Quality of bank capital in New Zealand

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The four largest banks in New Zealand have been accredited to operate as 'internal models' (IM) banks under the Basel II capital framework. Under this approach, banks are allowed to use their own models as a basis of determining their minimum capital requirements, subject to their models being accredited by the Reserve Bank. In this article, we explore the quality of capital in New Zealand. We explain the Reserve Bank's capital philosophy, and discuss the key issues that have been considered during the implementation of the IM approach within the New Zealand context. In doing so, we highlight areas in which the Reserve Bank has diverged from international practice to ensure that the New Zealand banking system operates within a conservatively capitalised framework, commensurate with the risks faced by New Zealand banks.

1 Introduction

The Reserve Bank registers and supervises banks in New Zealand for the purposes of promoting the maintenance of a sound and efficient financial system, and avoiding significant damage to the financial system that could result from the failure of a registered bank. Like most bank regulators, one of the principal ways the Reserve Bank undertakes prudential supervision is by setting the minimum level and quality of capital that banks must hold. Capital management is a fundamental aspect of bank risk management. Capital provides a buffer to reduce the risk of a bank becoming insolvent as a result of losses arising from a severe economic downturn. Bank capital is therefore a key contributing factor to a sound and efficient financial system.[2]

This article provides an update on how the Reserve Bank has implemented Basel II to ensure high-quality capital management outcomes. The article proceeds as follows. Section 2 provides a brief overview of the development of international capital adequacy requirements (principally the Basel II framework), and outlines the philosophy adopted by the Reserve Bank in implementing them in New Zealand. Section 3 summarises the key issues in the calculation of minimum capital holdings under Pillar 1 of the Basel II framework, focusing specifically on areas where the nature of risks in New Zealand make it appropriate to deviate from international practice. Section 4 discusses capital overlays and disclosure requirements (Pillars 2 and 3 of the Basel II framework), and section 5 outlines emerging issues.

2 International requirements and the Reserve Bank's capital philosophy

Capital adequacy frameworks developed by the Basel Committee on Banking Supervision (the Basel Committee) have been adopted by virtually all countries with internationally active banks. The current framework, known as Basel II, forms the basis of the Reserve Bank's capital adequacy requirements for banks incorporated in New Zealand. Box 1 provides further information on the Basel Committee and the standards it has developed.

One of the key features of the Basel framework is that banks' capital holdings should be risk sensitive. In simple terms, this means that the level of capital held against high-risk loans should be higher than the level of capital held against low-risk loans. As a result, under the Basel framework, the assets of a bank are weighted according to the risk of loss. For instance, a commercial loan would normally be considered more risky than a residential mortgage. Minimum capital requirements are set at 8 percent of the bank's aggregate risk-weighted assets (RWAs).

Whilst this minimum requirement applies to all banks under Basel II, the precise calculation of the bank's RWA will depend upon which of the two broad approaches to calculating capital it uses. As a default setting, the RWA will be calculated according to a set list of simple, broad categories of loans and risk weightings that are applied mechanically. This is known as the standardised model.

The alternative is to adopt, subject to supervisor approval, the IM approach. Whilst the basic principle of setting

Box 1

International bank capital adequacy requirements

International banking regulations are developed by the Basel Committee on Banking Supervision, which was established by the central bank governors of the Group of Ten countries in 1974. The Committee does not have any formal supranational supervisory authority, but seeks to encourage convergence towards common supervisory approaches and standards without attempting detailed harmonisation of member countries' supervisory techniques.

In 1988, the Committee developed the Basel Capital Accord (Basel I) to align the capital adequacy requirements applicable to internationally-active banks. Basel I introduced two key concepts:

- It defined what could be counted as capital, and designated capital as Tier 1 or Tier 2 depending on its loss-absorbing or creditor-protecting characteristics.

- It linked capital requirements to the risks associated with the assets held on banks' balance sheets, setting minimum capital requirements as a percentage of assets, which are adjusted for their riskiness.

The original Basel I framework applied solely to credit risks. The framework was subsequently enhanced in 1997 by a requirement to measure and apply capital charges to market risks.

Basel I was widely implemented around the world and was considered to be a broadly successful framework. However, as financial market instruments became increasingly more complex and sophisticated, the gap between the relatively simple risk measurement framework of Basel I and the actual practice of major international banks widened. In response, the Basel Committee began work on an updated capital adequacy framework, resulting in the release of the Basel II framework in June 2004.

