

# Irish Residential Mortgage-Backed Securities – Preliminary Analysis of Loan-Level Data

Andrew Linn, Anne-Marie Kelly and Samuel Bailey<sup>1</sup>

## Abstract

The European DataWarehouse, established in July 2012, provides access to publicly available information on European Asset-Backed Securities (ABS). There was limited detailed information on the underlying securities in Irish Residential Mortgage-Backed Securities (RMBS) prior to this time. This loan-level dataset allows investors in ABS to analyse the underlying assets. It also facilitates a detailed economic analysis of the underlying mortgage characteristics of Irish RMBS. This dataset supplements other currently available Central Bank of Ireland data sources, allowing a comparative analysis to be performed. This article analyses the underlying mortgages in the Irish RMBS dataset, focusing on Loan-to-Value and Loan-to-Income ratios, and mortgage arrears.

<sup>1</sup> The authors work in the Life Insurance, Statistics, and Organisational Risk Divisions of the Central Bank of Ireland. The views expressed in this article are solely the views of the authors and are not necessarily those held by the Central Bank of Ireland or the ESCB. The authors would like to acknowledge, with thanks, the helpful comments and suggestions of Joe McNeill, Rory McElligott, Robert Kelly, Allan Kearns and John Flynn.

## 1. Introduction

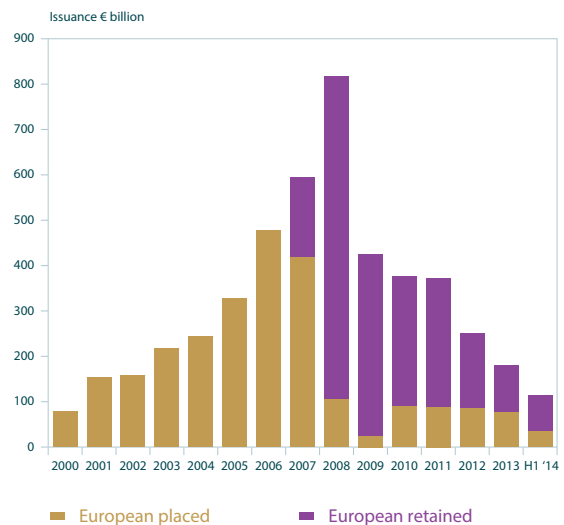
Irish credit supply developments since 2003, such as tracker mortgages, 100 per cent Loan-to-Value ratio mortgages, and mortgage equity withdrawal (MEW)<sup>2</sup>, contributed to the financial industry's risk exposure. The industry managed part of this additional risk through securitisation. These structures provide an income stream for investors from the performance of the underlying assets. An Asset-Backed Security (ABS) is a financial security backed by a specified pool of underlying assets. Residential Mortgage Backed Securities (RMBS) are a type of ABS, where the underlying asset is a packaged pool of mortgage loans, which is known as mortgage securitisation. This article analyses the Irish RMBS market using newly available data provided by originating financial institutions, with particular focus on the profile of the mortgages contained within the RMBS pools.

Section 2 gives an overview of the current Irish ABS market and the impact of the financial crisis. The introduction of loan-level data requirements for ABS and the establishment of the European DataWarehouse are discussed in Section 3. Section 4 examines the RMBS pooled mortgages in terms of the overall mortgage market. Section 5 analyses the key mortgage characteristics of the RMBS dataset's underlying loans, including Loan-to-Value and Loan-to-Income ratios highlighting the unique properties of this micro level dataset. Section 6 concludes.

## 2. Current Irish ABS Market

The financial crisis negatively impacted European ABS issuance levels, as highlighted in Chart 1. There was a large increase in ABS issuance from 2000 (€79 billion) to 2008 (over €800 billion), when ABS was regularly used as

Chart 1: European ABS Issuance



Source: AFME Securitisation Data Report Q4 2013, and AFME Securitisation Data Snapshot Q2 2014.

a source of funding by banks and as collateral for inter-bank lending. This dropped sharply to €424 billion in 2009, following the subprime mortgage crisis<sup>3</sup> that led to deterioration in the underlying mortgages, and a reduction in the quality and ratings of the ABS. These developments led to significant negative market sentiment towards these instruments. From 2008 onwards, issuers retained the majority of ABS issuance for use as collateral within the Eurosystem, rather than issue them into the market<sup>4</sup>, as shown in Chart 1. Some originators issued deals into the market but subsequently repurchased them as market conditions deteriorated, and deal dynamics changed.

