

## The income distribution and the Irish mortgage market

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### Abstract

In this *Letter* we study the evolution of the prevalence of groups of households from across the population income distribution in the Irish mortgage market. We document a period of financial liberalization between 1994 and 2007, where the share of new mortgages issued going to those in the top income quintile fell from 57 to 27 per cent, while those in the middle quintile increased their share from 13 to 29 per cent. The impact of the recent crisis is shown to have had a pronounced impact in the Previous-Owner mortgage market, where negative equity has impeded many households from purchasing property with a second or subsequent mortgage: the share of the top income quintile in this market segment has risen from 27 to 65 per cent in the period 2007 to 2014, marking a significant reversal relative to the pre-2007 period. The Buy to Let segment is shown to be composed predominantly of those at the top of the income distribution, with little variation across the 1994–2014 period. Finally, higher-income households are shown to borrow with higher Loan to Value but lower Loan to Income mortgages in all periods.

## 1 Introduction

How concentrated are mortgage originations among those on higher incomes? Has this pattern changed through expansion and contraction in the Irish housing market? Combining for the first time information on the incomes at origination of a large sample of Irish mortgage holders with survey information on the population income distribution, in this *Letter* we document how participation in the mortgage market in Ireland has evolved over the period 1994 to 2014. Given the data access to hand, ours is one of a very small number of studies to have carried out such an exercise globally. Using information from loan-level data on household income at mortgage origination, we are able to calculate in every year what share of all mortgage originations went to households from each quintile of the

population income distribution.

Our analysis uncovers a period of structural change in the mortgage market experienced concurrently with a period of deep credit market liberalization and economic expansion more generally in Ireland: between 1994 and 2007, the share of the top income quintile in annual mortgage originations decreased from 57 per cent to 27 per cent. Over the same period, the share of the 3rd income quintile in mortgage originations rose from 13 to 29 per cent, while that of those in the bottom 40 per cent of the income distribution rose from 2 to 11 per cent.

Secondly, the results presented here suggest that the financial crisis beginning in 2008 has had profound impacts on the housing market, beyond the already well-documented collapse in the number of purchase

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transactions per year: among those purchasing a second or subsequent home (Previous-Owners, or SSBs), the share of all transactions accounted for by the top income quintile has risen from 27 per cent in 2007 to 65 per cent in 2014. At the same time, the share of the 3rd quintile has fallen from 28 per cent to 8 per cent, while that of the 4th quintile has fallen from 36 to 25 per cent. One possible explanation for this pattern is that the fall in house prices experienced as a result of the crisis led to widespread experience of negative equity across the housing market, with those with higher incomes being the group most likely to have the financial means to overcome this negative equity and provide down-payments for an SSB mortgage. Research on the evolution of incomes during the crisis period from [Savage, Callan, Nolan, and Colgan \(2015\)](#) shows that percentage falls in income between 2008 and 2013 were lowest in the top three deciles of the income distribution, but that once tax policy changes are accounted for, the top and bottom deciles fared worse than all other groups. Despite this pattern, the prevalence of disproportionately large amounts of financial wealth among those on top incomes ([Lawless, Lydon, and McIndoe-Calder, 2015](#)) may still allow such households to overcome such problems associated with collapses in housing equity.

Among the First Time Buyer cohort, the post-crisis period is associated with a slight reversal in the trend experienced to 2007, with the top quintile share rising from 12 to 19 per cent and that of the 3rd quintile falling from 43 to 34 per cent. Relative to the experience in the SSB market however, such a reversal appears to be a smaller change.

Finally we show that the share of the top income quintile in Buy to Let originations has been between 55 and 65 per cent in every year from 1995 to 2014, suggesting stability in the patterns of market share over time. Those in the bottom sixty per cent of the population income distribution have generally accounted for around twenty per cent of BTL originations, with this number having fallen to 12 per cent by 2014.

