Banc Ceannais na hÉireann
Central Bank of Ireland
Eurosystem

Financial Stability Notes

The interest rate exposure of mortgaged Irish households

David Byrne, Fergal McCann and Edward Gaffney

Vol. 2023, No. 2

The interest rate exposure of mortgaged Irish households

David Byrne, Fergal McCann and Edward Gaffney ⓡ [1]

April 2023

Abstract

Interest rates in the euro area have increased by 350 basis points from July 2022 to March 2023, having been at, or close to, zero for much of the preceding decade. In this *Note* we focus on the wide dispersion in exposure to this monetary policy shock across Irish mortgage borrowers. We highlight the importance of recent switching activity and new loans originated on fixed interest rates, which insulate 60 per cent of mortgages in the short term and 41 per cent of mortgages until December 2024 or later. We estimate repayment increases to the end of 2023 under two scenarios: a 350 and a 425 basis point tightening from June 2022 to December 2023. The average repayment increase is 13 and 16 per cent across the two scenarios. There is extremely wide dispersion in the experience of the shock: among the most-exposed fifth of mortgagors the increase is 41 and 50 per cent, respectively, while up to two fifths of borrowers will experience no increase whatsoever. The most-exposed group, dominated by tracker and interest-only loans, and those with longer terms to maturity, had significantly smaller monthly repayments and interest rates at June 2022, and the result of the repayment change would be an equalisation of repayments across cohorts.

1 Introduction

Since the monetary policy tightening cycle began in July 2022 in the euro area, the key ECB interest rates have increased by 350 basis points.[2] This *Note* examines the implications in the Irish mortgage market, focusing on changes in borrowing rates and monthly repayments across the full distribution of households using granular data available to the Central Bank of Ireland.

Monetary policy affects Irish households through a number of channels. One direct channel is through the repayment burdens of indebted households, for whom mortgages are the dominant form of debt held. Increases in repayments can affect household consumption and, through that, aggregate demand in the economy. Changes in the repayment burden are also a key indicator of borrower resilience. Large adverse repayment shocks have the potential to lead to increased financial distress.

A key question in assessing the effects of monetary policy tightening on Irish households is the degree to which tightening will be "passed through" to borrowing costs. In Ireland, the outstanding stock of mortgages consists mainly of three types that differ in how this pass-through operates. Fixed rate mortgages have no pass-through for the duration of the fixation period. Tracker

[1] Macro-Financial Division, Central Bank of Ireland. Correspondence: edward.gaffney@centralbank.ie. All views expressed in this Note are those of the authors alone and do not represent the views of the Central Bank of Ireland. We thank Elio Bolliger for help with the Machine Learning analysis. We thank Vasileios Madouros, Mark Cassidy, and Tamanna Adhikari for helpful comments and discussion. Author ordering was generated with the AEA's author randomization tool, code H41DZVPWxocZ

[2] To the time of writing in mid-April 2023.

mortgages have complete pass-through: the mortgage rate rises or falls by the same amount that the key monetary policy rate does.[3] Variable rate mortgages pass through changes in the key policy rate at the discretion of the lender.[4] The differences in these contract types mean that households in Ireland are experiencing this current tightening cycle in different ways, with knock-on variation in financial stability implications stemming from households' repayment burdens.

This *Note* addresses a number of questions about recent developments in the Irish mortgage market. First, how has the distribution of outstanding mortgage rates changed in the wake of the monetary policy tightening? Using Central Credit Register (CCR) data, which provides a comprehensive view of the 788,449 loans, comprising €111bn of outstanding credit, in the Irish mortgage market,[5] we compare the mortgage rates on the stock of mortgages from June 2022, before the first rate rise, to December 2022. We show that the distribution of mortgage rates had changed meaningfully by December 2022 because of pass-through to Tracker mortgages, while the changes experienced among Variable rate mortgages were negligible up to that point.

Second, what is the extent of insulation against rate rises in the mortgage market? We calculate the residual fixation period for fixed-rate borrowers at retail banks in Ireland as of December 2022. This is the number of months left on their fixation agreement, rather than their original length of fixation. We show that 9 per cent of the outstanding stock of mortgages was fixed for less than one year in December 2022 and three in ten mortgages had less than three years of fixation left. We estimate that by end-2024 and end-2025, 30 and 22 per cent of today's mortgage accounts, respectively, will remain unaffected by rising interest rates.

Third, how has the distribution of mortgage types changed in Ireland over recent years? Our CCR data allow us for the first time to follow mortgaged households as they move between lenders and mortgage types. We find that the share of Variable loans has fallen due to two main reasons: new mortgage lending at fixed rates, and switching by one in four 2018 Variable borrowers to fixed-rate products by end-2022.

Fourth, we simulate the change in repayments on Irish mortgages by the end of 2023 through two scenarios for the key ECB interest rates, which relate to a 350 and 425 basis points increase in the key ECB policy rates over the 18-month horizon. We then sort borrowers by the size of the shock and examine the borrower/mortgage characteristics associated with having the largest payment shock. We estimate the average repayment change across the population of mortgaged households to be a 13 and 16 per cent increase under the two scenarios. The bottom two fifths of borrowers are almost fully insulated due to fixed rate products. We find that the top quintile of borrowers has an average repayment increase of 41 and 50 per cent across the two scenarios. Tracker mortgages, Interest-Only loans, and those with lengthy durations until loan maturity dominate this most-exposed group.

