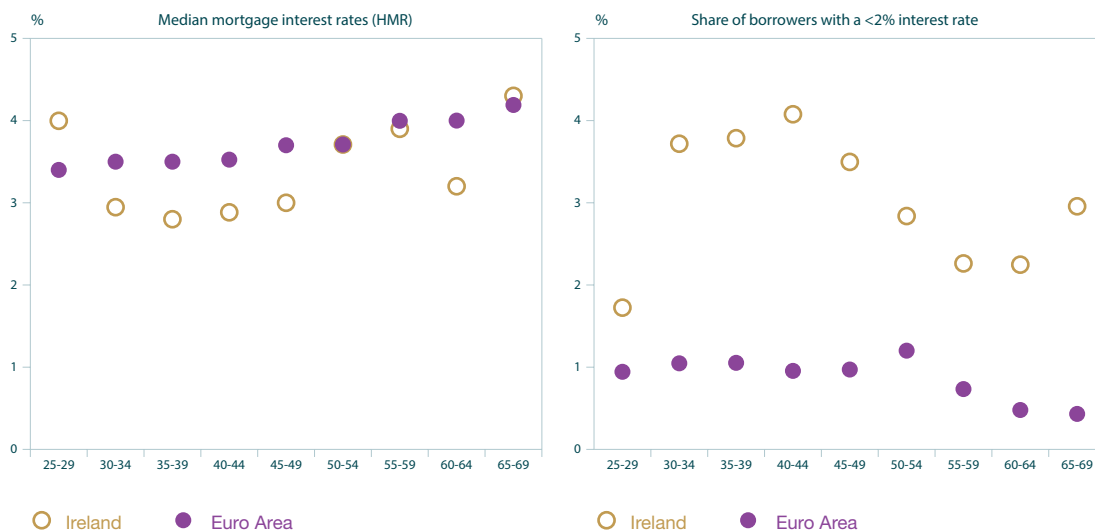
aggregating up to the population of loans, we estimate a decline in the stock of 2013 mortgage debt between 2013 and 2016 of just over €20 billion. This far exceeds new lending over this period – i.e., new FTB and mover-purchaser loans totalled €6.8 billion and €5.9 billion respectively over the same period – contributing to the on-going decline in the stock of mortgage debt.<sup>7</sup> These calculations illustrate that, going forward, the key factor affecting the change in the overall stock of household credit in the economy will be the *flow* of new lending. In fact, recent figures released by the Central Bank show a large step-up in new mortgage lending in Q4 2016, which in turn pushed growth in total outstanding lending for house purchase into positive territory for the first time since 2009.

#### 4.2 What are the risks?

With monetary policy set for the Euro Area bloc as a whole, one concern is the exposure of variable rate borrowers to interest rate rises, and in particular those with tracker mortgages.

<sup>6</sup> We use detailed loan characteristics and standard amortisation formulas to calculate loan balances at end of 2016. We assume no top-ups and that non-property debt levels remain constant. Tracker interest rates evolve according to changes in the ECB MRO rate. SVR rates are held constant at 2013 levels.

Chart 3.10: Mortgage interest rates, Euro Area versus Ireland, by age (per cent)



Source: HFCS, WAS.

Note: Euro Area households excludes Ireland. These charts use sampling weights and are also weighted by loan size. If we do not weight by loan size, the relative differences between Ireland and the Euro are unchanged, but the lines shift down marginally because households with larger loans also tend to have higher incomes.

As Table 4.1 shows, the very low share of fixed-rate mortgage loans in Ireland (14%) versus the rest of the Euro Area (63%) means that a far greater proportion of Irish borrowers are exposed to interest rate changes. Whilst this has helped the 200,000 households with tracker loans during the prolonged period of low policy rates (Table 4.1) – Irish mortgage holders are exposed to a reversal of this process when interest rates begin to rise again in the future.

Using administrative data on HFCS household incomes<sup>8</sup> and changing the average tracker rate in-line with changes in the ECB policy rate, we estimate that the fall in interest rates over the 2010-14 period directly boosted the disposable incomes (after debt repayments) of tracker borrowers by between 5 and 10%. The income boost is highest for borrowers who took out larger mortgages between 2006 and 2008. In contrast, we find almost no benefit to

SVR borrowers from the lower interest rates between 2010 and 2014.