The Basel II framework builds on the basic concepts of the original Basel Accord. In particular, the Committee wanted to incorporate the many elements that help to promote a sound and efficient financial system over and above the setting of minimum capital requirements. As a result, the Basel II framework features three complementary 'pillars' that draw on a range of approaches to ensure banks are adequately capitalised. These are:

- Pillar 1, which focuses on minimum capital requirements, specifying how banks should determine the capital requirements for the risks they face, including credit risk, traded market risk and operational risk;

- Pillar 2, which focuses on the supervisory review process, and is designed to reflect the fact that supervisors have a role to play in ensuring that banks' risk management practices reflect negative externalities that might arise from failure; and

- Pillar 3, which focuses on market discipline, recognising that market participants have a role in 'regulating' bank behaviour and emphasising the importance of strong and consistent disclosure requirements.

Whilst the three pillars are interdependent and are designed to collectively ensure that banks hold sufficient capital for their respective operations, Pillar 1 constitutes the most substantial part of the framework. It builds on the Basel I framework with the aim of increasing the risk sensitivity of capital requirements. It does this by focusing explicitly on the different risks that banks face, including:

- credit risk, which refers to the risks associated with borrowers defaulting on their obligations;

- operational risk, which reflects losses arising from inadequate or failed internal processes, people, and systems, or external events; and

- market risk, which reflects the risk of losses from holding financial instruments for trading purposes, and arises from movements in market prices.

Of these risks, credit risk represents the most significant element for New Zealand banks, as shown in figure 1.

Figure 1
Capital for Pillar 1 risks, NZ internal models based banks 31 March 2009
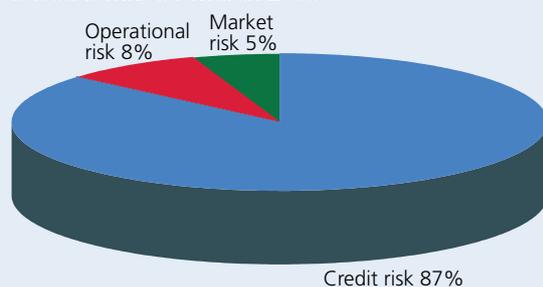
Source: Bank general disclosure statements.

capital requirements according to the underlying risk of the business is the same, the IM approach allows banks to align their capital requirement more closely with their individual risk profile. For credit risk, this means that the capital requirement for each category of asset is calculated with reference to the bank's own internal modelling and determination of factors that drive the risk profile of that asset (to a standard acceptable to the Reserve Bank). These factors include the downturn loss given default (LGD), the long-run average probability of default (PD), and the exposure at default (EAD). The models used by banks under the IM approach are subject to accreditation by the banks' supervisor.

The Basel II framework was implemented in New Zealand in the first quarter of 2008. Four banks in New Zealand have been accredited to use internal models for credit and operational risk. These banks are ANZ National Bank Limited, ASB Bank Limited, the Bank of New Zealand, and Westpac New Zealand Limited. Between them, these institutions account for over 80 percent of total New Zealand registered bank assets.

Given the scale of these institutions, and their resulting importance to the overall stability of the New Zealand financial system, the Reserve Bank seeks to ensure that each individual bank's model is consistent with the Reserve Bank's broader, and by international standards, conservative, capital philosophy. In part, the conservatism comes from a capital philosophy that reflects the features and risks particular to the New Zealand financial system, and in part from some of the implementation decisions we have taken.

Philosophically, there are two approaches to measuring risk over time. Under the point-in-time (PIT) approach, capital varies over time, generally in line with the economic cycle. Under the through-the-cycle (TTC) approach, capital is relatively stable over time and does not change materially with the ups and downs of the economic cycle. These two options are illustrated in figure 2 below. The TTC approach is the appropriate approach in the Reserve Bank's view. This view is based on the premise that the risk of loss a bank faces with respect to a loan should be measured in a way that reflects the full range of economic conditions that could prevail over the life of the loan. In setting a TTC capital

requirement at an appropriate level, the Reserve Bank considers that the following factors should be inherent within the modelling:

Calibration: that banks' minimum capital holdings should be calibrated to downturn economic conditions is a widely accepted principle. However, under a TTC approach, banks should hold a level of capital that is at all times capable of absorbing, with a high probability, the shocks that could occur over the reasonably foreseeable future.

Risk differentiation: that banks' minimum capital holdings should be risk sensitive is also widely accepted. However, in this context it is important that banks are able to differentiate risk (i.e., distinguish between high- and low-risk loans) appropriately under a TTC approach. In a favourable economic environment, the difference in risk between two particular loans may appear small, but in an economic downturn, the difference in risk could be significant. Banks should measure risk in the context of an economic downturn, which is also when the capital is most needed.

In combining these factors, the Reserve Bank has sought to ensure that the Basel II framework is implemented with risk weightings that are calibrated to an appropriately conservative threshold.[3] The remaining sections of this article explain in more detail how this outcome has been achieved.