---

[3] It is possible that some Tracker mortgages may use another interest rate as the "reference rate", but a large majority uses the Interest Rate on Main Refinancing Operations (MRO), one of the key ECB policy rates. We consider the MRO to be the reference rate throughout.

[4] Tracker mortgages are also a kind of variable rate mortgage. However, throughout this Note, we use "Variable" mortgages to mean mortgages for which the interest rate is adjustable but that are not Trackers. This includes "Standard Variable Rate" (SVR) loans.

[5] Central Bank of Ireland Residential Mortgage Arrears and Repossessions Statistics, December 2022. This covers mortgages to individuals secured on residential properties located in the State by Irish-resident banks, retail credit firms and credit servicing firms, including both Primary Dwelling House and Buy to Let loans.

Our research comes at a time when Irish mortgage arrears and non-performing loan (NPL) ratios are at their lowest since the Global Financial Crisis, with the effects of the current inflation and interest rate shock yet to feed through to realised mortgage distress. In the wake of the financial crisis, close to one-fifth of all Irish PDH mortgages were in arrears in 2013, with this having dropped to 6 per cent by end-2022. The extent to which increased repayment burdens will ultimately affect the ability of Irish households to meet their payment obligations is a key question for assessing the financial resilience of households over the coming years.

While our analysis cannot directly project future default rates due to a lack of information on the current income and liquidity profile of Irish mortgage borrowers, we point to prior research that highlights conclusively that, in isolation, reductions in mortgage repayments through interest rate reductions do lead to lower levels of default (Byrne et al., 2022). Due to a lack of data, the literature following the global financial crisis has not typically been able to compare the importance of different types of adverse shocks in driving mortgage default. Landmark papers such as Ganong and Noel (2020; 2023) have instead focussed on determining conclusively that, in the US mortgage market, mortgage default was driven almost exclusively by liquidity-related shocks, rather than "strategic" reasons relating to negative equity.

Recent research by Low (2022) is the first to weigh up the role of different types of liquidity shock. He shows that, among defaulters in the USA in survey data between 2016 and 2018, 64 per cent cited unexpected expenses, 56 per cent cited job loss, while only 32 per cent cited an increase in mortgage repayments as a key driver of their default. There is no direct mapping from previous research to today's situation, however, because interest rate increases of the magnitude being experienced in 2022 and 2023 have no precedent in the samples of historic granular data available to researchers in developed economies.

To overcome the lack of income and liquidity information in loan-level and CCR data, in a companion paper, Adhikari and Yao (2023) use household survey data to calculate estimates of financial distress and debt service to income ratios under the current shock. They estimate that following central projections of interest rate, inflation, and economic conditions outlined in the European Banking Authority's 2023 stress tests, modest increases in distress are modelled (from 8 to 10 per cent). Under more adverse projections, these distress rates may rise to 12.7 per cent (an increase in distress of one half relative to the pre-shock period).

2 Interest rates on mortgage accounts

2.1 Statistics on mortgage accounts

There are 712,145 mortgage accounts for Primary Dwelling Home (PDH) purposes in Ireland as of December 2022, and another 76,304 for Buy to Let (BTL) purposes.[6] Together, these amounted to €111bn of outstanding loan balances. In the PDH market, 84 per cent of those loans are held by retail banks, while 16 per cent are held by non-bank entities such as Retail Credit Firms and Credit Servicing Firms, with many of those holdings relating to transfers of non-performing portfolios from retail banks since 2014.

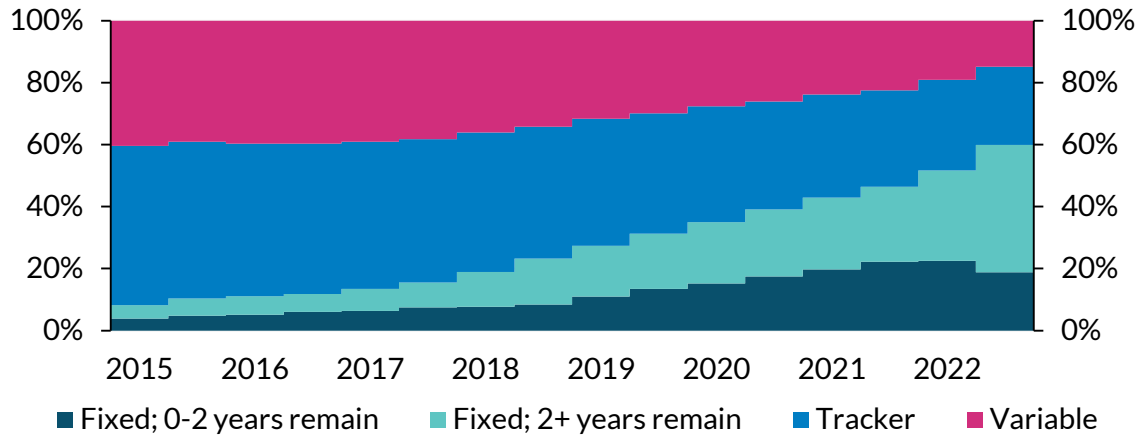
[6] Central Bank of Ireland Residential Mortgage Arrears and Repossessions Statistics, December 2022.

