Non-Bank Deposit Taker (NBDT) Capital Policy Paper

Subject: The risk weighting structure of the NBDT capital adequacy regime

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Introduction

1. This paper sets out, and explains the logic behind, the calibration of the exposure risk weighting structure of the NBDT capital adequacy regime.

2. It is important to note that while we have used models with well defined analytical structures to help us calibrate the NBDT risk weightings these models have been only one input in the decision making process. We have also had regard to our broader understanding of the nature of risk in loan and asset portfolios; our knowledge of the relative performance of banks and non-banks over the recent economic downturn; and industry practice as expressed in the capital adequacy requirements in some NBDT trust deeds. While we have used particular inputs in various models to generate exact risk weight outcomes, we do not want to give the sense that risk can be calibrated with the precision that these numbers suggest. In practice, we have used the model outputs as a guide to identify appropriate risk weightings for each particular asset class from a limited set of 'round number' risk weights.

3. The NBDT framework recognises the following loan and asset types. They are:

   (a) Loans fully secured by residential mortgages;
   (b) Personal loans under $40,000;
   (c) Business loans (non property development);
   (d) Property development loans;
   (e) Other loans;
   (f) Operating leases;
   (g) Investments; and
   (h) Other assets.

   The rest of the paper describes the risk weight or weights that apply to each asset class and how these were derived. The first section focuses on residential housing lending. The second section summarises the treatment of each of the asset types listed above, and the final section briefly outlines the treatment of market and operational risk.

Residential Housing Lending

4. The structure of NBDT and standardised bank risk weights for residential housing loans are set out in Table 1.

Table 1: NBDT and Bank housing lending risk weights

LVR	Risk weights (%)	
	NBDT	***Basel II standardised***
70% and under	35	35
>70-80%	50	35
>80-90%	100	50
>90-100%	125	75
Housing NZ insured	20	50 or 75
Other mortgage insurance	Not recognised	50 or 75 if compliant

5. In addition to the differences in some of the risk weights the NBDT model also differs from the standardised model in the following respects:

- There is no explicit allowance for loan commitments;
- There is no additional capital charge for loans in default (more than 90 days past due); and
- NBDT lenders can use current house values when calculating a housing loan's loan to valuation ratio (LVR). Banks must use the valuation at the time the last advance was made.

Explanation for the NBDT calibrations

Risk weights

6. The risk weights for residential housing loans in the NBDT framework have taken the Basel II standardised housing risk weights as one starting point. They have then been amended by outputs generated by the Reserve Bank's 'TUI' housing lending risk model. This model uses a variety of inputs; including the nature of the macroeconomic environment (the way house prices, interest rates and unemployment rates move and are related to each other); the structure of the lending portfolio; and the nature of borrowers' behavioural responses to shocks, to generate capital requirements for housing loan portfolios. The model was used to check banks' housing lending modelling for Basel II advanced modelling accreditation purposes and to calibrate the inputs that the Reserve Bank required banks to use to generate their housing loan capital requirements.

7. The model inputs used to help us generate NBDT housing lending risk weights are the same that were used with the advanced bank modelling except for the volatility of housing prices. This was increased to reflect the fact that NBDTs typically have regional housing lending portfolios. They are, therefore, more exposed to regional house prices which are more volatile than national house

prices. The effect of the difference in assumption about house price volatility is to add about 10-15 percent to required capital.

8. The risk weights for LVR buckets that are over 80 percent are higher than those in the standardised bank framework. The differences reflects the following factors:

   - The standardised risk weights were set in 2006 and do not reflect current and best practice for assessing the risk of the higher LVR risk buckets;
   - As noted above, there is an allowance for the regional concentration in NBDT portfolios; and
   - There is no explicit allowance for loan commitments in the NBDT model so we have increased the risk weight to compensate.

9. On the other hand the treatment of loans with an LVR of under 70 percent is concessional compared to the standardised treatment because there is no additional capital charge for loan commitments.

