



Banc Ceannais na hÉireann
Central Bank of Ireland
Eurosystem

The Distribution of Property Level Mortgage Arrears

Anne McGuinness¹

Vol 2011, No. 6

Economic Letter Series

Abstract

This economic letter uses new micro loan-level data from Irish banks to gain a better understanding of the financial difficulties in the Irish mortgage sector. The availability of these data provide a more granular view of borrower distress and clarifies mortgage arrears within the participating institutions. The letter generates a two-by-two matrix of negative equity and arrears, to identify the distribution of mortgage distress. This analysis finds that the majority of borrowers are current on their principal mortgage repayments. It also finds that while a large portion of borrowers may be in negative equity only 7 per cent of these borrowers are also in arrears.

1 Introduction

This economic letter uses micro loan-level data collected from AIB, Bank of Ireland, EBS and Permanent TSB to gain a better understanding of financial difficulties in the Irish mortgage sector. It identifies the number of borrowers who were in a distressed mortgage position in December 2010 by owner-occupier and buy-to-let properties. It also provides stylised facts surrounding mortgage distress which will help frame the current debate regarding household sector indebtedness.

The household sector's ability to service outstanding debt has been significantly affected by both the international and domestic economic downturn. The combination of increased unemployment (from 4.5 per cent in 2006 to 14.4 per cent in 2011) and declines in average disposable income (due to reduced working hours, pay cuts

and tax rate changes) have significantly affected household debt to income ratios. However, over the same period total household sector indebtedness fell from a peak of €156,796 million in May 2008 to €128,302 million in September 2011 and interest rates declined reducing the cost of servicing these debts. However, the net result varies significantly by borrower due to differences in individual circumstance.

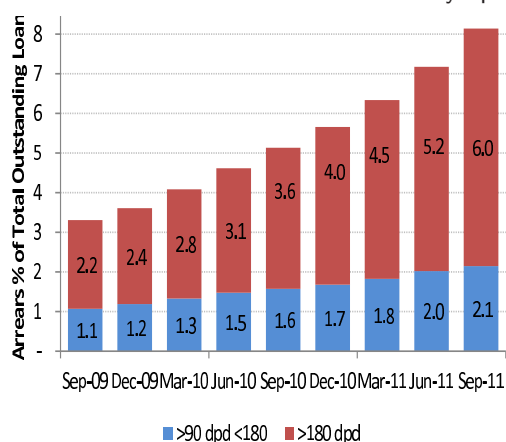
The EBS/DKM affordability index (2011c) indicates that first-time-buyer (FTB) affordability has improved. The average net income paid by FTBs on mortgage repayments was 13 per cent in June 2011 compared with 26.5 per cent at the peak in December 2006. Notwithstanding the improved affordability for new purchasers, the number of existing mortgage holders experiencing difficulty repaying their mortgages increased between 2008 and 2011.

¹The views expressed in this paper are my own, and do not necessarily reflect the views of the Central Bank of Ireland or the ESCB. I would like to thank Stefan Gerlach, Trevor Fitzpatrick, Reamonn Lydon and Kieran McQuinn for their comments on earlier drafts; any remaining errors are my own responsibility. This version as of 22nd November 2011 incorporates revisions made to year of origination of mortgage cohorts in Section 4.

Central Bank of Ireland (2011a) repossession and arrears data, which are collected from 19 mortgage providers operating in Ireland, indicate that as of September 2011, 8.1 per cent of outstanding primary dwelling loans were in arrears of more than 90 days past due. Figure 1 presents all loan arrears as a percentage of total outstanding loans, by the number of days past due (dpd) since September 2009. It shows that the number of loans in arrears has increased significantly over time.

It shows that the number of loans in arrears of more than 90 days increased from 3.3 per cent in September 2009 to 8.1 per cent in September 2011. Traditionally, borrowers experiencing short-term arrears (i.e., ≤ 90 dpd), corrected their balances relatively quickly. In fact the long-run average arrears rate in Ireland was just 0.8 per cent before 2008. However, the current crisis has meant that fewer loans are returning to financial health after short periods of arrears.

Figure 1: Volume of PDH loans in Arrears by dpd



Source: Central Bank of Ireland Residential Mortgage Arrears & Repossessions Data September 2011

Given the high level of financial strain being experienced by households, the Central Bank introduced the Code of Conduct on Mortgage Arrears (CCMA) in February 2009². Guidelines were provided within this code to enable lenders to assist distressed borrowers through a range of restructuring procedures. Restructuring options include interest only repayments, reduced payments, payment moratorium, arrears capitalisation, term extension or a hybrid of these options. The published

²The Code of Conduct on Mortgage Arrears was subsequently amended in February 2010, with the current version of the CCMA in effect since January 1st 2011

mortgage arrears and repossessions data indicate that approximately 69,735 loans had been restructured by September 2011; however, 36,376 (52 per cent) of these accounts are not in arrears.

While these aggregate-level data are informative and useful in indicating the average borrower's position, a key requirement in identifying the true nature and scale of distress is the availability of micro-level data on households. In particular, this data permits the identification of the "tail risk" of borrower distress rather than just aggregate level analysis.