Figure 2
Capital requirements under the PIT and TTC approaches
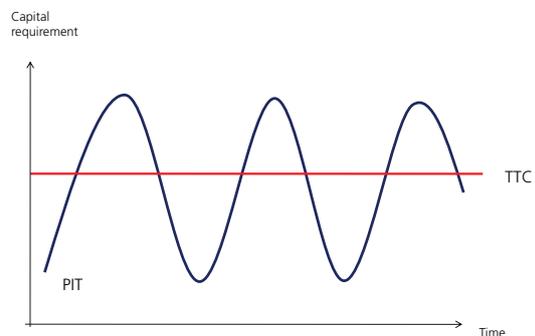
[3]   While the focus of this article is on the determination of conservative risk weights, by international standards, the Reserve Bank also has a conservative approach to the definition of regulatory capital (in particular eligible Tier 1 capital instruments).

3 Key issues in the calculation of minimum capital holdings under Pillar 1

As the standardised model is mechanistic (there is no discretion involved on the part of the bank other than to classify the loans), the key Pillar 1 issues arise in the context of the IM approach (see box 1 for an explanation of the 'three pillars' of Basel II). The New Zealand IM banks are all owned by Australian parent banks that have been accredited to use IM by the Australian Prudential Regulation Authority (APRA) and generally base their models on those used by their parents. In this context, it made sense for the Reserve Bank and APRA to work together as they undertook their assessments of banks' models.[4] The Reserve Bank focused on housing and farm lending risks for IM banks for several reasons:

- Both sectors represent a significant portion of New Zealand banks' balance sheets (see figure 3 below).

- Concerns the Reserve Bank had about the banks' housing models, based on a significant amount of analytical work in this area the Reserve Bank had undertaken.

- The distinctive nature of New Zealand farm lending risks compared to those risks built into the parent bank corporate lending models on which the New Zealand models were based.
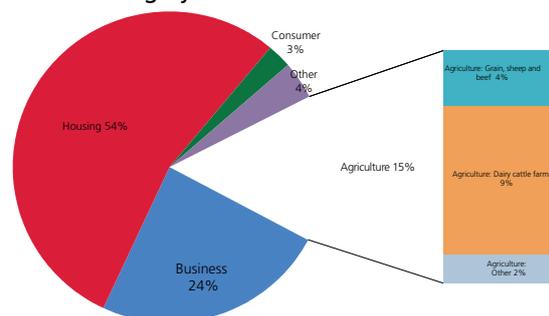
In addition, the Reserve Bank takes a particular approach to internal models for credit cards to best reflect New Zealand conditions. In other areas, particularly non-farming corporate loans and operational risk, the Reserve Bank has relied more on APRA's assessments.

The Basel II framework specifies an equation for determining risk-weighted assets for each class of asset.[5] The task of

Figure 3
Bank lending by sector

Source: RBNZ.[6]

IM banks includes determining which asset class is the most appropriate for each loan portfolio (this is usually straightforward), and determining the risk drivers and values for some of the inputs into the Basel II equations (see box 2 for more detail). Two of the key inputs are:

- Probability of default (PD) – the likelihood of a borrower defaulting on a contractual obligation. Banks determine the long-run average PD.

- Loss given default (LGD) – the proportion of the obligation that the bank expects to lose in the event of a default. Banks determine LGD for their portfolios assuming a downturn economic environment.

When assessing the initial models of the IM banks, the Reserve Bank found the models were inadequate in a number of areas. The Reserve Bank therefore required changes to be made either prior to accrediting the models, or as part of the post-accreditation model improvement process. The key areas of change are summarised in table 1 below and discussed in more detail below.

The purpose of table 1, overleaf, is to provide a general indication of New Zealand Basel II outcomes, as results will differ from bank to bank and through time. Some results for Australia and the UK are also shown to illustrate the extent to which the New Zealand approach departs from some comparator jurisdictions.

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[4]   DeSourdy (2006) explains the legislation relating to cooperation between New Zealand and Australian bank regulators. Also see the "Terms of Engagement between the Reserve Bank of New Zealand and the Australian Prudential Regulation Authority in relation to the implementation of Basel II" for an explanation of how the Reserve Bank and APRA seeks to dovetail their assessments of IM banks' models: http://www.rbnz.govt.nz/finstab/banking/regulation/1497871.html.

[5]   See the Reserve Bank's "Capital adequacy framework (internal models based approach)" for these equations (http://www.rbnz.govt.nz/finstab/banking/regulation/0094291.html).

[6]   Breakdown of bank lending by sector is as at June 2009, excluding inter-bank and non-residential claims. Percentages reported for the breakdown of lending to agriculture are estimated from the most recent RBNZ agricultural lending survey (June 2009).

