Box C

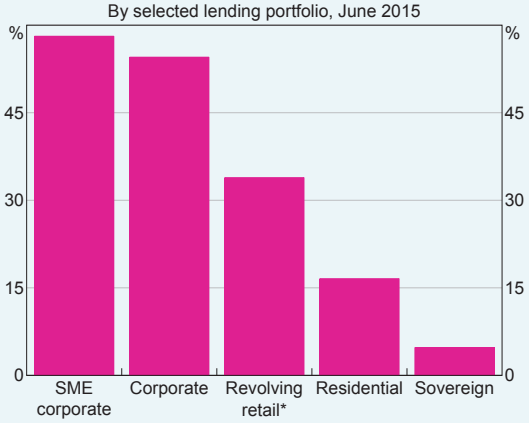
The Regulatory Capital Framework for Residential Mortgages

Simply put, a bank's capital represents its ability to absorb losses. To promote banking system resilience, regulators specify the minimum amount of capital that banks should allocate against various risks. Of particular importance is the amount of capital allocated against credit risk – the risk that borrowers will not repay their debt obligations – as this is typically the main risk that commercial banks assume. From mid 2016, the Australian Prudential Regulation Authority (APRA) will require some banks to increase the capital that they allocate against credit risk in their residential mortgage exposures. This box outlines the regulatory capital framework in Australia in order to provide some context for this recent decision.

The framework for credit risk requires banks to determine the capital that they need to allocate against their credit exposures by assigning each exposure a 'risk weight' that reflects the potential for unexpected losses.[1] For instance, a risk weight of 25 per cent on a $100 loan equates to a risk-adjusted exposure of $25, so a bank would need to allocate $2.50 in capital to achieve a capital ratio of 10 per cent of risk-weighted assets.[2] Average risk weights can differ significantly across classes of credit exposures: for example, most corporate lending exposures attract risk weights that are well above those on most residential mortgages (Graph C1).

In Australia, the four major banks and Macquarie Bank are approved to use the internal ratings-based (IRB) approach to credit risk, whereby they use internal models accredited by APRA to derive the risk weights on their credit exposures. All other authorised deposit-taking institutions (ADIs) currently use the standardised approach, where the risk weights are prescribed by APRA. The set of prudential standards for both of these approaches in Australia are consistent with the international capital standards issued by the Basel Committee on Banking Supervision (BCBS).

Graph C1
Major Banks' Average IRB Risk Weights
By selected lending portfolio, June 2015



* Excludes retail SME
Sources: APRA; RBA

Internal Ratings-based Approach

The IRB approach to measuring credit risk was a centrepiece of the international Basel II capital framework that was implemented in Australia in 2008. Its aim was to enable banks to more accurately estimate the risk of their credit exposures using their own data and experience, and to ensure that

1 Technically speaking, capital is required to cover unexpected losses up to a 99.9 per cent level of confidence. A bank's expected losses should be covered by its credit provisions.

2 A capital ratio of 10 per cent is used here for illustration. Required regulatory capital ratios are somewhat higher than this, although they may be lowered by supervisors in stressed conditions.

capital varies according to changes in measured risk over time.[3]

Under the IRB approach, the risk weight for each type of credit exposure is based on an estimated probability distribution of credit losses. The shape of this distribution is affected by the following key inputs:

- the effective maturity (M)
- the probability of default (PD) – the risk of borrower default in the course of a year
- the exposure at default (EAD) – the amount outstanding if the borrower defaults
- the loss given default (LGD) – the percentage of the exposure that the bank would lose if the borrower defaults.

Banks typically estimate these inputs internally after rating their exposures according to a number of risk characteristics – hence the term 'internal ratings-based' approach.[4] For instance, a mortgage for a borrower that has a poor repayment history and a high loan-to-valuation ratio (LVR) may be assigned a relatively weak rating and a higher estimated PD and LGD; differences in the composition of mortgage types is one reason why risk weights vary between IRB banks.

An additional input, a 'correlation factor', is specified by APRA for each broad type of credit portfolio. The correlation factor can be thought of as the dependence of exposures within a portfolio on the general state of the economy.

Although IRB banks largely determine the risk weights on their credit exposures using their internal models, supervisors play an important role in reviewing and approving the modelling approach. Indeed, APRA grants approval to use the IRB approach only after a bank has met strict governance and risk modelling criteria. Purely statistical models or other mechanical methods are not acceptable, and banks must have policies detailing how judgement and model results should be combined. Model outputs also need to be supplemented with insights from stress tests.