The March 2011 Prudential Capital Asset Requirement (PCAR) stress-testing exercise extracted detailed loan-level data from the mortgage book as well as other asset classes, for the four banks listed above. The data provides the clearest and most granular picture of each borrower's loan profile. However, it is not a micro-level household survey so no current income or wealth data are available. The benefit of these data are that they facilitate analysis of the distribution of mortgage distress across different borrower cohorts such as, loan-to-values, origination characteristics, performance history, regional location, etc.

The purpose of this letter is to provide an overview of these new loan-level data. It provides the actual number of properties that were in arrears in the four institutions as of December 2010. This is done by generating a two-by-two matrix of arrears and negative equity to identify four different borrower groups. This provides some facts upon which the debate of how to address the issue of mortgage distress can be based.

The remainder of this letter is laid out as follows. Section 2 describes the data; Section 3 outlines the two-by-two matrix methodology to identify distressed mortgage holders. Section 4 presents stylised facts with respect to primary dwelling mortgages. Section 5 highlights additional concerns relating to buy-to-let properties and non-property related personal credit. Finally, Section 6 provides the conclusions.

2 Data

As part of the EU-IMF Financial Measures Programme (FMP), the Central Bank of Ireland carried out an in-depth stress-test of the domestic

banking sector. The result of this was the PCAR stress-testing exercise published in March 2011³. The institutions involved include, AIB, Bank of Ireland, EBS and Permanent TSB, hereafter these institutions will be referred to “the four FMP banks”.

The loan-level data collected are based on each bank’s loan book at end-2010. The anonymous data contain a range of borrower information at the mortgage origination date and current information in relation to the mortgages themselves. This micro-level data enable granular level analysis of the Irish mortgage market to be carried out.

The data can be broadly categorised into six groups: loan identification, borrower information, loan information, property information, interest rate details and performance details.

Data Cleaning

The data collected for the PCAR exercise were raw data, extracted from the financial institutions operating systems. Therefore, some degree of data cleaning was inevitably required before any analysis could be undertaken.

This data cleaning requirement was mainly as a result of missing observations (i.e., original house price, year of origination and location), however, other cleaning techniques were also used - including winsorising⁴ house prices by 2.5 per cent and excluding any loan where the original loan-to-value was greater than 250 per cent due to reporting errors. This cleaning⁵ reduced the sample by 11 per cent.

Table 1: Residential Mortgage Market (loan-level)

Description	Sample	O/S Balance
Original Sample	677,984	€95.9 bln
Cleaned Sample	603,385	€86.6 bln
<i>of which</i>		
Primary Dwelling	509,152	€67.1 bln
Buy-To-Let	94,233	€19.6 bln

Source: PCAR 2011 level loan data

Table 1 shows that there are 603,385 residential loans in the cleaned sample, of which 509,152 are Primary Dwelling Home (PDH) loans worth €67

billion and 94,233 Buy-to-Let (BTL) loans worth €19.6 billion. BTL mortgages refer to any loan that is flagged for BTL purposes at origination by the institution, therefore properties that have subsequently been let by the owner are not captured in the data. Within each bank’s mortgage book equity withdrawal and top-up loans are recorded as separate loans on the property. In some cases borrowers are in arrears on some but not all of these loans.

To examine borrowers’ mortgage distress it is necessary to aggregate the loan-level data to a total property level. This is because default on the property would affect all loans secured on it not just the loans in arrears. As a result the loan-level balances of outstanding debt, mortgage repayments and arrears are all aggregated to the *property-level* total. Within the cleaned sample the ratio of loans to properties is 1.28 for PDH mortgages and 1.14 for residential BTL mortgages. For further information on this micro-level loan data see Kennedy and McIndoe Calder’s (2011).

Calculating Borrowers’ Equity Position

Studies such as Kelly, McCarthy and McQuinn (2011) establish negative equity and arrears as the two most important variables in the identification of borrowers in distress. For the micro-level data, these variables are generated as follows:

- **Current Property Value** was calculated by applying a combined house price index⁶ to the original property value based on the month and year of purchase. This house price series has monthly data from January 1970 to September 2011, by region (Dublin, non-Dublin) and property type (detached, semi-detached, apartment).
- **Equity Position** was estimated by subtracting current property value (September 2011) from the December 2010 total outstanding balance on the property.
- **Original loan-to-value (LTV)** ratio was generated by dividing the original mortgage

³For further detail on this data collection and methodology see Central Bank of Ireland Publication (2011b) The Financial Measures Programme.

⁴Winsorising is a statistical technique that removes extreme values from the data, this reduces the probability of spurious outliers which can affect the robustness of results.

⁵Due to cleaning, calculation made using the reduced sample should be scaled up to estimate the four institution level.

⁶The house price index was generated within the Central Bank, it combines house price data from the DoEHLG, ESRI/PTSB and CSO series.

by the original house price.

- **Arrears** borrowers are assumed to be in arrears of 90 days or more if the value of unpaid repayments is greater than three times the borrower's total monthly mortgage repayments at the property level.

Arrears and total outstanding balances are held constant at December 2010 levels as this was the cut-off date for the data. This decision is supported by the fact that supervisory data indicate that the current outstanding balance on PDH mortgages (in the four FMP banks) have fallen by just 0.8 per cent between 2010Q4 and 2011Q2. The number of loans has also declined between December 2010 and September 2011, the combination of which implies that relatively little principal has actually been repaid over this period. Arrears are also assumed to be unchanged, from their December 2010 levels.

