

INTERNATIONAL CONVERGENCE OF CAPITAL MEASUREMENT AND CAPITAL STANDARDS FOR BANKS

In this article, prepared mainly by Matthew Brosnahan and Tan Chong Lee, the regulatory framework for assessing New Zealand banks' capital adequacy is described.

Executive Summary

In December of last year the Reserve Bank issued a document outlining its approach to the implementation of a revised method for measuring the capital of, and setting capital standards for, New Zealand banks. This approach is similar in most respects to an internationally agreed framework for measuring capital developed by the Basle Committee on Banking Regulations and Supervisory Practices.

Banks require an adequate stock of capital to allow them to withstand unexpected losses which may result in the course of their business. In light of developments in international financial markets, an accurate assessment of capital adequacy must now take account not only of balance sheet assets, but also off-balance sheet business and the differing levels of credit risk associated with different categories of counterparty.

The three main elements of the revised New Zealand framework are a two tier definition of capital, which emphasises the need for a minimum amount of tier 1 or equity capital; a credit risk weighting framework, which allows for capital to be assessed in relation to the nature of counterparties, both on and off the balance sheet; and an 8 per cent total capital to risk adjusted assets requirement for registered banks which must be met by 1992, as well as a 4 per cent tier 1 capital requirement which will exist from the outset.

The allowance for varying degrees of credit risk that is brought into the assessment of capital via the credit risk weighting framework, is the major difference between the new approach and the traditional measures of capital-asset ratios. Under the new framework, each counterparty exposure, whether on or off the balance sheet, is allocated to one of five broad categories (zero, 10, 20, 50, and 100 per cent) of relative risk. For balance sheet assets, the principal value of the asset is multiplied by the percentage weight to obtain the risk-weighted value for each asset; off-balance sheet exposures must first be converted to on-balance sheet equivalents (by multiplying the principal value by a credit equivalent weight) to allow them to be added to on-balance sheet assets once they have been factored by the appropriate risk weight category. The sum of risk-weighted exposures represents the total credit exposure the financial institution has accepted. Both tier 1 and total capital are then divided by this total, to give the two risk weighted credit exposure measures used to assess capital adequacy.

It is important to appreciate that the risk weights do not purport to accurately capture the true credit risk associated with each particular transaction. To do so would require a much more detailed approach, the costs of which would not appear able to be justified in terms of the resultant benefits. Implicit in the framework is the expectation that banks will continue to fully evaluate and manage the risks which they assume to determine what is an appropriate level of capital to hold in relation to these risks, and that investors and depositors will conduct their own assessment of the prudential soundness of the institutions to be invested in. Capital adequacy will remain a function of many aspects of a bank's operations and only a subset of these has been captured within the new framework.

On 22 December 1988 the Reserve Bank issued a document outlining its approach to the implementation of a revised method for measuring the capital of, and to set capital standards for, New Zealand banks.¹ The new framework incorporates changes to an earlier consultative document issued by the Bank in August, and is similar in most respects to an internationally agreed framework developed by the Basle Committee on Banking Regulations and Supervisory Practices

(the Basle Committee).

The approach suggested in the August document diverged in a number of significant respects from the proposals outlined by the Basle Committee. Comments received in response to the consultative document were generally supportive of the international convergence framework, and many respondents were not in favour of the Bank's proposed divergences from that framework. In view of the strong support evidenced in favour of the framework developed by the Basle Committee, and the fact that this framework has also received strong support from other national super-

visory authorities, it was thought appropriate that the regime to be applied in New Zealand should be generally aligned with the international approach.

The Basle Committee

The Basle Committee was established at the end of 1974 with the objective of strengthening collaboration among national authorities in their prudential supervision of international banking. The Committee comprises representatives of the central banks and supervisory authorities of the Group of Ten industrialised countries and Luxembourg. However, the Committee

¹ This paper, entitled 'Implementation of Proposals for the International Convergence of Capital Measurement and Capital Standards for Banks', is available from the Financial Institutions Department of the Reserve Bank.

does have a wider representation. In a sense, it is the 'hub' of a forum of banking supervisors which extends beyond the G10 countries to include supervisors from many other parts of the world. This wider forum, which includes New Zealand, has sought to enhance co-operation on international supervisory matters by issuing a statement of principles (the 'Basle Concordat') to guide and best ensure effective supervision of international banks on a global basis. The Reserve Bank has regard for the principles of the concordat in its prudential supervision of financial institutions.