Box 2

Calculation of capital requirements

Conceptually, the process for determining the capital requirements for IM banks is as follows:

- IM banks determine a series of inputs for each 'pool' of loans.

- These inputs feed into the Basel II equation to determine a risk weight for the loan pool.

- The risk weight is then applied to the loan value to determine risk-weighted assets.

- Capital requirements are determined by multiplying risk-weighted assets by 8 percent.

An example of the determination of capital requirements for a pool of farm loans and a pool of residential mortgage loans is provided below.

Different asset classes use different equations (for instance, there are various classes of corporate and retail exposures). The inputs into the Basel II equation may include (depending

on asset class).

- **Probability of default (PD)** – the likelihood of a borrower defaulting on a contractual obligation. Banks determine the long-run average PD.

- **Loss given default (LGD)** – the proportion of the obligation that the bank expects to lose in the event of a default. Banks determine LGD for a downturn economic environment.

- **Exposure at default (EAD)** – the maximum amount of loss in the event of a default.

- **Maturity (M)** – the remaining age of the obligation.

- **Firm size** – there is a separate corporate equation for firms with annual sales of less than $50 million.

Another critical input into the Basel II equation is correlation. This is measure of risk diversification (the extent to which individual loan losses within a pool or portfolio are correlated). The correlations for the various asset classes are given by the respective equations and are not determined by IM banks.

Loan type	Loan value		Risk weight		Risk-weighted assets		Minimum capital requirement
Farm loan	$1,000	*	100%	=	$1,000	* 8% =	$80
Residential mortgage	$1,000	*	30%	=	$300	* 8% =	$24

Housing models

The Reserve Bank's assessment of IM banks' models drew heavily on a model of residential mortgage loan loss that it developed (box 3 contains a brief description of this model). A challenge for IM banks was the unavailability of a long sample of time series data. As a result, the models placed too much weight on the years just prior to when the models were developed, which were very benign in terms of housing credit losses. This meant the banks' models were not sufficiently calibrated to the long-run and were not well suited to identifying long-run or downturn risk drivers. The three key housing issues for the Reserve Bank (in table 1 overleaf) are described more fully below:

- LGD estimates were not sufficiently calibrated to economic downturn conditions and did not include the loan-to-value ratio (LVR) as a risk driver. LVR is the size of the mortgage compared to the value of the house.

The difference between normal-times LGD and downturn LGD can be very significant, particularly for high LVR loans. In benign economic times, a high proportion of defaults are 'liquidity events', where there is little or no loss to the bank because the house is either sold and the loan repaid in full, or the borrower is able to fully service the loan after a period of being in default. In a downturn, 'solvency events' are more common, whereby the bank incurs a loss because the borrower does not resume repayments and the value of the loan

Table 1

Key areas of change required to IM bank models

Issue	Basel I risk weights	Initial bank position	Final position after Reserve Bank actions	Australian estimates/risk weights[7]	UK risk weights
Housing					
LGD estimates		10%[8] Not LVR-sensitive	Just over 20% and sensitive to LVR	20% minimum	-
PD-model risk drivers		Emphasis on current signs of borrower distress	Pillar 2 capital overlay and further work required	-	-
Long-run portfolio PD estimates		0.5% (approx)	1.25% minimum	0.8%	-
Average risk weight	50%	10%	30%	15-20%	15-20%
Rural					
LGD estimates		Not sufficiently calibrated to downturn economic conditions	Appropriately calibrated	-	-
Risk diversification benefits (correlation coefficient)		Standard Basel II treatment overly optimistic	Better calibrated to homogeneous NZ sector	-	-
Average risk weight	100%	50%	System average of 80-90%	50%	-
Credit cards					
Assignment to appropriate Basel II asset class		Standard classification resulted in too much emphasis on idiosyncratic rather than systemic risk	Appropriate asset class classification fit for NZ conditions	-	-
Average risk weight	100%	30% (approx)	80%	30-50%	-

exceeds the amount that can be realised in a mortgagee sale (taking into account various other default-related costs incurred by the bank, such as administrative costs and the financial cost associated with the period of time between default and any recovery).

The following example illustrates: In a relatively benign environment, a realistic loss rate when there is a solvency event is 35 percent. Only 5 percent of defaults are solvency events and so the measured LGD is 35% x 5% = 1.75%. In a downturn environment, the typical loss rate for a solvency event can be expected to increase moderately to, say, 55 percent, but the proportion of solvency events will increase sharply. For high LVR loans, the proportion could easily increase to 50 percent. In this case, the measured stressed LGD becomes 55% x 50% = 27.5%.