Irish RMBS issuance remains subdued post-crisis, with only two cases of RMBS issuance backed by Irish assets since 2010. This is in line with European trends. Additionally, credit enhancements (CE)<sup>5</sup> levels such as subordinated tranches of the ABS structure,

<sup>2</sup> Mortgage equity withdrawal (MEW) is equity that mortgage borrowers withdraw against the real/market value of the property.

<sup>3</sup> A fall in house prices triggered the subprime mortgage crisis, leading to a large amount of lower credit quality mortgages (subprime) defaulting or entering into distress.

<sup>4</sup> From 2000-2005, data on the European ABS issuance split between retained and placed, was not available.

<sup>5</sup> CE refers to any method of improving the credit profile of an ABS transaction, and may include techniques that are internal to the transaction such as subordination or over-collateralisation, and external options such as the maintenance of a cash collateral account. The CE is the sum of the lower ranked tranches of the structure divided by the pool balance, and broadly implies that this amount is available to cover losses.

available to absorb losses, have increased since issuance (by between 2 per cent and 36 per cent<sup>6</sup>), reflecting the underlying loan pool's deterioration. Credit enhancements reduce the risk to investors in ABS structures and can take various forms, such as over-collateralisation or the inclusion of higher levels of subordinated or equity tranches designed to absorb losses that arise.

### 3. The ABS Loan-Level Data Initiative

#### 3.1 Rationale

The increased use of ABS as collateral in the Eurosystem, and the increasingly negative investor perception of ABS following the financial crisis prompted a policy response from the Eurosystem. This involved the provision of loan-level data on the assets underlying ABS to improve the functioning of this market segment. The Governing Council decided, in December 2010, to establish loan-by-loan level reporting requirements for ABS within the Eurosystem collateral framework. The two key aims of the initiative were:

- To facilitate a more detailed risk assessment of ABS used as collateral by Eurosystem counterparties in monetary policy operations;
- To improve transparency in ABS markets, by requiring that loan-level ABS information be available and accessible to investors and market participants.

The Eurosystem was ideally placed to incentivise issuers to provide loan-level data on ABS. It made data provision an eligibility requirement for assets used as collateral in

open market operations<sup>7</sup>. Currently, ABS represent 15.2 per cent of total collateral submitted to the Eurosystem<sup>8</sup>, compared to covered bonds and government debt securities at 18.2 per cent and 16.6 per cent, respectively. In 2010, when the loan-level data initiative was first established, ABS represented 24.4 per cent of total collateral pledged.

#### 3.2 The European DataWarehouse

In December 2009, the Eurosystem consulted publicly on the establishment of loan-level data requirements. Industry responses<sup>9</sup> were very supportive of the initiative, citing the resulting increase in transparency, and the contribution that the initiative would make in restoring investor confidence in the ABS market. Some respondents noted that ABS originators' additional compliance costs, resulting from internal systems changes, would be far outweighed by the benefits of having loan-level information publicly available to investors, the Eurosystem, and other market participants.

Inputs were sought for the development of the reporting templates, from key industry participants (issuers, rating agencies, and industry organisations<sup>10</sup>), the ECB, and several NCBs.

In July 2012, the European DataWarehouse (ED) was established as the initiative's data-handling platform, to manage, store, and monitor<sup>11</sup> the loan-level data submissions provided by ABS originators. The ED is independent of the ECB, and global market participants provide governance and funding. Reporting to the ED of loan-level data for RMBS and ABS backed by loans to small- and medium-sized enterprises (SMEs) started on 3 January 2013. Commercial Mortgage-Backed Securities (CMBS) followed on 1 March 2013, and

<sup>6</sup> Using 15 Irish RMBS issued by EBS Ltd, KBC Bank Ireland plc, Ulster Bank Ireland Ltd and Permanent tsb plc.

<sup>7</sup> Open market operations refer to the provision of central bank liquidity via operations of varying maturities in order to effectively implement monetary policy on behalf of the Eurosystem.

<sup>8</sup> Data at Q2 2012. Source: ECB collateral data, <https://www.ecb.europa.eu/paym/coll/html/index.en.html>

<sup>9</sup> Results of the public consultation: <http://www.ecb.europa.eu/pub/pdf/other/consultationabsloanlevelinformationen.pdf?a09dde00472de7a4f3f665961a5a0094>

<sup>10</sup> List of shareholders: [http://www.eurodw.eu/a\\_brief\\_history.html](http://www.eurodw.eu/a_brief_history.html)

<sup>11</sup> Please note the monitoring role of the ED relates to data quality only, and the DataWarehouse has no remit to impose eligibility requirements on issuers.