In this *Letter* we are agnostic as to whether mortgage market participation is determined more by supply- or demand-side factors; rather the aim is limited to documenting the income structure of the Irish mortgage market in a recent historical context. Further, normative statements regarding the desirability or otherwise of higher mortgage market shares among those on lower incomes are beyond the scope of the current study. A deeper analysis of the merits of improved home-ownership access relative to the increased risk associated with loans being issued to those at potentially higher risk of default would be required to contribute to such a debate. Finally, it is important to note also that non-mortgage home purchases (“cash buyers”) increased in their prevalence during the financial crisis

period, and are not observable in our mortgage data ([Coates, McNeill, and Williams, 2016](#)).

Research on the heterogeneity of wealth and debt profiles across the income distribution in Ireland is sparse, due mainly to data limitations. [Kelly and Lydon \(2017\)](#) show using the Household Finance and Consumption Survey (HFCS) for Irish households in 2013 that the share of households declaring to be saving for a house purchase is 20 per cent for households below the population median income, while being 60 per cent among those in the top 25 per cent of population incomes. Another exception is recent work from [Lawless, Lydon, and McIndoe-Calder \(2015\)](#) who show using the same HFCS data that home-ownership rates in the bottom quintile of the Irish income distribution were 60 per cent in 2013. This figure rises to 67, 79 and 88 per cent in the 3rd, 4th and 5th quintile, respectively, providing clear evidence that home-ownership is positively related to income. The overall home-ownership rate is 70.5 per cent, placing Ireland in 2013 significantly above the euro area average of 60.1 per cent (calculated at 2010). On the liability side of the household balance sheet, the authors show that, at end-2013, the share of the bottom income quintile in Ireland with an outstanding Household Main Residence (HMR) mortgage was 12.1 per cent, rising to 16.8 per cent in the 2nd quintile. At higher incomes, mortgage participation is far higher, measuring 32.2, 47.1 and 61.1 per cent in the 3rd, 4th and 5th quintiles, respectively. A disadvantage of the above work is its cross-sectional nature. Our approach in this paper expands on the above finding by linking information on mortgage originations per year to survey information on the population income distribution for a wide span of years, providing a view of the way in which patterns of participation in the mortgage market have evolved over periods of rapid change in the Irish economy.

## 2 International Evidence

While a large literature exists on access to homeownership, relatively little is known about the evolution over time of the income profile of those purchasing property in the mortgage market. In the US, recent research from [Adelino, Schoar, and Severino \(2016\)](#) shows that the share of mortgages originated to ZIP codes in each quintile of the ZIP code income distribution hardly shifted at all between 2002 and 2006, suggesting that the large mortgage expansion experienced there did nothing to alter the income structure of the overall market. They show that the top income quintile accounts for a disproportionate share of mortgage originations (34–36 per cent), with the 4th quintile accounting for a further 22 per cent, and only 11 per cent of originations going to those in the bottom income quintile.

Adelino, Schoar, and Severino (2016) also provide evidence that the role of the middle class was in fact more important than that of sub-prime mortgage borrowers in precipitating the US housing crash and mortgage default crisis. Looking at borrowers in ZIP codes in the top 20 per cent of incomes, they find that these households increased their share of all mortgage dollars in default from 13 per cent to 23 per cent between 2003 and 2006. Households from bottom-20 per cent ZIP codes, by contrast, reduced their share of total mortgage dollars in default from 22 per cent to just 11 per cent over the same period. This contrasts with a key finding of Mian and Sufi (2009) that growth in mortgage lending and growth in incomes per capita became decoupled in the run-up to the crisis, often interpreted as evidence of the role of sub-prime lending in causing the crisis.

### 3 Data Sources

Our approach involves the linking of two distinct data sources. Firstly, we use Central Bank of Ireland loan level data (LLD) to identify the population of mortgages outstanding at three large Irish lenders at December 2014. These lenders comprise over two thirds of the outstanding loans in Ireland at that point. Further, these lenders vary significantly in their ex-post mortgage default rates, suggesting that they provide a reliable view of the distribution of lending standards in Irish banking. From this data set, using information on the date of origination and borrowers' income at origination, we construct a data set of the income of borrowers purchasing property via a mortgage from 1994 to 2014. Given that our focus is on purchase of property, we restrict the data to loans for house purchase (which can be first time buyer, second or subsequent buyer, or buy to let), removing refinance and equity release products.

