Financial Stability Notes

Mortgage Repayment Affordability across the Income Distribution

Jane Kelly & Elena Mazza

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Abstract

Mortgage affordability can be measured in various ways including on the basis of the monthly serviceability of the mortgage relative to income (MSTI). Using Irish micro data, we show that the resilience of borrowers has improved on this basis, especially lower income borrowers who no longer have the highest mortgage service burdens relative to net income, in contrast to the pre-crisis period. We find that higher MSTI levels are generally correlated with higher default rates, especially among lower income groups. When measuring mortgage instalments relative to residual income after reasonable living expenses, we again see a big reduction relative to 2008, with lower income borrowers exhibiting the biggest improvement in affordability.

1   Introduction

Housing affordability remains a key issue in Ireland at present, both in the mortgage and rental markets, with various initiatives aiming to address the housing shortfall and price pressures in these markets.[1] In the mortgage market, one can measure affordability in various ways, including the monthly serviceability of the mortgage relative to income (MSTI).[2]

[1]For example: Rebuilding Ireland, Action Plan for Housing and Homelessness, RTB Rent Pressure Zones

[2]The Irish macroprudential authority regulates loan to income (LTI) at origination while also monitoring other indicators of household vulnerability. For more information on the overlap between MSTI and LTI (see Kelly and Mazza (2019)). For details of the mortgage measures see Mortgage Measures.

There is no universally agreed definition of what constitutes an affordable mortgage but the literature on over-indebtedness broadly reflects four criteria: making high repayments relative to income, being in arrears, making heavy use of credit and finding a debt burden excessive (D'Alessio and Iezzi, 2013).[3] One commonly used threshold is spending 30% or more of income on housing costs (Quigley and Raphael (2004)); this is often combined with a borrowers' collocation in the lowest 40% of the income distribution (Wood and Ong (2010); Baker et al. (2015); Borrowman et al. (2017)). Varying working definitions are also in use among Irish policy institutions.[4]

The purpose of this note is to examine how mortgage service burdens on newly issued mortgages have evolved for different population income cohorts over time. We illustrate a substantial improvement in borrower resilience, as targeted by the Central Bank's mortgage measures, with particularly large improvements among lower income borrowers. Using loan level data on Irish residential mortgages, we estimate two measures of MSTI. The first one calculates MSTI as the ratio of monthly mortgage instalments to income net of taxes and social insurance contributions (hereon 'net income'); the second one deducts an estimate of minimum living expenses (hereon 'disposable income') from the net income measure.

Our main findings are as follows. Average MSTIs on newly issued mortgages are much lower now than pre-crisis, especially among lower income borrowers. Lower income borrowers had the highest mortgage service burdens relative to net income pre-crisis. For example, in 2008, borrowers from the two lowest population income quintiles were spending on average just over a third of their net monthly income on servicing their mortgage at origination, compared to about a quarter for borrowers in the top income quintile.

By 2019H1, borrowers were spending on average between a fifth and a quarter of net income, with lower income groups spending slightly less on average than higher income groups. The reduction in MSTI since the crisis reflects a combination of lower LTI levels, including the impact of the mortgage measures in recent years, as well as lower interest rates (Kelly and Mazza, 2019).

When measuring the mortgage relative to residual income after reasonable living expenses, we again see a big reduction relative to 2008, with lower income borrowers exhibiting the biggest improvement in resilience to potential shocks, although they still have less remaining 'disposable income' on this measure compared to higher income borrowers.

Potential risk transmission channels from MSTI to the real economy include default and lower consumer spending. We find that, in general, higher MSTI levels relative to net income

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[3]Alternative measures also include the number of loans a borrower has (D'Alessio and Iezzi (2013)).

[4]See Alleweldt et al. (2013) Part 2 report for an overview of definitions in use. In Ireland, the definition is used for instance by the Economic and Social Research Institute, Money Advice and Budgeting Services (MABS), Think-Tank for Action and Social Change (TASC) and Combat Poverty Agency.

are correlated with higher default rates. In the past, lower income borrowers with higher MSTI levels had among the highest default rates on average, again highlighting the vulnerability among this group in the run-up to the crisis.

