Credit Loss Dynamics in Australasian Banking

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Abstract

The purpose of this thesis is to analyze the drivers and dynamics of credit losses in Australasian banking over an extended period of time in order to improve the means by which financial institutions manage their credit risks and regulatory bodies safeguard the stability and integrity of the financial system.

The analysis is based on a specially constructed data base of credit loss and provisioning data retrieved from original financial reports published by Australian and New Zealand banks. The observation period covers 1980 to 2005, starting at the time when such information was published for the first time in bank financial statements. It moreover covers the time of major crises which occurred in both Australia and New Zealand in the late 1980s and early 1990s.

The heterogeneity of reporting the data both amongst banks and through time requires the development of a reporting typology which allows data extraction with equivalent informational content. As a thorough study of credit risks requires long data series often not available from third party data providers, the method developed here will provide value to a range of researchers.

Based on an evaluation of many alternative proxies which track a bank's credit loss experience (CLE), the thesis proposes a preferred model for impaired assets expense (as % of loans) as dependent variable, mainly because of its timely nature and good data availability. Explanatory variables include aggregate macro variables of which changes in unemployment and the return in the share markets are found to have the most significant influence on a bank's credit losses. Bank-specific control variables include a pre-provision earnings proxy whose significance points to the use of provisions for the purpose of income smoothing by Australasian banks. The model also controls for size and nature of lending as smaller, retail-oriented housing lenders, on average, exhibit lower loan losses. Clear results are found with regard to the effect

of rapid expansion which appears to be followed by a surge of bad debt provisions 2 to 3 years later. Moreover, inefficient banks tend to suffer greater credit losses.

An important part of the thesis looks at the characteristics of alternative CLE proxies such as stock of provisions, impaired assets and write-offs which have been used by earlier literature. Estimating the preferred model with such alternative CLE parameters confirms their peculiarities such as the memory character of stock of provisions and the delayed nature of write-offs. These measures correlate rather poorly amongst themselves which calls for caution in the comparative interpretation of earlier studies that use differing CLE proxies.

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1 Introduction

1.1 Background: banks and credit risks

The financial sector, in particular banking institutions, forms the backbone of any modern economy and it has long been recognized that developments in this sector will affect the economy as a whole. The banks' role as important financial intermediaries is a key factor in this interaction. Banks attract savings from surplus agents and lend out the proceeds to agents that require such funds for consumption or investment purposes. The level of such lending will thus have a stimulating or a dampening effect on economic activity.

Lending is not without risk, however. Not all borrowers will be able to meet their financial commitments and banks may suffer lending losses. The study of credit risk has thus become an important area of research by practitioners, consulting and rating companies and academics alike.

From a bank's perspective, management of credit risks is a key component for success in a competitive market and it will set up systems and procedures to control such credit losses. Increased sophistication of markets and banking products has encouraged the development of a wide range models to support financial institutions in their management of credit risks. These are now broadly used by banks, both as in-house solutions or externally sourced applications. Reference books such as Saunders & Allen (2002), Crouhy, Galai, & Mark (2001) or Schmid (2000) provide a good overview of credit risk models used in the financial industry.

Prudential regulators and supervisors, on the other hand, need to understand and manage the dynamics of credit losses of the overall system. Very topical in this respect are rules of the revised Basel II Capital Accord (BCBS, 2004b) which seeks to increase the risk sensitivity of bank capital requirements. The accord also widens the view of what constitutes risk in banking by introducing, for instance, an operational risk category. Credit risk assessment nonetheless remains a key consideration as historically asset quality problems have ultimately triggered

failures of banks in an overwhelming number of cases.[1] Because Basel II gives banks the option to use their own proprietary credit risk models to determine the base parameters for the calculation of minimum capital required, it has spurred a flurry of studies into the new accord's potential systemic impacts (Allen & Gale, 1999; Borio, Furfine, & Lowe, 2001; Kupiec, 2006).

With all these advances in credit risk related research, there are still a large number of open questions. A fundamental issue relates to the calibration of credit risk models. Basel II rules prescribe a minimum observation period of five years to determine some of the fundamental parameters like probability of default and loss given default (e.g. BCBS, 2004b, paragraph 463, 466). While these parameters might well reflect the risk characteristics of the loan portfolio in 'normal' course of business, they could be misleading in times of economic stress. In the words of Danielsson (2002), "market data are endogenous to market behaviour so statistical analysis made in times of stability does not provide much guidance in times of crisis".

This thesis takes a longer-term perspective to the analysis of credit cycles[2] and focuses on Australasia for which specific studies on the subject have been rare. It examines the drivers of credit losses of Australian and New Zealand banks from 1980 to 2005, a period which includes a major crisis in both banking systems in the early 1990s. It attempts to identify the key factors that have affected the credit loss experience in the banking system. Ultimately, the insights gained through this research could improve the means by which financial institutions manage their credit risks and regulatory bodies safeguard the stability and integrity of the financial system.

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[1] See Graham & Horner (1988) for research into causes of US bank failures of the 1980s (as shown in Congressional Budget Office, 1994, p. 20, table 2). International evidence on causes that have led to such asset quality problems is shown in Caprio & Klingebiel (1996, figure 3, p. 13)

[2] Goodhart (2002) questions the use of the term 'credit cycle' in this respect. After all, the word cycle implies a certain degree of regularity yet experience shows how hard it is for anyone to predict the onset of a downturn accurately.

1.2 The data sample

Results of this thesis are based on a specially derived database of financial and credit loss information of 23 Australian and 10 New Zealand banks for the period of 1980 to 2005. The sample essentially includes all registered banking firms operating during this time with activities in retail and/or rural banking but excludes (1) institutions that are predominantly wholesale and/or merchant banks as well as (2) non-bank financial institutions. As stated above, this observation period covers the major banking system crises in both New Zealand and Australia which occurred in 1990/1991. In New Zealand, it culminated with the 1990 collapse and subsequent government bail-out for Bank of New Zealand, the leading bank at the time. In Australia, the state banking system was affected by the 1991 demise of both the State Bank of South Australia (later absorbed into a predecessor of St. George Bank) and State Bank of Victoria (amalgamated into Commonwealth Bank of Australia). Other Australian banking firms also suffered greatly during these years, most notably market leader Westpac which paid the price for its involvement in some high profile commercial real estate projects.[3]

With the inclusion of these troubled times into the data series, the empirical analysis includes at least one instance of a systemic crisis. Ideally, one should extend this analysis back even further but meaningful disclosure of credit loss and provisioning data in Australasia starts in 1980 only. Before this time, such information was netted from income and loan assets and not divulged separately in the financial accounts.

1.3 Methodological issues

There are several important methodological issues that have to be tackled in the process of collecting historical information on credit losses.

[3] Westpac's cumulative write-offs from 1990 to 1993 represented about 8% of loans outstanding.

One firstly finds that that there have been many variations of disclosure of loan loss and provisioning data, both through time and amongst banks. Accordingly, chapter 4 of this thesis proposes a reporting typology which classifies the accounting for loan losses which in turn defines the informational content of the bank's reporting. This forms the basis of capturing the data into a standardized template.

If we wish to describe the credit loss dynamics in Australasian banking, one has to decide on a suitable proxy which best tracks a bank's actual credit loss experience (CLE). Earlier literature has employed a number of measures, mostly without mention of, or deliberations on, reasons for selecting a particular one. The first part of chapter 5 is thus dedicated to an investigation of properties of a range of potential CLE proxies.

A great number of potential drivers of a bank's CLE have been identified by previous research. They include aggregate macroeconomic factors such as the state of the economy (e.g. GDP growth, unemployment rate), asset shock proxies (e.g. share prices, property prices), and indebtedness of households to name just the major ones. Moreover, it is obvious that bank specific factors play a major role in the level of credit losses, respectively the level of provisions reported. The primary factor relates to the risk choice of the bank, e.g. with regard to its portfolio composition. Next, there is anecdotal evidence confirmed by some empirical studies (e.g. Clair, 1992) that banks expanding (too) rapidly, are faced with elevated credit losses in subsequent years. There are behavioural aspects which have been found to influence the bank management's decision to set the level of discretionary provisions. Many researchers have, for instance, reported on earnings smoothing activities when banks postpone necessary provisions in bad years but rather book them in subsequent better years (and vice versa). There are also behavioural theories regarding the signalling character of provisions, the impact of taxation and the effects of capital management.

1.4 Empirical analysis

In chapter 6, the thesis models the CLE of Australasian banks by means of a distributed lag model which captures dynamic aspects of credit losses by the inclusion of lagged terms of explanatory variables. Model formulation and evaluation is conducted for the ratio of impaired asset expense as % of loans (IAE_LN) as the dependent variable because IAE_LN is identified as the most suitable CLE proxy in chapter 5.

Regressors are primarily selected based on economic arguments in the spirit of Verbeek (2004). They are all grouped into functional groups which can be expected to gauge similar effects. The basic model formulation includes three alternative proxies for the state of the economy and three further aggregate macro variables. There are a total of 4 bank-specific variables in this model but for shorter period estimates (1990 to 2005) this choice becomes richer through two additional bank-specific risk proxies reported with the introduction of the Basel I capital adequacy rules in 1988.

Equations are estimated for the combined sample for the full 1980 to 2005 period and shorter 1990 to 2005 period. There is also a separate analysis for the sub-samples of Australian and New Zealand banks. Results for both aggregate macro factors and bank-specific drivers are discussed in detail in chapter 6 (section 6.4).

A preferred model which the best explanatory power amongst all basic formulations is then estimated for other CLE proxies to gauge the impact on the results when alternative dependent variables are employed. CLE proxies considered are the stock of provisions, the level of impaired assets as well as net and gross write-offs. There is a special analysis on the effect of a bank's past growth on a bank's subsequent credit losses. A formal test on potential country-specific effects is conducted through the addition of a country dummy variable and interaction terms to the preferred form.

1.5 Thesis structure

This thesis will proceed as follows. Chapter 2 reviews the literature related to the modelling of credit losses and provisions of financial institutions. Chapter 3 provides an overview of the Australasian banking system. The sample is defined in this chapter and brief profiles present the banks included. Chapter 4 then describes the typology of credit loss and provisioning reporting developed to extract such data along equivalent informational content from published financial reports. The methodology chapter (chapter 5) introduces the principal model to be employed in the empirical analysis in this thesis. It includes a review of both dependent and explanatory model variables. Chapter 6 conducts the concrete formulation of the model, the estimations and discussion of empirical results. Chapter 7, finally, summarizes the findings of the thesis.

2 Literature review

2.1 Introduction

The goal of this chapter is a review of literature related to credit loss and provisioning by deposit taking institutions. It thus provides motivation and justification for the collection of such data for the Australasian banking sector as it is conducted in this thesis. Such data have been applied to study a broad range of research questions.

The chapter firstly introduces the basics of loan loss accounting in section 2.2. The following section (section 2.3) then reviews fundamental philosophies that influence loan loss provisioning by banks. Notwithstanding these fundamental philosophies, researchers have identified a number of additional factors that affect the levels of provisioning by the banks' managers, in particular the more subjective, general component. These are discussed in section 2.4. Another line of research applying loan loss and provisioning data are studies with a macroeconomic focus reviewed in section 2.5.

2.2 A primer on loan loss provisioning

'In the ordinary course of business, financial institutions suffer losses on loans, advances and other credit facilities as a result of their becoming wholly or partially uncollectable (Australian Accounting Standards AAS 1032, 7.2.1, see AASB, 1996)[4]. This section presents an overview of the fundamental accounting transactions which occur in this context. It also looks at the life cycle of loan loss provisions starting with the initial provision, subsequent write-off and, finally, recovery of some of the debts previously derecognized.

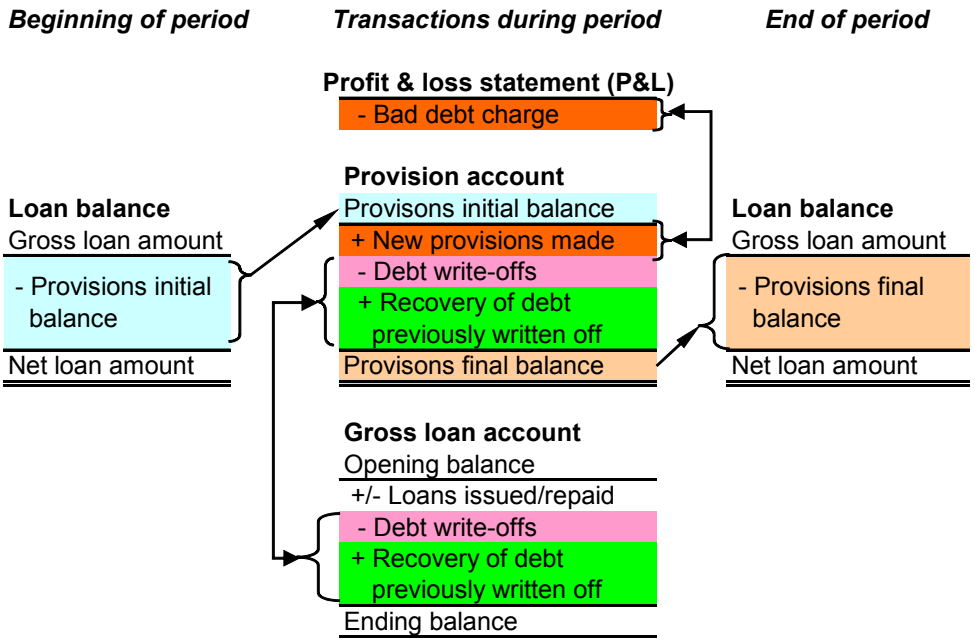
[4] Australian Accounting Standards Board (AASB) definitions on banking provisions have undergone some changes with the adoption of the International Financial Reporting Standards (IFRS) based AASB 139. In particular, the use of general provisions is more restricted and limited to assets with objective impairments. The term 'collective' provisions is used instead. This generalized description of provisions nevertheless remains valid in principle.

2.2.1 Basic accounting transactions

Figure 2-1 visualizes these accounting transactions using the loan account as an example and without distinguishing between specific and general provisions in the first instance. The banks maintain a counter-asset provision account whose opening balance is the difference between the gross loan amount and the net loan amount, i.e. the portion of the loan portfolio it does not expect to collect. If it identifies potential loan losses during the accounting period, it will charge them to the profit and loss (P&L) statement while at the same time increasing (crediting) the loan loss provisions. This means potential losses are not immediately written off from the gross loan balance. Write-offs, also called derecognitions, will typically occur later when the bank actually loses control of its contractual rights, for example if the loan is sold or legal rights are otherwise extinguished.[5] At that point, the corresponding provision is removed (debited) in an offsetting transaction. In some instances such derecognized bad debt might still be recovered, at which time the gross loan account is increased (debited) and the corresponding provision reinstated. Alternatively, some banks will apply recoveries directly to reducing the bad debt charge of the accounting period.

[5] In practice, write-offs occur once the debt has been crystallised and collateral has been liquidated but neither New Zealand nor Australian accounting standards before the introduction of IFRS have prescribed specific rules on the derecognition of financial assets (such as loans) equivalent to International Accounting Standard (IAS) 39.35. This standard states that 'an entity should derecognise a financial asset or a portion of it when, and only when, the entity loses control of the contractual rights that comprise the financial asset (or a portion of it)'. This practice is also recommended by the Basel Committee on Banking Supervision (BCBS, 1999, p. 15).

Figure 2-1: Provisioning for bad loans – generic description of method



2.2.2 Life cycle perspective

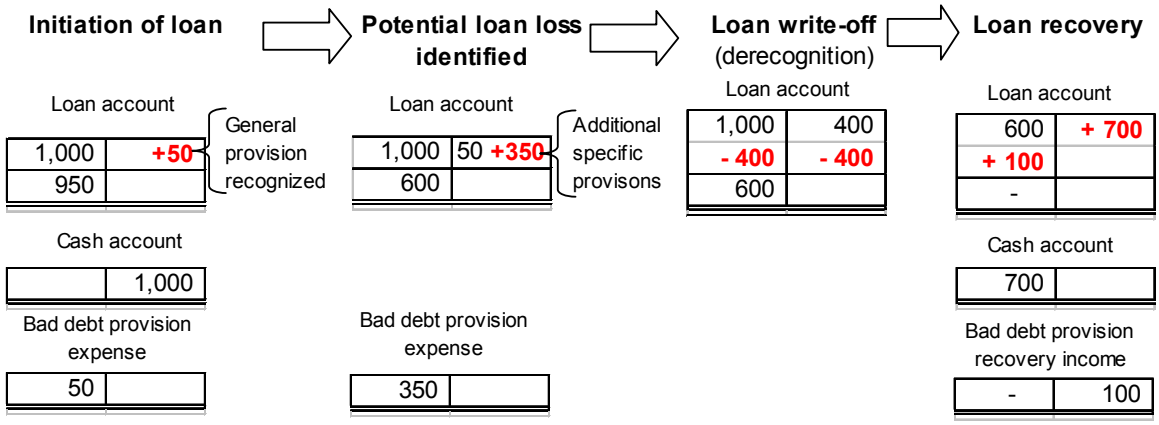
Another approach to understand accounting for bad debt is to follow the life cycle of a loan that suffers a loss. This is illustrated by means of a simplified numerical example in Figure 2-2 which does not consider the complexities of accounting for interest earned on defaulted loans.

When a loan is initiated, the bank typically recognises a *general provision* against it which is maintained as a global provision for a whole portfolio of loans, i.e. not for specific loans. As discussed for example in Wall and Koch (2000), there are at least three schools of thought as to how these should be set and there is even an argument whether they are justified for properly priced loans[6]. Whatever definition of general provisions is chosen, they are discretionary in nature being ultimately determined by judgment of the bank's management.

[6] Borio and Lowe (2001, footnote 10, p.46), for instance, dispute the argument that a provision should be created at origination even on correctly priced loans given that default could occur before the interest margin has been earned. They reason that provisioning is about expected outcomes. Loans are not expected to systematically default before the payment of interest. The possibility of an unexpectedly high

Once a potential loss has been identified and becomes reasonably probable, the bank will raise a *specific provision* against the loan which is in turn charged to the P&L statement. If the loss is confirmed, derecognition (loan write-off) follows. Finally, some portion of the loan may eventually be recovered. If more than the carrying value of the loan can be recovered, the bank recognizes the excess collected as recovery income, either directly to the P&L or as reduction of provision levels.

Figure 2-2: Life cycle of bad debt accounting, a simplified numerical example



2.3 Loan loss accounting: fundamental philosophies

The requirement to set aside reserves for bad loans is rooted in standards relating to true and fair value reporting and in particular to accounting for loss contingencies. Latter standards were formulated quite early in the history of accounting rule setting. In the US, for instance, FAS 5 (FASB, 1975) issued in 1975 makes it a requirement to provision if (1) the future impairment

number of early defaults should be covered by capital. Borio & Lowe's view is also embodied in the new IFRS which does not allow general provisions at the time of initial recognition of the loan.

of an asset is probable and (2) the amount of such a loss can be reasonably estimated. Similarly in New Zealand, SSAP 15 dealing with accounting for contingencies, later superseded by FRS 15, was issued in 1982. As the sophistication of financial markets and instruments increased, supplementary and more specific standards relating to loan losses came into force. Until the phase-in of International Financial Reporting Standards (IFRS) in 2006, loan loss provisioning and reporting in Australasia has mainly been affected by rules regarding the disclosure of information by financial institutions (AAS 32; IAS 32; NZ: FRS-33), the recognition and measurement of financial instruments (IAS 39, AASB 139; IAS 39,), the disclosure of these instruments (AASB 132; IAS 32) and, finally, the impairment of assets in general (AASB 136; IAS 36).

Researchers have determined repeatedly, however, that despite the 'rule making' there is no such thing as an objective provisioning for credit losses. Rather they found evidence of some fundamentally different philosophies as to what constitutes an ideal provisioning regime.

Wall & Koch (2000) review this in a US regulatory perspective. They identify three schools of thought regarding loan-loss accounting. The first one is what they term the economist's view as perspective that it is intended to capture expected future losses that will occur if a borrower does not repay in accordance with the loan contract. In contrast, the primary concern of the accounting standard setters, in Wall & Koch's case the US Financial Accounting Standards Board (FASB), is the measurement of a firm's net income over a given period which should allow "general purpose" users of financial statements like equity investors to make informed decisions. What this means is that accounting standards focus on losses expected to result from events during a given period and explicitly exclude the expected effect of future events which would be taken into account under an economist's provisioning regime.

A third philosophy, according to Wall & Koch, views loan losses as a type of capital that should be built up during good times to absorb losses during bad times. This perspective advocated by prudential supervisors differs from that of the economist or the accounting standards in that it recommends maintaining loan loss provisions in excess of expected losses

during good times. Such a perspective of loan-loss accounting is implicit in the Basel I capital regulations, which have included part of the loan-loss allowance as an element of capital. Wall & Koch note that many banks in the US have historically maintained a loan-loss allowance in excess of expected losses.

BIS researchers Borio & Lowe (2001) also discuss such conflicts of interest between the conservative regime of prudential regulation authorities and the 'true and fair' period accounting advocated for instance by securities market regulators. They note that the accounting principle of most countries is that financial statements should reflect the outcome of events that took place before the balance sheet date, and should not attempt to reflect events that have not yet occurred. In IFRS this view is codified by IAS 39 (IASB, 2005b) which is currently being adopted around the globe, including Australia and New Zealand. Under this standard, loans would normally be carried at their outstanding value unless there is "objective evidence" of impairment. This principle makes it difficult for a bank to create forward-looking general provisions.

Borio & Lowe generalize the main approaches to provisioning they observe around the globe into four main categories (see Table 2-1 below). In particular, they contrast IAS 39 discussed above with alternative methods. One category discussed are so-called dynamic, respectively statistical provisioning regimes which have been mandated in some countries (Banque de France, 2001; Spain: Poveda, 2000). In principle, these models can take account of likely future developments, including business cycle effects. Another method described is what Borio & Lowe (2001, p. 39) term "Fair Value Accounting" according to which the notion of provisioning for impaired loans would disappear. Instead, loans would be recorded directly at their fair value with changes in fair value flowing through to a bank's income statement. One could also retain provisioning, with provisions set to equal the difference between the contractual amount and the fair value of any loan[7]. Finally, Borio & Lowe contrast all three methods with

[7] While fair value accounting, in theory, appears as a superior concept, disadvantages in its practical implementation and moral hazard issues have been noted in many instances, especially with

the rules for determining expected losses according to the new Basel Capital Accord where the forward looking time horizon for losses is merely one year.

Table 2-1 Approaches to provisioning and measuring expected losses (adapted from Borio & Lowe, 2001, Table 1, p. 39)

	IFRS IAS 39	**Fair Value Accounting**	**Statistical provisioning**	**Basel II Capital regulation** (expected losses)
Trigger	Objective evidence	No	No	No
Horizon	Residual maturity for impaired loans	Residual maturity	Average default	One year
Discounting of cash flows	Discount expected cash flow using original effective interest rate	Discount contracted cash flows using market interest rate	No discounting	No discounting
Provision at origination	No	Possible	Yes	Not applicable

In summary, there are a number of competing provisioning philosophies and they are all coloured by the particular concerns of the respective regulators or standard setters.

2.4 Hypotheses on behavioural factors affecting levels of loan loss provisions

While the previous section identified a variety of estimation philosophies tailored to the needs of investors and regulators, a bank's reported loan-loss provisions are ultimately largely under its managers' control, and managers are likely to use any available discretion to attain their own goals. In this respect, research has suggested a range of motivations and, in line with the

regard to its application to financial instruments without observable market prices arising from active markets (see for example BCBS, 2004a, p. 5).

categorization suggested in Lobo & Yang (2001), they will be discussed under the following general headings (subsections 2.4.1 to 2.4.4): income smoothing, capital regulation, signalling and, finally, tax considerations. In essence, the literature looking at such behavioural aspects which determine level of loan loss provisions has mostly been researched with data on US banks and there is a relative paucity of studies using data from other banking systems. The final subsection 2.4.5 nevertheless reviews some of these articles.

2.4.1 Income Smoothing

In common accounting textbooks like Wild, Bernstein & Subramanyam (2001) income smoothing is described as a common form of earnings management, that is, managers may decrease or increase reported earnings to reduce volatility. The method used to smooth income involves not reporting part of earnings in profitable years through 'hidden reserves' or 'earnings banks', with these stored earnings reported in less profitable years. Given that loan loss provisions are generally the largest accrual expense item in a bank's P&L statement, they are thus likely to play a significant role in a manager's income smoothing strategy.

While Buckmaster (1992; 1997) documents the existence of income smoothing literature as far back as 1898, the hypothesis that banks will use loan-loss provisions for income smoothing purposes was first explored for the US by Schreiner (1981)[8] and in a more formal way by Greenawalt & Sinkey (1988) again with US data covering a period of 1976-1984. Over the years, considerable empirical evidence supporting this hypothesis has been accumulated. Scholes, Wilson, & Wolfson (1990, p. 646) show that loan-loss provisions are used in income smoothing in conjunction with unrealized securities gains. Collins & Shackelford (1995) document income smoothing but just for profitable banks while contrary to these findings, Bhat (1996) characterize an income smoothing bank "as a small one with high risk loans and poor financial conditions".

[8] As reported in Buckmaster (2001, p.179, 234), Schreiner (1981, p.123) concludes that "in general, banks do not appear to use the loan loss provision as a device to smooth net income".

Looking at bank capitalization, Niswander & Swanson (2000) find income smoothing solely for banks above a certain critical capital adequacy threshold.

Some studies, however, fail to find evidence of income smoothing through loan loss provisions. Examples are Wetmore & Brick (1994), Beatty, Chamberlain, & Magliolo (1995, 5.1.2, p. 254), and Ahmed, Takeda, & Thomas (1999).

Most of above studies do not attempt an in-depth interpretation of the patterns of income smoothing. Explanatory hypotheses are however explored in Kanagaretnam, Lobo, & Yang (2000) who argue that the level of current performance relative to the industry median is a key determinant of managers' decisions to smooth income. In a later paper, the same lead authors (Kanagaretnam, Lobo, & Mathieu, 2003) explore bank specific factors that explain income smoothing and conclude that the need to obtain external financing and the managers' job security concerns[9] appear to be a significant driver of income smoothing behaviour.

No such motives are identified in an earlier more technical explanation by Kim & Santomero (1993) who see income smoothing as a consequence of Bayesian models used by banks when forecasting loan losses. These models update projected loan losses as a function of new information obtained from the new audit and the historical variance of loan loss rates over the bank's previous history. A series of good years will thus mean that provisions get smaller. On the other hand, successive bad outcomes reduce the bank's prior belief in the historical distribution. The corresponding provisions on average get larger because the bank becomes more sure that it is drawing outcomes from a distribution with higher average loss rates and probabilities.

[9] Job security concerns are analysed in a framework developed by Fudenberg & Tirole (1995) which suggests that when current performance is poor, relative to other banks, managers have an incentive to shift future earnings into the current period to reduce the chance of dismissal or interference. Alternatively, when future relative performance is expected to be poor, managers have an incentive to shift current earnings to the future to reduce the likelihood of poor future performance.

2.4.2 Capital Regulation

The capital management incentive has its root in the fact that regulators monitor the banks accounting based capital ratios which are affected by provisioning decisions. Basel I capital adequacy rules, for instance, allow loan loss provisions, subject to certain upper limits, to be counted as a component of regulatory capital (BCBS, 1988, items 18-21, p. 5-6). Capital management through loan loss provisions is also addressed later in this chapter in what we classify as literature with a macro prudential and bank regulatory focus in section 2.5. At this stage, this subsection will review the development of the capital management argument through time.

The first paper that explicitly posits capital management through loan loss provisions is Moyer (1990, 3.1, p. 129-131). Her research looks at data before the introduction of the Basel regime with US regulations based on 'primary capital adequacy ratios' which allowed banks to prop up their ratios by inflating loan loss provisions. Accordingly, she tests and confirms the capital management hypothesis that predicts that the capital ratio is negatively related to discretionary loan loss provisions, i.e. the lower the capital ratio the greater the incentive to report higher provisions. Other researchers who confirmed her results also for sample periods before the introduction of the Basel capital adequacy regime are Collins, Shackelford & Whalen (1995) and Beatty, Chamberlain & Magliolo (1995).

A later study by Kim & Kross (1998) studies the impact of the introduction of the Basel I rules in 1989 which brought about limitations on the use of provisions as part of a bank's regulatory capital. The authors confirmed that the incentive of low capitalized banks to report provisions at high pre-1989 levels was indeed reduced. Kim & Kross' findings were confirmed by Ahmed, Takeda, & Thomas (1999) who conclude that the capital management motivation is the most important aspect in setting discretionary provisions, much more important than earnings management or signalling.

A more recent article by Luengnaruemitchai & Wilcox (2004) on capital management by US and Japanese banks looks at patterns in the use of discretionary provisions and charge-offs through time, in particular through what the authors call 'troubled' times. They firstly argue that in difficult times banking regulators are more lenient in the enforcement of capital requirements for fear of systemic repercussion (credit crunch, widespread bank failures) which in turn allows the banks to exercise more discretion, i.e. report lower provisions and charge offs when the banking system is in a troubled state. The authors secondly hypothesize that since supervisors are more likely to close 'atypical' banks, one should observe clustering of reporting behaviour when financial institutions seek 'safety in similarity'. As to the results, Luengnaruemitchai & Wilcox find some evidence for their hypotheses when capital ratios were low in the banking crisis of the late 1980s but no systematic relation of capital ratios among peer banks in the generally healthier times of the late 1990s when these ratios were generally higher. Such behavioural patterns, the authors conclude, would help mitigate procyclical effects of Basel II as they are sometimes feared in the literature (e.g. in Borio, Furfine, & Lowe, 2001).

2.4.3 Signalling

The need for signalling arises when managers, who possess information indicating that bank values are higher than those assessed by the market, wish to have market values revised upward. Because of an adverse selection problem as described in Akerlof (1970) and the accepted wisdom that well-informed agents can improve their market outcome by signalling their private information to poorly informed agents (Milgrom, 1981; Spence, 1973), bank managers could likewise employ signalling tools to communicate concerns about stock undervaluation resulting from information asymmetry.

Well known is the so-called dividend signalling theory which has given rise to an extensive literature going back to seminal articles by Bhattacharya (1979), Miller & Rock (1985) and John

& Williams (1985). This theory explains excess returns observed following announcements by firms of an increase in dividend.

Less famous are papers that explore potential signalling effects of discretionary accounting items like loan loss provisions. One potential hypothesis is that a bank increases the loan loss provision to signal that it is strong enough to absorb future potential losses. Research by Beaver, Eger, Ryan, & Wolfson (1989, p. 169 and Table 2, p. 170) suggests that an increase in loan loss provisions is indeed interpreted as 'good news' in that management indicate the "the earnings power of the bank to be sufficiently strong that it can withstand a 'hit to earnings' in the form of additional loan loss provisions." In some respects, signalling may be related to income smoothing or also capital management activities of bank managers. If a bank engages in earnings management, this might well be used as a signalling device. In this respect, Wahlen (1994) provides evidence that bank managers increase the discretionary component of unexpected loan loss provisions when future cash flow prospects improve. In his view, too, increased unexpected loan loss provisions could be interpreted a 'good news' consistent with above results.

An obvious way to test whether the provisioning is interpreted as 'good', respectively 'bad' news is to observe the reaction by the capital markets as was done in Grammatikos & Saunders (1990) in a case study for Citicorp Group which, at the time, had a very substantial LDC loan exposure. Beaver & Engel (1996) follow a more sophisticated approach. They hypothesize that the capital market perceives the stock of loan loss provisions to be comprised of two components: a nondiscretionary component which is negatively priced and a discretionary component whose incremental pricing coefficient is positive. In their study they model the non-discretionary portion of provisions as a function of subsequent loss experience and other factors while the remaining provision stock then becomes the discretionary portion. When regressing the market value of the bank with these two components, Beaver & Engel indeed find the predicted coefficients. This means market participants clearly interpret discretionary provisions as positive signals, and so bid up the share price.

Other hypotheses tested with regard to what makes provisioning good or bad news can be found in Liu, Ryan, & Wahlen (1997) who posit that increased loan loss provisions are good news only for banks with apparent loan default risk problems based on prior information. The data then confirm that loan loss provisions are good news only for such 'at risk' banks and bad news for 'not at risk' banks.

One recent example of researching loan loss provisions in the light of the signalling theory are Kanagaretnam, Lobo, & Yang (2005). They look at bank specific factors that determine signalling with loan loss provisions and find that signalling differs across banks based upon the degree of information asymmetry. It varies negatively with bank size and positively with earnings variability, future investment opportunities, and degree of income smoothing.

2.4.4 Taxation Management

The use of loan loss provisions in tax minimization strategies is comparably less researched but there is generally broad agreement among researchers that tax considerations do have an impact on levels of reported loan-loss provisions. In the US (see for example in Collins, Shackelford, & Wahlen, 1995, pp. 268-270) and many other countries, tax authorities will only accept specific provision or actual loan write-offs as a tax deductible item. General provisions, on the other hand, do not reduce taxable income in many instances. The typical research design will thus test whether the marginal corporate tax rate affects the level of loan write-offs while discretionary non-deductible loan loss provisions should not be affected.

Earlier studies that find evidence for tax optimization strategies being followed by banks are Scholes, Wilson, & Wolfson (1990) and Collins & Shackelford (1995). More recently, Niswander & Swanson (2000) document such behaviour for well capitalized banks, i.e. where there is a true discretion in setting loan loss reserves.

No evidence of tax planning is however found in (Beatty, Chamberlain, & Magliolo, 1995, 5.1.3, p. 254). The authors attribute the result to their "poor choice" of crude proxies for marginal tax rates.

2.4.5 Studies on behavioural aspects using non-US data

The previous four subsections have reviewed hypotheses mostly developed for the US banking market which provides large and homogeneous data samples over long time periods. This is important since such behavioural effects might be quite weak. Even though banks in other countries may have different accounting rules, regulation and supervision, and possibly different incentives, only few researchers have looked at behavioural factors driving the discretionary loss provisions outside the US.

One example is Hasan & Wall (2004) who test for signs of earnings management firstly with a sample of international banks and then especially with a smaller sample of Japanese and Canadian banks using Bankscope data from 1993 to 2000. They model levels of total loan loss provisions as a function of proxies for non-discretionary and discretionary components. The proxies for the discretionary component are the capital ratio at the beginning of the period, to test for potential signs of capital management, and the (pre-provision, pre-tax) return on assets (earnings ratio), to test for earnings management in general. Only effects of earnings management are found to be significant while the evidence for capital management is inconclusive. The coefficients on the earnings ratio are found to be positive and significantly lower for U.S. banks than for the non-U.S. banks. Hasan & Wall argue that these differences may reflect differences in the financial market benefits of managing earnings or in the flexibility that management has to manage earnings (i.e., the cost of managing earnings). They state that ”in at least some cases, the results may also reflect the banks’ determination to artificially boost reported net income, such as by realizing capital gains, in those periods where they need to increase their bad debt provisions.”

Data on the 50 largest EU banks are used by Valckx (2004) which, among mainly macroeconomic aspects, also looks at behavioural issues of loan loss provisioning. The time period covered is 1997 to 2001 only but is extended back to 1988 for a smaller panel of 21 EU banks. The author of this working paper concludes that ”the data are broadly consistent with the

hypothesis that income smoothing takes place in the EU but the findings are more mixed with respect to capital management".

2.5 Literature with a macro prudential and bank regulatory focus

This section reviews the use of loan provisioning but also other credit loss data in studies with a macroeconomic focus as they are, for instance, important for the purpose of prudential regulation and supervision of the banking system. The research focus of these studies differs from the literature of the previous sections in that authors explore loan loss provisions and write-offs in the context of the wider economy and the financial system in particular[10]. They are typically concerned with questions such as effects of capital regulations (e.g. procyclical effects of loan loss provisions), loan loss patterns in a systemic view (e.g. vulnerabilities in the sector) or questions of system stability (e.g. to obtain parameters for system stress testing). A common feature of this research is that it is less concerned with the discretionary aspect of provisioning but rather with the credit losses they gauge.

The strongest contributions in this area of research not surprisingly comes from authors associated with supervisory authorities who need to understand patterns in and influences on loan loss provisions. Many studies have been written in the past few years, a period which coincides with the design and development phase of the New Basel Capital Accord Basel (BCBS, 2004b). The following review of literature in this area is broken down into two subsections. It first lists studies with global data samples, followed by research with a country specific focus. For reference, Table 2-2 provides an overview of the data samples used in various loan-loss provisioning studies.

The focal point of this thesis is akin to the type of work reviewed in the following. This applies both to the proposed methodology and analyses. In particular, it is similar to Salas &

[10] Questions of capital management discussed in the previous section may have regulatory aspects as well.

Saurina (2002), Pain (2003) and Kearns (2004) who have all used data for specific European banking systems (Spain, UK, Ireland). This section proceeds with a review of studies using global data samples, followed by specific country or regional studies.

Table 2-2 Summary information on data samples of selected loan loss provisioning studies with a macro prudential and bank regulatory focus

Authors (Year)	Title	Time Range/ Scope	Geogr aphic Focus	Data Source	Provision Data Analysed
Arpa et al. (2001).	The influence of macroeconomic developments on Austrian banks: implications for banking supervision	1990-1999 (quarterly data) / approx. 950 banks operating in Austria	Austria	Non-public acct. data reported to super-visory authority; IMF	Ongoing provisions as % of total assets
Bikker & Hu (2001, p. 10-13)	Cyclical patterns in profits, provisioning and lending of banks and procyclicality of the new Basel capital requirements	21 banking systems (26 for other models in the paper)	Global	OECD country banking statistics'	Addition to provisions for credit losses in proportion to loans outstanding.
Bikker & Metzemakers (2003)	Bank Provisioning Behaviour and Procyclicality	1991 to 2001, up to 8,000 bank-year observations	Global (29 OECD countri es)	OECD, Bankscope database (Fitch-IBCA)	Level of provisions and annual additions to loan loss provisions
Cavallo & Majnoni (2001)	Do Banks Provision for Bad Loans in Good Times? Empirical Evidence and Policy Implications	1988-1999 / 5957 bank years of 1176 large commercial banks (372 of which from non-G10 countries)	Global, incl. LDC	Bankscope IMF, Worldbk data from La Porta et al. (1998)	Ongoing provisions as % of total assets
Esho & Liaw (2002)	Should the Capital Requirement on Housing Lending be Reduced? Evidence From Australian Banks	1991-2001 / 16 banks	Aust-ralia	Regulatory reporting	Impaired assets as % of assets, "credit losses" – special definition
Fernández de Lis et al. Martínez (2000)	Credit growth, problem loans and credit risk provisioning in Spain	1983-1999 / not specified	Spain	not specified	Ongoing provisions as % of total loans

Table 2-2 Summary information on data samples of selected loan loss provisioning studies with a macro prudential and bank regulatory focus (continued)

Kearns (2004)	Loan Losses and the Macroeconomy: A Framework for Stress Testing Credit Institutions' Financial Well-Being	mostly early 90s to 2003/ 14 banks with 132 observations	Ireland	Original annual accounts	Ongoing provisions (as % of total income); stock of provisions
Keeton (1999)	Does Faster Loan Growth Lead to Higher Loan Losses?	1982-1996 / sample size not disclosed	USA	Quarterly call reports of com-mercial banks	Share of delinquent loans
Pain (2003)	The provisioning experience of the major UK banks: a small panel investigation	1978-2000 / 7 commercial banks & 4 mortgage banks	UK	Published annual accounts	Ongoing provisions, write-offs, recoveries; stock of provisions (all as % of loans & advances)
Quagliariello (2004).	Banks' Performance over the Business Cycle: A Panel Analysis on Italian Intermediaries	207 financial intermediaries for a period of 1985 to 2002	Italy	Non-public reports to the Bank of Italy for statistical purposes	Loan loss provision ratio; flow of new bad debts to performing loans
Salas & Saurina (2002)	Credit Risk in Two Institutional Regimes: Spanish Commercial and Savings Banks	1985 – 1997, 597 observations for commercial banks and 784 for savings banks	Spain	Statistical Year Book of Private and Savings Banks	Problem loan ratio
Sinkey & Greenawalt (1991)	Loan-loss experience and risk-taking behaviour at large commercial banks	explain 1987 loan loss rates with 1984-86 data / 154 money-center & regional banks	USA	Regulatory reporting (NTIS)	Net charge-offs as % of total loans pre-charge-off
Valckx (2004)	What determines loan loss provisioning in the EU?	System specific for EU-15 from 1979 to 2001. Bank specific for 21 large EU banks 1988-2001.	EU	OECD (system data), CreditDisk and Bankscope	Ongoing provisions as % of total loans

2.5.1 Studies with global data samples

A major concern of regulators has been the potential for procyclical effects of capital regulation. We have mentioned BIS researchers Borio, Furfine & Lowe (2001) earlier in this thesis. In their comprehensive review of issues related to the procyclicality of the financial system they also touch on loan loss provisioning. They document that bank provisions are indeed one of the most procyclical variables, being highly negatively correlated with the business cycles (Borio, Furfine, & Lowe, 2001, Table 1, p. 15). Low (excessive) provisioning in good (bad) times then translates into a clear procyclical pattern in bank profitability. Whilst Borio et al. base their conclusions on a pure visual inspection of data for various countries, other researchers have conducted more formal empirical research.

One example is a study sponsored by the World Bank (Cavallo & Majnoni, 2001) where the authors put the role of provisioning into the centre of the procyclicality debate and ask the question "Do Banks Provision for Bad Loans in Good Times?". They look at a sample of 1,176 large commercial banks—372 of them in non-G10 countries—for the period 1988–99. The authors posit that a bank's decision to set loan loss reserves may also be affected by agency problems between the different classes of banks' stakeholders such as banks' "outsiders" (minority shareholders or the fiscal authority) and banks' "insiders" (bank managers and majority shareholders). The amount of legal protection granted to a firm's outsiders affects the allocation of a bank's earnings to provisions, income taxes and dividends. They find support in the data for their hypothesis that the protection of outsiders' claims—the claims of minority shareholders in common law countries and of fiscal authorities in countries with high public debt—on bank income has negative effects on the level of bank provisions (insufficient provisioning). Cavallo & Majnoni confirm a positive association between pre-tax income and provisions for their sub-sample of G10 banks which means these institutions indeed provision more in good times. On the other hand, non-G10 banks, on average, seem to provision too little

in good times and are forced to increase provisions in bad times. In conclusion, the authors argue that cyclical shortages of banks' capital may not only be due to the risk based regulation of bank capital but more importantly due to the lack of risk based regulation of loan loss provisioning practices.

A more recent study by Dutch Central Bank researchers Bikker & Metzemakers (2003) investigates how bank provisioning behaviour has related to the business cycle. They use 8,000 bank-year observations from 29 OECD countries over a period of 1991 to 2001. In their study they confirm what was noted by Borio, Furfine & Lowe (2001). Provisioning turns out to be substantially higher when GDP growth is lower, reflecting increased riskiness of the credit portfolio when the business cycle turns downwards, which at the same time increases the risk of a credit crunch.

2.5.2 Specific country and system studies

Specific country studies have a slightly longer history, pioneered by researchers in the US where large data sets have been available quite early. Seminal work in the US stems from Keeton & Morris (1988) and again from Sinkey & Greenawalt (1991)[11]. This section will, however, not follow the literature chronologically through time but will rather concentrate on country studies of the recent past which analyse (1) similar time periods as in this thesis and (2) banking markets with a comparable institutional setting as the one in Australasia. The list of studies also includes one for Australia (Esho & Liaw, 2002) which is discussed at the end of the section.

The first two studies discussed are publications of the Central Bank & Financial Services Authority of Ireland (Kearns, 2004) and the Bank of England (Pain, 2003). This is followed by reviews of studies for the Austrian, Spanish and the Italian banking market. It concludes with some work by Keeton (1999) for the US market.

[11] Sinkey & Greenawalt (1991) regress loan loss rates observed in 1987 with bank specific variables of the preceding three years

In his Irish study, Kearns (2004) uses provisioning panel data of a total of 14 Irish credit institutions which yields a total of 132 annual time series observations starting mostly from the early to mid 1990s. The author estimates a model with predominantly macro factors as explanatory variables but with a fixed effect estimator to account for unobserved individual bank characteristics. He finds some evidence for Ireland that the level of loan losses, proxied by loan-loss provisions, rises when GDP growth declines but more significantly when unemployment rises. Kearns then applies the coefficient estimates to run stress tests for the Irish financial system and concludes that the simulated increase in provisioning would differ across lenders but that every institution could afford the increase in provisions out of a typical year's profit.

Pain (2003) uses panel regression analysis to investigate factors that may lead to increases in loan-loss provisions for a sample of eleven major UK commercial and mortgage banks (1978-2000). He finds that there are indeed a number of macroeconomic variables that can provide information about banks' provisioning requirements, in particular real GDP growth, real interest rates and lagged aggregate lending growth. Because data are sourced from information-rich bank annual accounts instead of from generic databases, the author is also able to shed light on bank specific factors affecting provisioning such as the composition of the lending portfolio, the rapid credit expansion to certain sectors (e.g. commercial property lending) or collateral. All in all, the Pain paper follows a methodology (type of data used, analysis), which is most comparable to the one used in this thesis.

Slightly earlier, a group of researchers associated with the Bank of Austria (Arpa, Giulini, Ittner, & Pauer, 2001) published some analysis of provisioning patterns of Austrian banks[12]. They confirm, again in line with global studies above, that Austrian banks increase risk provisions in times of falling real GDP growth rates (procyclical behaviour) and in times of rising bank operating income or operating results (income smoothing).

[12] The authors also investigate macroeconomic factors that affect net interest, respectively operating incomes.

A study by Bank of Spain's Fernández de Lis, Martínez, & Saurina (2000) reviews loan growth and provisioning in the Spanish market and at the same time presents the Central Bank of Spain's approach to counteracting procyclical provisioning behaviour. In line with other banking supervisors (e.g. Banque de France, 2001), the Bank of Spain had at the time introduced a so-called statistical provisioning regime aimed at proper recognition of forward looking, i.e. ex ante credit risk. The results of the study provide support for the new regime in that lending in Spain was found to have been strongly procyclical while provisions had shown a similarly procyclical bias, being largely linked to the volume of contemporaneous problem assets. In line with the results of the global sample studies, the authors conclude that book profits have tended to overstate true profits in periods of low non-performing loans and high credit growth (upturn) and understate them in periods of high problem loans and low credit growth (downturn).

Also for the Spanish banking market Salas & Saurina (2002) analyze the credit risk in two institutional regimes: the Spanish commercial and savings banks. In particular, they study the determinants of bank problem loans using panel data of both macroeconomic and bank specific variables in the period of 1985–1997. Drivers of problem loans are the GDP growth rate, levels of corporate and consumer indebtedness, rapid past credit or branch expansion, the portfolio composition, bank size, net interest margin, capital ratio, and market power. However, the authors find significant differences between commercial and savings banks, which confirm the relevance of the institutional form. Like this thesis, Salas & Saurina partially rely on original bank annual reports for their data.

The performance of Italian banks over a period of 1985 to 2002 is analysed in a paper by Quagliariello (2004). For a sample of 207 banks[13], the author in particular investigates whether loan loss provisions and non-performing loans show a cyclical pattern. In line with research reviewed above, he finds that the flow of new bad debts and the provisions against loan losses

[13] Bank accounting data are sourced from non-public reports to the Bank of Italy (for use in their supervisory statistics) for a period of 1985 to 2002.

tend to increase when economic conditions deteriorate. As an interesting twist, however, GDP growth turns out to be significant only when lagged by 1 and 2 years, implying that the cyclical impacts in Italy are not instantaneous, but delayed. Similar to Kearns (2004), the author then applies the sensitivity parameters found to stress test the impact of a recession. In line with results for the Irish market, he concludes that level of Italian banks' earnings and capital buffers would be, on average, sufficient to absorb the effects of the shocks.

Determinants of loan losses have also been analysed by regulators in the US. In fact, studies on the US banking market, due to its size and regional differences, could well be considered as multi-country analysis. Keeton (1999) focuses on bank specific factors that help predict loan losses. He conducts his investigation with a sample of quarterly call reports filed by US commercial banks for the period 1982 to 1996. On balance, his data provide some support for the intuitive result that faster loan growth leads to higher loan losses. Specifically, US States experiencing unusually rapid loan growth over the period tended to experience unusually big increases in delinquencies several years later. Keeton nonetheless puts a question mark behind this seemingly clear-cut relationship since in his theory only increases in loan supply, associated with relaxation of underwriting standards, should lead to credit losses down the track. Conversely, increases in demand for loans, leading to more stringent selection of credits, or a productivity shift should, in his view, not give rise to increased loss rates in the future.

Finally, there is one study for Australia. A 2002 APRA study (Esho & Liaw, 2002) investigates appropriate levels of risk weights on lending secured by residential mortgages. The sample includes up to 16 Australian banks for sample periods ranging from 1991 to 2001 (shorter period for some estimates) for which the authors in particular model the level of impaired assets as a function of the relative proportion of loans in the various Basel I risk weight categories. They find no significant difference in risk associated with varying the proportion of assets held between the 20% and 50% risk weight buckets from which they conclude that the Basel I 50% risk weight on housing lending might be excessive.

2.6 Chapter summary

This chapter first provides an introduction to accounting for loan, respectively more generally, credit losses at banks. It highlights the competing philosophies in the estimation of such credit losses. While, for instance, equity market regulators prefer restrictive criteria for loan loss provisioning in order to prevent manipulations of earnings, prudential authorities may push banks to book higher levels of loan loss reserves.

The second part of the chapter is dedicated to reviewing literature and hypotheses related to drivers of loan loss provisions of banks. A number of behavioural factors have been postulated such as the tendency of income smoothing by means of discretionary provisions. Income smoothing involves higher provisions in good years and, vice versa, postponing required provisions into the next period to keep earnings on target in a bad year. Researchers have also suggested that provisioning may be affected by a need to prop up capital (capital management theory), the intention to signal strength to the market (signalling theory) or efforts to reduce taxation expense (taxation management theory).

Another line of research studies drivers of credit losses in a macroeconomic context. These researchers are often associated with authorities in charge of regulation and supervision of the financial system, respectively responsible for its overall stability. While the behavioural factors above are used as control parameters, this literature mainly investigates aggregate macro factors such as GDP growth, rate of unemployment, indebtedness of households and firms which could affect the credit loss experience of banks. Some studies include additional bank-specific factors into their modelling to control for the institution-specific characteristics (e.g. proxies for riskiness of the loan portfolio).

3 The Australasian banking system

3.1 Introduction

This chapter provides a historical review of developments and key events in the Australian and New Zealand banking system since 1980, i.e. the period for which credit loss and provisioning data as well as related information has been collected in the database. This time period will subsequently often be called the 'observation period'. The information gathered in this chapter is based not only on explicitly referenced sources but also on a comprehensive collection of original bank annual reports (see detailed list in Table 3-7).

These are the major parts to this chapter.

1. The short introductory section 3.2 describes the selection methodology for including an institution into the sample.
2. The second and major part presents a comprehensive history for both the Australian and New Zealand financial system as a whole and for the individual institutions covered in the database (see Table 3-1 and Table 3-2 below). There are two separate sub-sections, one for Australia (Section 3.3) and the other New Zealand (section 3.4).
3. Section 3.5 then explores the standards and rules which have affected disclosure by financial institutions in Australasia, especially with regard to information related to their credit risk and loss experience.
4. Section 3.6 summarises the chapter. Some of the longer tables and figures referenced in the text are all shown in section 3.7 as a chapter 3 appendix.

Table 3-1 Overview of banks in database (Australia)

Bank identifier	Bank full name	Institution earlier name	Successor	Registered	Data range
AU AdelaideBk	Adelaide Bank	Co-operative Building Society of South Australia		1994 to present	1988-2005
AU AdvanceBk	Advance Bank	NSW Building Society	AU StGeorge	1985 to 1998	1986-1996
AU ANZ	ANZ Banking Group (AUS)			whole period	1979-2005
AU BendigoBk	Bendigo Bank			1995 to present	1991-2005
AU BkMelbourne	Bank of Melbourne	RESI Statewide Building Society	AU Westpac	1989-1998	1998-1996
AU BkWest	Bank West / HBOS Australia	Rural & Industries Bank of Western Australia	HBOS Australia	whole period	1983-2005
AU BoQ	Bank of Queensland			whole period	1980-2005
AU CBC Sydney	Commercial Banking Company of Sydney Limited		AU NAB	to 1982	1979-1981
AU ChallengeBk	Challenge Bank	Hotham Permanent Building Society (Vic)/ Perth Building	AU Westpac	1987 to 1996	1987-1995
AU Colonial	Colonial / Colonial State Bank	Colonial Mutual Life Assurance Society	AU CoWthBk	1996 to 2001	1996-1999
AU CommBk	Commercial Bank of Australia		AU Westpac	to 1982	1979-1981
AU CoWthBk	Commonwealth Bank			whole period	1979-2005
AU EldersRural	Elders Rural Bank Limited			2000 to present	1999-2005
AU NAB	National Australia Bank	National Bank of Australasia		whole period	1979-2005
AU PIBA	Primary Industry Bank of Australia		Rabobank Australia	1987 to 2003	1979-1993
AU SBNSW	State Bank of New South Wales	Rural Bank of New South Wales	AU Colonial	to 1995	1980-1995
AU SBSA	State Bank of South Australia	The State Bank of South Australia	AU Advance Bk	to 1994	1980-1994
AU SBVictoria	State Bank of Victoria		AU CoWthBk	to 1991	1979-1990
AU StGeorge	St.George Bank	St.George Building Society		1993 to present	1989-2005
AU SuncorpMet	Suncorp-Metway, Suncorp after 2002	Metway Bank	renamed Suncorp in 2002	1988 to present	1991-2005
AU TasmaniaBk	Tasmania Bank	Statewide Bank (Launceston Bank for Savings), The Tasmanian Permanent Building Society	AU Trustbk TAS	to 1991	1984-1990
AU Trustbk TAS	Trust Bank Tasmania	SBT Bank (The Savings Bank of Tasmania), Hobart Savings Bank	AU CoWthBk	to 1999	1983-1999
AU Westpac	Westpac (AUS)	Bank of New South Wales		whole period	1979-2005

Table 3-2 Overview of banks in database (New Zealand)

Bank identifier	Bank full name	Institution earlier name	Successor	Registered	Data range
NZ ANZ	ANZ National Bank	ANZ Banking Group (New Zealand) until 2004		whole period	1980-2005
NZ ASB	ASB Ltd.	Auckland Savings Bank		1989 to present	1983-2005
NZ BNZ	Bank of New Zealand			whole period	1979-2005
NZ Countrywide	Countrywide Bank	Countrywide Building Society	NZ NBNZ	1987 to 1998	1983-1998
NZ NBNZ	National Bank of New Zealand		NZ ANZ	to 2004	1979-2003
NZ Rural Bank	Rural Bank	Rural Banking and Finance Corporation of New Zealand	NZ NBNZ	1990 to 1994	1984-1992
NZ Trust Bank	Trust Bank NZ	Trustee Bank Group	NZ Westpac	1989 to 1996	1988-1996
NZ TSB Bank	TSB Bank	Taranaki Savings Bank		1989 to present	1987-2005
NZ UnitedBK	United Bank	United Building Society	NZ Countrywide	1990 to 1994	1983-1992
NZ Westpac	Westpac Banking Corp. (NZ)	Bank of New South Wales		whole period	1987-2005

3.2 Sample selection

Credit risk, which is defined as the risk that a counterparty to a financial transaction will fail to fulfil its obligation, is omnipresent in the financial system. If we set out to assess the extent of losses which have been caused by credit risk, we would thus ideally have to measure the cumulative loss experience of all participants in the financial markets or, in an even wider perspective, the economy in general. This thesis is less ambitious in that it merely aims at studying the credit loss experience of banks as a particular group of financial intermediaries. This sector nonetheless plays a key role in virtually all economies and, being one of the most regulated industries, it is a special focus of the prudential supervisor of the financial system. This special attention is based on the fact that credit losses or, more generally, asset quality problems have ultimately triggered the overwhelming proportion of bank failures[14].

[14] See Graham & Horner (1988) for research into causes of US bank failures of the 1980s (as shown in Congressional Budget Office, 1994, p. 20, table 2). International evidence on causes that have led to such asset quality problems is shown in Caprio & Klingebiel (1996, figure 3, p. 13).

The starting point for the selection of the data sample is all institutions that have been registered as a bank in Australia and/or New Zealand during the observation period (see Table 3-6 in the chapter appendix). The full list of registered Australian banks has been assembled based on data in RBA (1991, p. 21-24, appendix 2) for information on banks registered pre-1991 and from RBA and APRA banking systems statistics after this time (APRA, 2002, , 2006; RBA, 1998). For New Zealand, the full list was sourced from RBNZ (2006a).

After applying the selection criteria below, data series for a total of 23 Australian[15] and 10 New Zealand banks were collected (as shown in Table 3-1 and Table 3-2 above).

3.2.1 Criteria for inclusion

As shown in Table 3-6, the selection firstly contains all the systemically important banks operating at a national level. Secondly, it includes banks where retail banking, generally both in terms of deposit-taking or lending, constitutes a substantial portion of the business. Banks taking retail deposits are potentially vulnerable to runs and are thus of interest to the prudential supervisor in view of contagion effects. Within this category we also include three specialty rural lenders (Rural Bank of New Zealand, Primary Industry Bank of Australia (PIBA), Elders Rural Bank). Finally, we consider banks with a strong regional market position in order to capture possible regional effects in our analysis. All these criteria are in fact overlapping in the sense that strong exposure to the retail business is usually associated with either systemic or regional importance.

3.2.2 Criteria for exclusion

In line with the above criteria, the database excludes institutions with the primary characteristic of being a wholesale and/or merchant bank. This class of institutions is dominated

[15] State Bank of NSW and Colonial were counted as separate banks.

by overseas based banks which started entering the Australasian market with the deregulation of the mid 1980s. Their exclusion is also forced by the fact that many of them have not consistently published financials for their local operations throughout the observation period. The exclusion of merchant and trading banks means that domestic institutions like NZI Bank[16], DFC New Zealand[17], a government-owned merchant bank, and Australian Bank[18], all of which experienced substantial credit losses during the observation period have been omitted.

A further reason for excluding a bank relates to size. Four very small institutions were eliminated owing to this criterion: Arab Bank Australia, Kookmin Bank (NZ), National Mutual Royal Bank and Town & Country Bank. Note that the latter two had been operating for just a few years before they were absorbed into ANZ Bank.

Many of the larger banking groups had more than one of their entities registered as a bank. While being a subsidiary of a larger entity was no cause for being excluded[19], financial data for many of them were either difficult to obtain or their results were reported within their parents' financial disclosure. Under this category, we most notably excluded the large number of savings banks which had been set up by the trading banks earlier in the observation period in order to offer certain restricted products and services. Similarly, we dropped the numerous regional trust banks in New Zealand that were part of the Trust Bank Group.

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[16] NZI Bank was born out of a wholesale finance subsidiary of insurance group NZI Corporation (NZI) in 1987. It experienced substantial losses arising from the October 1987 share market collapse and the 1988/89 fall in property market which led to its closure in early 1992. These losses forced NZI Corporation into the arms of General Accident, a UK insurer which took full control of NZI in September 1989.