To gauge the likely change in mortgage repayments for a given change in interest rates in the future, we simulate repayments for a 1 and 2% rate increase (Figure 4.1). The calculations use 2013 values for term remaining and outstanding debt, the tracker interest rate is adjusted for the fall in the ECB policy rate since 2013. For early-term mortgages, the bulk of the repayment is accounted for by interest. Therefore, younger borrowers experience a larger increase in their repayments for a given interest rate change. For example, a 2% interest rate rise increases the median repayment for the 35-39 age-group by 23%, from €760 to €932. For 45-49 year-olds, the increase in repayments is just 15%, from €775 to €895 per month.

Figure 4.2 translates these payment changes to changes in disposable incomes net of

<sup>7</sup> The data on new lending is from the Irish Banking and Payments Federation. The difference between estimated inflows and outflows described in the text broadly corresponds to the decline in the stock of loans for house purchase in the Central Bank Money and Banking Statistics, which was €9.5 billion over the same period (2014-16).

<sup>8</sup> The main data source we use to track incomes is administrative data from tax returns on income from work over the 2005-14 period, which we link to individuals in the Irish HFCS dataset. Lydon and Lozej (2016) describe this data in detail. Lydon and McIndoe-Calder (2017) also use these data to track leveraging and deleveraging over the 2005-14 period.

**Table 4.1:** Share of households with a given interest rate type and average interest rate [bold] for HMR mortgages (2013/14)

	Ireland [share of households, average interest rate]						Other Euro Area countries			
	Fixed		Tracker		Other variable		Fixed		Variable	
<30	29%	<b>3.8</b>	19%	<b>1.9</b>	52%	<b>4.0</b>	57%	<b>4.0</b>	31%	<b>3.9</b>
30-34	19%	<b>4.4</b>	41%	<b>1.8</b>	40%	<b>4.0</b>	59%	<b>4.1</b>	36%	<b>3.7</b>
35-39	13%	<b>5.2</b>	44%	<b>1.9</b>	43%	<b>4.3</b>	63%	<b>4.2</b>	33%	<b>3.8</b>
40-44	14%	<b>4.7</b>	35%	<b>1.9</b>	51%	<b>4.2</b>	68%	<b>4.2</b>	29%	<b>3.9</b>
45-49	9%	<b>4.3</b>	32%	<b>1.9</b>	59%	<b>4.3</b>	65%	<b>4.1</b>	32%	<b>3.8</b>
50-54	15%	<b>5.3</b>	29%	<b>2.2</b>	56%	<b>4.5</b>	64%	<b>4.3</b>	33%	<b>3.9</b>
55-59	17%	<b>5.0</b>	26%	<b>2.7</b>	57%	<b>4.8</b>	64%	<b>4.3</b>	32%	<b>4.1</b>
60+	13%	<b>4.5</b>	27%	<b>3.0</b>	60%	<b>5.1</b>	57%	<b>4.4</b>	39%	<b>4.2</b>
Total	14%	<b>4.8</b>	35%	<b>2.0</b>	51%	<b>4.4</b>	63%	<b>4.2</b>	33%	<b>3.9</b>

Source: HFCS (2016), wave 2. Data for Ireland is 2013. Most other country data is 2014.

Note: The average ECB policy rate in 2013, when the fieldwork for the Irish block of the HFCS wave 2 survey was carried out, was 0.50% to 0.75%. It has since fallen to zero, which would put the average tracker rate closer to 1.25% or 1.5% in 2017.

mortgage repayments. The reduction in median disposable income for younger households (under-44) is in the region of 4% for a 2% increase in rates. The simulation, under these interest rate scenarios, does not account for changes in gross incomes. These may be materially important and likely, especially if interest rate rises occur with inflation, but are unlikely to equal the changes in repayments for the most indebted households. In fact, a better case scenario, i.e. an interest rate increase of 2% alongside a 2% increase in disposable income, would mitigate around half the after-debt-repayment income decline. This is because a 2% interest rise increases the repayment amount by roughly the share of repayments in disposable income at the median (around a fifth), thus the effects of an offsetting income increase are fairly linear.

The simulations here focus on borrowers with tracker loans, because, as we showed earlier, the significant proportion of tracker loans amongst very high debt borrowers has kept

their debt service relatively low since 2008, when compared with other Euro Area countries. When we carry out the same simulations for SVR borrowers, the increase in payments from a given interest rate increase is around 30% smaller, reflecting the fact that the outstanding balance on trackers is higher.<sup>9 10</sup> The impact on disposable income after debt repayments is roughly the same however, reflecting the fact that median disposable incomes after debt for tracker borrowers aged between 35 and 54 are around 26% higher than their SVR counterparts.