**Table 1: Stylised Facts between Total Market and RMBS Population**

	<b>Total Market</b>	<b>RMBS Population</b>	<b>% Cover</b>
<b>No. of Mortgages</b>	907,140	231,506	26
<b>Current Balance € billion</b>	135.89	39.7	29
<b>Average Current Balance €000</b>	149.80	171.49	-
<b>No. of Mortgages in Arrears</b>	171,578	51,428	30
<b>% of Mortgages in Arrears</b>	0.19	0.22	-
<b>Arrears Balance € billion</b>	3.97	0.75	19
<b>Average Arrears Balance €000</b>	23.14	14.58	-
<b>Current Balance for Mortgages in Arrears € billion</b>	34.29	10.58	31
<b>% of Mortgages 'Tracker or SVR'</b>	92	94	-
<b>% of Mortgages 'Fixed or Other'</b>	8	6	-

reporting for the remaining asset classes started in the first quarter of 2014<sup>12</sup>. The Eurosystem requires a data score<sup>13</sup> for each ABS, in order for the assets to remain eligible as Eurosystem collateral. In addition, data consistency and accuracy checks on each loan-level data submission are carried out to ensure that data quality remains high.

#### 4. Market Coverage

The Irish RMBS dataset include securities issued by Permanent tsb plc (PTSB), KBC Bank Ireland plc, Ulster Bank Ireland Ltd, and EBS Ltd. Covered bond legislation led to Allied Irish Bank plc (AIB) and Bank of Ireland (BoI) retaining the majority of their mortgage issuance on balance sheet. They are, therefore, not included in the RMBS dataset analysed. As such, this article provides new information about smaller domestic and foreign-owned banks. While the data provides a valuable insight into time trends of key variables, caution is required when extrapolating findings to the banking sector as a whole, as the excluded banks could have significantly different lending profiles.

A comparative analysis with the aggregate Central Bank of Ireland mortgage arrears dataset establishes the share of the market represented by the RMBS dataset. This aggregate Central Bank mortgage arrears dataset, or total market data<sup>14</sup>, presents a macro level analysis of all mortgage loans in the country, and related trends over time, while the RMBS dataset<sup>15</sup> provides only partial coverage of the market. This coverage of the RMBS loan-level is outlined for particular mortgage characteristics in Table 1.

The stylised facts in Table 1 show that the RMBS dataset accounts for 26 per cent of all mortgages. A further breakdown analysis shows the average current balance for mortgages in the RMBS dataset is higher, at €171,490, compared with the average current balance in the aggregate Central Bank data, €149,800. The RMBS loans account for 30 per cent of mortgage arrears, or 19 per cent when compared by arrears balance. This shows that mortgages in arrears contained within the RMBS pools have a smaller mean arrears balance than the aggregate Central Bank data, €14,580 and €23,140, respectively. Given the

<sup>12</sup> Loan-level reporting for Consumer Finance, Leasing, and Auto ABS started on 1 January 2014, and for Credit Cards ABS on 1 April 2014.

<sup>13</sup> The data score for an ABS is generated by the ED after each regular data submission, and is based on the level of completion of the mandatory data fields in the loan-level reporting template. The RMBS template contains 69 mandatory and 113 optional fields.

<sup>14</sup> The aggregate residential mortgage arrears and repossessions dataset for all regulated entities in Ireland, at March 2014: [http://www.centralbank.ie/polstats/stats/mortgagearrears/Documents/2014q1\\_ie\\_mortgage\\_arrears\\_statistics.pdf](http://www.centralbank.ie/polstats/stats/mortgagearrears/Documents/2014q1_ie_mortgage_arrears_statistics.pdf)  
<http://www.centralbank.ie/polstats/stats/cmab/Pages/HouseholdCredit.aspx>

<sup>15</sup> The RMBS loan-level dataset includes data from Permanent tsb plc, KBC Bank Ireland plc, Ulster Bank Ireland Ltd, First Active Bank and EBS Ltd, at February 2014.

**Table 2: Loan-Level and RMBS Mortgages by Geographical Location**

IE Code	Region	Counties	Loan-Level dataset (%)	RMBS dataset (%)
IE011	Border	Cavan, Donegal, Leitrim, Louth, Monaghan, Sligo	10	14
IE012	Midland	Laois, Longford, Offaly, Westmeath	5	6
IE013	West	Galway, Mayo, Roscommon	9	6
IE021	Dublin	Dublin, (Dun Laoghaire-Rathdown, Fingal, South Dublin)	29	30
IE022	Mid-East	Kildare, Meath, Wicklow	9	14
IE023	Mid-West	Claire, Limerick, North Tipperary	14	8
IE024	South-East	Carlow, Kilkenny, Waterford, Wexford, South Tipperary	15	11
IE025	South-West	Cork, Kerry	9	11

higher average outstanding balance and lower average arrears of mortgages in RMBS pools, caution must be exercised when applying RMBS characteristics to the entire mortgage market.