[17] Development Finance Corporation (DFC) New Zealand, originally a development bank for industry, was converted to a limited liability company in March 1987. The government sold it to pension fund manager National Provident Fund (80%) and Salomon Brothers (20%) in November 1988. After substantial losses, it was placed under statutory management in October 1989.

[18] Australian Bank was formed in 1981 as a merchant bank and experienced large lending losses in 1985 and 1986. After a partial recovery, it was absorbed into State Bank of Victoria in 1989.

[19] Hypothetically this would have meant that we would have had to exclude all Australian owned banks in New Zealand, i.e. the leading players of the industry.

Finally, there is the exclusion category titled ‘data availability issues’, i.e. when (1) it was not feasible to retrieve the relevant financial reports or (2) the short data series did not warrant inclusion. Only very few institutions had to be omitted purely due to this category. The largest three under (1) are again overseas-owned institutions, rural specialist lender Rabobank as well as ING Bank and HSBC Bank, both with a sizeable retail loan book and deposits. Also left out was AMP Bank, a subsidiary of insurance and asset management conglomerate AMP. The banks excluded due to short time series under (2) are the New Zealand banks Elderbank, National Mutual Bank New Zealand, NAB (NZ), Kiwibank and Superbank, as well as Bank of Adelaide in Australia.

3.3 The Australian banking system

The following review of the Australian banking system firstly presents its overall development over the observation period, starting with the regime prior to the onset of deregulation and the effects of the deregulation initiated by the Campbell commission of inquiry. This is followed by a description of the major elements of the 1998 financial sector reform which drastically changed the regulatory framework. Lastly, it provides a general review of Australian banks' performance through the whole observation period with a particular focus on their credit loss and provisioning experience.

The second half of this section (section 3.3.2) is taken up by brief narratives for each bank covered in this database. The narratives present the historical background for each institution and the key events that have affected them during the observation period. The narratives are grouped by the five largest banking institutions in the present market (ANZ, Commonwealth Bank, NAB, Westpac and St. George), i.e. each subsection portrays the major bank with all its predecessors that have been absorbed by them through time. There is a final subsection that covers banks which have not become part of the above groups.

As a visual summary, Figure 3-11 to Figure 3-14 (on pages 100 to 103) depict genealogies of Australian banks which show major merger and acquisition events in the industry since 1980.

3.3.1 Development of the overall system

3.3.1.1 Pre-deregulation state of the world

The development of the financial system in Australia over the past 25 years coincides with a period of great change, both with regard to the rapid evolution of globalized financial markets

and concurrent changes in the regulatory environment[20]. The fundamental act regulating the banking system throughout this period has been the Banking Act 1959 but this piece of legislation has undergone major changes over the past 25 years. At the outset up until 1981, Australian banks' operations were strictly controlled, which coincided with the general enthusiasm for Keynesian macroeconomic management at the time. As one example, controls over the volume of lending were used to offset cyclical changes in the level of economic activity. Despite such a tight corset for the banks, Thomson & Abbott (2000, p. 81) note that the post-war era was nevertheless 'characterised by vigorous enterprise in the financial sector'. This was reflected in an increasing contribution of this sector to GDP with the emergence of a sector of non-bank financial institutions (NBFIs) which, subject to less regulation in the decades following WWII, grew more rapidly than banks as a consequence (Thomson & Abbott, 2000, p. 77).[21] See Table 3-3 below for an overview of growth of assets in the Australian financial system after 1955.

[20] For reference, Wallis Inquiry (1997, table 14,1, p. 570-574) provides a time line of selected events in the evolution of the Australian financial system from 1937 through to 1997.

[21] To engage into restricted areas of business such as hire-purchase and instalment lending, trading banks would thus buy into NBFIs. Examples were ANZ's ESANDA and Westpac's AGC finance company subsidiaries.

Table 3-3 Historical nominal growth of assets of Australian financial institutions

Year	Banks		NBFIs		Other	
(June)	AUD billion	growth	AUD billion	growth	AUD billion	growth
1955	5.7		0.9		2.0	
1960	7.2	26.5%	2.2	138.7%	3.3	64.1%
1965	10.6	48.0%	2.8	25.9%	5.4	65.4%
1970	15.9	50.1%	7.0	152.8%	9.0	66.0%
1975	32.5	104.0%	19.2	173.2%	15.1	66.7%
1980	58.3	79.5%	41.6	117.4%	27.4	81.6%
1985	123.0	111.0%	83.8	101.2%	71.2	159.9%
1990	325.8	164.9%	145.2	73.3%	213.6	200.1%
1995	437.9	34.4%	130.9	-9.8%	313.0	46.5%
2000	731.0	66.9%	168.8	28.9%	739.7	136.4%
2005	1245.0	70.3%	215.8	27.9%	1203.6	62.7%

Source: RBA (1997) for data to 1995; RBA (2006) for data 2000 and 2005
NBFI include permanent building societies, credit co-operatives, money market corporations, finance companies and general financiers
Others includes life offices and superannuation funds, other managed funds, securitisation vehicles, general insurance offices

3.3.1.2 Effects of the deregulation initiated by Campbell inquiry

By the late 1970s, pressure for regulatory reform was mounting through a combination of inflation, exogenous shocks (e.g. 1973 oil price shock) and the declining effectiveness of monetary policy which relied on the control of banks' balance sheets (Wallis Inquiry, 1997, p. 567). This ultimately resulted in the establishment of the Campbell Committee in 1979. The 1981 recommendations of this inquiry brought about a raft of deregulation measures. The researchers of the later Wallis Inquiry (1997, Table 14.3-5, p. 588-591) grouped these recommendation into four broad categories. Firstly, changes affecting the mechanisms of macroeconomic management, including foreign exchange controls and the implementation of monetary policy; secondly, the abolition of direct controls on interest rates and portfolio

composition; thirdly, a strengthening of regulations aimed at preserving system stability and, finally, a removal of barriers to entry by granting banking licenses to overseas institutions.

Most of these recommendations were subsequently implemented, although some not until the late 1980s or 1990s[22]. Recommendations relating to macroeconomic management, direct interest rate controls and the easing of bank entry restrictions were adopted first, foreign exchange controls, the remaining quantitative lending controls and restrictions on access for foreign institutions were removed by the late 1980s (Wallis Inquiry, 1997, p. 587).

Another important development in the Australian banking scene after 1981 was the gradual withdrawal of governments at both state and federal levels from direct ownership of financial institutions. This was consistent with the Campbell Committee's recommendation even though the actual trigger lay in the economic crisis that started after the global share crash of October 1987. Many of the state owned banks had lent aggressively into more liberalized markets and had diversified into unfamiliar types of business activities during the 1980s. Due to heavy losses, many of them subsequently required direct or indirect capital injections of public funds, a sobering experience for their owners and motivation to abolish government deposit guarantees and initiate privatisation. The process started in 1991 with the partial float of Commonwealth Bank (CBA) and the sale of the State Bank of Victoria to CBA. This was followed by the sale of State Bank of New South Wales and Trust Bank Tasmania to Colonial, itself absorbed into CBA in 2000. The sale of the State Bank of South Australia to Advance Bank and the full float of Bank of Western Australia occurred in 1995 and, lastly, CBA was fully privatised in 1997. The particular transactions are described in more detail in the following narratives for each of the (formerly) state owned entities in the sample.

[22] RBA (1991, Appendix 1, p. 15-20) provides a chronological overview of changes to banking regulations for the time period 1968 to 1990.

The 1972 Banks (Shareholdings) Act[23], whose key provision were later embodied in the Financial Sector (Shareholdings) Act 1998, is another piece of legislation that has affected the shape of the Australian banking industry up to the current day. It limits the holdings by any one shareholder in a bank to 15% (up until 1998 10%) unless an exemption is obtained. It was the basis for the government's so-called 'Six Pillars' policy which stated that mergers would not be permitted among any of the four major banks or two major life insurance institutions. This policy was later revised to the 'Four Pillars' policy in 1998, banning mergers among the four major banking groups even though researchers like Harper (2000, p. 71) have raised doubt whether mergers among major Australian banks should be handled any differently to mergers elsewhere in the economy.

3.3.1.3 Financial sector reforms of 1998

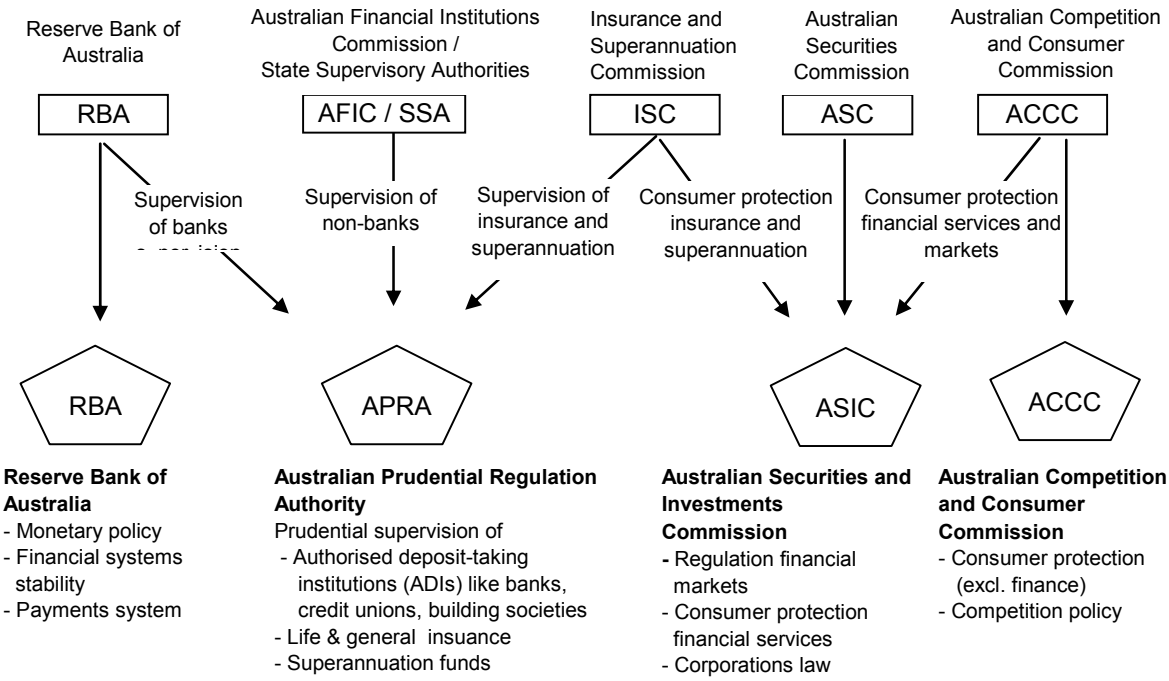
A final chapter in the development of the Australian financial system started with the financial sector reforms of 1998. These reform proposals were in essence instigated by the Financial System Inquiry (called Wallis Inquiry) which had been "charged with providing a stocktake of the results arising from the financial deregulation of the Australian financial system since the early 1980s" (Wallis Inquiry, 1997, p. vii). One of the stated goals of the Wallis Inquiry was to bring about 'competitive neutrality', an issue the earlier Campbell Committee in 1981 had been struggling with as well. For one thing, the distinction between banks and non-bank financial institutions had become even more blurred through time. In 1981, however, the time for a uniform regulatory framework was not ready yet and, similarly, the later Martin inquiry in 1991 just suggested better coordination among regulators (Martin Inquiry, 1991, p. 21). The financial sector reforms of 1998 were more radical, however. As one of its key recommendations, it

[23] The Banks (Shareholdings) Act 1972 placed a general limit on shareholdings in banks of 10 per cent of voting shares. Exemptions required the approval of the treasurer and these were typically provided for foreign banks to establish wholly owned wholesale subsidiaries. When repealed in 1998, the act's key provisions were included in the Financial Sector (Shareholdings) Act 1998.

postulated a single Commonwealth agency for the prudential regulation of the financial system. This entity, established in 1998 and named the Australian Prudential Regulation Authority (APRA), was assigned to supervise and regulate banks, NBFIs and insurance companies alike, all of which had previously been subject to the supervision of the Reserve Bank of Australia (RBA) and other regulatory bodies. As shown in Figure 3-1, the 1998 reform also reorganized the responsibilities for consumer protection in the financial industry by expanding the responsibilities of the Australian Securities and Investments Commission (ASIC).

In the time since adoption of the revised regulatory regime, its prudential aspects have been tested in 2001 with the collapse of HIH Insurance. It is fair to say, however, that APRA at the time was still in start-up mode and further changes to the insurance legislation have provided it with additional powers. In the favourable economic environment of the recent past the potential effects of the separation of prudential supervision (APRA) and maintenance of system stability (RBA) has not been 'stress tested' as yet. Here researchers like Valentine (1997, p. 308) have expressed concerns about the RBA losing direct contact with those institutions whose failure would prejudice systemic stability.

Figure 3-1 Restructuring of regulatory framework with the 1998 financial sector reform



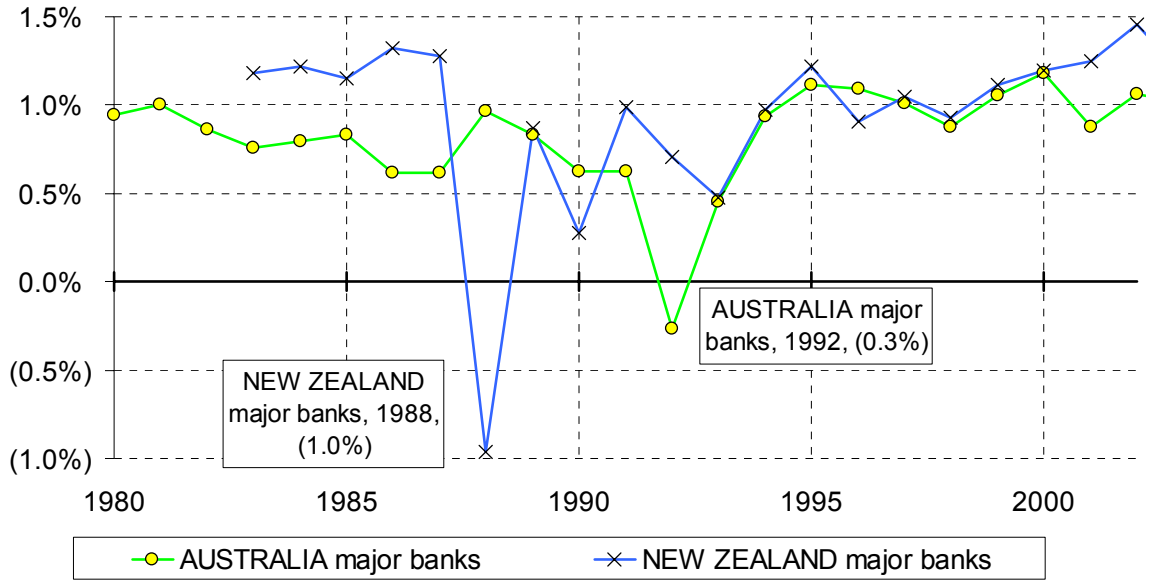
Source: adaptation of table provided by Goldsworthy, Lewis, & Shuetrim (2000, table 2, p. 5).

3.3.1.4 Performance and credit loss experience of Australian banks

The performance of Australian banks as measured by return on assets has been fluctuating in a range of 0.5 – 1.2% over the observation period except for the economic crisis of the early 1990s when Westpac and ANZ (of the major banks) suffered substantial losses (discussed later in this chapter). This is illustrated in Figure 3-2. One notices that the favourable economic climate since the mid 1990s has kept ROA at around 1%, while NZ banks have achieved higher returns more recently.

Compared to the New Zealand banking system, the crisis in Australia occurred about 1-2 years later even though the first signs of stress could be detected in Australia's banks' financial statements through increased provisioning as early 1990. Major losses were reported for the 1992 year only, however.

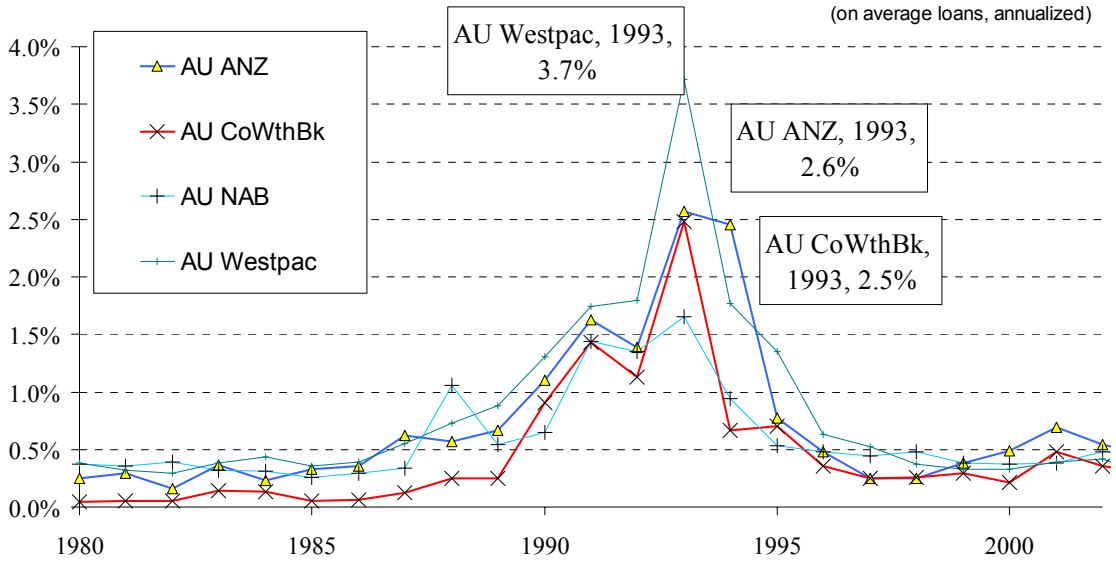
Figure 3-2 Return on assets of major Australian vs. New Zealand banks



Australian major banks comprise ANZ, CBA, NAB, Westpac
New Zealand major banks comprise ANZ, ASB, BNZ, NBNZ (to 2003), Westpac
Source: from original financial statements

A similar pattern as for the ROA emerges in the analysis of loan write-offs as measured as a percentage of loans. This is illustrated in Figure 3-3 for the major banks and in Figure 3-4 and Figure 3-5 for the universe of (former) state banks. A smaller 1991 peak in write-offs was followed by substantial asset write-downs in 1993 for the major banks. As to the state banks, the write-downs at State Bank of Victoria precipitated its merger with Commonwealth Bank in 1990 and the massive asset write-down at State Bank of South Australia occurred in 1993 (both banks are discussed in more detail in the following narratives). Similarly, former Rural & Industries Bank of Western Australia, now named Bank West, wrote off more loans than any of the major banks in the country (cumulative 1991 to 1993). Such a loss experience explains a motivation of state governments to seek privatization of these institutions.

Figure 3-3 Write-offs as % of average loans of major Australian banks



Source: from original financial statements

Figure 3-4 Write-offs as % of average loans of (former) Australian state banks

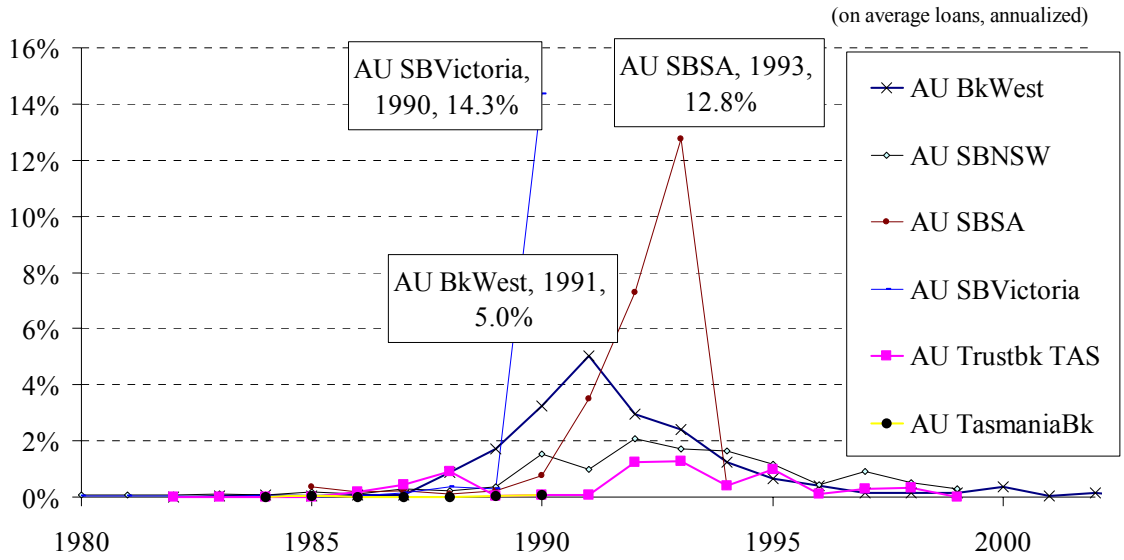
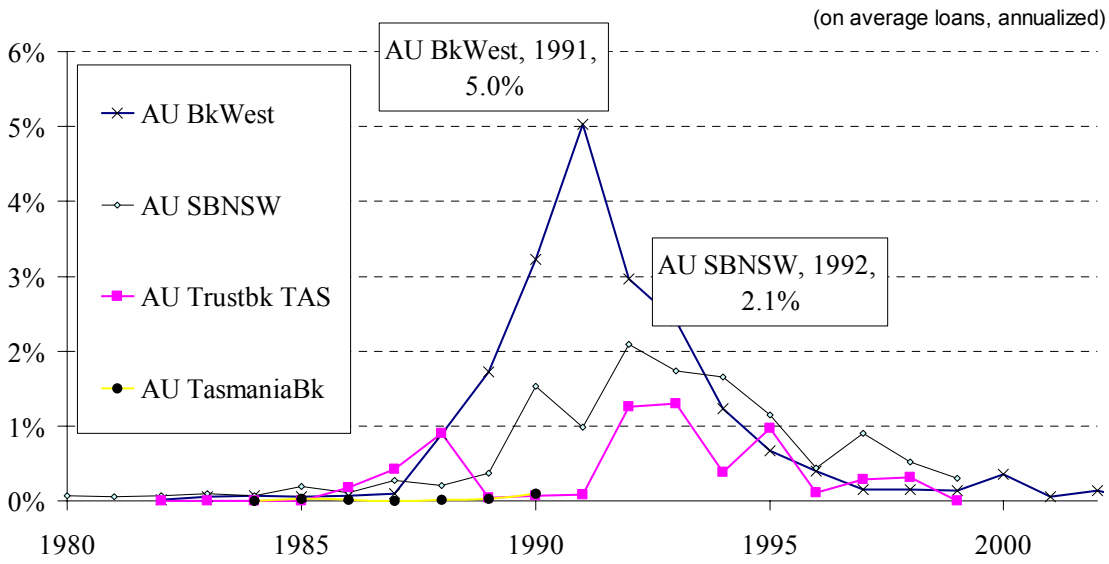


Figure 3-5 Write-offs as % of average loans of (former) Australian state banks (State Bank of Victoria and South Australia omitted for ease of presentation)



Source: data from original financial statements

3.3.2 Narratives on Australian banks in data base

As shown in section 3.2, the database compiled in this thesis covers the leading Australian banking institutions that have been operating over the 25 year observation period. For ease of presentation, the following banking profiles are grouped around the five leading multi-line banks (includes St. George Bank) together with all their major predecessors which have been absorbed through time. Some regional players have remained independent from these national banking groups. They are covered in a final subsection of these narratives.

In accordance with the sample selection criteria, no data have been collected on banks specializing in wholesale banking or specialty financial services (mostly overseas based institutions) and merchant banks (e.g. Macquarie Bank). Likewise, very small banks (e.g. Arab Bank Australia) and non-bank financial institutions (e.g. building societies, credit unions) have been omitted. Many of these institutions will nevertheless be mentioned in the following narratives because they had some association or at least some interaction with banks in the sample.

3.3.2.1 Australia and New Zealand Banking Group Limited (ANZ)

Australia and New Zealand Banking Group Limited (ANZ) is one of the longest standing major banking institutions, operating in Australia since well back into the 19th century. Its two predecessor banks, the Bank of Australasia (founded 1835) and the Union Bank of Australia (founded 1837) merged in 1951 to form ANZ Bank. In 1970, in what was then the largest merger in Australian banking history, ANZ merged with the English, Scottish and Australian Bank Limited, a bank established in 1852 (ANZ Bank, 2005).

In 1977 it transferred its headquarters from the UK to Melbourne and formally incorporated in Australia. In the time since then, it grew its own business with smaller acquisitions of minor players (e.g. local banks, building societies). Three notable exceptions were firstly ANZ Banking Group's 1979 takeover of troubled Bank of Adelaide, after problems

with Bank of Adelaide's finance company subsidiary (Wallis Inquiry, 1997, p. 571). The banking business of the Bank of Adelaide group was transferred to ANZ in October 1, 1980. Secondly, in 1984 ANZ purchased the merchant bank Grindlays (for the most part disposed of in 2000) and thirdly, it acquired in 2003 The National Bank of New Zealand (NBNZ) from Lloyds TSB. The NBNZ transaction virtually doubled ANZ's total overseas exposure.

The foray into merchant banking combined with heavy business and property lending in the 1980s had its consequences when it booked a loss in 1992 and had to write-off roughly 5% of its loan portfolio over the first half of the 90s[24]. Through its Grindlays subsidiary, ANZ was also involved in a major Indian banking scandal which was only settled in 2001 (ANZ Bank, 2001). It also faced losses at its specialty financier Esanda. In line with a more benign economic climate in Australia and New Zealand, ANZ's performance has been steady since that time.

3.3.2.2 Commonwealth Bank (CBA)

Commonwealth Bank (CBA) was established in 1911 though Act of Parliament as a federal government owned institution to carry out 'general and savings bank business' (Thomson & Abbott, 2000, p. 79). In 1924 the bank was also given the authority of a central bank, including the exclusive right of note issue. In 1960, after this dual role of the CBA had become a growing concern among private trading banks, it was finally divided into the new Commonwealth Banking Corporation (a commercial bank) and the Reserve Bank of Australia (RBA) in charge of undertaking central banking functions (Commonwealth Banks Act 1959). With an amendment to is founding act it changed its name to the Commonwealth Bank of Australia in 1988.

Major changes were initiated with the adoption of the Commonwealth Banks Restructuring Act 1990 which converted CBA from a statutory authority to a public company with

[24] ANZ wrote off its high bad debt provisions caused by the 1990 recession over a longer period of time than did most of its peers.

conventional share capital in 1991 and allowed the issue of up to 30% of these shares to the public. 1991 also constitutes a marked improvement in CBA's disclosure quality as earlier accounts did not contain consolidated financials with CBA's savings and development banks reporting as separate entities before 1989.[25] The long-term historical financial comparatives in the 1991 share issue prospectus allowed an extraction of some non-reported data as far back as1981.

An important chapter in CBA's history ended in July 1997 when the federal government, which had been reducing it shareholdings since 1991, at last sold off its 50.1% majority stake to the public (Commonwealth Bank Sale Act 1995). At the same time, this sale initiated the phase-out of government guarantees for CBA's liabilities and CBA thus became an institution purely governed by the applicable banking and corporations law.

The following subsections present the major institutions absorbed into CBA during the observation period. The acquisition of New Zealand based ASB Bank will be discussed in the New Zealand part of these narratives.

3.3.2.2.1 State Bank of Victoria (CBA succeeded to its assets per 1 January 1991)

One major trigger for CBA's 1991 conversion was the need to bail-out troubled State Bank of Victoria (SB Victoria). This institution founded in 1841 strongly expanded its asset base and scope of activities during the deregulation of the 1980s. Its eventual downfall was caused through soaring credit losses and especially the collapse of its merchant banking arm Tricontinental taken over in 1985. First signs of stress in Tricontinental's portfolio were reported in the 1989 annual report. In 1990, the Victoria state government agreed to compensate SB Victoria for loan write-offs of up AUD 2.1 billion. Finally, per 1 January 1991, CBA became 'successor in law' of SB Victoria.

[25] So-called 'combined' P&L and balance sheets were provided back to 1984 but detailed disclosure was disaggregated by unit.

3.3.2.2.2 Colonial State Bank / State Bank of New South Wales (acquired per 3 June 2000)

The insurance and banking conglomerate Colonial Ltd acquired by CBA in 2000 included the assets of former State Bank of New South Wales (SB NSW) which had been operating under the name of Colonial State Bank since having been corporatized and finally sold off by the NSW government per 31 December 1994.

SB NSW traced its origins back to one of Australia's first savings banks founded in 1819 and later merged with Government Savings Bank of New South Wales. When this bank's savings bank activities were assumed by CBA in 1931, it adopted the name "Rural Bank of New South Wales" until it changed its name to State Bank of New South Wales in 1982. SB NSW found itself in an awkward position of competing in the newly deregulated market of the 1980s without being able to offer savings bank products until 1987, when a historical 1931 amalgamation agreement with CBA was finally terminated.[26]

Like other banks, SB NSW was hit by the ensuing economic crisis of the late 1980s. It reported levels of bad debt provisions in excess of 4% of loans but unlike its counterparts in Victoria and South Australia it did not require government support. As the financial performance of SB NSW remained unsatisfactory, the NSW state government decided to offer it for sale in late 1993. With the four major trading banks excluded from tendering, Colonial Mutual Life was chosen as the purchaser. Finally, as mentioned above, Colonial Mutual Life, which demutualized in 1996 to become Colonial Ltd., operated the bank under the name of Colonial State Bank until Colonial itself was absorbed by CBA in 2000.

[26] Early in 1931, the Government Savings Bank of New South Wales closed its doors and froze the savings of depositors (Davidson & Salisbury, 2005). Later in December 1931, the failed bank was amalgamated into CBA. CBA was conferred an exclusive right of a state savings bank in NSW while passing on half its profits on these activities to state government owned Rural Bank of NSW. When Rural Bank of NSW changed it name to SB NSW in 1982, a dispute with CBA over the transfer of these profits arose which was only settled in 1987.

3.3.2.2.3 Trust Bank Tasmania (acquired 2000 as part of Colonial transaction)

A final minor addition to Commonwealth Bank's asset base also related to the takeover of Colonial Ltd. A few months before this transaction, Colonial had agreed to acquire Tasmania based Trust Bank in November 1999, the last remaining state bank. This institution had been struggling with investments in modern infrastructure, namely computer systems and had been formed at the peak of the financial crisis in 1991 by a combination of The Saving Bank of Tasmania (The Hobart Savings Bank) and ailing Tasmania Bank. Tasmania Bank itself had only been established as a state bank by Act of Parliament four years earlier in September 1987 through the merger of Launceston Bank for Savings and a local building society. Both Launceston Bank for Savings, in later years operating as Statewide Bank, and Hobart Savings Bank, later operating as Savings Bank of Tasmania – SBT Bank, trace their roots back to the early colonization of Tasmania and were founded in 1835 and 1845 respectively.

3.3.2.3 National Australia Bank

National Australia Bank (NAB) was formed by the merger of National Bank of Australasia and the Commercial Banking Corporation of Sydney (CBC) in 1981 when CBC became a wholly-owned subsidiary of NAB on 1 October 1981. Both these institutions had a long history as trading banks and had been founded in 1858 and 1834 respectively. Officially they started operating as a merged entity as of 1 January 1983 once the necessary approvals had been obtained (including a change of the banking act). The initial, rather lengthy name of National Commercial Banking Corporation of Australia was soon changed to National Australia Bank effective 1 October 1984.

During the eighties, unlike its peers ANZ and Westpac, NAB refrained from large scale property lending and diversification into merchant banking which saved it from large scale write-offs. Instead it sought expansion of its retail business overseas. Notable are the acquisition of several UK and Irish based banks per 30 October 1987. These included Clydesdale Bank (UK)

and Northern Bank (Northern Ireland, Ireland); the latter one renamed National Irish Bank. In 1990, it added Yorkshire Bank (UK) to its overseas assets. As result, NAB has long been the Australian bank with the most overseas banking exposure[27].

NAB continued its overseas expansion with the acquisition of BNZ from the New Zealand government in late 1992, the takeover of Michigan National Bank effective November 1995 and, finally, the purchase of HomeSide, Inc., a US originator and servicer of mortgage loans in February 1998. The US acquisitions did not prove a good decision as NAB saw itself forced to sell its major US subsidiaries at a loss in excess of AUD 2 billion in 2001 and 2002. This came on top of various scandals in NAB's domestic trading area which depressed financial performance at the beginning of the millennium. For illustration, NAB reported the lowest return on assets of any major Australian bank in all but one year from 2000 to 2005.

3.3.2.4 Westpac Banking Corporation

Westpac Banking Corporation (Westpac) is a successor of Australia's first bank. It was established as Bank of New South Wales in 1817 even before New South Wales was formally proclaimed a crown colony in 1824 and up until 2002 it operated under the statute of a special state act (the Bank of New South Wales Act of 1850) when it finally changed its status to a corporations law company. Note that the present Westpac name was adopted on occasion of the merger with the Commercial Bank of Australia in 1981, a bank of about a third the size of Bank of New South Wales (assets of AUD 7.1 billion vs. 18.4 billion). This merger also had an impact on the New Zealand banking scene since both Commercial Bank and Bank of NSW had been operating as trading banks in New Zealand prior to 1981.

The most dramatic episode in the history of the bank was Westpac's near failure in the early 1990s. An account of these events is provided in Carew (1997) and more recently Davidson

[27] This means that for purely domestic credit loss studies, data series for NAB have to be adjusted for the impact of these foreign loans.

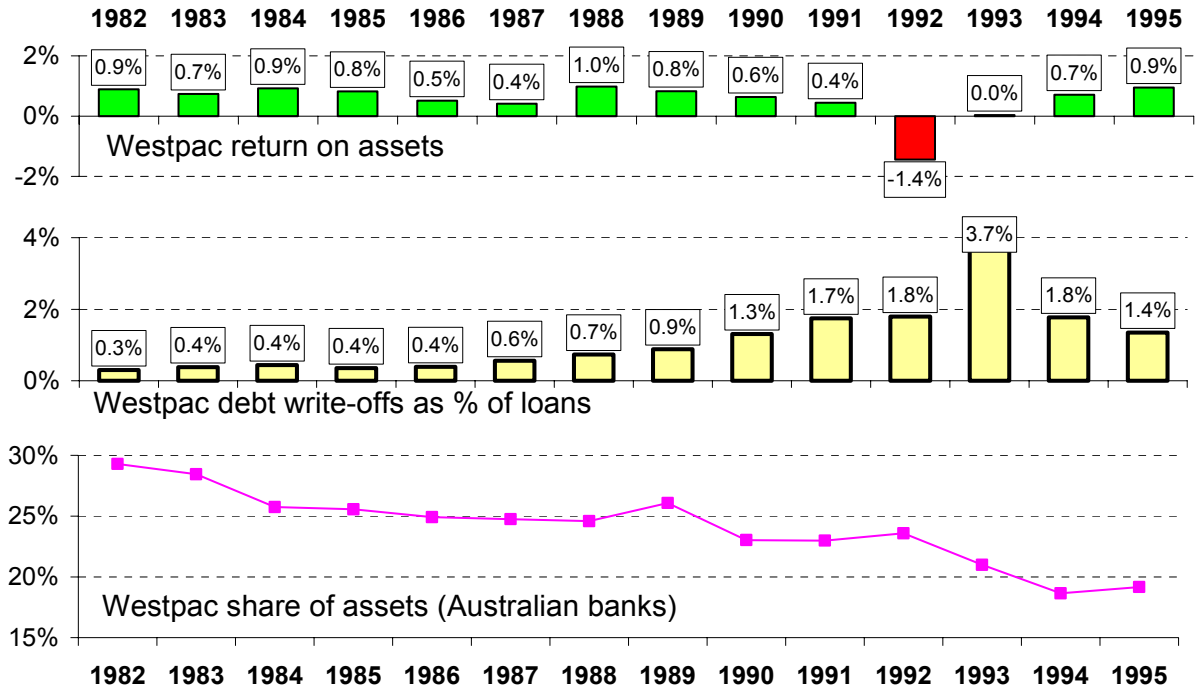
& Salisbury (2005) who discuss Westpac's forays into commercial property lending and also international wholesale banking of the eighties. It was not Westpac's international business, however, which ultimately required the bulk of write-offs of a cumulative AUD 5.6 billion for the 1990 to 1993 period[28]. The major losses came from involvement in high profile commercial real estate projects in Australia, mainly through its subsidiary AGC, and exposure to some larger corporate defaults (e.g. Lintner, Adsteam, Northern Star).

The chart in Figure 3-6 highlights the consequential loss of Westpac's market leadership. Through the merger with Commercial Bank of Australia in 1983 it held more than a quarter of Australian banks' assets and was clearly the largest among the major banks. After its lending losses of 1990 to 1993 it fell back behind NAB and Commonwealth Bank in terms of assets and is now comparable to ANZ's size.

The following accounts describe Challenge Bank and Bank of Melbourne which were acquired by Westpac in 1996 and 1998 respectively. Trust Bank New Zealand, taken over in 1996, is covered in the NZ narratives of section 3.4.3.3 on page 77.

[28] This compares to Westpac's AUD 65 billion in loans in 1990 and, more importantly, to its AUD 6.5 billion in equity.

Figure 3-6 Westpac: ROA, loan write-offs and market share through its crisis in the early 90s



Source: from original financial statements

3.3.2.4.1 Challenge Bank (acquired per 1 January 1996)

Western Australia based Challenge Bank had its roots in Perth Building Society which in 1982 acquired control of Victorian Hotham Permanent Building Society. Legislative barriers initially prevented a full integration of operations until the two units formally merged and registered under the Challenge Bank name in 1987. Challenge Bank, while still mainly a retail bank, expanded in the 1980s into corporate and commercial property lending. When the recession of the 90s hit the economy, it required major value adjustments in its loan portfolio. It wrote off about 3% of its loans in the three years from 1990 to 1992. In 1996, it was acquired by Westpac in a friendly takeover valuing it at AUD 689 million, i.e. about fourteen times earnings

(Carew, 1997, p. 436 and 1995 annual report Challenge Bank). Up until 2004, Westpac operated Challenge Bank under its original name under but then moved to a single national brand throughout Australia.

3.3.2.4.2 Bank of Melbourne (acquired per 3 May 1998)

According to Davidson & Salisbury (2005, p. 347), Westpac's footprint in Victoria had always been weak and even its 1982 merger with Melbourne based Commercial Bank of Australia did not pay off in this respect. Another opportunity to expand in Victoria arose in 1997 when Westpac completed the purchase of Bank of Melbourne. This bank had been formed in 1986 through the merger of RESI Building Society and Statewide Building Society. Until 1989, this entity operated under the name of RESI-Statewide Building Society when it registered as Bank of Melbourne. Despite low credit losses during the economic gloom of the early 1990s, the bank was subject to a short term deposit run after Pyramid Building Society folded in 1990 (K. Davis, 2004, p.12; Gizycki & Lowe, 2000, p. 184). At about the same time, Bank of Melbourne had to settle a costly lawsuit related to the embezzlement of statutory funds at Occidental Life and Regal Life (K. Davis, 2004, p. 244).

3.3.2.5 St. George Bank

St. George Bank is generally not considered as one of Australia's major banks[29] even though as the 5th largest bank it holds about 5% of the banking system's assets. It was originally founded in 1937 as St. George's Cooperative Building Society in a Sydney suburb. It grew through amalgamation with neighbouring building societies and by 1979 it had become the largest building society in the country with 130 branches and 800 staff (St. George Bank, 2006). Expansion continued through the merger with Statewide Building Society effective in 1988 and

[29] For instance, it has not been included in either the 'six pillars' or 'four pillars' policy.

acquisition of Victorian Savings and Loan Society in 1990. In 1992, it achieved its full banking status and changed its name to St. George Bank. To diversify its traditional retail loan portfolio, it acquired Barclays Bank's Australia commercial loan portfolio in 1994. After its unsuccessful attempt to acquire Queensland-based Metway bank in 1996,[30] its 1997 merger with Advance Bank, also a former Sydney building society, doubled its asset base in one single transaction.

The integration of Advance Bank initially cost St. George some momentum but in the past few years it has diversified its asset base even though its lending portfolio still comprises 72% residential mortgage loans (S&P, 2006). St. George was a relatively new entrant into the New Zealand market. Its Superbank subsidiary was launched in February 2003, a joint venture between supermarket chain Foodstuffs and St.George Bank Ltd. of Australia. Unsuccessful in growing its asset base in line with its targets, Superbank deregistered as a bank in 2006 after selling its loan portfolio and redeeming all customer deposits.

3.3.2.5.1 Advance Bank (acquired per 29 January 1997)

Advance Bank mentioned above was formed as a result of the conversion of NSW Building Society (founded 1940) to Advance Bank Australia in June 1985. In a submission to the Wallis inquiry, the bank claimed that it was 'the first building society in the world to demutualize, convert to bank status and list on the stock exchange' (Advance Bank, 1996, p. 1). In its first decade, growth of Advance Bank was steady and organic without major acquisitions. The major transaction for the bank was the July 1995 purchase of the core retail banking assets of troubled State Bank of South Australia. These assets provided Advance Bank and subsequently St. George Bank with a strong presence in South Australia. To this day, St. George operates under the brand name Bank of South Australia or 'BankSA' in this state.

[30] Metway subsequently joined with Suncorp and Queensland Industry Development Corp in a merger arranged by the Queensland state government.

3.3.2.5.2 State Bank of South Australia (acquired by Advance Bank in July 1995)

The State Bank of South Australia (SBSA) had been formed on 1 July 1984 by the amalgamation of two banks owned by the State Government of South Australia - the Savings Bank of South Australia, and the former State Bank of South Australia (MacPherson, 1993, SBSA Report of Investigation, chapter 3).[31] Set up as an entity with both commercial and non-commercial statutory objectives and with its profile as a regional retail bank, SBSA sought to compete against the newly deregulated private banks, embarking on an ambitious path of expansion outside its home state. As a consequence, the bank saw a remarkable enlargement of its asset base. Its more than 400% asset growth rate clearly exceeded that of other banks, both government owned, and private (MacPherson, 1993, Table 3.3). This turned it into a diversified financial services group with very significant Australia-wide and international operations. Acquisitions during this time included merchant banking subsidiaries, real estate companies as well as United Bank in New Zealand.

As documented in McCarthy (2002), SBSA saw itself faced with mounting loan losses for the 1991 financial year as the bullish economic conditions of the 80s came to an end. Only indemnity funds in excess of AUD 3 billion provided by the state government prevented SBSA's collapse. The state government subsequently resolved to remove the impaired assets from the core bank by setting up an entity named GAMD to assume these assets. This separation prepared the way for the corporatization (1994) and subsequent sale of SBSA's core banking assets to Advance Bank in July 1995. Impaired and non-banking assets remained with state-owned South Australian Asset Management Corporation.

[31] McCarthy (2002) provides a detailed history of these two predecessor banks and describes the events leading up to their merger, in particular the shift in culture that occurred within these banks from 'the old thrift philosophy' to 'the desire to be a major financial player' (p. 142-143).

3.3.2.6 Australian banks not absorbed into any of the major national banking groups

3.3.2.6.1 Bank West (formerly Rural and Industry Bank of Western Australia)

Bank West has its origins in the Agricultural Bank of Western Australia which was established to 'promote rural enterprise in the colony' (R&I Bank Annual Report 1986, p. 3). In 1944, the original charter was widened and Rural and Industry Bank of Western Australia (R&I Bank) opened in 1945, operating as a full trading bank including a government agency department. In 1956 it added a savings bank division.

Notable events earlier in the observation period are the 1987 full acquisition of the Primary Industry Bank of Australia (PIBA), an agricultural development bank reviewed in the next section. 1987 was also the year when, on behalf of the WA state government, R&I Bank had to acquire ailing Western Australian (WA) Teachers' Credit Society. According to Davis (2004, p. 243), this institution had grown rapidly in the first half of the 1980s partly based on commercial lending but then had to seek government assistance after several years of difficulty.

To improve commercial flexibility of the institution in a deregulated financial system, the state parliament passed legislation in 1988 which initiated corporatization of the bank. This process concluded with its incorporation as R&I Bank of Western Australia Ltd. in 1991. Like other state banks it had the difficult dual objective of 'operating profitably and also to the greatest advantage of the people of Western Australia and promoting the balanced development of Western Australia' (R&I Bank Annual Report 1989, p. 4).

In 1990, major asset quality problems became apparent in the bank's portfolio and the bank was the subject of a brief run in January 1992. The run ended when the RBA governor issued a statement pointing out that deposits with the R&I Bank were guaranteed by the state government of Western Australia (K. Davis, 2004, p. 242). Over a period of three years R&I Bank wrote off approximately 13% of its loans. It could only replenish its dwindling equity by means of

injections of capital by R&I Holdings, the formal owner of R&I Bank on behalf of the state government. R&I Holdings itself had to borrow these funds.

The 1994 name change from R&I Bank to Bank of Western Australia (Bank West) led the way to the full scale privatisation of the bank. In December 1995, Bank of Scotland acquired a 51% cornerstone stake in Bank West with the balance floated to the public in February 1996. In the subsequent years Bank West's Scottish owner steadily increased its holding. Finally, Bank of Scotland's successor HBOS, which itself had been formed in 2001 as a result of the merger between Bank of Scotland and the Halifax, moved to full control in August 2003. Accordingly, Bank West no longer publishes detailed financial accounts. Some key figures of P&L and balance sheet as well as the levels of provision are, however, disclosed as part of HBOS's annual segment reporting.

3.3.2.6.2 Primary Industry Bank of Australia

Primary Industry Bank of Australia (PIBA) was created under the Primary Industry Bank Act 1977 jointly by the Commonwealth government, the four major trading banks and the state banks as part of an electoral promise to the rural sector to have its own bank (Metcalfe, 1984). PIBA was operating purely as a refinance institution during the first decade of its existence, i.e. the shareholding banks were lending on its behalf but could then refinance these rural loans at special terms with PIBA[32]. The characteristics of PIBA's pre-1987 business means that its lending was not effectively subject to credit risks associated with the ultimate borrower before 1987 and no meaningful loss and provisioning data could thus be gathered for this period.

When the government indicated its desire to dispose of its PIBA stake in 1987, R&I Bank of Western Australia expressed an interest and the other shareholder agreed to sell their stakes as well. R&I Bank, later operating under the Bank West name, retained PIBA as a separate entity.

[32] PIBA itself was provided financial assistance by the Commonwealth by means of low-interest deposits with the bank.

PIBA was granted full banking authority in June 1987 and initiated direct lending, diversifying into corporate and commercial loan segments. Its credit losses remained at moderate levels throughout the crisis of the early 1990s.

In the context of the privatisation of its owner Bank West (renamed from R&I Bank), PIBA was then sold to Dutch Rabobank Group (Rabo) in October 1994. Rabo continued to operate the business under the PIBA brand name for the subsequent nine years to 2003 when PIBA's name was changed to Rabobank Australia Limited (Rabobank, 2006). Unfortunately, PIBA ceased publishing full standalone financials once it became part of Rabo.

As to PIBA's operations in New Zealand, these were initiated in 1989 with the granting of a banking license. By the time Rabobank became PIBA's owner, it had grown the NZ loan book to NZD 150 million which it managed from Sydney. Its New Zealand presence provided Rabo an entry into the NZ rural finance sector.

3.3.2.6.3 Suncorp (formerly Suncorp Metway, Metway Bank)

Queensland-based Metway Bank started business on 1 July, 1988 following conversion from Metropolitan Permanent Building Society which had been founded 33 years earlier (Metway Bank Annual Report, 1992). In 1990, Metway Bank acquired Prudential Finance Limited and, in 1992, the Household Building Society (Suncorp, 2006). In 1996, the Queensland Government-owned insurance company Suncorp and Queensland Industry Development Corp (QIDC) entities were merged into the publicly listed Metway Bank to create the new banking and insurance group Suncorp Metway. The Queensland state government was initially the largest shareholder of the new group with a 68 percent holding but by 2000 it had sold its stake in a series of instalment note placements.

In the meantime, Suncorp has simplified its name by dropping 'Metway' from its logo in 2002 and currently claims to be the sixth largest banking group in Australia (Suncorp annual report 2005). Both its insurance and banking operations contribute about equally to its bottom

line. This dual structure increases the difficulty of extracting bank specific data for this entity even though segment disclosure has greatly improved over the past few years.

3.3.2.6.4 Bank of Queensland (BOQ)

BOQ was established in 1874 as The Brisbane Permanent Benefit Building and Investment Society, the first permanent building society formed in Queensland but soon thereafter, in 1887, converted to a bank and then in 1942, following mergers with other Queensland-based financial institutions, to a trading bank. The name Bank of Queensland was adopted in 1970, one year before it listed on the Australian Stock Exchange (BOQ, 2006).

In 1996, Bank of Queensland stayed independent and did not to join the merger of Suncorp and Metway Bank arranged by the Queensland government. This was despite the fact that, at the time, the Queensland government held 44% of the bank[33]. However resistance by the bank's management, who saw Metway bank as a rival, as well as the possible need to buy out the remaining shareholders prevented the transaction (Bowen, Daley, & Huber Jr., 1982). As part of the merger arrangements, the Queensland government committed itself with the federal authorities to disposing of its BOQ shareholding. This was completed through a public offering in December 1999 (Queensland Audit Office, 2000, p. 95).

BOQ's retail banking activities have always been its core focus despite some small scale diversification of its earning stream. Most of its branches, whose number has doubled over the past five years, are still in Queensland. Much of this recent growth has been achieved through a franchising scheme called 'Owner-Managed Branches (OMB)', mainly set up to originate mortgage loans, including in other states of the East coast.

[33] The Queensland government held slightly less than 50% of BOQ throughout the 1980s and up to this transaction (from BOQ annual reports)

3.3.2.6.5 Bendigo Bank / Elders Rural Bank

Bendigo Bank (Bendigo) is a regional bank operating predominantly in Victoria which has its roots in the Bendigo goldfields. It was founded there as the 'Bendigo Permanent Land and Building Society' in 1858 (Bendigo Bank, 2005). Since the early 1980s it has expanded through a number of acquisitions, mainly of other building societies. By the time it converted to a bank in 1995, it had grown into Victoria's biggest building society. Unlike other building societies in its home state, e.g. the Pyramid group of building societies which had to rescued by the state government in 1990[34], Bendigo came out of the recession relatively unscathed. This is reflected by the support it received from the Victorian government which helped it acquire two other building societies at the time (Bendigo Bank, 1996, p. 5).

A special innovation of Bendigo have been the so-called community banks where since 1998 smaller local communities, many of whom had lost their local bank branch through closure, are able to form a company to operate it as a franchised Bendigo Bank branch. Bendigo provides banking support and revenue is shared with the locally owned company. By August 2005, 159 of these branches were operating, i.e. more than half of the total 310 Bendigo branches at the time (Bendigo Bank, 2005).

Finally, Bendigo is associated with Elders Rural Bank which it owns in a 50/50 joint venture together with Futuris Corp., the holding company of Elders group[35]. Elders Rural Bank, a specialist rural financial service provider and lender, was incorporated in January 1999 and the banking licence granted in 2000. Bendigo provides it with the banking systems and Elders with a

[34] During the mid-1980s, competing with banks and offering attractive interest rates, the Pyramid Building Society's problem was that it branched out from its traditional lending area - namely, a building society lending for home loans - and lent money to developers of projects such as hotels, motels, guest houses, office buildings, caravan parks and other resorts around Australia (K. Davis, 2004, p. 242, 243). The building society was then not able to sustain the crash on the commercial market as many of its borrowers had gone broke in the recession.

[35] Bendigo Bank accounts for Elders Rural Bank under the equity method, i.e. without full consolidation.

network of more than 400 branches in all Australian states (status March 2006). Elders Rural Bank had AUD 2.6 billion in assets in June 2005 compared to AUD 13.3 billion in assets for Bendigo.

3.3.2.6.6 Adelaide Bank

Adelaide Bank is a South Australian based institution born out of the building societies movement[36]. Incorporated as the Co-operative Building Society of South Australia in 1900, it had a relatively conservative risk profile going into the economic crisis of the early 1990s. At this time, it merged with, or rather de facto acquired two other South Australian building societies, the larger Hindmarsh Adelaide Building Society and the small REI Building Society[37], both of them struggling with the impact of the recession. This transaction almost doubled the co-operative's size and provided the basis for its listing on the ASX and then conversion to become Adelaide Bank at the beginning of 1994 (Adelaide Bank, 2006).

Most of Adelaide Bank's exposure is still to the housing market, although with only 25 branches it originates most of its loans through third party mortgage brokers. This means it is largely a wholesale mortgage lender. Currently, it has lending exposure to all Australian states and just a quarter of the lending is to South Australian borrowers. A substantial part of its lending is of non-prime nature by way of more risky so-called 'low-doc' mortgage loans[38].

The institution has two other special features. Firstly, it is involved in margin lending which started in 2000 with its acquisition of Leveraged Equity Ltd., the margin lending business

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[36] It is completely separate from Bank of Adelaide which had to be rescued by ANZ in 1979.

[37] The SA Government directed the Co-operative to take over REI after accounting irregularities had been uncovered that overstated REI's profits and an audit had determined that more than half of REI's assets had evaporated within a year.(Baker, 2000, p. 66; Darvall, 1991).

[38] Low-doc or low documentation loans are loans to borrowers like self-employed people who do not have the documentation required to get traditional home loans.

of stock broking firm Ord Minnett. Secondly, starting in 1996, Adelaide Bank has become increasingly reliant on funding through securitization of loan assets. By mid 2005, Adelaide Bank serviced off-balance sheet securitized assets of AUD8 billion, corresponding to just below 60% of its total assets. Under new international financial accounting standards (IFRS) these off-balance assets will be recognized on the balance sheet with the annual accounts of 2006.

3.4 The New Zealand banking system

This section reviews the development of the New Zealand banking system during the 1980 to 2005 observation period. It commences with a summary of key developments and events that have been shaping the current banking landscape (section 3.4.1). The following two subsections review the specific stories of two classes of institutions for which data have been collected in this thesis. In the first group are banks that had been operating as trading banks before the onset of deregulation of the financial system in the mid-1980s (section 3.4.2). The second group consists of banks that have only been formed as a result of the 1986 framework for bank registration and supervision (section 3.4.3). Most of the banks in the latter group had their roots in mutually owned financial institutions such as building societies and trustee savings banks. Some were special purpose government institutions like the Post Office Savings Bank or the Rural Bank of New Zealand.

As a visual summary, Figure 3-10 provides a condensed time line of merger and acquisition events in the New Zealand banking industry since 1980.

3.4.1 Key developments and events in New Zealand financial sector during observation period

The period since 1980 coincides with some major structural changes for the New Zealand financial sector. In essence, one can break this time into three separate phases:

- The pre-1984 era,
- the uncertainties mixed with some great optimism following the deregulation of the Financial Policy Reform, and, finally,
- the recovery and consolidation after the economic crisis in the early 1990s.

Prior to the reforms of the mid-1980s, New Zealand's financial system along with the economy in general was characterized by pervasive government regulations and other

interventions (Grimes, 1998, p. 294). Grimes notes that these interventions had not only macroeconomic efficiency problems, but also microeconomic distortionary effects as a result of treating different sub-sectors in very different ways. As to institutions operating in the pre-1984 era, Grimes (1998) suggested a break-down into three groups: trading banks, savings banks, and other non-bank financial institutions.

The five, respectively after 1982 four, trading banks included government-owned market leader Bank of New Zealand (BNZ) together with the National Bank of NZ, ANZ and Westpac (Bank of New South Wales merged with Commercial Bank of Australia in 1982 to form Westpac).

The universe of savings banks included the so-called 'Trustee Savings Banks' (i.e. community based banks), and the Post Office Savings Bank, all with a deposit guarantee by the New Zealand government (Grimes, 1998, p. 295). These institutions made mortgage, and to a minor extent also personal, loans. Typically as much as half their assets were invested in local and central government securities.[39] One could argue that this balance sheet structure made it harder for them to adapt in the subsequent deregulation as they lacked expertise to originate assets in a risky market. Note that in order to attract low-cost deposits and make certain classes of loans, the trading banks had also established their own savings bank subsidiaries at the time.

As to non-bank financial institutions during this period, cooperative building societies and credit unions were those which offered the most 'bank like' services to their members.

It had not escaped regulators' attention, however, that, while each of the above groups of financial institutions was subject to carefully delineated sets of legislation, a substantial blurring between their activities had been occurring both in New Zealand and overseas (Doughty, 1986, p. 115). Substantial changes were thus initiated following the change of government in July 1984 when all interest rate regulation, ratio requirements, credit ceilings, and numerous other

[39] Banks were subject to a maze of ratio requirements, with savings banks generally required to hold more low-risk government stock and other liquid assets (Deane, 1986, p. 17).

interventions were abolished (Deane, 1986, p. 11). The Reserve Bank of New Zealand (Amendment) Act 1986 legislated the structural reforms of the banking industry. It allowed the entry of new banks and specified that there would be only one type of 'bank' in New Zealand, the registered bank (Sun, Tong, & Tong, 2002).[40] Under the act, any registered bank was now able to engage in retail banking, wholesale banking or full service banking. No longer were there artificial limits on the number of banks, nor was there discrimination between domestic and foreign-owned institutions. The act also established a formal framework for the prudential supervision of banks.[41]

With the deregulation, the number of banks increased significantly as new foreign banks entered and domestic savings institutions and building societies converted to banks. One could describe the mood immediately after the 1986 deregulation as a time of uncertainty for some but great optimism, even euphoria for others. It was the time when some like United Bank and particularly Bank of New Zealand diversified into new areas of business whose unfamiliar risks subsequently caused major lending losses at the beginning of 1990.

As in Australia, state-owned institutions were among those which coped the least well in the rough climate of deteriorating markets. Most notable were extreme credit losses at Bank of New Zealand which lost its equity twice within a period of merely two years (see section 3.4.2.3). Debt write-offs for BNZ in Figure 3-8 were so large that they had to been shown in a chart separate from other NZ banks. Likewise, Rural Bank of New Zealand faced large loan losses. Development Finance Corporation New Zealand (DFC), a merchant bank which the government had just partially privatized in 1987, was strongly exposed to the falls of listed and non-listed companies after the 1987 share market crash and left with large bad debts. It collapsed

[40] Note that under previous regulation the formation of a trading bank had required a special act of parliament (Grimes, 1998, p. 294)

[41] Details of prudential regulation in New Zealand, in particular the elements of the bank disclosure regime, are presented in section 3.5.1.2.

in 1989 and was placed under statutory management by the Reserve Bank. The failure of DFC had a negative impact on New Zealand's international credit standing as many international lenders to DFC had been banking on an implicit guarantee by the government which still held 75% of DFC's shares. Finally, outside the sector of state-owned institutions, problems surfaced at NZI Bank which was created out of a wholesale finance subsidiary of insurance group NZI Corporation in 1987. It experienced substantial losses arising from the October 1987 share market collapse and the 1988/89 fall in the property market which led to its closure in February 1992.