10. A relevant, and in some ways more important, comparison with bank risk weights is with the advanced banks' risk weights because they dominate the market for mortgage loans in New Zealand. Their average risk weight for housing loans, taking into account the capital charge for loan commitments and a 15 percent additional capital requirement imposed by the Reserve Bank, is about 35 percent. The average risk weight for NBDT housing mortgage lenders should not be materially above this figure.

Reasons for other differences

No explicit provision for loan commitments

11. There is no explicit capital charge for loan commitments throughout the NBDT capital model. This simplifies the model and takes out the difficulty of defining a loan commitment.

No higher risk weights for loans in default for NBDTs

12. The standardised bank regime imposes an additional capital charge of 50 percentage points on housing loans that are in default. No additional charge is imposed on NBDT housing loans that are in default. This treatment reflects two considerations. First, it simplifies the regime by reducing the number of housing loan categories by half. Second, and more fundamentally, the NBDT treatment is more consistent with the Reserve Bank's 'through-the-cycle' approach to assessing capital adequacy. The Bank prefers an approach that requires financial institutions to carry broadly the same amount of capital through the economic cycle, reflecting the average of a wide range of circumstances that a financial institution may face, rather than one that takes a short term or 'point-in-time' approach. With a 'point-in-time' approach the capital requirement moves pro-cyclically. It is low in good times, when borrowers' financial health is robust, but then increases as the quality of the loan portfolio comes under pressure in a stress situation. The additional capital requirement for defaulted loans obviously has

this undesirable characteristic. In the NBDT model the additional risk and capital for defaulted loans is implicitly subsumed within the long run average risk weight.

Valuation of the security

13. In the banking model banks must use the value of the security at the orgination of the loan (a subsequent advance would bring the origination date forward) to calculate LVRs. With the NBDT model an NBDT may use an updated independent valuation. The reason why the origination requirement was applied in the banking model was that at the time the bank model was being calibrated house prices were increasing rapidly. Allowing banks to use current valuations would have seen LVRs, and hence measured risk and capital, fall at a time when the Reserve Bank thought that risks in the sector could actually be increasing because of the possibility that banks were lending into a house price bubble. Now that the housing market has turned there is no need to apply this conservative valuation requirement and NBDTs can use their current valuations.

Treatment of Housing New Zealand Welcome Home loans and guarantees

14. In the bank regime Housing New Zealand Welcome Home loans receive the standard treatment for qualifying insured loans. They have risk weights of either 50 or 75 percent depending on the LVR of the loan.

15. In the NBDT framework the risk characteristics of the Housing New Zealand guarantee have been analysed within the TUI model framework. This showed that the credit quality of the guarantor and the coverage of the guarantee generated a low level of risk. The risk weight of 20 percent reflects these factors.

16. As noted in the consultation document, the NBDT regime does not recognise other guarantees for capital calculation purposes. This primarily reflects concerns about the robustness of guarantees.

Non housing lending

17. For non-housing lending we have used some of the models and inputs in the Basel II advanced modelling framework to inform our judgements about appropriate risk weights for NBDTs' loans.

18. The relevant parts of the framework are:

- The 'other retail' exposures capital requirement equation;
- The 'corporate' exposure capital requirement equation; and
- The foundation LGDs (loss given default) for corporate exposures.

Personal loan capital requirement

19. To calibrate the personal loan requirement we primarily relied on the 'other' retail capital equation in the Basel II advanced modelling framework and which was

translated into the advanced bank capital adequacy framework (document BS2B). This equation, which is set out in appendix one, is used to generate the capital requirement for the New Zealand advanced modelling banks' non-residential mortgage retail exposures.

20. The retail loan capital equation has three inputs: the long run probability of default (PD); the downturn loss given default (LGD); and the default correlation coefficient. The banks provide estimates of the first two inputs for a set of relatively homogeneous risk buckets while the correlation coefficient, which is a measure of how sensitive a loan portfolio is to systematic risk, is built into the capital equation. This coefficient (which also has some sensitivity to the PD input) is calibrated at a lower level than that for commercial lending portfolios. This is designed to reflect the lower sensitivity of wage and salary incomes, compared to business incomes, to systematic economic shocks.

