

Patrick Honohan: Adverse selection and moral hazard in forecasting and limiting arrears and loan losses on mortgages

Speech by Mr Patrick Honohan, Governor of the Central Bank of Ireland, based on an address on 7 October to the Society of Actuaries in Ireland, on the occasion of his being conferred with an Honorary Fellowship of the Society, Dublin, 10 October 2013.

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Home ground for the actuary is measurement and evaluation of financial risk over time as it relates to human life and human behaviour; insurance has been the canonical application. It is instructive to use some insurance analogies to help describe how the Central Bank of Ireland is performing the underlying forecasting and policy analysis around the important and topical issue challenge of mortgage arrears.

As with much insurance business, the standard Irish residential mortgage is a long-lived contract requiring calculations involving complex interest and the time dimension of evolving uncertainty. In addition, behavioural issues such as moral hazard and adverse selection also come into play. The fact that the mortgage has long been seen as a very simple, very safe, product for the lender, because of secular rises in (nominal) house prices, sizable tax preference for the borrower and a strong credit discipline, has masked these complexities. But they are now coming to the fore in Ireland following the sharp fall in house prices, accompanied by the unprecedented decline in overall employment and a lengthy recession, from which recovery remains extremely gradual.

Two key policy questions that arise in the current situation and which we are studying closely at the Central Bank, are (i) the assessment of what the overall future loan-losses (over a few decades ahead) of the banks from their existing mortgage portfolio might be, in order to guide provisioning and capital requirements and (ii) the design of optimal treatment by lenders of distressed mortgages. The insurance analogy can help direct analysis of these questions, for which indeed there are no adequate standard answers in the international literature on mortgage lending. Lessons have been learnt from banking crises in other countries, but those which have experienced banking crises on a comparable scale have faced very different legal, institutional and macroeconomic circumstances. Nevertheless, we need good answers to these questions.

Our Prudential Capital Adequacy Review (PCAR) of March 2011 forms the basis of current capital requirements on the Irish banks. I have [previously explained in some detail](#) the timeline that led up to this assessment and the flow of partial information which defeated our attempts to manage expectations and stabilise the capital adequacy needs. Following the March 2011 exercise, we decided that there was no need to revisit this matter on an annual basis, as the banks evidently had plenty of capital for the immediate future, and it was also evident that the great uncertainties surrounding macroeconomic developments and other factors likely to influence the recoverability of loans would not diminish for some time.

Now we are embarking once again on an update of the capital adequacy assessment, this time designed as far as possible to anticipate the methodology for the balance sheet assessment soon to be launched by the ECB in anticipation of the start of the European Single Supervisory Mechanism (SSM). The Irish exercise comprises three main phases: (a) a static, point-in-time data integrity validation and asset quality review to be completed later this year¹, (b) a forward-looking expected loan-loss exercise and (c) the full balance

¹ Although accounting practices are evolving, existing methods typically do not take full account of expected loan losses. When expected loan losses are higher than provided for in the accounts, and when uncertainty surrounding future developments is high, banks need more capital if they are to operate effectively in the market without dependence on Government

sheet assessment, inclusive of macroeconomic stress tests, expected to be completed by mid-2014. Ideally, the outcome of this exercise will need little or no adaptation to comply with the final specification of the SSM balance sheet assessment. Liquidity, operating margins and loan-losses on such non-mortgage parts of the banks' assets as commercial real estate and SME lending will all be important and very material elements of this exercise. At the Central Bank, we have been developing in-house our methodologies for most of these elements, and not just for the residential mortgages on which I will concentrate today.

In updating our estimates, we are therefore not just comparing the overall economic conditions of the past three years with what had been assumed in early 2011, and the changed prospects for 2014 and beyond; we are also refining the forecasting methods using the greatly enlarged data we have collected and processed over the past three years and a wider range of credible methodologies.

As far as the overall environment is concerned, national economic activity and employment have been somewhat weaker than was projected in 2011. This is largely attributable to weaker external conditions; the negative impact of the national fiscal adjustment having been sufficiently built-in to the forecasts.