Our analysis adds important insights on the affordability of newly issued mortgages for different population income cohorts through time. This allow us to better understand why certain groups were so exposed to the income shocks (and unemployment) that arose during the crisis. The mortgage measures effectively cap mortgage servicing burdens for an average interest rate and an average term, meaning new borrowers, including those on lower incomes, are spending a smaller proportion of their income servicing their mortgage, increasing resilience to potential shocks.

2   Data

Throughout this analysis mortgage service burdens refer to origination features of newly issued mortgages. MSTI is calculated as the ratio of the mortgage instalment to borrowers' estimated net monthly income at origination.[5] To explore the idea of hypothetical mortgage service under stress, we also estimate a second measure (hereon 'disposable income'). This is calculated as the net monthly income remaining after deducting a minimum level of living expenses, based on the guidelines provided by the Insolvency Service of Ireland (ISI). Under the ISI model, Reasonable Living Expenses (RLEs) are the expenses a person necessarily incurs to achieve a reasonable standard of living.[6]

Our micro dataset consists of just over 300,000 observations from the Irish residential mortgage market covering the time period between 2003 and the first half of 2019, as described in Kelly & Mazza (2019).[7] The dataset also includes information gathered in 2017 regarding the status of each loan remaining on the banks' balance sheet. Namely, whether the loan has ever been in default since 2011 or whether non-defaulted.

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[5]We apply tax rates and social insurance contributions to the gross income measure contained in the data. We do not account for mortgage interest relief which could potentially overstate effective MSTI burdens in earlier years.

[6]ISI provides a detailed breakdown of RLEs under diverse circumstances: marital status, number of kids, possession of a vehicle, for instance. Due to the limited information available in our dataset we follow the guideline of ISI and include a short additional set of assumptions to calculate RLEs for borrowers. To estimate the 2008 RLE (i.e. prior to the introduction of the guidelines) we adjust the 2018 RLEs according to price growth.

[7]The data include both borrower-level and loan-level information, e.g. age, borrower status (First Time Buyer (FTB), Second and Subsequent Buyer (SSB), Buy-to-Let (BTL)), loan size, deposit etc. We are mainly interested in newly originated loans for private dwelling homes (PDH) and therefore we exclude top-up loans, mortgage switchers and BTL loans.

To benchmark the incomes of mortgage borrowers relative to the wider population, we use data from the CSO Survey of Income and Living Conditions (SILC ISSDA).[8] Specifically, we use the CSO SILC survey data to calculate population income quintiles for each survey year, based on the gross incomes of all households in that year. For each origination year, we then match the gross incomes of newly mortgaged households to the population income data. This allow us to place every new mortgage borrower in a quintile of that origination year's population income distribution. It also means we only observe low income households who manage to obtain a mortgage.

3   MSTI evolution over time and across income bands

In this section, we consider the variation in origination mortgage service burdens across the population income distribution for the years 2008 and 2019H1. We do this using our 'net income' and 'disposable income' measures. Our rationale is to better understand the role that mortgage servicing burdens may have played in subsequent defaults and to identify if any cohorts of the population are more vulnerable to potential future shocks.

In 2008, based on net income, we find that the two lowest income quintiles had the highest debt burdens (Figure 1). This illustrates the vulnerability of low-income borrowers immediately prior to the financial crisis. For example, on average borrowers from the lowest forty percent of the population income distribution were spending just over a third of their net monthly income on servicing their mortgage at origination , compared to about a quarter of net income for those from the top quintile.

This is before any other debt servicing payments (e.g. credit cards or car loans) or other housing related living expenses (e.g. utility bills, insurance etc.). For those who subsequently suffered income shocks during the crisis, mortgage repayment burdens would have increased further. Indeed, Corrigan et al. (2018) finds that 'current' mortgage repayment burdens increased over time and that this was especially acute for those in the lowest 25 per cent of the income distribution.[9]

By 2019H1, the burden on lower income borrowers had improved the most (Figure 2) and the differences across income quintiles were no longer material.[10] This in part reflects the impact of the mortgage measures, with the LTI limits providing an effective cap on mortgage

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[8]See CSO Survey on Income and Living Conditions (SILC) 2017 for example. We estimate the data for 2017 to 2019 using CSO average hourly wages.