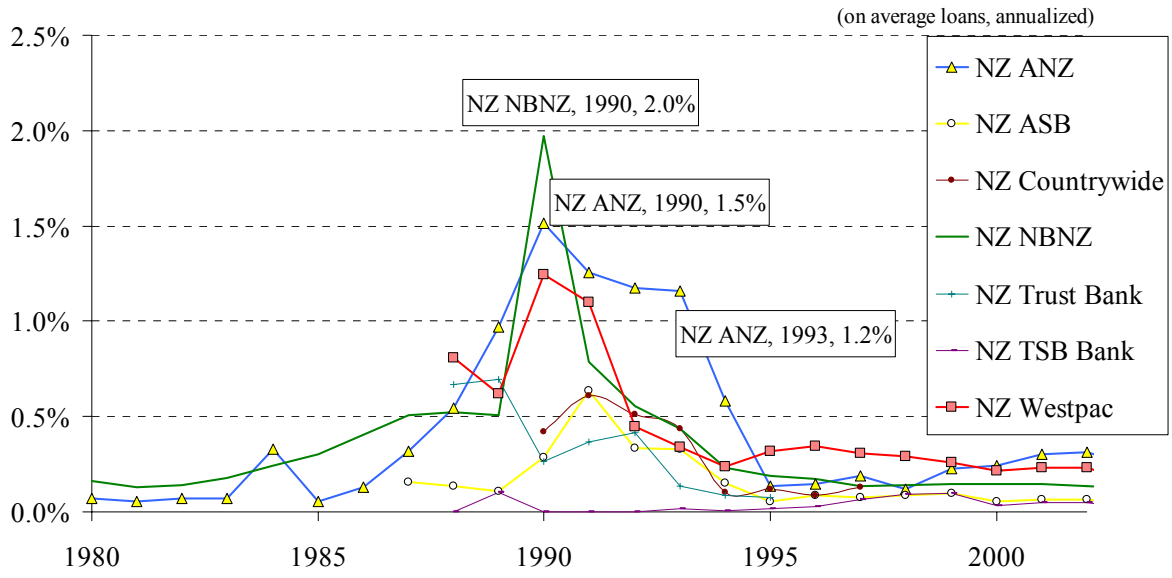
The period since the 1989/1990 crisis can be characterized by consolidation among banks, good financial performance with declining and then stabilizing levels of loan losses (as illustrated in Figure 3-7 and Figure 3-8). Many New Zealand-owned institutions were sold to foreign owned institutions after 1990.

As of 2006, and after the 2003 merger of NBNZ into ANZ, there remain 4 large multi-purpose banks in the market. As shown in Figure 3-9, ANZ, ASB, BNZ and Westpac hold 65% of total financial sector assets which corresponds to more than 80% of assets held by deposit taking institutions (RBNZ, 2005). Of the other 16 banks registered, there are four that could be characterized as retail banks. Locally owned TSB Bank (formerly Taranaki Savings Bank) is one savings bank that has operated over the full observation period and for which data has been collected. There are some recent entries into retail banking by government-owned Kiwibank and St. George Bank's New Zealand subsidiary Superbank which, in the meantime, has exited the market again. As mentioned earlier in this chapter, both have been omitted from the database due to the brevity of their existence. The same applies to the very small Auckland based Kookmin bank, a branch of a leading Korean retail bank, which mainly serves the Korean expatriate community.

A special feature of the New Zealand financial system is the comparably less regulated sector of non-bank financial institutions (NBFIs). Quite large pre-1984 according to Grimes (1998, p. 295), it later lost some significance but has again been growing strongly since 1998

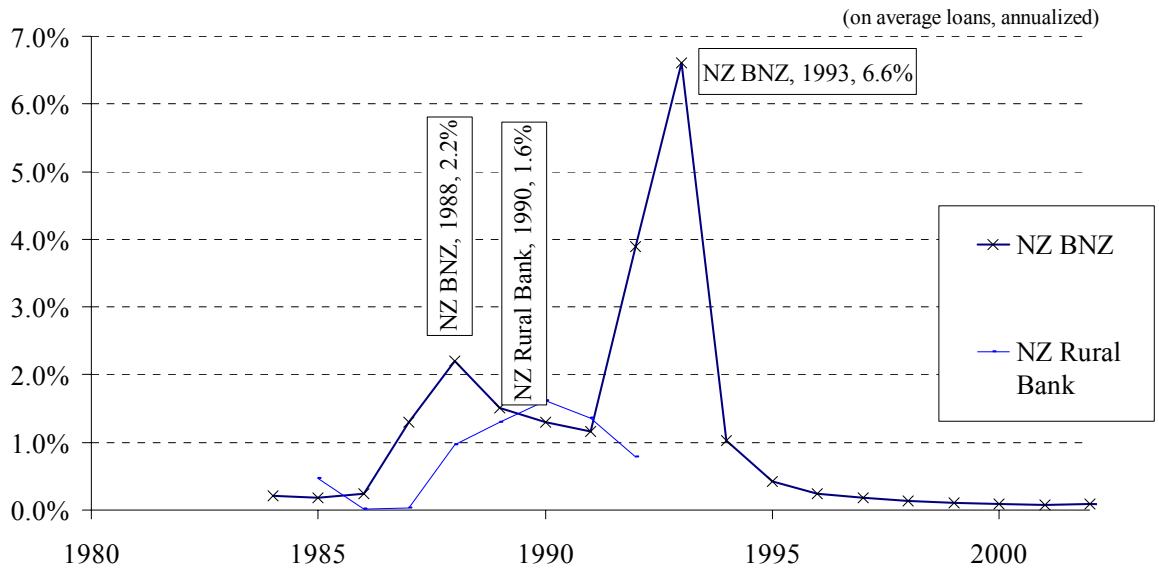
(Thorp, 2003, p. 18). It accounts for approximately 10% of total domestically sourced credit provision, provides half of consumer credit and over 15% of commercial property lending, with the share of development lending significantly higher (RBNZ, 2005, p. 22). As shown in Hess & Feng (2007), some NBFIs like Southland Building Society (SBS) and the cooperative PSIS (formerly Public Service Investment Society) have expanded into full scale retail banking activities without registering as banks with RBNZ. NBFIs have not been reporting under the bank disclosure regime but under the less stringent provisions of the Securities Act 1978. In line with the sample selection criteria, they have not been considered in this data collection.

Figure 3-7 Write-offs as % of average loans through observation period (New Zealand banks excluding BNZ and Rural Bank for ease of presentation)



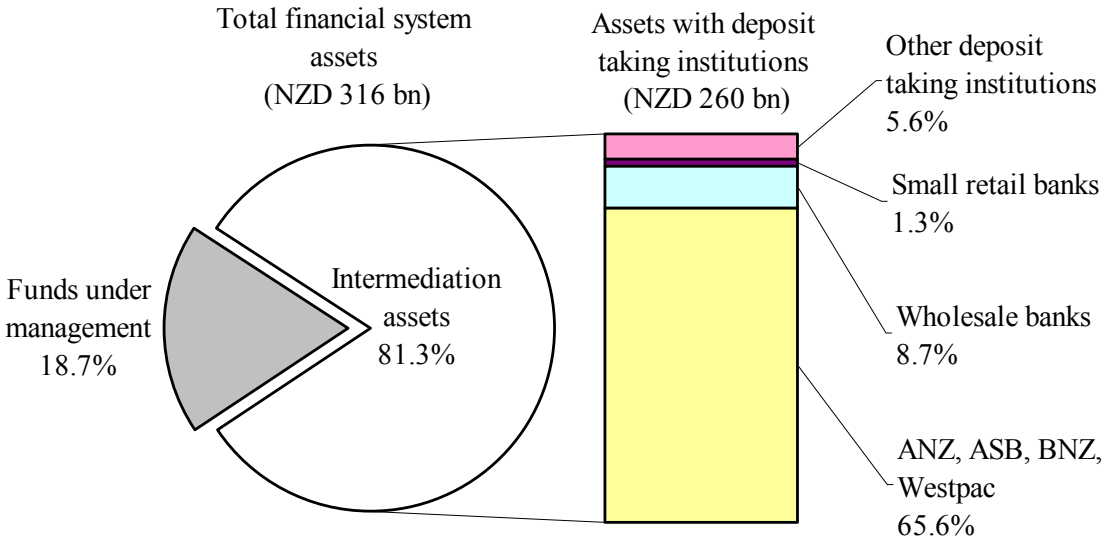
Source: from original financial statements

Figure 3-8 Write-offs as % of average loans through observation period (BNZ, Rural Bank)



Source: from original financial statements

Figure 3-9 New Zealand break-down of financial system assets (2004)



Source: RBNZ Financial Stability Report May 2005 (RBNZ, 2005)

3.4.2 Financial institutions with roots as trading banks

3.4.2.1 ANZ and National Bank of New Zealand (NBNZ)

The most complete set of data could be retrieved from National Bank of New Zealand (NBNZ) and ANZ, two trading banks with a long history in the New Zealand market which were joined in 2003 to form 'ANZ National Bank Ltd Group'.

NBNZ had always been a stand-alone entity in New Zealand. In 1919, UK-based Lloyds Bank took up its first shares in NBNZ and moved to become sole shareholder in 1966 (Holmes, 1999, p. 22, 79-82). When NBNZ moved its head office from London to Wellington in 1979, it also switched from GBP to NZD based financial reporting (p. 133-154). Before being sold to

ANZ, NBNZ had grown through a series of acquisitions including Rural Bank of New Zealand in 1992 and Countrywide Bank in 1999 (see genealogy of New Zealand banks in Figure 3-10).

ANZ, on the other hand, is part of an Australia based international banking conglomerate (more details in the Australian section of this review). Its NZ operations had 25% public minority shareholders after its local incorporation in 1979. The Australian parent bought them out in 1986 after local ownership rules had been relaxed during the deregulation.

The acquisition of government-owned Post Office Bank was a major addition to ANZ's depositor base in 1989. As it formed part of New Zealand Post, there was no detailed segment reporting of its banking activities except for some prospectuses in the very brief period between incorporation (24 February 1987) and its sale to ANZ as per 28 February 1989.

As a final note, both ANZ and NBNZ experienced quite high levels of loan write-offs in the early 1990s, with a higher 2% peak for NBNZ but in cumulative terms greater losses for ANZ (see Figure 3-7).

3.4.2.2 Westpac Banking Corporation, New Zealand Division

Westpac Banking Corporation (Westpac) is another of the commercial banks with a very long history in New Zealand. It was founded 1817 in Australia as Bank of New South Wales and later expanded its operations to New Zealand. The name Westpac was devised in 1982 when Bank of New South Wales merged with Commercial Bank of Australia, another Australian institution with strong representation in the New Zealand market. Westpac has operated in New Zealand merely as a branch of its Australian parent. This has made it difficult to obtain a full range of financial data on its New Zealand operations before it became subject to the bank disclosure regime in 1996. Fortunately, some pro-forma consolidated information on the New Zealand division was contained in prospectuses published under the securities regulations as far back as 1988. Accordingly, pre-1996 data are comparably 'thin' in the database. In a recent

development, the Reserve Bank of New Zealand has required Westpac to incorporate its local New Zealand retail operations.[42]

3.4.2.3 Bank of New Zealand (BNZ)

Bank of New Zealand (BNZ), founded in 1861, also has its roots as a trading bank but as early as 1895 (Bank of New Zealand Banking Act 1895), the New Zealand government injected preferential share capital to cover large bad debts.[43] BNZ was fully taken over by the Crown in 1945 and there were even concerns the whole of the banking system would be nationalized by the government of the day (Holmes, 1999, p. 33). The legislation regarding BNZ was revised with The Bank of New Zealand Act 1979 which reconfirmed the 100% government ownership but clearly stated that the Crown would not be liable for BNZ's debts (unlike the trustee bank legislation discussed later in this chapter). The subsequent 1986 amendment to the 1979 Act allowed the placement of up to one-third of equity with other investors. In 1988, finally, the special statutes related to BNZ were repealed and the bank converted to a limited liability company incorporated under the Companies Act.

With the deregulation of the mid 1980s, an ambitious team of directors had assumed management responsibility with the obvious aim to turn BNZ into a global player. The 1987 share prospectus, for illustration, featured a picture of Wellington's BNZ Centre as "the headquarters for the Bank's worldwide activities" (p. 13).

Soon after an initial 25% of BNZ shares had been placed to the public, huge bad debts and property losses in both Australia and New Zealand became apparent. It forced BNZ's two main

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[42] The local incorporation per 2007 has led to minor additional disclosure. As a branch bank, Westpac (NZ) did not publish tier 1 and 2 capital which became available as a locally incorporated bank.

[43] See Colgate et al. (1990, Appendix VI, p. 12, minutes of BNZ shareholder meeting of March 1895).

shareholders, the government and Fay Richwhite & Co[44], to bail out the BNZ twice. In total, they had to inject over NZD 1.1 billion into the bank in 1990 and 1991[45]. As part of the restructuring, the troubled portion of BNZ' loan portfolio was transferred to a special entity (ADBRO Investments Ltd) to speed up the recovery of the main banking operations. Finally in 1993, BNZ was sold to National Australia Bank (NAB), one of the major Australian banking groups, which has operated BNZ as a stand-alone subsidiary ever since.

To a certain extent, BNZ's changes in ownership are also reflected in its financial disclosure. In the early 1980s, at the beginning of the observation period, BNZ reported like a public sector entity, emphasizing its role for the good of the New Zealand economy. Disclosure became more in line with privately owned banks, which are accountable to their shareholders, only when it was partially floated in 1987.

Prior to acquiring BNZ, NAB had already been actively building a presence in the New Zealand market. In 1987, it had registered as a bank which by 1992 had grown into a network of 35 branches with assets in excess of NZD 2 billion, i.e. 11% of BNZ's asset at the time of its purchase by NAB.

3.4.3 New Zealand banks with roots as special statutes institutions

ASB Bank (ASB) and TSB Bank (TSB) as well as former Trustbank, Countywide Bank and United Bank are institutions that have their roots in the previously very fragmented trustee banking and building society sectors which were regulated by a myriad of statutes. Furthermore, before the onset of financial deregulation, the activities of Post Office Savings Bank, mentioned earlier in the context of ANZ, as well as Rural Bank of New Zealand were subject to special

[44] Fay Richwhite & Co through its 62% controlled subsidiary Capital Markets Equities became 30% BNZ shareholder with the first recapitalization in June 1989 only.

[45] Including capitalization of ADBRO, capital of NZD 495 and 635 million was injected in 1990 and 1991 respectively.

statutes. All these institutions corporatized and sought bank registration in the late 1980s/early 1990s which meant a change of their ownership relationships and legal structure. As limited liability companies they now had easier access to external capital and, after the statutory protection of their original business activity had vanished, they competed head on with the established banks. Moreover, as limited liability companies, they could now be sold to or merge with other players in the industry.

This section firstly gives a brief overview on these statutes which is then followed by the profiles of the particular institutions.

3.4.3.1 Special statutes overview

The discussion in this subsection is based on Table 3-5 which lists the special statute legislation that has been in force during the observation period.

Building Societies have been and still are subject to the Building Societies Act 1965 which has, however, undergone some substantial revisions mainly with the Building Societies Amendment Act 1987 which defined building societies more along the lines of other financial institutions. The amendment removed powers of the registrar, formerly the supervisor for this industry, and eliminated cross-support clauses among building societies. It also allowed the conversion of the institutions to a company registered under the regular companies legislation, i.e. issuing shares to its members. Later, the building societies also became subject to the provisions of the Financial Reporting Act 1993 which requires them to report with generally accepted accounting standards. Some building societies like SBS (Southland Building Society) have opted not to convert to a bank and still operate as a non-bank financial institution incorporated as a building society.

The sector of regional trustee banks was subject to the Trustee Banks Act 1948, subsequently repealed by the Trustee Banks Act 1983. Under both acts, the government effectively guaranteed their deposits. The trustee bank legislation was repealed in 1988 by the Trustee Banks Restructuring Act which phased out government guarantees and set the

framework for corporatization. Community trusts were created to assume ownership of the newly formed banking entities.

The group of private savings banks had their own statute (Private Savings Banks Act 1964, repealed by Private Savings Banks Act 1983). This statute applied to savings bank set up as subsidiaries of the main trading banks which enabled them to offer savings products to their clients. This legislation was repealed with the Private Savings Banks (Transfer of Undertakings) Act 1992 which enabled trading banks to amalgamate their savings subsidiaries.

Post Office Savings Bank, Rural Bank and Bank of New Zealand were subject to their own statutes (see Table 3-5 and also the earlier discussion on BNZ for details). All three lost their privileges in 1987 when the system for uniform bank registration was put into place (with the enactment of The Reserve Bank of New Zealand (Amendment) Act 1986, subsequently replaced by The Reserve Bank of New Zealand Act 1989).

3.4.3.2 ASB (formerly Auckland Savings Bank)

ASB, established in 1847 as Auckland Savings Bank, had been a community savings bank in the Auckland area. Incorporated as a Trustee Savings bank with government deposit guarantee, it expressed its intention to become a member of the group of Trustee banks (subsequently called Trust Bank NZ) in 1986 but not much later opted to pursue its independent path. It had started extending its reach to other parts of the country when it corporatized and registered as a bank in 1989. Ownership was first transferred to the charitable ASB Bank Community Trust but in the same year Commonwealth Bank of Australia (CBA) acquired a controlling 75% stake in the institution. CBA finally bought out the community trust in late 2000 to become sole shareholder. To develop into one of the five leading banks in New Zealand, ASB has mostly relied on internal growth as opposed to taking over other banks; the 1990 acquisition of the small Nelson based Westland Bank, like ASB a former trustee savings bank, being the only notable exception. Given ASB's history, meaningful disclosure of selected credit loss related information only became available in 1987.

3.4.3.3 Trust Bank Group

Trustbank was an institution that had directly been formed as a result of financial sector reform when eight regional trust banks joined forces in 1988 to form Trust Bank Group (Trustbank). While an increasing number of services were centralized into this new entity, Trustbank formally remained a cooperative arrangement with its members remaining independently owned legal entities. New members joined later but others like small Taranaki Savings Bank (TSB) and more notably ASB left the group to follow their independent path. In April 1995 the member banks formally amalgamated into one unit but this was just one year before Trustbank was sold to and merged into Westpac (May 1996). In line with its policy to keep regional brand names,[46] Westpac adopted 'WestpacTrust' as its official bank name in New Zealand until it reverted back to the original Westpac brand in 2002.

3.4.3.4 TSB Bank (formerly Taranaki Savings Bank)

Taranaki based TSB booked its first deposit in 1850. With the loosening of regulations on banking by financial policy reform of the mid 1980, TSB decided to seek an independent path and to stand aside from the amalgamation of the country's Trustee banks mentioned above. Its ownership was transferred to a community trust and in 1989 it registered as a bank, changing its name to TSB Bank. It adapted its infrastructure to cope with lending activities of a retail bank because, like other trust banks, it had previously held much of its assets in government stock and other liquid investments with trading banks. Its growth has been smooth and steady, purely financed by internally generated funds. It has not ventured into activities unrelated to retail banking to any substantial degree with 90% of its gross loan portfolio classified as residential mortgages (data per 30 March 2005). Full service branches are predominantly located in the Taranaki core region but for the origination of home loans the bank has established service

[46] Westpac initially also retained names of other banks acquired in Australia in the late 1990s like Challenge Bank and Bank of Melbourne.

centres in Auckland, Wellington and Christchurch. Accordingly, by 2005 more than two thirds of credit exposures are now outside Taranaki. To serve these customers and also to expand its depositor base, TSB started offering phone and later Internet banking services at a national level in 1996.

3.4.3.5 Countrywide Bank

Cooperative Countrywide Building Society became a registered bank in 1988 when it changed its name to Countrywide Bank (Countrywide). At the same time, the bank was publicly listed with members of the former building society allocated 40% of the shares while UK based Royal Bank of Scotland (40%) and General Accident Insurance Company (20%) became the dominant shareholders. Royal Bank of Scotland eventually bought out General Accident Insurance Company and when Countrywide acquired United Bank, the UK bank took its stake to 100% in 1992. In 1998, finally, the bank was sold to and integrated into NBNZ.

3.4.3.6 United Bank

United Bank had its origin as a building society, too. It had been formed as United Building Society by the union of Northern United Building Society and the Canterbury Building Society in October 1982. It became the target of a run on its deposits in August 1988 (MacPherson, 1993, 18.2.2). In 1990, it became a wholly owned subsidiary of State Bank of South Australia (SBSA) when it converted to a bank and SBSA subscribed to NZD 150 million for 100% of its capital. SBSA's own problems soon became apparent and, only two years later in 1992, Royal Bank of Scotland merged United Bank into Countrywide.

This disturbed history and its short existence as a registered bank had effects on the data retrieved from United Bank's accounts. The only extended time series were the static stocks of bad debt provisions reported from 1987 onwards. No substantial bad debt appeared in United's

published accounts even though they must have existed according to the losses at United Bank shown in MacPherson's report into the failure of SBSA (MacPherson, chapter 3.1.2).[47]

3.4.3.7 Rural Bank of New Zealand

The Rural Bank of New Zealand had originally been established as part of the State Advances Corporation after WWII. Legislation in 1974 constituted it as a rural development bank for the purpose of 'making loans and providing other assistance for farming purposes and for other purposes in relation to primary industries' ("Rural Banking and Finance Corporation Act 1974"s 19). When the new Labour government of 1984 gave it the direction to become a stand-alone bank, it registered as a bank under the new regime. Given that its customer base was comparably narrow and much of its loan portfolio had been lent at subsidized rates, its short existence in a liberalized market does not surprise. In 1990 the government sold it to the Fletcher Challenge Group and just two years later it was integrated into NBNZ. This is one of the reasons why NBNZ (since 2003 part of ANZ Group) still has a strong position as a lender to the rural sector in New Zealand.

[47] As noted in the report on the collapse of SBSA, SBSA had paid NZD 150 million for the estimated NZD 40.2 million net book value of United Bank. In fact, this book value was later estimated at a negative NZD 17 million (MacPherson, 1993, volume 8, chapter 18.1). It would be too speculative to derive more realistic estimates of loan losses at United Bank with the rough data provided in MacPherson.

3.5 Review of disclosure rules in Australasian banking

This section firstly examines the detailed rules and standards with regard to information disclosure by New Zealand financial intermediaries that have been in force over the observation period. It focuses in particular on those standards that have impacted the disclosure of credit losses, provisions and related credit risk information.

In a more global fashion, a second and shorter sub-section then reviews the Australian disclosure rules, highlighting its distinct differences to the New Zealand model. These differences relate in particular to the lack of a disclosure regime specific for registered banks. It also examines the impact of listing rules in Australia where all main banking groups have been exchange traded on the ASX over much of the observation period.

3.5.1 Disclosure rules for financial intermediaries in New Zealand

There are essentially three sets of standards or rules which have affected financial reporting by New Zealand financial intermediaries since the early 1980s.

1. Rules founded in general company legislation (Companies Act) with associated accounting standards issued by professional accounting bodies.
2. Rules prescribed by the prudential regulator, namely the Reserve Bank of New Zealand.
3. Rules mandated by the provisions of the securities law.

The following review is supported by a chronological history of acts, regulations and standards in tabular form which summarize their impact in Table 3-4.

3.5.1.1 Company legislation and accounting standards

From the start of the observation period up until the mid 1990s, companies reported under the Companies Act 1955. As a fundamental principle, the act required that every balance sheet and profit and loss account of a company should give a "true and fair view" of the state of affairs (s 153(1)). Rules regarding the form of accounts were laid out in Schedule 8 to this act and were very general in form. Disclosure requirements that touched on the reporting of credit losses were the obligation to show the impairment of assets but specifically just for fixed assets ("Companies Act 1955" Eight Schedule, cl 11(1)) and the need to show provisions and reversals in a broad sense if they were material (cl 13.1 (g)).

At the time, there were accounting standards in force – then named 'Statements of Standard Accounting Practice' (SSAP) and issued by the Council of the New Zealand Society of Accountants (NZSA) – on the basis that members of the society were required to comply with them or to disclose departures, in accordance with specified criteria.[48] None of the SSAPs related however to the specifics of the reporting by financial institutions in general, or loan loss provisions in particular. Some of these standards helped push banks towards greater disclosure of credit provisions as for example SSAP-9, issued in 1978 (cl 4.1 (c)), which bans material items from being included with or offset against other items without separate identification. Pre-1980, loan loss provisions, though material in most cases, had been offset against loans while provisions expense had typically been netted against gross revenues by the banks.

A major reshuffle of company legislation in the New Zealand occurred with the enactment of the Companies Act 1993 which is still in force today.[49] Unlike the Companies Act 1955, the

[48] See Zeff (1979) for a more historical perspective of how accounting principles have evolved in New Zealand.

[49] Mortlock (2003, p. 16-19) provides a concise summary of the philosophy and workings of New Zealand's current financial and accounting system which includes the financial reporting and auditing framework.

1993 Act no longer contains any requirements relating to the contents of financial statements but these issues were addressed in the Financial Reporting Act 1993. Not all banks started reporting immediately under the new act as there was a 3-year transitional period to the mid of 1997 during which both acts were in force.

The Financial Reporting Act 1993 represented a new approach to legislating the way companies have to disclose information in that the act does not define reporting rules per se but requires reporting to comply with generally accepted accounting practice set by the Accounting Standards Review Board (ASRB), which itself is established through this act (III, ss 22-35). The process is that the NZSA, later renamed Institute of Chartered Accountants of New Zealand (ICANZ) submits these standards to the ASRB for approval which thereby makes them legally binding.

The number of financial reporting standards (FRSs) has grown through the years, at the same time replacing the previous SSAP standards.[50] Standards relating to the reporting on credit provisions and losses may be found in

- FRS-9 - Information to be Disclosed in Financial Statements (ICANZ, 1995),
- FRS-31 - Disclosure of Information About Financial Instruments (NZSA, 1982),
- FRS-33 - Disclosure of Information by Financial Institutions (ICANZ, 2000).

As a final note, a major reshaping of accounting standards is on its way at the time of writing. This relates to the introduction of the New Zealand equivalents to International Financial Reporting Standards (NZ IFRS) which are currently being phased in.[51] A new set of rules will replace above the FRSs, in particular,

[50] While standards were renamed from SSAP to FRS, they kept the number of the older SSAP standard for a particular subject field. For example, both SSAP-9 and FRS-9 deal with standards for disclosure in financial statements.

[51] Entities are permitted to use NZ IFRS in the preparation of financial statements for periods commencing on or after 1 January 2005. These standards will become mandatory for reporting periods commencing on or after 1 January 2007 (ICANZ, 2005a, s 13, p. 7).

- FRS-9 by NZ IAS 1 (ICANZ, 2006),
- FRS-31 by NZ IAS 32 (ICANZ, 2005b) and , finally,
- FRS-33 by NZ IAS 30 (ICANZ, 2004).

Rules regarding 'impairment and uncollectibility of financial assets' will no longer be covered in FRS-33, however, but in NZ IFRS 39 - Financial Instruments: Recognition and Measurement (ICANZ, 2005c). Under the new provisioning rules, the concepts of specific and general provisions are discontinued and replaced by the new categories of individual and collective impairment (KPMG, 2005, p. 22).[52] These changes will, however, have no effect on the historical provisioning data which have been reported under earlier rules and standards.

3.5.1.2 Prudential regulation of New Zealand banks

Given the public interest to safeguard the financial system, banks operating in New Zealand have always been subject to particular regulation and supervision beyond the general company legislation. Before the financial deregulation starting in the mid 1980s, legislation dealing with banks, e.g. as laid out in the Reserve Bank of New Zealand Act 1964 ("Reserve Bank of New Zealand Act 1964"Part V: Regulation of Banking and Credit) was less concerned with prudential supervision of the banks per se but contained direct prescriptive authority of the RBNZ over the operations of financial institutions, i.e. very much in the spirit of the time with pervasive regulations in almost every sector of the economy. Prudential aspects were indirectly addressed by RBNZ's right to impose so-called reserve ratios, i.e. a requirement to hold a certain

[52] In future, there will be less discretion in the provisioning of unidentified losses and financial assets may be regarded as impaired only if there is objective evidence to this effect as a result of past events. There is uncertainty as to the interpretation of these new rules as shown, for instance, in Westpac's NZ disclosure statement per September 2005 (p. 26), which expects reduced provisions but states that 'the extent of this reduction in provisioning has not yet been determined as a result of unsettled interpretation issues'. In general, the market expects banks' earnings volatility to increase.

percentage of borrowings as deposits with the RBNZ or government stock. The main purpose of these ratios lay in monetary policy implementation. Grimes (1998, p. 298) points out that such rules had the opposite effect of prudential requirements in 1984 when it left some savings institutions technically insolvent when a sharp rise in interest rates caused the market value of their long-term government securities to fall markedly.

A formal prudential framework came into force only with the 1986 Reserve Bank of New Zealand Amendment Act, subsequently replaced by the 1989 Reserve Bank of New Zealand Act 1989 (still in force today). For the first time, it defined the role of the RBNZ as a prudential regulator and supervisor of the banking system. Accordingly, these acts introduced a new registration process for banks and defined prudential regulation and supervision as a specific role for the RBNZ. Powers of the RBNZ under these acts are still extensive but the 1986 Amendment Act had no provisions of forcing relevant information disclosure to the banks' depositors. The 1989 Act ("Reserve Bank of New Zealand Act 1989"s 81) then provided RBNZ with the explicit mandate of prescribing information to be disclosed by means of 'disclosure statements'.

The 1989 Act had no immediate effect, however, as the required regulation defining the content of these disclosure statements was issued only in 1995 (RBNZ, 1995 Registered Bank Disclosure Statement Order). The issuance of the 1995 order, whose implications are summarized in Mortlock (1999), coincided with a change in RBNZ application of its powers under the 1989 Act and a shift to a comparably light-handed disclosure based regime of banking supervision. This included a shift in focus to ensuring proper disclosure to the market away from obtaining direct information from banks or even interfering with a bank's affairs. More recently, the RBNZ has become slightly more intrusive. Since 2003 essentially all the country's main banks have been owned by the four leading Australian banking groups and this has given rise to concerns regarding potential effects of financial contagion spreading from Australia (see for example research by Hull, 1999). RBNZ has thus acted by imposing limits on outsourcing essential core bank functions to their parents for systemically important institutions (RBNZ,

2006b). It has also forced Westpac, which had been operating as a branch bank in New Zealand since 1861, to seek local incorporation, at least for its retail activities.

Both the 1995 Order mentioned above and its 1998 revision (RBNZ, 1998 Order in Council) have nevertheless brought uniformity into the banks' information disclosure and New Zealand's market discipline based approach to regulation is often cited as a model in international publications (e.g. in Gup, 2000, p. 189-190; e.g. in Mayes, 2000). The orders lay down the form, content and frequency of bank disclosure statements in great detail. Specific disclosure requirements relate to asset quality (various types of impaired assets, specific and general provisions, asset write-offs), risk concentrations (credit, funding, individual, connected counterparties), and general credit information (guarantee and ownership, credit ratings, relevant accounting policies). There are also rules on how to present information on the bank's capital ratios in the Basel capital adequacy framework (BCBS, 1988). The 1998 order also added requirements regarding disclosure of exposures to market risk, in particular interest rates, equity and foreign exchange exposures.

3.5.1.3 Securities law

Securities law is a third area of legislation that has affected financial reporting of banks. The Securities Act 1978 was drafted as consumer protection legislation in response to some high profile investment scandals such as the 1976 failure of Securitibank, a private merchant bank (Hunt, 2001, p. 69). The banks are affected by this legislation because the term "security" as defined in the act ("Securities Act 1978"s 2D) also encompasses deposit products such as term investments. The act introduced the rules for offers of securities to the public, which includes the obligation to produce a prospectus and investment statement ("Securities Act 1978" Part II, s 33, 37). The specific requirements as to what has to appear in these offering documents, in particular also in respect of financial statements, are set out in the 1983 Securities Regulations ("Securities Regulation 1983"Schedule 1,2).

Collecting the financial data from annual reports and prospectuses in earlier years, one could observe that reporting requirements under the securities legislation did not always match the accounting standards used in the preparation of regular annual accounts at the time. This forced the banks to produce two sets of financial statements even though differences between the two methods were minute. Two examples of differences were alternative methods of accounting for the value of certain subsidiaries and the classification of debt instruments.

With the introduction of the bank disclosure statement requirement orders in 1996, registered banks became exempt from the requirement to produce prospectuses under securities legislation but up to this point in time, prospectuses were the only available source of financial information for some of the banks (e.g. Westpac NZ operating as a branch of its Australian parent).

While banks are no longer required to produce a prospectus – unless they were to list their equity on the NZX – the securities legislation remains the main foundation of reporting for non-bank financial institutions in New Zealand. As these rules are less specific than the bank disclosure regime, concerns regarding the disclosure quality of NBFI prospectuses has been expressed repeatedly (Securities Commission New Zealand, 2005; Van Schaardenburg, 2002) and might thus change in future.

3.5.2 Disclosure in Australia

This review of rules that has affected the financial reporting of Australian banks since 1980 will be somewhat less detailed than the previous section reviewing this topic for New Zealand. This can be justified with a parallel development of accounting standards in both countries with New Zealand standards generally well coordinated with those of Australia even though a formal Trans-Tasman Accounting Standards Advisory Group (TTASAG) was set up only in 2004. In its initial meeting, the group noted that "while there were some differences in standards in Australia and New Zealand, generally both countries are modifying the standards in similar ways and therefore differences were limited" (TTASAG, 2004).

Unlike New Zealand, Australia does not explicitly rely on a disclosure based regulatory regime to enforce market discipline in the banking sector, i.e. APRA as the prudential regulator does not prescribe supplementary disclosure rules in addition to those of the general companies law or securities legislation. Gray (1996, Attachment 1) analyzed the information disclosure of Australian banks in the light of the New Zealand bank disclosure rules that had just been issued. He noted that while Australian banks did not strictly fulfil all elements of the NZ rules in detail, they nevertheless "appear to meet most of the requirements". In the case of Bank West, however, the lack of a universal bank disclosure regime in Australia led to missing data since 2003 for this quite sizeable institution. After HBOS took full control (see section 3.3.2.6.1), this bank has no longer published separate annual reports for its Australian operations. There are similar data availability issues with other overseas-owned institutions such as PIBA (Rabobank) and ING Bank.

There is one explanation why good disclosure by Australia's banks appears to be achieved even without specific rules issued by the prudential regulator. With the exception of the former state bank sector and non-bank financial institutions later converted to banks, all of the leading Australian banks have been listed on the stock exchange through the observation period. This compares to New Zealand where the government or overseas-owned banking sector at times had issued some minority shares with limited float. In general – and this comment applies to both New Zealand and Australia – one can observe that a listing on the stock exchange had a beneficial impact on the disclosure quality as shareholders keenly scrutinize the activities of firms and push for openness in reporting.[53] Depositors, on the other hand, tend to take less interest in the affairs, or more importantly risks, of their banks. Such a mindset and limited

[53] In some case missing data series could be extended backward thanks to detailed historical information provided in new share issue prospectuses. Examples include CBA (Prospectus - Commonwealth Bank Public Share Offer 1991) and BNZ (Prospectus for an Issue of Ordinary Shares 1987).

knowledge about their banks have repeatedly been confirmed in surveys like the one conducted by Wood (2000) for the New Zealand market.

Similar to New Zealand, disclosure earlier in the observation period was strongly influenced by special statutes of which there were a great many in Australia with its federal structure. The Campbell committee had found that financial intermediaries were subject to a range of disclosure requirements but that these lacked consistency as they were being imposed by different jurisdictions (State and Commonwealth) and administered by different authorities (Campbell Inquiry, 1981, 21.39, p. 370). For example, the various state acts regulating credit unions and building societies imposed disclosure requirements that differed from each other and from those of the Companies Act. Such statutes had much the same effect as in New Zealand, namely that disclosure of these special statutes entities was either deficient or simply non-existent (e.g. credit provisioning information for former building societies).

In summary, the data collection process confirmed that the information disclosure quality of Australian and New Zealand Banks, many of the latter owned by Australian parents, moved very much in tandem through the observation period.

3.6 Chapter summary

This chapter has provided an overview on the development of the Australasian banking system through the observation period. In both Australia and New Zealand, this period has seen considerable change in structure and regulatory framework of the financial industry.

The post-war phase of banking regulation and regulation in general was characterized by a very Keynesian view of the world. The financial institutions regulations were thus primarily designed to control the amount of business done by the banking sector, the money supply and hence the level of economic activity.

Changes were initiated based on the recommendations by the 1981 Campbell commission in Australia and three years later with the change of government in New Zealand with the financial sector policy reform. Both economies were subsequently hit by a crisis which had an

impact on the credit loss experience of financial institutions. The peak of problems cumulated in 1989 and 1990 in New Zealand and included the NZD 1.1 billion bailout of BNZ, the collapse of DFC, large loan losses at government owned Rural Bank and the demise of NZI Bank. Similarly, one to two years later in Australia, the state banking sector – in particular State Bank of Victoria and South Australia – as well as Westpac, were most affected.

In the time since then, the economic climate has been more benign in both countries. Performance of banks recovered and credit losses stabilized on comparably low levels. In both systems local and central governments abandoned their direct ownership of financial institutions. This led to a consolidation around four major banking groups in Australia (ANZ, CBA, NAB, Westpac) which now each own one of the four leading banks in New Zealand. Concentration was slightly less pronounced in Australia where players like St. George Bank, Bank West and Suncorp have established a sizeable national presence. In New Zealand, however, the four main banks have become very dominant, controlling 80% of assets subject to financial intermediation in the country.

Notable was Australia's financial sector reform of 1998 which reorganized regulation and supervision of the financial sector by creating APRA as the agency in charge of prudential supervision of most financial institutions including insurance and banks.

Pre-1980 bank annual accounts were not rich on information with typical P&Ls often showing just three items: (1) total income including all interest and non-interest expense but net of bad debt provision or write-off expense for the period, (2) total of all interest and operating expenses and, finally (3) the taxation expense. Likewise, loan assets in the balance sheet were shown as a net number without details on bad debt provisions.

With the onset of deregulation, disclosure quality of banks in Australasia improved steadily. The best financial information has been available from privately owned banks subject to the scrutiny of the share markets whereas state banks and mutuals subject to special statutes (e.g. building societies) provided limited or no detailed information until they converted to banks under the new registration regimes.

In 1995, New Zealand created a specific bank disclosure regime under the auspices of the RBNZ as the prudential regulator. This supervisory regime based on market discipline has found some international attention. In Australia, on the other hand, disclosure is driven primarily by the companies and securities regulation. Its quality is not inferior, however, as the leading banks are listed on the stock exchange which enforces good disclosure.

Appendices chapter 3

3.7 Appendix tables & figures chapter 3

Statutes & standards

Bank genealogies

Bank & annual report lists

Table 3-4 Chronological list of statutes/standards that have shaped the financial reporting of banks in New Zealand

Rule / Standard	Description	Rules affecting financial disclosure generally and credit loss/risk reporting in particular	Valid from/to	Effect
Companies Act 1955, Eight Schedule	Sets the rules as to the form of the balance sheet and the profit and loss account. Embodies s153(1) of Act requiring accounts to give a true and fair view of the state of affairs and profit or loss of the company.	No specific rules. Defined the need to show provisions and reversals in a broad sense if they are material [cl 13.1 (g)]. Requirement to show impairment of fixed assets (not financial assets!) in cl 11.1	1956 to 1994 (phase out until mid 1997)	Legally binding
Reserve Bank of New Zealand Act 1964	"Constitution" of reserve Bank replacing a corresponding 1933 Act. Defines the role of the Reserve Bank in the "sovereign control of currency and credit"	Authorizes the RBNZ regulate and control (on behalf of the government) the financial system including far reaching presecriptive powers over the banking system (e.g. investment requirements, setting of rates of interests and foreign exchange rates). Specifies reporting requirements to the RBNZ but no rules on reporting to the public.	1965 to 1989	Legally binding
Securities Act 1978	This Act regulates the offer of securities to the public for subscription by requiring disclosure of information to potential investors but is not concerned with secondary markets. Sets up the Securities Commission.	Introduced the requirement to publish information on new offerings in general (Part II, ss 33, 37) which were then laid out in the Securities Regulations 1983. Deposit and other investment products typically offered to the public by banks fall under the definition debt securities in this Act.	1979 to present (some parts phased in later)	Legally binding
SSAP-9	Sets the accounting standards regarding the information to be disclosed in company balance sheets and profit & loss statements. At the time, SSAP-9 was modeled on IAS 5 (Information to be Disclosed in Financial Statements) and was meant to supplement the provisions of the Eighth Schedule of the Companies Act 1955.	Similar requirements as the Eighth Schedule of 1955 Companies Act, i.e. no specific standards on credit loss/risk disclosure. Some general principles spelled out in SSAP-9 like 4.1 (c) on materiality formulates a need for disclosure of material items without offsetting them against other items. Loan loss provisions which would be material in most cases had historically been offset against loans, respectively been included in gross revenues. SSAP-9 also requires disclosure of contingent liabilities [4.4 (c)].	1978 to 1995 (superseded by FRS–9)	Recommended standard
Securities Regulations 1983	Released by Securities Commission it prescribes the details of the information that must appear in the offering documentation (investment statement, registered prospectus).	Schedule 2 refers to the requirements in respect of financial statements for debt securities offerings. Clause 31 requires a disclosure of maturity profile of lending for financial institutions and arears but in its earlier form it does not contain further credit risk specific disclosure requirements. Later versions were adapted meet to the requirements of the Financial Reporting Act 1993.	1984 to present	Legally binding

Table 3-4 Chronological list of statutes/standards that have shaped the financial reporting of banks in New Zealand (continued 2)

Rule / Standard	Description	Rules affecting financial disclosure generally and credit loss/risk reporting in particular	Valid from/to	Effect
SSAP-15	Sets standards on accounting for contingencies which refers to particular conditions or situations where the ultimate outcome is unknown.	Within the SSAP-15 framework, 5.1 implies the requirement for loan loss provisioning. 5.1 requires recognition of contingent losses in the financial statements if is expected that a future event will confirm the loss and reasonable estimate of the loss can be made.	1983 - 2000 (superseded by FRS–15)	Recommended standard
Reserve Bank of New Zealand Amendment Act 1986	Amends Reserve Bank of New Zealand Act 1964 to define the role of the RBNZ in registration of banks and prudential regulation and supervision.	Section 38L requires banking institutions to provide information for the purposes of prudential supervision to the RBNZ. No provisions for disclosure to the public. Repealed by 1989 Reserve Bank Act.	1986-1989	Legally binding
Reserve Bank of New Zealand Act 1989	Provides the constitution for the Reserve Bank of New Zealand. Defines functions and powers, which in particular also includes registration and prudential supervision of the banking system (Part 5).	Section 81 allows the RBNZ to prescribe the information to be disclosed to the public (disclosure statements). The act has no immediate effect as the required order defining the content of these disclosure statements are issued in 1995 only (Registered Bank Disclosure Statement Order 1995).	1989 to present	Legally binding
FRS-31	Sets the standard for disclosure of information about financial instruments which by definition also include loan assets	Defines the standard to provide credit risk information such as exposure, concentrations, collateral.	1993 to present	Legally binding
Companies Act 1993	The Act came into force on 1 July 1994 together with a package of new company legislation	Does no longer address disclosure requirements as these are now covered by Financial Reporting Act 1993	1994 to present (transitional period until 1997)	Legally binding
Financial Reporting Act 1993	Requires public securities issuers to file financial statements that comply with generally accepted accounting practice and give a true and fair view of their affairs. Establishes the Accounting Standards Review Board (“ASRB”).	Unlike Companies Act 1955 this Act no longer contains specific accounting and disclosure rules but gives legal power to the Financial Reporting Standards (FRS) approved by the ASRB. FRS standards thus superseded the requirements under Schedule Eight of the 1955 Act.	1994 to present (transitional period until 1997)	Legally binding

Table 3-4 Chronological list of statutes/standards that have shaped the financial reporting of banks in New Zealand (continued 3)

Rule / Standard	Description	Rules affecting financial disclosure generally and credit loss/risk reporting in particular	Valid from/to	Effect
FRS-9	Information to be Disclosed in Financial Statements - replaced SSAP-9	FRS-9 6.13 (d) (i) and (ii) require disclosure of bad and doubtful debts, distinguishing between debts written off (i) and changes in the provision for doubtful debts (ii)	1995 to present	Legally binding standard (under Financial Reporting Act 1993)
Registered Bank Disclosure Statement (Order 1995)	Issued under the Reserve Bank of New Zealand Act 1989. Defines the public disclosure regime for registered banks replacing the prospectus requirements under the Securities Act 1978	Comprehensive set of guidellines on type, shape, content and frequency of bank disclosure statements. Banks must disclose specific items relating to credit losses/risks and asset quality. The major items listed in the First Schedule are: > Asset quality (various types of impaired assets, specific and general provisions, asset write-offs) > Risk concentrations (credit, funding, individual, connected counterparties) > General credit information (guarantee and ownership, credit ratings, relevant accounting policies)	1995 to 1998	Legally binding
FRS-33	Sets the standard for disclosure of information by financial institutions.		1997 to present	
Registered Bank Disclosure Statement (Order 1998)	Replaces Registered Bank Disclosure Statement (Order 1995)	Similar provisions as in 1995 order but adds rules on how to disclose exposures to market risk (Eighth Schedule). Also aligns it to FRS-33 which had come into force.	1998 to present	Legally binding

Table 3-5 Selected special statutes applicable to financial institutions in New Zealand (past & present)

	Description	History / Background	Valid from/to
Building Societies			
Building Societies Act 1965, No 22	Sets the rules of registration and operations for building societies.	Substantial revisions mainly in the Building Societies Amendment Act 1987 No 175 which defines building societies more along the lines of other financial institutions. The 1987 amendment also removes powers of registrar and cross-support clauses among building societies. Allows conversion of society into company under Companies Act. Stricter requirements regarding reporting enacted with the Financial Reporting Act 1993.	still in force with amendments
Credit Unions			
Friendly Societies and Credit Unions Act 1982, No 118	Consolidates law relating to friendly and certain other societies, makes provisions for the formation and administration of credit unions.	The common bond provision restricts membership to a group of people, for example, employees of a company or people in a particular area. There are also restrictions on raising capital from members. Recent amendments have focused on providing more operational flexibility to the credit unions, e.g. the deposit cap for individual members was raised.	still in force with amendments
Post Office Bank			
Post Office Act 1959 (Part VII), No 30	Part VII of this act [ss 113-130] contained the legal basis for the post office to set up and operate a post bank.	Repealed in 1987. Legislation related to the operation of a post bank (Part VII of the Post Office Act 1959) was subsequently contained in Post Office Bank Act 1987.	to 1987
Post Office Bank Act 1987, No 114	Provisions preparing the sale of the post office bank.		
Private Savings Banks			
Private Savings Banks Act 1964, No 9	Regulates the operation of savings banks operated by trading banks	Savings banks were set up by trading banks in a bid to offer long-term savings products mortgage lending products. Trading banks per se faced regulatory restrictions on these types of activities and this act allowed them to start competing in an area which had been the turf of trustee savings banks and the post office bank.	to 1983
Private Savings Banks Act 1983, No 117	Regulates the operation of savings banks operated by trading banks	Repealed by Private Savings Banks (Transfer of Undertakings) Act 1992 which allowed trading banks to amalgamate their stand-alone savings banks.	

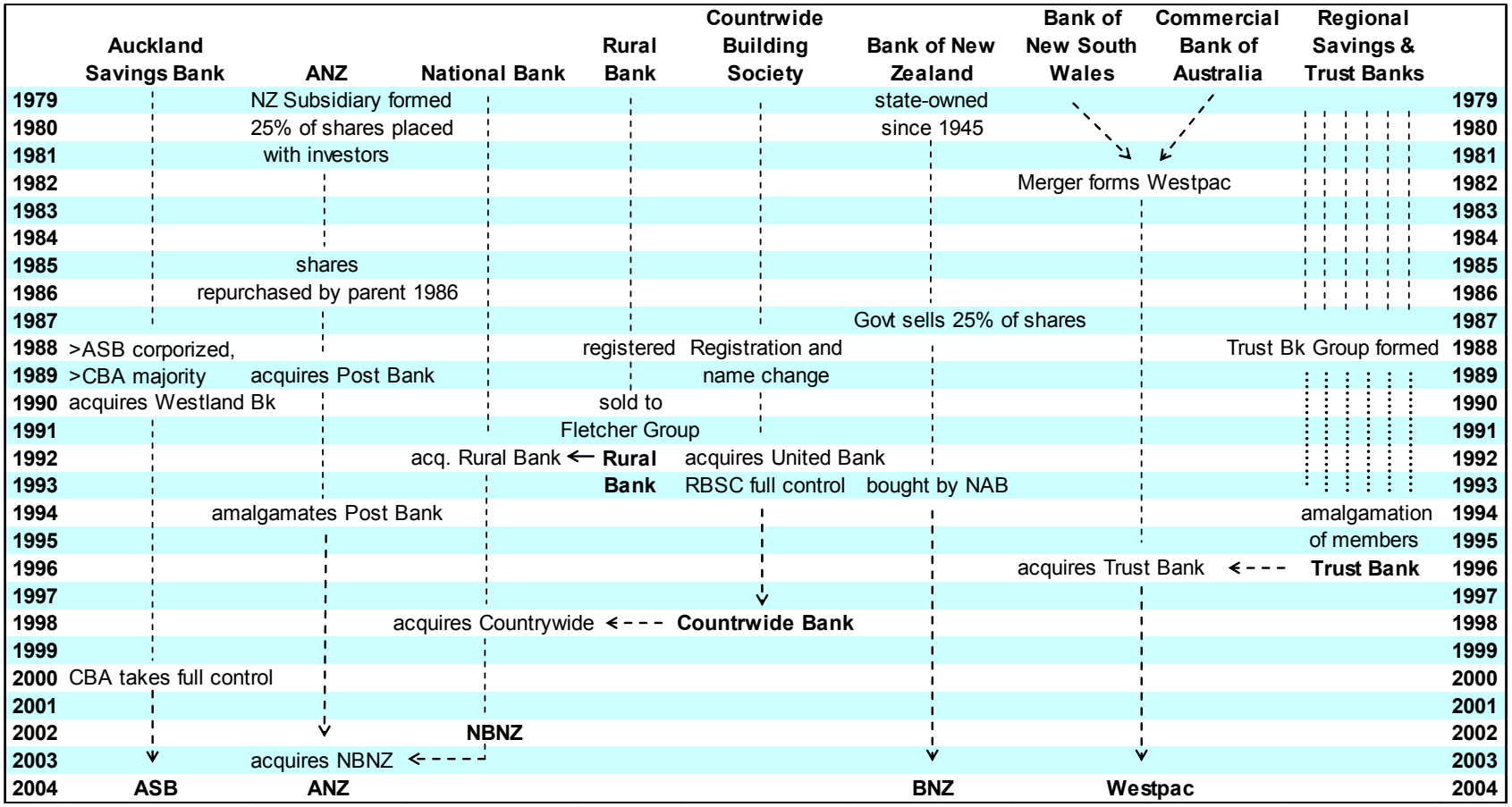
Table 3-5 Selected special statutes applicable to financial institutions in New Zealand (past & present)-(continued 2)

	Description	History / Background	Valid from/to
Rural Banking and Finance Corporation			
Rural Banking and Finance Corporation Act 1974, No 3	Establishes Rural Banking and Finance Corporation as a rural development bank. This is the predecessor of what was later known as Rural Bank.	Repealed by Rural Banking and Finance Corporation Act 1989	to 1989
Rural Banking and Finance Corporation Act 1989, No 81	Allows corporization of Rural Banking and Finance Corporation under the Companies Act 1955.	This Act was repealed, as from 1 July 1994, by s 15(1) National Bank of New Zealand Limited Act 1994	to 1994
National Bank of New Zealand Limited Act 1994, No 3 (Private)	Provides for the transfer to Rural Bank to National Bank and dissolution of Rural Bank.		
Trustee Savings Banks			
Trustee Savings Banks Act 1948, No 62	Sets foundation of trust bank sector whose deposits are government guaranteed.	Repealed by Trustee Banks Act 1983	to 1983
Trustee Banks Act 1983, No 116	Brings regulation of trustee banks in line with legislation for other players in the financial sector but government guarantee is maintained.	Repealed by Trustee Banks Restructuring Act 1988, No 90	to 1988
Trustee Banks Restructuring Act 1988, No 90	Phases out government deposit guarantees for trustee banks and sets framework for corporization. Community trusts were created to initially take over the share capital of the newly formed trust banks.	Sets the stage for the consolidation of 9 out the 12 the regional trust banks under the umbrella of Trust Bank New Zealand Ltd which acquired the share capital of the regional Trust Banks. The regional community trusts in turn became shareholders of Trust Bank New Zealand Ltd. ASB, Westland Savings Bank (later amalgamated into ASB) and Taranaki Savings Bank (TSB) remain outside this Trust Bank Group.	