The majority of mortgages in the aggregate Central Bank data and the RMBS population have ‘Tracker or Standard Variable Rate (SVR)’ interest rate types<sup>16</sup>. The equivalent figures are 92 per cent for the Central Bank aggregate data, and 94 per cent for RMBS mortgages. The RMBS dataset shows six per cent of mortgages having a fixed interest rate, with an equivalent figure of eight per cent for the total market<sup>17</sup>.

The classification system has limited information on the interest rate types in the RMBS dataset. Little can be inferred with respect to this variable, as responses received from the financial institutions contacted<sup>18</sup> show differing reporting across interest rate types for tracker mortgages. However, the aggregate Central Bank data shows that of the 92 per cent of total mortgages within the ‘Tracker or SVR’ category, 50 per cent represent tracker

mortgages, with the remaining 42 per cent of mortgages on SVRs<sup>19</sup>. The majority of mortgages subject to tracker interest rates are linked to the ECB’s main policy rate, reflecting the lending practices of the banks primarily between 2004 and 2008, when this product type was very popular and house prices were elevated.

A separate Central Bank loan-level dataset includes mortgage data for AIB (including EBS Ltd.), BoI and PTSB. This was initially collected in 2011 for the Prudential Capital Assessment Review (PCAR) of banks’ financial performance. It has since been used for stress-test analysis, and more recently for the Central Bank’s balance sheet assessment exercise. The loan-level data includes information on several mortgage variables, similar to those presented in the RMBS dataset. Kennedy and McIndoe Calder (2011), and Frost et al (2014) gave a detailed description of the data.

As the Central Bank loan-level dataset includes AIB (including EBS Ltd.), BoI, and PTSB mortgages, and the RMBS dataset includes mortgage data for PTSB, KBC Bank Ireland

<sup>16</sup> In the RMBS dataset, the ‘Tracker or SVR’ mortgages includes floating rate loan (for life), plus floating rate loan linked to Libor, Euribor, ECB reverting to a bank’s SVR, and discount rate mortgages.

<sup>17</sup> In the RMBS dataset, the ‘Fixed or Other’ mortgages includes fixed rate loan (for life), plus fixed with future periodic resets, plus fixed rate loan with compulsory future switch to floating, plus capped, and other mortgage interest rates.

<sup>18</sup> For the purpose of the analysis performed in this article, particularly with regard to mandatory fields, the covered institutions included in the RMBS dataset, namely Permanent tsb plc, KBC Bank Ireland plc, Ulster Bank Ireland Ltd, and EBS Ltd, were all contacted individually to ensure that the interpretation of the loan-level requirements was consistent and comparable across selected variables.

<sup>19</sup> SVRs and up to one year fixed.

plc, Ulster Bank Ireland Ltd, and EBS Ltd, it is possible to calculate the additional coverage provided by the RMBS dataset.

Both the Central bank loan-level and the RMBS dataset show loan distribution by regional code. The geographical code assigned to the loan-level data in both datasets is a standard known as the Nomenclature of Units for Territorial Statistics (NUTS 3). It divides the country into eight regions and assigns a code to each. The RMBS dataset includes an additional 17 per cent of the total mortgages, which are not covered in the Central Bank loan-level dataset. The Central Bank loan-level and the RMBS dataset are presented in Table 2. Interestingly, the RMBS has a higher proportion of loans in Dublin and its commuter belt<sup>20</sup> (44 per cent compared to 38 per cent), despite having lower average arrears. This may indicate that in overall terms, the loans in the RMBS pools are of a higher quality.

## 5. RMBS Data Analysis

Investors who can analyse the assets underlying an ABS are better able to assess a rating's appropriateness. This dataset is, therefore, particularly useful for those investing in such securities, as it allows investors to monitor movements in the underlying mortgages promptly and in great detail. The ED's RMBS information is updated with interest payments on the underlying assets, at a minimum quarterly. A secondary benefit of the increased transparency is the detail provided on 26 per cent of the total mortgage market, as discussed in Section 4. This can be used to monitor developments in the overall mortgage market.

The RMBS loan characteristics are examined for each year from 1994 to 2012, which all have more than 100 mortgages within the RMBS pools examined. This article also undertakes some preliminary stylistic analysis

of the determinants of mortgage arrears. It should be noted that the mortgage analysis performed on the RMBS dataset solely represents the characteristics of the underlying mortgages in the RMBS dataset, which may not be representative of the market as a whole, as discussed in Section 4 (Table 1).