A principal focus of the Basle Committee's work over the last few years has been on capital adequacy, which is central to sound banking. The erosion of capital, and the consequent lower capital ratios among international banks in the early 1980s, prompted the Committee to express its concern in a paper issued in 1983. The Committee concluded that national authorities should resist further declines in the capital positions of banks under their supervision.

The Committee's attempts at monitoring the progress achieved in strengthening standards of capital adequacy was hampered by the absence of uniform methods of defining the constituents of capital and of measuring capital in relation to the volume of banking business undertaken. In addition, the divergence in capital positions among banks operating globally has proved to be a source of competitive inequality, as regards the pricing of banking products and transactions. To facilitate comparison of capital standards in different countries, and to achieve greater competitive equality among banks operating internationally, the Committee argued strongly for closer co-operation in the formulation of standards and policies.

As a result of several years of work under the chairmanship of Mr W.P. Cooke, a report entitled 'Proposals for International Convergence of Capital Measurement and Capital

Standards' was presented to, and endorsed by, the central bank Governors of the G10 countries at their meeting in Basle on 7 December 1987. The report was circulated to national banking associations in the G10 countries as a basis for consultations. In addition, the Committee distributed the report to the wider forum of supervisory authorities, with a view to using the proposed framework as a basis for a worldwide standard for banks undertaking international business. In light of comments from national banking associations in G10 countries and other interested parties, significant changes were made to some aspects of the original proposals and a new document, 'International Convergence of Capital Measurement and Capital Standards', was released on 11 July 1988. This document was subsequently adopted for international implementation at an international conference of banking supervisors held in Tokyo in October 1988.

The New Framework

Capital has been defined as 'adequate' when it reduces the chance of future insolvency to some predetermined minimum level. In this regard, capital should be related to the full spectrum of risks a financial institution faces to ascertain its effectiveness in reducing the potential for failure.

Historically, the accepted method of assessing capital adequacy was by reference to the 'capital to total assets' ratio. This ratio was effective in measuring the risk of future insolvency when financial institutions had broadly similar balance sheet structures, and off-balance sheet instruments were not a significant part of total operations. However, global deregulation of financial markets has increasingly undermined the usefulness of the simple capital ratio measure and thereby created the need for new measures of capital adequacy. The new risk-based approach to capital measurement

which has been adopted is intended to take account of the differing levels of risk associated with different categories of balance sheet assets and to capture off-balance sheet business.

The main elements of the revised New Zealand capital framework are threefold:

1. a two tier definition of capital, which emphasises the need for a minimum amount of equity capital (tier 1), but allows for the inclusion of a range of supplementary capital elements in total capital;
2. a method of measuring capital adequacy based on a system of relative credit risk weightings applied to all balance sheet assets and off-balance sheet engagements;
3. minimum ratios of capital to risk weighted credit exposures in line with the Basle Agreement; minimum ratios of 4 per cent (for tier 1 capital) and 8 per cent (for total capital) will be required to be achieved by all registered banks incorporated in New Zealand by end-1992 (the tier 1 capital to risk ratio will have to be met from the outset).

The underlying rationale and prudential principles of the new approach are discussed below in greater detail.

The Definition of Capital

A financial institution, by virtue of the business it engages in, assumes an array of risks in order to make profits. During the course of a financial period, a certain proportion of these risks will result in losses, and an institution requires a buffer to absorb these losses when they occur unexpectedly. Capital is able to provide this buffer because it represents a commitment of funds to an institution, the servicing obligations on which may be waived or deferred should the financial condition of the institution make servicing imprudent. An adequate buffer of capital is

essential to contribute resilience and strength to an institution experiencing financial difficulties, allowing it to meet transitory losses whilst the cause of the losses is redressed. In addition, the fact that capital exists provides a reassurance to creditors.

Tier 1, or 'core' capital, the highest quality capital, includes permanent shareholders' equity (paid up ordinary shares and irredeemable non-cumulative preference shares) and reserves created from retained earnings. Tier 1 capital is regarded as containing the key elements of capital.

Tier 2, or 'supplementary', capital elements are lower 'quality' forms of capital such as revaluation reserves, various undisclosed reserves, and hybrid debt-equity instruments and term subordinated debt which meet certain qualifying requirements.