But some key elements have shown a stronger evolution. House prices are an important determinant of predicted loan losses in most models; having fallen during 2011 faster than we had expected, the *average* price of Irish residential property then stabilised and now stands well above (about 10% more than) where we expected it to be. Banks also managed to make the scheduled disposals of non-core assets at much better prices than was pencilled into the 2011 exercise.

However, the percentage of residential mortgages in arrears has trended a lot higher than was projected in early 2011. How this trend will map into future loan losses is one of the key questions that need to be answered for the 2014 exercise.

Despite a large amount of relatively sophisticated work at the Central Bank,² it is important to acknowledge that our state of knowledge still does not allow us to be very definite and precise about prospective residential loan-losses. The main problem is a lack of sufficient detailed history covering analogous falling house-price episodes in Ireland. But we do have a growing collection of loan-by-loan data covering this downturn – part of half a business cycle if you will. This allows us to uncover statistical regularities that should help improve predictions at least to some extent.

Just as a life or disability assurance actuary needs to begin by modelling the probability of each insured person passing from the living to the dead state in each year going forward from the present, the typical loan-loss forecasting approach for a long-lived mortgage models migration of the loan from performing to non-performing. The loan may be cured (that is to say returned to performing status); so that has to be modelled also. Finally, there is the need to calculate how much can be recovered by the lender in the case that cure is not possible and the loan moves from default into loss.

Based on loan-by-loan data for as many as 660,000 loans collected from the relevant banks at annual or bi-annual frequency, and covering the period from the end of 2008, it is possible to model some of the determinants of a loan's migration from performing to non-performing, and of cures. But, although lenders record borrower and loan characteristics at loan origination, they do not track the income and employment status of each mortgage borrower on an on-going basis. Therefore the impact of changing economic conditions on the probability of a given loan's default or cure can only be detected at the level of regional (e.g. county level) data on, for example, unemployment or house prices: the former an indicator of

² The Central Bank's new loan-loss models have been validated by BlackRock Solutions, who conducted the loan-loss projection exercise for us in March 2011.

affordability, the latter contributing to a measure of negative equity. The probabilistic impact on a given loan's migration from performing to non-performing (or the reverse) of regional unemployment, of the estimated loan-to-collateral-value ratio and of other loan characteristics has been estimated by Central Bank researchers using relatively complex econometric techniques. Given estimates of future macroeconomic developments, the estimated model can be used to simulate the evolving performance of the loans in the period ahead.

With over half-a-million loans and five years of records it might seem that there is no shortage of data; but this is not the case. Indeed, to some extent it is a question of "water, water everywhere, nor any drop to drink", not just because the current household circumstances are not recorded, but also because so few loans have been remediated and/or so few loan losses have been crystallised

How then are we to model the extent to which persistently non-performing loans turn into lender losses? An important modelling judgement call is how far forward to model the process of loan migration and at what point losses on delinquent loans are assumed to crystallise. In practice there has been so little loss crystallisation that the data is not very informative on this. But the reliability of the migration model as a forecasting tool presumably deteriorates the longer it is projected forward, i.e. the more remote the migration simulation horizon. So it is sensible to draw a line a few years ahead. Having chosen this simulation horizon, and assuming crystallisation of the defaulted loans at that point³, the loss forecast requires calculating the lender's exposure at the time of crystallisation, and, above all, estimating the loss-given-default. This loss-given-default will of course be influenced by the projected loan-to-collateral value ratio at the horizon; that is why projecting future property prices is important. Indeed, absent a track record of successful loan long-term modifications designed to turn defaulting loans into sustainable loans, the bank needs to hold enough capital to enable it to absorb losses on the assumption that, when crystallised, defaulted loans will not recover more than the collateral value (at distressed prices) less the costs of repossession.

At the Central Bank we have also been developing a complementary loan-loss forecasting model which, instead of simply evaluating collateral recovery, assumes that the lender uses a loan modification strategy designed to make distressed loans sustainable. This alternative effort is using a richer household-level data set, with, for example, current income and employment, but on a much smaller sample of loans. The assumed loan modification is calibrated to ensure sustainability given current household circumstances. However, it may not be possible to rely for capital stress-testing purposes on the results of this alternative exercise until there is sufficient evidence of the banks actually using such modifications, which could in fact reduce the overall ultimate loan-loss that will have to be absorbed, and hence reduce the need for additional capital injections to meet the losses.