One caveat to the interpretation of figures from the LLD is that it suffers from "survivorship bias", in the sense that any loans issued in year X before 2014 and having exited the loan book before December 2014 due to foreclosure, mortgage switching or early repayment, will not be present in the year X origination data used in our analysis. Clearly, the further back in time from 2014 we go in the analysis, the more acute this problem becomes. However, what is important from an interpretation point of view is not whether there are loans missing from the year X cohort, but rather whether there is any bias in the income distribution among those year X mortgages that are not present. Given that mortgage early repayment and switching are likely to be more prevalent among more educated (Brunetti, Ciciretti, and Djordjevic, 2015) and wealthier (Keys, Pope, and Pope, 2016) households, it is perhaps possible that our estimates are understating the

prevalence of high-income households in the mortgage market for earlier years.

A further point worthy of consideration when interpreting data from earlier years relates to the fact that only the *current* mortgage outstanding for each household is recorded in the data. This means that all households who entered the housing market as a First Time Buyer, but then transitioned to a Second and Subsequent Buyer (SSB) by moving home, will only be visible in our data as an SSB purchaser for the year of the purchase of the property on which they currently have a mortgage. If there is a bias toward lower- or higher-income borrowers in the propensity to purchase a second home with a mortgage, this could lead to distorted results. While SSB mortgage holders have higher incomes than FTB mortgage holders when comparing across a cross-section (Kinghan, McCarthy, and O'Toole, 2016), no study has formally investigated whether those on higher incomes are more likely to transition from FTB to SSB status than lower-income FTBs. It is also important to point out that for more recent years, particularly since the crisis period, it is highly unlikely that a household will have made two home purchases with a mortgage, limiting the scope for this type of problem to affect results.

Data on the gross household income distribution come from two micro data sources:

- Living in Ireland Survey (LIS, 1994-2001)
- Survey of Income and Living Standards (SILC, 2003-2014)

For the year 2002, no survey with information on the income distribution exists in Ireland. We estimate the percentiles of the 2002 income distribution by applying national income growth rates between 2001 and 2002 to the 2001 income distribution. In all cases, the metric that we use is gross annual household income.

### 4 Incomes

Our first empirical investigation focuses on the income levels of all borrowers for which origination income information is available as of December 2014. For each origination year, we match the borrower's household gross annual income to the population income data which allows us to place every mortgage borrower in a quintile of that origination year's population income distribution.

Figure 1 highlights the long-term lack of participation in the Irish mortgage market of those in the bottom two quintiles of the income distribution. Through all years 1994 to 2014, the share of originated mortgages going to borrowers on these income levels is between 2 and 12 per cent. In line with credit market expansion, the market share of these lower-income bor-

rowers increased through the period 2005 to 2009, but has since decreased to 6 per cent in 2014.

The most obvious structural shift visible in the graph is the divergence between the mortgage market share of the “middle class” (3rd income quintile) and those in the top quintile in 2003. At that point, again consistent with a liberalization on both the demand- and supply-side in the Irish mortgage market, these groups went from having equal market shares to a situation where the 3rd quintile had 15 per cent larger share than the 5th quintile by 2008. The next striking structural shift is the reversal of this market liberalization in the aftermath of the financial crisis, with the top quintile’s market share growing to 35 per cent of 2014 originations while the 3rd quintile’s share has fallen back to 23 per cent. The reader is also reminded that, accompanying this shift in the composition of borrowers after 2008 was a collapse in the annual number of transactions. Data from the Department of the Environment show that the total number of mortgage approvals went from a maximum of 120,037 in 2005 to 12,834 in 2011. Throughout the whole time period under discussion, the mortgage origination share of the 4th quintile has remained steady around 35 per cent.

The patterns in Figure 1 may however be masking important variation by borrower type. In order to paint a fuller picture of the income structure of the Irish mortgage market, we repeat the methodology of Figure 1 separately for First Time Buyers (FTB) and previous-owners purchasing their second or subsequent home (SSB). Figure 2 shows that restricting the analysis to FTB only does not change the picture with regard to market participation of the bottom income quintile. The chart suggests that the vast bulk of the FTB market is made up of borrowers from the 3rd and 4th quintile of the population income distribution. The combined share of these two segments has been steady at between 75 and 80 per cent since 2003.