Throughout this *Note*, for assessing the interest rate exposure of Irish mortgaged households, we categorise four types of mortgage[7]:

1. ***Tracker***, whose interest rate moves mechanically in line with a reference rate such as the ECB's Main Refinancing Operation rate.
2. ***Variable,*** whose interest rate moves at the discretion of the lender. In many cases, differentiated Variable rates are applied by the same lender at different levels of Loan to Value (LTV).
3. ***Short-term fixed*** mortgages, whose interest rate is agreed and fixed until a future point within two years.
4. ***Medium-term fixed*** mortgages, whose interest rate is agreed and fixed until a date more than two years into the future.[8]

In Figure 1, we highlight the evolving share of our four contract types using Loan Level Data (LLD) for Irish retail banks. Borrower responses to lower interest rates caused the share of fixed rate mortgages to rise, reaching 60 per cent of loan balances by December 2022, while the medium-term fixation share rose from 4 per cent to 41 per cent between 2015 and 2022.

Figure 1: Share of outstanding mortgages at Irish retail banks by interest rate type



Source: Central Bank of Ireland loan-level data.
Note: Shares are reported as a percentage of all outstanding mortgage loans at the five main retail banks. Data end in December 2022.

From a resilience perspective, these loan types differ both due to the selection of different types of borrower into each product, as well as to the direct, causative effect of the interest rates associated with different products over the last decade or so. As an example of the former, previous research has shown that fixed rate customers in Ireland have typically had lower default rates, even when controlling for a range of characteristics and shocks (Kelly and O'Malley, 2016; Kelly and McCann, 2016). On the latter, Byrne et al. (2022) show that the interest rate benefit that accrued to Tracker

[7] A small minority of borrowers has a mortgage that blends these types. Another small share of borrowers has an "Interest-Only" payment arrangement for their mortgage.
[8] We refrain from using the term "long-term" fixed rate mortgages in this Note based on the relative duration of mortgage fixation in Ireland (which rarely exceeds 10 years), and experiences in other countries where fixation agreements of up to 30 years are common.

customers after 2008, led to lower default rates when compared to similar borrowers who experienced higher rates due to their choice of Variable loan in the pre-2008 period.

Table 1 provides a summary of ex-ante proxies for vulnerability, which are available only for loans at retail banks. Tracker loans were particularly likely to be originated during the pre-2008 period, when credit conditions were at their most loose in Ireland. 29 per cent of Tracker and 24 per cent of Variable mortgages have ever been forborne, with 24 and 23 per cent having ever been non-performing. Previous work using similar data has shown that a history of modification or forbearance is associated with higher likelihoods of future default (McCann, 2017). By contrast, much smaller shares of fixed rate lending have ever been in either the forborne or non-performing state. The *current* risk profile varies similarly, with much smaller NPL ratios among fixed rate than Tracker or Variable rate lending at December 2022.

Table 1: Vulnerability characteristics as at December 2022 by contract type; retail banks only

Type	Fixed (short term)	Fixed (medium term)	Tracker	Variable
Average year of origination	2015	2016	2006	2010
Average year of planned maturity	2042	2043	2034	2036
Ever forborne (per cent)	9.7	9.5	29.5	24.4
Ever non-performing (per cent)	7.2	7.2	24.0	23.4
Non-performing (end-2022, per cent)	1.2	1.0	3.7	5.1

Source: Central Bank of Ireland loan-level data, retail banks only.
Note: Shares are reported as a percentage of all outstanding mortgage loans at the five main retail banks at end-December 2022.

2.2 Pass-through of interest rates to borrowers since 2022

Monetary policy *pass-through* refers to the extent to which financial intermediaries adjust the price of their products in response to changes in the key monetary policy rate. In this *Note*, we are interested in the change in mortgage rates experienced by Irish borrowers following recent monetary policy tightening.

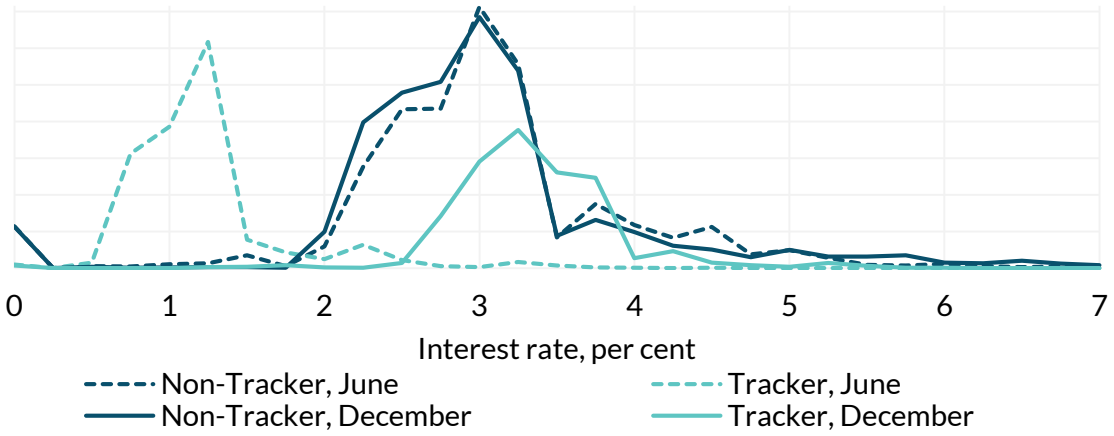
The likely pass-through of ECB policy varies across our four reported loan types. For Tracker mortgage customers, pass-through is precisely one: borrowers' interest rates increase in line with the reference interest rate. For Variable customers, pass-through will depend on lender decisions and can vary depending on the competitive environment, the point in the financial cycle, lender balance sheet health, and borrower risk. Internal Central Bank of Ireland modelling used for stress testing purposes on bank balance sheets suggests that, over the medium term, a pass-through of about 60 per cent on SVR loans has prevailed on average. For fixed-rate customers, pass-through is precisely zero, for the duration of the fixation agreement. At that point, the change in a borrower's repayment depends upon the rate to which they move. The borrower can also refinance or switch lender. The rates available to them are largely affected by the same factors discussed above for Variable rates.