The choice of the downturn scenario is critical. In the example above, the downturn LGD is more than 10 times the benign LGD. The difference between benign and downturn LGD would be less with a more moderate downturn. The Reserve Bank's view is that a 'severe' rather than a moderate downturn scenario is appropriate for modelling capital requirements. This is

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[7]   Source: Australian bank Pillar 3 disclosures.
[8]   The Basel II framework specifies a minimum value of 10 percent for LGD. Some banks' initial modelling work produced estimates below this floor.

consistent with the Basel II framework.

The Reserve Bank required that, over time, banks undertake further work to improve the sensitivity of their own LGD models to economic risk drivers, and to ensure their own LGD models are calibrated to economic downturn conditions that incorporate a fall in average house prices of 30 percent. In the meantime, in order to ensure banks' models are appropriately calibrated and risk-sensitive, IM banks are required to use the following set of LGD estimates in their capital calculations:

Table 2

Reserve Bank downturn LGD estimates

LVR	90-100%	80-89%	70-79%	60-69%	Under 60%
LGD	40%	35%	30%	20%	10%

- Several PD models placed too much emphasis on signs of current borrower distress such as delinquency (delinquency occurs when the borrower's repayments of principal or interest fall behind schedule). The predictive power of the models overstated their practical usefulness for capital purposes, as logically a borrower will always miss payments prior to defaulting on a loan. Also, while delinquency can provide a useful 'early warning signal' of potential near-term losses, it represents a point-in-time measure of risk. In particular, during favourable economic times when delinquencies are low, PD would also be low. During unfavourable economic times, as delinquencies increase, PD would increase accordingly. For the purpose of determining capital requirements, it is the vulnerability to distress over the longer term (through the cycle) that is most relevant.

The Reserve Bank did not require IM banks to address PD risk differentiation issues at the point of accreditation. However, over time, IM banks are required to investigate long-term structural drivers of default risk (such as the debt-servicing ratio, marital status, and occupation)[9] that can predict average default years, rather than weeks or months, ahead of time.

In the meantime, a condition of accredited IM bank status is that the IM banks are required to hold additional

capital equal to 15 percent of the capital modelled for credit risk arising from residential mortgage lending, to recognise that model improvements are needed.

- The estimates of long-run PD were generally low in relation to comparable estimates observed internationally, and low on the basis of the Reserve Bank's own modelling. Also, the estimates of long-run portfolio PD varied across banks more than could be reasonably expected given the New Zealand banks generally have a similar customer base. The Reserve Bank thus required IM banks to maintain a long-run average portfolio PD of at least 1.25 percent to reflect the range of economic conditions that could reasonably be expected over the medium- to long-term.

Given the point-in-time nature of IM banks' models, periodic adjustments may be necessary to ensure banks' PDs remain calibrated to 1.25 percent throughout the economic cycle. Figure 4 illustrates how such an adjustment could be made. In this example, in relatively good economic times, the unadjusted modelled PD is 0.42 percent, reflecting a low delinquency rate. To comply with the Reserve Bank's requirements, the unadjusted PD would need to be multiplied by a factor of about 3. In unfavourable economic times, unadjusted PD rises to 2.5 percent as delinquencies increase. In this case the bank may elect to divide unadjusted PD by 2 to achieve an adjusted PD of 1.25 percent. While the actual adjustment process used by some banks is complex, the description provided here is, in essence, what the Reserve Bank requires IM banks to do.

Figure 4

Illustrative PD long-run adjustment
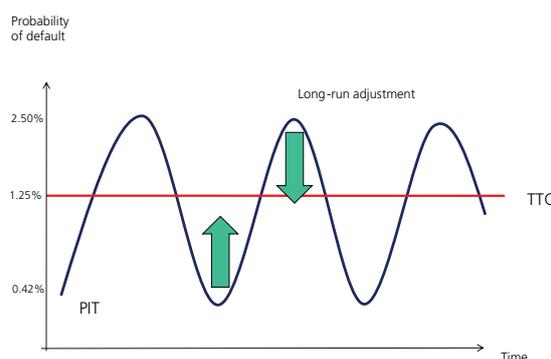
The three measures taken by the Reserve Bank as outlined above had the effect of lifting the average risk weight for housing loans from around 10 percent (based on the IM banks' initial estimates) to 30 percent. Figure 5 below illustrates the contributions to the final risk weight.