The property's negative equity position is driven by house prices, according to the CSO national average house prices fell by approximately 12 per cent between December 2010 and September 2011. We estimate that an additional 35,597 (9 per cent) PDH properties have fallen into negative equity over that period. While negative equity does not necessarily mean that a household is in financial distress, it can be associated with distress when borrower is also in arrears⁷.

The distribution of underlying distress in the mortgage market is captured by a two-by-two matrix of arrears and negative equity described in Section 3.

Data Caveats

Even though these loan-level data are a rich source of financial information on residential mortgages, there are a number of issues concerning the data which need to be highlighted.

First, the data only represent the four FMP banks which means extending the result to a total mortgage market level should be done with caution, as lending strategies and activity in the market varies significantly outside of the four FMP banks. For example, Table 2 illustrates that according to Central Bank data, the four FMP banks held approximately 68 per cent of all PDH mort-

gages loans and 63 per cent of outstanding balances in the PDH mortgage market, in September 2011.

If the sample is restricted to distressed PDH loans with arrears of more than 90 days, the four FMP banks have 56 per cent of these distressed mortgage accounts on their books even though they have a significantly higher proportion of loans. This implies that the cost of any mortgage distress resolution may be somewhat larger, at a market level.

Table 2: Market breakdown of PDH Mortgages (loan-level Data) including Arrears (90dpd)

	All Institutions	Covered Banks	Other Prime	Sub Prime
Accounts	773,420	68%	31%	1.5%
O/S Debt	€114 bln	63%	35%	1.9%
<i>of which arrears (90dpd)</i>				
Accounts	62,970	56%	35%	8.5%
O/S Debt	€12 bln	50%	40%	9.7%
Arrears	€1.1 bln	48%	40%	11%

Source: Central Bank of Ireland Residential Mortgage Arrears & Repossessions Data September 2011

The second issue with the data is that while Buy-to-Let (BTL) loan-level data are available from the four FMP banks, there is limited market level information available. Therefore the analysis of BTL distress in this paper focuses on the four FMP banks.

The third consideration with the data is that, while borrowers with more than one property can be identified within three of the four FMP banks, there is no way to identify cross-institutional property investments or cross-collateralisation of properties. If a significant amount of cross-institutional debt exists, this is not captured by the data. For example, it is not possible to analyse the consequence of default on a BTL property in one bank on the borrower's PDH mortgage in a different institution.

Finally, borrower characteristics in the micro-data are only available at the point of loan origination. Without current household income levels it is not possible to identify if a household that is currently up-to-date on their mortgage repayment, is at risk of becoming distressed in the event of worsening economic conditions.

Notwithstanding the outlined limitations with

⁷This is because a borrower in arrears who has positive equity has the option to sell their home or engage in debt for equity swap with their mortgage provider to clear their debts.

this data source, it still provides a new insight into residential mortgage distress levels.

3 Mortgage Distress Identification Method

To identify those borrowers in most distress in the Irish mortgage market, a two-by-two matrix of arrears and negative equity is used. Mortgages are divided into the following four groups based on the estimated equity position of the property in September 2011 and if the borrower was in arrears of more than 90 days in December 2010:

- **Group 1** - Positive Equity and No Arrears - pose no immediate risk (white box).
- **Group 2** - Negative Equity and No Arrears - borrowers are at risk of becoming distressed if they suffer an income shock, i.e., wage cuts or redundancy (green box).
- **Group 3** - Positive Equity and Arrears - these borrowers are distressed, however, their positive equity provides additional options (e.g., debt-equity swap and down-sizing) to meet their mortgage repayments (blue box).
- **Group 4** - Negative Equity and Arrears - pose the highest risk from a financial stability perspective because if they default on their mortgage, the sale of the property will not cover the outstanding balances owed, resulting in an increase in bad debts (red box).

As discussed above, analysis must be carried out at the property level rather than the loan level because it is the total debt position on the property that is important. This is done separately for both PDH and BTL mortgage holders. Property level analysis reduces the PDH sample from 509,152 loans to 395,510 properties and the BTL sample from 94,233 loans to 82,300 properties.

The main limitation with the data is that there is no way to estimate the number of borrowers who are likely to migrate between the Groups. The risk is that a large number of borrowers currently in Groups 2 and 3 may fall into Group 4 if house prices continue to fall or if they suffer an income

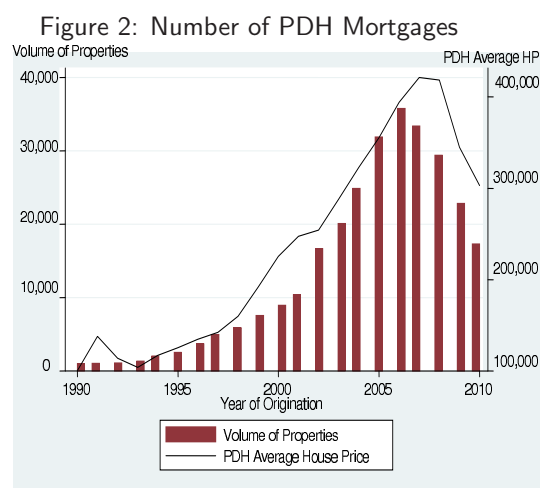
shock. The knock on effect of these migrations to financial stability could be significant if it results in a large number of mortgage defaults.