### 5.1 Loan-to-Value Ratios

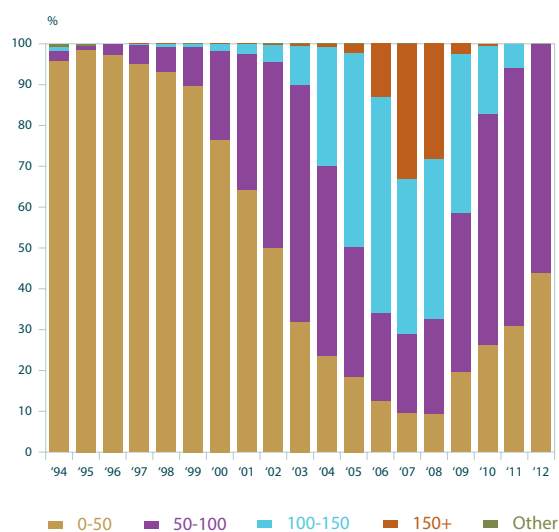
As described by McCarthy and McQuinn (2013), the loosening of Irish financial institutions credit standards during the economic boom led to increases in the Loan-to-Value (LTV) ratio for loans issued. In 2005, many lenders introduced 100 per cent LTV ratio mortgages. LTV ratios are of particular interest as an indicator of credit standards, because of the effect which negative equity (an LTV ratio of greater than 100 per cent) has on borrower behaviour.

The estimated LTV ratio at Q4 2013 for the RMBS mortgages is calculated after deriving the 'current valuation' variable. This was calculated using a house price index, the 'initial valuation' and 'current balance' variables in the RMBS dataset. For each valuation within the RMBS dataset, the date of the valuation and the region in which the associated property is located is known. The individual property valuations are updated to Q4 2013, using the Central Statistics Office (CSO) housing price index<sup>21</sup>, which differentiates between properties located in the Dublin region, and properties located elsewhere.

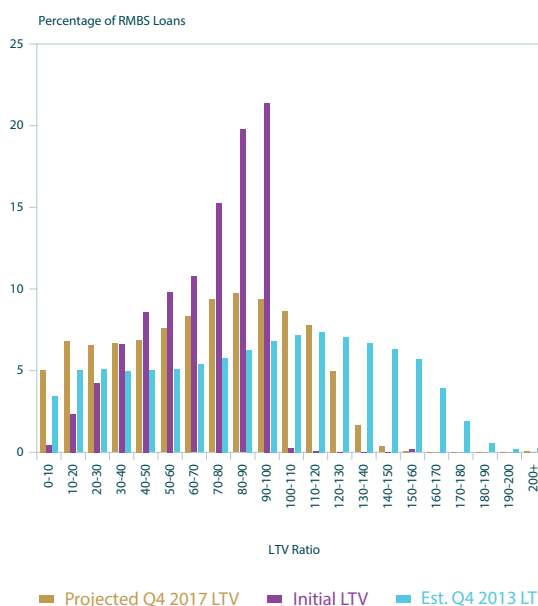
There is a clear relationship between the LTV ratios at Q4 2013 and loan origination year for the mortgages underlying Irish RMBS, as shown in Chart 2. It shows that a large proportion of RMBS loans originating between 2004 and 2009 have an estimated LTV ratio, at Q4 2013, greater than 100 per cent. For RMBS loans originating in 2007, it is estimated that approximately 71 per cent are in negative equity at Q4 2013. The estimated LTV ratio at

<sup>20</sup> Commuter belt includes Kildare, Meath, and Wicklow.

<sup>21</sup> CSO residential property price index from 2005 onwards and the house price index prior to 2005 was backcast using the PTSB/ESRI house price index.

**Chart 2: Estimated LTV Ratio at Q4 2013 in RMBS Pools by Origination Year**

Source: European DataWarehouse.

**Chart 3: Distribution of Initial, Estimated Q4 2013, and Projected Q4 2017 LTV Ratios in RMBS Pools**

Source: European DataWarehouse.

Q4 2013 indicates that roughly 45 per cent of the loans in the RMBS dataset are in negative equity, caused by the decrease in property prices between 2008 and 2013. The estimated LTV ratio at Q4 2013 for the RMBS mortgages is above estimates obtained by Duffy (2014) who estimated that by Q4 2013, 268,000 (or 35 per cent<sup>22</sup>) of all mortgaged households were in negative equity. Differences in coverage may contribute to this higher figure.