21. The Basel II correlation coefficients were largely calibrated off international banks' economic capital models. Given the poor performance of many of those models, in particular their failure to adequately understand sensitivities to systematic shocks, there is a question as to whether the Basel correlation coefficients are high enough. For the purpose of this exercise, however, we took the existing Basel II retail correlation as a given.

22. The average LGD used by banks for the calculation of retail lending risk weight is around 70 percent. For NBDTs we have assumed a 60 percent LGD reflecting the value of security. Combined with a long run PD of 3 percent, which is around the bank average, the retail capital adequacy equation generates a risk weight of about 85 percent. Having regard to a 1.06 multiplicative scalar that is applied to all risk weights in the bank regime, and making some allowance for loan commitments, we concluded that a risk weight of 100 percent was appropriate for secured NBDT personal loans.

23. It is important to note that the LGDs used in the Basel II framework are 'downturn' LGDs. That is, they are the losses that would be experienced in the acute downturn that the capital model is calibrated to. Mathematically it can be described as a 1:1000 shock in a world where asset prices are normally distributed. In the real world, where asset price distributions have 'fat tails' and the probability of large shocks is much more prevalent than a normal distribution would suggest, the odds of an acute downturn that would absorb all of the capital committed to the loan exposure are much lower than 1 in 1000. A once in a life-time is a reasonable characterisation of the likelihood. Even so, this is a much more acute shock than most NBDTs are likely to have experienced over their history and LGD outcomes will be much worse than they would have experienced in more moderate downturns.

24. The loss given default measure also includes losses beyond the loss of principal. It includes administrative and other costs in dealing with the defaulted loan and recovering monies, and a time value cost because of the time taken to recover loan monies from the point a loan goes into default.

25. It should also be noted that a default in the Basel framework includes any instance where a loan has become more than 90 days past due. This definition generates higher default rates than one based on the number of instances where there has been a loss of principal.

26. The risk weight for personal lending without security was increased to the default (150 percent) risk weight setting to reflect the likely lower recovery rates and higher default rates for these exposures.

27. A limit of $40,000 was placed on personal loans qualifying for the 100 percent risk weight to help reduce the migration of what could be essentially business loans into this category.

Business loans (non-property development)

28. Business loans fall into three risk weight categories in the NBDT capital framework:

    - 100 percent for loans secured with a first ranking security over qualifying moveable machinery or by land and buildings with an LVR of 70 percent or less;
    - 150 percent for loans with a first ranking security over qualifying moveable property or land and buildings with an LVR of over 70 percent and up to 100 percent; and
    - 200 percent for loans with no security or a second ranking security.

29. We have used the corporate loan capital equation in the advanced bank capital adequacy framework and the LGDs used in the 'foundation' version of the advanced regime to calibrate NBDT risk weights for the above loan categories.

30. The advanced model has two equations for calculating corporate exposure risk weights. The first is the standard equation which requires inputs for PD, LGD and loan maturity and which embeds an asset correlation coefficient assumption. The second equation makes a downward adjustment to the correlation coefficient for small and medium enterprises. The latter equation reflects the assumption that smaller businesses are less exposed to systematic risks than larger firms and that the smaller the firm the less sensitive to systematic risks it is. A firm size adjustment factor based on the borrowing firms' revenue is used to adjust the correlation coefficient.

31. In our view the second equation is likely to understate the sensitivity to systematic risks of small firms in New Zealand. There is no evidence that smaller firms are less sensitive to systematic shocks than large firms. Rather, firms of all sizes are likely to be more exposed to systematic shocks than is the international norm because the New Zealand economy is more exposed to terms of trade shocks. Accordingly we have not applied the concessional correlation adjustment in our assessment of NBDT capital requirements.