4 Primary Dwelling Homes

This section uses the PCAR 2011 loan-level data to address a number of questions relating to the PDH mortgage market. Specifically, it will examine the number of borrowers who are in negative equity, arrears or both. This is important because it highlights the fact that (a) not all people in negative equity are in arrears on their mortgage and (b) that there are a significant portion of those in arrears who have positive equity in their homes.

Typically, when borrowers fall into arrears it occurs for a short period of time (i.e., less than 90 days). Difficulties tend to arise from lost income due to illness, reduced hours or redundancy. In a normal economic environment this lost income is restored relatively quickly and the borrower returns to full mortgage repayment. As such the arrears rate in Ireland has traditionally been very low; in fact pre-2008 the average long-run arrears rate was just 0.8 per cent of mortgage loans.

Figure 2 shows the number of PDH properties⁸ (with outstanding balances) that were mortgaged between 1990 and 2010 in the four FMP banks.



Source: PCAR 2011 level loan data

Note: Data relates to property transactions at mortgage origination date, it excludes subsequent top-ups or equity release.

⁸These observations are based on the origination loan, it does not include subsequent top-ups and equity release loans.

⁹Originally this was published as 33 per cent, however, revised data has increased this to 50 per cent.

It shows that, 50 per cent⁹ of PDH properties with outstanding balances originated between 2005 and 2008 in the four FMP banks. Figure 2 also gives the average house price paid within each year based on the property valuations available in the data. The figure clearly illustrates the increased demand for property while house prices were increasing during these years.

While the year of origination is informative it is necessary to determine the value of outstanding debt borrowers are liable for. Table 3 gives the number of properties by total outstanding balances. It shows that in December 2010, the majority of borrowers had an outstanding balance of less than €200,000, with 97 per cent of PDH mortgages below €500,000. Of the 8,051 (3 per cent) properties with outstanding balances over €500,000, only 962 have outstanding balances over €1 million. Within this high value category very few borrowers (just 625 properties) are also in arrears of more than 90 days.

Table 3: PDH properties by Outstanding Balances

Number	Sample Total	Arrears > 90dpd
< €200K	262,352	10,726
€200K - €500K	125,077	7,762
€500K - €1 mln	7,089	536
> €1 mln	962	89
Total	395,480	19,113

Source: PCAR 2011 level loan data

Note: Data are aggregated to the property level. Arrears and outstanding balances are end-2010.

Two-by-Two PDH Matrix

This section uses the two-by-two matrix (Figure 3) to further decompose borrower liabilities according to borrower groups as discussed in Section 3. This identification provides the platform for a more in-depth analysis of the arrears problem.

Figure 3 shows the breakdown of PDH properties within the context of the two-by-two matrix. Calculations are based on December 2010 outstanding balances and arrears, and the borrower's September 2011 equity position at the property

level. The white and green quadrants represent the borrowers that are up to date on their mortgages (i.e., Groups 1 and 2 defined above). The blue and red quadrants contain borrowers in arrears of more than 90 days past due (i.e., Groups 3 and 4). The borrowers in a negative equity¹⁰ position are in the columns on the right hand side, while positive equity borrowers are in the middle columns.

Figure 3: Financial Distribution of PDH Mortgages

		Negative Equity	
		N	Y
Arrears 90+	Aggregate		
	Number of Properties	242,360	134,007
	Negative Equity (p.p)	-	67,768
	Total Group NE (€m)	-	9,081
	Arrears Value (p.p)	-	-
	Total Arrears (€m)	-	-
	Average Balance (p.p)	120,501	258,761
	Total Balance (€m)	29,200	34,676
Y	Number of Properties	9,598	9,515
	Negative Equity (p.p)	-	83,911
	Total Group NE (€m)	-	798.4
	Arrears Value (p.p)	11,811	16,853
	Total Arrears (€m)	113	160
	Average Balance (p.p)	130,783	272,991
	Total Balance (€m)	1,255	2,598

Source: PCAR 2011 level loan data

Note: Data are aggregated to the property level. Arrears and outstanding balances are end-2010, equity is based on September 2011 house prices.

No Arrears (Groups 1 and 2)

Figure 3 shows that, 95 per cent of mortgaged PDH properties were meeting their repayment obligations in December 2010, of which 34 per cent were in negative equity (Group 2) in September 2011. However, Central Bank data indicates that within the four FMP banks approximately 11,000 (2.2 per cent) of properties that had been performing in December 2010 had subsequently fallen into arrears by September 2011.