The above method, with appropriate assumptions, can also be used to estimate LTV ratios for RMBS mortgages in the future. McQuinn (2014) uses the model also contained in Kelly and McQuinn (2013) that finds a very close relationship between house prices and unemployment in an Irish context from 1980 to 2013. The 'current valuation' variable computed above is used in conjunction with these estimated property price forecasts and Consumer Price Index (CPI) projections<sup>23</sup> to project LTV ratios at Q4 2017 for the RMBS mortgages. According to McQuinn (2014), real

Irish house prices will increase by 8 per cent in 2014, and 9 per cent in 2015, before falling back to 4.9 and 3.9 per cent in 2016 and 2017. These forecasts, as detailed by McQuinn (2014) are based upon three assumptions:

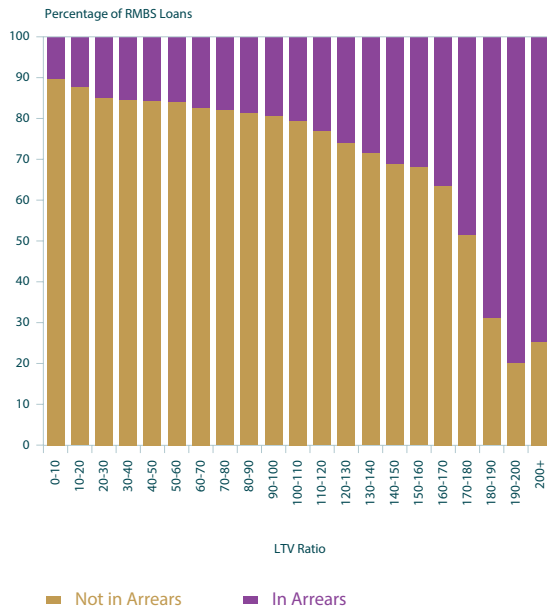
- 1) An improvement in key macroeconomic variables;
- 2) The presence of a degree of undervaluation in the property market;
- 3) No significant change in housing supply.

Furthermore, when calculating the LTV ratio at Q4 2017 for the RMBS mortgages, it is assumed that the current balance does not fall in the intervening period. While this is an unrealistic assumption, it serves to provide an upper limit for LTV ratios in 2017. It should be noted that issuers may switch underlying mortgages in the RMBS pools, so the pool's composition may change between now and Q4 2017. The projected LTV at Q4 2017 may

<sup>22</sup> Using the total number of mortgage accounts in the Central Bank of Ireland's Residential Mortgage Arrears and Repossessions Statistics, December 2013: [http://www.centralbank.ie/polstats/stats/mortgagearrears/Documents/2013q4\\_ie\\_mortgage\\_arrears\\_statistics.pdf](http://www.centralbank.ie/polstats/stats/mortgagearrears/Documents/2013q4_ie_mortgage_arrears_statistics.pdf)

<sup>23</sup> Using the Central Bank of Ireland's CPI forecasts for 2014 and 2015, Quarterly Bulletin, Q3 2014. It should be noted here that the CPI forecast for 2015 was also used for the 2016 and 2017 projected LTV ratios, so the estimates derived may be somewhat conservative.

**Chart 4: Percentage of RMBS Loans in Arrears by LTV Ratio at Q4 2013**



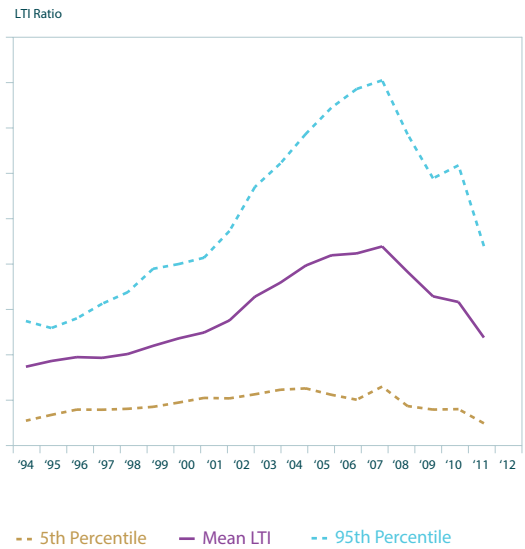
Source: European DataWarehouse.

not, therefore, reflect the underlying mortgages in the RMBS securities at that time.