32. The other inputs into the capital requirement equation were handled as follows.

33. With respect to loan maturity the average maturity was assumed to be the default setting (2.5 years) in the IRB model. The capital requirement is not very sensitive to the maturity input so an alternative assumption would not have made much difference to our analysis. For example, reducing the average maturity input from 2.5 to 2 years reduces the risk weight by around 4 percent.

34. Our downturn LGD inputs had regard to the LGDs that are specified in the Basel framework for the 'foundation'[1] version of the IRB model. The lowest LGD is 35 percent for exposures that are well secured by real estate collateral and the highest is 75 percent for subordinated exposures. With respect to PDs we have had regard to the PDs reported by banks in their capital adequacy disclosures and have used a default rate of 2 percent as a starting point. Table 2 sets out an array of risk weights for different PDs and LGDs. Note that the risk weights are relatively insensitive to PDs.

Table 2: Commercial lending risk weights using IRB model

LGD %	***35***	***55***	***75***
PD%			
2.0	89	140	191
2.5	95	149	203
3.0	100	157	214

35. We also had regard to the following factors in assessing the NBDT risk weights:

- Bank capital ratios have a 1.06 calibration factor applied to the model outputs;
- Banks have to make an explicit allowance for loan commitments; and
- The model assumes that all idiosyncratic risk is fully diversified away. This is a reasonably safe assumption with banks which have large portfolios and a large number of individual commercial exposures. With the average NBDT portfolio, on the other hand, some allowance has to be made for capital to mitigate concentration risk.

36. Taking these factors together we think that a risk weight of 100 percent is reasonable for well secured loans and 200 percent is appropriate for no security or a subordinated security. The risk weight for less well secured first ranking loans sits between these two risk weights.

Property development loans

37. The following factors were relevant to our consideration of property development loan risk weights:

[1] In the foundation version of the IRB model LGDs are taken from the Basel framework or are specified by the supervisor rather than being calculated by the IRB bank.

- Property development loans typically have higher default rates than other commercial loans;
- There is more volatility in the value of the security underpinning property development loans. This translates into higher loss given default numbers;
- Property loan portfolios are more subject to systematic shocks. When a negative shock hits the property sector all developments tend to be similarly affected; and
- Loan commitments tend to be more significant compared to actual advances.

38. On the third point the Basel framework does take some account of this greater sensitivity to systematic property price movements by applying a higher correlation coefficient to the calculation of the risk weight of what are called 'High-volatility commercial real estate' (HVCRE) loans. The effect of the correlation coefficient increase is to increase the risk weight by less than ten percent, which in our view does not capture, by a material margin, the full increase in risk compared to other commercial loans. Notwithstanding this we have taken the Basel framework (HVCRE) capital equation as our starting point in assessing the risk weight for property development loans.

39. We have applied the following changes to the calibration of the lower risk bucket risk weight for commercial loans to reflect the higher risk characteristics of property development loans:

    - The LVR cut-off is 60 percent rather than 70 percent;
    - The probability of default is increased from 2 percent to 3 percent; and
    - The loss given default is increased from 35 percent to 40 percent.

40. After adjusting for the bank calibration factor of 1.06 these assumptions result in a risk weight of 132 percent. Having regard for a correlation coefficient which is still lower than is economically justified and the fact that the NBDT framework does not capture loan commitments we think that a risk weight of 150 percent is appropriate for loans with an LVR of 60 percent or less.

41. With respect to loans without security or with a second ranking security we made the following adjustments to the capital equation inputs:

    - The LGD was set at 80 percent reflecting our judgement that loss rates are higher for property development loans; and
    - The PD is set at 4 percent or around twice the rate for other commercial bank loans. This higher number reflects the increased fragility often associated with funding structures which include mezzanine financing as well as the inherent risk of the property development sector.

42. With both of these parameters we did not have the benefit of empirical inputs from recent finance company loss experiences. We are not aware that any useful summary data has been compiled. If it were we suspect that both the PD and LGD data would suggest higher inputs than those set out above.