To observe how the changes in the key ECB policy rates have transmitted to the stock of mortgages, we plot the distribution of interest rates in Figure 2, using CCR data on all outstanding home loan mortgages at retail banks and non-banks. In June 2022, there were two distinct groups in the market, with many Tracker mortgages having interest rates between 0.5 and 1.5 per cent, reflecting their different margins above the ECB MRO rate of zero. By contrast, non-tracker (fixed and

Variable) loans were priced in a range between 2.25 and 4.75 per cent, with a modal interest rate of about 3 per cent.

The distribution at December 2022 is notable for two reasons: first, the sharp increase experienced by Tracker customers is starkly visible; second, the non-Tracker distribution appears not to have moved over the six months, suggesting that pass-through for this group had been close to zero during this period. Overall, by December 2022, Tracker rates exceeded non-Tracker rates slightly on average (3.3% versus 3.1%), with the two groups having very similar distributions, eradicating the pre-tightening bifurcation in the mortgage market.

Figure 2: Distribution of tracker and non-tracker rates on mortgages, June 2022 and December 2022



Source: Central Bank of Ireland Central Credit Register data. Mortgages held by banks, RCFs and CSFs included.
Notes: Chart shows mortgages at rates between 0 and 7 per cent.

3 The role of contract choices in recent years in insulating borrowers from rising interest rates

As interest rates fell from 2015 onwards, in a context of rapid economic recovery from the GFC, low-for-long monetary policy and increasing competitive pressure from non-banks, the share of new lending for house purchase on fixed rates rose from 50 per cent to 90 per cent.[9] At the same time, refinancing activity (where an existing mortgage is switched between two lenders) rose rapidly, from €522 million in 2016 to €1.6 billion in 2022, with most of this activity involving borrowers moving to fixed rates.[10] Further, "renegotiation" activity onto fixed-rate mortgages, where a borrower does not switch lender but varies the terms of the mortgage, averaged €2.2 billion per year over the period 2018 to 2021, but surged to €5.5 billion in 2022.[11]

We visualise the changes that have occurred in mortgage contract types in a flow diagram in Figure 3, taking CCR data at end-2018, and tracing through how the status of all households with mortgages had changed by December 2022. The graph highlights the most important groups in the market overall: those that have stayed on Trackers (24 per cent of all loans) and Variable loans (17

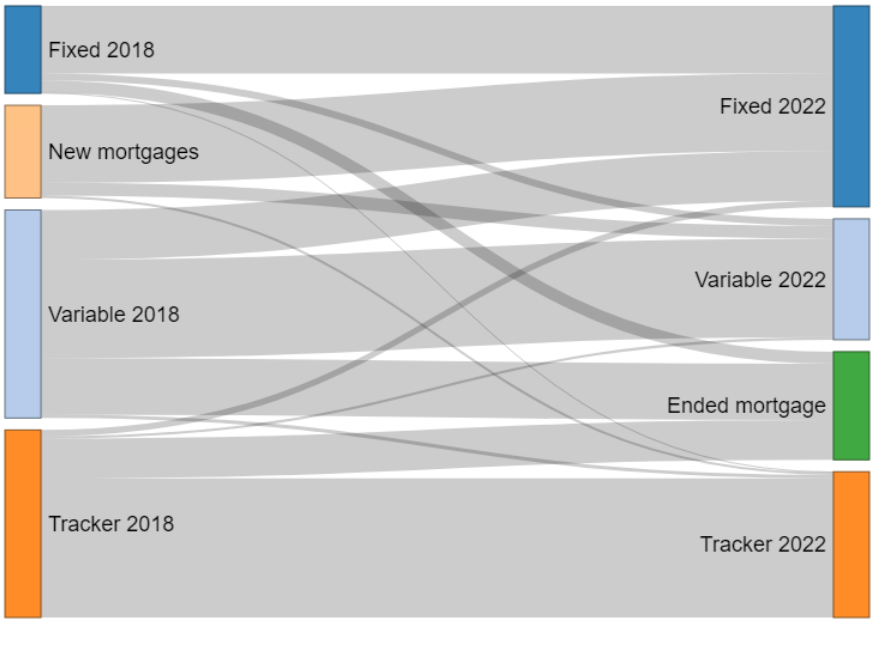
[9] Central Bank of Ireland Monitoring Templates Data, comparing loans drawn down for purchase and self-build during 2016 and 2022 H1.

[10] BPFI mortgage drawdown series.

[11] Central Bank of Ireland Money and Banking Statistics, Table B.2.2. Covers bank loans to euro area households that were already on the balance sheet of the bank at the end of the previous month, where the customer actively adjusted the terms and conditions of the loan, including the interest rate. These figures include all adjustments that result in a fixed-rate mortgage, such as extending a previous fixation period.

per cent); those that have moved from Variable to fixed (9 per cent), those that did not exist in 2018 and are now fixed (13 per cent) and those that were fixed in 2017 and remain fixed (12 per cent).