Table 3-5 Selected special statutes applicable to financial institutions in New Zealand (past & present)-(continued 3)

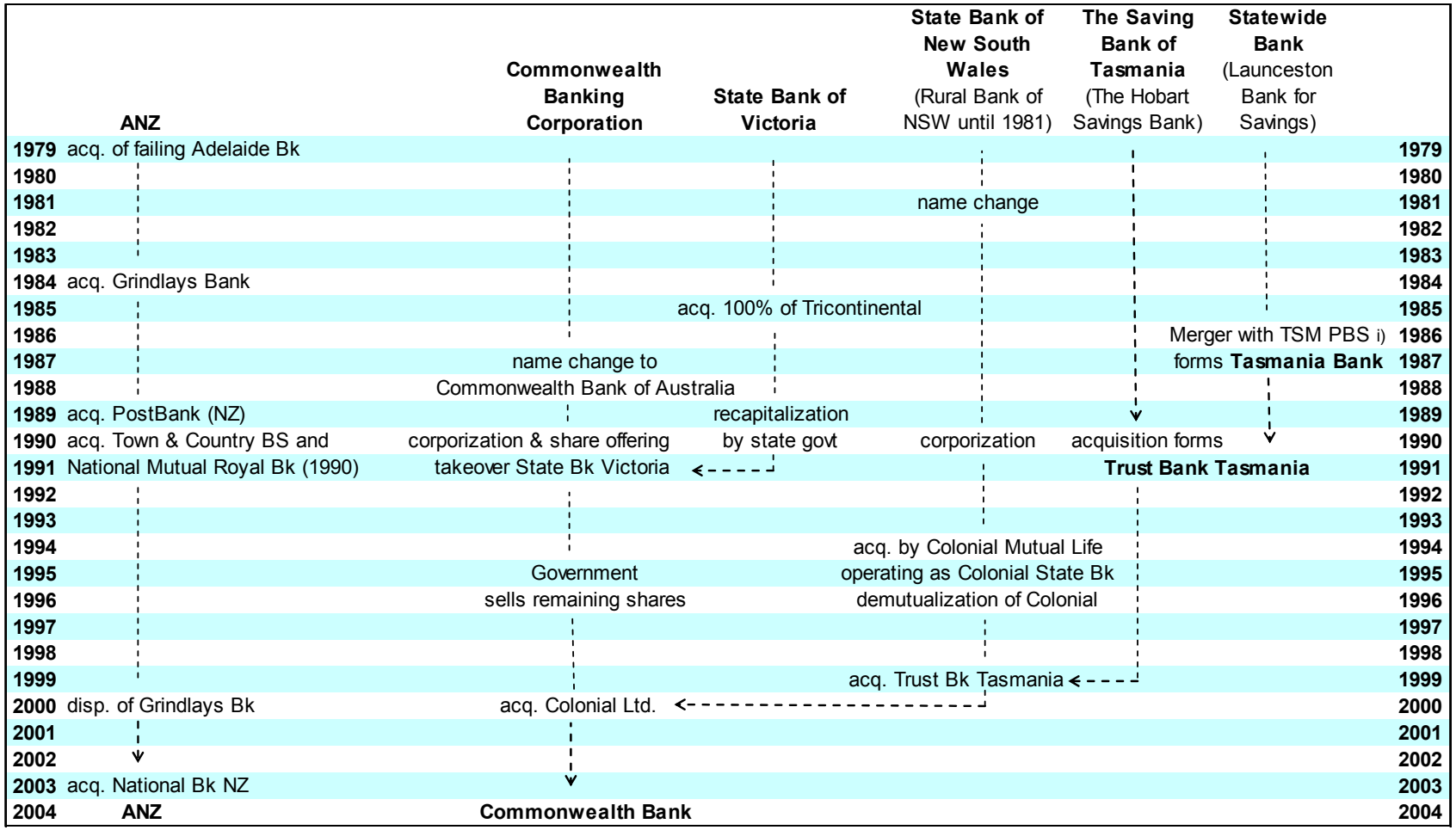
	Description	History / Background	Valid from/to
Bank of New Zealand			
The bank of New Zealand Act 1861, No 1 (private)	Original act of incorporation for Bank of New Zealand	repealed by Bank of New Zealand Act 1979	to 1979
Bank of New Zealand Act 1945, No 18	Nationalization of Bank of New Zealand as "State trading bank"	repealed by Bank of New Zealand Act 1979	to 1979
Bank of New Zealand Act 1979, No 34	Consolidates legislation relating to bank of New Zealand, including a new incorporation by repealing The New Zealand Bank Act 1861	Confirms full Crown ownership of bank but this was amended with the Bank of New Zealand Amendment Act 1986 that lowered minimum Crown ownership to two-thirds of capital. According to s 9, the Crown does not guarantee the deposits however. Repealed by Bank of New Zealand Act 1988.	to 1988
Bank of New Zealand Act 1988, No 172	Conversion of bank to an entity registered under the 1955 Companies Act		

Figure 3-10 Genealogy of New Zealand banks



RBSC: Royal Bank of Scotland
CBA: Commonwealth Bank of Australia

Figure 3-11 Genealogy of major Australian banks (ANZ, Commonwealth Bank)



i) TSM PBS: the Tasmanian Permanent Building Society

Figure 3-12 Genealogy of major Australian banks (NAB, Westpac)

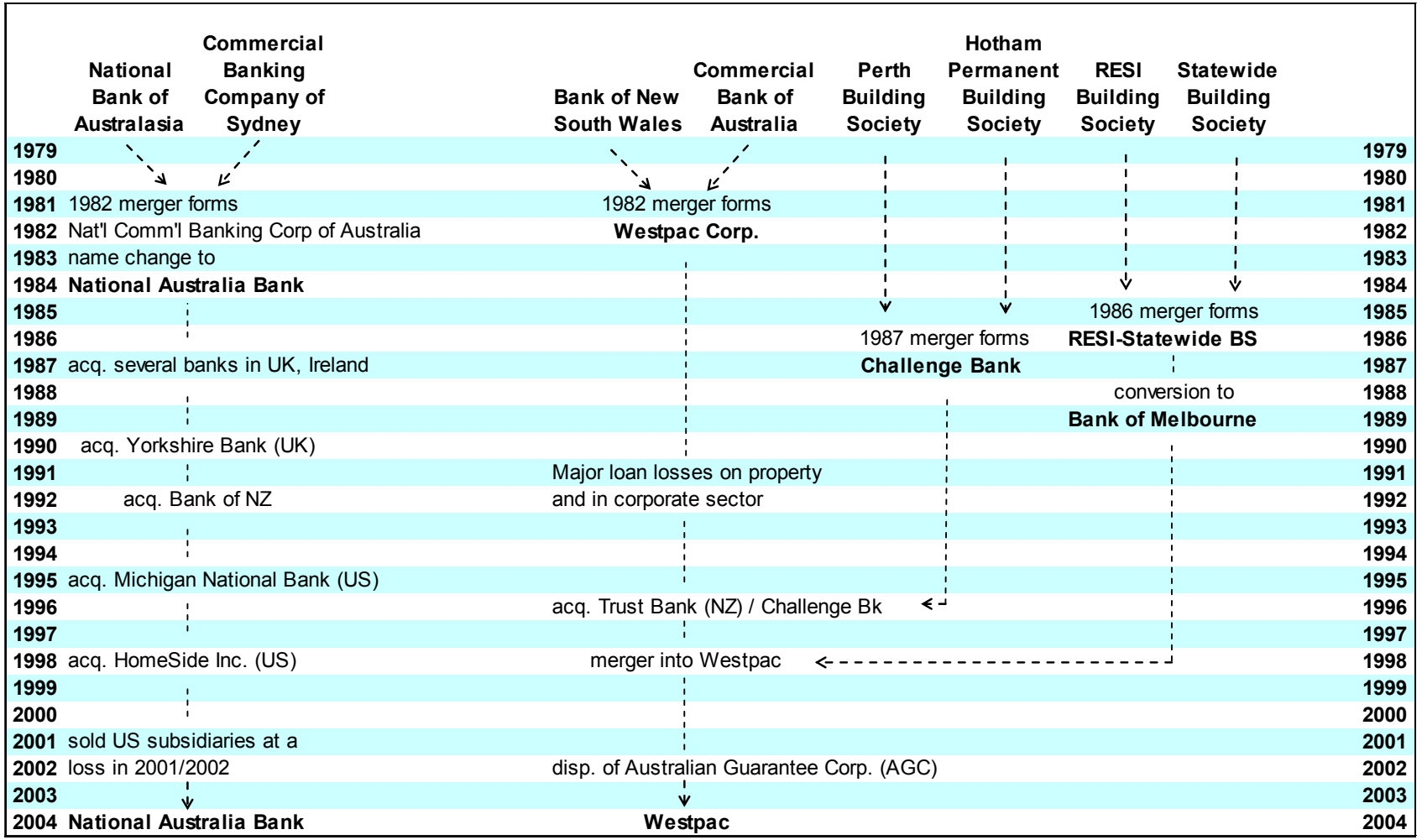
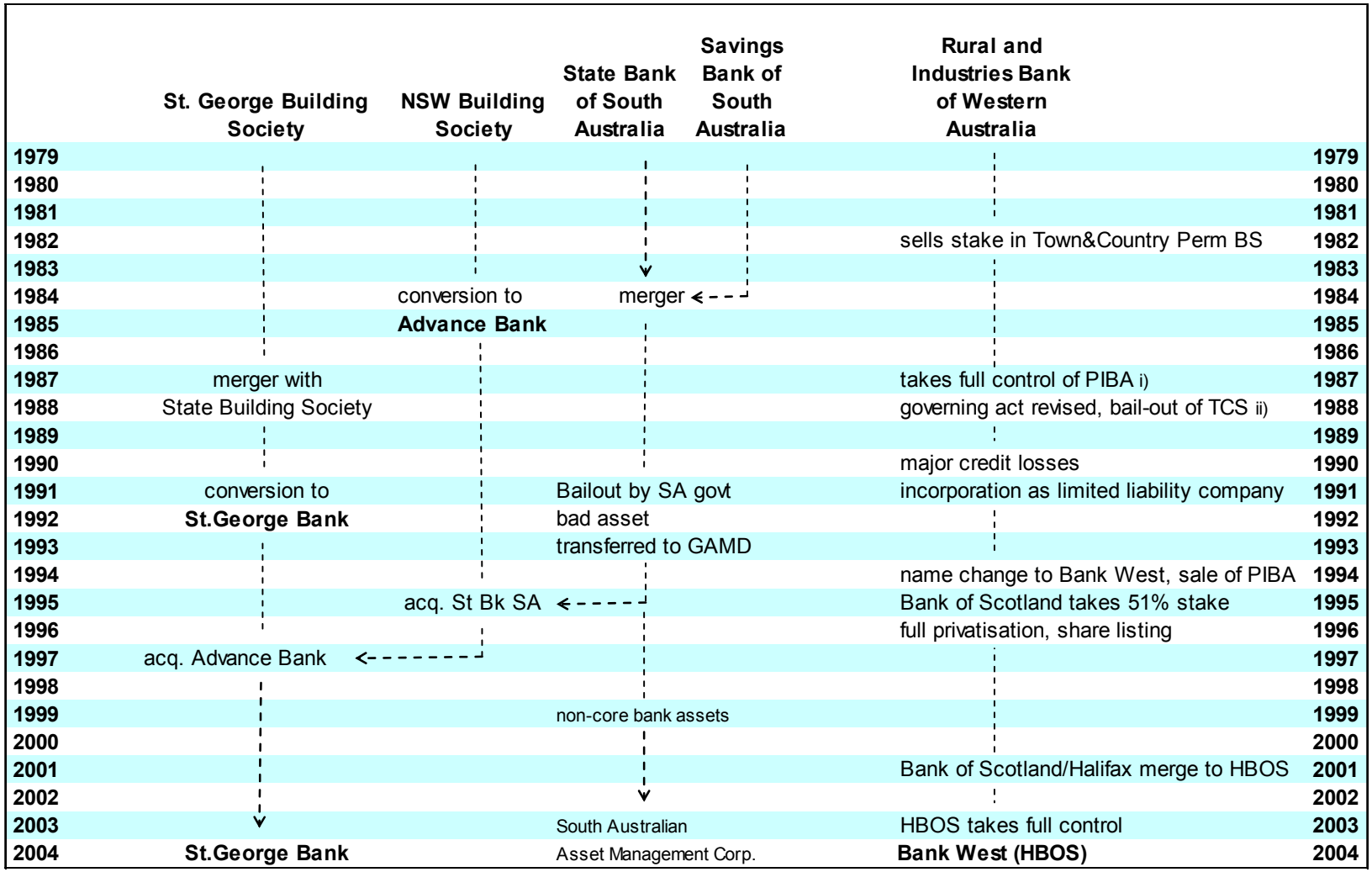
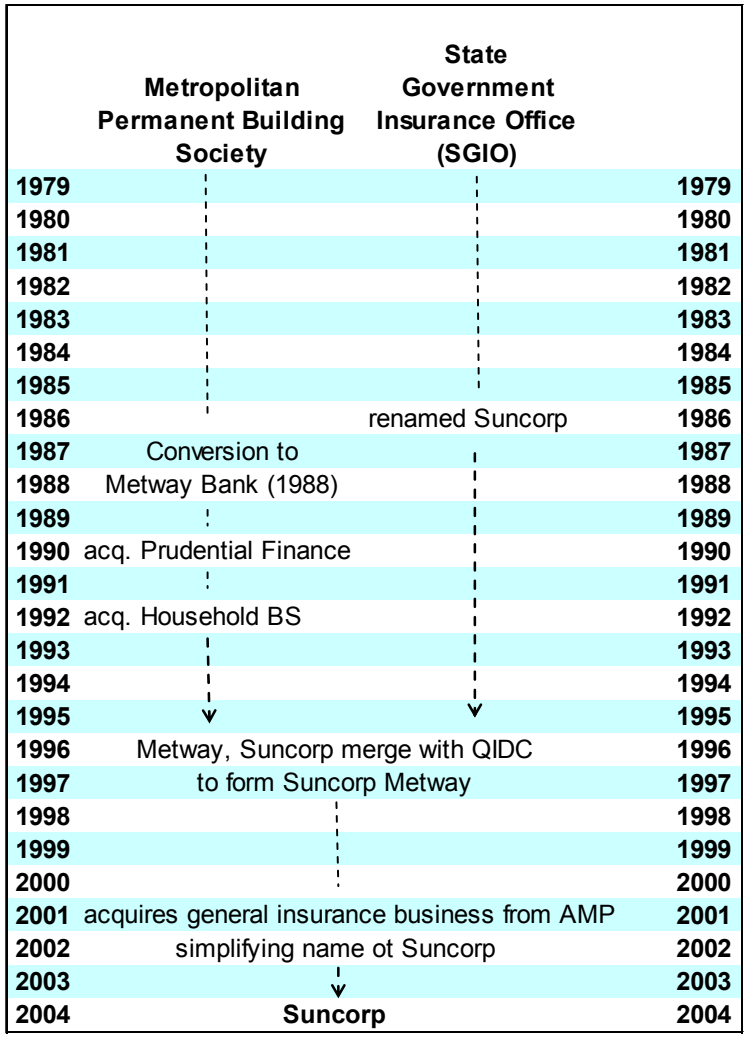


Figure 3-13 Genealogy of major Australian banks (St. George Bank, Bank West)



i) PIBA: Primary Industry Bank of Australia; ii) TCS: W.A. Teachers' Credit Society

Figure 3-14 Genealogy of major Australian banks (Suncorp Metway)



QIDC: Queensland Industry Development Corp
Household BS: Household Building Society

Table 3-6 Registered banks in Australia and New Zealand 1980 to 2005

Bank name	Registration from	Registration to	Comments, alternative names	Inclusion in sample due to: Systemic importance	Strong regional market position	Substantial retail / rural business	Exclusion from sample due to: Wholesale / merchant banking business	Size	Consolidated subsidiary of bank in sample	Data availability issues
Australia										
ABN AMRO Bank N.V.	1997	2005					O			O
ABN AMRO Finance (Aust.)	1999	1999					O			O
Adelaide Bank Limited	1994	2005	conversion from building society 1994			X				
Advance Bank Australia	1985	1998	formed through conversion from building society. Merged with St. George Bank in 1997		X	X				
AMP Bank Limited	1998	2005								O
ANZ Banking Group Limited		2005	ANZ Banking Group	X		X				
ANZ Grindlays Bank	1995	2000	acquired by Standard Chartered and subsequently trading as Standard Chartered Grindlays Bank				O		O	
ANZ Savings Bank		1992							O	
Arab Bank Australia Limited	1994	2005	owned by Arab Bank plc, incorporated in Amman, Jordan					O		
Australian Bank	1981	1992	acquired by SB Victoria in 1989, then part of Commonwealth Bank				O			O
Australian Resources Development Bank		1993	acquired by NAB in 1989				O		O	O
Asahi Bank	1995	2002					O			
Bank of Adelaide		1980	merged with ANZ Banking Group.						O	O
Bank of Adelaide Savings Bank		1980	merged with ANZ Banking Group.						O	O
Bank of America, National Association	1994	2005					O			O
Bank of America Australia	1986	1995					O			O
Bank of China	1985	2005					O			O
Bank of China (Australia) Limited	2002	2005					O			O
Bank of Cyprus Australia Pty Limited	2000	2005					O			O
Bank of Melbourne	1989	1998	transformed from BS in 1989, acquired by Westpac 1998		X	X				
Bank of New South Wales		1982	becomes part of Westpac		X	X				

Table 3-6 Registered banks in Australia and New Zealand 1980 to 2005 (2 of 9)

Bank name	Registration from	Registration to	Comments, alternative names	Inclusion in sample due to: Systemic importance	Strong regional market position	Substantial retail / rural business	Exclusion from sample due to: Wholesale / merchant banking business	Size	Consolidated subsidiary of bank in sample	Data availability issues
Bank of New South Wales Savings Bank		1982							O	
Bank of New Zealand		1996	acquired by NAB in 1993				O		O	O
Bank of New Zealand Savings Bank		1993							O	O
Bank of Queensland Limited		2005			X	X				
Bank of Queensland Savings Bank	1983	1994							O	O
Bank of Singapore (Australia)	1986	1996	becomes part of Oversea-Chinese Banking Corporation in 1996				O			O
Bank of South Australia	1994	1997			X	X				
Bank of Tokyo Australia	1985	1995	succeeded by the Bank of Tokyo-Mitsubishi				O			O
Bank of Western Australia Limited	1994	2005	BankWest, succeeds R&I Bank		X	X				
Bank One, National Association	1999	2003	until 1999 First National Bank of Chicago (merged into Bank One)				O			O
Bankers Trust Australia	1986	2000	acquired 1998 and then sold by Deutsche Bank in 1999. Later partially absorbed into Westpac (2002)				O			O
Banque Nationale de Paris		1998	succeeded by BNP Paribas				O			O
Barclays Bank Plc	1990	2005	Barclays Capital				O			O
Bendigo Bank Limited	1995	2005	conversion from building society 1995			X				
BNP Paribas	1998	2005	until 1998 Banque Nationale de Paris				O			O
Canberra Advance Bank	1990	1992	renamed from Civic Advance Bank						O	
CBC Savings Bank		1982	savings bank subsidiary of Commercial Banking Company of Sydney						O	
Challenge Bank	1987	1996	converted from BS in 1987, acquired by Westpac 1996		X	X				
Chase Manhattan Bank	1985	2001	name change to JPMorgan Chase Bank related to merger of J.P. Morgan and Manhattan Chase.				O			O
Chase Manhattan Bank Australia	1994	1995					O			O
Citibank N.A.	1995	2005					O			O
Citigroup Pty Limited	1985	2005					O			O
Citibank Savings	1985	1995					O			O

Table 3-6 Registered banks in Australia and New Zealand 1980 to 2005 (3 of 9)

Bank name	Registration from	Registration to	Comments, alternative names	Inclusion in sample due to: Systemic importance	Strong regional market position	Substantial retail / rural business	Exclusion from sample due to: Wholesale / merchant banking business	Size	Consolidated subsidiary of bank in sample	Data availability issues
Civic Advance Bank	1986	1990	converted from BS in 1986, renamed to Canberra Advance Bank in 1990.						O	O
Colonial State Bank	1996	2001	acquired by CBA in 2000.		X	X				O
Commercial Bank of Australia		1982	becomes part of Westpac	X		X				
Commercial Savings Bank of Australia		1982							O	
Commercial Banking Company of Sydney		1982	becomes part of NAB	X		X				
Commonwealth Bank of Australia		2005	until 1984 Commonwealth Trading Bank of Australia	X		X				
Commonwealth Savings Bank		1993							O	
Commonwealth Development Bank of Australia Limited		2005	Commonwealth Development Bank				O		O	
Co-operative Central Raiffeisen-Boernenleenbank	2003	2005	trading as Rabobank							O
Co-operative Central Raiffeisen-Boernenleenbank B.A.	1995	1996	trading as Rabobank							O
Credit Suisse	1994	2005	Credit Suisse First Boston between 1997-2004				O			O
Dai-Ichi Kangyo Bank	1995	2003	succeeded by Mizuho Corporate Bank				O			O
Deutsche Bank AG	1986	2005					O			O
Dresdner Bank AG	1998	2003					O			O
Elders Rural Bank Limited	2000	2005	Elders Rural Bank is a joint venture between Bendigo Bank Limited and Futuris Corporation Limited, the parent company of Elders Limited.			X				
First National Bank of Chicago	1994	1999					O			
HBOS Treasury Services plc	2005	2005					O			
HongkongBank of Australia	1986	1999	renamed HSBC Bank Australia Limited in 1999				O			
Hobart Savings Bank		1991	trading as The Savings Bank of Tasmania, predecessor of Trust Bank Tasmania.		X	X				

Table 3-6 Registered banks in Australia and New Zealand 1980 to 2005 (4 of 9)

Bank name	Registration from	Registration to	Comments, alternative names	Inclusion in sample due to: Systemic importance	Strong regional market position	Substantial retail / rural business	Exclusion from sample due to: Wholesale / merchant banking business	Size	Consolidated subsidiary of bank in sample	Data availability issues
HSBC Bank Australia Limited	1999	2005	until 1999 HongkongBank of Australia				O			O
HSBC Bank Plc	1996	2005	until 1999 Midland Bank PLC				O			O
IBJ Australia Bank	1985	2003	succeeded by Mizuho Corporate Bank				O			O
ING Bank (Australia) Limited	1994	2005	until 1999 ING Mercantile Mutual Bank							O
ING Bank NV	1997	2005					O			
Investec Bank (Australia) Limited	2003	2005					O			
International Commercial Bank of China	1995	2003					O			
JPMorgan Chase Bank, National Association	2001	2005	name change from Chase Manhattan Bank				O			
Laiki Bank (Australia) Limited	2001	2005			X	X				
Launceston Bank for Savings		1987	becomes Tasmania Bank in 1987.							
Lloyds Bank NZA	1985	1996					O			
Macquarie Bank Limited (1985)	1985	2005	before 1985 Macquarie Associates Limited				O			
Members Equity Bank Pty Limited	2001	2005					O			
Metway Bank	1988	1996	conversion from BS in 1988, merger with QIDC and Suncorp in 1996		X	X				
Midland Bank PLC	1995	1996	succeeded by HSBC Bank Plc				O			
Mitsubishi Bank of Australia	1986	1995	Merged with Bank of Tokyo 1995				O			
Mizuho Corporate Bank, Ltd	2002	2005	successor of Dai-Ichi Kangyo Australia Limited and IBJ Australia Bank Limited				O			
Morgan Guaranty Trust Company of New York	1993	2001	Part of JP Morgan. Merger of to merger of J.P. Morgan and Manhattan Chase in 2001.				O			
NatWest Markets Australia/NatWest Australia Bank	1986	1998	Royal Bank of Scotland acquired National Westminster Bank in 2000, In earlier years trading as NatWest Australia Bank.				O			
National Australia Bank Limited (NAB)	1982	2005	formed through merger of National Bank of Australasia and Commercial Banking Company of Sydney.	X		X				
National Australia Savings Bank	1982	1992							O	
National Bank of Australasia		1982	succeeded by NAB	X		X				

Table 3-6 Registered banks in Australia and New Zealand 1980 to 2005 (5 of 9)

Bank name	Registration from	Registration to	Comments, alternative names	Inclusion in sample due to: Systemic importance	Strong regional market position	Substantial retail / rural business	Exclusion from sample due to: Wholesale / merchant banking business	Size	Consolidated subsidiary of bank in sample	Data availability issues
National Bank Savings Bank		1982	succeeded by NAB Savings Bank						O	
National Mutual Royal Bank	1986	1990	acquired by ANZ in 1990					O		O
National Mutual Royal Savings Bank	1986	1987						O		O
NBD Bank	1994	1995	merged with First National Bank of Chicago				O			O
NM Rothschild & Sons (Australia) Limited	1998	2005					O			O
Oversea-Chinese Banking Corporation Limited	1995	2005	successor of Bank of Singapore (Australia)				O			O
Overseas Union Bank	1993	2002					O			O
Primary Industry Bank of Australia (PIBA)	1987	2003	since 1994 part of Rabo Bank. 1987 to 1994 part of R&I Bank (BankWest).			X				
QIDC (Queensland Industry Development Corporation)	1995	1998	merged with Metway Bank and Suncorp 1996				O		O	O
R&I Bank of Western Australia		1994	earlier trading under full name "The Rural and Industries Bank of Western Australia"		X	X				
Rabobank Australia Limited	1996	2005	until 1998 registered under Co-operative Central Raiffeisen-Boernenleenbank B.A. Purchased PIBA 1994.							O
Royal Bank of Canada	1996	2005					O			O
Rural Bank of New South Wales		1981	renamed to State Bank of NSW in 1981.		X	X				
Savings Bank of South Australia		1984	merged with State Bank SA						O	O
Societe Generale	2003	2005					O			O
St George Bank Limited	1993	2005		X		X				
St. George Partnership Banking	1994	1996	part of St. George Bank				O		O	O
Standard Chartered Bank	1986	2005					O			O
Standard Chartered Grindlays Bank	2000	2003	until 2000 ANZ Grindlays Bank				O			O
State Bank of India	2003	2005					O			O

Table 3-6 Registered banks in Australia and New Zealand 1980 to 2005 (6 of 9)

Bank name	Registration from	Registration to	Comments, alternative names	Inclusion in sample due to: Systemic importance	Strong regional market position	Substantial retail / rural business	Exclusion from sample due to: Wholesale / merchant banking business	Size	Consolidated subsidiary of bank in sample	Data availability issues
State Bank of NSW	1981	1995	predecessor renamed from Rural bank of NSW. Succeeded by Colonial State Bank		X	X				
State Bank of SA		1994	succeeded by Bank of South Australia (acquired by Advance Bank)		X	X				
State Bank of Victoria		1991	before 1981 operating as State Savings Bank of Victoria. Taken over by Commonwealth Bank		X	X				
State Street Bank and Trust Company	1994	2005					O			O
Suncorp-Metway Limited	1996	2005	Preceded by Metway Bank. Since 2003 trading as Suncorp.		X	X				
Taiwan Business Bank	2001	2005					O			O
Tasmania Bank	1987	1991	becomes part of Trust Bank Tasmania		X	X				
The Bank of Tokyo-Mitsubishi UFJ, Ltd	1995	2005	Bank of Tokyo - Mitsubishi (Australia)				O			O
The International Commercial Bank of China	2003	2005					O			O
The Royal Bank of Scotland Plc	2003	2005					O			O
The Toronto-Dominion Bank	1998	2005					O			O
Town & Country Bank	1992	1995	Regional WA bank converted from BS; acquired by ANZ in 1990					O	O	short
Trust Bank Tasmania	1991	1999	formed through merger of Hobart Savings Bank and Tasmania Bank in 1991		X	X				
UBS AG	2003	2005					O			O
United Overseas Bank Limited	1993	2005					O			O
WestLB AG	1995	2005	before 1997 Westdeutsche Landesbank Girozentrale				O			O
Westpac Banking Corporation	1982	2005	formed through merger of Bank of New South Wales and Commercial Bank of Australia.	X		X				
Westpac Savings Bank	1982	1993							O	

Table 3-6 Registered banks in Australia and New Zealand 1980 to 2005 (7 of 9)

Bank name	Registration from	Registration to	Comments, alternative names	Inclusion in sample due to: Systemic importance	Strong regional market position	Substantial retail / rural business	Exclusion from sample due to: Wholesale / merchant banking business	Size	Consolidated subsidiary of bank in sample	Data availability issues
New Zealand										
ABN AMRO Bank NV	1998	2005					O			O
AMP Bank Limited	1988	2004								O
ANZ Banking Group (New Zealand) Limited		2004		X		X				
ANZ National Bank Limited	2004	2005	successor of ANZ Banking Group after merger of ANZ and National Bank	X		X				
ASB Bank Limited	1989			X		X				
Westland Bank Limited	1990	1994	acquired by ASB in 1990						O	O
Bank of New Zealand		2005	acquired by NAB in 1993	X		X				
Bank of Tokyo-Mitsubishi (Australia) Limited	1996	2004					O			O
The Bank of Tokyo-Mitsubishi, Ltd.	2004	2005	successor of Bank of Tokyo-Mitsubishi (Australia) Limited				O			O
Indosuez New Zealand Limited	1987	1987					O			O
Banque Indosuez New Zealand Limited	1987	1991	successor of Indosuez New Zealand Limited				O			O
Banque Indosuez	1991	1997					O			O
Crédit Agricole Indosuez	1997	1998	successor of Banque Indosuez				O			O
Banque Nationale de Paris	1997	2000					O			O
BNP Paribas	2000	2001	successor of Banque Nationale de Paris				O			O
Barclays New Zealand Limited	1987						O			O
Barclays Bank New Zealand Limited	1987	1989	successor of Barclays New Zealand Limited				O			O
Barclays Bank PLC	1988	1998					O			O
BT New Zealand (Holdings) Limited	1988	1988					O			O
Bankers Trust New Zealand Limited	1988	1999					O			O
BNZ Finance Limited	1991	2001							O	
CIBC New Zealand Limited	1987	1989					O			O
Citibank N A	1987	2005					O			O

Table 3-6 Registered banks in Australia and New Zealand 1980 to 2005 (8 of 9)

Bank name	Registration from	Registration to	Comments, alternative names	Inclusion in sample due to: Systemic importance	Inclusion in sample due to: Strong regional market position	Inclusion in sample due to: Substantial retail / rural business	Exclusion from sample due to: Wholesale / merchant banking business	Exclusion from sample due to: Size	Exclusion from sample due to: Consolidated subsidiary of bank in sample	Exclusion from sample due to: Data availability issues
Commonwealth Bank of Australia	2000	2005					O			O
Deutsche Bank A G	1996						O			O
Countrywide Banking Corporation Limited	1987	1998	acquired by National Bank in 1998	X		X				
Elders Merchant Finance Limited	1989	1989					O			O
Elderbank Limited	1989	1990	successor of Elders Merchant Finance							O
The Hongkong and Shanghai Banking Corporation	1987	2005					O			O
Kiwibank Limited	2001	2005								short
Kookmin Bank	1997	2005						O		O
Macquarie Bank Limited	1987	1991					O			
National Mutual Corporation New Zealand Limited	1989	1989								O
National Mutual Bank New Zealand Limited	1989	1990	successor of National Mutual Corporation NZ							short
NZI Financial Corporation Limited	1987	1987					O			
NZI Bank Limited	1987	1992	successor of NZI Financial Corporation Limited				O			O
The National Bank of New Zealand Limited		2004		X		X				
Broadbank Corporation Limited	1987	1987	predecessor of National Australia Bank (NZ) Limited				O			O
National Australia Bank (NZ) Limited	1987	1993								short
Post Office Bank Limited	1989	1994	acquired by ANZ in 1989						O	O
Primary Industry Bank of Australia Limited	1989	1999	acquired by Rabobank in 1994						O	O
Rabobank Nederland	1996	2005								O
Rabo Wrightson Finance Limited	1999	1999								O
Rabobank New Zealand Limited	1999	2005	successor of Rabo Wrightson Finance Limited							O

Table 3-6 Registered banks in Australia and New Zealand 1980 to 2005 (9 of 9)

Bank name	Registration from	Registration to	Comments, alternative names	Inclusion in sample due to: Systemic importance	Strong regional market position	Substantial retail / rural business	Exclusion from sample due to: Wholesale / merchant banking business	Size	Consolidated subsidiary of bank in sample	Data availability issues
Rural Banking and Finance Corporation of New Zealand Limited	1990	1990				X				
The Rural Bank Limited	1990	1994	Successor of the Rural Banking and Finance Corporation of New Zealand Limited			X				
St George Bank New Zealand Limited	2003	2005	trading as Superbank							short
Taranaki Savings Bank Limited	1989	1989			X	X				
TSB Bank Limited	1989	2005	successor of Taranaki Savings Bank Limited		X	X				
Trust Bank New Zealand Limited (and its subsidiaries)	1989	1996	sold to Westpac in 1997		X	X				
Trust Bank Auckland Limited	1989	1995	part of Trust Bank New Zealand Group						O	O
Trust Bank Bay of Plenty Limited	1989	1995	part of Trust Bank New Zealand Group						O	O
Trust Bank Canterbury Limited	1989	1995	part of Trust Bank New Zealand Group						O	O
Trust Bank Central Limited	1989	1995	part of Trust Bank New Zealand Group						O	O
Trust Bank Otago Limited	1989	1995	part of Trust Bank New Zealand Group						O	O
Trust Bank South Canterbury Limited	1989	1995	part of Trust Bank New Zealand Group						O	O
Trust Bank Southland Limited	1989	1995	part of Trust Bank New Zealand Group						O	O
Trust Bank Waikato Limited	1989	1995	part of Trust Bank New Zealand Group						O	O
Trust Bank Wellington Limited	1989	1995	part of Trust Bank New Zealand Group						O	O
Security Pacific New Zealand Limited	1987	1988					O			
Security Pacific Bank New Zealand Limited	1988	1988	successor of Security Pacific New Zealand Limited				O			O
State Bank of South Australia	1988	1994	acquired United Bank in 1990						O	O
United Banking Group Limited	1990	1990	succeeded by United Bank Limited			X				O
United Bank Limited	1990	1994	merged into Countrywide Bank in 1992			X				O
Westpac Banking Corporation		2005		X		X				O

Table 3-7 Full list of bank annual reports used in this research project

Table 3 7: Full list of bank annual reports used in this research project (1 of 35)
AU AdelaideBk 2005 to AU AdvanceBk 1990

Institution	Year	Year End	Months reported	Name of Report	Reporting Entity	Comments	Data in sample (Yes/No)
AU AdelaideBk	2005	June	12	Annual Report 2005	Adelaide Bank Limited		Y
AU AdelaideBk	2004	June	12	Annual Report 2004	Adelaide Bank Limited		Y
AU AdelaideBk	2003	June	12	Annual Report 2003	Adelaide Bank Limited		Y
AU AdelaideBk	2002	June	12	Annual Report 2002	Adelaide Bank Limited		Y
AU AdelaideBk	2001	June	12	Annual Report 2001	Adelaide Bank Limited		Y
AU AdelaideBk	2000	June	12	Annual Report 2000	Adelaide Bank Limited		Y
AU AdelaideBk	1999	June	12	Annual Report 1999	Adelaide Bank Limited		Y
AU AdelaideBk	1998	June	12	Annual Report 1998	Adelaide Bank Limited		Y
AU AdelaideBk	1997	June	12	Annual Report 1997	Adelaide Bank Limited		Y
AU AdelaideBk	1996	June	12	Annual Report 1996	Adelaide Bank Limited		Y
AU AdelaideBk	1995	June	12	Annual Report 1995	Adelaide Bank Limited		Y
AU AdelaideBk	1994	June	12	Annual Report 1994	Adelaide Bank Limited	Incorporated on January 1, 1994	Y
AU AdelaideBk	1993	June	12	Annual Report 1993	The Cooperative Building Society of South Australia		Y
AU AdelaideBk	1992	June	12	Annual Report 1992	The Cooperative Building Society of South Australia		Y
AU AdelaideBk	1991	June	12	Annual Report 1991	The Cooperative Building Society of South Australia		N
AU AdelaideBk	1990	June	12	Annual Report 1990	The Cooperative Building Society of South Australia		N
AU AdelaideBk	1989	June	12	Annual Report 1989	The Cooperative Building Society of South Australia		N
AU AdvanceBk	1996	May	12	Annual Report 1996	Advance Bank Australia Limited	Acquired by St George Bank January 29, 1997.	Y
AU AdvanceBk	1995	May	12	Annual Report 1995	Advance Bank Australia Limited	Acquisition of Bank of South Australia Limited (former State Bank of South Australia) from SA Government July 1995.	Y
AU AdvanceBk	1994	May	12	Annual Report 1994	Advance Bank Australia Limited		Y
AU AdvanceBk	1993	May	12	Annual Report 1993	Advance Bank Australia Limited		Y
AU AdvanceBk	1992	May	12	Annual Report 1992	Advance Bank Australia Limited		Y
AU AdvanceBk	1991	May	12	Annual Report 1991	Advance Bank Australia Limited		Y
AU AdvanceBk	1990	May	12	Annual Report 1990	Advance Bank Australia Limited		Y

Table 3 7: Full list of bank annual reports used in this research project (2 of 35)
AU AdvanceBk 1989 to AU ANZ 1994

Institution	Year	Year End	Months reported	Name of Report	Reporting Entity	Comments	Data in sample (Yes/No)
AU AdvanceBk	1989	May	12	Annual Report 1989	Advance Bank Australia Limited		Y
AU AdvanceBk	1988	May	12	Annual Report 1988	Advance Bank Australia Limited		Y
AU AdvanceBk	1987	May	12	Annual Report 1987	Advance Bank Australia Limited		Y
AU AdvanceBk	1986	May	12	Annual Report 1986	Advance Bank Australia Limited	Conversion from Building Society (NSW Building Society) into Savings Bank effective 1 June 1995. Previous name: NSW Building Society.	Y
AU ANZ	2005	September	12	2005 Annual Report / Financial Report 2005	Australia and New Zealand Banking Group Limited		Y
AU ANZ	2004	September	12	2004 Annual Report / Financial Report 2004	Australia and New Zealand Banking Group Limited	Acquisition of NZ NBNZ effective 1 December 2003. Financial statements as separate publication	Y
AU ANZ	2003	September	12	2003 Annual Report / Financial Report 2003	Australia and New Zealand Banking Group Limited	Financial statements as separate publication	Y
AU ANZ	2002	September	12	2002 Annual Report / Financial Report 2002	Australia and New Zealand Banking Group Limited	Financial statements as separate publication	Y
AU ANZ	2001	September	12	2001 Annual Report / Financial Report 2001	Australia and New Zealand Banking Group Limited	Financial statements as separate publication	Y
AU ANZ	2000	September	12	2000 Annual Report / Financial Report 2000	Australia and New Zealand Banking Group Limited	Financial statements as separate publication	Y
AU ANZ	1999	September	12	1999 Annual Report / 1999 Financial Statements	Australia and New Zealand Banking Group Limited	Financial statements as separate publication	Y
AU ANZ	1998	September	12	1998 Annual Report	Australia and New Zealand Banking Group Limited		Y
AU ANZ	1997	September	12	1997 Annual Report	Australia and New Zealand Banking Group Limited		Y
AU ANZ	1996	September	12	1996 Annual Report	Australia and New Zealand Banking Group Limited		Y
AU ANZ	1995	September	12	1995 Annual Report	Australia and New Zealand Banking Group Limited		Y
AU ANZ	1994	September	12	Report to Shareholders 1994	Australia and New Zealand Banking Group Limited		Y

Table 3 7: Full list of bank annual reports used in this research project (3 of 35)
AU ANZ 1993 to AU ANZ 1978

Institution	Year	Year End	Months reported	Name of Report	Reporting Entity	Comments	Data in sample (Yes/No)
AU ANZ	1993	September	12	Report to Shareholders 1993	Australia and New Zealand Banking Group Limited		Y
AU ANZ	1992	September	12	Report to Shareholders 1992	Australia and New Zealand Banking Group Limited		Y
AU ANZ	1991	September	12	Report to Shareholders 1991	Australia and New Zealand Banking Group Limited		Y
AU ANZ	1990	September	12	Report to Shareholders 1990 /Financial Statements 1990	Australia and New Zealand Banking Group Limited	Financial statements in separate booklet	Y
AU ANZ	1989	September	12	Annual Report 1989 /Financial Statements 1989	Australia and New Zealand Banking Group Limited	Financial statements in separate booklet	Y
AU ANZ	1988	September	12	1988 Annual Report	Australia and New Zealand Banking Group Limited		Y
AU ANZ	1987	September	12	1987 Audited Accounts	Australia and New Zealand Banking Group Limited		Y
AU ANZ	1986	September	12	1986 Annual Report	Australia and New Zealand Banking Group Limited		Y
AU ANZ	1985	September	12	1985 Annual Report	Australia and New Zealand Banking Group Limited		Y
AU ANZ	1984	September	12	1984 Annual Report	Australia and New Zealand Banking Group Limited		Y
AU ANZ	1983	September	12	1983 Annual Report	Australia and New Zealand Banking Group Limited	only p. 15-40	Y
AU ANZ	1982	September	12	1982 Annual Report	Australia and New Zealand Banking Group Limited		Y
AU ANZ	1981	September	12	1981 Annual Report	Australia and New Zealand Banking Group Limited		Y
AU ANZ	1980	September	12	1980 Annual Report	Australia and New Zealand Banking Group Limited		Y
AU ANZ	1979	September	12	1979 Report and Accounts	Australia and New Zealand Banking Group Limited		Y
AU ANZ	1978	September	12	1978 Report and Accounts	Australia and New Zealand Banking Group Limited		N

Table 3 7: Full list of bank annual reports used in this research project (4 of 35)
AU ANZ 1977 to AU BankWest 1999

Institution	Year	Year End	Months reported	Name of Report	Reporting Entity	Comments	Data in sample (Yes/No)
AU ANZ	1977	September	12	1977 Annual Report and Notice of Annual General Meeting	Australia and New Zealand Banking Group Limited		N
AU ANZ	1976	September	12	1976 Annual Report and Notice of Annual General Meeting	Australia and New Zealand Banking Group Limited		N
AU ANZ	1975	September	12	1975 Report and Accounts	Australia and New Zealand Banking Group Limited		N
AU ArabBk	2005	December	12	Annual Report	Arab Bank Australia Limited		N
AU ArabBk	2004	December	12	Annual Report	Arab Bank Australia Limited		N
AU ArabBk	2003	December	12	Annual Report	Arab Bank Australia Limited		N
AU ArabBk	2002	December	12	Annual Report	Arab Bank Australia Limited		N
AU ArabBk	2001	December	12	Annual Report	Arab Bank Australia Limited		N
AU ArabBk	2000	December	12	Annual Report	Arab Bank Australia Limited		N
AU ArabBk	1999	December	12	Annual Report	Arab Bank Australia Limited		N
AU ArabBk	1998	December	12	Annual Report	Arab Bank Australia Limited		N
AU ArabBk	1997	December	12	Annual Report	Arab Bank Australia Limited		N
AU ArabBk	1996	December	12	Annual Report	Arab Bank Australia Limited		N
AU ArabBk	1995	December	12	Annual Report	Arab Bank Australia Limited		N
AU ArabBk	1994	December	12	Annual Report	Arab Bank Australia Limited	Banking licence granted	
AU BankWest	2005	December	12	HBOS Annual Report 2005	HBOS Plc.	Data derived from sector reporting on Australian operations.	Y
AU BankWest	2004	December	12	HBOS Annual Report 2004	HBOS Plc.	Data derived from sector reporting on Australian operations.	Y
AU BankWest	2003	December	12	HBOS Annual Report 2003	HBOS Plc.	Data derived from sector reporting on Australian operations.	Y
AU BankWest	2003	n/a	n/a	HBOS Proposal – Scheme Booklet	Bank of Western Australia Limited	HBOS buys out minority shareholders. Scheme becomes effective 26 August 2003.	N
AU BankWest	2002	December	12	Annual Report 2002	Bank of Western Australia Limited		Y
AU BankWest	2001	December	10	Annual Report 2001	Bank of Western Australia Limited		Y
AU BankWest	2001	February	12	Annual Report 2001	Bank of Western Australia Limited		Y
AU BankWest	2000	February	12	Annual Report 2000	Bank of Western Australia Limited		Y
AU BankWest	1999	February	12	Annual Report 1999	Bank of Western Australia Limited		Y

Table 3 7: Full list of bank annual reports used in this research project (5 of 35)
AU BankWest 1998 to AU BendigoBk 2004

Institution	Year	Year End	Months reported	Name of Report	Reporting Entity	Comments	Data in sample (Yes/No)
AU BankWest	1998	February	12	Annual Report 1998	Bank of Western Australia Limited		Y
AU BankWest	1997	February	12	Annual Report 1997	Bank of Western Australia Limited		Y
AU BankWest	1996	February	5	Interim Five-Month Report, to 29 February 1996	Bank of Western Australia Limited		Y
AU BankWest	1996	n/a	n/a	Prospectus - BankWest Public Share Offer	Bank of Western Australia Limited	Bank of Scotland offers 49% of shares to public.	Y
AU BankWest	1995	September	12	Annual Report 1995	Bank of Western Australia Limited	Privatisation on December 1, 1995	Y
AU BankWest	1994	September	12	Annual Report 1994	Bank of Western Australia Limited	Name change 26 April 1994	Y
AU BankWest	1993	September	12	Annual Report 1993	R&I Bank of Western Australia Limited		Y
AU BankWest	1992	September	12	Annual Report 1992	R&I Bank of Western Australia Limited		Y
AU BankWest	1991	September	9	Report for the nine months ended 30 September 1991	R&I Bank of Western Australia Limited	Incorporated as limited liability company on 1 January 1991.	Y
AU BankWest	1990	December	9	Report for the nine months ended 31 December 1990	The Rural & Industries Bank of Western Australia	Not published but data disclosed in subsequent 9 month report	Y
AU BankWest	1990	March	12	44th Annual Report 1990	The Rural & Industries Bank of Western Australia		Y
AU BankWest	1989	March	12	43rd Annual Report 1989	The Rural & Industries Bank of Western Australia		Y
AU BankWest	1988	March	12	42nd Annual Report 1988	The Rural & Industries Bank of Western Australia		Y
AU BankWest	1987	March	12	41st Annual Report 1987	The Rural & Industries Bank of Western Australia		Y
AU BankWest	1986	March	12	40th Annual Report 1986	The Rural & Industries Bank of Western Australia		Y
AU BankWest	1985	March	12	39th Annual Report 1985	The Rural & Industries Bank of Western Australia		Y
AU BankWest	1984	March	12	38th Annual Report 1984	The Rural & Industries Bank of Western Australia		Y
AU BankWest	1983	March	12	37th Annual Report 1983	The Rural & Industries Bank of Western Australia		Y
AU BendigoBk	2005	June	12	Full Financial Report 2005	Bendigo Bank Limited	Concise and full Financial Report	Y
AU BendigoBk	2004	June	12	Full Financial Report 2004	Bendigo Bank Limited	Concise and full Financial Report	Y

Table 3 7: Full list of bank annual reports used in this research project (6 of 35)
AU BendigoBk 2003 to AU BoQ 2003

Institution	Year	Year End	Months reported	Name of Report	Reporting Entity	Comments	Data in sample (Yes/No)
AU BendigoBk	2003	June	12	Full Financial Report 2003	Bendigo Bank Limited	Concise and full Financial Report	Y
AU BendigoBk	2002	June	12	Full Financial Report 2002	Bendigo Bank Limited	Concise and full Financial Report	Y
AU BendigoBk	2001	June	12	Full Financial Report 2001	Bendigo Bank Limited	Concise and full Financial Report	Y
AU BendigoBk	2000	June	12	Full Financial Report 2000	Bendigo Bank Limited	Concise and full Financial Report	Y
AU BendigoBk	1999	June	12	Annual Report 1999	Bendigo Bank Limited		Y
AU BendigoBk	1998	June	12	Annual Report 1998	Bendigo Bank Limited		Y
AU BendigoBk	1997	June	12	Annual Report 1997	Bendigo Bank Limited		Y
AU BendigoBk	1996	June	12	Annual Report 1996	Bendigo Bank Limited		Y
AU BendigoBk	1995	June	12	Annual Report 1995	Bendigo Bank Limited	Granted bank status July 1, 1995	Y
AU BendigoBk	1994	June	12	Annual Report 1994	Bendigo Building Society		Y
AU BendigoBk	1993	June	12	Annual Report 1993	Bendigo Building Society		Y
AU BendigoBk	1992	June	12	Annual Report 1992	Bendigo Building Society		Y
AU BkMelbourne	1996	June	12	Annual Report 1996	Bank of Melbourne Limited	Absorbed into Westpac effective 3 May 1998	Y
AU BkMelbourne	1995	June	12	Annual Report 1995	Bank of Melbourne Limited		Y
AU BkMelbourne	1994	June	12	Annual Report 1994	Bank of Melbourne Limited		Y
AU BkMelbourne	1993	June	12	Annual Report 1993	Bank of Melbourne Limited		Y
AU BkMelbourne	1992	June	12	Annual Report 1992	Bank of Melbourne Limited		Y
AU BkMelbourne	1991	June	12	Annual Report 1991	Bank of Melbourne Limited		Y
AU BkMelbourne	1990	June	12	Annual Report 1990	Bank of Melbourne Limited	Converted from RESI-Statewide Building Society to Bank of Melbourne on July 1, 1989.	Y
AU BkMelbourne	1989	June	12	Annual Report 1989	RESI Statewide Building Society	Last year of reporting as a Building Society	Y
AU BkMelbourne	1988	June	12	Annual Report 1988	RESI Statewide Building Society	Data reconstructed from 1989 data	Y
AU BkMelbourne	1987	June	12	Annual Report 1987	RESI Statewide Building Society		Y
AU BkMelbourne	1986	June	12	Annual Report 1986	RESI Statewide Building Society	RESI & Statewide building societies merge to form RESI-Statewide Building Society	Y
AU BoQ	2005	August	12	Annual Report / Financial Report	Bank of Queensland Limited		Y
AU BoQ	2004	August	12	Annual Report / Financial Report	Bank of Queensland Limited		Y
AU BoQ	2003	August	12	Annual Report / Financial Report	Bank of Queensland Limited		Y

Table 3 7: Full list of bank annual reports used in this research project (7 of 35)
AU BoQ 2002 to AU CBC Sydney 1980

Institution	Year	Year End	Months reported	Name of Report	Reporting Entity	Comments	Data in sample (Yes/No)
AU BoQ	2002	August	12	Annual Report / Financial Report	Bank of Queensland Limited		Y
AU BoQ	2001	August	12	Annual Report / Financial Report	Bank of Queensland Limited		Y
AU BoQ	2000	August	12	Annual Report / Financial Report	Bank of Queensland Limited		Y
AU BoQ	1999	August	12	Annual Report / Financial Report	Bank of Queensland Limited		Y
AU BoQ	1998	August	12	Annual Report / Financial Report	Bank of Queensland Limited		Y
AU BoQ	1997	August	12	Annual Report 1997	Bank of Queensland Limited		Y
AU BoQ	1996	August	12	Annual Report 1996	Bank of Queensland Limited		Y
AU BoQ	1995	August	12	Annual Report 1995	Bank of Queensland Limited		Y
AU BoQ	1994	August	12	Annual Report 1994	Bank of Queensland Limited		Y
AU BoQ	1993	August	12	Annual Report 1993	Bank of Queensland Limited		Y
AU BoQ	1992	August	12	Annual Report 1992	Bank of Queensland Limited		Y
AU BoQ	1991	August	12	Annual Report 1991	Bank of Queensland Limited		Y
AU BoQ	1990	August	12	Annual Report 1990	Bank of Queensland Limited		Y
AU BoQ	1989	August	12	Annual Report 1989	Bank of Queensland Limited		Y
AU BoQ	1988	August	12	Annual Report 1988	Bank of Queensland Limited		Y
AU BoQ	1987	August	12	Annual Report 1987	Bank of Queensland Limited		Y
AU BoQ	1986	August	12	Annual Report 1986	Bank of Queensland Limited		Y
AU BoQ	1985	August	12	Annual Report 1985	Bank of Queensland Limited		Y
AU BoQ	1984	August	12	Annual Report 1984	Bank of Queensland Limited		Y
AU BoQ	1983	August	12	Annual Report 1983	Bank of Queensland Limited		Y
AU BoQ	1982	August	12	Annual Report 1982	Bank of Queensland Limited		Y
AU BoQ	1981	August	12	Annual Report 1981	Bank of Queensland Limited		Y
AU BoQ	1980	August	12	Annual Report 1980	Bank of Queensland Limited		Y
AU CBC Sydney	1981	June	12	Annual Report 1981	The Commercial Banking Company of Sydney Ltd	Merged with National Bank of Australasia to form National Commercial Banking Corporation of Australia, later renamed National Australia Bank effective 1 October 1981.	Y
AU CBC Sydney	1980	June	12	Annual Report 1980	The Commercial Banking Company of Sydney Ltd		Y

Table 3 7: Full list of bank annual reports used in this research project (8 of 35)
AU CBC Sydney 1979 to AU Colonial 1996

Institution	Year	Year End	Months reported	Name of Report	Reporting Entity	Comments	Data in sample (Yes/No)
AU CBC Sydney	1979	June	12	Annual Report 1979	The Commercial Banking Company of Sydney Ltd	No reporting of provisions on a consolidated basis, but for non-banking subsidiaries only.	Y
AU ChallengeBk	1995	September	12	Annual Financial Statements 1995	Challenge Bank Limited	Acquired by Westpac effective 1 January 1996	Y
AU ChallengeBk	1994	September	12	Annual Report 1994	Challenge Bank Limited		Y
AU ChallengeBk	1993	September	12	Annual Report 1993	Challenge Bank Limited		Y
AU ChallengeBk	1992	September	12	Annual Report 1992	Challenge Bank Limited		Y
AU ChallengeBk	1991	September	12	Annual Report 1991	Challenge Bank Limited		Y
AU ChallengeBk	1990	September	12	Annual Report 1990	Challenge Bank Limited		Y
AU ChallengeBk	1989	September	12	Annual Report 1989	Challenge Bank Limited		Y
AU ChallengeBk	1988	September	12	Annual Report 1988	Challenge Bank Limited		Y
AU ChallengeBk	1987	September	5	Annual Report 1987	Challenge Bank Limited	Formed out of conversion of Perth Building Society and Hotham Permanent Building Society 16 April 1987. Reporting covers 16 April to 30 September only.	Y
AU Colonial	1999	December	12	Annual Report 1999	Colonial Limited	Acquires Trust Bank Tasmania (December 1999). Merges with Commonwealth Bank, 13 June 2000	Y
AU Colonial	1998	December	12	Annual Report 1998	Colonial Limited	Includes segment reporting on Colonial State Bank.	Y
AU Colonial	1997	December	12	Annual Report 1997	Colonial Limited	Includes segment reporting on Colonial State Bank.	Y
AU Colonial	1996	December	12	Annual Report 1996	Colonial Limited	Incorporation of Colonial on 15 July 1996. This report covers just the period of 15 July to 31 December 1996. There are however pro-forma results for the whole of 1996 available on p. 40 of the 1997 report.	Y

Table 3 7: Full list of bank annual reports used in this research project (9 of 35)
AU Colonial 1995 to AU CoWthBk 1994

Institution	Year	Year End	Months reported	Name of Report	Reporting Entity	Comments	Data in sample (Yes/No)
AU Colonial	1995	December	12	Annual Report 1995	The Colonial Mutual Life Assurance Society Limited	Includes full year results of Colonial State Bank (formerly State Bank of NSW) acquired from NSW government 31 December 1994. Stand-alone results for Colonial State Bank also published in separate report.	N
AU Colonial	1994	December	12	Annual Report 1994	The Colonial Mutual Life Assurance Society Limited	No relevant banking activities	N
AU Colonial	1993	December	12	Annual Report 1993	The Colonial Mutual Life Assurance Society Limited	No relevant banking activities	N
AU CommBk	1981	June	12	Annual Report 1981	The Commercial Bank of Australia Limited	Merged with Bank of New South Wales to form Westpac	Y
AU CommBk	1980	June	12	Annual Report 1980	The Commercial Bank of Australia Limited		Y
AU CommBk	1979	June	12	Annual Report 1979	The Commercial Bank of Australia Limited		Y
AU CoWthBk	2005	June	12	Annual Report 2005	Commonwealth Bank of Australia		Y
AU CoWthBk	2004	June	12	Annual Report 2004	Commonwealth Bank of Australia		Y
AU CoWthBk	2003	June	12	Annual Report 2003	Commonwealth Bank of Australia		Y
AU CoWthBk	2002	June	12	Annual Report 2002	Commonwealth Bank of Australia		Y
AU CoWthBk	2001	June	12	Annual Report 2001	Commonwealth Bank of Australia		Y
AU CoWthBk	2000	June	12	Annual Report 2000	Commonwealth Bank of Australia		Y
AU CoWthBk	1999	June	12	Annual Report 1999	Commonwealth Bank of Australia		Y
AU CoWthBk	1998	June	12	Annual Report 1998	Commonwealth Bank of Australia		Y
AU CoWthBk	1997	June	12	Annual Report 1997	Commonwealth Bank of Australia	Government sells remaining 50.39% shareholding in July 1996.	Y
AU CoWthBk	1996	n/a	n/a	Share Buy Back Explanatory Memorandum and Independent Expert's Report	Commonwealth Bank of Australia		N
AU CoWthBk	1996	June	12	Annual Report 1996	Commonwealth Bank of Australia		Y
AU CoWthBk	1995	June	12	Annual Report 1995	Commonwealth Bank of Australia		Y
AU CoWthBk	1994	June	12	Annual Report 1994	Commonwealth Bank of Australia		Y

Table 3 7: Full list of bank annual reports used in this research project (10 of 35)
AU CoWthBk 1993 to AU Macquarie 2005

Institution	Year	Year End	Months reported	Name of Report	Reporting Entity	Comments	Data in sample (Yes/No)
AU CoWthBk	1993	June	12	Annual Report 1993	Commonwealth Bank of Australia		Y
AU CoWthBk	1992	June	12	Annual Report 1992	Commonwealth Bank of Australia	Listing on stock exchange 12 September 1991.	Y
AU CoWthBk	1991	June	12	Annual Report 1991	Commonwealth Bank of Australia	Takeover of State Bank of Victoria (31 December 1990)	Y
AU CoWthBk	1991	n/a	n/a	Prospectus -Commonwealth Bank Public Share Offer	Commonwealth Bank of Australia		Y
AU CoWthBk	1990	June	12	Annual Report 1990	Commonwealth Bank of Australia		Y
AU CoWthBk	1989	June	12	Annual Report 1989	Commonwealth Bank of Australia		Y
AU CoWthBk	1988	June	12	Annual Report 1988	Commonwealth Bank of Australia	Name change with 87/88 amendment of Commonwealth Bank Act	Y
AU CoWthBk	1987	June	12	Annual Report 1987	Commonwealth Banking Corporation		Y
AU CoWthBk	1986	June	12	Annual Report 1986	Commonwealth Banking Corporation		Y
AU CoWthBk	1985	June	12	Annual Report 1985	Commonwealth Banking Corporation		Y
AU CoWthBk	1984	June	12	Annual Report 1984	Commonwealth Banking Corporation		Y
AU CoWthBk	1983	June	12	Annual Report 1983	Commonwealth Banking Corporation		Y
AU CoWthBk	1982	June	12	Annual Report 1982	Commonwealth Banking Corporation		Y
AU CoWthBk	1981	June	12	Annual Report 1981	Commonwealth Banking Corporation		Y
AU CoWthBk	1980	June	12	Annual Report 1980	Commonwealth Banking Corporation		Y
AU CoWthBk	1979	June	12	Annual Report 1979	Commonwealth Banking Corporation		N
AU EldersRural	2005	June	12	Annual Report	Elders Rural Bank Limited		Y
AU EldersRural	2004	June	12	Annual Report	Elders Rural Bank Limited		Y
AU EldersRural	2003	June	12	Annual Report	Elders Rural Bank Limited		Y
AU EldersRural	2002	June	12	Annual Report	Elders Rural Bank Limited		Y
AU EldersRural	2001	June	12	Annual Report	Elders Rural Bank Limited		Y
AU EldersRural	2000	June	12	Annual Report	Elders Rural Bank Limited	Incorporated January 1999. Banking licence per 26 June 2000. Elders Rural Bank is a JV between Bendigo Bank Limited and Futuris Corp., the parent company of Elders Limited.	Y
AU Macquarie	2005	March	12	Annual Review 2005 / 2005 Financial Report	Macquarie Bank Limited	Financial report published separately	Y

Table 3 7: Full list of bank annual reports used in this research project (11 of 35)
AU Macquarie 2004 to AU NAB 2005

Institution	Year	Year End	Months reported	Name of Report	Reporting Entity	Comments	Data in sample (Yes/No)
AU Macquarie	2004	March	12	Annual Review 2004 / 2004 Financial Report	Macquarie Bank Limited	Financial report published separately	Y
AU Macquarie	2003	March	12	Annual Review 2003 / 2003 Financial Report	Macquarie Bank Limited	Financial report published separately	Y
AU Macquarie	2002	March	12	Annual Review 2002 / 2002 Financial Report	Macquarie Bank Limited	Financial report published separately	Y
AU Macquarie	2001	March	12	Annual Review 2001 / 2001 Financial Report	Macquarie Bank Limited	Financial report published separately	Y
AU Macquarie	2000	March	12	Annual Review 2000 / 2000 Financial Report	Macquarie Bank Limited	Financial report published separately	Y
AU Macquarie	1999	March	12	Annual Review 1999 / 1999 Financial Report	Macquarie Bank Limited	Financial report published separately	Y
AU Macquarie	1998	March	12	Annual Review 1998 / 1998 Financial Report	Macquarie Bank Limited	Financial report published separately	Y
AU Macquarie	1997	March	12	Annual Review 1997 / 1997 Financial Report	Macquarie Bank Limited	Financial report published separately	Y
AU Macquarie	1996	March	12	Annual Review 1996 / 1996 Financial Report	Macquarie Bank Limited	Financial report published separately	Y
AU Macquarie	1995	March	12	Annual Report 1995	Macquarie Bank Limited		Y
AU Macquarie	1994	March	12	Annual Report 1994	Macquarie Bank Limited		Y
AU Macquarie	1993	March	12	Annual Report 1993	Macquarie Bank Limited		Y
AU Macquarie	1992	March	12	Annual Report 1992	Macquarie Bank Limited		Y
AU Macquarie	1991	March	12	Annual Report 1991	Macquarie Bank Limited		Y
AU Macquarie	1990	March	12	Annual Report 1990	Macquarie Bank Limited		Y
AU Macquarie	1989	March	12	Annual Report 1989	Macquarie Bank Limited		Y
AU Macquarie	1988	March	12	Annual Report 1988	Macquarie Bank Limited		Y
AU Macquarie	1987	March	12	Annual Report 1987	Macquarie Bank Limited		Y
AU Macquarie	1986	March	12	Annual Report 1986	Macquarie Bank Limited		Y
AU Macquarie	1985	March	12	Annual Report 1985	Macquarie Bank Limited		Y
AU NAB	2005	September	12	Full Year Results / Concise Annual Report	National Australia Bank Limited	Separate publications of full financial report and concise version of annual report	Y

Table 3 7: Full list of bank annual reports used in this research project (12 of 35)
AU NAB 2004 to AU NAB 1985

Institution	Year	Year End	Months reported	Name of Report	Reporting Entity	Comments	Data in sample (Yes/No)
AU NAB	2004	September	12	Full Year Results / Concise Annual Report	National Australia Bank Limited	Separate publications of full financial report and concise version of annual report	Y
AU NAB	2003	September	12	Annual Financial Report / Concise Annual Report	National Australia Bank Limited	Separate publications of full financial report and concise version of annual report	Y
AU NAB	2002	September	12	Annual Financial Report / Concise Annual Report	National Australia Bank Limited	Separate publications of full financial report and concise version of annual report	Y
AU NAB	2001	September	12	Annual Financial Report / Annual Review	National Australia Bank Limited	Separate publications of full financial report and annual review	Y
AU NAB	2000	September	12	Annual Financial Report / Annual Review	National Australia Bank Limited	Separate publications of full financial report and annual review, Annual review missing	Y
AU NAB	1999	September	12	Annual Report 1999	National Australia Bank Limited		Y
AU NAB	1999	September	12	Annual Report 1999	National Australia Bank Limited		Y
AU NAB	1998	September	12	Annual Report 1998	National Australia Bank Limited	NAB acquires HomeSide Inc. (US)	Y
AU NAB	1997	September	12	Annual Report 1997	National Australia Bank Limited		Y
AU NAB	1996	September	12	Annual Report 1996	National Australia Bank Limited	NAB acquires Michigan National Bank (US) in November 1995.	Y
AU NAB	1995	September	12	Annual Report 1995	National Australia Bank Limited		Y
AU NAB	1994	September	12	Annual Report 1994	National Australia Bank Limited		Y
AU NAB	1993	September	12	Annual Report 1993	National Australia Bank Limited		Y
AU NAB	1992	September	12	Annual Report 1992	National Australia Bank Limited		Y
AU NAB	1991	September	12	Annual Report 1991	National Australia Bank Limited		Y
AU NAB	1990	September	12	Annual Report 1990	National Australia Bank Limited	NAB acquires Yorkshire Bank (UK)	Y
AU NAB	1989	September	12	Annual Report 1989	National Australia Bank Limited		Y
AU NAB	1988	September	12	Annual Report 1988	National Australia Bank Limited	NAB acquires several banks in UK, Ireland (October 1987)	Y
AU NAB	1987	September	12	Annual Report 1987	National Australia Bank Limited		Y
AU NAB	1986	September	12	Annual Report 1986	National Australia Bank Limited		Y
AU NAB	1985	September	12	Annual Report 1985	National Australia Bank Limited		Y

Table 3 7: Full list of bank annual reports used in this research project (13 of 35)
AU NAB 1984 to AU PIBA 1986