43. The risk weight generated by the capital equation is 260 percent. Adjusting for the bank calibration factor of 1.06 and making an allowance for loan commitments and the other factors discussed above, leads us to a risk weight of 300 percent.

44. For first ranking loans with an LVR of over 60 percent and less than 100 percent we have made intermediate assumptions about the LGD and PD that suggest a risk weight of 200 percent is appropriate.

Operating Leases

45. In the first version of the NBDT capital framework operating leases were treated as other assets with a risk weight of 500 percent. We have now taken the view that these assets have risk characteristics which are more like that of a loan than an equity interest in real property. We have taken the medium risk commercial loan risk weight of 150 percent as a starting point and applied an increase of 25 percentage points to take account of the increased risk because of the residual interest in the value of the leased asset.

Other Assets

46. The risk weight for other assets is 350 percent down from the 500 percent in the initial proposal. The 350 percent reflects the volatility of land and building values which is the primary asset in this risk category.

47. In the banking regime other assets are risk weighted at 100 percent. This weight is inappropriately low but is not material to banks which, as a group, hold little real property.

Investments

48. The risk weight for investments is 600 percent. This compares with risk weights of 300 percent for exchange traded equities and 400 percent for non-exchanged traded investments in the banking regime. The banking regime numbers are taken from the Basel II framework.

49. In our view the 300 percent risk weight does not take adequate account of the volatility of New Zealand listed shares and a risk weight of 600 percent is required to absorb shocks of over two standard deviations that is implied by the calibration of the capital model. A case could be made for applying a higher risk weight than the 600 percent to non-exchange trade investments because of the additional risk relating to the lower degree of transparency in the pricing of these assets. It was decided to leave this problem for trustees to deal with by the imposing of a suitably higher minimum capital ratio if the risk issues here were to become material in any particular case.

Market and Operational risk

50. Capital for market and operational risk exposures are generated by a scalar of an average of balance sheet and risk weighted assets. The scalar is derived from

bank information but has been increased up to reflect the fact that operational risk is relatively greater (compared to balance sheet size) for smaller institutions.

51. The underlying bank numbers which provided the basis for setting the scalar are predominantly driven by operational risk. The market risk component of the bank numbers are almost entirely driven by interest rate risk in the banking book. These risks primarily reflect the fact that banks cannot entirely hedge the economic effect of interest rate changes due to behavioural and operational factors. These behavioural and operational factors also typically apply to NBDTs. Interest rate and exchange rate risk in the trading book account for only a very small part of banks' market risk capital calculations. Thus banks' trading activities do not generate a material part of the bank capital comparator which the NBDT operational and market risk capital requirement has been calibrated to.

Contacts

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Appendix one

Capital requirement equations

Corporate

Capital requirement[18] (**K**) =

$$\left[LGD\times N\left[\left(\frac{1}{\sqrt{1-R}}\right)\times G(PD)+\left(\sqrt{\left(\frac{R}{1-R}\right)}\right)\times G(0.999)\right]-(PD\times LGD)\right]$$
$$\times\left[\frac{1}{(1-(1.5\times b))}\times(1+(b\times(M-2.5)))\right]$$

Correlation (**R**) $=\left[0.12\times\left(\frac{1-e^{-50\times PD}}{1-e^{-50}}\right)\right]+\left[0.24\times\left(1-\left(\frac{\left(1-e^{-50\times PD}\right)}{1-e^{-50}}\right)\right)\right]$

Maturity adjustment (**b**) = $[0.11852-(0.05478\times\ln(PD))]^2$

Other Retail

Capital requirement (**K**) =

$$LGD\times N\left[\left(\frac{1}{\sqrt{(1-R)}}\times G(PD)\right)+\sqrt{\left(\frac{R}{1-R}\right)}\times G(0.999)\right]-(PD\times LGD)$$

Correlation (**R**) =

$$\left[0.03\times\frac{1-e^{-35\times PD}}{1-e^{-35}}\right]+\left[0.16\times\left(1-\frac{1-e^{-35\times PD}}{1-e^{-35}}\right)\right]$$