One potential risk to this borrower group's ability to repay is future changes in mortgage interest rates. Table 4 gives the breakdown of PDH mortgages (original mortgage contracts) by interest rate type. It shows that 40 per cent of original mortgage contracts are on Tracker interest rates, 12 per cent of these are in arrears of which just 4.2

¹⁰It should be noted negative equity value in this letter differs from the results found in Kennedy and McIndoe Calder (2011). This is due to three factors; first, their equity value is calculated as of December 2010, while here house prices are carried forward to September 2011. Second, the house price index used in Kennedy and McIndoe Calder is the national average, compared with regional and tenure type house price averages used here. Finally, total PDH equity is used here, including all equity release secured on the PDH property.

per cent are in arrears of more than 90 days past due. However, 42 per cent of PDH properties are on SVRs, 16 per cent of which have some arrears and 6 per cent have arrears of over 90 days.

This implies that 10 per cent of properties on SVRs, which have already experienced some level of arrears (< 90 days-past-due), could experience long-term arrears if standard variable rates were to increase significantly. There is also a potential risk that those who have not experienced any arrears yet, could also find that their mortgage repayments are too high if these rates increase significantly. Households' debt servicing ability could also rise if there is a further deterioration in disposable income.

Table 4: Distribution of PDH Interest Rate Type

	Sample Total	Arrears < 90dpd	Arrears > 90dpd
Fixed	70,961 (18%)	9%	3%
Tracker	158,056 (40%)	12%	4.2%
SVR	166,463 (42%)	16%	6.3%
Total	395,480 (100%)	13%	4.8%

Source: PCAR 2011 level loan data.

Note: Arrears are December 2010. Interest Rate Decomposition is based on original mortgage contract, additional loans on the property are typically on different interest rates. The percentage share of the loan book at end-2010 is in brackets.

In addition to these risks, another borrower cohort of concern (within Groups 1 and 2) is those who have restructured their mortgages but have not experienced any arrears. Central Bank data indicate that this accounts for 36,376 loans or approximately 28,418 properties across the entire market¹¹ in September 2011.

These borrowers are currently meeting their mortgage repayment due to restructured conditions they have agreed with their mortgage provider. These borrowers are in the potential risk category as they have clearly experienced some income shock requiring them to restructure. The risk is that they might fail to meet this new repayment schedule and will fall into arrears in the future. Unfortunately, there is no way to identify these at risk borrowers from the data.

¹¹This applies the 1.28 loan-to-property ratio discussed in Section 2 to the published Central Bank Arrears and Repossessions data.

¹²Global Property Guide estimate that in 2008 property related transaction costs in Ireland are approximately 7 per cent of the property value, see <http://www.globalpropertyguide.com/investment-analysis/Housing-transaction-costs-in-the-OECD>

With Arrears (Groups 3 and 4)

Borrowers are defined as being distressed if they have an arrears value greater than or equal to 3 months' worth of mortgage repayments (Groups 3 and 4). This is a standard proxy for distress levels in residential mortgage markets because short-term arrears can be due to errors in payments systems, minor cash flow issues, etc. This is supported by Kelly (2011) who indicates that the cure rate of borrowers in less than 90 day arrears is approximately 69 per cent within one year and 81 per cent over a 3 year period.

Borrowers are considered to be most distressed if they also have negative equity (Group 4). This is not based on monetary values but on the fact that if the borrower in difficulty is also in negative equity fewer options are available to them to correct their financial position.

Figure 3 indicates that, across the four FMP banks, there were 19,113 (4.8 per cent) properties in arrears of 90 days past due as of December 2010. However, less than half of these (9,515) also had negative equity in September 2011.

By contrast 9,598 properties (Group 3) were in positive equity, of which 77 per cent had at least 20 per cent equity accumulated in their homes. This provides these borrowers with a sufficient equity buffer to absorb future house price declines without moving into a negative equity position (Group 4). If these borrowers wished to sell their property, additional equity may be required to cover transaction costs¹² and other outstanding debts. It is estimated that 55 per cent of the 9,598 properties in arrears and positive equity have at least a 40 per cent equity stake in their homes. This provides a substantial buffer for these borrowers to clear their financial obligations and improve their net position. However, the value of positive equity required to do this will vary by borrower.

Across the four FMP banks those in most distress account for 9,515 properties (Group 4). As shown in Figure 3 these borrowers' average negative equity (€83,911), arrears (€16,853) and outstanding balances (€272,991) are all higher than any other group defined above.

It is therefore necessary to examine the decomposition of Groups 3 and 4 by both days past due and equity stake (Table 5). Panel 1 gives the distri-

bution of the *number of loans in arrears*; it shows that there are more borrowers in arrears with positive equity than in negative equity. A possible explanation for this is that banks may have offered debt for equity swaps on arrears where positive equity exists, but have not capitalised those arrears. The high number of borrowers in arrears who have positive equity again suggests that negative equity is not the sole determinant of borrower distress.

However, it also illustrates that some borrowers have had difficulty meeting their mortgage repayments for a prolonged period. In the four FMP banks, 7,426 borrowers are in arrears for over 12 months, of which 3,575 also were in negative equity. Panel 1 also indicates that there were 32,773 properties in arrears of less than 90 days in December 2010. Kelly (2011) indicates that less than 30 per cent of those in short-term arrears (i.e., less than 90 days past due) will become long-term distressed with arrears over 90 days within the next year.