If the potential shocks we simulate here were to materialise in the future, the impact on the wider economy could be felt through two main channels: (i) household spending; and (ii) mortgage arrears. At the household level there are several reasons to think that interest rate increases could have an immediate and significant impact on spending. First, the consumption to income ratio for high-debt borrowers is very close to one ranging from

<sup>9</sup> The 2013 median HMR balance for a household with tracker loan was €140,000 (households aged 35-54), compared with €92,000 for SVR loans.

<sup>10</sup> Whilst the contractual arrangements for tracker mortgages mean 100% pass through from policy rate changes for a given margin, changes to interest rate setting practices for SVRs since 2009 (see Goggin et al., 2011) means it is not all clear how lenders might alter SVR rates (currently a 3% margin over the policy rate) in response to an increase in the policy rate in the future.

<sup>11</sup> See Carroll (1997) for the differences between consumption to income ratios of savers and borrowers using buffer-stock theory; high consumption to income ratios are found for mortgage holders in Ireland using a different data set in Danne and McGuinness (2016).

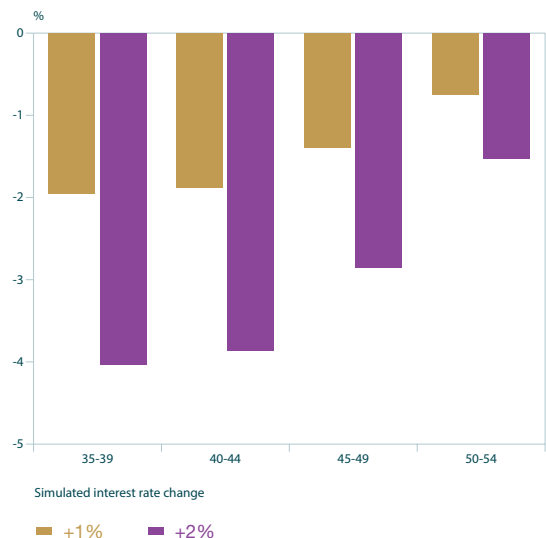
**Chart 4.1:** Simulated change in mortgage repayments, by age (€) for borrowers with a tracker mortgage



Source: Authors' calculations and HFCS.

Note: The base case is the average repayment given tracker interest rates in 2017.

**Chart 4.2:** Simulated change in disposable income net of mortgage repayment for borrowers with tracker mortgages, by age (per cent)



Source: Authors' calculations and HFCS.

0.90 to 0.97,<sup>11</sup> indicating limited scope for reduced savings in response to an interest rate shock. The economics literature suggests a marginal propensity to consume out of income for indebted borrowers of between 0.5 and 0.9 (Bunn et al, 2015). This implies that for each €1 fall in disposable income net of mortgage repayments, household spending falls by between €0.50 and €0.90. Second, and related to the first point, these borrowers hold relatively low savings stocks which could be drawn on in the case of a positive interest rate shock. Median savings (net liquid assets) range from just €2,000 to €5,500 for tracker borrowers aged between 35 and 49, and €1,000 to €1,600 for SVR borrowers.

Whilst the effects of an interest rate rise for high debt borrowers could be quite large *at the household level*, the aggregate effects will be smaller. This is because tracker borrowers as a group represent only a fraction of households – 12% in 2013 – although their consumption share is marginally higher, at 16%. Including *all variable loans* (i.e. trackers and SVRs)

increases the household and consumption shares to 29 and 36% respectively. However, as we discuss above, it is difficult to know in advance how lenders might adjust SVRs in response to a rate rise, given that the current margin on SVRs is already around 3%. In addition, savers will gain from higher rates. This is not trivial as aggregate household interest receipts are now close to interest payments (CSO, 2017).

The key to determining how an interest rise might affect households' ability to repay debt is to estimate the likely change in the debt service to income ratio (DSI), and specifically, how many households get pushed into higher, potentially unsustainable DSI territory (Fasianos and Bunn, 2017).<sup>12</sup> Recent Central Bank analysis of 'forward-looking vulnerabilities' also estimated the three-year probability of default (at end-2014) for different household types, controlling for, amongst other things, the path for interest-rates through to end-2017 (Central Bank of Ireland, 2016).