The share of FTB mortgages accounted for by the top income quintile (generally comprised of older households who are not in general expected to be first time home buyers) has generally hovered between 10 and 15 per cent, but has moved closer to 20 per cent in the aftermath of the financial crisis. Demand for mortgage finance may have become more skewed towards higher-income borrowers, due to greater down-payment constraints among lower income borrowers, or a changing age profile whereby older and therefore higher-income borrowers are entering the FTB market relative to previous years. Research from the Real Estate Alliance has indeed shown that the average age of First Time Buyers has risen from 29 in 2006 to 34 in 2015.<sup>2</sup> It is also likely that post-crisis risk aversion on the part of lenders has meant that those on higher incomes, and particularly households with two salaried

incomes, are the most likely to be approved for their desired mortgage amounts.

Figure 3 plots the income structure of the SSB mortgage market. Here we again see that those in the bottom 40 per cent of the population income distribution account for under 5 per cent of all mortgage originations in the years 2010-2014. The most striking trend here is the divergence in the aftermath of the crisis in the market share of the top versus the 3rd income quintile, with those at the top now having an SSB market share of roughly 60 per cent. One potential explanation for this is that the scope for making SSB purchases is impeded by negative equity, and it may be that those in the middle class took out higher-LTV loans at the point of first purchase or live in areas suffering more pronounced house price falls, leaving them more exposed to entering negative equity as a result of the housing market crash. Further, even if negative equity is equally spread across the income distribution, it may be the case that those at the high end of the income distribution can draw on greater accumulated savings since the point of first purchase, as well as greater family financial resources to allow an SSB purchase even when the first property is close to or in negative equity. Lawless, Lydon, and McIndoe-Calder (2015) show that median financial wealth is between five and ten times larger among top-income-decile households than for households below the median income in Ireland, supporting the possibility that this channel could be at play.

Figure 4 provides the same plot as above for the Buy to Let (BTL) segment. Given that this is an investment good, it is unsurprising that market participation is heavily skewed towards those in the top income quintile, with their market share generally being between 60 and 70 per cent of all BTL mortgage originations per year. This tendency has held through periods of credit market expansion, financial crisis and subsequent recovery.

## 5 Credit conditions

Finally we consider the credit conditions at origination of mortgage holders across the income distribution. In doing so we will ascertain whether those from lower or higher-income groups access ex-ante riskier mortgages. We focus on two originating credit conditions: The Originating Loan to Value Ratio (OLTV) and the origination ratio of the loan balance to gross household income (OLTI). Both of these credit conditions have been shown in Kelly, O’Malley, and O’Toole (2015) to be associated with ex-post mortgage default. In this section we focus solely on the First Time Buyer (FTB) cohort of borrowers.

<sup>2</sup>This industry research is reported on [here](#), in the Irish Independent, 7 June 2016.

Figure 5 plots average OLV for each group between 2000 and 2014. The first and second income quintile are grouped together given that the small number of mortgages in the first income quintile leads to statistically noisy average annual estimates. From Figure 5 it is clear that those on lower incomes take out *less risky* mortgages by this metric: during the period 2000–2007, average OLV among the first and second quintiles was between 50 and 60 per cent. By contrast, OLV rose consistently for those in the 3rd quintile from 60 to 75 over the same period, while those in the 4th and 5th quintile had a similar trend increase starting from a higher base, with average OLV among both groups surpassing 80 in 2006. In the post-crisis period, the pattern of riskier mortgages among those on higher incomes has persisted, although the level differences in OLV across the income quintiles is not as pronounced as in the pre-crisis period.