Institution	Year	Year End	Months reported	Name of Report	Reporting Entity	Comments	Data in sample (Yes/No)
AU NAB	1984	September	12	Annual Report 1984	National Australia Bank Limited		Y
AU NAB	1983	September	12	Annual Report 1983	National Commercial Banking Corporation of Australia Ltd	Starts operating as a merged bank 1/01/1983 (Merger of National Bank of Australasia and Commercial Banking Company of Sydney)	Y
AU NAB	1982	September	12	Annual Report 1982	National Commercial Banking Corporation of Australia Ltd	Reports results of merged banks for both 1982 and 1981. Name officially changed on 31 December 1982 only.	Y
AU NAB	1981	September	12	123rd Annual Report 1981	National Bank of Australasia Limited	Merged with Commercial Banking Company of Sydney to form National Commercial Banking Corporation of Australia effective 1 October 1981.	Y
AU NAB	1980	September	12	122nd Annual Report 1980	National Bank of Australasia Limited		Y
AU NAB	1979	September	12	121st Annual Report 1979	National Bank of Australasia Limited	No reporting of provisions on a consolidated basis.	N
AU PIBA	1993	September	12	1993 Annual Report	Primary Industry Bank of Australia Limited	Acquired by Rabobank in 1994	Y
AU PIBA	1992	September	12	1992 Annual Report	Primary Industry Bank of Australia Limited		Y
AU PIBA	1991	September	18	1991 Financial Report for the 18 months ended 30 September 1991	Primary Industry Bank of Australia Limited		Y
AU PIBA	1990	March	12	1990 Annual Report	Primary Industry Bank of Australia Limited		Y
AU PIBA	1989	March	9	1989 Annual Report	Primary Industry Bank of Australia Limited		Y
AU PIBA	1988	June	12	1988 Annual Report	Primary Industry Bank of Australia Limited		Y
AU PIBA	1987	June	12	1987 Annual Report	Primary Industry Bank of Australia Limited	Rural and Industry Bank of Western Australia takes full control. Banking license per 30 June 1987	Y
AU PIBA	1986	June	12	1986 Annual Report	Primary Industry Bank of Australia Limited		Y

Table 3 7: Full list of bank annual reports used in this research project (14 of 35)
AU PIBA 1985 to AU SavBkSA 1983

Institution	Year	Year End	Months reported	Name of Report	Reporting Entity	Comments	Data in sample (Yes/No)
AU PIBA	1985	June	12	1985 Annual Report	Primary Industry Bank of Australia Limited		Y
AU PIBA	1984	June	12	1984 Annual Report	Primary Industry Bank of Australia Limited		Y
AU PIBA	1983	June	12	1983 Annual Report	Primary Industry Bank of Australia Limited		Y
AU PIBA	1982	June	12	1982 Annual Report	Primary Industry Bank of Australia Limited		Y
AU PIBA	1981	June	12	1981 Annual Report	Primary Industry Bank of Australia Limited		Y
AU PIBA	1980	June	12	1980 Annual Report	Primary Industry Bank of Australia Limited		Y
AU PIBA	1979	June	12	1979 Annual Report	Primary Industry Bank of Australia Limited	Set up 1978 under Primary Industry Bank Act 1977.	Y
AU Rock BS	2005	June	12	Annual Report	The Rock Building Society Limited		N
AU Rock BS	2004	June	12	Annual Report	The Rock Building Society Limited		N
AU Rock BS	2003	June	12	Annual Report	The Rock Building Society Limited		N
AU Rock BS	2002	June	12	Annual Report	The Rock Building Society Limited		N
AU Rock BS	2001	June	12	Annual Report	The Rock Building Society Limited		N
AU Rock BS	2000	June	12	Annual Report	The Rock Building Society Limited		N
AU Rock BS	1999	June	12	Annual Report	The Rock Building Society Limited		N
AU Rock BS	1998	June	12	Annual Report	The Rock Building Society Limited		N
AU Rock BS	1997	June	12	Annual Report	The Rock Building Society Limited		N
AU Rock BS	1996	June	12	Annual Report	The Rock Building Society Limited		N
AU Rock BS	1995	June	12	Annual Report	The Rock Building Society Limited		N
AU Rock BS	1994	June	12	Annual Report	The Rock Building Society Limited		N
AU Rock BS	1993	June	12	Annual Report	The Rock Building Society		N
AU Rock BS	1992	June	12	Annual Report	The Rock Building Society		N
AU Rock BS	1991	June	12	Annual Report	The Rock Building Society		N
AU Rock BS	1990	June	12	Annual Report	The Rock Building Society		N
AU SavBkSA	1983	June	12	Annual Report 1983	The Savings Bank of South Australia	Merged with State Bank of South Australia effective July 1, 1984	N

Table 3 7: Full list of bank annual reports used in this research project (15 of 35)
AU SavBkSA 1982 to AU SBSA 1994

Institution	Year	Year End	Months reported	Name of Report	Reporting Entity	Comments	Data in sample (Yes/No)
AU SavBkSA	1982	June	12	Annual Report 1982	The Savings Bank of South Australia		N
AU SavBkSA	1981	June	12	Annual Report 1981	The Savings Bank of South Australia		N
AU SavBkSA	1980	June	12	Annual Report 1980	The Savings Bank of South Australia		N
AU SBNSW	1995	December	12	Annual Report 1995	State Bank of New South Wales Ltd	First report as member of Colonial Group which bought bank per 31 Dec 1994. Includes 3 mos reporting per December 1994.	Y
AU SBNSW	1994	September	12	Annual Report 1994	State Bank of New South Wales Ltd	Not published	N
AU SBNSW	1994	March	6	Consolidated Results Six Months Ended 31 March 1994	State Bank of New South Wales Ltd	Half year report only	N
AU SBNSW	1993	September	12	Annual Report 1990	State Bank of New South Wales Ltd		Y
AU SBNSW	1992	September	12	Annual Report 1990	State Bank of New South Wales Ltd		Y
AU SBNSW	1991	September	15	Annual Report 1991	State Bank of New South Wales Ltd		Y
AU SBNSW	1990	September	15	Annual Report 1990	State Bank of New South Wales Ltd	Corporization, 14 May 1990	Y
AU SBNSW	1989	June	12	Annual Report 1989	State Bank of New South Wales		Y
AU SBNSW	1988	June	12	Annual Report 1988	State Bank of New South Wales		Y
AU SBNSW	1987	June	12	Annual Report 1987	State Bank of New South Wales		Y
AU SBNSW	1986	June	12	Annual Report 1986	State Bank of New South Wales		Y
AU SBNSW	1985	June	12	Annual Report 1985	State Bank of New South Wales		Y
AU SBNSW	1984	June	12	Annual Report 1984	State Bank of New South Wales		Y
AU SBNSW	1983	June	12	Annual Report 1983	State Bank of New South Wales		Y
AU SBNSW	1982	June	12	Annual Report 1982	State Bank of New South Wales	Name change to State Bank of New South Wales effective 2 November 1981	Y
AU SBNSW	1981	June	12	Annual Report 1981	Rural Bank of New South Wales		Y
AU SBNSW	1980	June	12	Annual Report 1980	Rural Bank of New South Wales		N
AU SBSA	1995	June	12	Annual Report 1994-95	South Australian Asset Management Corporation	No financials published. Bank SA acquired by Advance Bank Australia July 1995.	N
AU SBSA	1994	June	12	Annual Report 1993-94	South Australian Asset Management Corporation	Corporatisation by transferring core banking operations to Bank of South Australia Ltd (Bank SA) effective 1 July 1994.	Y

Table 3 7: Full list of bank annual reports used in this research project (16 of 35)
AU SBSA 1993 to AU SBVictoria 1981

Institution	Year	Year End	Months reported	Name of Report	Reporting Entity	Comments	Data in sample (Yes/No)
AU SBSA	1993	December	6	Interim Report Six Months Ended 31st December 1993	State Bank of South Australia		Y
AU SBSA	1993	June	12	Annual Report 1993	State Bank of South Australia		Y
AU SBSA	1992	June	12	Annual Report 1992	State Bank of South Australia		Y
AU SBSA	1991	June	12	Annual Report 1991	State Bank of South Australia	Bail-out by SA State Government which provides an indemnity of AUD 3.1 billion.	Y
AU SBSA	1990	June	12	Annual Report 1990	State Bank of South Australia		Y
AU SBSA	1989	June	12	Annual Report 1989	State Bank of South Australia		Y
AU SBSA	1988	June	12	Annual Report 1988	State Bank of South Australia		Y
AU SBSA	1987	June	12	Annual Report 1987	State Bank of South Australia		Y
AU SBSA	1986	June	12	Annual Report 1986	State Bank of South Australia		Y
AU SBSA	1985	June	12	Annual Report 1985	State Bank of South Australia	Merger with Savings Bank of South Australia effective July 1, 1984	Y
AU SBSA	1984	June	12	Annual Report 1984	State Bank of South Australia	Savings Bank of Australia and State Bank of South Australia report as a merged entity for the first time.	Y
AU SBSA	1983	June	12	Annual Report 1983	The State Bank of South Australia		Y
AU SBSA	1982	June	12	Annual Report 1982	The State Bank of South Australia		Y
AU SBSA	1981	June	12	Annual Report 1981	The State Bank of South Australia		Y
AU SBSA	1980	June	12	Annual Report 1980	The State Bank of South Australia		Y
AU SBVictoria	1990	June	12	Annual Report 1990	State Bank of Victoria	Last year of reporting. Merged with Commonwealth Bank effective January 1, 1991.	Y
AU SBVictoria	1989	June	12	Annual Report 1989	State Bank of Victoria		Y
AU SBVictoria	1988	June	12	Annual Report 1988	State Bank of Victoria		Y
AU SBVictoria	1987	June	12	Annual Report 1987	State Bank of Victoria		Y
AU SBVictoria	1986	June	12	Annual Report 1986	State Bank of Victoria		Y
AU SBVictoria	1985	June	12	Annual Report 1985	State Bank of Victoria		Y
AU SBVictoria	1984	June	12	Annual Report 1984	State Bank of Victoria		Y
AU SBVictoria	1983	June	12	Annual Report 1983	State Bank of Victoria		Y
AU SBVictoria	1982	June	12	Annual Report 1982	State Bank of Victoria		Y
AU SBVictoria	1981	June	12	Annual Report 1981	State Bank of Victoria		Y

Table 3 7: Full list of bank annual reports used in this research project (17 of 35)
AU SBVictoria 1980 to AU SuncorpMet 2004

Institution	Year	Year End	Months reported	Name of Report	Reporting Entity	Comments	Data in sample (Yes/No)
AU SBVictoria	1980	June	12	Annual Report 1980	State Bank of Victoria		Y
AU SBVictoria	1979	June	12	Annual Report 1979	State Bank of Victoria		N
AU StGeorge	2005	September	12	Full Financial Report /Concise Annual Report	St. George Bank Limited		Y
AU StGeorge	2004	September	12	Full Financial Report /Concise Annual Report	St. George Bank Limited		Y
AU StGeorge	2003	September	12	Full Financial Report /Concise Annual Report	St. George Bank Limited	Concise and full Financial Report	Y
AU StGeorge	2002	September	12	Full Financial Report	St. George Bank Limited	Full Financial Report	Y
AU StGeorge	2001	September	12	Full Financial Report / Concise Financial Report	St. George Bank Limited	Concise and full Financial Report	Y
AU StGeorge	2000	September	12	Full Financial Report / Concise Financial Report	St. George Bank Limited	Concise and full Financial Report	Y
AU StGeorge	1999	September	12	Full Financial Report / Concise Financial Report	St. George Bank Limited	Concise and full Financial Report	Y
AU StGeorge	1998	September	12	Annual Report 1998	St. George Bank Limited		Y
AU StGeorge	1997	September	12	Annual Report 1997	St. George Bank Limited	Acquired Advance Bank Australia effective January 29, 1997	Y
AU StGeorge	1996	September	12	Annual Report 1996	St. George Bank Limited		Y
AU StGeorge	1995	September	12	Annual Report 1995	St. George Bank Limited		Y
AU StGeorge	1994	September	12	Annual Report 1994	St. George Bank Limited	Acquired Barclays Bank commercial banking assets per 6 April 1994	Y
AU StGeorge	1993	September	16	Annual Report 1992/1993	St. George Bank Limited	Changed name to St.George Bank per 1 July 1992	Y
AU StGeorge	1992	May	12	Annual Report 1992	St. George Building Society Limited	Last year of reporting as a building society	Y
AU StGeorge	1991	May	12	Annual Report 1991	St. George Building Society Limited		Y
AU StGeorge	1990	May	12	Annual Report 1990	St. George Building Society Limited		Y
AU StGeorge	1989	May	12	Annual Report 1989	St. George Building Society Limited	Merger with State Building Society effective 1 October 1988	Y
AU SuncorpMet	2005	June	12	Annual Report 2005	Suncorp Limited		Y
AU SuncorpMet	2004	June	12	Annual Report 2004	Suncorp Limited		Y

Table 3 7: Full list of bank annual reports used in this research project (18 of 35)
AU SuncorpMet 2003 to AU TasmaniaBk 1988

Institution	Year	Year End	Months reported	Name of Report	Reporting Entity	Comments	Data in sample (Yes/No)
AU SuncorpMet	2003	June	12	Annual Report 2003	Suncorp Limited		Y
AU SuncorpMet	2002	June	12	Annual Report 2002	Suncorp-Metway Limited		Y
AU SuncorpMet	2001	June	12	Annual Report 2001	Suncorp-Metway Limited		Y
AU SuncorpMet	2000	June	12	Annual Report 2000	Suncorp-Metway Limited		Y
AU SuncorpMet	1999	June	12	Annual Report 1999 / / Announcement of Consolidated Financial Results	Suncorp-Metway Limited		Y
AU SuncorpMet	1998	June	12	Annual Report 1998 / Announcement of Consolidated Financial Results	Suncorp-Metway Limited		Y
AU SuncorpMet	1997	June	12	Annual Report 1997	Suncorp-Metway Limited	Merger December 1, 1996 (Suncorp, Metway Bank, QIDC)	Y
AU SuncorpMet	1996	June	12	Annual Report 1996	Metway Bank Limited		Y
AU SuncorpMet	1995	June	12	Annual Report 1995	Metway Bank Limited		Y
AU SuncorpMet	1994	June	12	Annual Report 1994	Metway Bank Limited		Y
AU SuncorpMet	1993	June	12	Annual Report 1993	Metway Bank Limited		Y
AU SuncorpMet	1992	June	12	Annual Report 1992	Metway Bank Limited		Y
AU SuncorpMet	1991	June	12	Annual Report 1991	Metway Bank Limited		Y
AU SuncorpMet	1990	June	12	Annual Report 1990	Metway Bank Limited		Y
AU SuncorpMet	1989	June	12	Annual Report 1989	Metway Bank Limited	First year of business as Metway Bank after converting from Metropolitan Permanent Building Society on 1 July 1988.	Y
AU TasmaniaBk	1990	August	12	Annual Report 1990	Tasmania Bank	Acquired by SBT Bank to form Trust Bank Tasmania (AU Trustbk TAS) 1 September 1991	Y
AU TasmaniaBk	1989	August	12	Annual Report 1989	Tasmania Bank		Y
AU TasmaniaBk	1988	August	12	Inaugural Annual Report 1987-1988	Tasmania Bank	Tasmania Bank established by Act of Parliament 1 Sept 1987 after merger with Tasmanian Permanent Building Society, no report published for 1987 financial year	Y

Table 3 7: Full list of bank annual reports used in this research project (19 of 35)
AU TasmaniaBk 1987 to AU Trustbk TAS 1983

Institution	Year	Year End	Months reported	Name of Report	Reporting Entity	Comments	Data in sample (Yes/No)
AU TasmaniaBk	1987	August	12	Annual Report 1987	Launceston Bank of Savings (LBS Statewide Bank)	not published, data from 1988 report	Y
AU TasmaniaBk	1986	August	12	Annual Report 1986	Launceston Bank of Savings (LBS Statewide Bank)		Y
AU TasmaniaBk	1985	August	12	Annual Report 1985	Launceston Bank of Savings (LBS Statewide Bank)		Y
AU TasmaniaBk	1984	August	12	Annual Report 1984	Launceston Bank of Savings (LBS Statewide Bank)		Y
AU Trustbk TAS	1999	February	n/a	Half Yearly Report	Trust Bank Tasmania	Absorbed into Colonial Ltd as Colonial Trust Bank (30/11/1999) and later into Commonwealth Bank (13/6/2000)	N
AU Trustbk TAS	1998	August	12	1998 Annual Report	Trust Bank Tasmania		Y
AU Trustbk TAS	1997	August	12	1997 Annual Report	Trust Bank Tasmania		Y
AU Trustbk TAS	1996	August	12	1996 Annual Report	Trust Bank Tasmania		Y
AU Trustbk TAS	1995	August	12	1995 Annual Report	Trust Bank Tasmania		Y
AU Trustbk TAS	1994	August	12	1994 Annual Report	Trust Bank Tasmania		Y
AU Trustbk TAS	1993	August	12	1993 Annual Report	Trust Bank Tasmania		Y
AU Trustbk TAS	1992	August	12	1992 Annual Report	Trust Bank Tasmania	Trust Bank Tasmania commenced operations 1 Sept 1991	Y
AU Trustbk TAS	1991	August	12	1991 Annual Report	The Hobart Savings Bank (trading as SBT Bank)	Apparently not published	N
AU Trustbk TAS	1990	August	12	1990 Annual Report	The Hobart Savings Bank (trading as SBT Bank)	Acquires Tasmania Bank	Y
AU Trustbk TAS	1989	August	12	1989 Annual Report	The Hobart Savings Bank (trading as SBT Bank)		Y
AU Trustbk TAS	1988	August	12	1988 Annual Report	The Hobart Savings Bank (trading as SBT Bank)		Y
AU Trustbk TAS	1987	August	12	1987 Annual Report	The Savings Bank of Tasmania		Y
AU Trustbk TAS	1986	August	12	1986 Annual Report	The Savings Bank of Tasmania		Y
AU Trustbk TAS	1985	August	12	1985 Annual Report	The Savings Bank of Tasmania		Y
AU Trustbk TAS	1984	August	12	1984 Annual Report	The Savings Bank of Tasmania		Y
AU Trustbk TAS	1983	August	12	1983 Annual Report	The Savings Bank of Tasmania		Y

Table 3 7: Full list of bank annual reports used in this research project (20 of 35)
AU Westpac 2005 to AU Westpac 1992

Institution	Year	Year End	Months reported	Name of Report	Reporting Entity	Comments	Data in sample (Yes/No)
AU Westpac	2005	September	12	Annual Financial Report / Concise Annual Report	Westpac Banking Corporation	Separate publications of full financial report and concise version of annual report	Y
AU Westpac	2004	September	12	Annual Financial Report / Concise Annual Report	Westpac Banking Corporation	Separate publications of full financial report and concise version of annual report	Y
AU Westpac	2003	September	12	Annual Financial Report / Concise Annual Report	Westpac Banking Corporation	Separate publications of full financial report and concise version of annual report	Y
AU Westpac	2002	September	12	Annual Financial Report / Concise Annual Report	Westpac Banking Corporation	Separate publications of full financial report and concise version of annual report. Reports the first time as a public limited company after registering 23 August 2002.	Y
AU Westpac	2001	September	12	Annual Financial Report / Concise Annual Report	Westpac Banking Corporation	Separate publications of full financial report and concise version of annual report	Y
AU Westpac	2000	September	12	Annual Financial Report	Westpac Banking Corporation	Separate publications of full financial report and concise version of annual report	Y
AU Westpac	1999	September	12	Annual Financial Report	Westpac Banking Corporation		Y
AU Westpac	1998	September	12	Annual Report 1998	Westpac Banking Corporation	Bank of Melbourne merges into Westpac 3 May 1998	Y
AU Westpac	1997	September	12	Annual Report 1997	Westpac Banking Corporation		Y
AU Westpac	1996	September	12	Annual Report 1996	Westpac Banking Corporation	Acquisition of Challenge Bank per 1 January 1996 and Trust Bank per 1 June 1996.	Y
AU Westpac	1995	September	12	Annual Report 1995	Westpac Banking Corporation	pages to p. 22 missing	Y
AU Westpac	1994	September	12	Annual Report 1994	Westpac Banking Corporation		Y
AU Westpac	1993	September	12	Annual Report 1993	Westpac Banking Corporation		Y
AU Westpac	1992	September	12	Annual Report 1992	Westpac Banking Corporation		Y

Table 3 7: Full list of bank annual reports used in this research project (21 of 35)
AU Westpac 1991 to AU WideBay BS 1998

Institution	Year	Year End	Months reported	Name of Report	Reporting Entity	Comments	Data in sample (Yes/No)
AU Westpac	1991	September	12	Annual Report & Financial Accounts 1991	Westpac Banking Corporation		Y
AU Westpac	1990	September	12	Annual Report & Financial Accounts 1990	Westpac Banking Corporation		Y
AU Westpac	1989	September	12	Annual Report 1989	Westpac Banking Corporation		Y
AU Westpac	1988	September	12	Annual Report 1988	Westpac Banking Corporation		Y
AU Westpac	1987	September	12	Annual Report 1987	Westpac Banking Corporation		Y
AU Westpac	1986	September	12	Annual Report 1986	Westpac Banking Corporation		Y
AU Westpac	1985	September	12	Annual Report 1985	Westpac Banking Corporation		Y
AU Westpac	1984	September	12	Annual Report 1984	Westpac Banking Corporation		Y
AU Westpac	1983	September	12	Annual Report 1983	Westpac Banking Corporation		Y
AU Westpac	1982	September	12	Annual Report 1982	Bank of New South Wales	Merger with Commercial Bank of Australia. Name change to Westpac Banking Corporation 1 October 1982.	Y
AU Westpac	1981	September	12	Annual Report 1981	Bank of New South Wales		Y
AU Westpac	1980	September	12	Annual Report 1980	Bank of New South Wales		Y
AU Westpac	1979	September	12	Annual Report 1979	Bank of New South Wales		Y
AU WideBay BS	2005	June	12	Annual Report	Wide Bay Australia Limited		N
AU WideBay BS	2004	June	12	Annual Report	Wide Bay Australia Limited		N
AU WideBay BS	2003	June	12	Annual Report	Wide Bay Capricorn Building Society Limited		N
AU WideBay BS	2002	June	12	Annual Report	Wide Bay Capricorn Building Society Limited		N
AU WideBay BS	2001	June	12	Annual Report	Wide Bay Capricorn Building Society Limited		N
AU WideBay BS	2000	June	12	Annual Report	Wide Bay Capricorn Building Society Limited		N
AU WideBay BS	1999	June	12	Annual Report	Wide Bay Capricorn Building Society Limited		N
AU WideBay BS	1998	June	12	Annual Report	Wide Bay Capricorn Building Society Limited		N

Table 3 7: Full list of bank annual reports used in this research project (22 of 35)
AU WideBay BS 1997 to NZ ANZ 1994

Institution	Year	Year End	Months reported	Name of Report	Reporting Entity	Comments	Data in sample (Yes/No)
AU WideBay BS	1997	June	12	Annual Report	Wide Bay Capricorn Building Society Limited		N
AU WideBay BS	1996	June	12	Annual Report	Wide Bay Capricorn Building Society Limited		N
AU WideBay BS	1995	June	12	Annual Report	Wide Bay Capricorn Building Society Limited	Listed on ASX on Sept 1994	N
NZ ANZ	2005	September	12	General Disclosure Statement September 2005	ANZ National Bank Limited Group		Y
NZ ANZ	2004	September	12	General Disclosure Statement September 2004	ANZ National Bank Limited Group		Y
NZ ANZ	2003	September	12	General Disclosure Statement September 2003	ANZ Banking Group (New Zealand) Ltd.		Y
NZ ANZ	2002	September	12	General Disclosure Statement September 2002	ANZ Banking Group (New Zealand) Ltd.		Y
NZ ANZ	2001	September	12	General Disclosure Statement September 2001	ANZ Banking Group (New Zealand) Ltd.		Y
NZ ANZ	2000	September	12	General Disclosure Statement September 2000	ANZ Banking Group (New Zealand) Ltd.		Y
NZ ANZ	1999	September	12	General Disclosure Statement September 1999	ANZ Banking Group (New Zealand) Ltd.		Y
NZ ANZ	1998	September	12	General Disclosure Statement September 1998	ANZ Banking Group (New Zealand) Ltd.		Y
NZ ANZ	1997	September	12	General Disclosure Statement September 1997	ANZ Banking Group (New Zealand) Ltd.		Y
NZ ANZ	1996	September	12	General Disclosure Statement September 1996	ANZ Banking Group (New Zealand) Ltd.		Y
NZ ANZ	1995	September	12	Review and Financial Statements 1995	ANZ Banking Group (New Zealand) Ltd.		Y
NZ ANZ	1994	September	12	Prospectus No. 14 24 November 1994	ANZ Banking Group (New Zealand) Ltd.		N
NZ ANZ	1994	September	12	Review and Financial Statements 1994	ANZ Banking Group (New Zealand) Ltd.		Y

Table 3 7: Full list of bank annual reports used in this research project (23 of 35)
NZ ANZ 1993 to NZ ASB 2003

Institution	Year	Year End	Months reported	Name of Report	Reporting Entity	Comments	Data in sample (Yes/No)
NZ ANZ	1993	September	12	Prospectus No. 12 13 December 1993	ANZ Banking Group (New Zealand) Ltd.		N
NZ ANZ	1993	September	12	Prospectus No. 13 24 June 1994	ANZ Banking Group (New Zealand) Ltd.		N
NZ ANZ	1993	September	12	Review and Financial Statements 1993	ANZ Banking Group (New Zealand) Ltd.		Y
NZ ANZ	1992	September	12	Prospectus No. 10 7 December 1992	ANZ Banking Group (New Zealand) Ltd.		N
NZ ANZ	1992	September	12	Review and Financial Statements 1992	ANZ Banking Group (New Zealand) Ltd.		Y
NZ ANZ	1991	September	12	Prospectus No. 8 18 December 1991	ANZ Banking Group (New Zealand) Ltd.		N
NZ ANZ	1991	September	12	Prospectus No. 9 23 June 1992	ANZ Banking Group (New Zealand) Ltd.		N
NZ ANZ	1991	September	12	Review and Financial Statements 1991	ANZ Banking Group (New Zealand) Ltd.		Y
NZ ANZ	1990	September	12	Financial Statements 30 September 1990	ANZ Banking Group (New Zealand) Ltd.		Y
NZ ANZ	1990	September	12	Prospectus No. 7 24 June 1991	ANZ Banking Group (New Zealand) Ltd.		N
NZ ANZ	1989	September	12	Financial Statements 30 September 1989	ANZ Banking Group (New Zealand) Ltd.		Y
NZ ANZ	1988	September	12	Annual Report 1988	ANZ Banking Group (New Zealand) Ltd.		Y
NZ ANZ	1987	September	12	Annual Report 1987	ANZ Banking Group (New Zealand) Ltd.		Y
NZ ANZ	1986	September	12	Annual Report 1986	ANZ Banking Group (New Zealand) Ltd.		Y
NZ ANZ	1985	September	12	Annual Report 1985	ANZ Banking Group (New Zealand) Ltd.		Y
NZ ANZ	1984	September	12	Annual Report 1984	ANZ Banking Group (New Zealand) Ltd.		Y
NZ ANZ	1983	September	12	Annual Report 1983	ANZ Banking Group (New Zealand) Ltd.		Y
NZ ANZ	1982	September	12	Annual Report 1982	ANZ Banking Group (New Zealand) Ltd.		Y
NZ ANZ	1981	September	12	Annual Report 1981	ANZ Banking Group (New Zealand) Ltd.		Y
NZ ANZ	1980	September	12	Annual Report 1980	ANZ Banking Group (New Zealand) Ltd.		Y
NZ ASB	2005	June	12	General Disclosure Statement June 2005	ASB Bank Ltd.		Y
NZ ASB	2004	June	12	General Disclosure Statement June 2004	ASB Bank Ltd.		Y
NZ ASB	2003	June	12	General Disclosure Statement June 2003	ASB Bank Ltd.		Y

Table 3 7: Full list of bank annual reports used in this research project (24 of 35)
NZ ASB 2002 to NZ BNZ 2002

Institution	Year	Year End	Months reported	Name of Report	Reporting Entity	Comments	Data in sample (Yes/No)
NZ ASB	2002	June	12	Annual Report 2002	ASB Bank Ltd.		Y
NZ ASB	2001	June	12	Annual Report 2001	ASB Bank Ltd.		Y
NZ ASB	2000	June	12	Annual Report 2000	ASB Bank Ltd.		Y
NZ ASB	1999	June	12	Annual Report 1999	ASB Bank Ltd.		Y
NZ ASB	1998	June	12	Annual Report 1998	ASB Bank Ltd.		Y
NZ ASB	1997	June	12	Annual Report 1997	ASB Bank Ltd.		Y
NZ ASB	1996	June	12	Annual Report 1996	ASB Bank Ltd.		Y
NZ ASB	1995	June	12	Annual Report 1995	ASB Bank Ltd.		Y
NZ ASB	1994	June	12	Annual Report 1994	ASB Bank Ltd.		Y
NZ ASB	1993	June	12	Annual Report 1993	ASB Bank Ltd.		Y
NZ ASB	1992	June	12	Annual Report 1992	ASB Bank Ltd.		Y
NZ ASB	1991	June	12	Annual Report 1991	ASB Bank Ltd.		Y
NZ ASB	1990	June	12	Annual Report 1990	ASB Bank Ltd.		Y
NZ ASB	1989	June	12	Annual Report 1989	ASB Bank Ltd.		Y
NZ ASB	1988	March	15	Annual Report 1988	ASB Bank		Y
NZ ASB	1987	March	12	Annual Report 1987	ASB Bank		Y
NZ ASB	1986	March	12	Annual Report 1986	ASB Trustee Bank		Y
NZ ASB	1985	March	12	Annual Report 1985	Auckland Savings Bank		Y
NZ ASB	1984	March	12	Annual Report 1984	Auckland Savings Bank		Y
NZ ASB	1983	March	12	Annual Report 1983	Auckland Savings Bank		Y
NZ ASB	1982	March	12	Annual Report 1982	Auckland Savings Bank		Y
NZ ASB	1981	March	12	Annual Report 1981	Auckland Savings Bank		Y
NZ ASB	1980	March	12	Annual Report 1980	Auckland Savings Bank		Y
NZ BNZ	2005	September	12	General Disclosure Statement September 2005	Bank of New Zealand Ltd.		Y
NZ BNZ	2004	September	12	General Disclosure Statement September 2004	Bank of New Zealand Ltd.		Y
NZ BNZ	2003	September	12	General Disclosure Statement September 2003	Bank of New Zealand Ltd.		Y
NZ BNZ	2002	September	12	General Disclosure Statement September 2002	Bank of New Zealand Ltd.		Y

Table 3 7: Full list of bank annual reports used in this research project (25 of 35)
NZ BNZ 2001 to NZ BNZ 1981

Institution	Year	Year End	Months reported	Name of Report	Reporting Entity	Comments	Data in sample (Yes/No)
NZ BNZ	2001	September	12	General Disclosure Statement September 2001	Bank of New Zealand Ltd.		Y
NZ BNZ	2000	September	12	General Disclosure Statement September 2000	Bank of New Zealand Ltd.		Y
NZ BNZ	1999	September	12	General Disclosure Statement September 1999	Bank of New Zealand Ltd.		Y
NZ BNZ	1998	September	12	General Disclosure Statement September 1998	Bank of New Zealand Ltd.		Y
NZ BNZ	1997	September	12	General Disclosure Statement September 1997	Bank of New Zealand Ltd.		Y
NZ BNZ	1996	September	12	General Disclosure Statement September 1996	Bank of New Zealand Ltd.		Y
NZ BNZ	1995	September	12	Prospectus Number 16 December 1995	Bank of New Zealand Ltd.		Y
NZ BNZ	1994	September	12	Prospectus Number 14 December 1994	Bank of New Zealand Ltd.		Y
NZ BNZ	1993	September	18	Prospectus Number 12 December 1993	Bank of New Zealand Ltd.		Y
NZ BNZ	1992	March	12	Annual Report 1992	Bank of New Zealand Ltd.		Y
NZ BNZ	1991	March	12	Annual Report 1991	Bank of New Zealand Ltd.		Y
NZ BNZ	1990	March	12	Annual Report 1990	Bank of New Zealand Ltd.		Y
NZ BNZ	1989	March	12	Annual Report 1989	Bank of New Zealand Ltd.		Y
NZ BNZ	1988	March	12	Annual Report 1988	Bank of New Zealand		Y
NZ BNZ	1987	March	12	Annual Report 1987	Bank of New Zealand		Y
NZ BNZ	1987	n/a	n/a	Prospectus for an Issue of Ordinary Shares 12 February 1987	Bank of New Zealand		Y
NZ BNZ	1986	March	12	125th Annual Report 1986	Bank of New Zealand		Y
NZ BNZ	1985	March	12	124th Annual Report 1985	Bank of New Zealand		Y
NZ BNZ	1984	March	12	123rd Annual Report 1984	Bank of New Zealand		Y
NZ BNZ	1983	March	12	122nd Annual Report 1983	Bank of New Zealand		Y
NZ BNZ	1982	March	12	121st Annual Report 1982	Bank of New Zealand		Y
NZ BNZ	1981	March	12	120th Annual Report 1981	Bank of New Zealand		Y

Table 3 7: Full list of bank annual reports used in this research project (26 of 35)
NZ BNZ 1980 to NZ Countrywide 1994

Institution	Year	Year End	Months reported	Name of Report	Reporting Entity	Comments	Data in sample (Yes/No)
NZ BNZ	1980	March	12	118th Annual Report 1979	Bank of New Zealand	incorporated under 1979 Bank of New Zealand Act	Y
NZ BNZ	1980	March	12	119th Annual Report 1980	Bank of New Zealand	incorporated under Bank of New Zealand Act 1945, No 18	Y
NZ BNZ	1979	March	12	118th Annual Report 1979	Bank of New Zealand		N
NZ BNZ	1978	March	12	117th Annual Report 1979	Bank of New Zealand		N
NZ BNZ Fin	1995	September	12	Annual Report 1995	BNZ Finance Limited		Y
NZ BNZ Fin	1994	September	12	Annual Report 1994	BNZ Finance Limited		Y
NZ BNZ Fin	1993	September	18	Annual Report 1993	BNZ Finance Limited		Y
NZ BNZ Fin	1992	March	12	Annual Report 1992	BNZ Finance Limited		Y
NZ BNZ Fin	1991	March	12	Annual Report 1991	BNZ Finance Limited		Y
NZ BNZ Fin	1990	March	12	Annual Report 1990	BNZ Finance Limited		Y
NZ BNZ Fin	1989	March	12	Annual Report 1989	BNZ Finance Limited		Y
NZ BNZ Fin	1988	March	12	Annual Report 1988	BNZ Finance Limited		Y
NZ BNZ Fin	1987	March	12	Annual Report 1987	BNZ Finance Limited		Y
NZ BNZ Fin	1986	March	12	Annual Report 1986	BNZ Finance Limited		Y
NZ BNZ Fin	1985	March	12	Annual Report 1985	BNZ Finance Limited		Y
NZ BNZ Fin	1984	March	12	Annual Report 1984	BNZ Finance Limited		Y
NZ BNZ Fin	1983	March	12	Annual Report 1983	BNZ Finance Limited		Y
NZ BNZ Fin	1982	March	12	Annual Report 1982	BNZ Finance Limited		Y
NZ BNZ Fin	1981	March	12	Annual Report 1981	BNZ Finance Limited		Y
NZ BNZ Fin	1980	March	12	Annual Report 1980	BNZ Finance Limited		Y
NZ Countrywide	1998	February	12	Registered bank General Disclosure Statement 1998	Countrywide Banking Corporation Limited		Y
NZ Countrywide	1997	February	12	Registered bank General Disclosure Statement 1997	Countrywide Banking Corporation Limited		Y
NZ Countrywide	1996	February	12	Registered bank General Disclosure Statement 1996	Countrywide Banking Corporation Limited		Y
NZ Countrywide	1995	February	14	Annual Report 1995	Countrywide Banking Corporation Limited		Y
NZ Countrywide	1994	n/a	n/a	No annual report for 1994 due to end of reporting year change	Countrywide Banking Corporation Limited		Y

Table 3 7: Full list of bank annual reports used in this research project (27 of 35)
NZ Countrywide 1993 to NZ NAB 1992

Institution	Year	Year End	Months reported	Name of Report	Reporting Entity	Comments	Data in sample (Yes/No)
NZ Countrywide	1993	December	12	Annual Report 1993	Countrywide Banking Corporation Limited		Y
NZ Countrywide	1992	December	18	Annual Report 1992	Countrywide Banking Corporation Limited		Y
NZ Countrywide	1992	June	12	Interim Report to Shareholders for 12 month interim period ended 30 June 1992	Countrywide Banking Corporation Limited	Issued due to change to 31 December reporting date after takeover by Bank of Scotland	Y
NZ Countrywide	1991	June	12	Annual Report 1991	Countrywide Banking Corporation Limited		Y
NZ Countrywide	1990	June	12	Annual Report 1990	Countrywide Banking Corporation Limited		Y
NZ Countrywide	1989	June	12	Annual Report 1989	Countrywide Banking Corporation Limited		Y
NZ Countrywide	1988	June	12	Annual Report 1988	Countrywide Banking Corporation Limited		Y
NZ Countrywide	1987	June	12	Annual Report 1987	Countrywide Building Society		Y
NZ Countrywide	1986	June	12	Annual Report 1986	Countrywide Building Society		Y
NZ Countrywide	1985	June	12	Annual Report 1985	Countrywide Building Society		Y
NZ Countrywide	1984	June	12	Annual Report 1984	Countrywide Building Society		Y
NZ Countrywide	1983	June	12	86th Annual Report 1983	Countrywide Building Society		Y
NZ KiwiBank	2005	June	12	General Disclosure Statement & Annual Report 2005	Kiwi Bank Limited		N
NZ KiwiBank	2004	June	12	General Disclosure Statement & Annual Report 2004	Kiwi Bank Limited		N
NZ KiwiBank	2003	June	12	General Disclosure Statement & Annual Report 2003	Kiwi Bank Limited		N
NZ KiwiBank	2002	June	12	General Disclosure Statement & Annual Report 2002	Kiwi Bank Limited		N
NZ NAB	1993	September	12	Financial Statements in BNZ Prospectus No. 12	National Australia (NZ) Limited	Merged with BNZ October 1, 1993. Name change to National Australia (NZ) Ltd.	Y
NZ NAB	1992	September	12	Prospectus No 20	National Australia Bank (NZ) Limited		Y

Table 3 7: Full list of bank annual reports used in this research project (28 of 35)
NZ NAB 1991 to NZ NBNZ 1996

Institution	Year	Year End	Months reported	Name of Report	Reporting Entity	Comments	Data in sample (Yes/No)
NZ NAB	1991	September	12	Prospectus No 19 Dated 5 June 1992	National Australia Bank (NZ) Limited		Y
NZ NAB	1990	September	12	Prospectus No 16	National Australia Bank (NZ) Limited		Y
NZ NAB	1989	September	12	Prospectus No 15 Dated 5 June 1990	National Australia Bank (NZ) Limited		Y
NZ NAB	1989		12	Prospectus No ?	National Australia Bank (NZ) Limited		Y
NZ NAB	1988	September	12	Prospectus No ?	National Australia Bank (NZ) Limited		Y
NZ NAB	1988		12	Prospectus No ?	National Australia Bank (NZ) Limited		Y
NZ NAB	1987	September	12	Prospectus No ?	National Australia Bank (NZ) Limited	Name change from Broadbank Ltd. to National Australia Bank (NZ) Ltd 1/10/1987	Y
NZ NAB	1987		12	Prospectus No ?	National Australia Bank (NZ) Limited		Y
NZ NAB	1986	September	12	Prospectus No ?	Broadbank Corporation Limited	Registered as bank 22 July 1987	Y
NZ NBNZ	2003	December	12	Annual Report and General Disclosure Statement 2003	National Bank of New Zealand Ltd. (The)	Acquired by AU ANZ effective December 1, 2003. Amalgamated with ANZ Banking Group (New Zealand) Limited to create ANZ National Bank Limited on 26 June 2004.	Y
NZ NBNZ	2002	December	12	Annual Report and General Disclosure Statement 2002	National Bank of New Zealand Ltd. (The)		Y
NZ NBNZ	2001	December	12	Annual Report and General Disclosure Statement 2001	National Bank of New Zealand Ltd. (The)		Y
NZ NBNZ	2000	December	12	Annual Report and General Disclosure Statement 2000	National Bank of New Zealand Ltd. (The)		Y
NZ NBNZ	1999	December	12	Annual Report and General Disclosure Statement 1999	National Bank of New Zealand Ltd. (The)		Y
NZ NBNZ	1998	December	12	Annual Report and General Disclosure Statement 1998	National Bank of New Zealand Ltd. (The)		Y
NZ NBNZ	1997	December	12	Annual Report and General Disclosure Statement 1997	National Bank of New Zealand Ltd. (The)		Y
NZ NBNZ	1996	December	12	Annual Report and General Disclosure Statement 1996	National Bank of New Zealand Ltd. (The)		Y

Table 3 7: Full list of bank annual reports used in this research project (29 of 35)
NZ NBNZ 1995 to NZ NBNZ 1980

Institution	Year	Year End	Months reported	Name of Report	Reporting Entity	Comments	Data in sample (Yes/No)
NZ NBNZ	1995	December	12	Annual Report 1995	National Bank of New Zealand Ltd. (The)		Y
NZ NBNZ	1994	December	12	The National Bank Annual Report 1994	National Bank of New Zealand Ltd. (The)		Y
NZ NBNZ	1993	December	12	The National Bank Annual Report 1993	National Bank of New Zealand Ltd. (The)		Y
NZ NBNZ	1992	December	12	The National Bank Annual Report 1992	National Bank of New Zealand Ltd. (The)		Y
NZ NBNZ	1991	December	12	The National Bank Annual Report 1991	National Bank of New Zealand Ltd. (The)		Y
NZ NBNZ	1990	December	12	The National Bank Annual Report 1990	National Bank of New Zealand Ltd. (The)		Y
NZ NBNZ	1989	December	12	The National Bank Annual Report 1989	National Bank of New Zealand Ltd. (The)		Y
NZ NBNZ	1988	December	12	The National Bank Annual Report 1988	National Bank of New Zealand Ltd. (The)		Y
NZ NBNZ	1987	December	12	The National Bank Annual Report 1987	National Bank of New Zealand Ltd. (The)		Y
NZ NBNZ	1986	December	12	The National Bank Annual Report 1986	National Bank of New Zealand Ltd. (The)		Y
NZ NBNZ	1985	December	12	The National Bank Annual Report 1985	National Bank of New Zealand Ltd. (The)		Y
NZ NBNZ	1984	December	14	The National Bank Annual Report 1984	National Bank of New Zealand Ltd. (The)		Y
NZ NBNZ	1983	October	12	The National Bank Annual Report 1983	National Bank of New Zealand Ltd. (The)		Y
NZ NBNZ	1982	October	12	The National Bank Annual Report 1982	National Bank of New Zealand Ltd. (The)		Y
NZ NBNZ	1981	October	12	The National Bank Annual Report 1981	National Bank of New Zealand Ltd. (The)		Y
NZ NBNZ	1980	October	12	The National Bank Annual Report 1980	National Bank of New Zealand Ltd. (The)		Y

Table 3 7: Full list of bank annual reports used in this research project (30 of 35)
NZ NBNZ 1979 to NZ Rural Bank 1987

Institution	Year	Year End	Months reported	Name of Report	Reporting Entity	Comments	Data in sample (Yes/No)
NZ NBNZ	1979	October	12	The National Bank Annual Report 1979	National Bank of New Zealand Ltd. (The)		Y
NZ NBNZ	1978	October	12	The National Bank Annual Report 1978	National Bank of New Zealand Ltd. (The)		N
NZ NBNZ	1977	October	12	The National Bank Annual Report 1977	National Bank of New Zealand Ltd. (The)		N
NZ NZIBank	1987	March		Annual Report 1987	NZI Bank Limited	Some data from 1987 and 1988 reconstructed from Australian Ratings report	Y
NZ NZIBank	1988	March	12	Annual Report 1988	NZI Bank Limited		Y
NZ NZIBank	1989	March	12	Report and Accounts for year ended 31 March 1989	NZI Bank Limited		
NZ NZIBank	1989	December		Annual Report	NZI Bank Limited	Data retrieved from 1990 report.	Y
NZ NZIBank	1990	December	12	Annual Report 1990	NZI Bank Limited		Y
NZ NZIBank	1991	December		Annual Report	NZI Bank Limited	Relinquished banking license in February 1992.	Y
NZ PostBank	1991	September	12	Prospectus No. 8 dated 18 December 1991	Post Office Bank Limited		N
NZ PostBank	1990	September		Prospectus No. 6 September 1992	Post Office Bank Limited		N
NZ PostBank	1989	February	11	Annual Report 1989	Post Office Bank Limited		Y
NZ PostBank	1988	March	12	Annual Report 1988	Post Office Bank Limited		Y
NZ PostBank	1988	March	12	Prospectus No.1 dated 30th June 1988	Post Office Bank Limited	Incorporated 24/2/1987, bank registration per 11/8/1989	N
NZ Rural Bank	1992	June	12	Annual Report 1992	The Rural Bank Limited		Y
NZ Rural Bank	1991	June	12	Annual Report 1991	The Rural Bank Limited		Y
NZ Rural Bank	1990	June	15	Annual Report 1990	The Rural Bank Limited		Y
NZ Rural Bank	1989	March	12	Annual Report 1989	Rural Banking and Finance Corporation		Y
NZ Rural Bank	1988	September	12	Half Year Report	Rural Banking and Finance Corporation		N
NZ Rural Bank	1988	March	12	Report of the Rural Banking and Finance Corporation of New Zealand	Rural Banking and Finance Corporation		Y
NZ Rural Bank	1987	March	12	Annual Report 1987	Rural Banking and Finance Corporation		Y

Table 3 7: Full list of bank annual reports used in this research project (31 of 35)
NZ Rural Bank 1986 to NZ Trust Bank 1988

Institution	Year	Year End	Months reported	Name of Report	Reporting Entity	Comments	Data in sample (Yes/No)
NZ Rural Bank	1986	March	12	Annual Report 1986	The Rural Banking and Finance Corporation of New Zealand		Y
NZ Rural Bank	1985	March	12	Annual Report 1985	The Rural Banking and Finance Corporation of New Zealand		Y
NZ Rural Bank	1984	March	12	Report of the Rural Banking and Finance Corporation of New Zealand	The Rural Banking and Finance Corporation of New Zealand		Y
NZ Superbank	2005	September	12	Annual Report and General Disclosure Statement	St.George Bank New Zealand Limited		Y
NZ Superbank	2004	September	12	Annual Report and General Disclosure Statement	St.George Bank New Zealand Limited		Y
NZ Superbank	2003	September	14	General Disclosure Statement for the six months ended 31 March 2004	St.George Bank New Zealand Limited	Shows data to 30 September 2003 for first 14 months of operations.	Y
NZ Trust Bank	1996	March	12	Annual Report 1996	Trust Bank New Zealand Limited and its Subsidiaries	Acquired by Westpac Banking Corp. effective 1 June 1996.	Y
NZ Trust Bank	1995	March	12	Annual Report 1995	Trust Bank New Zealand Limited and its Subsidiaries		Y
NZ Trust Bank	1994	March	12	Annual Report 1994	Trust Bank New Zealand Limited and its Subsidiaries		Y
NZ Trust Bank	1993	March	12	Annual Report 1993	Trust Bank New Zealand Limited and its Subsidiaries		Y
NZ Trust Bank	1992	March	12	Annual Report 1992	Trust Bank New Zealand Limited and its Subsidiaries		Y
NZ Trust Bank	1991	March	12	Annual Report 1991	Trust Bank New Zealand Limited and its Subsidiaries		Y
NZ Trust Bank	1990	March	12	Annual Report 1990	Trust Bank New Zealand Limited and its Subsidiaries		Y
NZ Trust Bank	1989	March	12	Annual Report 1989	Trust Bank New Zealand Limited and its Subsidiaries		Y
NZ Trust Bank	1988	March	12	Annual Report 1988	Trust Bank New Zealand Limited and its Subsidiaries		Y

Table 3 7: Full list of bank annual reports used in this research project (32 of 35)
NZ TSB Bank 2006 to NZ UnitedBk 1990

Institution	Year	Year End	Months reported	Name of Report	Reporting Entity	Comments	Data in sample (Yes/No)
NZ TSB Bank	2006	March	12	Annual Report 2005	TSB Bank Limited		Y
NZ TSB Bank	2005	March	12	Annual Report 2005	TSB Bank Limited		Y
NZ TSB Bank	2004	March	12	Annual Report 2004	TSB Bank Limited		Y
NZ TSB Bank	2003	March	12	Annual Report 2003	TSB Bank Limited		Y
NZ TSB Bank	2002	March	12	Annual Report 2002	TSB Bank Limited		Y
NZ TSB Bank	2001	March	12	Annual Report 2001	TSB Bank Limited		Y
NZ TSB Bank	2000	March	12	Annual Report 2000	TSB Bank Limited		Y
NZ TSB Bank	1999	March	12	Annual Report 1999	TSB Bank Limited		Y
NZ TSB Bank	1998	March	12	Annual Report 1998	TSB Bank Limited		Y
NZ TSB Bank	1997	March	12	Annual Report 1997	TSB Bank Limited		Y
NZ TSB Bank	1996	March	12	Annual Report 1996	TSB Bank Limited		Y
NZ TSB Bank	1995	March	12	Annual Report 1995	TSB Bank Limited		Y
NZ TSB Bank	1994	March	12	Annual Report 1994	TSB Bank Limited		Y
NZ TSB Bank	1993	March	12	Annual Report 1993	TSB Bank Limited		Y
NZ TSB Bank	1992	March	12	Annual Report 1992	TSB Bank Limited		Y
NZ TSB Bank	1991	March	12	Annual Report 1991	TSB Bank Limited		Y
NZ TSB Bank	1990	March	12	Annual Report 1990	TSB Bank Limited	Name change to TSB Bank Ltd in November 1989	Y
NZ TSB Bank	1990	March	12	Prospectus No. 4 31 May 1990	TSB Bank Limited		N
NZ TSB Bank	1989	March	12	Annual Report 1989	Taranaki Savings Bank Limited		Y
NZ TSB Bank	1989	March	12	Prospectus No. 3 27 November 1989	Taranaki Savings Bank Limited		N
NZ TSB Bank	1988	March	12	Annual Report 1988	Taranaki Savings Bank		Y
NZ TSB Bank	1987	March	12	Annual Report 1987	Taranaki Savings Bank		Y
NZ UnitedBk	1992	June	n/a	Prospectus No. 6 September 1992	United Bank Limited	Becomes subsidiary of Countrywide Bank 30/4/1992	Y
NZ UnitedBk	1992	March	6	Prospectus No. 5 March 1992	United Bank Limited		N
NZ UnitedBk	1991	September	12	Prospectus No. 4 September 1991	United Bank Limited		Y
NZ UnitedBk	1991	September	12	Prospectus No. 3 September 1991	United Bank Limited		Y
NZ UnitedBk	1990	September	12	Prospectus No. 2 September 1990	United Banking Group Limited	Name change to United Bank Ltd 22 November 1990	Y

Table 3 7: Full list of bank annual reports used in this research project (33 of 35)
NZ UnitedBk 1990 to NZ Westpac 2002

Institution	Year	Year End	Months reported	Name of Report	Reporting Entity	Comments	Data in sample (Yes/No)
NZ UnitedBk	1990	March	6	Prospectus No. 1, 29th June 1990	United Banking Group Limited	Incorporated as limited liability 29 June 1990	Y
NZ UnitedBk	1990	n/a	n/a	Conversion Plan	United Building Society	Explanatory notice for conversion to registered bank and capital injection by State Bank of South Australia	Y
NZ UnitedBk	1989	September	12	Annual Report 1989	United Building Society		Y
NZ UnitedBk	1988	September	12	Annual Report 1988	United Building Society		Y
NZ UnitedBk	1987	September	12	Annual Report 1987	United Building Society		Y
NZ UnitedBk	1986	September	12	Annual Report and Financial Statements 1986	United Building Society		Y
NZ UnitedBk	1985	September	12	Annual Report 1985	United Building Society		Y
NZ UnitedBk	1984	September	12	Annual Report 1984	United Building Society		Y
NZ UnitedBk	1983	September	12	Annual Report 1983	United Building Society	Formed by the union of Northern United Building Society and the Canterbury Building Society effective October 1, 1982.	Y
NZ Westland	1990	June	15	Annual Report 1990	Westland Bank Limited	Reports as a subsidiary of ASB (Westland became wholly owned subsidiary of ASB per 29 September 1989)	Y
NZ Westland	1989	March	12	Financial Report 1989	Westland Bank Limited	Incorporated as limited liability company on 1 September 1988	Y
NZ Westland	1988	March	12	Annual Report 1988	Westland Bank		Y
NZ Westland	1987	March	12	121st Annual Report 1987	Westland Bank		Y
NZ Westpac	2005	September	12	General Disclosure Statement	Westpac Banking Corporation (NZ Division and NZ Branch)		Y
NZ Westpac	2004	September	12	General Disclosure Statement	Westpac Banking Corporation (NZ Division and NZ Branch)		Y
NZ Westpac	2003	September	12	General Disclosure Statement	Westpac Banking Corporation (NZ Division and NZ Branch)		Y
NZ Westpac	2002	September	12	General Disclosure Statement	Westpac Banking Corporation (NZ Division and NZ Branch)		Y

Table 3 7: Full list of bank annual reports used in this research project (34 of 35)
NZ Westpac 2001 to NZ Westpac 1989

Institution	Year	Year End	Months reported	Name of Report	Reporting Entity	Comments	Data in sample (Yes/No)
NZ Westpac	2001	September	12	General Disclosure Statement	Westpac Banking Corporation (NZ Division and NZ Branch)		Y
NZ Westpac	2000	September	12	General Disclosure Statement	Westpac Banking Corporation (NZ Division and NZ Branch)		Y
NZ Westpac	1999	September	12	General Disclosure Statement	Westpac Banking Corporation (NZ Division and NZ Branch)		Y
NZ Westpac	1998	September	12	General Disclosure Statement	Westpac Banking Corporation (NZ Division and NZ Branch)		Y
NZ Westpac	1997	September	12	General Disclosure Statement	Westpac Banking Corporation (NZ Division and NZ Branch)		Y
NZ Westpac	1996	September	12	General Disclosure Statement	Westpac Banking Corporation (NZ Division and NZ Branch)		Y
NZ Westpac	1995	September	12	New Zealand Prospectus 15 December 1995	Westpac Banking Corporation (NZ Division and NZ Branch)		Y
NZ Westpac	1994	September	12	New Zealand Prospectus 20 December 1994	Westpac Banking Corporation (NZ Division and NZ Branch)		Y
NZ Westpac	1994	September	12	New Zealand Prospectus 20 June 1995	Westpac Banking Corporation (NZ Division and NZ Branch)		N
NZ Westpac	1993	September	12	New Zealand Prospectus 20 June 1994	Westpac Banking Corporation (NZ Division and NZ Branch)	Dec 93 prospectus missing but this report provides 92/93 data	Y
NZ Westpac	1992	September	12	New Zealand Prospectus 18 December 1992	Westpac Banking Corporation (NZ Division and NZ Branch)		Y
NZ Westpac	1991	September	12	New Zealand Prospectus 24 June 1992	Westpac Banking Corporation (NZ Division and NZ Branch)	Dec 91 prospectus missing but this report provides 91/92 data	Y
NZ Westpac	1990	September	12	New Zealand Prospectus 21 December 1990	Westpac Banking Corporation (NZ Division and NZ Branch)		Y
NZ Westpac	1990	September	12	New Zealand Prospectus 26 June 1991	Westpac Banking Corporation (NZ Division and NZ Branch)		N
NZ Westpac	1989	September	12	New Zealand Prospectus 22 December 1989	Westpac Banking Corporation (NZ Division and NZ Branch)		Y
NZ Westpac	1989	September	12	New Zealand Prospectus 22 June 1990	Westpac Banking Corporation (NZ Division and NZ Branch)		N

Table 3 7: Full list of bank annual reports used in this research project (35 of 35)
NZ Westpac 1988 to NZ Westpac 1987

Institution	Year	Year End	Months reported	Name of Report	Reporting Entity	Comments	Data in sample (Yes/No)
NZ Westpac	1988	September	12	New Zealand Prospectus 22 December 1988	Westpac Banking Corporation (NZ Division and NZ Branch)		Y
NZ Westpac	1988	September	12	New Zealand Prospectus 22 June 1989	Westpac Banking Corporation (NZ Division and NZ Branch)		N
NZ Westpac	1987	September	12	New Zealand Prospectus 28 June 1988	Westpac Banking Corporation (NZ Division and NZ Branch)	Dec 87 prospectus missing but this report provides 86/87 data	Y

4 Typology of credit loss and provisioning reporting

4.1 Introduction

Banks make charges against profits and reduce the value of loans recorded in their balance sheets when they have reason to believe that borrowers will default on those loans. Such loan-loss provisions are typically one of the first quantitative indicators of deterioration in loan quality and, at the same time, a key contributor to fluctuations in bank profits and capital. Understanding the determinants of provisions is therefore important for assessing fundamental credit risks in a particular market, or more generally, the stability of a particular financial system.

Many researchers have therefore focused on these bad debt provisioning data, mostly relying on data series supplied by external data providers (e.g. Bankscope database of Fitch-IBCA used by Bikker & Metzemakers, 2003). Reliance on such data limits a researcher's control of how the data have actually been transferred and adjusted from reported accounts. Moreover, these series in the best case range back to the early nineties only. To study the credit loss dynamics in a particular financial system in more detail and over a longer period of time, one will have to source information from the original bank financial reports, an approach, for example, taken by Pain (2003) for the UK and Kearns (2004) for the Irish banking system.

Despite this use of provisioning data, there seems to be no documentation of how these data were actually extracted from published financial accounts in any of these studies. Furthermore, commercial data providers remain vague as to their methods of transferring and adjusting such data, limiting themselves to a generic description of data items. The motivation for analysing this extraction process in more detail has transpired in the course of compiling the database for this thesis back to 1980, i.e. the time when such information was divulged for the first time. One finds that there have been many variations of disclosure of loss and provisioning data, both through time and between institutions. Accordingly, this chapter proposes a reporting typology which describes (1) the stocks of provisions, (2) the method of accounting for annual

provision charges to P&L, (3) debt write-offs and, finally, (4) recoveries. This typology defines the informational content of the bank's reporting and forms the basis of capturing credit loss and provisioning data into a standardized template proposed here.

The chapter will proceed as follows. The next section provides a brief review on accounting for loan losses, which is followed by the explanation of the proposed reporting typology using two numerical examples (section 3). Section 4 then presents the standardized template and how the typology defines the informational content of the financial accounts. The chapter concludes with some sample time series extracted through this template.

4.2 Accounting for loan losses

The literature review in chapter 2 has provided a primer on loan loss provisioning. In preparation of the subsequent development of a reporting typology, this section gives an abbreviated review of the key transactions occurring.