Figure 5
Policy actions and housing risk weights
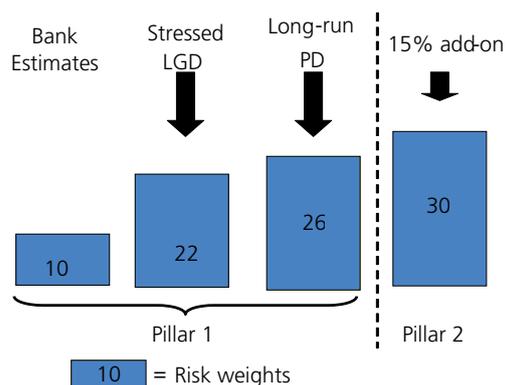
There are two additional issues worth noting:

• Bank estimates should incorporate an upward adjustment as an additional measure of conservatism. This is needed to take account of the uncertainty associated with any long-run estimate, and also to take account of the uncertainty associated with the models being new and largely untested.

• Housing loan losses in the New Zealand housing market are more highly correlated than the Basel II equation for determining housing capital assumes. In effect, the equation gives too much weight to idiosyncratic risk (ie, that associated with the particular circumstances of the borrower) compared to systemic risk (ie, that associated with general economic conditions). A higher loss correlation implies that downturn losses are potentially higher. This issue relates to the Basel II framework rather than banks' models per se.

As a result of these concerns, the Reserve Bank included an additional margin in its LGD estimates and minimum PD requirements.

Credit card models

Within the Basel II framework, there are three categories of retail loans: residential mortgages, 'Qualifying Revolving Retail Exposures' (QRRE), and a residual category called 'Other Retail'. Under the Basel II framework, it can be expected that loans classified as QRRE would attract less capital than Other Retail loans, but only those loans that meet certain criteria can be classified as QRRE.[10] The QRRE category was created by the Basel Committee in part to accommodate the risk characteristics of credit card loans.

The lower capital requirement for QRRE loans is based on an assumption that there is relatively more idiosyncratic risk associated with credit card losses because banks target a customer base that has a relatively high loss rate due to individual circumstances, and relatively less risk associated with economic events affecting a large portion of obligators at the same time (systemic risk). This rationale for the QRRE treatment was developed from the experience of countries such as the US where credit cards are relatively easy to obtain.

Unlike in many other countries (including Australia), the Reserve Bank has not permitted New Zealand banks to classify their credit card portfolios as QRRE loans for two reasons:

• New Zealand banks have not been able to demonstrate that New Zealand credit card loss rates are only weakly correlated with the economic cycle. This is not surprising. In New Zealand, relative to some other countries, more creditworthiness must generally be demonstrated before banks will issue credit cards. Consequently, a greater proportion of credit card losses arise from unfavourable general economic conditions rather than from (uncorrelated) individual circumstances.

• Given the nature of NewZealand credit card risks, use of the QRRE category would mean credit card loans attract a similar level of capital as residential mortgage loans. However, intuitively, credit card loans are more risky than mortgages because no collateral is provided for credit card loans, while a house is provided as collateral for a mortgage.

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[10] The correlation coefficient for loans classified as Other Retail decreases with PD. So while generally loans classified as QRRE generate less capital, very high PD loans do not.

Box 3

The Reserve Bank's model of residential mortgage loan loss

The Reserve Bank's model is designed to investigate major loss events in residential housing loan portfolios. These events are rare, but are nevertheless possible, and are relevant to questions such as the amount of capital a mortgage lender should hold or what might happen in a particularly acute stress event. The name of the model – Tool for Unobserved-event Investigation – TUI, captures this focus on the analysis of 'tail-end' events when there is limited reliable data from actual events.

The TUI model was useful for the Reserve Bank in assessing the Basel II internal models for housing risk for a number of reasons. First, the standard Basel II equation adopts a one size fits all approach. It is therefore necessary to consider whether this equation has been appropriately calibrated to measure risk in New Zealand housing loan portfolios. Second, even if the underlying Basel II model is robust for New Zealand, its implementation raises some difficult data problems. The banks' internal models relied heavily on recent data that is characterised by historically benign conditions in the housing market. Given this period lacks data on the kind of event that generates unusually high but plausible losses, it is necessary to consider whether the values generated for key inputs into the equation (ie, PD and LGD) are appropriate. TUI provided a reference point to help address these kinds of questions.

TUI combines an explicit structure of the loan default and loss process with estimates of behavioural and macroeconomic risk driver coefficients to produce a distribution of loss outcomes. Once a loss distribution has been calculated, the model can generate an array of outputs including the long-run probability of default, average and downturn loss given defaults and risk weights for an overall loan portfolio. For the purposes of assessing capital requirements for New Zealand banks, the model was set to assess the impact of extreme but plausible events rather than more moderate stress events.

The following is a sample of some of the more important TUI results:

- The biggest driver of risk is a simultaneous interest rate increase and a house price fall. The volatility of interest rates and house prices and the way they are correlated are, therefore, the biggest determinants of capital requirements in the model.