Figure 6 presents the average Originating Loan to Income (OLTI) ratio across the income quintiles from 2000–2014. By this measure, the pattern is reversed relative to Figure 5: higher-income borrowers have in all years taken out *less risky* mortgages. The liberalization of credit conditions in the Irish market is clearly visible in this graph, with average OLTI rising significantly among all groups from 2000 to 2006/2007. Those in the top income quintile had OLTI of under 2 in 2000, rising to 3 by 2006, and standing at 2.4 by 2014. Those in the 4th quintile experienced increases from 2.4 to 3.8, followed by a retrenchment to 2.6 over the same time frame. For those in the bottom 60 per cent of the population income distribution, riskier mortgages have in all time periods been more common place, with average OLTI reaching 4.5 in some cases in the period preceding the financial crisis.

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## 6 Conclusion

We have documented how mortgage originations in Ireland between 1994 and 2014 were spread across the population income distribution. We highlight a pronounced period of financial liberalization from 1994 to 2007 where a continued fall in the share of those in the top income quintile in total mortgage originations was matched by a commensurate rise in the share of those in the 3rd income quintile. This pattern is shown to have been prevalent in both the First Time Buyer (FTB) and Previous-Owner mortgage markets. In all cases, those in the bottom 40 per cent of the population income distribution have a mortgage market share of close to ten per cent or under.

We highlight that the tendency towards concentration among those on middle incomes has been partially reversed since the financial crisis. In the FTB segment, the market share of those in the top income quintile has risen from 12 to 19 per cent since 2008, while that of the middle quintile has fallen from 42 to 33 per cent. In the Previous-Owner market, where negative equity in the aftermath of the financial crisis has had pronounced impacts on households' ability to move, a more stark pattern has emerged, with the share of originations going to the top income quintile rising from 28 to 63 per cent between 2008 and 2014.

We further show that the Buy to Let market has exhibited a stable income profile: in all years between 1994 and 2014, with the market share of the top income quintile has been permanently between 55 and 65 per cent.

Finally we document the evolution of Originating Loan to Value and Loan to Income ratios across the income distribution. For First Time Buyers, we show that those on higher incomes have consistently accessed higher-LTV mortgages, but with lower LTIs, with this pattern persisting through the expansionary and contractionary phase of the housing cycle.

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## Tables and Figures

Figure 1: Mortgage originations by population income quintile, All Mortgages, 1994 to 2014.

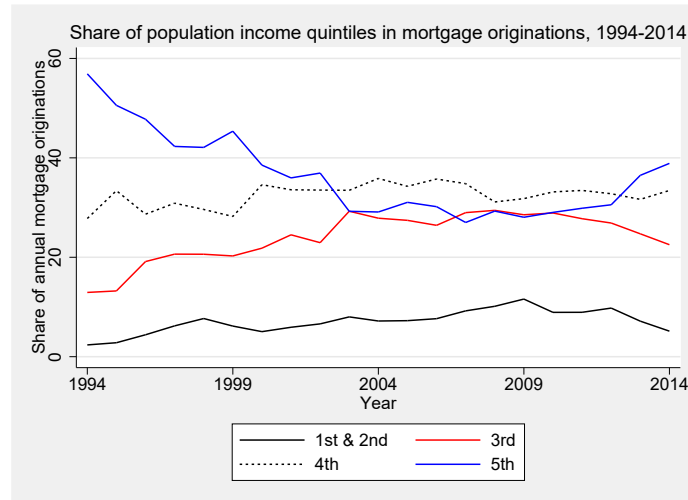


Figure 2: Mortgage originations by population income quintile, First Time Buyers, 1994 to 2014.

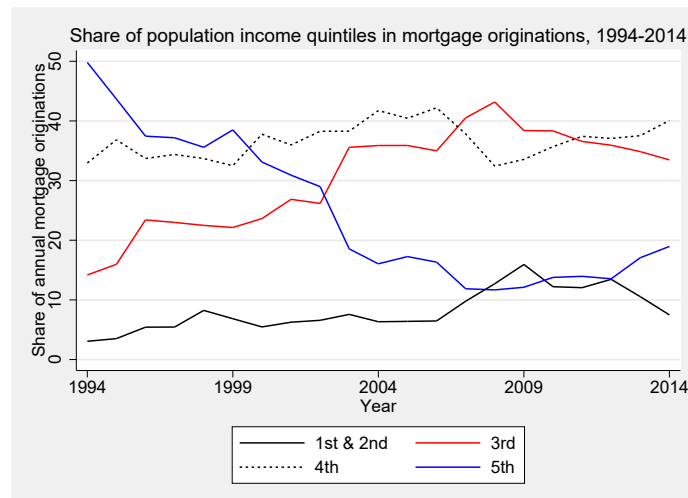


Figure 3: Mortgage originations by population income quintile, Previous-Owners, 1994 to 2014.