A provision for loan losses, or more generally, a provision for a credit loss on any of a bank's claims, is an expense set aside as an allowance for 'bad debt' caused by customers actually defaulting or a related event, such as the terms of a loan having to be renegotiated because of a weak borrower. The amount of such expected losses recognized in the profit and loss statement (P&L) is deducted from the appropriate category of assets as (1) a specific provision for impairment if the loan concerned has been identified or (2) as a general provision for impairment, called 'collective provision' under the new IFRS terminology[54], if assets have not been specifically identified.

[54] Revised provisioning rules under IFRS for Australia are embodied in AASB 139 (AASB, 2004b). They impose a higher threshold for a provision to be recognized as a collective provision than the more loosely formulated former rules under AAS 1032, 7.2.1 (AASB, 1996) for general provisions. For the empirical analysis in this thesis, IFRS rules have no relevance however as the observation period ends in 2005.

The transactions above are visualized in Figure 2-1 (chapter 2) without distinguishing between specific and general provisions. The banks maintain a counter-asset provision account whose opening balance is the difference between the gross loan amount and the net loan amount, i.e. the portion of the loan portfolio it does not expect to collect. If it identifies potential loan losses during the accounting period, it will charge them to the P&L while at the same time crediting the loan loss provisions account.

Write-offs, also called derecognitions, of such impaired assets then occur at a later point in time when the bank actually loses control of its contractual rights on the claim, for example, if the loan is sold or legal rights are otherwise extinguished. At that point, the corresponding provision is removed (debited) in an offsetting transaction. In some instances such derecognized bad debt might still be recovered, at which time the value recovered above the expected amount is debited to the loan asset (gross loans) and the corresponding provision reinstated, respectively directly applied to reduce the bad debt charge in the P&L by some banks.

An alternative approach for looking at bad debt is to follow the life cycle of a loan that suffers a loss. This is illustrated by means of a simplified numerical example in Figure 2-2 (chapter 2) which does not consider the complexities of accounting for interest earned on defaulted loans.

When a loan is initiated, the bank will typically recognize a general provision ($50) against it which is maintained as a global provision for a whole portfolio of loans, i.e. not for specific loans. Once a potential loss has been identified and becomes reasonably probable, the bank will raise an additional specific provision ($350) against the loan which is in turn charged to the P&L statement. If the loss is confirmed, derecognition ($400) follows. Finally, some portion of the loan ($700) may eventually be recovered. If more than the carrying value of the loan can be recovered, the bank recognizes the excess collected as recovery income ($100).

4.3 Developing typology of reporting for loan losses and provisions

The previous section has described accounting for loan losses in a generic way. The way financial institutions in Australasia have actually implemented it, or more importantly, how they have reported this information, has been subject to considerable variation both amongst institutions and also through time. This section first illustrates this heterogeneity in reporting for the case of New Zealand banks and then presents a general system for typifying the numerous methods of reporting and accounting for credit losses. A last sub-section provides an overview of the numerous reporting types that are observed in the sample of Australasian banking institutions.

4.3.1 Reporting of credit provisions by New Zealand banks

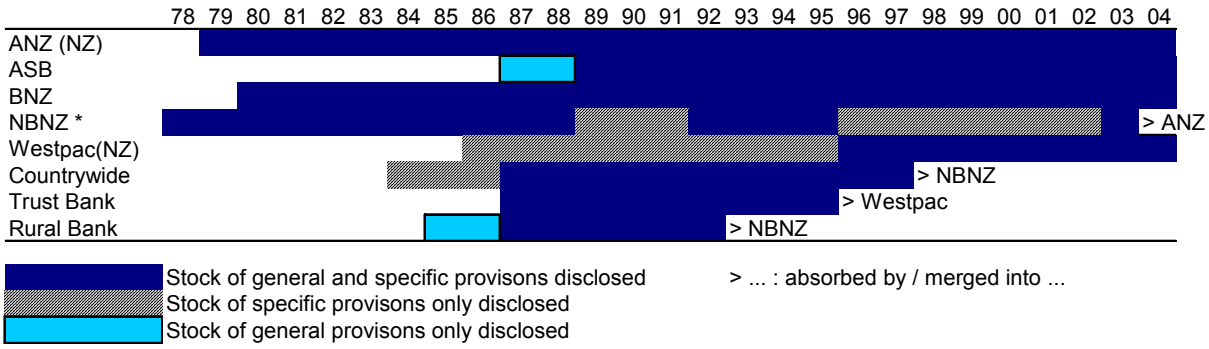
Provision information has both a static and a dynamic component. The first is the information on the balance of provisions at a particular point in time, sometimes termed 'stock of provisions' or 'loan loss reserves', the second comprises information on transactions in the provisions account that have occurred during the period. As shown in Figure 4-1 and Figure 4-2, banks in New Zealand started reporting static stocks of provisions before they began disclosing the movements in this account.

Dynamic flow information, however, provides deeper information about the bad debt charges and about which portion of the claims was eventually written off. Earlier bank reports typically disclosed such flow information not as a P&L data item but rather in inconspicuous footnotes. In some instances, this flow information was incomplete as banks avoided explicit disclosure of bad debt expense which then had to be derived indirectly from information on write-offs as well as beginning and ending provision balances. Similarly, debt recoveries were rarely explicitly disclosed in earlier years but rather netted with write-offs. Figure 4-6 in the appendix to this chapter illustrates an example for Westpac's New Zealand division on how time

series can be extended backwards by deriving some key data elements like net loan write-offs for the period from other data items reported.

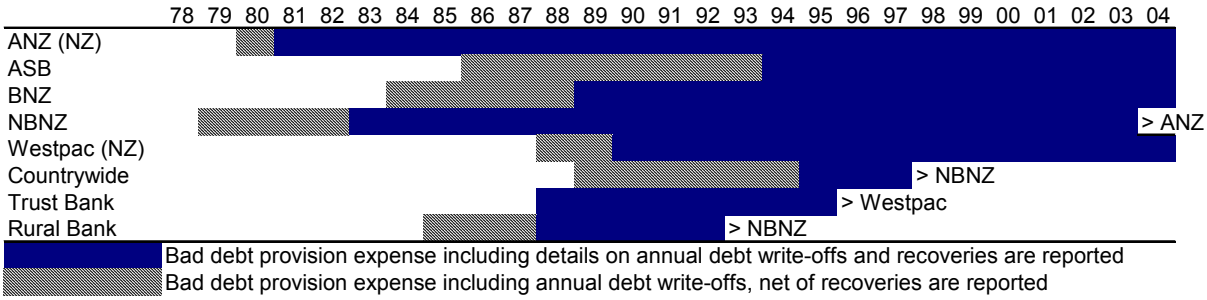
Overall (and the following comment also applies to Australian banks), extended time series of data are more easily obtainable for institutions with roots as privately owned commercial banks than for (formerly) publicly owned banks, like BNZ or state banks in Australia, which were more tardy in embracing detailed provision reporting. Likewise, data series are shorter for banks that have converted from special statutes institutions during the sample period, e.g. from building societies or trust banks (in New Zealand).

Figure 4-1 NZ banks disclosure of stock of loan loss provisions



* Both NBNZ and Westpac had a policy of not disclosing separate general provisions over much of the observation period. These were held by the parent bank as part of a global provision without breaking out a New Zealand component. In fact, Westpac abandoned this practice in 2003 only. Previous general provisions had been provisions associated with the acquisition of Trust Bank (NZ) only.

Figure 4-2 NZ Banks disclosure of annual bad debt expense, write-offs and recoveries



4.3.2 Typifying accounting and reporting of credit losses and provisions

The general typology of loan loss and provisioning reporting proposed here was developed in the process of compiling the comprehensive collection of credit loss and provisioning data required for the empirical work of this thesis. While the full data sample described in chapter 3 includes a total of 33 Australian and New Zealand banks, the typology presented here is described for a slightly smaller sub-sample of 15 Australian and 9 New Zealand banks. There is no impediment to classifying the reporting of other banks in the sample or in other markets using this methodology.

The typology is based on four sub-categories. The first one (STK) captures the characteristic of static provisioning data or stock of provisions while the remaining three categories describe the reporting and accounting of flow data. The first flow category typifies the transaction shown in the provisioning accounts, the second the nature of reporting write-offs (W) and, finally, the third the way recoveries of claims previously written off are shown (R).

While a full description of each sub-category including detailed sub-codes assigned for each type of reporting is provided in Table 4-4 in the chapter appendix, it is more meaningful to explain the classification process through two numerical examples.

Example 1 in Figure 4-3 shows one of the methods of reporting as they were observed in the sample by means of illustrating them in simple T-accounts. It shows the four accounts in which transactions related to loan loss provisioning will occur. In this Example 1, write-offs ($40) and recoveries ($20) are reported as movements in the specific provisions account with any additional specific provisions required ($50) funded from the general provisions account. The net increase in general provisions ($80) thus becomes the bad debt charge shown in the P&L.

Many alternative practices of reporting these same transactions shown in Figure 4-3 have been observed, however. Most banks fund required additions to their provisions in both specific and general accounts directly from the P&L. One could characterize this as a parallel provisioning accounting type instead of the serial accounting shown in Figure 4-3. Other differences relate to the accounts the write-offs and recoveries are shown in. In particular, there is a variety of approaches when booking recoveries which can be shown either in one of the provision accounts or directly as an offset to bad debt charges in the P&L.

With regard to write-offs, there are some reporting formats which reveal additional information compared to Example 1 in Figure 4-3. Example 2 in Figure 4-4 depicts such a format where only the write-offs of loans for which the bank had already provided for ($25) are debited to specific provisions while unanticipated problem loans are written off directly to the P&L ($15). This additional information can, for instance, be useful to study the quality of a bank's credit risk management system. Note also that in this second example, recoveries are booked directly to the P&L to offset bad debt expense there.

Figure 4-3 Example 1: sample structure of reporting credit provisions and write-offs

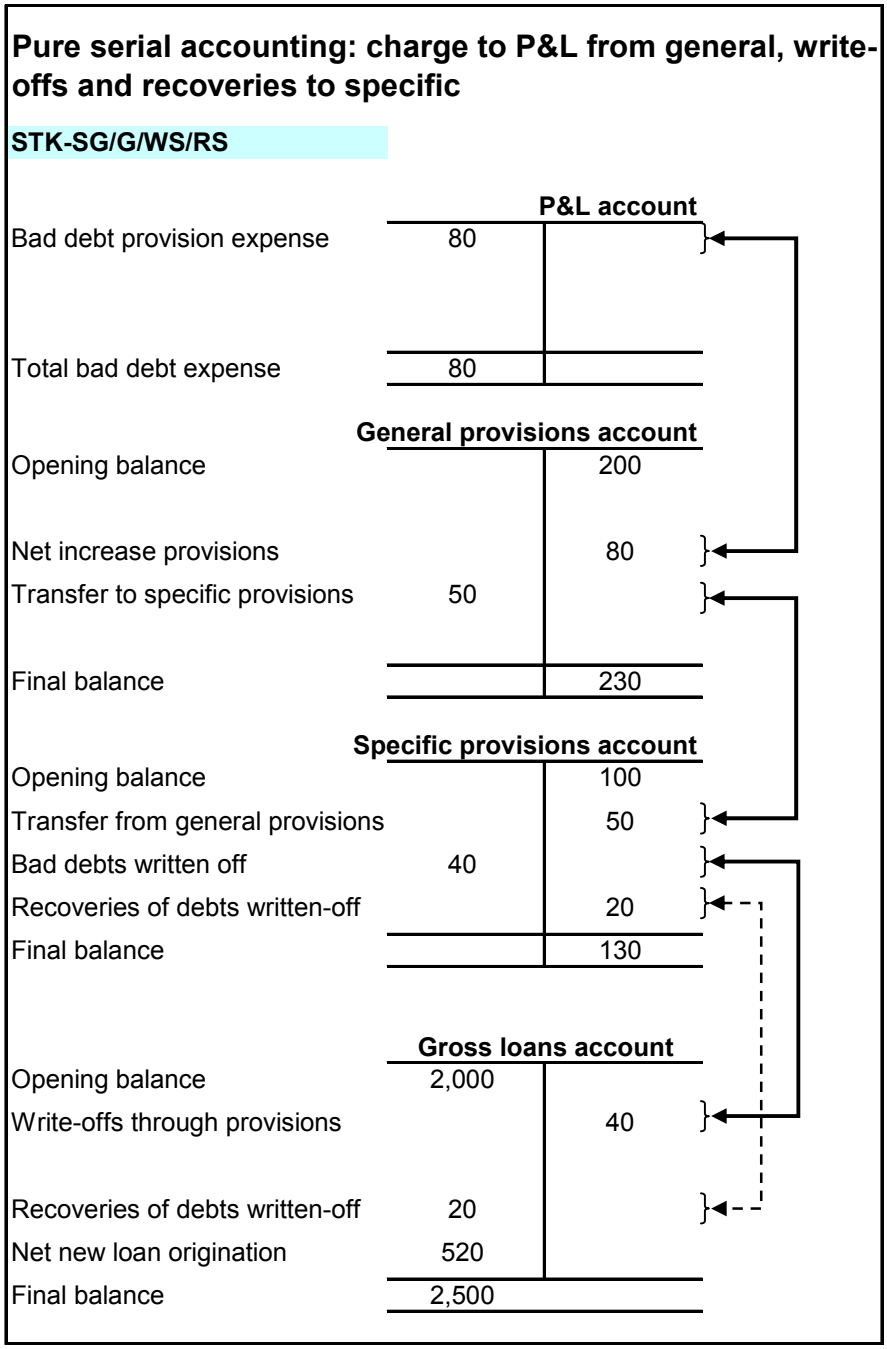
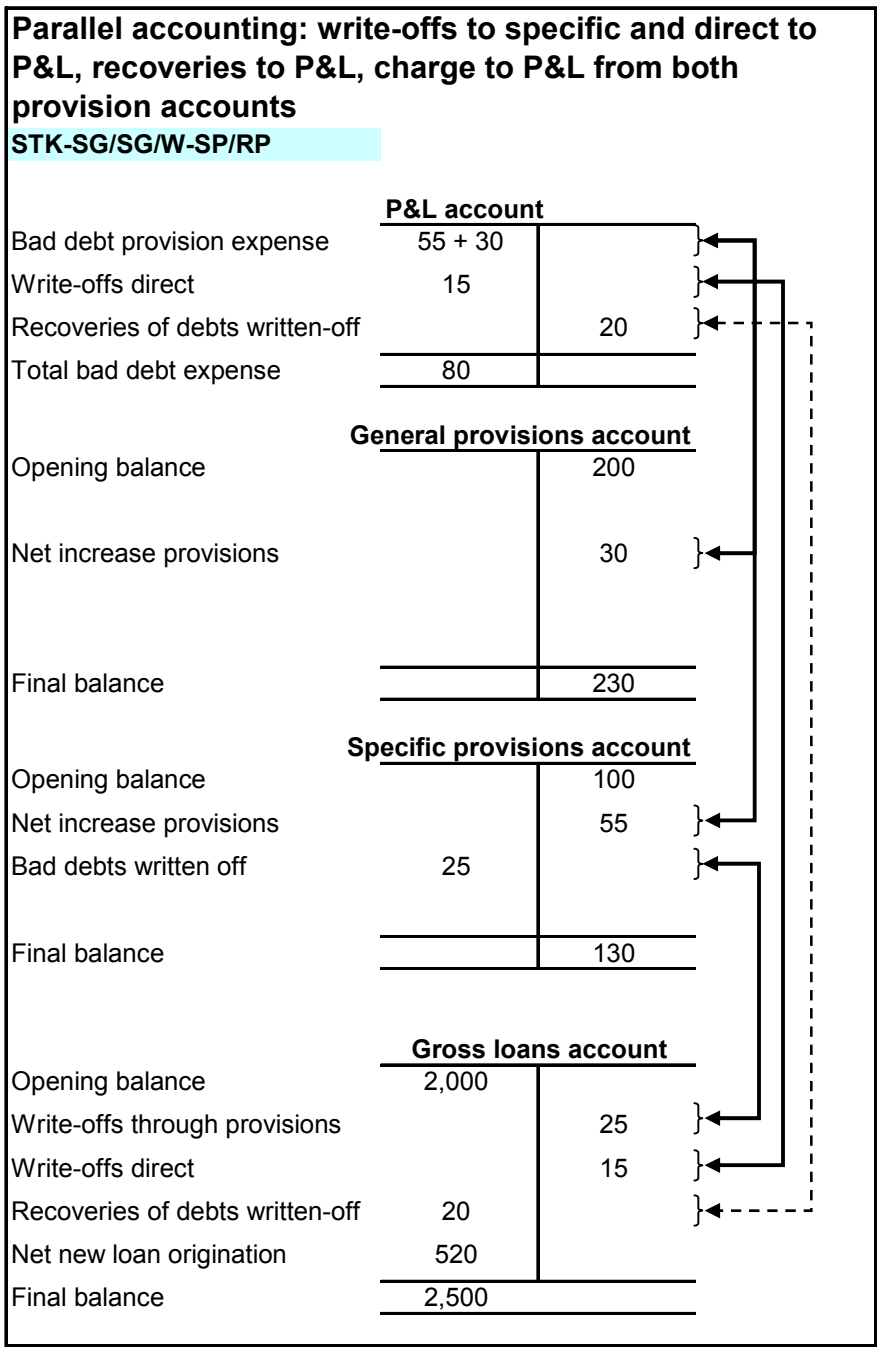


Figure 4-4 Example 2: sample structure of reporting credit provisions and write-offs with additional information on write-offs.



The process of typifying the reporting formats of example 1 (Figure 4-3) and example 2 (Figure 4-4) is shown in Table 4-1. It starts with the existence, respectively absence, of provision accounts in the reports. STK-SG means that both the stock of specific and general provisions is shown. In earlier years of reporting, banks sometimes just showed one combined provisions account which would then be typified as STK-C.

The next step typifies the funding method of provisions. In the first example, the increase of general provisions only will be charged to the P&L (G), in the second case the sum of net increases in both accounts is charged (SG). The write-offs are shown in the specific provisions account in the first example (WS), while part of these write-offs are charged directly to the P&L in the second example (W-SP). Finally, the recoveries are shown with specific provisions in the first case (RS) and charged directly to the P&L in the second (RP).

Table 4-1 Typifying the reporting formats of the two numerical examples

	Example Figure 4-3	Example Figure 4-4
Stock of provisions (STK)	STK-SG	STK-SG
Charges to P&L from …	G	SG
Write-offs shown in …	WS	W-SP
Recoveries shown in …	RS	RP
Type	STK-SG/G/WS/RS	STK-SG/SG/W-SP/RP

Note:
A complete decision table for typifying the reporting is shown in Table 4-4.

4.3.3 Typologies observed in the sample of Australasian banks

In summary, a total of 20 different main reporting types for Australasian banks could be identified over the sample period (see Table 4-2). As there are also variations within a type, especially with regard to reporting of recoveries, one can distinguish a total of 27 types. Moreover, this table does not include the types which do not report meaningful flow information (i.e. stocks reported only - STK-SG/O/WO/RO) or no provisioning information at all (i.e. STK-O/O/WO/RO). For additional details, Table 4-5 for New Zealand (page 171) and Table 4-6 for Australia (page 172) in the appendix to this chapter show the reporting types through time for each of the 24 institutions considered in this typology analysis.

Table 4-2 Reporting types observed in Australasian banking sample

STK-SG/SG/W-SP/RP	STK-SG/G/W-SG/RG	STK-S/S/W-SP/RP
…/W-SG/RS	…/WS/RS	…/WS/RS or RO
…/W-SG/RP or R-SG	…/WS/RO	
…/W-SG or W-SP/RG or RO	…/WS/RG	STK-C/C/WP/RO
…/WS/RS		…/WC/RC
…/WS/RP or RG	STK-SG/C/W-CP/RP	
…/WS/RP	…/W-CP/RO	
…/WS/RO	…/W-CP/RC or WC/RC	
…/WP/RO		

4.4 Data template and informational content of reporting types

The typology developed in the previous section serves as the basis for capturing credit loss and provisioning information for subsequent empirical analysis. Each type is characterized by its informational content which in turn determines the data items that can be extracted into a standard template proposed in this section.

4.4.1 Data template

To capture credit loss and provisioning data, the template shown in Table 4-3 has been set up. The first two data items are again the static stock of specific and general provisions (1) & (2), the second portion of the table captures the movements in a combined general and specific provisions account. The usual transactions in this account are (3) write-off of debts, which reduces provisions, respectively (5) new provisions funded from the P&L (charge to P&L) and (4) debt recoveries, which both increase provisions (credit transaction). Typical examples of other transactions (6) are provisions added as a result of acquisitions, respectively removed as a consequence of disposals. For banks with international loan portfolios like some of the larger Australian banks, currency translation effects are also a regular component of other transactions (6). In earlier years, banks would sometimes fund bad debt provisions from their contingency reserves (a component of a bank's equity). Such transactions were considered as funded from the P&L as they in fact constitute a bad debt expense booked directly against equity.

The third and last section of Table 4-3 captures details of the charge to the P&L and thus also provides an insight into transactions that occurred in each of the two provisioning accounts. Item (7) are the specific, respectively item (8) the general, provision component of charges to P&L. This section also provides information on the so-called direct write-off component (9) which some banks will book if loans are written off for which no specific provision had been set aside.

Finally, item (10) (Other) is used for special adjustments as shown by the following examples. In some instances, banks fundamentally changed their method of provisioning which distorted the actual bad debt experience for a particular year. Most banks, for instance, switched to statistical provisioning in the 90s which created discontinuities in general provision series. Another case was Westpac's 2003 transfer of general provisions from the parent to the NZ division's balance sheet. This special adjustment was then used to show bad debt charges that were judged to be more adequate for the year's loan loss experience.

Special adjustments were, however, also included when a bank, in order to window-dress its accounts, resorted to reporting larger loan-asset write-downs as an extraordinary or exceptional item. If such additional charges were judged to have the characteristics of bad debt expense, they were added to the bad debt charge without corresponding transactions in the provisioning accounts. Especially earlier in the observation period, some banks made liberal use of extraordinary cost reporting in order to show more favourable "ordinary" earnings but accounting standards have been tightened through time. There are still issues in this regard, if a bank, for instance, spins off a loss making subsidiary below book value, thereby avoiding an explicit bad debt charge for impaired loans in these subsidiaries.[55]

An example of a comparable adjustment was the case of the Rural Bank of New Zealand, where in March 1989, in preparation of the bank's privatisation, loan provisions were booked directly against equity reserves that had been formed after the conversion of government-held borrowings. While no explicit bad debt charges were thus shown in the P&L, this write-down of reserves was classified as a bad debt expense.

[55] The 2002 disposal of NAB's US operations at a loss is a recent example. Most of the approximately AUD 2 billion write-down was, however, related to a value adjustment of mortgage servicing rights and not to loan losses in these subsidiaries (see note NAB annual report 2001, note 5, p. 78).

Table 4-3 Data items of credit loss and provisioning template

Stock of provisions	Stock of provisions specific	(1)
	Stock of provisions general	(2)
Movement in provisions / flow information	Starting total provision	
	- Bad debt written off	(3)
	+ Recoveries debts written off	(4)
	+ Charge/(credit) to P&L	(5)
	+/- Other transactions	(6)
	Ending total provision	(1)+(2)
Details bad debt charge to P&L	+ Specific provisions additions	(7)
	+ General provisions additions	(8)
	+ Direct write-offs	(9)
	- Recoveries	(4)
	+/- Other (plug)	(10)
	Total charge to P&L	(5)

4.4.2 Informational content of reporting types

The informational content of the credit loss and provisioning reporting is given by its type. The four components of the typology (STK, charge to P&L, W, R) in essence determine which data element can be captured into the template described in the previous sub-section. Table 4-7 in the appendix (page174) depicts this relationship.

As the template combines the two provisioning accounts into one, all reporting formats (except "O") allow the extraction of the total bad debt charge to P&L. For data analysis that needs to distinguish between the specific (non-discretionary) and the general (discretionary)

component of this expense, reporting formats are more convenient that fund provisions in both accounts directly from P&L. However, even with the common format in which specific provisions are funded from general provisions (e.g. as in Figure 4-3), one can derive reasonable estimates of the components. The funding from general is then simply treated as the specific provision element while the balance (of total bad debt charge) is the general component.

Distinctive differences in informational content are present in the reporting of write-offs and recoveries. Firstly, only net write-offs can be extracted if recoveries remain undisclosed (RO) as happened often earlier in the observation period. Secondly, a distinction between 'planned' write-offs (for which provisions have been made) and 'unplanned', here called direct write-offs (for which no provisions have been set aside) can only be captured with the W-SP, W-SG or W-CP reporting types. Lastly, there is a chance for extracting at least net write-offs even if these write-offs are not specifically reported (WO). This is the case if bad debt charges are disclosed and net write-offs can then be derived as an implied offsetting transaction in the combined provision account.

4.5 Visualization of selected provisioning and loss data

This section presents selected charts that have been derived using times series obtained by the methodology developed and described in this chapter. Some bank individual time series have already been shown and reviewed in chapter 3 and the following chapters 5 and 6 will analyse them more formally through panel data analysis. The following Figure 4-5 thus simply provides some initial insights into the overall credit loss dynamics for New Zealand as well as an impetus for the development of hypotheses to be explored in the remainder of this thesis.

The charts in Figure 4-5 firstly illustrate that BNZ and, to a lesser extent Rural Bank, were faced with the bulk of loan losses in the system crises of late 1980s and early 1990s. While the top chart shows absolute $ amounts of provisioning, it is equally meaningful to view provisions in proportion to loans outstanding. This is done in the second chart of Figure 4-5 which distinguishes between specific and general provisions. For this purely illustrative second chart,

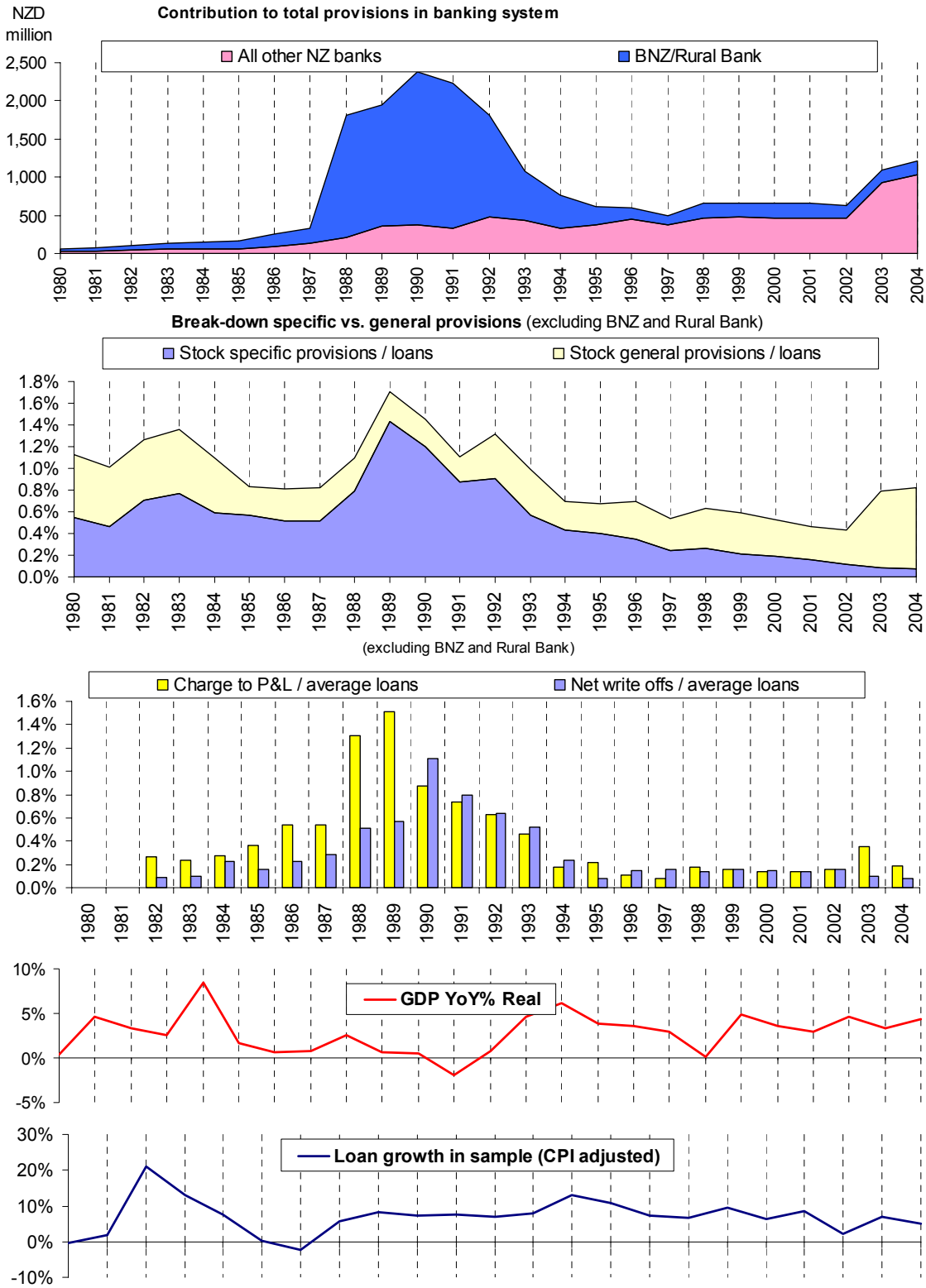
BNZ and Rural Bank have been excluded in order to follow the break-down of provisions for the banks which have survived the 1990 system crisis without external support. One notices that in the favourable economic climate of the past 10 years, specific provisions have been declining while the share of general provisions has grown. The 2003 bulge in additional provisioning is due the first time recognition of general provisions by NBNZ and Westpac in their NZ operations balance sheets. These provisions were previously held by their respective overseas parent banks (Westpac, Lloyds TSB for NBNZ). Banks have also switched to statistical provisioning regimes during this time which may have kept overall provisions at about constant levels.

The third chart in Figure 4-5 shows the percentage of loans charged as bad debt expense to the P&L and written off in each year. Again, BNZ and Rural Bark are not part of this cumulative analysis. One notices the lagged relationship of write-offs relative to provision charges to P&L. It thus seems worthwhile to explore the characteristics of such alternative series measuring a bank's credit loss experience (CLE) further.

The figure also graphs real annual GDP growth for New Zealand. The prolonged low growth phase of the NZ economy starting with the deregulation of 1985 culminated in substantial loan losses culminating in 1991, i.e. about one year before the corresponding peak in Australia. Without employing sophisticated econometric techniques, it seems as if later dips in growth have not impacted credit losses in a similar way.

The fifth and last chart of Figure 4-5 is motivated by the common observation, e.g. in research by Clair (1992) and Fernández de Lis et al. (2000), that fast expanding banks are often faced with rising credit losses in subsequent years when the true risks of their lending becomes apparent. Accordingly, the series showing the CPI adjusted loan growth in the universe of New Zealand banks is shown at the bottom of Figure 4-5. On a cumulative basis, loan growth does not appear to be an immediate indicator of loan losses to come. It rather seems this question will have to be investigated on a bank specific level since relative growth differentials between banks might be more important.

Figure 4-5 New Zealand banks: cumulative provision and write-off data



4.6 Chapter summary and conclusion

This chapter has presented a method for typifying the reporting of loan loss and provisioning data in bank financial accounts. This then serves as the basis to capture these data into a standardized template developed to capture equivalent informational content. This process, while quite time consuming, is nevertheless vital in order to provide the foundation for a consistent extraction of loan loss and provisioning information for subsequent empirical research. Current literature does not elaborate on this process and the methods used by financial data providers remain essentially undocumented. Moreover, commercial providers are typically unable to deliver time series back to the late 70s and early 80s so the researcher is forced to extract information from published annual accounts.

The methodology presented here has been motivated by the work of compiling the comprehensive data base of historical financial data for Australasian banks for this thesis. It is found that the reporting of credit loss and provisioning varied considerably both through time and also between institutions. To be more specific, a total of 27 reporting types in accordance with above typology are detected for a time span from 1980 to 2004.

Typology and data template developed here should be equally useful for application in other geographic areas. The study of credit risks requires long data series often not available from standard sources and this is exactly where the techniques developed in this chapter will provide value to a range of researchers.

Appendices chapter 4

4.7 Appendices typology of loan loss reporting chapter 4

4.7.1 Extending data series through deduction

In some earlier year financial accounts, banks have sometimes provides incomplete provision flow information in their account. The accounts of Westpac Corporation's New Zealand division for 1989 are an example. The division reported beginning and ending balance of provisions and disclosed NZD 12.4 million write-offs from provisions (Prospectus 22 December 1989, p. 13). A later year prospectus (Prospectus 18 Dec. 1992, p. 6) reported bad and doubtful debt expense of NZD 47.7 million for the 1989 year per 30/9/89. As shown in Figure 4-6, these data allow deriving both the total of write-offs for 1989 and the amount directly written-off to the P&L.

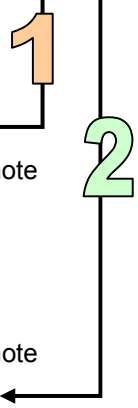
Figure 4-6 Example for deriving missing loan write-off data in Westpac's NZ Division (1989 accounts)

1989 DATA

	P&L account		
Opening balance 1/10/1988	0		
Net new provisons	34.3		
Direct write-offs*	13.4		DERIVED
Final balance 30/9/89	47.7		reported

	Specific provision account		
Opening balance 1/10/1988		16.4	reported
Net new provisions		34.3	DERIVED
Write-offs from provisions	12.4		reported in footnote
Final balance 30/9/89		38.3	reported

	Gross loans account		
Opening balance 1/10/1988	3,827.8		reported
Write-offs from provisions		12.4	reported in footnote
Direct write-offs*		13.4	
Net new loan origination	669.2		derived
Final balance 30/9/89	4,471.2		reported



* Direct write-offs net of recoveries

4.7.2 Typology decision table

The table below presents the decision criteria to set the appropriate typology code for provision/loan loss reporting. This code consists of four elements. The first one describes the reporting of the static stock of provisions; the remaining three characterize the dynamic reporting of provisions, write-offs and recoveries respectively.

Table 4-4 Typology decision table

Stock of provisions (STK)		
Stock of provisions specifically shown	STK-O	Not shown (net loans shown only)
	STK-S	Specific provisions
	STK-G	General provisions
	STK-SG	Specific and general provisions
	STK-C	Combined balance shown only
Activity in provision account(s)		
Annual provision charge to P&L shown	O	Not shown. Typically stock of provisions shown only.
	S	Shows annual charge to P&L of specific provisions.
	G	Shows annual charge to P&L of general provisions.
	SG	Shows annual charge to P&L of specific and general provisions.
	C	Annual charges to P&L from an account combining general & specific provision balances

Table 4-4 Typology decision table (continued)

Debt write-offs (W)		
Debt write-offs shown in financial statements	WO	Not shown, typically stock of provisions shown only.
	WS	All write-offs debited to specific provisions.
	WG	All write-offs debited to general provisions.
	WC	Write-offs from an account combining general & specific provision balances.
	W-SP	Write offs split into debits to specific provisions and direct write-offs to P&L.
	W-SG	Write offs split into debits to specific provisions and debits to general provisions.
	W-CP	Write-offs from an account combining general & specific provision balances and directly to P&L.
Debt recoveries (R)		
Recoveries of claims written off in earlier periods are specifically shown	RO	Not specifically shown. Typically R are netted with debt write-offs.
	RS	R are credited to specific provisions.
	RG	R are credited to general provisions.
	R-SG	R are credited to general & specific provisions.*
	RP	R are credited to P&L debt expense account.
	RC	Recoveries from an account combining general & specific provision balances.

Note:
* as a very rare format, State Bank of Victoria (AU SB Victoria) 1989/1990 distinguished between recoveries of debt they had originally provided for and recoveries on debts written off directly.

4.7.3 Typology tables for New Zealand and Australian banks

Table 4-5 Typology of New Zealand banks

	NZ ANZ	NZ ASB	NZ BNZ	NZ NBNZ	NZ Westpac	NZ Countrywide	NZ Trustbank	NZ Rural Bk	NZ UnitedBk
STK-SG/SG/W-SP/RP					1996-2003	1996-1998			
STK-SG/SG/W-SG/RS									
STK-SG/SG/W-SG/RP or R-SG		1994-2004, 1990-1993(RO)							
STK-SG/SG/W-SG or W-SP/RG or RO									
STK-SG/SG/WS/RS	1980-1997		1991-1999	2003, 1978 to 1988			1989-1996		
STK-SG/SG/WS/RP or RG									
STK-SG/SG/WS/RP									
STK-SG/SG/WS/RO			1987-1990			1990-1995			1992 (i)
STK-SG/SG/WP/RO									
STK-SG/G/W-SG/RG									
STK-SG/G/WS/RS			2000-2004						
STK-SG/G/WS/RO									
STK-SG/G/WS/RG	1998-2003								
STK-SG/C/W-CP/RP									
STK-SG/C/W-CP/RO									
STK-SG/C/W-CP/RC or WC/RC					1990-1995 (ii)			1989-1992 (RP)	
STK-S/S/W-SP/RP									
STK-S/S/WS/RS or RO				1989-2002				1987-1988	
STK-C/C/WP/RO									
STK-C/C/WC/RC									

(i) NZ UnitedBk reported stock of provisions only from 1987-1991
(ii) Some data derived before 1990 from reported data

Table 4-6 Typology of Australian banks

	AU ANZ	AU CoWthBk	AU NAB	AU Westpac	AU BkofQld	AU BkWest	AU St. George	AU SB NSW
STK-SG/SG/W-SP/RP				1988-1990	1998-2000			
STK-SG/SG/W-SG/RS	1989-1993							
STK-SG/SG/W-SG/RP or R-SG								
STK-SG/SG/W-SG or W-SP/RG or RO		1991-1995 (W-SP 1991,92)		1987, 1991-2001				
STK-SG/SG/WS/RS	1980-88, 1994		1989-1997			1989-1995 (ii)	1998-2000, 2002-2004	
STK-SG/SG/WS/RP or RG					2001-2005 (RP)	1988 (RG)		1997-1999 (RP)
STK-SG/SG/WS/RP	1995-1997					1996-2002	2001	
STK-SG/SG/WS/RO							1996, 1997	1990-1995
STK-SG/SG/WP/RO							1993 -1995	
STK-SG/G/W-SG/RG		1980-1982, 1996-2004		2002-2004				
STK-SG/G/WS/RS			1988, 1998-2004					
STK-SG/G/WS/RO								1988, 1989 (i)
STK-SG/G/WS/RG	1998-2004							
STK-SG/C/W-CP/RP					1989-1997			
STK-SG/C/W-CP/RO								
STK-SG/C/W-CP/RC or WC/RC		1986-1990, 1983-1985 (WC/RC)	1981-1987 (WC/RC)	1980-1986 (WC/RC)	1980-1988 (WC/RC)			
STK-S/S/W-SP/RP								
STK-S/S/WS/RS or RO								
STK-C/C/WP/RO							1989 -1992	
STK-C/C/WC/RC						1984-1987		

(i) Contingencies reserves serve as general provision before 1988
(ii) Some funding of specific provisions from general
(iii) Some direct write-offs in 1993

Table 4-6 Typology of Australian banks (continued)

	AU SB Victoria	AU CommBk	AU CBC Sydney	AU ChallengeBk	AU BkMelbourne	AU AdvanceBk	AU SB SA
STK-SG/SG/W-SP/RP							
STK-SG/SG/W-SG/RS							
STK-SG/SG/W-SG/RP or R-SG	1989,1990 (R-SG) (vi)						
STK-SG/SG/W-SG or W-SP/RG or RO							
STK-SG/SG/WS/RS				1994, 1995			1990-1994 (iii)
STK-SG/SG/WS/RP or RG							
STK-SG/SG/WS/RP							
STK-SG/SG/WS/RO						1993-1996	
STK-SG/SG/WP/RO							
STK-SG/G/W-SG/RG							
STK-SG/G/WS/RS							
STK-SG/G/WS/RO							
STK-SG/G/WS/RG							
STK-SG/C/W-CP/RP					1992-1996, 1990-1991 (WC)		
STK-SG/C/W-CP/RO							1986-1987
STK-SG/C/W-CP/RC or WC/RC	1987,1988 (WC/RC)	1980-1982	1980-1982	1987-1993 (WC/RC) (iv)			1988,1989 (WC/RC)
STK-S/S/W-SP/RP							
STK-S/S/WS/RS or RO							
STK-C/C/WP/RO					1986-1989 (WO)	1986-1992 (v)	
STK-C/C/WC/RC							

(iv) 1987-1989 STK-C only

(v) Shows STK-SG in 1992

(vi) As a very rare format, AU SB Victoria 1989/1990 distinguished between recoveries of debt they had originally provided for and recoveries on debts written off directly.

4.7.4 Informational content of reporting types

Table 4-7 Data items available for each reporting type

			Stock of provisions		Movement in provisions / flow information						Details bad debt charge to P&L					
			Stock of provisions specific (1)	Stock of provisions general (2)	Starting total provisions	- Bad debt written off (3)	+ Recoveries debts written off (4)	+ Charge/(credit) income stmt. (P&L) (5)	+/- Other transactions (6)	Ending total provision (1)+(2)	+ Specific prov. additions (7)	+ General prov. additions (8)	+ Direct write-offs (9)	- Recoveries (4)	+/- other (plug) (10)	Total charge to P&L (5)
Stock of provisions (STK)																
Stock of provisions specifically shown	STK-O	Not shown (net loans shown only)														
	STK-S	Specific provisions (S)	X		X					X						
	STK-G	General provisions (G)		X	X					X						
	STK-SG	Specific and general provisions (SG)	X	X	X					X						
	STK-C	Combined balance shown only (C)			X					X						
Activity in provision account(s)																
Annual provision charge to P&L	O	Not shown. Typically stock of provisions shown only.						(iii)								
	S	Shows annual charge to P&L of specific provisions (S)						X			X	(ii) (X)				X
	G	Shows annual charge to P&L of general provisions (G)						X			(ii) (X)	X				X
	SG	Shows annual charge to P&L of specific and general provisions (SG)						X			X	X				X
	C	Annual charges to P&L from an account combining general & specific provision balances						X								X
Debt write-offs (W)																
Debt write-offs shown in financial statements	WO	Not shown, typically stock of provisions shown only				(iii)										
	WS	All write-offs debited to specific provisions				X										
	WG	All write-offs debited to general provisions				X										
	WC	Write-offs from an account combining general & specific provision balances.				X										
	W-SP	Write offs split into debits to specific provisions and direct write-offs to P&L				X							X			
	W-SG	Write offs split into debits to specific provisions and debits to general provisions				X							X			
	W-CP	Write-offs from an account combining general & specific provision balances and directly to P&L				X							X			

Footnotes shown and explained on next page.

Table 4-7 Data items available for each reporting type (continued)

			Stock of provisions		Movement in provisions / flow information						Details bad debt charge to P&L					
			Stock of provisions specific	Stock of provisions general	Starting total provisions	- Bad debt written off	+ Recoveries debts written off	+ Charge/(credit) income stmt. (P&L)	+/- Other transactions	Ending total provision	+ Specific prov. additions	+ General prov. additions	+ Direct write-offs	- Recoveries	+/- other (plug)	Total charge to P&L
			(1)	(2)		(3)	(4)	(5)	(6)	(1)+(2)	(7)	(8)	(9)	(4)	(10)	(5)
Debt recoveries (R)																
Recoveries of claims written off in earlier periods are specifically shown	RO	Not specifically shown. Typically recoveries are netted with debt write-offs														
	RS	R are credited to specific provisions					X							X		
	RG	R are credited to general provisions					X							X		
	R-SG	R are credited to general & specific provisions (i)					X							X		
	RP	R are credited to P&L debt expense account					X							X		
	RC	Recoveries from an account combining general & specific provision balances.					X							X		

(i) As a very rare format, AU SB Victoria 1989/1990 distinguished between recoveries of debt they had originally provided for and recoveries on debts written off directly.
(ii) These data items can be derived/estimated from transfers between provision accounts.
(iii) Can potentially be derived if either write-offs, respectively bad debt charges, are disclosed

5 Methodology

5.1 Introduction

This chapter presents the methodology employed to explore the credit loss dynamics in Australasian banking. The scope of data available has an important bearing on the type of analyses which can be conducted. The information specifically gathered from original bank financial reports is comparable to the data employed by Salas & Saurina (2002), Pain (2003) and more recently Kearns (2004). All three articles are country specific studies for the Spanish, the UK, and the Irish banking markets respectively. The authors are associated with their respective banking system supervisors. This has the advantage that they can partially rely on confidential data records which have also been used by authors like Arpa, Giulini, Ittner, & Pauer (2001) and Quagliariello (2004). Models applied in the above studies provide the methodological starting point for the principal model (see section 5.2) in this thesis.

In line with this literature, we apply a reduced form approach. As outlined in Pain (2003), a reduced form has its limitations as it does not explicitly link the drivers of loan losses to the loan loss experience itself. One will thus be able to answer the questions as to the sensitivities of loan losses to apparent drivers but one cannot explain the mechanism of how slower economic growth, for instance, translates into credit losses. The advantage of our approach is however the possibility of including a range of explanatory variables whose actions on the dependent variable are often complex and indirect.

In theory, there are numerous data items which could serve as a potential proxy for a bank's credit loss experience (CLE). These include ongoing provisions expense, stock of provisions (total, specific or general), level of impaired assets reported and loan write-offs. The existing literature does not generally elaborate on reasons for picking any particular one of them. Some discussion on this subject can be found in Pain (2003) which we extend in section 5.3. In subsection 5.3.1 we first construct and then explore a number of CLE ratio series and the

relationship between them. In particular, we study both contemporaneous and lead/lagged correlations among them (section 5.3.2.3). Moreover, it is important to define suitable reference levels to measure CLE against a bank's business volume. Only such ratios allow comparisons among banks. A study of issues related to the denominators of CLE ratios can be found in section 5.3.2.2.

Explanatory variables that drive observed CLE are discussed in section 5.4. In the first category are macroeconomic factors which include measures of general economic activity, the indebtedness of households and firms as well as the returns in the property and financial markets to gauge the impact of asset price shocks. The other group of explanatory variables (presented in section 5.4.2) are microeconomic or bank specific factors. They comprise the effects of past credit expansion, the bank's risk choice as reflected in the riskiness of its loan portfolio, the efficiency of a bank's credit monitoring, possible competitive effects of market power and, finally, other behavioural aspects including incentives for banks to engage in income smoothing and capital management activities.

5.2 The principal model

As indicated in the introduction, this thesis sets out to estimate a reduced-form relationship between key explanatory variables and a bank's credit loss experience (CLE). Accordingly, the principal model attempts to capture the credit loss experience of the banks as follows.

$$CLE_{it} = Const + \sum_{k=1}^{K}\sum_{s=0}^{z}\beta_{ks}x_{ki(t-s)} + \sum_{s=1}^{q}\delta_{s}CLE_{i(t-s)} + u_{it};\ \ i = 1,.....,n;\ \ t = q+1,....,T$$

Where

CLE_{it}	Credit loss experience for bank i in period t
x_{kit}	Observations of the potential explanatory variable k for bank i and period t
u_{it}	Random error term with distribution $N(0,\Sigma)$,
Σ	Variance-covariance matrix of σ_{it} error terms
n	Number of banks in sample
T	Years in observation period
K	Number of explanatory variables
z	Maximum lag of the explanatory variables of the model
q	Maximum lag of the dependent variable of the model

The principal model contains a static component of explanatory variables x with a dynamic component added (lagged x and CLE terms). The lagged CLE variable as an explanatory term is in line with assertions by Kim & Santomero (1993) who explain income smoothing as a consequence of Bayesian models used by banks when forecasting loan losses. These models update projected loan losses as a function of new information obtained from the new audit and the historical variance of loan loss rates over the bank's previous history. Not all previous research analysing CLEs has included a lagged CLE term. For instance, Cavallo & Majnoni (2001) have used a static model only while Pain (2003) has estimated both a static and dynamic formulation. Note that dynamics can also be captured by including several lags of the explanatory x variables (distributed-lag model), a special form of modelling within the generic

formulation of the principal model above. The actual formulation of the estimation model will be conducted in the following estimation chapter 6.

There are many potential proxies for a bank's CLE and a number of them will be constructed and evaluated in the next section. The explanatory variables explored thereafter are usually broken down into two groups. These are firstly macroeconomic factors which for instance capture economic and business cycles and, secondly microeconomic or bank specific variables which constitute drivers of credit losses at an individual institution level.

5.3 Proxies for credit loss experience (CLE)

There are number of potential proxies to measure CLE that have been used by earlier studies (see Table 2-2 in chapter 2). Typical CLE proxies employed are ratios with a numerator such as impaired asset charges, the stock of provisions, level of impaired assets or loan write-offs (the latter is called loan charge-offs in the US terminology of Sinkey Jr. & Greenawalt, 1991). The denominator is mostly chosen as the total balance of loans outstanding and in some cases total bank assets. In general, there is no deliberation in these papers as to why a particular CLE ratio was chosen.[56] An exception is Pain (2003) whose findings are discussed later in the section. This section applies and extends Pain's analysis to a larger number of potential CLE ratios. It first proposes and then explores the characteristics of 13 CLE proxies.

5.3.1 Construction of CLE proxies

Numerous data items in a bank's financial reporting provide information about its CLE (see Table 5-1 for an overview). Loan loss provisions, both as a period expense and as a stock, impaired assets (also called problem or delinquent loans by some researchers) and write-offs are the most obvious items for the overall loss experience. There are, however, more detailed

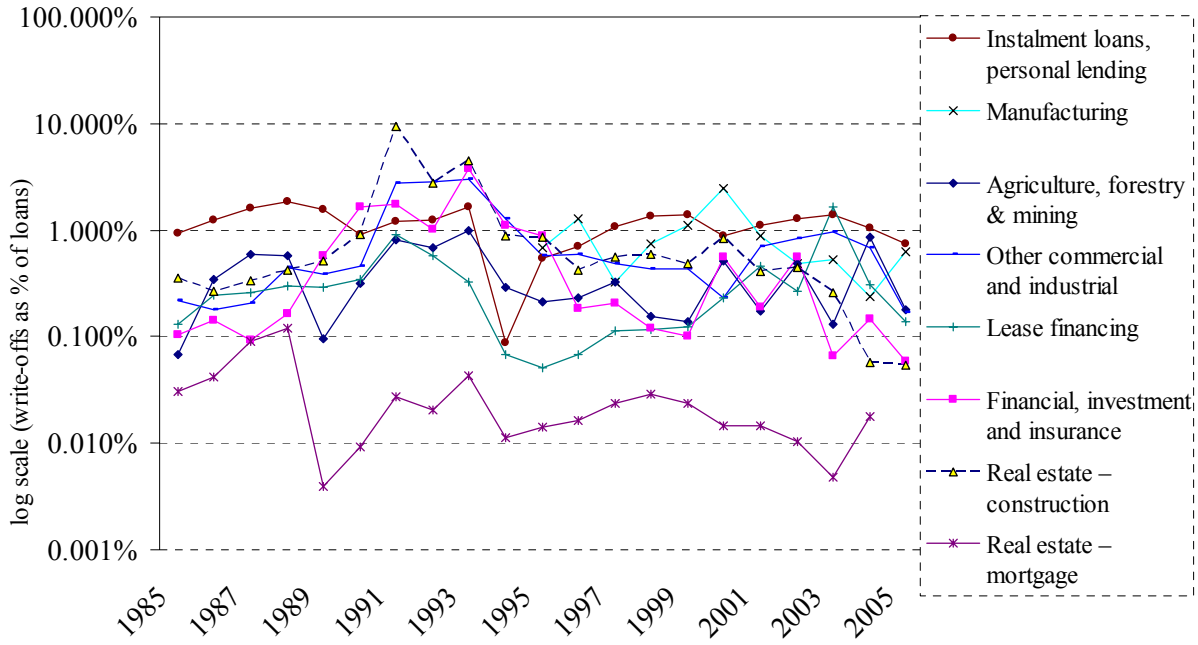
[56] The data in many studies are sourced from third party providers which possibly limits the choice of CLE proxies.

components of these main CLE data which are also disclosed. The stock of provisions can be split into specific and general components which provide information about the degree of certainty of the expected losses. Likewise, the period loan loss provisions (impaired asset expense) may be separated into a specific and general period expense. Some write-offs relate to loans for which previous provisions have been set aside in an earlier period while others, often labelled as 'direct write-offs', imply cases of more sudden credit events where loans are written off immediately, without first recognizing provisions.

The level of past due loans is another relevant item. Under common accounting definitions past due loans exclude impaired loans, i.e. the bank does not expect to suffer credit losses on these loans. We include it as a CLE proxy because past due loans might provide an indication of stress on creditors in the financial system or they may be a leading indicator of other CLE measures.

Finally, reporting of CLEs by geography and industry segment provides further insights into their characteristics. For illustration, Figure 5-1 below shows an example of NAB's disclosure of credit losses by lending segment from 1985 to 2005. This segment reporting, however, lacks a standardization of categories across the sample and disclosure in Australasia generally started in the mid 1990s only, i.e. after the major historical peak of credit losses. Moreover, disclosure is non-existent for some smaller banks with limited scope of activities. In the following construction of potential proxies, such segment CLEs have thus not been considered.

Figure 5-1 NAB: rate of loan write-offs by lending category



Whatever CLE proxy is chosen, it needs to be measured against a reference level. The literature generally sets it against the amount of total loans and sometimes total assets in the bank's balance sheet. For balance sheet CLEs such as the stock of provisions, the normal choice is the level of loans or assets at same balance sheet date. Conversely, period CLEs like bad debt expense or write-offs may be better compared against average levels of loans, respectively assets, observed during the whole accounting period.

There are, however, further potential ratio denominators which can be sourced from a bank's P&L statement. We could compare the CLE to the amount of interest income (either gross or net) or total operating income (the latter if we wish to consider credit losses stemming from non-balance sheet activities). In the following section (5.3.2.2), the properties of all these potential ratio denominators are explored.

In theory, the combination of CLE variables and potential ratio denominators would generate innumerable proxy ratios. For the following investigation, we focus on ratios based on loans and assets but also include a measure of bad debt expense against a denominator of gross

and net interest income, i.e. two types of P&L data items. An overview of CLE proxy ratios constructed for this study is shown in Table 5-2. It includes a ratio based on recoveries of bad debts previously written off. Strictly speaking, this is not a CLE proxy but it has been included to test its properties and in particular its correlation with other CLE ratios in the subsequent analysis. Note that all ratios are annualized for comparability, i.e. in cases of shorter or longer accounting periods, CLE data items sourced from the P&L have been adjusted.

Not all ratios constructed could be retrieved for all banks throughout the observation period. Figure 5-2 illustrates the percentage of banks in our database in existence at the time which reported the particular data item. As reporting of recoveries was patchy until the mid 1990s, net debt write-offs as % of loans provide a much more complete date series. Likewise, ratios based on impaired assets, past due loans and components of bad debt expense are available later in the observation period only. The general picture of CLE data availability does not change if we create the same figure for the Australian, respectively the New Zealand, sub-sample in Figure 5-3 and Figure 5-4. The reporting in Australia has nonetheless been more complete.

Table 5-1 Potential data to measure credit loss experience (CLE)

CLE variable	Description	General considerations, data availability & issues
Stock of provisions	Total level of specific and general provisions from balance sheet	Widest availability because provisioning level is one of the data items reported very early by most banks. Represents the bank's assessment of the portion of the loan portfolio (or more generally assets) which will be lost due to credit losses. Potential interpretation problems due to effect of write-offs which lower provisioning levels[57]. Some banks did not report general provisions as a component of total provisions which might affect comparability (e.g. many banks earlier in observation period, and NBNZ and Westpac(NZ) in New Zealand until recently)
Stock of specific provisions	Total level of specific provisions from balance sheet	Good data availability. Provides a measure of identified losses which will materialize with a great probability. Potential proxy for expected losses as opposed to unexpected losses which could be proxied by levels of general provisions (see below).
Stock of general provisions	Total level of general provisions from balance sheet	Good data availability. Proxy for the discretionary portion of expected loan losses to test hypotheses regarding behavioural factors driving loan loss provisioning. Proxy for unexpected losses. General provisions partially qualify as capital under current Basel I capital adequacy rules.
Bad debt charges to P&L	Total bad debt expense reported in P&L alternative names are impaired asset expense / ongoing provisions expense.	Generally good data availability but not as good as stock of provisions earlier in the observation period. Provides the bank's assessment of the total credit losses which have occurred during the period. Often requires a manual adjustment in high loss situations when banks were inclined to report such losses as extraordinary or abnormal items.
Specific and general component of bad debt expense to P&L	Bad debt expense to P&L can be disaggregated into a specific component and general component.	Similar considerations as for specific and general component of stock of provisions. Like general provisions above, these two data elements could again be applied to study behavioural aspects when management estimates the discretionary component of provisions. The disaggregation is difficult for some reporting formats and data are incomplete earlier in the observation period.

[57] As discussed in Pain (2003, p. 14, 25)

Table 5-1 Potential data to measure credit loss experience (CLE) – (continued)

CLE variable	Description	General considerations, data availability & issues
Gross /net debt write-offs	Period write-offs of loan assets (gross) or after deducting recoveries of debts previously written off (net)	Write-offs lag bad debt charges but are "more certain". Anecdotal evidence suggests this is the measure banks consider in their internal performance systems. Earlier in observation period, recoveries of debts previously written-off were often netted (deducted) from this amount. Time series for net write-offs are thus more complete.
Impaired assets (gross before provisions)	Impaired assets include (1) non-accrual assets and (2) restructured assets.	Widespread reporting generally started at the beginning of 1990s. Inconsistent reporting of this data item (if reported at all) before 1990 due to judgment issues as to what constitutes an impaired loan. This is reflected in time series breaks with substantial restatements in subsequent periods.
Past due assets	Servicing on past-due loan assets is typically overdue for more than 90 days	Past due assets consistently reported only after the mid 1990s. They do not necessarily imply impending credit losses as they then would be classified as impaired loans.