- Residential mortgage lending appears to be substantially more risky than initial modelling by banks would suggest and some higher-risk risk-buckets may require more capital than required by the standardised model.

- Low observed default rates in benign times can be consistent with a risky portfolio and a high capital requirement.

- The Basel II housing equation requires calibration for New Zealand conditions. The correlation factor needs to be increased to reflect the fact that systemic risk is a bigger component of overall risk in New Zealand than in some other jurisdictions. In other words, losses associated with general economic conditions rather than with particular borrower circumstances are relatively more significant for New Zealand.

Although the Reserve Bank has used the TUI model in its assessments of IM banks, TUI is not intended as a substitute or a template for banks' own models.

Farming lending models

As shown in figure 3, farm lending accounts for around 15 percent of NZ bank lending. However, when adjusted for risk, it is of similar importance to housing in terms of capital.

The Reserve Bank advised IM banks at the time they were accredited that their farm lending models were inadequate and would be further reviewed post-accreditation.[11] In some cases, it was necessary to require banks to hold additional capital pending this further work. Given the commonality of the key risk drivers between banks, the Reserve Bank undertook to lead the modelling work in this area. Taking into account the significance of dairy sector lending, the work focused on this sector.[12] The two key issues identified in this work, shown in table 1 above, are described more fully below:

- Firstly, bank models did not sufficiently take account of the risk of a sharp fall in farm land prices, particularly given the sharp dairy land price increase that occurred between 2001 and 2008. During this period, dairy land prices were heavily influenced by positive expectations about future dairy payouts and there was a risk of a substantial price fall if those expectations were not met. In response, the Reserve Bank plans to specify a minimum set of downturn LGDs differentiated by LVR for farm lending. These LGD estimates will take account of changing economic conditions (e.g., farm land prices have now fallen from their peak).

- Secondly, the initial categorisation of farms as small businesses within the Basel II framework incorporated an overly optimistic view of the extent that risks in the sector can be diversified. The Basel II framework assumes that small business lending is more heterogeneous than large business lending and therefore subject to less systemic risk. New Zealand farm lending is in fact very homogeneous. In response, the Reserve Bank plans to

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[11] Note that for the purposes of the Reserve Bank's capital requirements, farm lending is defined relatively narrowly. It includes banks' lending to farms but not to the wider agricultural sector that provides supplies and support to farms.

[12] Dairy represents more than 60 percent of total farm lending and has an indirect effect on land values and hence on risk in the sheep and beef sector, which accounts for a further 25 percent of lending.

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require banks to apply the standard corporate correlation coefficient to farm loans. This will incorporate lower assumed diversification benefits, consistent with the characteristics of the farming sector in New Zealand.

Two additional farm lending issues the Reserve Bank identified are:

- The Basel II model gives significant weight to the contractual maturity of a loan in determining the risk of the loan. For instance, a loan with a contractual term of five years is considered 60 percent more risky than a loan with a one-year contractual term. In the Reserve Bank's view, this calibration significantly overstates the effect of contractual maturity on risk in the farming sector and provides an incentive to rewrite contracts to reduce regulatory capital. In response, the Reserve Bank plans to require IM banks to have a minimum average capital model maturity input of 3.5 years for farm loans. This is based on the sector average and will reduce the incentive to rewrite contracts to reduce regulatory capital.

- Banks may need to periodically adjust their farm lending PD models to account for their models' PIT characteristics. These adjustments will be similar to those described for housing above (and shown in figure 4).

4   Pillar 2 and 3 implementation
Pillar 2

The Pillar 2 component of the Basel II framework ensures that banks are adequately capitalised, taking account of risks not captured sufficiently in the Pillar 1 process. The two main aspects of Pillar 2 for New Zealand banks are described below:

Internal Capital Adequacy Assessment Process

Each bank is required to have in place an Internal Capital Adequacy Assessment Process (ICAAP) to ensure that it has adequate capital against all material risks. As part of this, all banks are expected to determine and disclose the appropriate level of capital for 'other material risks' (ie, those risks that are not captured by the Pillar 1 regulatory capital requirement). While banks generally

hold capital for other material risks, it is not part of their regulatory capital requirements. The 'disclosure only' requirement recognises the early stages of development of banks' ICAAP processes. To require banks to hold capital against these risks prematurely could result in divergent capital outcomes across banks that would not reflect differences in actual risk.

Additional regulatory capital

The Reserve Bank will impose additional regulatory requirements if it is not satisfied that a bank's capital determined under Pillar 1 is adequate. The additional 15 percent of housing capital for IM banks described above falls into this category.