[9]'Current' mortgage service burdens generally differ from origination MSTI as both income and loan value may change after origination due to income growth, unemployment shocks, amortisation etc.

[10]Borrowers from the second population income quintile were spending roughly a fifth of net income on servicing their mortgage compared to just under a quarter for those in the top income quintile.

service burdens as previously noted.

Another way to look at over-indebtedness is whether income remaining after housing costs allows the household some reasonable minimum level of consumption. One might expect that households lower down the income distribution would have less capacity to reduce spending when faced by an income shock. We measure 'disposable income' as the net monthly income remaining after deducting the appropriate RLE level for each household type. We then recalculate MSTI as the ratio of mortgage repayments to this 'disposable income'.[11]

On this basis, we observe more significant variation in our measure of vulnerability by population income quintile. Again it is worth noting here that we only observe lower income households who manage to obtain a mortgage. There are very few borrowers from the first population income quintile and they have no remaining income on the basis of our approximations. They are therefore excluded from the chart for the sake of readability. The MSTI distribution of borrowers in the second and third lowest population income quintiles are the most skewed rightwards meaning these borrowers spend the highest share of their "disposable income" on mortgage repayments both in earlier years (Figure 3) and in 2018 (Figure 4) and therefore have less income available to absorb shocks. In relative terms, however, the lower income group has exhibited the biggest improvement over time.

Specifically, in the lower income quintiles in 2008, some borrowers were spending close to all of their income after expenses on their mortgage, whereas in 2019H1 it is uncommon for households at any point to spend more than half of their available income on their mortgage.

The improvement in these MSTI distributions, irrespective of the metric, is consistent with the lower level of LTIs and interest rates over time. This improvement in resilience has been accompanied by a change in borrower composition, however. Borrowers from the two lowest population quintiles accounted for 10 per cent of new mortgages in 2008 but half of that in 2018 and in 2019 (first half). By contrast, the share of borrowers from the top two income quintiles rose from just over half to almost three quarters over the same period. This continues the longer term decline in share of lower income borrowers documented in Lydon and McCann, who show that the bottom two income quintiles account for at most 12 per cent of mortgage originations between 1994 and 2014, falling to 6 per cent by 2014.[12]

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[11]Higher-income borrowers are likely to have higher living expenses, i.e. they spend much more than the other borrowers, which means that their overall spending burdens may be just as proportionally big as those of lower-income groups, however, the point here is to illustrate that it may be possible for higher-income borrowers to adjust their spending downward by more in a shock scenario.

[12]During the boom, there was an expansion in lending to borrowers in the middle income quintile and a reduction for the top income quintile, both of which subsequently reversed as credit conditions tightened.

4 MSTI and ex-post default

Potential risk transmission channels from MSTI to the real economy include default and lower consumer spending. While the relationship between LTI and default has long been established in Ireland (see Kelly and O'Malley (2016), Lydon and McCarthy (2013), McCarthy (2014), Kelly et al. (2014)), the role of MSTI and default has received far less attention.[13] Many studies suggest low income households are more vulnerable to default when over-indebted than high income households.[14] Therefore, in this section we examine the relationship between origination MSTI and default and position in the income distribution.

We first examine the probability of defaulting between 2011 and 2017 for loans issued in 2006, 2007, 2008 and 2009 at varying MSTI levels (based on net income). The percentage of loans that have ever defaulted in the past generally increases as we move up to higher MSTI bands (Figure 5).

For example, around a fifth of loans issued in 2007 with a MSTI of between 15 - 20 per cent have ever defaulted compared to around a third of those with a MSTI of over 35 per cent. However, the percentages of loans that have ever defaulted are also clearly dependent on the year of loan origination, with loans issued in 2009 (by which time credit conditions had already tightened) having much lower default rates across the board. Moreover, there is no single MSTI 'threshold' level above which credit risk jumps discontinuously.