Also, the RMBS dataset allows us to compute the initial LTV ratio for each loan in the dataset. The distributions of the initial LTV ratios, LTV ratios at Q4 2013, and projected LTV ratios at Q4 2017 for the RMBS mortgages are shown in Chart 3. A large number of RMBS loans (21 per cent) have an initial LTV ratio between 90-100 per cent. Such loans leave borrowers more exposed to negative equity in the event of a fall in property prices, and increases loss given default<sup>24</sup> for the originating financial institution. However, as previously mentioned, the RMBS dataset may not be fully representative. Furthermore, it is assumed that the ‘current balance’ remains constant, so any inferences drawn from this analysis need to be interpreted carefully.

The existence of a particularly strong non-linear positive correlation between the LTV ratio at

**Chart 5: Mean LTI Ratios in RMBS Pools by Origination Year**



Source: European DataWarehouse.

Q4 2013 and proportion of RMBS mortgages in arrears is shown in Chart 4. There is a significant, and in some instances strong, correlation between negative equity and arrears<sup>25</sup> in the RMBS mortgages. The effect of a movement into negative equity appears to significantly strengthen the probability of RMBS mortgages entering into arrears. This generally supports finding by Kelly, McCarthy and McQuinn (2012), and Lydon and McCarthy (2011).

### 5.2 Loan-to-Income Ratios

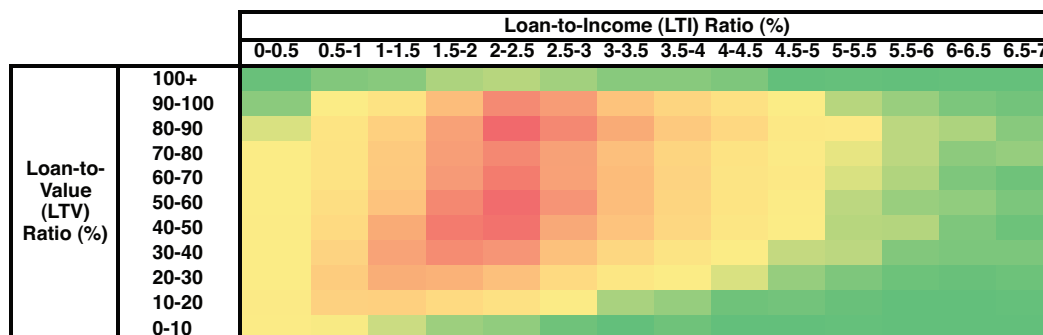
The RMBS dataset includes the gross income of both the primary and secondary borrower for each RMBS mortgage. These variables, recorded at loan origination, may be combined with the original loan balance variable to obtain the Loan-to-Income (LTI) ratio<sup>26</sup> for the RMBS mortgages at the time of draw-down. The LTI ratios are a general measure of both lending standards and loan affordability at the

<sup>24</sup> 'Loss given default' measures the proportion of the current balance the credit institution can recover through repossessions.

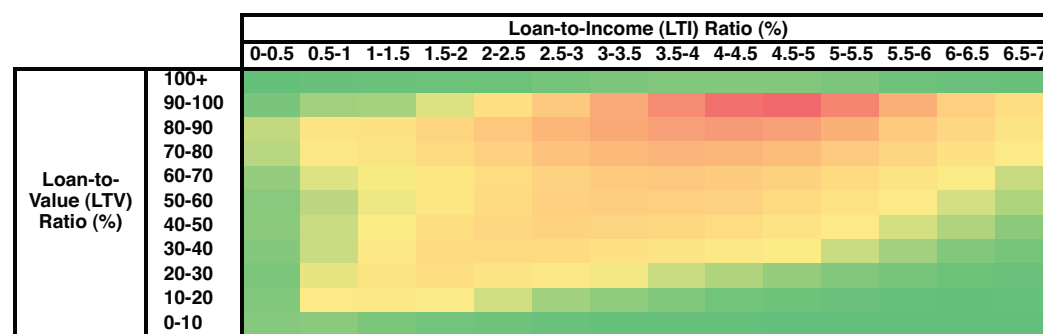
<sup>25</sup> Using the same definition as O'Toole and Prasad (2013) to identify loans as being in arrears; If the account status is available, then a loan is identified as non-performing if account status is 2 (arrears) or 3 (default or foreclosure). If account status is not available, a loan is identified as in arrears if arrears balance > 0, or the number of months in arrears > 0.

<sup>26</sup> 'Total income' used in the calculation of the LTI ratios is the sum of the 'primary income' and 'secondary income'.

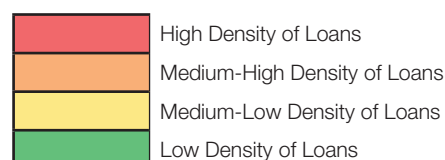


**Table 3: Heat Maps of Initial LTV and LTI Ratios for RMBS Mortgages, 1994-2002**

Source: European DataWarehouse.