Table 5: PDH Properties in Arrears by dpd

	Arrears & PE Group 3	Arrears & NE Group 4
Panel 1: Number of Properties		
< 3 months	20,008	12,765
> 3 > 6 months	2,994	3,041
> 6 > 9 months	1,633	1,697
> 9 > 12 months	1,120	1,202
> 12 months	3,851	3,575
Total	29,606	22,280
Panel 2: Average Arrears Value (€)		
< 3 months	620	1,048
> 3 > 6 months	3,507	4,998
> 6 > 9 months	6,470	8,584
> 9 > 12 months	8,621	13,010
> 12 months	21,461	32,155
Total €mln	125.8	173.7
Panel 3: Outstanding Balance (€)		
< 3 months	112,224	255,210
> 3 > 6 months	131,002	262,912
> 6 > 9 months	139,177	267,223
> 9 > 12 months	130,925	275,812
> 12 months	127,012	283,354
Total €mln	3,501	5,855

Source: PCAR 2011 level loan data

Note: Data are aggregated to the property level. Arrears and outstanding balances are end-2010, equity is based on September 2011 house prices.

Panel 2 gives the *average arrears balance* of those in arrears, over time and by borrower group. This provides some indication of whether a borrower might be able to repay their total mortgage in the long-run. It is clear from Panel 2 that, even though more borrowers in arrears have positive equity, their average arrears balance is significantly smaller than those with negative equity. It also illustrates that borrowers, who have arrears of at least 12 months and negative equity, have significantly higher arrears balances than anyone else. This group of 3,575 borrowers have, on average, an arrears balance of €32,155 and are the most likely to be in an unsustainable long-run position based on the data.

Finally, Panel 3 in Table 5 provides the *average outstanding balance* on the property held by borrowers in each group by days past due. Panel 3 indicates that properties in positive equity have significantly less outstanding balances than those in negative equity. This is due to the fact that those in positive equity are more likely to have mortgages that were originated before the property boom, and their LTV at origination will have been lower than those in negative equity.

However, this breakdown of borrowers does not provide much information in relation to mortgage characteristics. The following section examines the four groups with respect to different elements of the mortgage contract to determine if some borrowers are more likely to be in arrears than others.

PDH Mortgage Cohorts

Before the mortgage arrears problem can be addressed it is necessary to get a better understanding of borrower profiles. Figure 4 isolates specific mortgage characteristics within the four FMP banks that have been highlighted as potential risk categories. These include

- borrowers who purchased their property between 2005 and 2008¹³,
- those who received extended mortgage terms (> 25 years)
- borrower who were granted high level original LTV ratios ($\geq 80\%$), and
- first-time-buyers (FTBs)

¹³2005-2008 are chosen as this is when the most property transactions occurred

Each panel builds on the one before by restricting the previous borrower selection to meet the new condition. To apply this to the aggregate property level, the characteristics from the borrower's original mortgage are used; additional top-up and equity release loan contracts are not used for identification. It should be noted that, there are a variety of ways of combining these cohorts, therefore, this is merely an illustrative example.

Figure 4 does show that 197,152 (50 per cent) of all total PDH mortgages (with outstanding balances) were granted by these banks between 2005 and 2008, of which only 5.6 per cent were in arrears, and just 3.7 per cent were in both arrears and negative equity, as of December 2010.

Of those who bought between 2005 and 2008, a significant portion of these (55 per cent) were also given extended mortgage terms (over 25 years) to improve affordability. This represents 27.5 per cent of the total PDH mortgage book. The longer

mortgage terms reduces lender flexibility to modify these mortgages through term extensions. This is true across all four borrower groups, however, it is the borrowers that currently have negative equity that are most likely to satisfy both these criteria (2005-2008 and extended terms).

The mortgage book is then restricted to include borrowers that were also given high original LTV ratios. This has been defined as any original loan with an LTV greater than 80 per cent as it exceeds the pre-boom standard of providing a 20 per cent deposit. The data show that just 15 per cent (62,490 properties) of the total PDH mortgage book satisfies all three criteria. However, given that house prices have fallen approximately 44 per cent from the peak, excessive LTV ratios granted during the boom years have exacerbated this decline as borrowers held little or no equity in these properties from loan origination.

Figure 4: Financial Distribution of PDH Mortgages by Cohorts

	PE	NE	PE & arrears	NE & arrears		PE	NE	PE & arrears	NE & arrears
Boom Years 2005/2008					Boom Years 2005/2008 + Term > 25 yrs				
Number of Properties	98,015	87,962	3,763	7,412	Number of Properties	29,568	72,120	1,299	5,834
Negative Equity (p.p)	-	68,901	-	9,798	Negative Equity (p.p)	-	2,453	-	3,059
Total Group NE (€m)	-	61	-	91	Total Group NE (€m)	-	225	-	85
Arrears Value (p.p)	-	-	877	5,577	Arrears Value (p.p)	-	-	75	2,065
Total Arrears (€m)	-	-	0.7	15	Total Arrears (€m)	-	-	0.9	0.39
Average Balance (p.p)	51,885	68,072	9,765	75,211	Average Balance (p.p)	5,466	68,091	8,833	70,709
Total Balance (€m)	884	3,580	76	40	Total Balance (€m)	79	9,335	1.3	579
Boom Years 2005/2008 + Term > 25 yrs + LTV > 80%					Boom Years 2005/2008 + Term > 25 yrs + LTV > 80% + FTB				
Number of Properties	2,045	55,887	47	4,511	Number of Properties	979	40,170	23	3,108
Negative Equity (p.p)	-	81,078	-	92,804	Negative Equity (p.p)	-	79,819.3	-	92,531.6
Total Group NE (€m)	-	4,531	-	419	Total Group NE (€m)	-	3,206.3	-	287.6
Arrears Value (p.p)	-	-	5,989	11,927	Arrears Value (p.p)	-	-	5,683.9	11,246.9
Total Arrears (€m)	-	-	0.3	53.8	Total Arrears (€m)	-	-	0.13	35
Average Balance (p.p)	198,511	267,880	175,429	268,955	Average Balance (p.p)	168,011	252,401	158,245	254,949
Total Balance (€m)	406	14,971	8.2	1,213	Total Balance (€m)	164	10,138.9	4	792.4