Capital floors

The Basel II framework provides for a transitional capital floor for IM banks. This is to allow time to ensure sound implementation of banks' models. Consistent with international practice, the Reserve Bank has required that each IM bank's capital is maintained at a level at least 90 percent of what it would be under the previous Basel I regime for the foreseeable future.

Pillar 3

The decision by the Basel Committee to include disclosure requirements in the Basel II framework fitted well with the Reserve Bank's existing banking supervision approach, in which market discipline is a cornerstone. New Zealand banks have been required to make comprehensive quarterly financial and prudential disclosures for many years. However, the Basel II Pillar 3 requirement entails disclosure of more comprehensive risk information and came into effect around the same time as new and substantial additional requirements associated with the introduction of International Financial Reporting Standards.

The Reserve Bank decided not to implement all aspects of the Pillar 3 regime in New Zealand. Some aspects were excluded either on the grounds of immateriality for New Zealand banks, or because they were unjustifiably burdensome. In

some areas the Reserve Bank's disclosure requirements do go beyond Basel II framework, most noticeably in regard to the frequency of disclosure.

The Basel II framework requires disclosures on a semi-annual basis (with some exceptions), compared with New Zealand's quarterly requirements. The Reserve Bank did not alter the required frequency of bank disclosures with the introduction of Basel II, although banks are not required to disclose the full set of capital adequacy information every quarter.

A Reserve Bank requirement for residential mortgage LVR disclosures also goes beyond the Basel II framework.[13] This requirement reflects the significance of housing risk for New Zealand banks and the importance of LVR as a housing risk factor, as discussed earlier.

5   Emerging Issues

Internationally, debate about the application and calibration of the Basel II capital framework continues. The recent financial crisis has exposed a number of weaknesses in the Basel II framework that the Basel Committee had sought to address. To date, many of the changes made have been designed to improve the effectiveness of market risk models and provide for a more conservative treatment of securitisations. These areas are of limited relevance for New Zealand because the Reserve Bank has not allowed internal models to be used to determine market risk capital requirements, and New Zealand banks are not significantly involved in securitisation.

On 7 September 2009, the Basel Committee outlined plans to strengthen the regulation, supervision and risk management of the banking sector, with the aim of substantially reducing the probability and severity of economic and financial stress.[14] One aspect of the Committee's plans is the concept of 'capital buffers' that are built up during favourable economic times and 'drawn down' during periods of stress. In part, this proposal reflects concerns some commentators have expressed that Basel II

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[13]   **The Reserve Bank requires New Zealand banks to disclose the value of residential mortgage lending by LVR category.**

[14]   See http://www.bis.org/press/p090907.htm

can accentuate the ups and downs of the economic cycle, as capital requirements increase (constrain lending) in 'bad' times and fall (encourage lending) in good times. This pro-cyclicality may contribute to a 'boom-bust' economic cycle. The Reserve Bank's existing capital philosophy (in particular our TTC approach) stands New Zealand in good stead for any likely international developments in this area. In particular, the adjustments banks are able to make to their long-run portfolio housing PD estimates (illustrated in figure 4), and the sensitivity of banks' models to asset values (via LVR risk drivers) can provide significant smoothing of capital requirements throughout the economic cycle.

Other key areas that have been identified by the Basel Committee plans include:

- The quality of bank capital. The quality and quantity of banks' capital has come under increasing scrutiny by markets in the context of the financial crisis (particularly by potential suppliers of bank wholesale funding). In response, some banks have increased their holdings of capital, particularly of 'higher quality' Tier 1 capital. The Basel Committee intends to strengthen the quality, consistency and transparency of the highest forms of Tier 1 capital.

- Leverage ratio. A leverage ratio sets a lower limit to the capital-to-assets ratio of banks. The Basel Committee intends to introduce a leverage ratio requirement to act as a supplementary measure to the Basel II risk-based framework, ensuring that banks do not build up excessive leverage.

6   References

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PDF edition change log

Original publication (30-9-09) to current (8-10-09)

Figure 1: replaced.

Figure 2: replaced.

Table 1: changed "Appropriately" to "Appropriately calibrated" (rural LGD estimate).

Figure 5: changed "Estimates Banks" to "Bank Estimates".

Page 8: changed to "Banks determine their own long-run portfolio average PD" to "Banks determine the long-run average PD" (third paragraph, first bullet point).

Box 2: changed "roll of farm loans" to "pool of farm loans" (second paragraph).

Box 2: removed "portfolio" (probably of default definition).

Box 2: inserted "by" (last sentence).

Page 14: changed "small" to "small business" (second paragraph, second bullet point).

Page 16: changed "pro-cyclically" to "pro-cyclicality" (first paragraph).