Certain deductions are required from capital as it would be calculated using normal accounting conventions. In particular, intangibles (including goodwill) are deducted from tier 1 capital and, in addition, tax loss carry forwards, certain types of future tax benefits, security revaluation losses, and holdings of 10 per cent or more of the capital of other companies are deducted from total capital. These adjustments are not intended to deny the validity of the accounting convention of incorporating these assets in the balance sheet on the basis of the 'going concern' assumption. However, in the context of the objectives of prudential supervision, the going concern assumption ceases to be relevant. From a prudential perspective, the uncertainty associated with the ability to realise these assets at their reported value in the event of the bank coming under financial stress gives rise to the need to deduct them from the calculation. The new framework thus attempts to measure the economic substance of an institution's capital. A numerical example showing how to calculate capital under the new framework on the assumed bank in table 1, is given in table 2.

Table 1
Bank ABC

<i>Balance Sheet Assets</i>	NZ\$m
Cash	5
5 year government stock	25
Interbank holdings	20
Housing loans (fully secured by mortgage)	50
Commercial loans	30
Equity Investments ¹	4
Goodwill	5
Fixed assets	10
	\$149
	\$149
<i>Liabilities</i>	
Deposits	80
Bills payable	34
Provision for dividend	5
Minority interests in consolidated subsidiaries	2
<i>Subordinated Term Debt</i>	5
<i>Capital and Reserves</i>	
Issued and paid up ordinary capital	10
Perpetual preference shares	5
Retained earnings	3
Fixed asset revaluation reserves	5
Total	\$149
	\$149
<i>OFF-BALANCE SHEET EXPOSURES</i>	
Guarantees to corporates	50
Asset sale with recourse (of a bank bill)	20
Standby letter of credit (related to an export transaction)	70
Documentary letter of credit (trade related)	40
5-month forward foreign exchange contract with a corporate	60
4-year fixed/floating foreign interest rate swap with a bank	60
Total	\$300
	\$300

¹ Equity investments in other companies which equal or exceed 10 per cent of the total equity of the company in which the investment is made.

The Risk Weighting Framework

The emphasis in the new capital framework is on the losses which may result from taking 'credit risks' – the possibility that a counterparty will fail to meet contractual obligations. The new framework en-

deavours to make an allowance for the differing *degrees* of credit risk associated with different types of counterparty by allocating all off- and on-balance sheet items to one of five weighting 'bands' (zero, 10, 20, 50 or 100 per cent of the value of the asset). The weighting bands represent broad categories of relative risk.

Only five weights have been used in an attempt to keep the framework as simple as possible.

For on-balance sheet items the principal value of each asset is multiplied by its appropriate weight to obtain a 'risk-weighted exposure' for that asset; the risk weighted exposure represents an estimate of the credit exposure the institution has on the asset. When summed, the risk weighted exposures represent an estimate of the total on-balance sheet credit exposure that the financial institutions has accepted (refer table 3 for a numeric illustration).

A feature of New Zealand on-balance sheet risk weightings is that the risk weighting assigned to OECD countries' central government securities is 10 per cent, instead of the zero weighting suggested by the Basle Committee. The Reserve Bank has used its discretion within the Basle framework to incorporate an allowance for interest rate risk into this weighting by increasing it to 10 per cent. This adjustment is, however, a very arbitrary allowance for interest rate risk; in recognition of the difficulty of allowing for interest rate risk on assets, the Basle Committee has agreed that further study is required so that this issue can be better addressed in the context of prudential supervision.

With respect to off-balance sheet items (excluding interest rate and foreign exchange contracts), principal values must first be converted to an on-balance sheet equivalent form (called the 'credit equivalent amount') before being multiplied by the appropriate weight to obtain a risk-weighted exposure. This prior adjustment is necessary because some off-balance sheet items entail less counterparty risk than would an on-balance sheet claim on the same counterparty. For example, a note issuance facility, which commits a bank to underwrite a loan, entails less counterparty risk than a loan to the same party because drawdown of the facility is uncertain. The credit conversion factors used to obtain the on-balance sheet equivalent values range from 0-100 per cent. The cal-

Table 2
Total Capital

	NZ\$m
<i>Tier 1: Core Capital</i>	
Paid up ordinary share capital	10
Published retained profit	3
Tier 1 minority interests	2
Subtotal	15
<i>Deductions From Tier 1 Capital</i>	
Goodwill	5
Total tier 1 (core) capital	10
<i>Tier 2: Supplementary Capital</i>	
Perpetual cumulative preference shares	5
Fixed asset revaluation reserves	5
Subordinated term debt	5
Total tier 2 (supplementary) capital	10 ¹
Total tier 1 (core) capital (c/down)	10
Total capital (tier 1 plus tier 2)	20
<i>Deductions from Total Capital</i>	
Investments in subsidiaries	4
CAPITAL	\$16

¹ Tier 2 capital may not exceed 100 per cent of tier 1 capital.

