



Some defaults are deeper than others: Understanding long-term mortgage arrears



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ABSTRACT

The 2007–2008 financial crisis yielded a significant number of delinquent mortgage loans, which ordinarily would have faced foreclosure and repossession. However, given the negative externalities of repossession, policy response has shifted towards forbearance and mortgage modification, which has led to longer spells in default for delinquent mortgage holders. It is therefore imperative to move beyond binary models of default towards an understanding of the factors that drive the depth of default spells. Exploiting a highly detailed dataset on financially distressed households in Ireland in 2012 and 2013, we are able to identify the impact of a range of *current* household-level factors, generally not available in loan-level studies of mortgage default, on the probability of entering early and deep states of mortgage default. Our results suggest that high loan-to-value ratios, consumer credit growth, shocks to mortgage affordability and unemployment should all trigger serious concerns among policy makers regarding subsequent stability in the mortgage market, with these measures all shown to have differentially large impacts on entry to deep, relative to early-stage arrears.

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1. Introduction

The importance of the mortgage market to the banking system¹ and the economy at large cannot be overstated given the central role played by misguided mortgage lending in precipitating the 2007–2008 financial crisis. The fallout from this crisis was a tranche of borrowers with unaffordable loans. Globally, governments have responded through intervention, for example the Home Affordable Modification Program (HAMP) introduced in the US, which aimed to minimize the negative externalities associated with foreclosure (Campbell et al., 2011; Guiso et al., 2013 and Mian et al., 2011), and the Central Bank of Ireland's Mortgage Arrears Resolution Targets (MART) program. Remarkably, while there is a large stock of literature investigating the causes of default, there is scant empirical evidence on the extent to which the group of defaulted borrowers are heterogeneous in their responses to equity and affordability shocks. An understanding of these differences

is of vital importance in evaluating the likely effectiveness of modification policies such as HAMP and MART, and in identifying patterns that should trigger concerns for potential repayment difficulties in the mortgage market.

In this paper we move beyond the typical binary treatment of mortgage default to consider deeper levels of mortgage default as distinct states.² Specifically, in our baseline model we take a sample of roughly twenty thousand financially distressed households in Ireland, and model the probability of default (greater than three missed payments, or ninety days past due) and deep default (greater than twelve missed payments, or three hundred and sixty days past due) relative to the probability of being in the early stages of mortgage arrears. We show that our results are not simply explained by the duration since the onset of a negative economic shock, but that our explanatory factors capture the ability and willingness of households to repay their mortgage.

The results of our baseline model suggest that households experiencing an unemployment shock or a divorce have a three and two percentage point higher probability of deep default, respectively.³ We show that the affordability of a mortgage is a crucial

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¹ Jorda et al. (2014) have shown that the relative importance of mortgage lending in the activity of retail banks has increased unrelentingly since the 1950s, to the point where mortgages represent the majority of bank lending in most developed economies.

² See Table A.1 for a classification of the ways in which default is defined in the economics literature.

³ The baseline probabilities of default and deep default in the estimation sample are 18% and 16%, respectively.

determinant of deep mortgage defaults, with a one-standard-deviation increase in the monthly debt service ratio (DSR, measured as the ratio of mortgage repayment to net income) leading to a two percentage point increase in the probability of deep default. However, we extend the literature's understanding of the role of affordability in mortgage default by showing that it is the *shock* to mortgage affordability which is the most important factor: when the change in DSR between origination and our sample period is included, it is this affordability shock which drives entry to deep default, while the level of the DSR loses its statistical significance.

Borrowers' non-mortgage leverage is also shown to play an extremely important role in driving long-term mortgage distress, with a one-standard-deviation increase in non-mortgage debts (either measured as a ratio relative to total debts or relative to income) leading to an increase of between 1 and 3 percentage points in the probability of deep default. Lower household incomes are also shown to have explanatory power in the deep default equation. Further, higher mortgage interest rates are also shown to be associated with higher probabilities of both default and deep default. These findings provide a crucial insight for policy-makers both in non-crisis times and when designing responses to a mortgage arrears crisis: shocks to borrowers' ability to repay are crucial drivers of mortgage arrears, and are more likely to lead borrowers to deeper states of default, where any recovery to full repayments is extremely unlikely.⁴

In our baseline model, we find that housing equity has a similar impact on the depth of mortgage default to a household unemployment shock. Recent studies from Gerardi et al. (2013), Guiso et al. (2013) and Bhutta et al. (2010) suggest that affordability shocks such as unemployment and income shocks are the economically more important factor in explaining mortgage default, with extremely large falls in housing equity required before "strategic default" becomes likely.⁵ Our finding suggests that the "double trigger" hypothesis appears to hold when considering long-term mortgage arrears during the Irish crisis, with both equity and affordability problems playing a role.