Table 5-2 CLE ratios constructed

Ratio acronym	Full ratio name
IAE_LN	Impaired asset expense as % of average loans
IAE_NI	Impaired asset expense as % net interest income
IAE_GI	Impaired asset expense as % gross interest income
NW_LN	Net debt write-offs as % of average loans
GW_LN	Gross debt write-offs as % of average loans
RC_LN	Recoveries as % of average loans
PRV_LN	Stock of provisions as % of loans
GE_LN	General provisions total as % of loans
SP_LN	Specific provisions total as % of loans
IA_A	Impaired assets as % total assets
PD_A	Past due loans as % total assets
GEE_LN	General provision expense as % of average loans
SPE_LN	Specific provision expense as % of average loans

Figure 5-2 Percentage of banks reporting CLE proxy ratios during observation period (**full sample**)

AU+NZ	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
IAE_LN	85%	79%	63%	53%	52%	64%	77%	85%	89%	93%	96%	96%	96%	96%	100%	96%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
IAE_NI	62%	64%	50%	42%	43%	60%	81%	89%	89%	93%	96%	96%	96%	96%	100%	96%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
IAE_GI	54%	57%	44%	42%	43%	60%	81%	89%	89%	93%	96%	96%	96%	96%	100%	96%	100%	100%	100%	100%	100%	100%	100%	88%	94%	94%
NW_LN	85%	79%	63%	53%	57%	60%	65%	74%	85%	93%	89%	93%	89%	96%	100%	96%	100%	100%	100%	95%	100%	100%	100%	100%	100%	100%
GW_LN	69%	64%	50%	47%	43%	36%	35%	37%	48%	54%	61%	63%	63%	68%	79%	79%	85%	95%	94%	84%	88%	88%	88%	82%	81%	81%
RC_LN	62%	64%	50%	47%	43%	36%	35%	37%	48%	50%	61%	59%	59%	68%	79%	79%	85%	95%	94%	84%	88%	88%	88%	82%	81%	81%
PRV_LN	92%	93%	75%	68%	71%	72%	88%	96%	96%	96%	96%	96%	96%	100%	100%	96%	100%	100%	100%	95%	100%	100%	100%	100%	100%	100%
GE_LN	69%	79%	69%	58%	57%	60%	69%	81%	81%	82%	89%	85%	93%	92%	96%	92%	95%	95%	94%	89%	94%	94%	94%	100%	100%	94%
SP_LN	54%	57%	56%	53%	48%	40%	50%	67%	59%	86%	89%	93%	93%	96%	96%	92%	95%	95%	94%	89%	100%	100%	100%	94%	94%	94%
IA_A	0%	0%	6%	5%	10%	12%	12%	15%	19%	29%	46%	63%	81%	84%	88%	92%	95%	95%	94%	89%	100%	100%	100%	100%	100%	100%
PD_A	0%	0%	0%	0%	0%	4%	8%	7%	7%	11%	18%	26%	37%	52%	63%	71%	90%	95%	94%	89%	100%	100%	100%	94%	94%	94%
GEE_LN	15%	14%	19%	16%	19%	16%	23%	26%	30%	36%	46%	52%	59%	72%	79%	75%	80%	95%	94%	84%	88%	88%	94%	94%	94%	94%
SPE_LN	15%	14%	13%	11%	14%	12%	19%	22%	37%	43%	54%	63%	70%	80%	83%	88%	90%	100%	100%	95%	100%	100%	100%	94%	94%	94%
Total banks	13	14	16	19	21	25	26	27	27	28	28	27	27	25	24	24	20	19	18	19	17	17	17	17	16	16

Colour coding:

XX% 0 to 25% XX% 25% to 50% XX% 50% to 75% XX% more than 75%

Figure 5-3 Percentage of banks reporting CLE proxy ratios during observation period (**Australian sub-sample**)

Australia	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
IAE_LN	90%	82%	80%	73%	62%	80%	88%	88%	100%	100%	100%	100%	100%	100%	100%	94%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
IAE_NI	70%	73%	70%	64%	54%	80%	94%	94%	100%	100%	100%	100%	100%	100%	100%	94%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
IAE_GI	60%	64%	60%	64%	54%	80%	94%	94%	100%	100%	100%	100%	100%	100%	100%	94%	100%	100%	100%	100%	100%	100%	100%	91%	91%	91%
NW_LN	90%	82%	80%	73%	62%	73%	81%	88%	94%	94%	94%	94%	94%	94%	100%	94%	100%	100%	100%	92%	100%	100%	100%	100%	100%	100%
GW_LN	80%	73%	70%	64%	54%	47%	44%	47%	53%	56%	61%	65%	65%	71%	81%	75%	85%	100%	100%	85%	91%	91%	91%	82%	82%	82%
RC_LN	80%	73%	70%	64%	54%	47%	44%	47%	53%	50%	61%	59%	65%	71%	81%	75%	85%	100%	100%	85%	91%	91%	91%	82%	82%	82%
PRV_LN	90%	91%	80%	82%	85%	87%	94%	94%	94%	94%	94%	94%	94%	100%	100%	94%	100%	100%	100%	92%	100%	100%	100%	100%	100%	100%
GE_LN	60%	73%	80%	73%	69%	73%	75%	82%	82%	89%	94%	88%	94%	94%	100%	94%	100%	100%	100%	92%	100%	100%	100%	100%	100%	91%
SP_LN	40%	45%	50%	55%	46%	40%	50%	59%	53%	83%	89%	94%	94%	100%	100%	94%	100%	100%	100%	92%	100%	100%	100%	100%	100%	91%
IA_A	0%	0%	10%	9%	15%	20%	19%	24%	29%	39%	56%	76%	94%	94%	94%	94%	100%	100%	100%	92%	100%	100%	100%	100%	100%	100%
PD_A	0%	0%	0%	0%	0%	7%	13%	12%	12%	17%	28%	41%	59%	71%	75%	69%	85%	92%	92%	85%	100%	100%	100%	91%	91%	91%
GEE_LN	10%	9%	20%	18%	15%	13%	19%	24%	29%	33%	44%	53%	65%	76%	75%	81%	85%	100%	100%	85%	91%	91%	100%	91%	91%	91%
SPE_LN	10%	9%	10%	9%	8%	7%	19%	24%	29%	33%	44%	53%	65%	76%	75%	81%	85%	100%	100%	92%	100%	100%	100%	91%	91%	91%
Total banks	10	11	10	11	13	15	16	17	17	18	18	17	17	17	16	16	13	12	12	13	11	11	11	11	11	11

Colour coding:

XX% 0 to 25% XX% 25% to 50% XX% 50% to 75% XX% more than 75%

Figure 5-4 Percentage of banks reporting CLE proxy ratios during observation period (**New Zealand sub-sample**)

NZLD	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
IAE_LN	67%	67%	33%	25%	38%	40%	60%	80%	70%	80%	90%	90%	90%	88%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
IAE_NI	33%	33%	17%	13%	25%	30%	60%	80%	70%	80%	90%	90%	90%	88%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
IAE_GI	33%	33%	17%	13%	25%	30%	60%	80%	70%	80%	90%	90%	90%	88%	100%	100%	100%	100%	100%	100%	100%	100%	100%	83%	100%	100%
NW_LN	67%	67%	33%	25%	50%	40%	40%	50%	70%	90%	80%	90%	80%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
GW_LN	33%	33%	17%	25%	25%	20%	20%	20%	40%	50%	60%	60%	60%	63%	75%	88%	86%	86%	83%	83%	83%	83%	83%	83%	80%	80%
RC_LN	0%	33%	17%	25%	25%	20%	20%	20%	40%	50%	60%	60%	50%	63%	75%	88%	86%	86%	83%	83%	83%	83%	83%	83%	80%	80%
PRV_LN	100%	100%	67%	50%	50%	50%	80%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
GE_LN	100%	100%	50%	38%	38%	40%	60%	80%	80%	70%	80%	80%	90%	88%	88%	88%	86%	86%	83%	83%	83%	83%	83%	100%	100%	100%
SP_LN	100%	100%	67%	50%	50%	40%	50%	80%	70%	90%	90%	90%	90%	88%	88%	88%	86%	86%	83%	83%	100%	100%	100%	83%	80%	100%
IA_A	0%	0%	0%	0%	0%	0%	0%	0%	0%	10%	30%	40%	60%	63%	75%	88%	86%	86%	83%	83%	100%	100%	100%	100%	100%	100%
PD_A	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	13%	38%	75%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
GEE_LN	33%	33%	17%	13%	25%	20%	30%	30%	30%	40%	50%	50%	50%	63%	88%	63%	71%	86%	83%	83%	83%	83%	83%	100%	100%	100%
SPE_LN	33%	33%	17%	13%	25%	20%	20%	20%	50%	60%	70%	80%	80%	88%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Total banks	3	3	6	8	8	10	10	10	10	10	10	10	10	8	8	8	7	7	6	6	6	6	6	6	5	5

Colour coding:

XX% 0 to 25% XX% 25% to 50% XX% 50% to 75% XX% more than 75%

Table 5-3 Summary statistics CLE proxies (pooled observations of all banks in data sample)

	IAE_LN	IAE_NI	IAE_GI	NW_LN	GW_LN	RC_LN	PRV_LN	GE_LN	SP_LN	IA_A	PD_A	GEE_LN	SPE_LN
Mean	0.57%	14.71%	3.61%	0.46%	0.57%	0.05%	1.37%	0.79%	0.74%	1.42%	0.35%	0.08%	0.51%
Median	0.27%	6.40%	2.17%	0.20%	0.25%	0.03%	0.89%	0.59%	0.35%	0.63%	0.27%	0.05%	0.22%
Maximum	16.51%	790.46%	79.24%	14.35%	14.35%	0.46%	18.75%	16.46%	11.15%	22.60%	4.32%	1.61%	16.66%
Minimum	-7.41%	-59.98%	-28.16%	-0.03%	0.01%	0.00%	0.00%	0.02%	0.00%	0.00%	-0.26%	-1.17%	-7.36%
Std. Dev.	1.38%	50.97%	7.08%	1.10%	1.26%	0.05%	1.80%	1.20%	1.21%	2.40%	0.39%	0.23%	1.31%
Coef of Var*	2.42	3.47	1.96	2.39	2.22	1.12	1.32	1.51	1.64	1.70	1.12	2.78	2.55
Skewness	6.47	11.19	6.30	8.31	7.35	2.55	4.82	8.54	4.44	4.59	5.49	2.14	6.40
Kurtosis	66.84	149.45	59.78	90.57	70.19	13.98	33.44	92.02	29.92	32.13	49.41	20.85	81.08
Jarque-Bera	86265.9	437177.0	66383.3	157235.7	70751.0	2166.3	21707.8	158154.4	14635.5	12202.7	23119.6	4296.2	85806.7
Probability	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Observations	488	478	471	475	359	355	511	462	437	314	244	306	329
Cross sections (banks)	32	31	31	32	26	26	32	30	30	28	25	25	26

* Coef. of Var.: Coefficient of variation defined as Mean / Std. Dev.

5.3.2 Properties and evaluation of CLE proxies

This section analyses the properties of the 13 CLE proxy ratios that have been constructed. It is informed by Pain (2003, p. 14-18), who evaluates and explores some of these measures for his sample of UK commercial and mortgage banks[58].

5.3.2.1 Summary statistics and initial data exploration

The summary statistics of CLE proxies are shown in Table 5-3. None of the CLE proxies appears normally distributed judging from skewness values and Jarque-Bera statistics. Rather they exhibit a truncated left tail and an extended right tail (positive skewness) as is typical for credit loss distributions where high loss credit events are infrequent. This distribution can be seen in the histogram for some important CLE's in Figure 5-5. The large number of observations beyond two standard deviations above the median observation are of particular concern for the risk management of a bank[59]. Notable in the histogram is the fact that there are no observations of very low levels of net-write-offs (NW_LN), i.e. less then 0.25 standard deviations below median. Unlike provisions, which contain a substantial element of discretion and might be negative (i.e. unwound) in some years, net write-offs have always been above some minimum level.

An important aspect in the evaluation of CLE proxies is how they have measured loan losses through time. As shown in the summary statistics in Table 5-3, CLE proxies vary greatly in their overall sensitivity with coefficients of variation ranging from 1.12 for past due loans

[58] Pain looks in particular at the interaction of provisions, write-offs and recoveries.

[59] Note that that we have chosen the median instead of the mean in this chart mainly for presentation purposes because mean values of some CLEs are affected by a few extreme outliers.

(relative to assets) to 3.47 for impaired asset expense as % of net interest income.[60] These differing levels of sensitivity can also be seen in Figure 5-6 which shows CLE standard deviations through the observation period against a logarithmic scale. Overall the CLE proxies nevertheless all seem to measure the credit loss experience through time with a similar pattern. For this purpose we demean and standardize the observed annual averages of CLE proxies and plot them in Figure 5-7. Note that standardization means that we divide the demeaned annual average by the standard deviation of the CLE proxy of all banks over the whole sample period, not by the standard deviation of the particular year.

[60] Recoveries with their low standard deviation are not considered as they are not an actual CLE proxy.

Figure 5-5 Histogram of selected CLE proxies

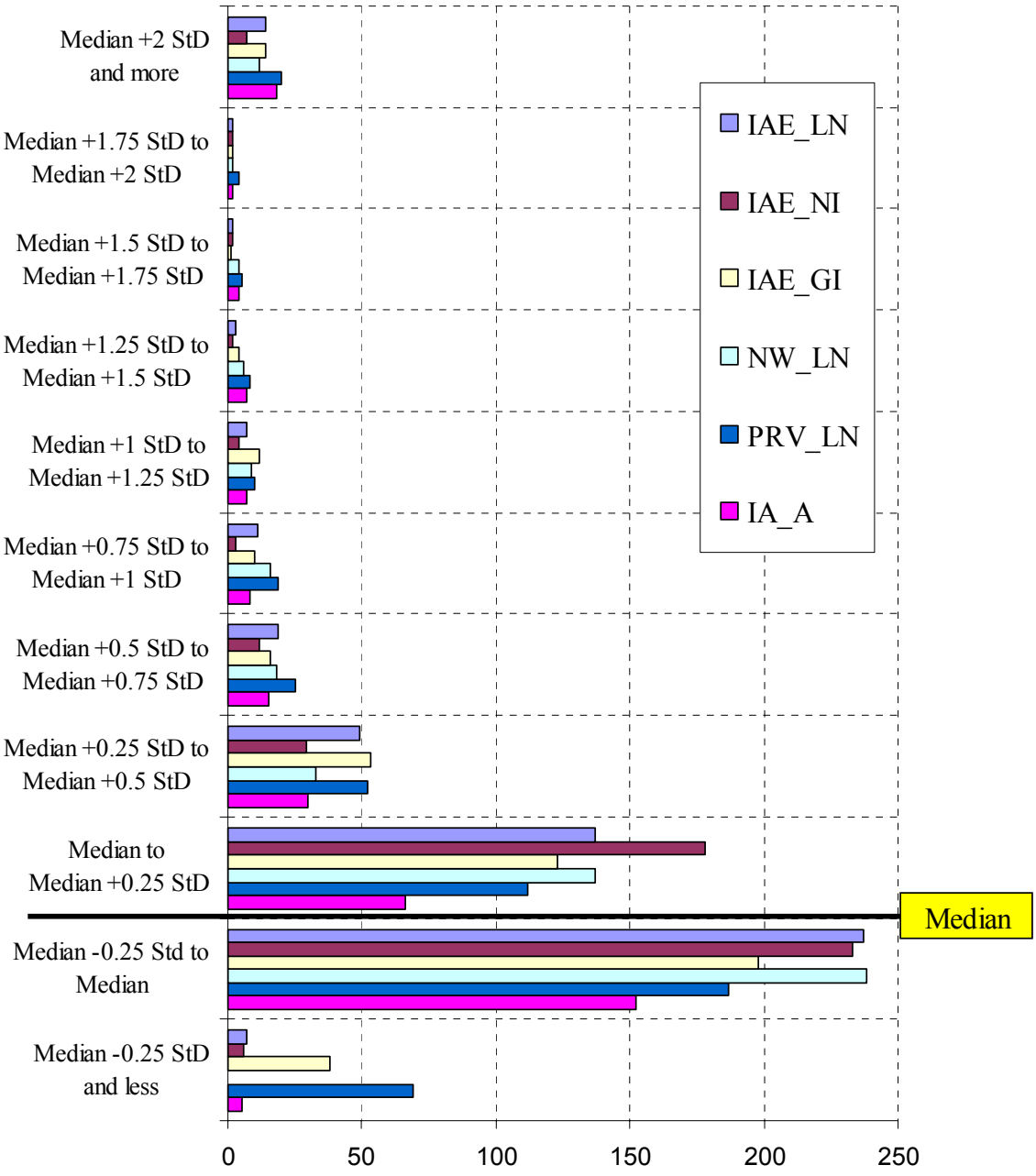
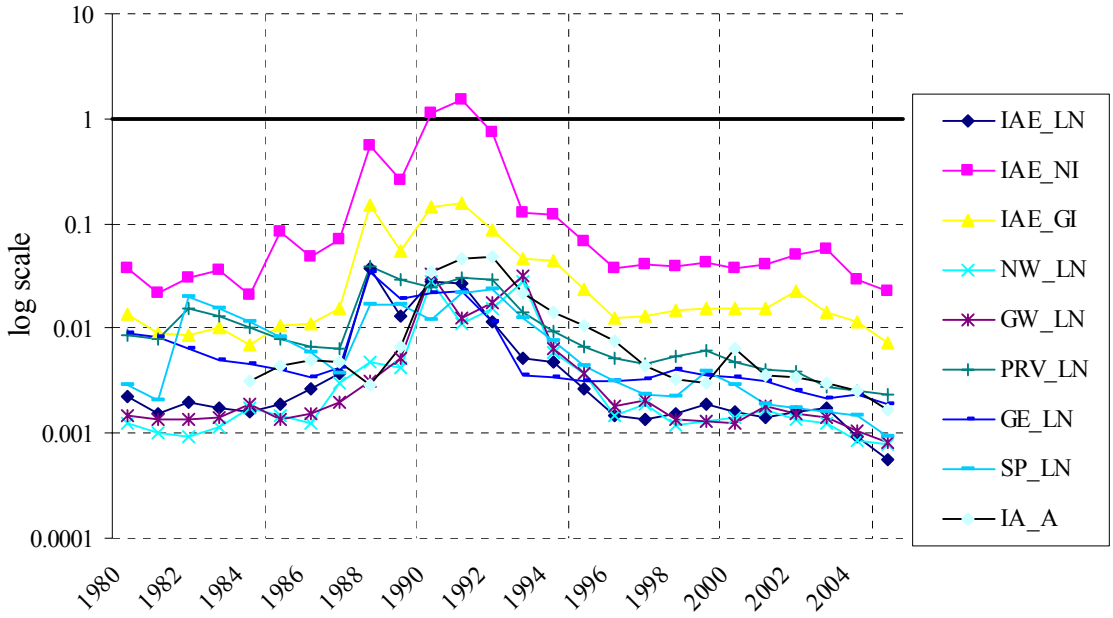


Figure 5-6 Standard deviation of CLE proxies for each year in observation period



Standard deviation of CLE proxy k in year t: $\sigma_{k,t} = \sqrt{\frac{\sum_{n}\left(CLE_{k,i,t} - \mu_{k,t}\right)^2}{n_{k,t} - 1}}$

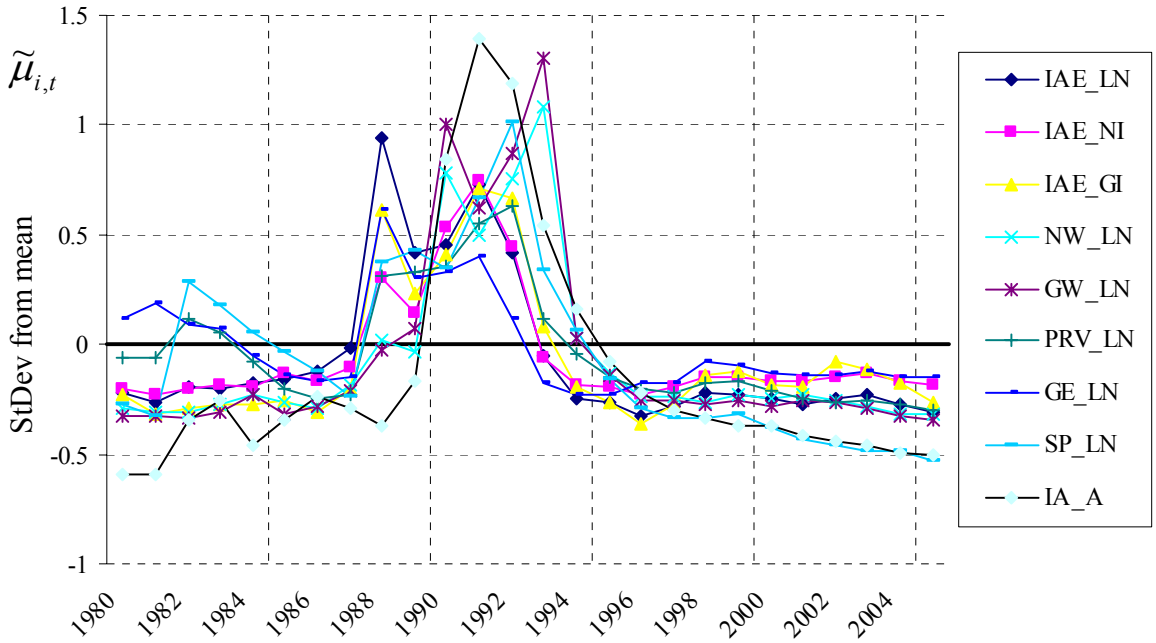
where

$CLE_{k,i,t}$ is the observation of CLE k (k= 1 to 9) for observation i (i=1 to n) in year t

$\mu_{k,t}$ is mean of CLE proxy k of all n banks in year t

$n_{k,t}$ is number of observations of CLE k in year t

Figure 5-7 Demeaned and standardized CLE proxies through 1980-2005 observation period



Demeaned, standardized $\tilde{\mu}_{k,t} = \frac{\mu_{k,t} - \overline{\mu}_k}{\overline{\sigma}_k}$,

where $\mu_{k,t}$ is mean of all CLE k (k= 1 to 9) observations for year t;

$\overline{\mu}_k$ / $\overline{\sigma}_k$ are mean / standard deviation of CLE k for all banks over the whole observation period.

5.3.2.2 Evaluating the properties of CLE ratio denominators

As stated earlier, most research uses either total loans or assets as a reference to measure credit loan loss experience. For our evaluation we have also chosen net and gross interest income as a denominator for two of the CLE proxies. This sub-section reviews the properties of these denominators and other P&L data items.

Whenever we use a ratio as a variable to be explained, we need to understand factors affecting both numerator and denominator. In the case of CLE ratios, the numerator proxies the loss experience while the denominator provides a reference level against which this loss experience is measured. Ideally we wish this reference level to be a measure of the bank's

business activities subject to credit risk. It should be unaffected by other factors, especially not by contemporaneous or lagged explanatory variables of the CLE estimation model.

To study their general characteristics, we select 5 potential proxy denominators and analyse their time series of percentage changes, i.e. growth rates of total assets (ASGRW), total loans (LNGRW), net interest income (NIGRW), gross interest income (GIGRW), and, finally, total operating income (TOIGRW) which is defined as the sum of net interest and other operating income. The summary statistics are shown in Table 5-4 below.

Table 5-4 Summary statistics of CLE ratio denominators

Growth rate of …	Assets	Loans	Net interest income	Gross interest income	Total operating income
Variable name	ASGRW	LNGRW	NIGRW	GIGRW	TOIGRW
Mean	17.26%	19.73%	16.46%	15.97%	17.56%
Median	14.14%	15.50%	11.14%	14.22%	12.32%
Maximum	180.55%	326.52%	374.24%	507.87%	374.24%
Minimum	-40.07%	-28.33%	-101.59%	-98.57%	-100.15%
Std. Dev.	19.55%	24.63%	33.27%	33.47%	31.16%
Skewness	2.99	5.42	4.59	7.13	5.00
Kurtosis	20.58	55.32	40.53	99.87	47.64
Observations	526	516	498	488	504
Cross sections	32	32	31	31	31

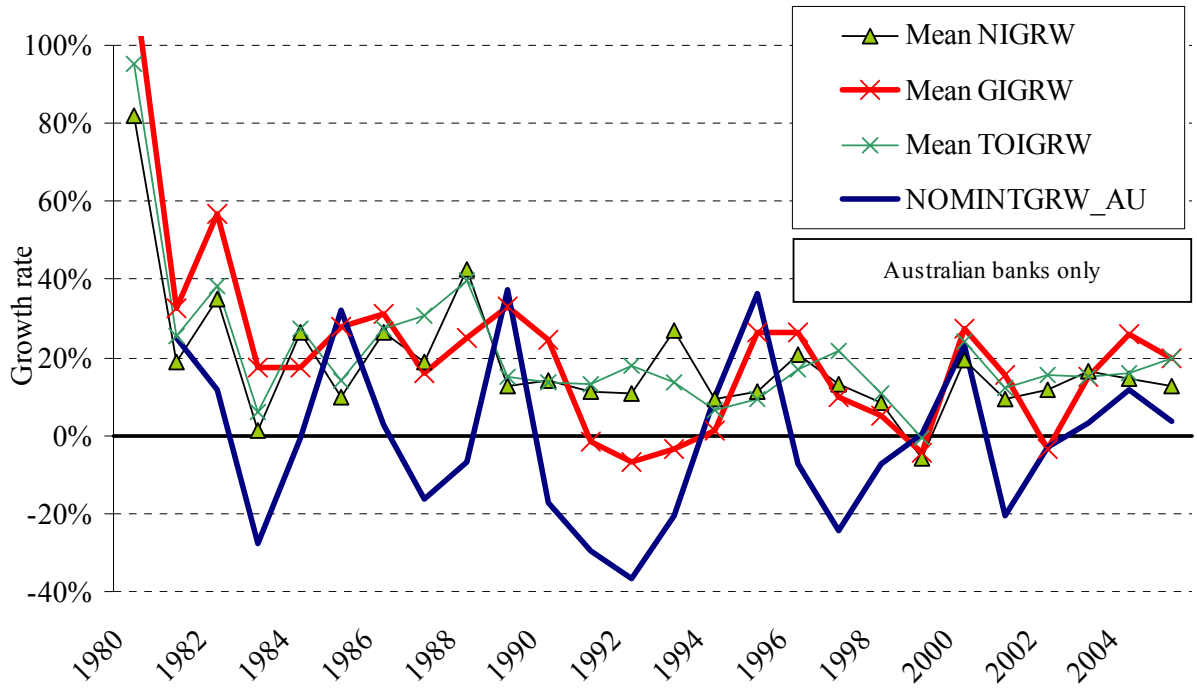
One observes lower levels of volatility for changes in stocks (assets and loans) with standard deviations of 19.6% and 24.6% respectively, than for the income flow variables which each has more than 30% standard deviation. Denominators of ratios based on stocks of assets and loans are moreover comparably much larger than income based denominators which helps explain the much higher volatility of the income flow based proxies shown in the earlier ratio summary statistics of Table 5-3.

The explanatory variables considered for the model proposed in this chapter are presented in the second part of this chapter. We step ahead here and test for an obvious factor which one would expect to drive changes in CLE denominators. This factor is the level of nominal interest

rates which will affect interest income. Market interest rates will have an immediate impact on gross interest income but in the case of net interest income and total operating income the effect could possibly cancel out due to an offsetting effect on interest expense. We plot the % changes of these three income items against % changes in nominal interest rates for the sub-sample of Australian banks in Figure 5-8.

As expected, nominal interest rates appear to drive levels of gross interest income, in some cases flowing through with a small delay. On the other hand, any interactions with the other two income items, net interest income and total operating income, are not immediately apparent. To test this more formally, we estimate changes in CLE ratio denominators as a linear function of contemporaneous and one year lagged nominal interest rate changes for both the Australian and New Zealand sub-sample. The results in Table 5-5 confirm the visual impression of Figure 5-8. Gross interest income has been one of the five items which is significantly affected by contemporaneous and lagged changes in nominal interest rates in both Australia and New Zealand.

Figure 5-8 Growth rates Australian bank income items compared to growth of nominal interest rates



Explanations:
NIGRW – Growth net interest income, GIGRW – Growth gross interest income, TOIGRW – Growth total operating income, NOMINT_AU_GRW: growth nominal interest rate AUD (short-term rates sourced from Datastream code AUOCFIST)

Table 5-5 Modelling % changes of CLE ratio denominators as a linear function of point changes in nominal interest rates (NOMINTGRW)

	NOMINTGRW Coefficient (t-Statistic)			Adj. R-square	No of banks	Pool obs.	F-statistic
	Constant C	Contem-poraneous α_0	One year lagged α_{-1}				
Australia							
ASGRW	**0.1797	0.5052	-0.0597	-0.0025	22	331	0.587
	(16.646)	(1.288)	(-0.141)				
LNGRW	0.21186	0.0422	0.1479	-0.0060	22	327	0.033
	(15.043)	(0.069)	(0.277)				
NIGRW	**0.1598	0.2974	-0.2917	0.0000	21	322	0.190
	(10.716)	(0.587)	(-0.427)				
GIGRW	**0.1819	**2.8294	**3.3047	0.1789	21	315	**35.214
	(13.431)	(6.550)	(6.080)				
TOIGRW	**0.1769	0.0757	0.0887	-0.0061	21	322	0.021
	(12.117)	(0.147)	(0.152)				
New Zealand							
ASGRW	**0.1625	0.8323	0.4174	0.0097	10	182	1.890
	(12.130)	(1.951)	(0.938)				
LNGRW	**0.1748	0.5465	0.1944	-0.0046	10	177	0.597
	(11.442)	(1.105)	(0.387)				
NIGRW	**0.1440	-1.0929	0.4666	0.0002	10	168	1.013
	(6.689)	(-0.933)	(0.560)				
GIGRW	**0.1664	**4.2845	**2.2619	0.3208	10	167	**40.199
	(11.028)	(8.106)	(4.522)				
TOIGRW	**0.1500	-0.9963	0.9881	0.0154	10	175	2.365
	(8.267)	(-1.064)	(1.318)				

** significant at 1% level, * at 5% level

Estimation equation for the example of asset growth proxy (ASGRW):

$$ASGRW_{i,t} = C + \alpha_0 NOMINTGRW_{i,t} + \alpha_{-1} NOMINTGRW_{i,t-1} + u_{i,t}$$

with $ASGRW_{i,t} = \dfrac{Assets_{i,t} - Assets_{i,t-1}}{Assets_{i,t-1}}$ and $NOMINTGRW_{i,t} = NOMINT_{i,t} - NOMINT_{i,t-1}$

All t-statistics use White diagonal standard errors (d.f. corrected).

Since the balance sheet items (assets and loans) are much larger than bad debt expense and write-offs in the numerator, changes in credit loss experience will be the dominant effect on the CLE ratio. Gross interest income is also quite large compared to the CLE numerators but it is immediately affected by interest rates in the market. Net interest and total interest income, finally, are rather small and the factors that drive them will lead to great volatility in the CLE proxy. Overall, therefore, the less volatile balance sheet items (assets and loans) appear to have more desirable characteristics for the purpose of CLE ratio denominators.

5.3.2.3 Analysis of contemporaneous and lead/lag characteristics

An important question relates to the correlations among the 13 ratios measuring aspects of a bank's CLE. Overall one would expect very high correlations, particularly among those using the stock of provision, impaired assets and impaired asset expense. For this purpose, we follow the methodology of examining contemporaneous and lead/lag correlations as used, for instance, in the research on transmission of economic cycles across nations, regions or industries (an example is Grimes, 2005).

The top block of Table 5-6 shows the matrix of contemporaneous Pearson product moment correlation coefficients among the 13 CLEs. High correlations above 0.8, respectively between 0.6 and 0.8, are highlighted. Not surprising is the very high correlation among the three proxies using impaired asset expense in the numerator. There is a moderately high correlation of 0.63 between impaired asset expense (as % of loans) and the level of impaired assets (as % of total assets). A little lower (just under 0.6) is the correlation between impaired asset expense and the stock of provisions. Both ratios have been used by researchers and it is important to test how robust their estimations would be with the alternative measure. Pain (2003) argues in favour of employing impaired asset expense instead of the stock of provisions. This is because stock of provisions may give a misleading picture of current credit loss developments as large write-offs

in any one period may cause a fall in provisioning levels even though significant new bad debts have arisen.[61]

There is a very high correlation (0.98) between the overall impaired asset expense and its specific component which thus appears to dominate the general (more discretionary) part of total bad debt expense (correlation only 0.4). In the case of the stock of provisions, both general and specific components have similarly high correlations.

A further result is that past due assets do not appear to correlate with any other CLE ratio. As stated before, assets classified as past due are not considered impaired. The low correlation would thus indicate that past due loans are indeed attributable to technical delays in loan servicing and not due to fundamental quality problems in the portfolio. Due to this low correlation we have omitted past due assets based CLEs in some of the statistics earlier in this chapter.

Neither write-off proxy (NW_LN, GW_LN) exhibits a high contemporaneous correlation with the other major CLE measures (0.38 – 0.6) but the picture changes if we consider the lead/lag correlation matrix at the bottom of Table 5-6. In this matrix, the diagonal elements provide a measure of the degree of persistence of each CLE series. More interesting for study of delayed effects between the series are the non-diagonal elements. Where the lead/lag correlation (lower block of Table 5-6) exceeds the corresponding contemporaneous value (upper block of Table 5-6), one can say that the CLE proxy in the left column leads the proxy in the top row. Such instances are highlighted in bold in the lower block of Table 5-6. As an example, the contemporaneous correlation between the stock of provisions (PRV_LN) and net write-offs (NW_LN) is merely 0.39 while the level of provisions has a higher correlation with write-offs in the subsequent period (0.55). This result is highly intuitive since provisions will eventually lead

[61] Formally the accounting relationship between stock of provisions and provision charges is: stock of provisions$_t$ = stock of provisions$_{t-1}$ + new charges to P&L$_t$ – [write-offs$_t$ – recoveries$_t$] + other adjustments (i.e. currency translation, provisions of acquired or sold entities)

to definite loan derecognitions. Likewise the matrix indicates that after high levels of write-offs, the recovery rate will be higher. The correlation of past due assets at time t with other measures at t+1 remains very low, reconfirming that past due assets do not contain material information about future loan losses.

For his sample of UK banks Pain (2003) also explores the lead/lag characteristics of loan write-offs for individual UK banks and finds that lag coefficients are likely to differ among them. Inspired by Pain's (2003, Table 4, p. 17) approach, we study this question for the major banking institutions in the sample as well as for some smaller ones with extended data series (total 13 banks). The result of this analysis is shown in Table 5-7 and Table 5-8 where we calculate correlations of stocks of provisions with subsequent write-offs (Table 5-7) and correlations of impaired asset expense with subsequent write-offs (Table 5-8). Contemporaneous correlations and correlations of up to four leads are shown in these tables.

Pain finds correlation coefficients of around 0.7 for the first leads and lower coefficients when longer leads are applied to the provisions term;[62] by contrast, the coefficients seem to be substantially higher for many banks in our sample. At the same time we note some extreme outliers with New Zealand's TSB Bank and to a minor extent also Bank of Queensland showing very low and even negative correlations in many instances. Both are smaller, retail focused institutions where one observes a quite erratic provisioning pattern, particularly with regard to general provisioning earlier in the observation period, without subsequent write-offs. Likewise, we find low average correlations for BNZ (historically the largest New Zealand Bank) whose results are affected by substantial provisions after its 1990-91 de facto collapse which were then not all followed by corresponding write-offs but were partially reversed in subsequent years (see Figure 5-10 for illustration). Overall banks exhibit very different write-down patterns of loan loss

[62] Note that Pain (2003) calculates up to three period lagged correlations for impaired assed expense (termed 'new provision charges' in his paper).

provisions with some appearing to write them off quicker than others. This can best be seen in Figure 5-9 where we visualize results of Table 5-8 for the case of major New Zealand banks.

Table 5-6 Correlations among CLE proxies (full data sample)

Contemporaneous correlations

	IAE_LN	IAE_NI	IAE_GI	NW_LN	GW_LN	RC_LN	PRV_LN	GE_LN	SP_LN	IA_A	PD_A	GEE_LN	SPE_LN
IAE_LN	1.00	**0.80**	**0.96**	0.46	0.46	0.11	0.60	0.46	0.48	0.63	0.06	0.40	**0.98**
IAE_NI	**0.80**	1.00	**0.88**	0.57	0.56	0.02	0.49	0.20	0.59	0.71	-0.02	0.32	**0.91**
IAE_GI	**0.96**	**0.88**	1.00	0.52	0.51	0.09	0.59	0.40	0.53	0.68	0.04	0.26	**0.95**
NW_LN	0.46	0.57	0.52	1.00	**1.00**	0.20	0.39	0.15	0.46	0.60	0.00	-0.07	0.37
GW_LN	0.46	0.56	0.51	**1.00**	1.00	0.24	0.38	0.15	0.46	0.59	-0.02	-0.14	0.34
RC_LN	0.11	0.02	0.09	0.20	0.24	1.00	0.40	0.30	0.33	0.30	-0.16	-0.17	0.24
PRV_LN	0.60	0.49	0.59	0.39	0.38	0.40	1.00	**0.80**	0.77	0.77	-0.01	0.00	0.64
GE_LN	0.46	0.20	0.40	0.15	0.15	0.30	**0.80**	1.00	0.24	0.38	-0.23	-0.09	0.60
SP_LN	0.48	0.59	0.53	0.46	0.46	0.33	0.77	0.24	1.00	**0.81**	0.04	0.10	0.41
IA_A	0.63	0.71	0.68	0.60	0.59	0.30	0.77	0.38	**0.81**	1.00	0.12	-0.27	0.53
PD_A	0.06	-0.02	0.04	0.00	-0.02	-0.16	-0.01	-0.23	0.04	0.12	1.00	0.02	0.13
GEE_LN	0.40	0.32	0.26	-0.07	-0.14	-0.17	0.00	-0.09	0.10	-0.27	0.02	1.00	0.18
SPE_LN	**0.98**	**0.91**	**0.95**	0.37	0.34	0.24	0.64	0.60	0.41	0.53	0.13	0.18	1.00

0.XX: in range [0.8 – 1.0] 0.XX: in range [0.6 – 0.8]

Lead / lag correlations

	IAE_LN (+1)	IAE_NI (+1)	IAE_GI (+1)	NW_LN (+1)	GW_LN (+1)	RC_LN (+1)	PRV_LN (+1)	GE_LN (+1)	SP_LN (+1)	IA_A (+1)	PD_A (+1)	GEE_LN (+1)	SPE_LN (+1)
IAE_LN	0.27	0.32	0.31	0.42	0.42	**0.33**	0.54	0.27	**0.59**	0.51	0.06	-0.13	0.26
IAE_NI	0.22	0.40	0.29	**0.58**	**0.58**	**0.20**	0.48	0.18	**0.59**	0.60	**-0.01**	-0.15	0.28
IAE_GI	0.26	0.36	0.34	0.49	0.49	**0.31**	0.54	0.25	**0.60**	0.57	0.04	-0.14	0.24
NW_LN	0.08	0.10	0.09	0.47	0.47	**0.43**	0.31	0.12	0.37	0.36	-0.02	-0.13	0.19
GW_LN	0.09	0.08	0.08	0.45	0.47	**0.47**	0.35	**0.18**	0.35	0.35	-0.04	-0.16	0.28
RC_LN	0.01	-0.02	0.01	0.15	0.18	0.79	0.35	**0.43**	0.13	0.25	-0.18	-0.28	0.15
PRV_LN	0.12	0.19	0.16	**0.55**	**0.56**	**0.43**	0.74	0.55	0.62	0.54	-0.03	-0.26	0.11
GE_LN	0.01	0.03	0.02	**0.21**	**0.22**	0.28	0.59	0.59	**0.33**	0.25	**-0.17**	-0.18	0.04
SP_LN	0.16	0.26	0.21	**0.66**	**0.68**	**0.40**	0.55	**0.25**	0.66	0.61	0.02	-0.22	0.15
IA_A	0.34	0.40	0.39	**0.88**	**0.89**	**0.41**	0.69	**0.38**	0.65	0.78	0.07	**-0.23**	0.34
PD_A	**0.10**	**0.03**	**0.09**	**0.02**	**0.01**	-0.16	**0.03**	**-0.22**	**0.09**	**0.14**	0.59	0.01	0.12
GEE_LN	0.00	0.00	0.02	-0.11	**-0.09**	**0.07**	**0.02**	-0.15	**0.19**	-0.32	**0.05**	-0.09	0.04
SPE_LN	0.32	0.35	0.35	**0.40**	**0.41**	**0.40**	0.58	0.42	**0.53**	0.40	0.09	-0.12	0.37

0.XX: > than corresponding contemporaneous correlation

Table 5-7 Correlation of stock of provisions (PRV_LN) with subsequent loan net write-offs (NW_LN) for selected banks in sample

	NW_LN	NW_LN (+1)	NW_LN (+2)	NW_LN (+3)	NW_LN (+4)
AU ANZ	0.68	0.92	0.76	0.42	0.20
AU CoWthBk	0.68	0.85	0.66	0.31	0.12
AU NAB	0.86	0.78	0.49	0.30	0.08
AU StGeorge	0.74	0.67	0.46	0.10	-0.40
AU Westpac	0.80	0.81	0.41	0.09	-0.19
AU BOQ	-0.09	0.60	0.29	-0.16	-0.11
AU BkWest	0.78	0.85	0.85	0.50	0.20
NZ ANZ	0.71	0.85	0.66	0.40	0.17
NZ ASB	0.71	0.97	0.66	0.49	0.16
NZ BNZ	0.50	0.59	0.70	0.61	0.44
NZ NBNZ	0.40	0.81	0.43	0.22	0.03
NZ Westpac	0.34	0.51	0.16	0.13	-0.02
NZ TSB Bank	-0.09	0.15	0.17	-0.61	-0.37
Overall	0.39	0.55	0.42	0.23	0.15

Table 5-8 Correlation of impaired asset expense (IAE_LN) with subsequent loan net write-offs (NW_LN) for selected banks in sample

	NW_LN	NW_LN (+1)	NW_LN (+2)	NW_LN (+3)	NW_LN (+4)
AU ANZ	0.53	0.86	0.89	0.50	0.27
AU CoWthBk	0.67	0.80	0.86	0.46	0.25
AU NAB	0.73	0.87	0.73	0.54	0.26
AU StGeorge	0.64	0.75	0.44	0.25	-0.14
AU Westpac	0.69	0.97	0.75	0.51	0.21
AU BOQ	0.72	0.26	0.42	-0.06	-0.12
AU BkWest	0.72	0.63	0.76	0.47	0.20
NZ ANZ	0.72	0.85	0.72	0.53	0.37
NZ ASB	0.49	0.82	0.70	0.71	0.59
NZ BNZ	0.20	0.09	0.22	0.35	0.52
NZ NBNZ	0.33	0.80	0.72	0.46	0.29
NZ Westpac	0.78	0.80	0.51	0.20	0.02
NZ TSB Bank	0.31	-0.08	0.33	-0.78	-0.37
Overall	0.46	0.42	0.46	0.20	0.17

Figure 5-9 Correlation of impaired asset expense with subsequent loan net write-offs for major New Zealand banks

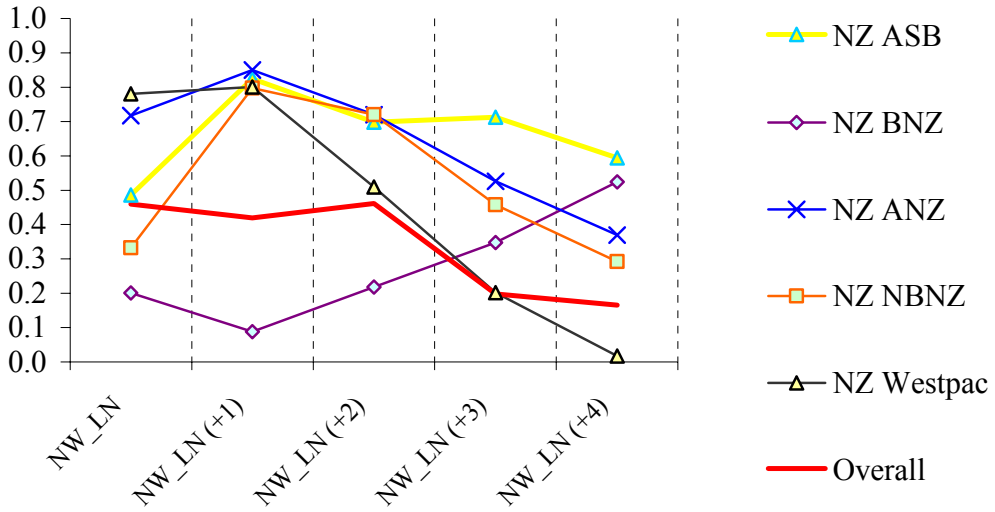
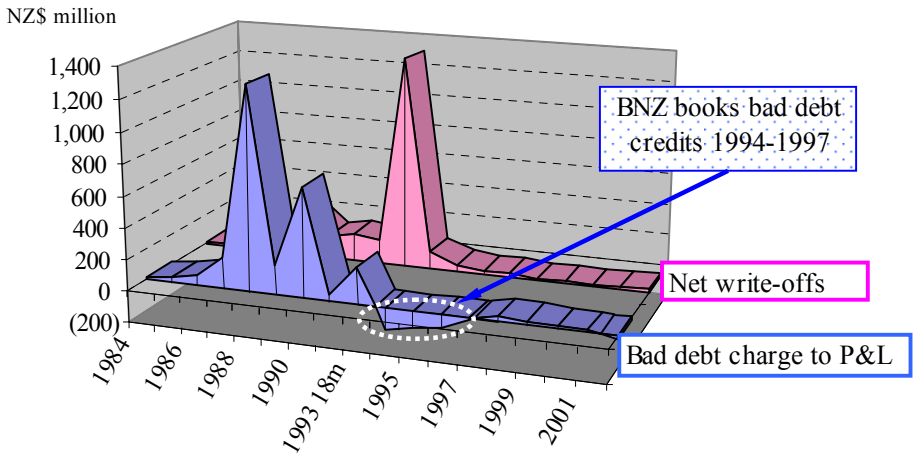


Figure 5-10 Bank of New Zealand: bad debt provisioning and write-offs 1984 to 2002



Pain (2003) also employs an alternative approach for studying the lag characteristics of write-offs. In particular, he estimates the write-offs following provisions booked in earlier periods by means of a pooled regression model in which write-offs are a linear function of past provision charges. The approach more specifically answers questions related to write-down patterns of loan loss provisions. This analysis has been conducted for Australasian banks in Table 5-9 for the full sample as well as for a number of sub-samples. For the UK, Pain (2003, p. 17, Table 3)[63] determines that around 80% of provisions appear to be reflected in write-offs after around 3 to 4 years with a mean lag of around 1½ years. For the Australasian banks, the F-statistics of the multiple regressions are all highly significant. The results indicate that for the overall sample about a quarter (25%) of the provision expense is written down in the subsequent year, another 30%, 6% and 14% in the following three years. This means that (similar to what was found by Pain), on average, three quarters of a year's provisions expense are extinguished from the balance sheet in the subsequent four years.

The regression results for various Australian and New Zealand sub-samples point to distinctive bank specific or possibly country specific write-down patterns. Australian banks write off half their provisions expense in the following year while the same coefficient for New Zealand banks is lower than 10%.

The difference could be an effect of banks using their discretion when writing down loans. This is shown by the fact that the first two lagged provisions expense terms become consistently significant[64] if we just use the specific component of provisions expense (SPE_LN) while there is no significance for the lagged general component (GEE_LN). The results of these estimates

[63] Pain applies his regression to the log transforms of net write-offs/loans and impaired asset expense/loans (provision charge in Pain's terminology). There are numerous observations of negative impaired asset expense which would be lost under this approach. These mainly originate from reversals of excessive provision stocks after the crisis of the early 1990s.

[64] When estimating the regression with fixed effects, one finds that the coefficients lose some of their significance, however. Note that in this case t-values are still much higher than for the corresponding coefficients of the GEE_LN regression.

are shown in Table 5-10. Note that the sample period was shortened for this analysis (1988 to 2005) as a satisfactory reporting of components of impaired asset expense became available only around the end of the 1980s (see Figure 5-2 as a reference for the availability of CLE proxies).

If one considers that impaired asset expense represents management's best estimate of credit losses that have occurred during a period, one would have to be cautious regarding its ability to do so based on the above results. For instance, less than half of the bad debt provisions translate into actual later write-offs for New Zealand banks. This finding confirms anecdotal information that write-offs are considered as true losses by banks for internal purposes whereas provisions, even specific ones, are deemed uncertain. On the other hand, one has to consider the extended period of generally benign economic climate since the mid 1990s. It is difficult to estimate a credit loss distribution without observing extreme events. This can be seen for the example of New Zealand ASB Bank's annual impaired asset expense compared to its loan write-offs in Figure 5-11. The absolute dollar amount of loan write-offs has hardly changed from 1995 through to 2005 while ASB has maintained provisioning levels just under 0.4% of total assets which themselves have more than quadrupled during the same time period. This implies that ASB has been over-provisioning since 1995 with additional provisions not being followed by corresponding higher write-offs. In view of long-term lending loss experience in comparable banking systems, ASB's provisions may nevertheless be prudent.

Table 5-9 Results of pooled regression of net write-offs/loans as a function of preceding impaired asset expense/loans

	Full sample	Australia all banks	Australia 4 major banks	New Zealand all banks	New Zealand 5 major banks
Dependent variable		Net debt write-offs as % of average loans (NW_LN)			
Constant	0.0004	-0.0006	-0.0001	**0.0015	*0.0012
(t-statistics)	(0.552)	(-1.260)	(-0.256)	(3.171)	(2.593)
IAE_LN(-1)	*0.2694	**0.5425	**0.5686	**0.0710	0.0786
(t-statistics)	(2.476)	(4.410)	(5.731)	(3.670)	(1.251)
IAE_LN(-2)	0.3136	**0.6856	0.2926	*0.1095	0.0632
(t-statistics)	(1.772)	(5.017)	(1.698)	(2.509)	(1.167)
IAE_LN(-3)	0.0630	*-0.1226	-0.0528	0.0953	0.1505
(t-statistics)	(0.879)	(-2.134)	(-0.826)	(1.731)	(0.737)
IAE_LN(-4)	**0.1404	-0.1372	0.0402	0.1383	**0.3003
(t-statistics)	(3.252)	(-1.366)	(1.261)	(1.864)	(10.003)
Adj. R-squared	0.3290	0.5821	0.8481	0.2626	0.3340
Cross sections / Observations	29 / 362	20 / 249	4 / 88	9 / 113	5 / 91
F-statistic	**45.247	**87.377	**122.473	**10.970	**11.782

Notes: ** significant at 1% level, * at 5% level

Model:

$$\mathrm{NW\_LN}_{it} = \alpha + \sum_{s=1}^{4} \beta_s \, \mathrm{IAE\_LN}_{i(t-s)} + u_{it}; \quad \mathrm{i: bank\ cross\ sections\ 1,.....,N;\ t: year}$$

NW_LN: net debt write-offs as % of average loans is dependent variable.
IAE_LN: impaired asset expense as % of average loans.
All t-statistics adjusted with White diagonal standard errors (d.f. corrected). Estimated for full observation period 1980 to 2005 without fixed or random effects.

Table 5-9 Results of pooled regression of net write-offs/loans as a function of preceding impaired asset expense/loans **(continued)**

Estimations with fixed bank-specific effects

	Full sample	Australia all banks	Australia 4 major banks	New Zealand all banks	New Zealand 5 major banks
Dependent variable		Net debt write-offs as % of average loans (NW_LN)			
Constant	0.0002	-0.0005	-0.0001	0.0008	*0.0015
(t-statistics)	(0.327)	(-0.777)	(-0.268)	(1.033)	(2.454)
IAE_LN(-1)	**0.2485	**0.5072	**0.5689	0.0977	0.0609
(t-statistics)	(3.095)	(4.157)	(5.551)	(1.943)	(0.813)
IAE_LN(-2)	*0.3072	**0.6670	0.2926	**0.1265	0.0527
(t-statistics)	(2.472)	(5.522)	(1.648)	(3.369)	(0.778)
IAE_LN(-3)	0.0679	-0.1354	-0.0528	0.1377	0.1399
(t-statistics)	(0.585)	(-1.808)	(-0.803)	(1.499)	(0.678)
IAE_LN(-4)	**0.1957	-0.0775	0.0405	**0.1679	**0.2828
(t-statistics)	(2.928)	(-0.837)	(1.209)	(3.652)	(8.321)
Adj. R-squared	0.3945	0.6018	0.8430	0.3209	0.3337
Cross sections / Observations	29 / 362	20 / 249	4 / 88	9 / 113	5 / 91
F-statistic	**8.349	**17.293	**67.754	**5.410	**6.635

Explanations: see Table 5-9
Estimated with fixed cross-sectional (bank) effect to control for bank-specific levels of net write-offs.

Table 5-10 Results of pooled regression of net write-offs/loans as a function of preceding total, specific and general impaired asset expense/loans

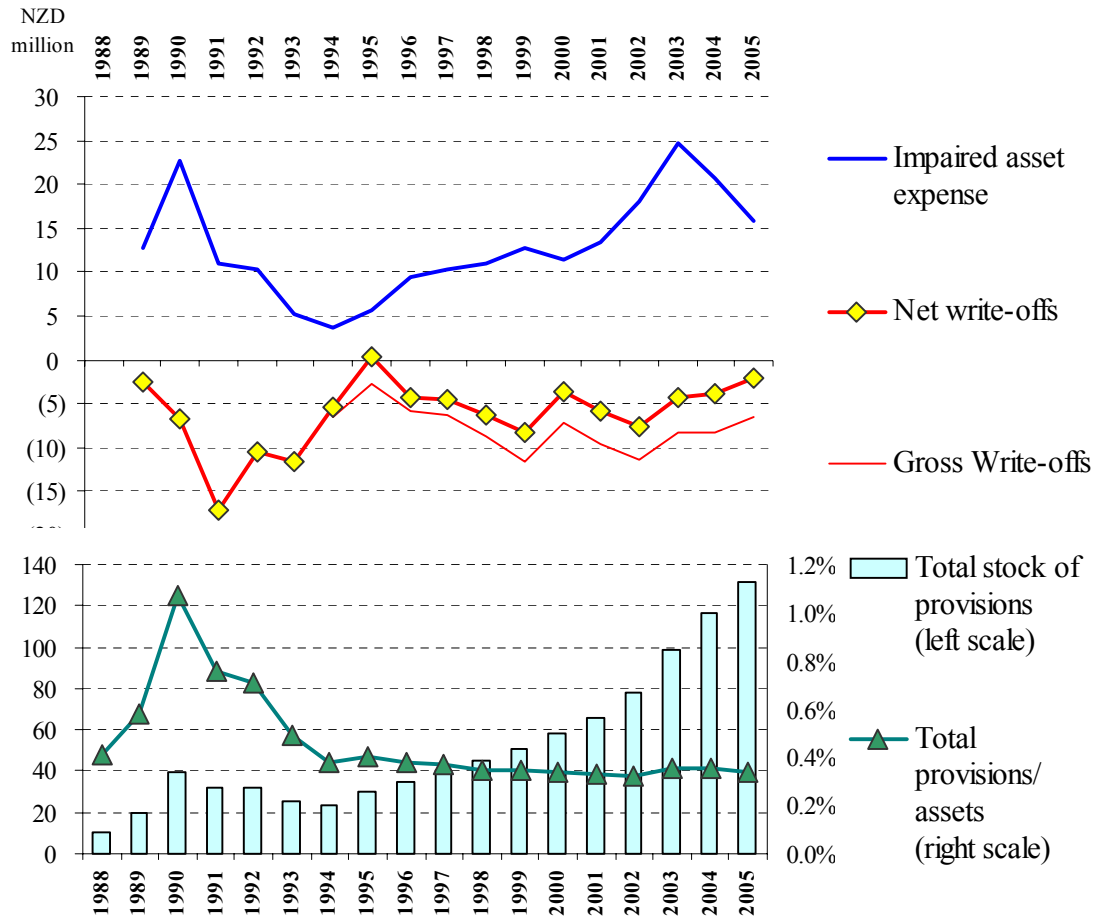
Explanatory variable	Total impaired asset expense/average loans	Specific component of impaired asset expense/ average loans	General component of impaired asset expense/ average loans
	IAE_LN	SPE_LN	GEE_LN
Dependent variable	Net debt write-offs as % of average loans (NW_LN)		
Constant	0.0006	0.0005	**0.0042
(t-statistics)	(0.689)	(1.487)	(3.303)
Lag (-1)	*0.2685	*0.2834	-0.2087
(t-statistics)	(2.466)	(2.319)	(-0.361)
Lag (-2)	0.3126	**0.2227	0.2804
(t-statistics)	(1.761)	(2.615)	(0.433)
Lag (-3)	0.0619	0.1083	-0.0600
(t-statistics)	(0.866)	(0.703)	(-0.092)
Lag (-4)	**0.1386	0.1125	0.7738
(t-statistics)	(3.158)	(1.842)	(1.842)
Adj. R-squared	0.3234	0.4707	0.0508
Cross sections	29	22	20
Observations	324	221	196
F-statistic	**39.593	**49.901	**3.610

Notes:
** significant at 1% level, * at 5% level
Model and estimation as in Table 5-9 for all Australasian banks in sample but data range from 1988 onwards. Reporting of SPE_LN and GEE_LN started only around this time. Estimated without fixed or random effects.

Explanatory variable	Total impaired asset expense/average loans	Specific component of impaired asset expense/ average loans	General component of impaired asset expense/ average loans
	IAE_LN	SPE_LN	GEE_LN
Dependent variable	Net debt write-offs as % of average loans (NW_LN)		
Constant	0.0005	0.0007	**0.0044
(t-statistics)	(0.665)	(1.400)	(3.318)
Lag (-1)	**0.2310	0.2630	-0.2056
(t-statistics)	(3.306)	(1.906)	(-0.398)
Lag (-2)	*0.3038	0.2036	0.2540
(t-statistics)	(2.417)	(1.492)	(0.419)
Lag (-3)	0.0601	0.1063	-0.1375
(t-statistics)	(0.525)	(0.643)	(-0.215)
Lag (-4)	**0.1912	0.1118	0.6968
(t-statistics)	(2.882)	(1.052)	(1.834)
Adj. R-squared	0.4509	0.4423	0.1453
Cross sections	29	22	20
Observations	324	221	196
F-statistic	**9.288	**7.980	**2.442

As above but estimated with fixed cross-sectional (bank) effect to control for bank-specific levels of net write-offs.

Figure 5-11 ASB Bank: Impaired asset expense, write-offs and provisioning



5.3.2.4 Recoveries of debts written off

Unlike provisions, write-offs mean losses with a high degree of probability. Subsequent recoveries should thus be comparably small. This section sets out to test this intuitive assumption by looking at patterns of bad debt recoveries for banks in the sample.

We find that over the pooled sample, on average, recoveries amount to 10.9% (median value[65]) of same year gross debt written off (see Table 5-11). Due to the underlying growth in the loan portfolio, this value will understate true loan loss recovery rates as recoveries are from loans

[65] The median value is more useful as some extreme outliers distort the pooled sample mean.

written off in previous years. Table 5-11 also shows summary statistics of recoveries as a proportion of gross write offs with a one and two year lag. The median values of the share of bad debts subsequently recovered amounts to 13.6% (1 year lag), respectively 15.4% (2 year lag).

Table 5-11 Summary statistics of recoveries as % of current and past years gross write-offs

	Recoveries as % of same year gross write-offs	as % of previous year gross write-offs	as % of 2 year lagged gross write-offs
Mean	16.33%	16.95%	19.77%
Median	**10.90%**	**13.61%**	**15.38%**
Maximum	116.60%	104.48%	252.99%
Minimum	0.00%	0.35%	0.29%
Std. Dev.	16.95%	15.15%	20.66%
Skewness	2.37	1.99	5.24
Kurtosis	10.86	9.11	53.17
Observations	353	339	325
Cross sections	26	26	24

An alternative approach to gauge this ratio is used by Pain (2003, Chart 9, p. 18). He divides the aggregate recoveries by total gross write-offs over the whole 1978 to 2000 observation period and finds that around 10% of write-offs incurred by 6 leading UK commercial banks were subsequently recovered.[66] His bank specific analysis reveals that this ratio has values ranging from around 6% to 13%.

We replicate Pain's method for this sample. We limit the analysis to 14 banks with series of 12 or more contiguous observations of recoveries and gross write-offs. The results are shown in Figure 5-12. The overall cumulative recovery ratio for this sub-sample is 13.9%, i.e. comparable to the median value of recoveries over one year lagged gross write-offs found in Table 5-11. The bank specific values are quite erratic and range from 3% for Bendigo Bank to

[66] Due to data quality problems, Pain cannot extend his analysis to UK mortgage banks in this case.