Table 3
Calculation of Risk-Weighted On-Balance Sheet Assets

<i>Asset¹</i>	<i>Principal Amount</i>	<i>Risk Weight</i>	<i>Risk Adj. Value</i>
Cash	5	0%	0
5 year New Zealand Government stock	25	10%	2.5
Interbank holdings (New Zealand banks)	20	20%	4.0
Housing loans	50	50%	25.0
Commercial loans	30	100%	30.0
Fixed assets	10	100%	10.0
			\$71.5

¹ Assets deducted in the measurement of capital are excluded from the calculation of risk weighted assets.

Table 4
Calculation of Risk-Weighted Off-Balance Sheet Exposures
 (Exclude interest rate and foreign exchange contracts)

<i>Off-Balance Sheet Item</i>	<i>Principal Amount</i>	<i>Credit Conv. Fact</i>	<i>Credit Equivalent</i>	<i>Average Risk Weight</i>	<i>Risk Adj Value</i>
Guarantee	50	100%	50.0	100%	50.0
Asset Sale with Recourse	20	100%	20.0	20% ¹	4.0
Standby Letter of Credit	70	50%	35.0	100%	35.0
Documentary Letter of Credit	40	20%	8.0	100%	8.0
Total					\$97.0

¹ The risk weight relates to the asset sold, rather than the counterparty with whom the sale takes place.

ulation of risk weighted off-balance sheet exposures is illustrated in table 4.

There are three broad categories of off-balance sheet transactions (excluding interest rate and foreign exchange contracts). The first is *direct credit substitutes*, which have a credit exposure which is essentially the same as a direct advance of funds to the counterparty; these transactions have a credit conversion factor of 100 per cent. Examples of direct credit substitutes include financial guarantees and bill acceptances. The second category is *trade related contingencies*, which include instruments relating to trade or professional obligations (for example, bid and performance bonds which have a credit conversion factor of 50 per cent) and trade financing instruments (such as documentary letters of credit which have a credit conver-

sion factor of 20 per cent). The third category is *commitments*. The framework attempts to distinguish between three different types of commitment – those where draw-down is certain, i.e. a claim will eventually come onto the balance sheet (for example, forward asset purchases); those where the institution has an irrevocable obligation but drawdown is uncertain (for example, note issuance facilities); and those where the institution has the ability to unconditionally cancel its obligation (for example, unutilised overdraft limits). The credit conversion factors for these three types of commitments are respectively 100 per cent, 50 per cent and zero.

A category of off-balance sheet exposures which has so far been abstracted from is *interest rate and exchange rate related contracts*; examples of such contracts include for-

ward contracts, over-the-counter options and swaps. These instruments require special treatment because the failure of a counterparty to this class of transaction will not necessarily lead to a loss which is equivalent to the principal amount of the transaction. The credit exposure arises from the possibility that a counterparty will default on a contract which has a *positive market value*, i.e. where an unrealised gain exists, and the cash flows associated with the contract will need to be replaced at a cost to the institution.

The preferred method for identifying the credit risk on these contracts is the 'mark-to-market' (or 'current exposure') method (see table 5 for an illustration of the use of this method). This method involves marking all contracts to market and then aggregating contracts with a *positive* market value.

Table 5
Calculation of Risk Weighted Interest Rate and Exchange Rate Contracts

<i>Contract</i>	<i>Principal Amount</i>	<i>Current Exposure¹</i>	<i>Potential Exposure</i>	<i>Credit Equiv.</i>	<i>Risk Weight²</i>	<i>Risk Adj Value</i>
FX Contract	60	0.1	0.6	0.7	50%	0.35
Int Contract	60	-0.1	0.3	0.3 ³	20%	0.06
Total						0.41

¹ Current exposure method used.

² 50 per cent is the maximum weight on these contracts.

³ Only positive current exposures are included.

The aggregate represents the credit exposure on the book of contracts *at that point in time*. In addition, an allowance is made for the potential for exposure to increase over the remaining life of the contract. This allowance is made by adding a factor for 'potential exposure', which is calculated on the basis of the total principal amount of the book split by residual maturity (remaining time to maturity). The 'add-on' factors were determined by the Basle Committee and are based on historical measures of exchange rate and interest rate volatility. The credit equivalent amount is the sum of current and potential exposure. To obtain the risk adjusted value of interest rate and exchange rate contracts, the credit equivalent amount of each contract is multiplied by the appropriate risk weight and the resulting products are summed; weights for these contracts range from zero to 50 per cent.