<sup>12</sup> The literature on the determination of mortgage arrears is rich and includes Deng et al (2000) and Gerardi et al (2015).

**Table 4.2:** Distribution of debt service burden in base case (actual 2013) and simulated 2% interest rate rise

	Trackers only Base case	Simulation	Trackers and SVRs Base case	Simulation
Mean	25.4	30.7	29.2	31.4
Median	18.5	22.2	19.2	22.8
% >=30	17.7%	27.8%	21.8%	31.1%
% >=40	7.5%	12.8%	9.8%	15.6%

Source: Authors' calculations and HFCS (2016). Note: Debt-service ratio, or burden, is the ratio of HMR (i.e. owner-occupier) mortgage repayments to gross income.

We simulate the DSI distribution for a 2% interest rate rise, holding incomes constant and assuming the rate rise is passed through fully. Table 4.2 summarises the results. For both tracker and all variable rate mortgage holders the interest rate increase scenario (an assumed 2% rise) results in a substantial shift to the right in the debt service burden distribution, although the picture is more stark for tracker borrowers alone where the average debt service burden increases by fully one-fifth. The share of households with tracker rate mortgages whose debt service burdens are considered high – over 30% – increases from 17.7 to 27.8%. When we include *both* trackers and SVR loans, the share rises to 31.1%. Looking even further along the high-DSR distribution, one-in-six variable rate borrowers (15.6%) would be spending 40% or more of their net disposable income on mortgage repayments were rates to rise by 2%. We emphasise once again, that these simulations *hold disposable income levels constant*.

Whilst these results are something to be aware from both a financial stability and real economy perspective, there are some important mitigating factors. First, the simulated 2% interest rate rise is highly unlikely to occur overnight. If it were to materialise, it would likely be only gradual over an extended period time, giving both borrowers and lenders time to adjust. Second, rising asset prices domestically, which is likely to occur simultaneously with interest rate rises, will go some way to mitigating both financial stability and real economy effects, particularly as more

households emerge from negative equity.<sup>13</sup> Third, as we have repeatedly emphasised, these simulations hold nominal gross incomes constant. If interest rates rise as a result of increases in the ECB policy rate, this will coincide with *sustained* nominal income and output growth in the Euro area, with some positive spill overs to Irish households' incomes also likely.<sup>14</sup>

## 5. Conclusion

Irish households, especially those where the head of household was born from the mid-1960s through to the early-1980s, hold a large quantity of debt. Even accounting for their higher incomes, the levels of this debt are higher than for comparator households in Europe or the US. When accounting for debt repayments and income however, the Irish experience is very much in line with that of the UK, US and Euro Area, due in the main to the (currently) low interest rates on tracker loans in Ireland.

Debt in Ireland is more concentrated in property, particularly for those whose debts outweigh their assets, than for comparator households in the US, UK or EA. This means that the majority of debt held in Ireland is secured, on assets whose prices are rising; unlike the most vulnerable households in the US and the UK who hold a variety of unsecured debt including loans related to medical and education borrowing.

<sup>13</sup> In fact, we estimate that the recent rise in house prices has already significantly reduced the proportion of households in negative equity, from 11% in 2013 to just under 7% by end-2016.

<sup>14</sup> ECB policy rate changes do not always occur simultaneously and in the same direction as income changes in Ireland. As we note above for example, ECB policy rates were low in the early part of the 2000s – a time of relative income *growth* in Ireland.

It is likely that, in the absence of much room to save, for the most indebted households in Ireland substantial debt reduction will continue for some time yet. The low interest rate environment that has prevailed since 2008 has been particularly beneficial to highly indebted Irish households. However, in relative terms, a far greater proportion of Irish borrowers are also exposed to potential interest rate rises in the future. Holding income constant, we show that a 1 to 2% interest rate rise reduces the disposable income after debt repayments of a typical borrower by between 2 and 4%, with larger impacts for younger borrowers. As well as the impact on household spending from lower disposable incomes, there could also be financial stability implications, depending on how increases in the debt service burden affect households' ability to repay debt. Finally, and on a more positive note, we highlight a number of mitigating factors, including: nominal income increases, asset price increases – both of which are also likely to occur with interest rate rises in the future – and the fact that a return to a more normalised interest rate environment is something that is only likely to occur over a gradual timeframe, giving all stakeholders time to adjust.

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