Source: PCAR 2011 level loan data

Note: Data are aggregated to the property level. Arrears and outstanding balances are end-2010, equity is based on September 2011 house prices. Cohorts are defined as per the borrower's initial mortgage contract only. As a result of revisions in the year of origination data, this table has been revised since its original publication.

Following a banking crisis, house prices tend to decline for some time with recovery usually lagging behind economic growth, see Kennedy and McQuinn (2011) for more on this. This indicates that it could be some time before borrowers return to a positive equity position. The chart shows that it is Groups 2 and 4 (i.e., those with negative equity) that retain the largest portion of borrowers when the LTV ratio condition, however, many of these borrowers are not in arrears. By contrast borrowers in Group 3, who are in arrears on their mortgage repayments, are not being captured under this type of risk analysis because they have positive equity.

Figure 4 also identifies borrowers who were FTBs. It indicates that just 11 per cent of borrowers satisfy all conditions. However, a significant portion of these borrowers (93 per cent) are meeting all their mortgage repayments and are not currently in need of assistance (Groups 1 and 2). This demonstrates how difficult it is to address residential mortgage arrears and distress at a market level.

Market Level Estimations

When examining the arrears problem in the residential mortgage market it is necessary to look outside the four FMP banks that were involved in the PCAR 2011 exercise. As shown by the Central Bank mortgage arrears and repossessions data, 44 per cent of borrowers in distress, are not in the four FMP banks in September 2011 (Table 2). It is therefore pertinent that estimations at a market level are considered here.

Unfortunately, the equity distributions of borrowers in distress are not available in the mortgage arrears and repossessions data. However, the equity position of properties within the four FMP banks can be used to estimate what this distribution might be at an industry level.

The estimations are based on two industry level assumptions; *Scenario I* assumes that the distribution of equity found in the four bank sample is the same across the entire market. However, given that many of the other institutions entered the Irish property market during the period 2004 to 2007, it is unlikely that they will have the same level of positive equity on their loan books. Therefore, the second assumption or *Scenario II* assumes that

only the four FMP banks have properties with positive equity and that all other properties in arrears are also in negative equity.

To estimate the number of properties at the industry level, the ratio of 1.28 loans to property is applied to the Central Bank arrears data¹⁴. This indicates that there are approximately 604,234 properties (773,420 loans) in the PDH market, of which 49,195 (62,970 loans) are in arrears of more than 90 days past due.

Table 6 presents the potential equity distribution of properties in arrears across the entire mortgage market based on these two scenarios. Under Scenario I, where the sample ratios are applied to the market, approximately 50 per cent of properties in arrears have positive equity; this equates to 24,597 properties at a market level. Options available to these borrowers include debt-for-equity swaps and selling to clear their arrears. However, lenders are unlikely to engage in debt-for-equity swaps if the property is at risk of falling into negative equity if house prices decline further. Therefore it is assumed that these options are only available for those with at least 20 per cent equity in their homes so that other debt, arrears and costs may also be cleared (however, this equity value will vary on a case-by-case basis). This potentially implies that 18,935 (38.7 per cent) properties have at least 20 per cent equity in their homes under Scenario I.

Table 6: Estimated Property Arrears at Sector level

Number	Market Scenario I	Market Scenario II
Properties	604,234	604,234
Arrears +90 dpd	49,195	49,195
<i>of which</i>		
Positive Equity	24,597	9,598
Negative Equity	24,598	39,597

Source: Central Bank of Ireland Residential Mortgage Arrears & Repossessions Data September 2011 & Authors Calculations

Note: *Scenario I*, assumes that the distribution of equity found in the four bank sample is the same across the entire market. *Scenario II*, assumes that only the four FMP banks have properties in positive equity. Data are estimated at the property level using a ratio of 1.28 loans to property.

In Scenario II, it is assumed that there are no properties outside of the four FMP banks, in ar-

¹⁴This ratio is based on calculations made in Section 2; however, it should be noted that this ratio may not be the same outside the four sample institutions.

rears with positive equity. This implies that only 9,598 (19.5 per cent) properties have positive equity in the market, of which 7,401 (15 per cent) have positive equity of more than 20 per cent.

These Scenarios should be considered with caution as Scenario I is likely to overestimate the amount of positive equity properties in the market while Scenario II will underestimate this number. However, these estimations indicate that of the 8.1 per cent in arrears across the PDH mortgage market, between 2-4 per cent have positive equity in their homes.