**Table 4: Heat Maps of Initial LTV and LTI Ratios for RMBS Mortgages, 2003-2011**

Source: European DataWarehouse.



time of RMBS loan origination. It is important to note that the income data in this dataset is not current, and given the increase in unemployment levels over time, on average, borrowers' current income levels are likely to be significantly lower than at loan origination.

The LTI ratio for RMBS mortgages increased significantly through the 1990s and 2000s, from an average of 1.74 in 1994 to a peak of 4.39 in 2008, as shown in Chart 5<sup>27</sup>. In 2012, the average LTI ratio for RMBS mortgages

declined to 2.38. Given that the mortgages in the RMBS dataset have a higher average current balance, the LTI ratios for RMBS mortgages would generally be higher than the LTI ratios for total mortgages.

### 5.3 Loan-to-Value and Loan-to-Income Ratios

The preceding initial LTV and LTI ratios for RMBS mortgages, and their evolution by loan origination date, may be combined to produce

<sup>27</sup> Chart 5 excludes LTI=0, 'total income' that was less than €20,000, and any outliers where the LTI ratio was greater than or equal to 10.

heat maps (Table 3 and Table 4). Table 3 shows a heat map with a distribution of initial LTV and LTI ratios for RMBS loans originated between 1994 and 2002. Table 4 shows a heat map with a distribution of initial LTV and LTI ratios for RMBS loans originated between 2003 and 2011. The red colour indicates a higher concentration of loans within a category, while green indicates a lower concentration.

The heat maps illustrate a joint movement in LTV and LTI ratios for RMBS mortgages over the period covered in the analysis. Between 1994 and 2002, there is a clustering of loans issued with a LTI ratio between 2 and 2.5, and a LTV ratio between 40 and 90. There is evident movement towards an LTI ratio between 4 and 5, and LTV ratio between 90 and 100 in the subsequent period (2003 to 2011). These movements in LTV and LTI ratios for RMBS mortgages are generally in line with the loosening of credit standards described by McCarthy and McQuinn (2013).

## **6. Conclusion**

The European DataWarehouse has filled a void in information on the underlying mortgages in Irish RMBS. The current Irish ABS market remains relatively subdued, in line with European trends. The underlying mortgages in the Irish RMBS pools have deteriorated, as the number of distressed borrowers has increased, on account of the economic downturn. An analysis of the underlying mortgages in the RMBS dataset shows a particularly strong relationship between the LTV ratio at Q4 2013 and mortgage arrears. Also, as expected, higher LTV and LTI ratios for RMBS mortgages prevail predominantly for RMBS mortgages originating between 2005 and 2008, before falling sharply.

## References

Duffy, D. (2014), 'Updated Estimates on the Extent of Negative Equity in the Irish Housing Market', The Economic and Social Research Institution, Research Note 2014/2/1.

Frost, S., P. Lyons and J. Goggin (2014), 'Analysing Mortgage Arrears with Aggregated and Granular Data', Statistics Conference, Central Bank of Ireland, April 2014.

Kelly, R. and K. McQuinn (2013), 'On the hook for impaired bank lending: Do sovereign-bank inter-linkages affect the net cost of a fiscal stimulus?', Research Technical Papers, 01/RT/13, Central Bank of Ireland.

Kelly, R., Y. McCarthy and K. McQuinn (2012), 'Impairment and Negative Equity in the Irish Mortgage Market', Journal of Housing Economics, Elsevier, vol. 21(3), pages 256-268.

Kennedy, G. and T. McIndoe Calder (2011), 'The Irish Mortgage Market: Stylised facts, Negative Equity and Arrears', 'The Irish Mortgage Market in Context', Conference paper, October 2011.

Lydon, R. and Y. McCarthy (2011), 'What Lies Beneath? Understanding Recent Trends in Irish Mortgage Arrears', Research Technical Papers, 14/RT/11, Central Bank of Ireland.

McCarthy, Y. and K. McQuinn (2013), 'Credit conditions in a boom and bust property market', Research Technical Papers, 8/RT/13, Central Bank of Ireland.

McQuinn, K. (2014), 'Bubble, Bubble Toil and Trouble? An Assessment of the Current State of the Irish Housing Market', The Economic and Social Research Institution, Special Report, Quarterly Economic Commentary, Summer 2014.

O'Toole, C. and R. Prasad (2013), 'Spanish RMBS: Mining loan level data', Deutsche Bank Market Research, Special Report, September 2013.