Bank behaviour around loan modification and loss crystallisation introduces what are classic insurance issues of moral hazard and especially adverse selection.

Of course, the whole mortgage concept depends on the lender having the ability to recover the collateral; not every loan can be modified: repossession has to be an option.

But over-reliance on repossession also entails costs. A growing economics literature considers why it is that banks in the United States have been proceeding aggressively with collateral repossession/foreclosure even in circumstances where a narrow calculation suggests that an affordable loan modification would offer better long-term loan recovery to the lender, especially considering the significant value destruction and costs entailed in

³ Some account also has to be taken of the potential for subsequent defaults of loans that are current at the simulation horizon.

repossession of residential property. It seems that these US bankers are fearful that a strategy of loan modification could prove more costly to the lender if it resulted in numerous borrowers opting for the offered modification even though they actually could afford to return to the original payment schedule. After all, from the lender's point of view, the overall success of a loan modification strategy hinges on the lender's ability to solve the adverse selection problem, i.e. to distinguish effectively between borrowers who can pay and those who can't: between those who can be expected to return to the original payment schedule, and those who cannot.

If a lender believes itself to be unable to achieve this triage with sufficient accuracy, it may indeed seem rational for it to deal with adverse selection by over-use of repossession. Because of the collateral damage to the economy, many specialist economists regard the rate of repossessions in the United States in the current crisis as socially excessive.

In contrast to the Americans, Irish banks have traditionally been very slow to move to repossession. Over the years, this may have reflected better information about their borrowers, allowing them to solve the adverse selection problem. It may also reflect the market structure: banks with a large market share will partly internalise, and take account of, the systemic damage caused by widespread unresolved debt distress and excessive repossessions.

The current crisis, though, is on a scale that has challenged the Irish banks' capacity to respond. Their reluctance to provide deep or lasting loan modifications has protected them from adverse selection. But the lack of clarity about the consequences of accumulating arrears has likely contributed to moral hazard for the lender, as growing numbers of stressed borrowers decide for whatever reasons to deprioritise mortgage servicing.

We have all heard the anecdotes about well-heeled borrowers flatly refusing to pay their mortgage instalments despite having plenty of money in a current account to do so, and still taking expensive holidays or buying new 132 reg cars. I don't deny that there may be such people who feel that is possible to rationalise such behaviour).

Who could endorse such behaviour? But does it really characterise the attitude of most arrears case? Of course many arrears cases are characterised by absolute cash squeezes – where the household simply does not have the resources to maintain consumption above, say the minima set out by the Insolvency Service of Ireland.

There also seem (on the basis of such limited survey evidence as exists⁴ to be many other households who could continue to pay their mortgages but, for the moment, are not doing so. Identifying these cases robustly can only be done on a loan-by-loan basis by the lenders as they seek to solve the adverse selection problem. But I suspect that most such households are not simply refusing to pay on a “won't pay: come-and-get-me-if-you-can” strategic default basis.

Indeed, I have a gripe about the term “strategic defaulter” being increasingly thrown around in Ireland to characterise the mortgage arrears problem. This term, ill-defined in the Irish context, is a transplant from the United States (where it is used mainly to refer to people who have decided to walk-away from their non-recourse mortgage loans, but are living on in the property for a last few cost-free month.⁵ The context being so different here, I find much of

⁴ Examination of the Standard Financial Statement (SFS) returns of defaulting borrowers in Ireland has shown that, indeed, monthly amounts due on the original monthly schedule represent a remarkably small portion of current monthly income, for a relatively high fraction of borrowers.

⁵ Evidence that default is correlated with factors other than affordability is often taken in the US as indicating that “strategic default” is present. For example, if the extent of negative equity of a household is correlated with default status, this could be seen as indicating “strategic default”. Such a correlation exists in Irish data; however, forthcoming research from the Central Bank seems to suggest that, once affordability factors are

the Irish use of this value-loaded⁶ term inauthentic; a rhetorical use, which obscures the diversity and complexity of arrears circumstances.