Next, to delve into any variation across the income distribution, we create a heatmap of average default rates for different combinations of MSTI and population income quintiles of loans originated in 2008. Figure 6 shows these unconditional results for combinations of MSTI and income bands. This is created by crossing the three MSTI bands with the three income bands to create nine categorical groups and calculate average default rates per group. The highest default rates occur, on average, for borrowers with the low or medium income and the highest MSTI. For example, among loans originated with an income in band 1 or 2 and MSTI in band 3, the average default rate was 25 to 27 per cent, see Figure 5.

These results highlight the need to ensure that borrowers who enter the mortgage market can afford the repayments.

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[13]Corrigan et al. (2018) study the relationship between current mortgage service burdens and default but not on newly issued mortgages.

[14]For example, Alleweldt et al. (2013).

5 Conclusion

Looking at measures of mortgage serviceability relative to net income, we document that lower income borrowers, who had the highest mortgage service burdens pre-crisis, are no longer shouldering the highest MSTIs and are therefore in a better position to afford their mortgages and maintain levels of consumption and saving while repaying their loans.

In 2008, new borrowers from the two lowest population income quintiles were spending on average 34 to 35 per cent of their net monthly income on servicing their mortgage, compared to about a quarter for borrowers in the top income quintile. Spending 30 per cent or more of income on debt repayments, along with collocation in the lowest 40 per cent of the income distribution, is a commonly used threshold to determine affordability and is among the many possible criteria to identify over-indebtedness.

By 2019H1, on average, new borrowers were spending between a fifth and a quarter of net income, with lower income groups spending slightly less on average than higher income groups on a net income basis. The mortgage measures provide an effective cap on mortgage servicing burdens for an average interest rate and an average term, providing borrowers with a greater degree of resilience to shocks.

If we deduct estimated minimum living expenses, however, we still observe substantial variation, with lower-income households having less income available to absorb shocks. Irrespective of the metric, though, these distributions are much healthier than in 2008 and lower income borrowers have experienced the biggest relative improvement.

Our analysis of MSTI and default rates brings further evidence to the existence of a relationship between the two: we find that, in general, as borrowers have higher levels of MSTI at origination, default rates rise. We would therefore expect higher degrees of resilience to shocks in light of the healthier distribution of MSTI across the income distribution.
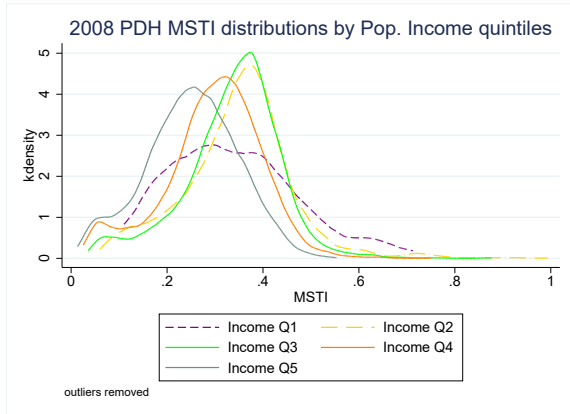
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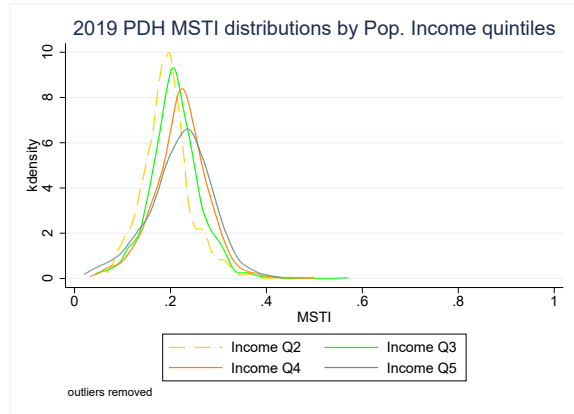
Figures and Tables