Figure 3: Flows across contract types, December 2018 to December 2022



Source: Central Bank of Ireland Central Credit Register data. Mortgages held by banks, RCFs and CSFs included
Note: where a household has more than one mortgage account and more than one contract type, we assign a contract type based on the share of balance in the household's total balance owed.

The analysis yields insights on the behaviour of borrowers with variable rate lending during the period of falling interest rates: of 293,000 borrowers identified in the data as Variable at end-2018, a quarter had moved to a fixed-rate product by December 2022, while another quarter had paid off their loan, with close to one half remaining on Variable loans.

Table 2: Remaining fixation period at December 2022, share of all outstanding loans

Duration	Share, Dec. 2022
1-12 months	9%
13-24 months	10%
25-36 months	10%
37-48 months	11%
49-60 months	15%
61+ months	5%
Tracker/Variable	40%

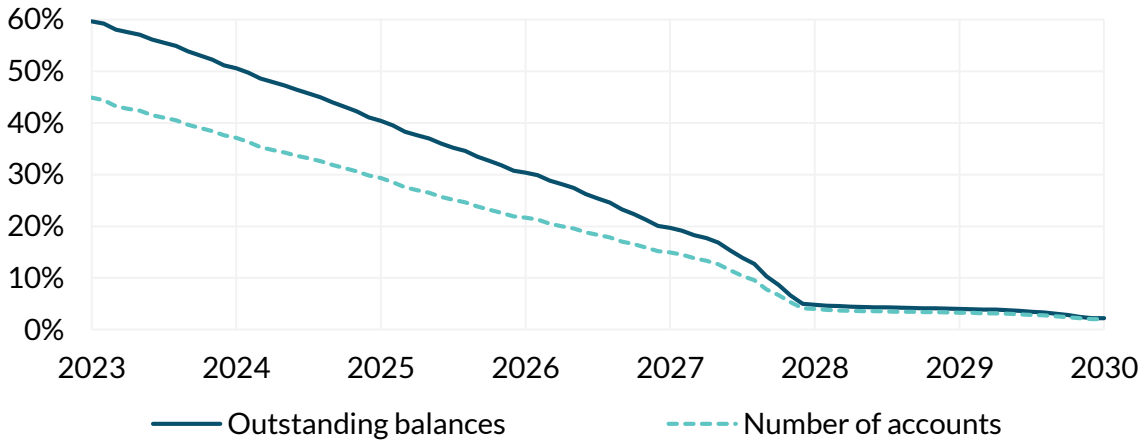
Source: Central Bank of Ireland loan-level data. Retail banks only.
Note: Shares are reported as a percentage of all outstanding mortgage lending at the five main retail banks at end-December 2022.

Finally, we consult the LLD, for retail banks only, to document the remaining duration of loans that were fixed at December 2022. Approximately 9 per cent of all loans (by balance) are due to roll off their current fixed rate by December 2023, with another 10 per cent due before December 2024 (Table 2). This leaves a fifth of the mortgage market in a situation where, despite currently being

insulated, they are likely to face higher mortgage rates reflecting the increase in the key ECB policy rates since July 2022 and projections for the path for ECB policy. For the 41 per cent of loans that will not roll off fixed rates until after December 2024, they also likely to face an increase in their borrowing cost at that point, although the level of the key ECB policy rates is more uncertain over a longer projection horizon.

Figure 4 visualises these changes: if no action is taken by borrowers at the end of their fixation period, on a number of accounts basis, the share of loans insulated from interest rate rises will fall from 60 per cent today to 30 per cent by end-2025 and 22 per cent by end-2026.

Figure 4: Shares of today's retail bank mortgages on fixed rate, by future date



Source: Central Bank of Ireland loan-level data
Note: shares are reported as a percentage of all outstanding loans at the five retail banks at end-December 2022. Assumption imposed that borrowers revert to variable interest rates at the end of their fixation period.

4 Simulating increases in repayments

We now simulate the increases in mortgage repayments by households until the end of 2023. We do this through two scenarios for the key ECB interest rates. Using a scenario analysis allows us to examine the sensitivity of the repayment change distribution to the level of the key interest rates and to acknowledge uncertainty about their path. In the first, we hold the increase in the key policy rates since June 2022 constant at 350 basis points, implying no further change in the MRO from the time of writing. In the second, we depict a hypothetical larger increase of 425 basis points by December 2023.[12]

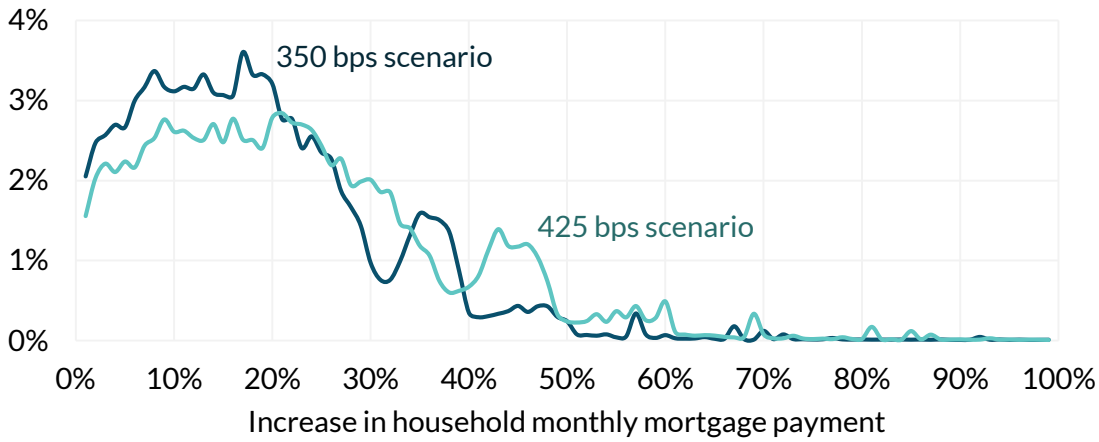
In each scenario, by end-2023, it is assumed that there will be 60 per cent pass-through of key policy rates to Variable rates, 100 per cent pass-through to Tracker rates, and zero per cent to fixed rates. The assumption on fixed-rate pass-through reflects limitations in the CCR data. In practice, some fixed-rate customers are expected to end their current fixed period prior to December 2023, likely involving an increase in the interest rate. Fixed-rate end dates are not available in the CCR data used for this simulation. Thus, some fixed-rate customers would be expected to experience repayment changes before end-2023 that cannot be modelled here.