But we need to understand the multiplicity of causes for such behaviour if we are to be effective in correcting it. Among other cases contributing to the persistent surge of mortgage arrears, is it not plausible that some, perhaps many, would be better characterised as some variety of “wait-and-see” behaviour? Though different to the US archetype of “strategic default,” “wait and see” is not a safe or viable plan for the borrower, or for society, and clearly calls for corrective action. Let me elaborate on a few examples of situations which I would characterise as “wait-and-see.”

- *Slow to face facts.* It takes time for many borrowers to understand and come to terms with their own changed circumstances and the consequences of their past investment and/or borrowing decisions. The over-indebtedness which many now face may seem to them to be something for which they themselves bear at most a part of the responsibility. The fact of their legal obligation to pay debts, including those assumed to finance leveraged property investments, is blurred in their minds by a sense of moral outrage directed at others: co-decisionmakers, lenders, the wider political and economic system. Though, deep down, they know their legal obligations will likely catch up with them sooner or later, they choose to wait-and-see.
- *Management of multiple debts.* Accumulating arrears on credit-card and utility debts, for example, can impose immediate costs in higher interest or in having the utilities cut-off. Non-mortgage debt will often be prioritised as a temporary coping strategy. Repossession of one’s home can seem a remote risk in the face of more immediately pressing financial issues resulting again in wait-and-see behaviour on mortgage debt in order to pay bills or service other debts.
- *Consumption-smoothing.* Micro-economics text-books generally explain household borrowing and saving behaviour as a strategy for life-time consumption-smoothing. No reader of such texts should be surprised to see households seeking to manage an income-shock by borrowing from the cheapest source. It can appear to households that, for a time, accumulation of mortgage arrears is the cheapest form of borrowing, in the hope that the income shock might prove transitory. Given the passivity of Irish banks, such households can be tempted to postpone adjustments to their consumption pattern; to wait-and-see.

But, for good reasons, mortgage contracts do not contain “wait-and see” clauses. “Wait-and-see” erodes the remaining life-time resources of the household available to service long-term debt, it heightens aggregate economic uncertainty, and can have spillover effects on the behaviour of others, ultimately undermining the functioning of the economic and financial system.

The scale to which the unresolved arrears situation has grown in Ireland reflects the absence of immediate consequences for non-payment. This lack of consequences has created a degree of moral hazard.

taken into account, there is no evidence of a marked change in arrears behaviour when a borrower moves into a negative equity position.

⁶ Even in the US, and in the States where it is impossible for the lender to pursue a defaulting mortgage holder for the deficiency after sale of the collateral, the vast majority of borrowers (over 80 per cent) tell surveys that they regard not paying debts when one can afford to do so as morally wrong. Nevertheless (according to [research](#) carried out at the US Federal Reserve) the existence of negative equity greatly increases the probability of default in non-recourse States, but not in recourse States.

Admittedly, this is not only down to banker behaviour.⁷ To an extent, necessary policy rightly designed to prevent over-aggressive recovery tactics from lenders, as defined in earlier versions of the Central Bank's Code of Conduct on Mortgage Arrears, will also have contributed to reducing the risk to households of employing "wait-and-see" tactics. The temporary removal of some repossession risk during the "Dunne judgement" period may also have emboldened those who wait-and-see. But these barriers have been removed, and the introduction of credible personal insolvency legislation also creates a new environment less conducive to "wait-and-see".

In sum, resolving the mortgage arrears problem is not just a question of modifying unbearable debts. It also requires action to end the procrastination of those whose situation is not unsustainable, including moving to repossession if necessary.

It's not an easy job. It will take time and skill: having allowed such a large build-up of arrears cases working through them individually and determining the correct treatment will be the work of the coming year to eighteen months. Ensuring that this happens effectively is the biggest challenge currently facing the Central Bank. As the banks secure the information needed to implement sustainable solutions without too much adverse selection, which will include getting those who can afford to pay back onto a full repayment schedule, and in some cases (especially, but not exclusively buy-to-lets) will have to involve repossession, the share of wait-and-sees in aggregate arrears will diminish.

Resolving the deep and protracted banking crisis calls on the use of advanced analytical techniques to measure and design solutions, as well as ensuring that they are implemented by the banks. Though challenging, and although concrete results on the ground have been slower coming than we want to see, this work is now well advanced at the Central Bank and will continue to be pushed forward energetically.

⁷ Though three out of every four arrears cases have not yet been re-arranged by the lender.