The post-2008 economic and policy climate in Ireland provides an ideal environment for a study that differentiates mortgage defaults according to their depth of arrears. Firstly, the sheer scale of the mortgage arrears crisis has few historical precedents, with the number of accounts in arrears rising from roughly 50,000 to 150,000 between 2009 and 2013, with the peak level representing 18% of all primary residential mortgages (Fig. 1a). Further, and more importantly from the point of view of this study, the composition of households in mortgage arrears has shifted through the crisis, with half of all accounts in arrears being in arrears of greater than one year (deep default) by end-2013 (Fig. 1b).

This build-up in the number of mortgages in deep default has been caused in part by the significant policy uncertainty that existed in Ireland between 2009 and 2013. A legal judgment passed in 2009 rendered the repossession of homes in default extremely difficult, with the legal uncertainty only fully eradicated in 2013. Further, due to the scale of the crisis in Irish banks and public finances, and the state's role in recapitalizing the country's main mortgage lenders, the period was characterized by a high degree of uncertainty around the likely debt write-downs that might be received by distressed mortgage borrowers. These policy and political factors led to a situation where properties entered deeper states of mortgage arrears, with no move toward repossession on

the part of lenders. It is highly likely that in jurisdictions with more clarity around the foreclosure process, a large number of these properties would have been repossessed, thus exiting the system and placing downward pressure on the aggregate number of accounts in arrears.

The distinction between deep and early mortgage default has a number of crucial policy dimensions. Kelly and O'Malley (2016) and McCann (2014) have shown that the depth of mortgage arrears has an extremely strong negative association with the probability of loan cure (a return to full repayment). In the case of Ireland, Kelly and O'Malley (2016) show that the probability of loan cure for loans in default of three months is more than four times larger than the probability for loans in default of twelve months. These diminished cure probabilities have a number of important implications. From a prudential perspective, lower cure probabilities, especially if coupled with house price falls must be met with higher estimates of Loss Given Default (LGD), and subsequently higher loan provisions (Qi and Xiaolong, 2009). Lower cure probabilities also have social implications through their analogue, which is a higher probability of entry to foreclosure for loans that are not successfully modified. Heightened foreclosures exert significant distress on the homeowners in question, have negative implications for house prices in the locality (Gerardi et al., 2012), affecting performance of other local area modifications (Been et al., 2013) and place pressure on the public finances through the provision of social housing for those experiencing foreclosure.

Our paper builds on recent work that has exploited data on *current*, rather than at-origination measures of affordability such as household unemployment and income (Gerardi et al., 2013; McCarthy, 2014). Our study distinguishes itself from this previous work both in the focus on the depth of mortgage arrears, and in the nature of the dataset under study: both studies mentioned used survey data of between one and two thousand households, while our data set, on the other hand, contains information on twenty thousand households, with this information verified and audited by lenders before being used to assess the obligor's suitability for a modified mortgage.

The paper proceeds as follows: Section 2 explains our data sources, Section 3 describes our empirical approach, Section 4 reports regression results, while Section 5 concludes.

2. Data

Two data sources are used to construct the file used in our baseline estimation. The first is the Central Bank of Ireland's Loan Level Data (LLD). These files contain information on all loans issued by Irish banks participating in the 2011 Financial Measures Programme (FMP). In the case of the Irish residential mortgage market, these lenders account for roughly two thirds of the total market, making this a particularly rich source of data. The data have been explained in detail by Kennedy and McIndoe-Calder (2012) and used subsequently in a number of mortgage default analyses (Kelly, 2011; Kelly et al., 2014; Lydon and McCarthy, 2013; McCarthy, 2014). The data are concerned mainly with the terms of the *mortgages*, with reliable information on *inter alia* current mortgage balance, bank, current interest rate, interest rate type, origination and maturity dates, current loan to value ratio (LTV), First Time Buyer status (FTB), and property values at origination and at December 2013. Certain characteristics of the *borrower* are also reported in the data, such as marital status, geographic location, employment group, income and joint versus single assessment. These variables are all collected at the mortgage origination date.

As is the case in the majority of studies on mortgage default, the LLD suffers from an important omitted variable problem, given that *current borrower characteristics* are relatively scarce in the data. This problem arises from the fact that, in managing their mortgage

⁴ Internal Central Bank of Ireland research shows that when borrowers have entered into arrears of greater than one year, the probability of any repayment is below 20%, and falls even lower once borrowers enter arrears of more than two years.

⁵ Strategic default is generally considered to be a default that is explained by a loan amount that is larger than the market value of the property (referred to as negative equity, where the loan to value ratio rises above 100%).

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