The mark-to-market method is somewhat complex as regards its computational and informational requirements. For this reason the framework permits institutions which do not actively write or trade a significant volume of such contracts to adopt a simpler alternative called the 'rule-of-thumb' or 'original exposure' method. This method uses a single (larger) conversion factor (again determined by the Basle Committee) to capture, in approximate fashion, both current and potential exposure. While the Reserve Bank will accept the use of the original exposure method, the mark-to-market method is widely regarded as the more appropriate method, certainly from the standpoint of effective risk management.

Once the values of tier 1 and total capital and the risk adjusted values of all on and off-balance sheet items have been calculated, risk weighted credit exposures are readily obtained. Tier 1 and total capital are respectively divided by the total of risk-adjusted on and off-balance sheet items to calculate the two risk weighted credit exposure measures required within the Basle frame-

Table 6
Risk-Adjusted Capital Ratio

Tier 1 capital	10.0
Total capital	16.0
Total risk weight exposures	
On-Balance Sheet	71.5
Off-Balance Sheet	97.0
FX and Interest rate Related	0.4
Total risk weighted exposures	168.9
Risk Ratio	
Tier 1 capital to risk weighted exposures	10.0/168.9 = 5.9%
Total capital to risk weighted exposures	16.0/168.9 = 9.5%

work (see table 6 for an illustration of these calculations). As previously noted, a minimum ratio of 4 per cent (for tier 1 capital) and 8 per cent (for total capital) must be met by end 1992.

It is important to appreciate that the risk weighting framework provides for different categories of asset or off-balance sheet exposure to be weighted according to *broad categories of relative riskiness*. The weights do not purport to accurately capture the true credit risk (and interest rate risk in some cases) associated with each particular transaction. To do so would require a much more detailed approach, the costs of which would not appear able to be justified in terms of the resultant benefits.

It should also be noted that the framework does not capture many of the other risks inherent in banking which capital must also be called upon to support. For example, it captures to only a limited degree liquidity risk, interest rate risk, exchange rate risk and exposure concentration risks. Implicit in the framework is an expectation that banks themselves will continue to fully evaluate and manage all the risks they assume, and will not rely on the 'broad brush' risk weighting framework as a substitute for their own risk management.

Conclusion

The main features of the Basle framework for assessing the capital adequacy of banks have been explained in this article. This framework forms the basis of the capital adequacy requirements which New Zealand banks will have to meet from 30 June 1989. From the outset, banks will have to have a ratio of tier 1 capital to risk weighted credit exposures of at least 4 per cent. By end 1992, the ratio of total capital to risk weighted credit exposures must also be at least 8 per cent.

The 4 per cent 'tier 1 capital to risk adjusted assets' requirement should not represent a substantial hurdle for New Zealand banks because historically they have been well capitalised with mainly ordinary share capital and retained earnings. It is envisaged that more use will be made in the future of perpetual preference shares, as well as hybrid debt-equity instruments, in a bid to meet the 8 per cent total capital requirement before it comes into force at the end of 1992. These instruments are less familiar to the New Zealand financial environment, and the Reserve Bank will continue to monitor developments in this area to ensure that new instruments do have the characteristics of capital.

It is important for both investors

in, and managers of, financial institutions to realise that an 8 per cent ratio of capital to risk-adjusted assets will not, in itself, necessarily prevent a financial institution from experiencing financial difficulties. As a number of overseas bank failures have demonstrated, a bank can have adequate capital in terms of prudential requirements, but may nevertheless assume risks that cannot be supported by that level of capital. This consideration gives rise to two important observations. First, capital adequacy is, and will remain, a function of many aspects of an institution's operations, including

asset quality. Consequently, the new capital requirements will not remove the responsibility for each depositor and investor to conduct his or her own assessment of the prudential soundness of the institution to be invested in. Differences in the strength of individual banks will remain, despite the introduction of the new requirements. Secondly, it must be stressed that the 8 per cent requirement for registered banks' capital is only a minimum. Each bank must determine for itself what is an appropriate level of capital, having regard to the precise nature and magnitude of the risks it undertakes.

Probably the most important benefit of the new framework, beside the underpinning it will provide for the banking system's capital adequacy, is the focus it brings to bear on important aspects of prudential management. The quite comprehensive information requirements (in terms of the credit risks arising from a wide variety of instruments) implicit in the new framework may lead to significant improvements in the way financial institutions monitor and manage not only counterparty risks but also the array of other risks to which they are exposed.