Our metric of interest is Δ_{REPAY}, which is the percentage increase in the household's total mortgage payment modelled over the 18-month horizon. In Figure 5, we graph the distribution of Δ_{REPAY} for Variable and Tracker loans, excluding fixed-rate borrowers, for whom Δ_{REPAY} is zero. Increases of

[12] This higher rate scenario is motivated by the median expectation for the MRO at end-2023 from the March 2023 edition of the ECB's Survey of Monetary Analysts, available here.

more than one-third are modelled for 16 per cent of this group of households in the first scenario (involving a 350 basis points increase in ECB interest rates), which rises to 23 per cent of affected households in the second scenario (involving a 425 basis points increase).

Figure 5: Distribution of repayment increases for Variable and Tracker loans



Source: Simulation exercise based on Central Bank of Ireland Central Credit Register data.
Note: Density chart depicting the distribution of percentage increases in mortgage payments at the household level under two scenarios. Each point represents the share of households on Variable and Tracker mortgage whose increase in mortgage payment is within a band of one percentage point width, beginning with households whose increase is above zero per cent and less than or equal to one per cent. The chart does not depict approximately two per cent of the sample of households whose increases in payments is more than 100 per cent.

The quintiles of Δ_{REPAY} scenario are reported in Table 3. The average increase is close to zero across the first two quintiles, due to the large share of fixed-rate lending. In the third quintile, which includes the median borrower, under the lower-rate scenario, an increase of 8.3 per cent is modelled, followed by average increases of 18.0 per cent and 40.9 per cent in the fourth and fifth quintiles respectively. Under the higher-rate scenario, the average value in the full sample would be 16.4 per cent while the average in the most-exposed fifth of borrowers would be 50.1 per cent.

Table 3: Increase in repayment per quintile under full tightening cycle of 350 and 425 basis points

	+350 scenario		+425 scenario	
Quintile	Average (per cent)	Bounds (per cent)	Average (per cent)	Bounds (per cent)
1st & 2nd	0.2	[0,3.2]	0.3	[0,3.8]
3rd	8.3	[3.2,13.1]	10.1	[3.8,16.1]
4th	18.0	[13.1,23.2]	22.0	[16.1,28.5]
5th	40.9	[23.2+]	50.1	[28.5+]
All	13.4		16.4	

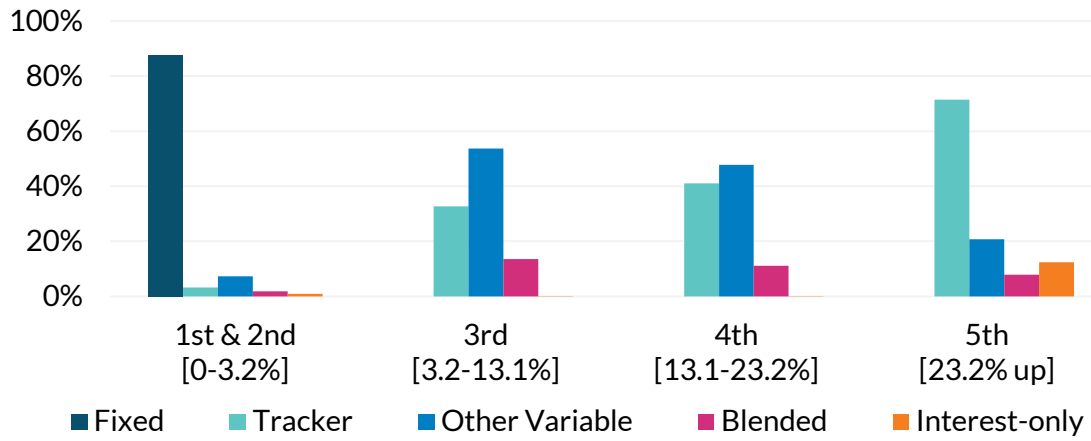
Source: Simulation exercise based on Central Bank of Ireland Central Credit Register data.
Note: the top 0.5 per cent of observations is trimmed, to remove the influence of extreme outliers on the calculated mean values.