5 Buy-to-Let and Personal Sector Credit

The analysis so far has highlighted the distress position of PDH properties. While the PDH segment is the largest share of the market, it is necessary to consider the fact that many borrowers not only have BTL properties but they also have a significant amount of unsecured personal debt. While the sample data do not include unsecured personal credit, the Central Bank indicates that at a sector level non-property related credit was €30,338 million in September 2011. This section highlights the consequences of these additional household debts.

At a property level there are approximately 82,300 BTL mortgages across the four FMP banks. These properties had a total outstanding debt of nearly €20 billion or 22 per cent of the total loan book in December 2010. The micro-level data show that 33 per cent of BTL investors have their PDH mortgage in the same institution.

Figure 5 gives the two-by-two matrix at the BTL property-level. It shows that 51 per cent of BTL properties were in negative equity in September 2011, 6.4 per cent were in arrears, while just 4.3 per cent were in both. As expected, the current average outstanding balances are significantly higher for those in negative equity as they would have purchased the property during the boom years. The average arrears per BTL property are also larger than that of PDH properties.

If the BTL borrowers in group 4 also have a PDH mortgage, there is a risk that if they default on the BTL mortgage this could increase the probability of default on the PDH property. Even if a borrower manages to sell their BTL properties in this group, they are still responsible for the outstanding balances after sale, regardless of whether

it is secured on their PDH or not. This additional financial pressure could result in borrowers going into or increasing arrears on their PDH mortgages.

In addition to this secured property debt, many borrowers have unsecured debt. As stated the non-property related lending across the entire household sector was €30,338 million in September 2011, therefore, the complexity of household mortgage distress extends beyond the borrowers primary residence. As discussed, the data do not provide personal debt values for borrowers in mortgage arrears, preventing any further analysis in this area. However, the revised Code of Conduct on Mortgage Arrears (CCMA), which is effective since January 2011, requires lenders to use a Standard Financial Statement (SFS) to obtain financial information from borrowers experiencing financial difficulty or in arrears. The SFS includes all assets and liabilities held by the borrower, which enables mortgage providers assess and assist each borrower fairly on a case-by-case basis.

Figure 5: Financial Distribution of BTL Mortgages

		Negative Equity		
		Aggregate		
		N	Y	
Arrears 90+	N	Number of Properties	38,115	38,916
		Negative Equity (p.p)	-	98,257
		Total Group NE (€m)	-	3,824
		Arrears Value (p.p)	-	-
		Total Arrears (€m)	-	-
		Average Balance (p.p)	142,883	312,114
		Total Balance (€m)	5,446	12,146
Arrears 90+	Y	Number of Properties	1,692	3,597
		Negative Equity (p.p)	-	137,696
		Total Group NE (€m)	-	495.3
		Arrears Value (p.p)	15,566	26,934
		Total Arrears (€m)	26	97
		Average Balance (p.p)	189,477	387,654
		Total Balance (€m)	321	1,394

Source: PCAR 2011 level loan data

Note: Data are aggregated to the property level. Arrears and outstanding balances are end-2010, equity is based on September 2011 house prices.

6 Conclusions

This letter uses new micro-level loans data to analyse the residential mortgage market and the level of borrower distress. By creating a two-by-two matrix of negative equity and arrears it is possible to identify the most distressed borrowers. This analysis finds that, within the four FMP banks 95 per cent

of properties have no arrears, and are fully compliant with their mortgage repayment contracts.

The analysis also shows that 50 per cent of mortgages in the combined loan book were issued during 2005 and 2008, inclusive; as such it is not surprising that 51 per cent of these properties are now in negative equity. However, the majority of the properties in negative equity are performing, highlighting the fact that while negative equity is associated with default if the borrower is also in arrears, it does not necessarily cause default.

In December 2010, 5 per cent of properties in the four FMP banks were in arrears, of which just 2.4 per cent were also in negative equity. If those with positive equity of less than 20 per cent were included in the most distressed group (as house price decline would erode their equity position), then 2.6 per cent of properties would potentially be in need of assistance.

By applying a number of assumptions to the Central Bank's arrears and repossessions data from September 2011, the industry level distribution of equity can be estimated. The data indicate that a significant portion of borrowers are able to afford their mortgage repayments and of the 49,195

properties in arrears at the market level, between 24,598 and 39,597 properties could be in both negative equity and arrears.

By contract between 9,598 and 24,597 borrowers who are in arrears could have positive equity in their home. This provides these borrowers with additional options such as selling and debt-for-equity swaps with mortgage providers. These additional options could provide borrowers with a way to clear any other unsecured outstanding debts and ultimately improve their financial position.

The purpose of this letter is to provide the data underlying mortgage distress in Ireland. While this is the most informative dataset currently available there are a number of limitations. The data are only provided for four FMP banks in Ireland as of December 2010 and the current financial position of borrowers along with other outstanding debt obligations are not available. As such it is not possible to identify borrowers who have fallen into arrears during 2011, or to identify those who are pre-arrears candidates and could fall into arrears in the coming months. Notwithstanding these limitations, this letter provides insight into the financial positions of residential mortgage borrowers.

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