In addition to overseeing banks' internal modelling processes, national supervisors may use discretion under the Basel II framework to require banks to maintain capital above the international minimum for a particular exposure class, as circumstances can differ materially between jurisdictions. The residential mortgage asset class is one area where APRA has adopted a more conservative local stance than the minimum requirements set out in the Basel II framework. Specifically, in 2008 APRA set a 'floor' of 20 per cent on the LGD for residential mortgage exposures, rather than the 10 per cent floor prescribed by the BCBS. The higher floor was judged necessary in the Australian context to guard against banks underestimating the losses on their mortgage portfolio in a downturn. There are no historical data that cover a severe loss episode, because there has not been a major housing downturn in Australia since the 1890s.[5]

In recent years, some national regulators have made adjustments to the IRB approach for residential mortgages in response to concerns that modelling practices were not adequately capturing the full range of risks. In particular:

- Hong Kong introduced a 15 per cent risk weight floor
- Sweden introduced a 25 per cent risk weight floor
- Norway introduced a 20 per cent LGD floor

3 The IRB Basel II framework was also a way of addressing incentives for capital arbitrage that had become apparent under the simple Basel I framework – that is, the incentive to accumulate assets in areas where risks were under-recognised in the previous capital framework. See Ingves S (2013), 'Strengthening Bank Capital – Basel III and Beyond', address to the Ninth High Level Meeting for the Middle East & North Africa Region, Abu Dhabi, 18 November.

4 For non-retail exposures, such as corporate lending, there are two tiers within the IRB framework: 'advanced' IRB banks have supervisory approval to model the PD, EAD, LGD and M parameters, whereas 'foundation' IRB banks must use supervisor-specified estimates for LGD and EAD. Currently Macquarie Bank is a foundation bank whereas the four major banks are all advanced banks.

5 See Stapledon N (2012), 'Trends and Cycles in Sydney and Melbourne House Prices from 1880 to 2011', *Australian Economic History Review*, 52(3), pp 293–317.

- New Zealand increased the correlation factor for loans with high LVRs.

Standardised Approach

Relative to the IRB approach, the standardised approach is a simpler way of measuring credit risk and determining minimum capital requirements. Risk weights are prescribed by supervisors based on some observable risk characteristics. For residential mortgage exposures, risk weights in Australia are based on:

- the loan-to-valuation ratio
- whether the loan is standard or non-standard (e.g. loans with low documentation)
- whether the loan is covered by lenders mortgage insurance (LMI).

Depending on the mix of characteristics, residential mortgage exposures can attract a risk weight of 35, 50, 75 or 100 per cent (Table C1). APRA's prudential standard applies more risk-sensitive prudential criteria than in some jurisdictions, which typically impose risk weights of 35 per cent for loans with an LVR of less than 80 per cent.

The standardised approach is not as risk-sensitive as the IRB approach for residential mortgages in Australia. One consequence is that certain mortgage exposures with the same risk profile can attract a different risk weight (and hence capital requirement) under the IRB approach than the standardised approach. In practice, risk weights tend to be lower under the IRB approach, although APRA's adjustments to the Basel II framework have reduced the difference somewhat. The difference in average risk weights between the two approaches provides an incentive for banks to invest in developing and maintaining the models and risk management processes required to achieve IRB accreditation;[6] a number of smaller banks are currently progressing towards meeting the necessary criteria.

Recent Developments

In July APRA announced an increase in capital requirements for Australian residential mortgage exposures under the IRB approach. The increase will be implemented via an adjustment to the correlation factor prescribed by APRA. The average risk weight of residential mortgage exposures using

Table C1: Mortgage Risk-weights Under the Standardised Approach to Credit Risk

Per cent

	Standard loans		Non-standard loans	
LVR	With LMI[(a)]	Without LMI	With LMI[(a)]	Without LMI
0–60	35	35	35	50
60.01–80	35	35	50	75
80.01–90	35	50	75	100
90.01–100	50	75	75	100
> 100.01	75	100	100	100

(a) A minimum of 40 per cent of the original loan amount must be insured
Source: APRA

6 The standardised and IRB credit risk-weights are not directly comparable for a given product. First, ADIs that use the standardised approach tend to be relatively undiversified across geographies and products, as well as have greater business/strategic and credit concentration risks than the larger, more diversified banks using the IRB approach. Second, IRB banks are subject to other capital requirements that are not applied to standardised banks, including for interest rate risk in the banking book. See APRA (2014), *Submission to the Financial System Inquiry*, p 75.

the IRB approach will increase to at least 25 per cent by mid 2016, from an average of around 17 per cent at the end of June 2015. By comparison, the average risk weight for residential mortgage exposures under the standardised approach was around 40 per cent.

The increase in IRB mortgage risk weights addresses a recommendation of the 2014 Financial System Inquiry that APRA raise the average IRB mortgage risk weight to narrow the difference between average mortgage risk weights for banks using the IRB approach and those using the standardised approach. The increase is also consistent with the direction of work being undertaken by the BCBS on changes to the global capital adequacy framework for credit risk.

The increase in IRB mortgage risk weights in Australia is an interim measure. The final calibration between the IRB and standardised mortgage risk weights will not be finalised until the BCBS' broader reviews of these frameworks are completed.