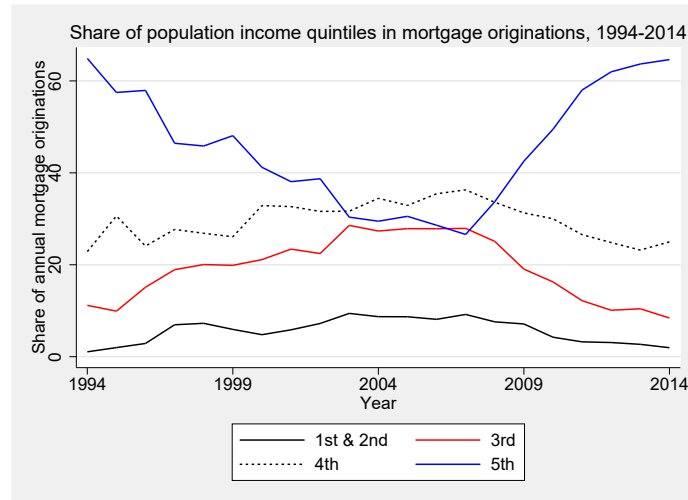


Figure 4: Mortgage originations by population income quintile, Buy to Let, 1994 to 2014.

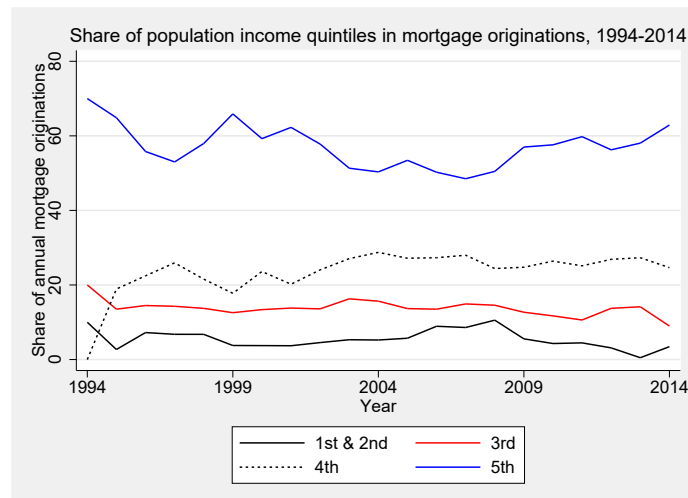


Figure 5: Originating Loan to Values by population income quintile, First Time Buyers, 2000 to 2014.

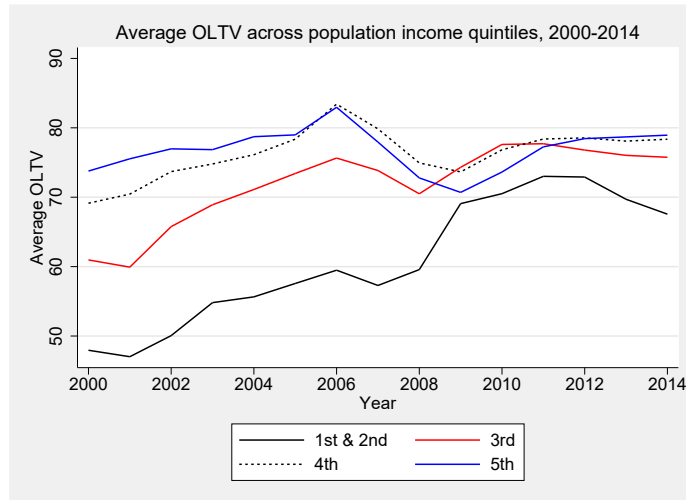


Figure 6: Originating Loan to Incomes by population income quintile, First Time Buyers, 2000 to 2014.