5 Identifying those most exposed to rising interest rates

Having established the variation in Δ_{REPAY} across households, we now characterise the groups of borrowers most exposed to rising interest rates. The relative exposure of different borrowers to higher interest rates does not vary significantly by scenario. We therefore focus on quintiles of the distribution of repayment increases in the first scenario (350 basis points), and document which

types of borrower are most likely to be in each quintile. In Figure 6, the importance of contract types is illustrated. Fixed mortgages account for 88 per cent of all loans in the first two quintiles, i.e. those least exposed to interest rate shocks over 18 months. Tracker mortgages, by contrast, account for 41 per cent of the fourth quintile and 71 per cent of the top quintile. Variable rate mortgages are the main contributor to the third and fourth quintiles of the distribution. Interest-only mortgages are few in total, but account for 12 per cent of households in the top quintile.

Figure 6: Share of contract types in each quintile of Δ_{REPAY}



Source: Simulation exercise based on Central Bank of Ireland Central Credit Register data.
Note: Each group displays data for households falling into the respective quintiles of Δ_{REPAY} in the 350 basis points scenario. "Blended" describes households with multiple interest rate types, typically including some non-fixed rate element. The four categories of interest rate type sum to 100 per cent for each group. "Interest-only" mortgages may have any interest rate type.

In Table 4, we report key loan characteristics across the distribution of the repayment shock. Of particular note is the size of the loan balance owed, which is far higher among the top quintile than elsewhere. Despite such high balances, repayments at June 2022 were the lowest among the top quintile. These two facts are explained by the predominance of Tracker and Interest-Only customers, who benefitted during the period of low interest rates but are now most exposed, proportionally, to monetary tightening.

Table 4: Key loan characteristics across the distribution of repayment shocks

Variable	1st & 2nd	3rd	4th	5th
Outstanding balance (€)	176,579	102,410	163,401	224,677
Payment in 2022 (€)	1,287	1,291	1,148	951
Shocked payment (€)	1,292	1,395	1,352	1,356
Interest rate, 2022 (per cent)	2.8	2.6	2.3	1.7
Shocked interest rate (per cent)	3.0	5.1	5.0	4.8
Interest rate shock (pp)	0.3	2.5	2.7	3.1
Years of mortgage remaining	19	8	15	19

Source: Simulation exercise based on Central Bank of Ireland Central Credit Register data. Scenario of a 350bps tightening cycle is reported.
Note: Average values of statistics shown, by quintile. The top 0.5 per cent of observations is trimmed, to remove the influence of extreme outliers on the calculated mean values.

The "equalisation" of repayment burdens is evident across the third row – despite the most exposed customers having repayments that were €200-300 cheaper last June, repayment burdens at end-2023 would be estimated to be almost equal across the quintiles, as are December 2023 interest rates (modelled to be between 4.8 and 5 per cent across the top three quintiles). The importance of

mortgage duration is also emphasised: the most exposed have 19 years remaining on average, compared to just 8 years in the third quintile.

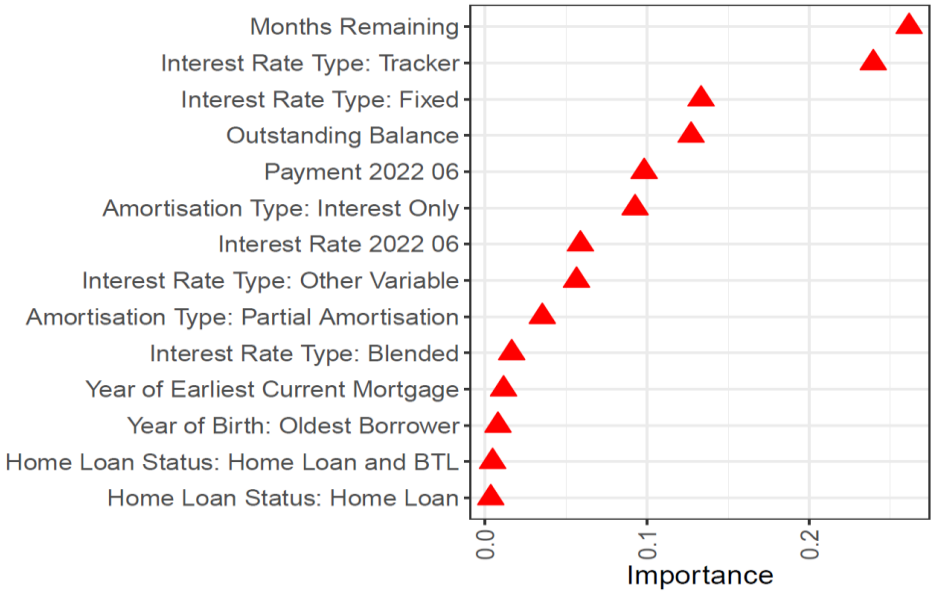
Table 5: Age and origination profile across the distribution of repayment shocks

Variable	1st & 2nd	3rd	4th	5th
Share of quintile by origination year				
Pre-2003 (per cent)	9	24	7	3
2004-2008 (per cent)	15	57	61	81
2009-2022 (per cent)	76	19	32	16
Borrower age (Average)	45	56	50	48
Has BTL debt (per cent)	2	18	15	9

Source: Simulation exercise based on Central Bank of Ireland Central Credit Register data. Scenario of a 350bps tightening cycle is reported.
Note: Average values of statistics shown, by quintile. The top 0.5 per cent of observations is trimmed, to remove the influence of extreme outliers on the calculated mean values.