Figure 1 | Origination MSTI per quintiles of population income 2008
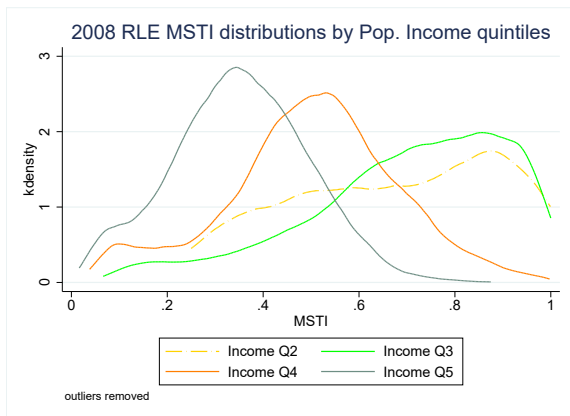

Source: Central Bank of Ireland, MTD data.

Figure 2 | Origination MSTI per quintiles of population income 2019H1
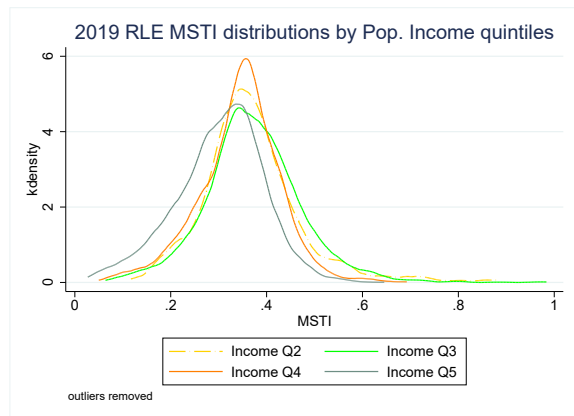

Source: Central Bank of Ireland, MTD data.

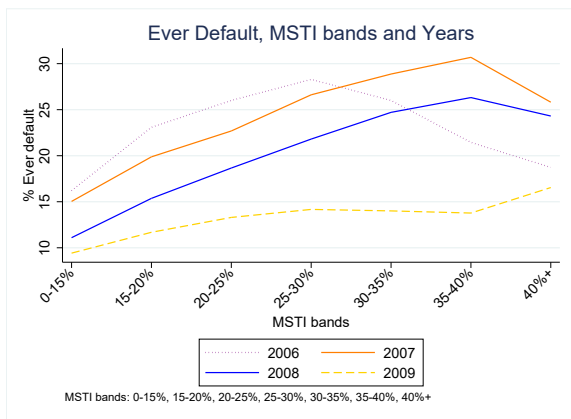## Figure 3 | Origination MSTI per quintiles of population disposable income 2008

Source: Central Bank of Ireland, MTD data.

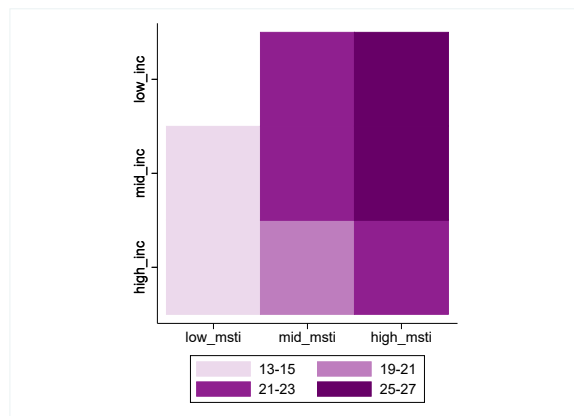## Figure 4 | Origination MSTI per quintiles of population disposable income 2019H1

Source: Central Bank of Ireland, MTD data.

Figure 5 | **Share of loans defaulting from 2010 to 2017, by origination year**

Source: Central Bank of Ireland, MTD data.

Figure 6 | **Heat Map, loans originated in 2008: unconditional combinations of MSTI and income**

Source: Central Bank of Ireland, MTD data.