In Table 5, we highlight that the most-exposed borrowers are most likely to have originated between 2004 and 2008, the period during which credit conditions were most loose. These origination years were also associated with the greatest default risk after 2008. By contrast, loans originated after 2009 dominate the bottom two quintiles, owing to the share of fixed-rate lending during that period. This highlights an important coincidence of risks: there is a strong correlation between exposure to the current monetary tightening and longstanding measures of vulnerability arising from the late-2000s crisis, as highlighted in Table 1 above. The question of whether this coinciding set of vulnerabilities means that substantial increases in default rates should be expected among most-exposed borrowers is beyond the scope of this analysis. Improvements such as income and savings growth, as well as loan amortization, mean that vulnerabilities among this group may have fallen since the apex of the previous arrears crisis around 2013.

Figure 7: The importance of each explanatory factor in determining variation in Δ_{REPAY}



Source: Own calculations, based on Central Bank of Ireland Central Credit Register data.
Note: Shows a measure of variable importance from a model to predict that a borrower is in the top quintile for the change in their mortgage repayment. The methodology used is an ensemble of Random Forest, Gradient Boosting and Elastic Net methods.

The most exposed borrowers are slightly younger than those in the third and fourth quintiles, likely owing to the age at which these borrowers took out loans during the previous credit cycle. They are also less likely to have a BTL exposure than those in the third and fourth quintiles.

We complete the analysis by using Machine Learning techniques to assess the relative importance of the range of inputs outlined above (Figure 7). The analysis indicates that the term remaining on the loan, along with the Tracker mortgage flag, are the most important factors explaining variation in the repayment shock.

6 Conclusion

In this *Note* we study the exposure of mortgaged Irish households to rising interest rates. We focus both on observed changes in mortgage pricing between June and December 2022 using credit register data, as well as on modelling the distribution of likely repayment shocks across the period from June 2022 to December 2023.

We have highlighted that there is a wide dispersion of outcomes across Irish households. Up to two fifths of all mortgage holders are likely to have experienced no increase in repayments by the end of 2023, due to mortgage fixation. By contrast, the average household will experience an increase of 13 or 16 per cent under two scenarios for the ECB's key policy interest rates. Among the most-exposed fifth of borrowers, large increases of 41 and 50 per cent are modelled.

We use data on mortgage fixation of contracts to estimate that, of the current stock of loans, three in ten will be insulated from higher interest rates by end-2024, and around one-fifth will be insulated by end-2025, under the assumption that they do not take action and instead revert to variable rates at the end of their fixation period.

We analyse mortgages on the Central Credit Register from 2018 to 2022 and document the importance for current borrower resilience of both new lending on fixed mortgage rates and variable-rate customers actively switching within and across lenders, during the period of low interest rates.

Finally, we profile the customers most exposed to the repayment shock. Tracker mortgage customers and Interest-Only customers dominate the most-exposed group. Borrowers in this group have a much longer term remaining on their loan than borrowers in the median category, and have substantially larger mortgage balances. The most-exposed group had significantly smaller monthly repayments and interest rates at June 2022, and the result of the repayment shock has been an equalization of rates of repayments across cohorts. We also report that the most exposed customers were most likely to originate their lending between 2004 and 2008. Taken together, our results highlight a correlation between exposure to this current repayment shock and measures of vulnerability stemming from the post-2008 crisis.

Will such large increases in monthly contracted payments lead to increases in arrears and default? The answer is ultimately beyond the scope of this research, and will depend on how borrowers' incomes have evolved since their loans were originated, how they have accumulated savings in recent years, and how their income and employment profile will withstand changes in the macroeconomic environment that may arise due to high inflation and high interest rates. In related Central Bank research, Adhikari and Yao (2023) estimate that in a baseline scenario, financial distress rates are expected to only rise modestly through to the end of 2023, and that even under an adverse scenario, the share of households in distress may increase by one half relative to the 2021 level.

References

Adhikari, T. and F. Yao (2023). Expenditure or debt service? The resilience of households to macroeconomic shocks. *Central Bank of Ireland Financial Stability Notes*, Vol. 2023 No. 3

Byrne, David, Kelly, Robert and Conor O'Toole (2022). How Does Monetary Policy Pass-Through Affect Mortgage Default? Evidence from the Irish Mortgage Market, *Journal of Money, Credit and Banking*, 54: 2081-2101.

Ganong, Peter and Pascal Noel (2023). Why do borrowers default on mortgages? *Quarterly Journal of Economics*, Volume 138, Issue 2, May, p. 1001-1065

Ganong, Peter and Pascal Noel (2020). Liquidity vs. Wealth in Household Debt Obligations: Evidence from Housing Policy in the Great Recession. *American Economic Review* 2020, 110(10): 3100-3138.

Kelly, Robert and Terence, O'Malley, (2016). The good, the bad and the impaired: A credit risk model of the Irish mortgage market, *Journal of Financial Stability*, 22, issue C, p. 1-9.

Kelly, Robert and Fergal McCann, Some defaults are deeper than others: Understanding long-term mortgage arrears, *Journal of Banking & Finance*, Volume 72, 2016, Pages 15-27.

Low, David (2022). What triggers mortgage default? New evidence from linked administrative and survey data. *CFPB Office of Research Working Paper* No. 02, 2022

McCann, Fergal (2017). Resolving a Non-Performing Loan crisis: the ongoing case of the Irish mortgage market. *Central Bank of Ireland Research Technical Paper* 10/RT/17

T: +353 (0)1 224 6000
www.centralbank.ie
publications@centralbank.ie

Bosca PO 559, Baile Átha Cliath 1, Éire
PO Box 559, Dublin 1, Ireland

Banc Ceannais na hÉireann
Central Bank of Ireland

Eurosystem