ASB's 26%; ratios are higher for New Zealand banks on average. Even entities of the same banking group such as ANZ have recovered vastly different amounts as a consolidated group (8.7%) compared to 15% in its New Zealand operations. Some banks like ASB and NAB appear to use write-offs liberally only to subsequently recover them in substantial amounts. Write-offs in their case thus have the characteristic of specific provisions with a high degree of uncertainty attached to them.

Figure 5-12 Cumulative bad debt recoveries as a percentage of cumulative write-offs for selected banks with extended time series observation

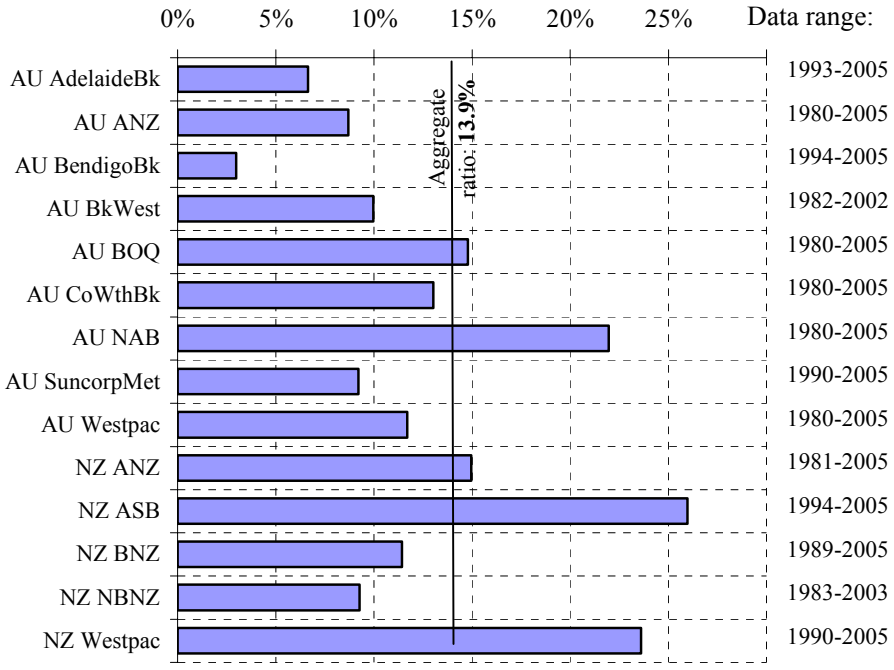
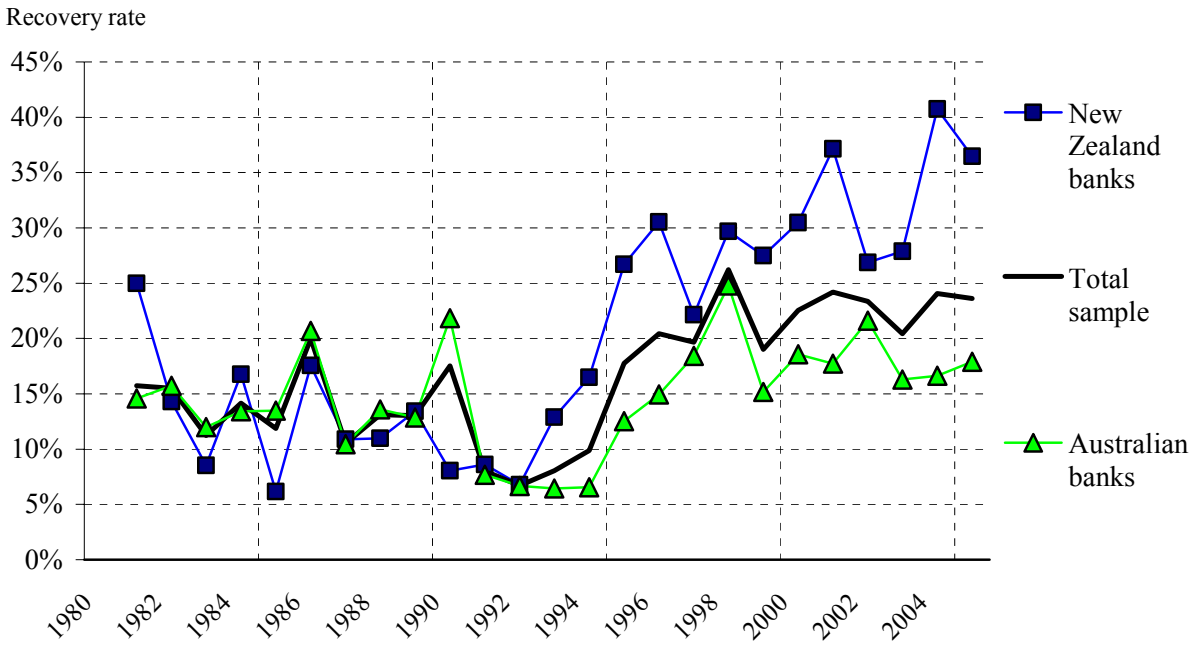


Figure 5-12 shows the range of years used to derive the bank specific cumulative recovery rates. It may be the case that the different ratios are the result of differences in the observation window. To study this phenomenon in more depth, one can follow recoveries as % of current or past years' gross write-offs through time. This is done for the ratio of recoveries over one year lagged year write-offs in Figure 5-13 which reveals considerable variability both across time and across countries. Between1980 and the onset of the 1990 financial crisis, this ratio generally remained in the 10-15% range. It reaches a nadir at the height of the crisis and subsequently peaks when part of these loan losses are recovered in a more benign economic climate. Such a trough in recoveries during bad times is also found in research which studies 'Loss Given Default' (LGD), which equals one minus the recovery rate.[67] For New Zealand banks, and to a lesser extent for Australian banks, recovery rates do not seem to revert to pre-crisis levels, however, and have been hovering in the 25-35% range since the mid 1990s.

[67] See Allen & Saunders (1999, p. 18-20) for a review of literature related to the cyclicality of LGD.

Figure 5-13 Australasian banks: average bad debt recoveries as % of one year lagged gross-write-offs through time



A look at the universe of major banks in Australia (Figure 5-14) and New Zealand (Figure 5-15) provides further insights. The trough discussed above becomes clearly visible for the sample of Australian banks. NAB's high average loan recoveries contrast with much lower and less variable recoveries at AU ANZ. Data quality for New Zealand banks is not as good with only NZ ANZ reporting recoveries back to 1980. There is again a striking difference between high and very volatile recovery rates at ASB and lower and more stable ratios for NBNZ. Bank of New Zealand's time series also exhibits great volatility from 1995 to 2000 when some past large write-offs are reversed. This time period partially coincides with substantial releases of provisions at BNZ when it showed impaired asset credits in its P&L for five years from 1993 and 1997 (see Figure 5-10).

Figure 5-14 Major Australian banks: average bad debt recoveries as % of one year lagged gross-write-offs through time

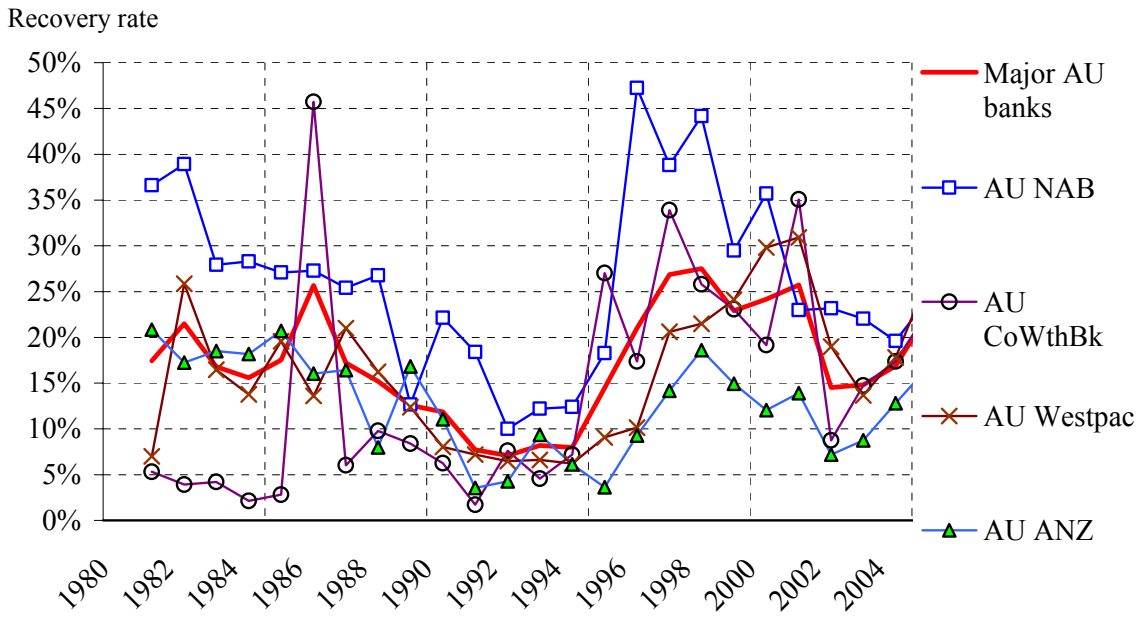
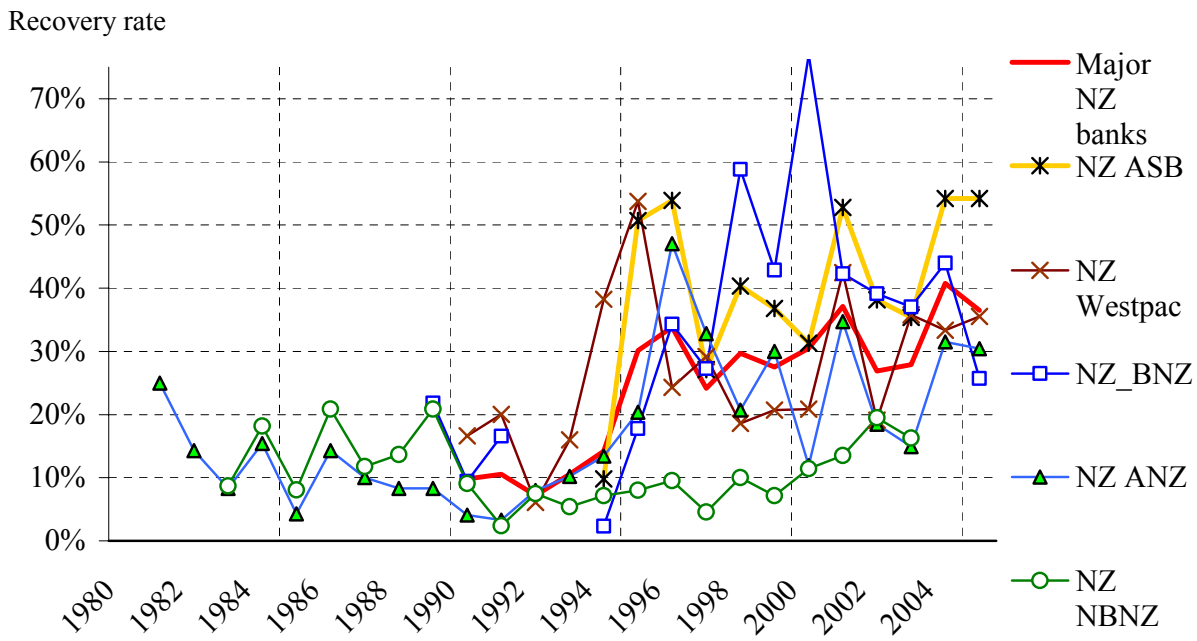


Figure 5-15 Major New Zealand banks: average bad debt recoveries as % of one year lagged gross-write-offs through time



There is a lack of literature which has analysed such recovery data.[68] One can nevertheless posit some hypotheses as ideas for continued research on the subject. Much like CLEs in general, recoveries are possibly driven by external macro-economic, behavioural and bank specific micro-economic factors.

A key macroeconomic factor mentioned previously is the procyclicality of recoveries with lower recoveries in times of crises and higher recoveries in a benign economic climate.

Another possible driver relates to tax effects of loan write-offs. Some bad debt provision expenses of the general type, e.g. determined by statistical methods, might not necessarily qualify for tax relief. Conversely, banks may find it easier to convince tax authorities that debt write-offs are a genuine, tax-deductible business expense. By generously writing off debts just to "recover" them again some years later, banks effectively push tax obligations into the future. Write-offs then take on the character of provisions without the definite nature one would expect them to have.

Another factor could be differences in the motivation to signal via loan write-offs. Unlike provisions, write-offs remove impaired assets from the bank's books which could be important for a prudential regulator. On the other hand, write-offs have no impact on reported earnings (assuming they have been provided for in earlier periods). Reported earnings are most important for stock listed companies who thus have less incentive to use this 'communication tool'. This postulated relationship would help explain lower recovery rates for the Australian, (mostly exchange listed) sub-sample while non-listed New Zealand banks may emphasize communication with the prudential regulator. The increase in recoveries in New Zealand coincides with the introduction of the country's 1995 Registered Bank Disclosure Regime (RBNZ, 1995). Likewise, new accounting standards relevant for financial instruments and

[68] Note that literature on recovery rates is typically based on bond market data and not accounting data sourced from bank annual reports.

institutions came into force at the time[69] but none of these standards contained specific rules regarding derecognitions of loan assets.

Earlier research on bank specific factors has found recoveries to depend on the type of loans written off. Evidence is usually obtained from the bond markets where unsecured claims will recover less than collateralized obligations.[70] Recoveries disclosed by banks are not immediately comparable, however. If a loan is written down, it should only be to the extent that it is unlikely to be recovered. Management should thus consider quality and asset backing of a claim both when it first provides for losses and subsequently writes it off.

There is reporting of sectoral recoveries for the 4 major Australian banks back to 1995 and even to 1988 in the case of NAB. The results of a preliminary analysis of these data is shown in Table 5-12 for the ratio of cumulative recoveries over cumulative write-offs by lending segment and in Table 5-13 for the average ratio of recoveries over previous year write-offs. The loan segmentation is not uniform across the sub-sample but all four banks show real estate lending through mortgages separated from lending for construction and development, lending to primary industries as well as consumer type personal lending as separate categories. Table 5-13 shows both mean and median ratio to highlight the erratic character of observations for some segments. A few large recoveries lift the mean ratio even though minimal amounts were recovered in most years. Note also that the analysis for banks with the shorter time windows starting in 1995 is likely to be biased as they are able to book comparably large recoveries on write-offs of the preceding crisis. This is reflected in some extreme ratios in Table 5-13, e.g. 83.8% mean recovery in Commonwealth Bank's finance and insurance segment.

The most consistent result can be found for the personal lending segment which exhibits median recoveries in the 15 to 35% range. This is likely to be the result of generic policies to

[69] Examples are AASB 1033 / FRS-31 (information about financial instruments) and AASB 1032 / FRS-33 (disclosure of information by financial institutions).

[70] See for example Altman & Brady (2001) as quoted in Allen & Saunders (1999, Table 9, p. 18).

write-down small consumer loans in default to zero while larger loans, possibly with collateral, are assessed on a more individual basis. This would explain generally lower recovery rates for other segments which, however, often display quite different ratios between banks. An example is mortgage lending where ANZ and Commonwealth Bank recovered less than half as much as NBA and Westpac. We attribute this mainly to a lack of common standards as to how to classify loans into segments. An example concerns construction loans which Westpac defines as 'lending in the commercial and financial sectors in Australia is for the purpose of the financing of construction of real estate and land development projects which cannot be separately identified from other lending to these borrowers' (Westpac 2005 Annual Financial Report). Another example is mortgaged lending to the agricultural sector which, for instance, Westpac includes with mortgage loans whereas Commonwealth bank characterizes mortgage loans as 'principally owner occupied housing' (Commonwealth Bank 2005 Financial Report). More concise definitions are missing in the banks' segment reporting.

Table 5-12 Major Australian banks – rates of bad debt recoveries by lending segment

Cumulative recoveries as % of cumulative write-offs

Segment recovery data (domestic)	AU ANZ 1992 – 2005	AU CoWthBk 1995 – 2005	AU NAB 1988 – 2005	AU Westpac 1995 – 2005
Government and public authorities	0.0%	0.0%	n.a.	n.a.
Agriculture, forestry, fishing and mining	6.5%	23.7%	15.1%	23.9%
Financial, investment and insurance	12.0%	26.7%	22.0%	n.a.
Real estate – mortgage	3.5%	5.0%	13.1%	11.8%
Real estate – construction	5.5%	6.9%	5.0%	6.0%
Personal	15.1%	20.9%	29.8%	24.1%
Retail and wholesale trade	4.5%	n.a.	n.a.	n.a.
Lease financing	13.0%	18.8%	9.0%	n.a.
Other commercial and industrial	1.0%	14.6%	12.3%	n.a.
Entertainment, leisure and tourism	7.0%	n.a.	n.a.	n.a.
Manufacturing	7.7%	n.a.	9.5%	n.a.
Overseas lending	9.9%	23.4%	24.5%	6.2%
Overall domestic and overseas	8.6%	20.6%	21.8%	19.9%

Table 5-13 Major Australian banks – rates of bad debt recoveries by lending segment

Average recoveries as % of previous year write-offs

Segment recovery data	AU ANZ 1993 – 2005		AU CoWthBk 1996 – 2005		AU NAB 1989 – 2005		AU Westpac 1996 – 2005	
(domestic)	Mean	Median	Mean	Median	Mean	Median	Mean	Median
Agriculture, forestry, fishing and mining	15.1%	2.8%	37.2%	23.6%	28.7%	20.0%	14.2%	0.0%
Financial, investment and insurance	24.8%	13.2%	83.8%	41.0%	34.5%	21.9%	n.a.	n.a.
Real estate – mortgage	8.4%	5.9%	6.6%	5.0%	19.2%	14.3%	5.6%	0.0%
Real estate – construction	14.7%	15.4%	18.3%	5.9%	10.5%	10.0%	6.2%	0.0%
Personal	17.3%	18.2%	27.0%	27.6%	44.9%	34.6%	27.5%	28.2%
Retail and wholesale trade	5.1%	4.8%	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Lease financing	24.4%	17.9%	23.9%	22.7%	12.7%	13.6%	n.a.	n.a.
Other commercial and industrial	n.a.	n.a.	15.3%	15.7%	17.7%	12.2%	n.a.	n.a.
Entertainment, leisure and tourism	11.6%	6.9%	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Manufacturing	16.0%	4.8%	n.a.	n.a.	11.3%	9.7%	n.a.	n.a.

Overall, we find that recovery rates vary greatly between institutions, across countries and also through time. This shows that despite common accounting and prudential standards, banks have discretion not only with regard to providing for credit losses but also in the second step when loans are finally derecognized. There are interesting hypotheses relating to tax aspects, signalling and types of lending which could be used to research this issue further.

For the study of the overall credit loss experience, recoveries are nevertheless of secondary importance. The focus in this research is rather on provisions and net write-offs. This means that the relatively small recoveries, in line with most other empirical work, are removed from same year gross write-down experience. This is theoretically inferior to adjusting write-offs with subsequently reported recoveries but is easier to implement and brings the advantage of extended data series as earlier in the observation period the banks often just reported write-off figures net of recoveries.

5.4 Determinants of credit losses

The following potential determinants of credit losses are presented as two distinctive groups. In the first group are aggregate macroeconomic variables which are period specific for their respective system (Australia, New Zealand) but apply to all banks in the cross-section. The second are bank specific variables which have mostly been sourced from the database of Australasian banks compiled for the purpose of this thesis. Table 5-14 below provides an overview of all explanatory variables which are considered for the estimation of the principal model introduced at the beginning of this chapter.

Table 5-14 Potential explanatory variables and the expected sign of the regression coefficient

Aggregate explanatory variable system and not bank specific	**Acronym**	**Expected sign of coefficient**	**Comment**
Real GDP growth	GDPGRW	-ve	Ability of borrowers to service debt will be determined by the economic cycle.
Unemployment rate	UNEMP	+ve	Unemployment rate is included as it not only reflects the business cycle (like GDP growth) but also longer term and structural imbalances of the economy.
Liabilities of households and firms as % of disposable income	LIAB_INC	+ve	The more households and firms in the system are indebted, the more financially vulnerable they will be.
Asset prices / interest rates:			Disturbances in the asset markets can impair the value of banks' assets both directly and indirectly (i.e. through reduced collateral values). Experience shows that the property sector and the share markets may play a critical role in triggering losses in the banking system. Similar effects are expected in a high and volatile interest rate environment.
Housing price index (changes)	HPGRW	-ve	
Return on leading share indices	RET_ASX, RET_NZX	-ve	
Change real/nominal interest rates	NOMINTGRW REALINTGRW	+ve	

Table 5-14 Potential explanatory variables and the expected sign of the regression coefficient (continued)

Bank specific explanatory variable	Acronym	Expected sign of coefficient	Comment
Past credit expansion as measured by asset growth, loan growth and total income growth. Relative growth measures DVLNGRW and DVSYSALLGRW are the point differences of a bank's growth relative to the system's asset, resp. loan growth.	ASGRW LNGRW TOIGRW DVLNGRW DVSYSALLGRW	+ve or (-ve)	Fast growth of the loan portfolio is often associated with subsequent loan losses. Alternatively, some researchers have argued that a slow growing loan portfolio may be caused by a weak economy and thus be associated with CLE. This effect should, however, be picked up by broader activity variables like GDPGRW.
Risk choice			
Pricing of risks as measured by net interest margins	NIM	+ve/(-ve)	A bank's deliberate choice to lend to more risky borrowers is likely reflected in higher interest margins. An uncertain sign arises because lower past margins (lagged terms) might induce greater risk-taking by bank, as argued by Pain (2003, Table 5, p. 24).
Characteristic of lending portfolio Share of housing loans	HS_LN	-ve	The share of comparably lower risk housing loans as % of loans proxies a key risk characteristic of the bank's loan portfolio.
Diversification / systemic importance as measured by share of system assets, resp. loans.	SH_SYSASS SH_SYSLNS	-ve	A bank's assets in proportion to the overall banking system assets provides a crude proxy for loan portfolio diversification.
Cost efficiency as measured by Cost-income ratio	CIR	+ve/(-ve)	Inefficient banks can be expected to suffer greater credit losses. Alternatively, such banks could maintain an expensive credit evaluation procedure and will thus exhibit lower credit losses.
Market power as measured by share of system assets	SH_SYSASS SH_SYSLNS	+ve/(-ve)	Monopolistic markets structures promote lending to young firms which then leads to higher credit losses (Petersen & Rajan, 1995). Conversely, increased competition may induce banks to take greater risks.
Other behavioural aspects			
Income smoothing Income measured as earnings before taxes & provisions as % of assets and equity respectively	EBTP_AS EBTP_EQ	+ve	Some literature has found evidence of banks using discretionary provisions to smooth earnings for a variety of motivations.
Capital management Capital measured as tier 1 or tier 1+2 capital as % of risk weighted assets	TR1_RWA TR12_RWA	-ve	General provisions count towards Basel I minimum capital and weaker banks might thus be tempted to engage in capital management through provisioning.

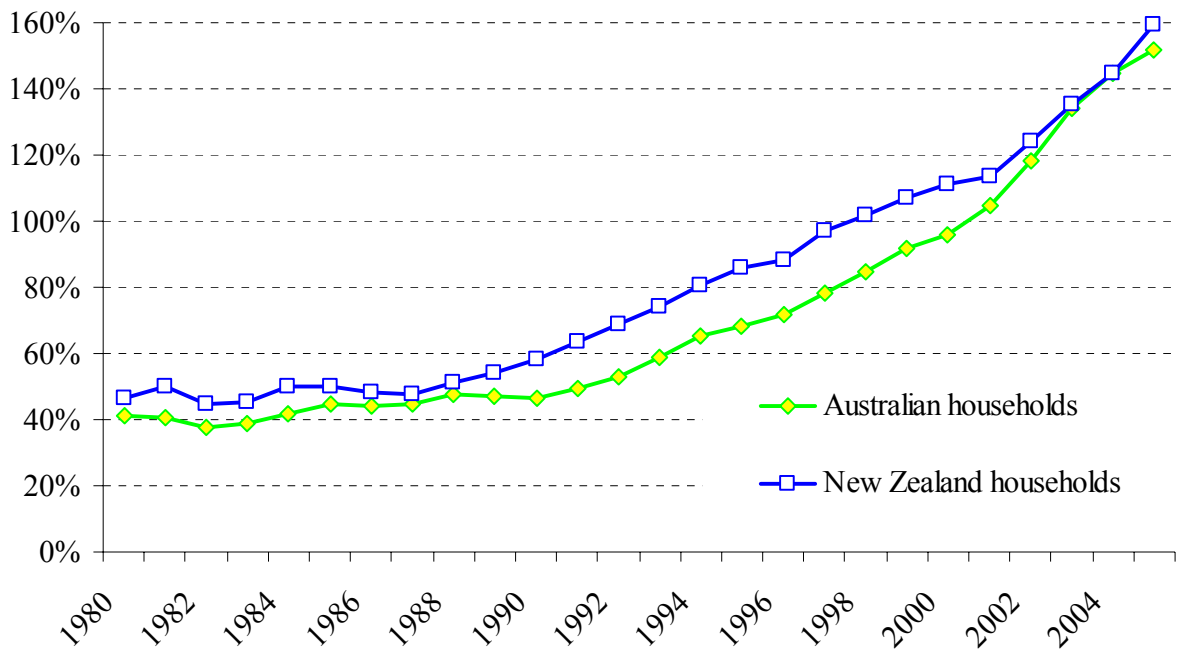
5.4.1 Macroeconomic factors

Macroeconomic influences on asset quality have repeatedly been explored by researchers. Firstly, incomes and non-housing wealth of households and firms will typically vary with the economic cycle and therefore affect their ability to service debt. To measure the impact of changes in aggregate economic activity, it is general practice[71] to use the real GDP growth rate (GDPGRW) as it is the broadest measure of economic activity.

Secondly, the more households and firms are indebted, the more likely adverse macroeconomic shocks will lead to higher levels of defaults (as for example shown in E. P. Davis, 1993) and there could well be nonlinearities in the relationship between such shocks and defaults. As a measure of household, respectively firm, debt, Salas & Saurina (2002) calculate a ratio of household debt over GDP, respectively the liabilities of the corporate sector over its market value. Likewise, Pain (2003, p. 24) calculates corporate capital gearing as the sector's interest payments as a proportion of net profits. He also defines household capital gearing as the stock of household debt as a proportion of financial and tangible assets. Due to data availability issues, we construct a slightly different proxy for household indebtedness. We calculate a ratio of household financial liabilities over disposable income (LIAB_INC) as an indicator of the households' ability to service debts. As illustrated in Figure 5-16, households in both Australia and New Zealand have been taking on increasingly higher levels of debt since about 1990.

[71] GDP growth has been employed in models of Arpa et al. (2001), Kearns (2004), Pain (2003) and Salas & Saurina (2002).

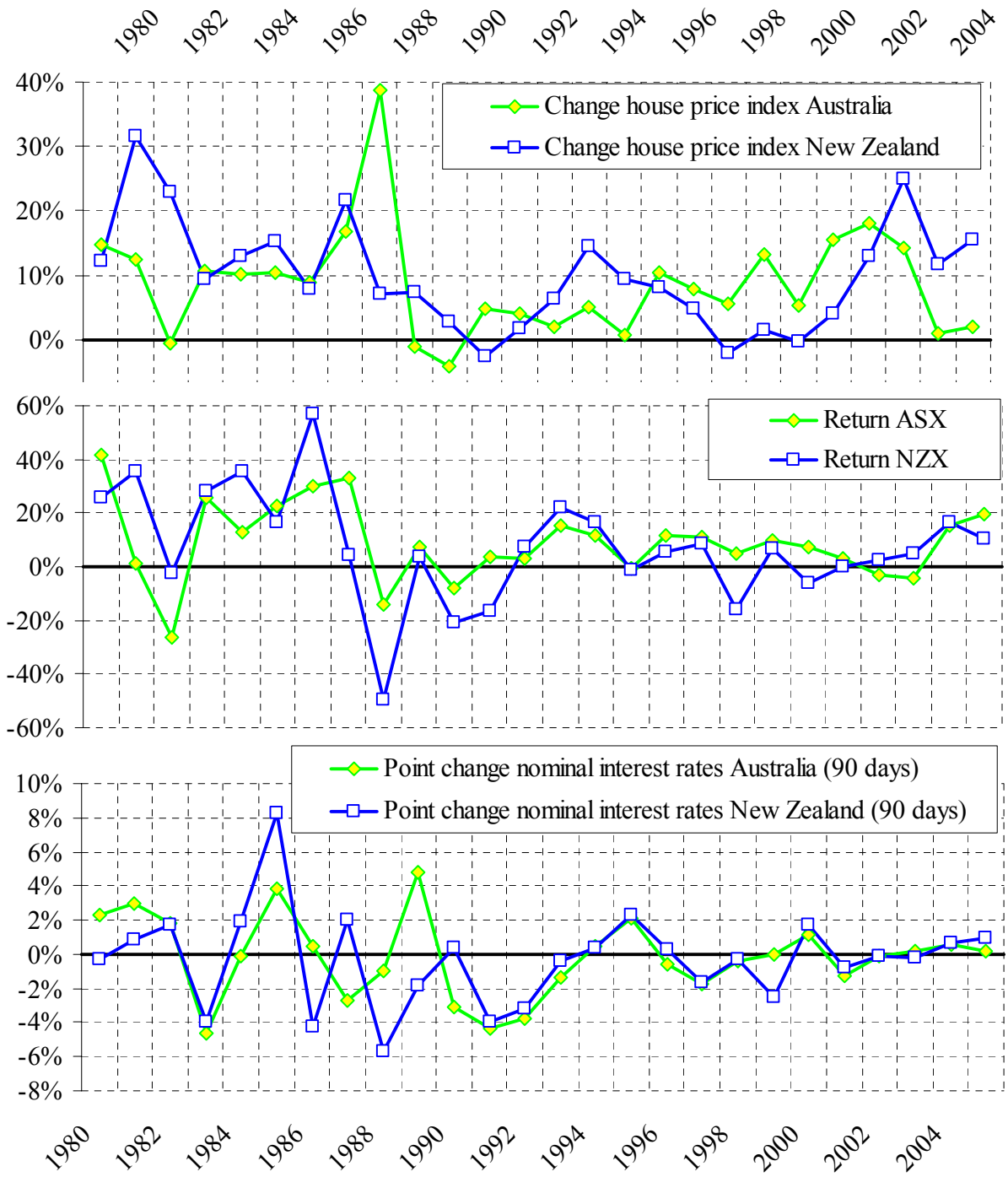
Figure 5-16 Household financial liabilities as % of disposable income



Development of asset prices in the economy - particularly asset price shocks - is a third macro factor which may weaken borrowers and reduce the value of collateral held by banks. Moreover, Pain (2003, p. 21) argues that sharp changes in asset prices may be associated with increased fragility of borrowers through more traditional macroeconomic channels. For example, swift increases in interest rates can lead to cash-flow problems in both the corporate and household sectors, which in turn can lead to borrower default. To test the effect of changes in asset prices, we include three explanatory variables in the model. These are the growth rate of house prices in Australia and New Zealand (HPGRW_AU, HPGRW_NZ), the annual return of the main shares indices (RET_ASX, RET_NZX) as well as the changes in 90 day real and nominal interest rates (REALINTGRW, NOMINTGRW) of both currencies. The real interest rate is the nominal mid year interest rate adjusted by the percentage change in CPI inflation (CPIGRW) observed for this year.

The above asset price and interest rate proxies are all graphed in Figure 5-17.

Figure 5-17 Asset price and interest rate proxies



The rate of unemployment (UNEMP) is a final macro variable which we consider as a driver of credit losses in the banking system. Kearns (2004, p. 117), for instance, uses it together

with GDP growth for a study of provisioning patterns of Irish banks. Earlier it had also been employed by Bikker & Metzemakers (2003). These authors argue that while GDP growth captures cyclical effects, the unemployment rate also reflects longer term imbalances in the economy. It can also be said that the unemployment rate is more directly relevant for the financial health of affected households. Figure 5-18 visualizes the jobless rate experience for both Australia and New Zealand through the 1980 to 2005 observation period.

Figure 5-18 Rate of unemployment Australia and New Zealand

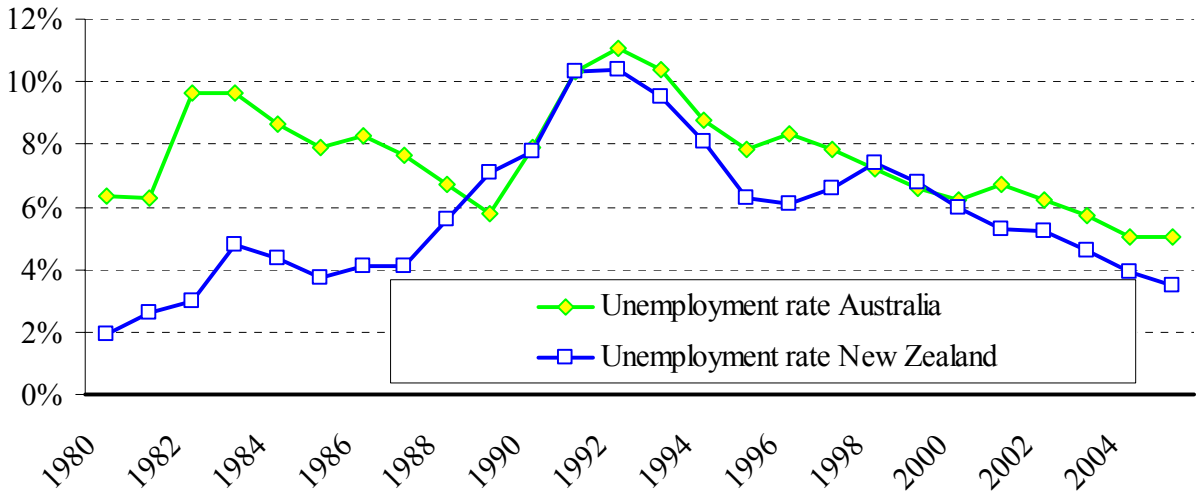


Table 5-15 below provides an overview of sources for all macro data (including auxiliary series) considered for the principal model. Table 5-16 presents corresponding summary statistics.

Table 5-15 Acronym, source and details of aggregate macro factors (including auxiliary)

Acronym	Description	Country	Source: Code* (DS, ABS)
CPIGRW_AU	CPI % growth Australia	AU	DS: AUQ64..XF
CPIGRW_NZ	CPI % growth New Zealand	NZ	DS: NZQ64..XF
GDPGRW_AU	GDP % growth Australia	AU	DS: AUOCFGDP (Source OECD)
GDPGRW_NZ	GDP % growth New Zealand	NZ	DS: NZOCFGDP (Source OECD)
HPGRW_AU	House price index % change Australia	AU	Median House Price All Capital Cities RBA, REIA
HPGRW_NZ	House price index % change New Zealand	NZ	RBNZ Value of housing stock and house prices
LIAB_INC_AU	Liabilities / disposable income	AU	RBA, ABS
LIAB_INC_NZ	Liabilities / disposable income	NZ	RBNZ, HHAandL2005webcopy.xls
NOMINT_AU	Nominal short-term interest rates Australia (3 months money market rates or equivalent)	AU	DS: AUOCFIST, OECD code IRS
NOMINT_NZ	Nominal short-term interest rates New Zealand (3 months)	NZ	DS: NZOCFIST, OECD code IRS
NOMINTGRW_AU	Point change of NOMINT_AU	AU	from NOMINT_AU
NOMINTGRW_NZ	Point change of NOMINT_NZ	NZ	from NOMINT_NZ
PSC_AU	Private sector credit (PSC) Australia	AU	RBA: DLCANCS
PSC_NZ	PSC New Zealand	NZ	RBNZ: PSC(R) excluding repos
PSCGRW_AU/NZ	% change PSC Australia/New Zealand Auxiliary series to calculate bank specific DVLNGRW series	AU/NZ	from PSC_AU, PSC_NZ
REALINT_AU	Real interest rates Australia	AU	from NOMINT_AU, CPIGRW_AU
REALINT_NZ	Real interest rates New Zealand	NZ	from NOMINT_NZ, CPIGRW_NZ
REALINTGRW_AU	Point change of REALINT_AU	AU	from REALINT_AU
REALINTGRW_NZ	Point change of REALINT_NZ	NZ	from REALINT_NZ
RET_ASX	Return ASX All Ordinaries index	AU	DS: AUOSP001F
RET_NZX	Return NZX All Shares index	NZ	DS: NZOSP001F
SYSASALL_AU	Banking system assets Australia Auxiliary to deriving relative size of banks in system (SH_SYSASALL) and deviation from system growth (DVSYSALLGRW)	AU	RBA: B02HIST.XLS BBATA (in AUD)
SYSASALL_NZ	Banking system assets New Zealand Auxiliary, see SYSASALL_AU	NZ	RBNZ: hC4.xls (in NZD)
SYSASALLGRW_ AU/NZ	Growth of banking system assets SYSASALL_AU/NZ	AU/NZ	from SYSASALL_AU, SYSASALL_NZ
UNEMP_AU	Unemployment rate (level)	AU	ABS: Series ID A163165V
UNEMP_NZ	Unemployment rate (level)	NZ	Statistics NZ: Table B.2.3, HFLS

Series data are for calendar year to 31 December for period data (CPIGRW, GDPGRW, HPGRW, NOMINTGRW, PSCGRW, REALINTGRW, RET, SYSASALLGRW) and as of 31 December for point/level data (all other series).
*Source codes: DS – Datastream code, ABS – Australian Bureau of Statistics code

Table 5-16 Summary statistics aggregate macro factors and auxiliary series

Acronym	Mean	Median	Maximum	Minimum	Std. Dev.	Skewness	Kurtosis	Obs
CPIGRW_AU	5.0%	4.2%	11.2%	0.2%	3.4%	0.412	1.809	26
CPIGRW_NZ	6.0%	2.9%	17.1%	-0.1%	5.7%	0.977	2.377	26
GDPGRW_AU	3.3%	3.8%	6.6%	-0.7%	1.8%	-0.667	3.074	26
GDPGRW_NZ	2.8%	2.8%	8.5%	-1.9%	2.2%	0.277	3.287	26
HPGRW_AU	8.7%	8.4%	38.8%	-4.2%	8.6%	1.508	6.757	26
HPGRW_NZ	10.1%	8.7%	31.6%	-2.5%	8.5%	0.703	3.100	26
LIAB_INC_AU	71%	56%	152%	38%	35%	1.058	2.916	26
LIAB_INC_NZ	81%	71%	160%	45%	35%	0.722	2.366	26
NOMINT_AU	9.6%	7.4%	17.6%	4.7%	4.6%	0.409	1.564	26
NOMINT_NZ	11.0%	9.2%	23.3%	4.8%	5.3%	0.712	2.396	26
NOMINTGRW_AU	-0.16%	-0.04%	4.81%	-4.64%	2.37%	-0.003	2.704	26
NOMINTGRW_NZ	-0.29%	-0.16%	8.28%	-5.71%	2.78%	0.632	4.948	26
PSC_AU (AUD bil)	433.0	346.5	1,141.4	69.7	299.7	0.774	2.709	26
PSC_NZ (NZD bil)	77.2	62.0	201.9	10.9	54.0	0.656	2.463	26
PSCGRW_AU	12.2%	11.3%	23.9%	-1.2%	6.2%	-0.120	2.955	26
PSCGRW_NZ	12.8%	10.9%	31.0%	4.9%	6.9%	1.182	3.664	26
REALINT_AU	4.6%	4.3%	10.1%	0.5%	2.5%	0.474	2.484	26
REALINT_NZ	5.0%	5.3%	9.0%	-2.8%	2.7%	-0.989	4.067	26
REALINTGRW_AU	0.09%	0.02%	5.99%	-3.43%	2.18%	0.917	3.855	26
REALINTGRW_NZ	0.12%	-0.26%	4.89%	-3.73%	1.85%	0.767	3.763	26
RET_ASX	9.0%	8.8%	41.5%	-26.6%	14.8%	-0.019	3.354	26
RET_NZX	7.5%	6.3%	57.1%	-49.5%	20.9%	-0.239	4.291	26
SYSASALL_AU (AUD billion)	491.2	383.0	1,451.1	61.6	392.5	0.984	3.087	26
SYSASALL_NZ (NZD billion)	138.7	126.7	252.3	70.2	61.3	1.856	1.856	18
SYSASALLGRW_AU	13.6%	12.8%	24.0%	2.8%	6.0%	2.226	2.226	26
SYSASALLGRW_NZ	7.9%	8.4%	14.4%	0.0%	4.2%	2.498	2.498	17
UNEMP_AU	7.6%	7.7%	11.1%	5.1%	1.7%	0.371	2.272	26
UNEMP_NZ	5.7%	5.5%	10.4%	1.9%	2.3%	0.480	2.556	26

5.4.2 Microeconomic or bank specific factors

This subsection reviews bank specific factors with potential explanatory power over an institution's CLE. The major categories relate to (1) past credit expansion, (2) the risk choice of

the bank as, for example, reflected in the composition of its portfolio or the level of collateral backing, (3) the efficiency of a bank's credit risk management, (4) the amount of market power of an institution, and, finally, (5) miscellaneous behavioural factors that could potentially influence the discretionary element of reported CLEs. A final sub-section provides a description and summary statistics of all bank specific series.

5.4.2.1 Past credit expansion

Rapid expansion of lending has often been associated with subsequent credit losses when banks inadvertently assume far greater credit risk than they realize (e.g. in Clair, 1992). To gain market share, a bank may be tempted to compromise on credit quality. Effects of adverse selection can occur when incumbent lenders 'allow' their doubtful customers to switch the banking relationship to the newcomer.

This phenomenon has often been observed in the context of financial deregulation such as for the Scandinavian banking sector where a very rapid credit expansion after the liberalization of the system led to substantial credit losses in the early 1990s (Hyytinen, 2002, p. 617). A similar sequence of events occurred for several Australasian financial institutions during the observation period.

An alternative school of thought associates low loan growth with rising credit losses. Low bank specific credit growth may be induced by a fall in aggregate demand in the economy which in turn weakens the borrowers. Moreover, a 'low growth' bank may be inefficient and consequently suffer greater credit losses. Negative coefficients consistent with this alternative hypothesis were found in empirical research by Pain (2003, p. 29) and Cavallo & Majnoni (2001).

Hess & Feng (2007) have proposed a modelling methodology which could potentially take both of the above effects into account. They use the squared difference between a bank's asset growth and the average growth of the banking system as a proxy. We would then expect a positive relationship between credit losses and a proxy constructed in such a way as banks which

either expand very rapidly or fail to grow their portfolios relative to the average may suffer greater credit losses. Expanding this idea, one could consider modelling positive and negative squared deviations separately which then would allow for different coefficients on positive versus negative deviations.

Previous research generally uses either asset or loan growth as a proxy for bank expansion. Salas & Saurina (2002, p. 213) also calculate the expansion rate of the branch network for Spanish banks but this data item is not reported consistently by banks in Australasia. Additional growth parameter candidates are provided by income data items. We select the growth in total operating profit as an alternative proxy.

The summary statistics of the five growth rate proxies (ASGRW, LNGRW, TOIGRW, DVSYSALLGRW, DVLNGRW) across both countries over the full 1980 to 2005 observation period are shown in Table 5-17 below. The median growth over the observation period amounted to 14.0% for assets (ASGRW) and 15.4% for loans (LNGRW). Median growth in total operating income was slightly lower at 12.3%. Not surprisingly, asset and loan growth correlate well (0.88) while total operating income growth has a lower but still positive correlation with the other two variables. Figure 5-19 displays the dynamics of the three base growth series (ASGRW, LNGRW, TOIGRW) over the observation period. It highlights the good correlation between asset and loan growth, in particular after 1990. The correlation appears weaker during the earlier period when the changing regulatory framework led to changing balance sheet structures of various institutions (e.g. former savings banks and building societies). An example is TSB Bank in New Zealand. Before becoming a registered bank in 1989, much of its assets were in the form of deposits with the country's trading banks. Only with time did TSB grow its loan portfolio to a larger proportion of assets.

DVSYSALLGRW and DVLNGRW measure the point difference of a bank's growth rate to the growth rate of the overall system. DVSYSALLGRW refers to the difference of ASGRW to the growth in total systemic bank assets (SYSALLGRW), while DVLNGRW is the difference of LNGRW to growth in total private sector credit (PSCGRW). Not surprisingly, both

parameters correlate well with ASGWR and LNGRW. Data series to derive DVSYSALLGRW only start 1989 in New Zealand because assets in the banking system were not reported before 1988. DVLNGRW, on the other hand, is more complete because data on private sector credit (PSC) has been reconstructed back to before 1980 for both Australian and New Zealand. 43% (199 of 456) and 38% (197 of 513) of observations of DVSYSALLGRW and DVLNGRW, respectively, are negative; i.e. growth of the bank was below the system growth in that particular year.

Table 5-17 Summary statistics and correlations of parameters to measure credit expansion

	Growth total assets	Growth total loans	Growth total operating income	Deviation ASGRW from growth of system asset**	Deviation LNGRW from growth of loans in system**
	ASGRW	LNGRW	TOIGRW*	DVSYSALLGRW	DVLNGRW
Mean	17.0%	19.0%	16.5%	4.9%	7.1%
Median	14.1%	15.4%	12.3%	1.7%	3.3%
Maximum	180.6%	160.4%	256.7%	170.7%	147.8%
Minimum	-40.1%	-28.3%	-100.2%	-50.1%	-39.5%
Std. Dev.	19.1%	20.6%	25.9%	19.8%	20.7%
Skewness	3.06	2.97	3.52	3.33	2.87
Kurtosis	21.91	17.99	28.15	22.89	17.20
# observations	517	513	494	456	513
Of which negative values	39	32	65	198	197
Cross sections (banks)	32	32	31	32	32

Correlations

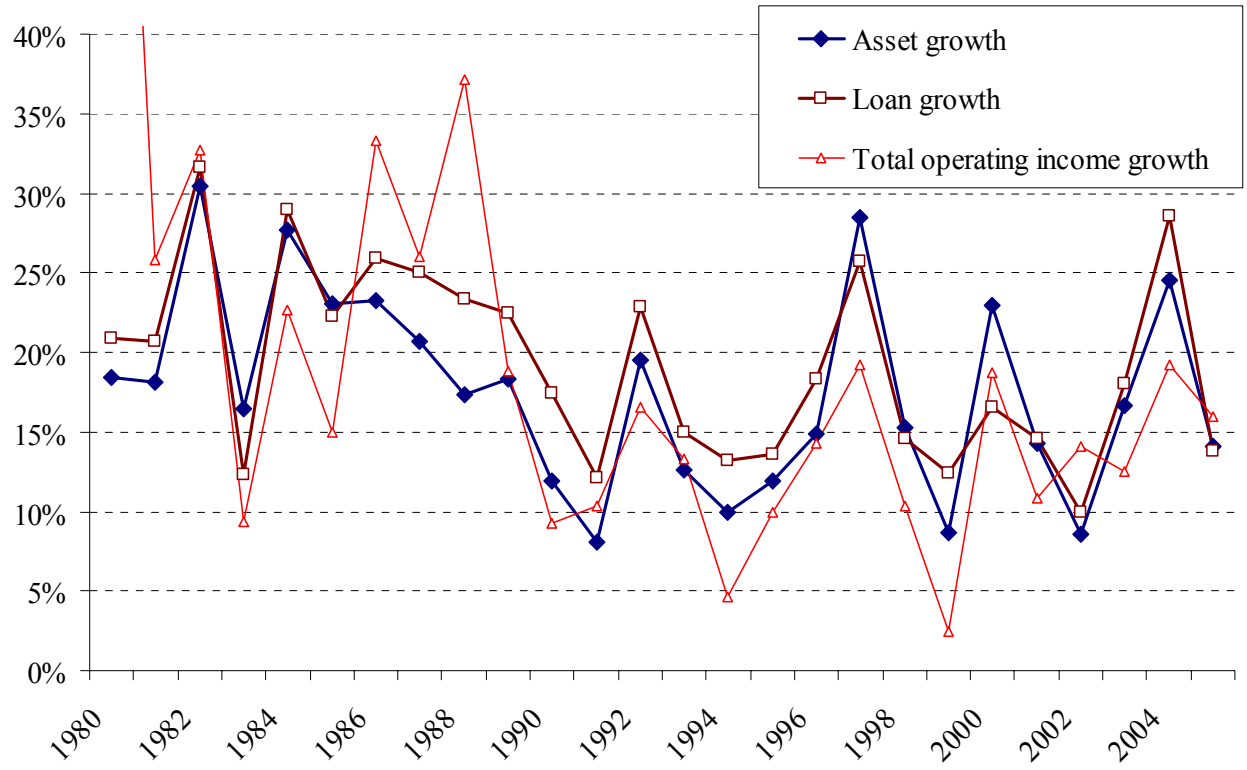
	ASGRW	LNGRW	TOIGRW	DVSYSALLGRW	DVLNGRW
ASGRW	1.00				
LNGRW	**0.88**	1.00			
TOIGRW	0.41	0.38	1.00		
DVSYSALLGRW	**0.95**	**0.82**	0.47	1.00	
DVLNGRW	**0.82**	**0.95**	0.31	**0.86**	1.00

Notes:

* Total operating income is defined as net interest income (pre-provision) plus other operating income.

** For a more details on the definition of DVSYSALLGRW and DVLNGRW refer to Table 5-18.

Figure 5-19 Mean growth of assets, loans and total operating income 1980 - 2005



5.4.2.2 Risk choice

Banks make some deliberate decisions as to their exposure to credit risk and these decisions are likely to affect their CLE. Two such choices are discussed in the following two sub-sections.

5.4.2.2.1 Pricing of higher risks as reflected by interest margins

In theory, banks can manage their lending risk by appropriate screening and pricing of transactions. This means some banks will deliberately take on more risk but higher expected losses will be reflected in higher ex ante margins earned and this in turn will reward the banks'

shareholders to absorb potentially higher unexpected losses[72]. Higher provisions and ultimately losses may therefore arise from engaging in such deliberate lending policies. Empirical evidence for this effect is provided by Keeton & Morris (1988, Chart 6, p. 16)[73]. Similarly, Sinkey & Greenawalt (1991) found that 'loan-loss rates were positively associated with loan rates, volatile funds, and loan volume from the preceding three years'. This implies a bank's net interest margin in lagged form is a suitable proxy to capture the idea that loan risk of past loans is subsequently revealed in higher loan losses.

While the above considerations would call for a positive expected sign for this coefficient, Pain (2003, Table 5, p. 24) sees some uncertainty regarding the sign for bank behavioural factors. He reasons that lower past margins might induce greater risk-taking by banks which then could lead to higher losses.

5.4.2.2.2 Characteristics of lending portfolio

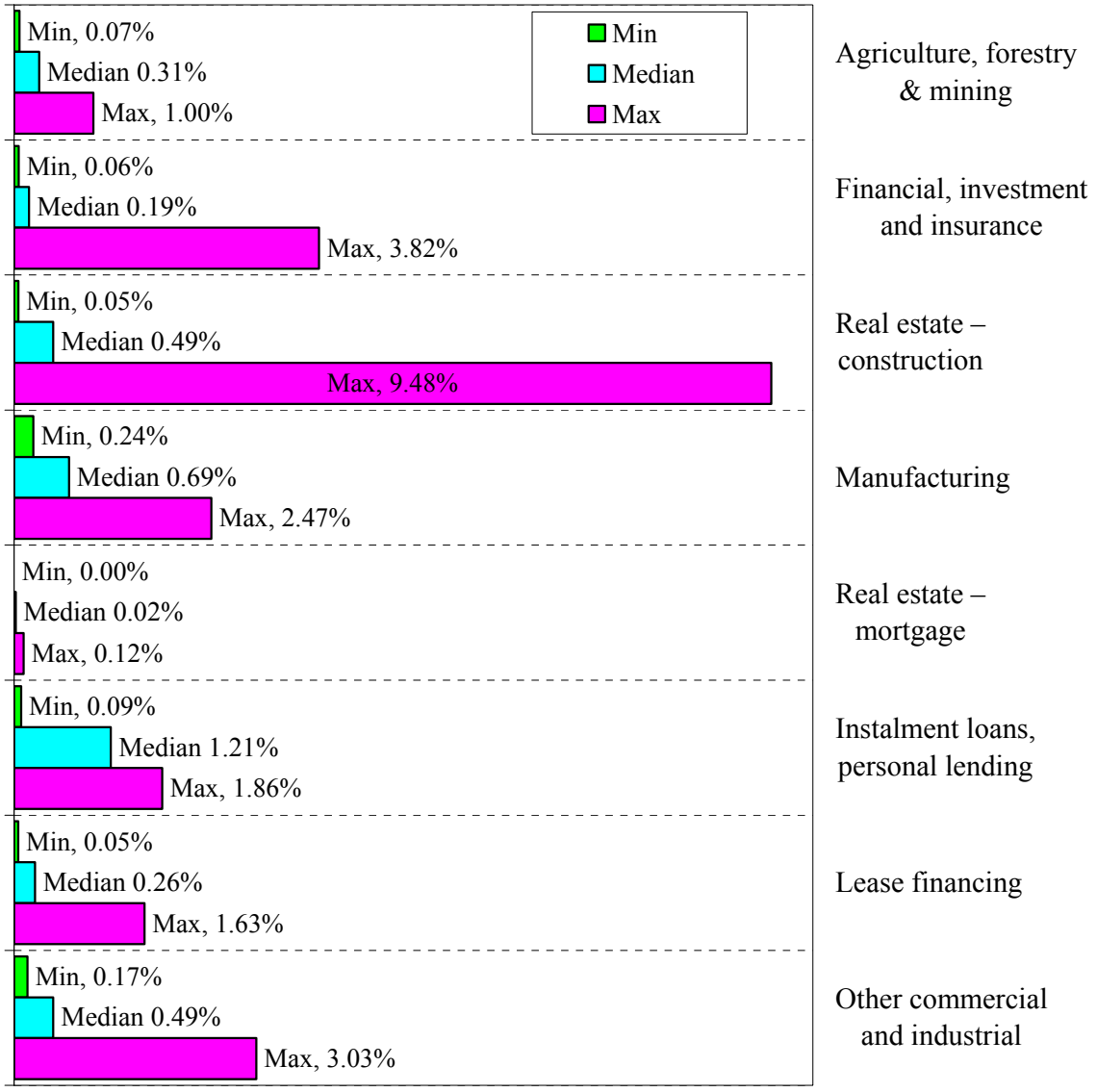
Related to effects of higher risk lending is the fact that credit risks vary considerably across different loan types. Pain (2003, p. 22) mentions Davis (1993) who had previously investigated the variation of credit risk across loans to different sectors in the UK. Such information is also available for Australasia. From about the mid 1990s, major Australian (and to a lesser extent New Zealand) banks started disclosing credit exposure to various types of lending and associated them with corresponding segmental write-offs and/or specific provisions. As shown in Figure 5-1 earlier in this chapter, NAB was the first bank with complete details available back to 1985. While NAB lending losses on residential mortgage loans barely appear in the graph of Figure 5-20 (median of 0.02% and maximum of 0.12%), real estate development activities and

[72] As an example, in the US a vibrant subprime mortgage lending sector has evolved which has accounted for 9% of total loan origination in 2003 (Federal Reserve Board, 2004)

[73] Note that Keeton & Morris (1988) calculate an excess loan returns as a proxy for deliberate risk taking by banks instead of net interest rate margins.

commercial and industrial lending have proven much more risky, particularly in the economic crisis of the early 1990s. Loss rates on personal lending are higher (median of 1.21% and maximum of 1.86%) but appear more resilient to general economic developments. Unfortunately, disclosure of such data is limited to larger banks and not consistently reported throughout the observation period.

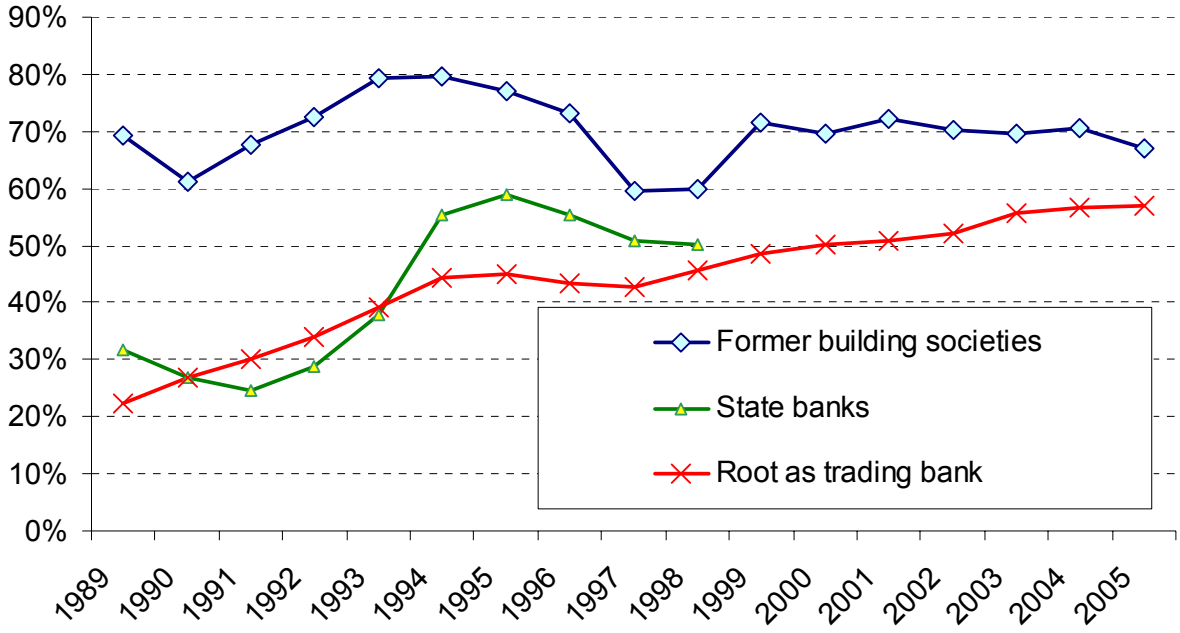
Figure 5-20 NAB: Median, maximum, minimum rate of loan write-offs by lending segment 1985-2005



As a simpler alternative, the proportion of assets in the various risk buckets under the Basel I capital accord provides a measure of riskiness of a bank's loan portfolio. Specifically, since the introduction of these capital adequacy guidelines in 1989, banks disclose their share of comparably low risk residential mortgage lending as a percentage of total assets. Sometimes these series can be extended further back in time because banks provided information about their

mortgage lending before 1989. Accordingly, the proportion of housing loans as a percentage of total loans has been extracted for the sample of Australasian banks. Figure 5-21 shows the time series of the mean proportion of housing loans for three groups of Australian banks. Historically, trading banks had very low portions of mortgage lending for regulatory reasons. Housing finance was the turf of building societies (and savings banks in New Zealand) and later also state banks. Over time, one can observe a steady convergence of lending portfolio structure as the former trading banks have increased their mortgage lending.

Figure 5-21 Share of housing loans as % of loans for three groups of Australian banks



Another characteristic of the lending portfolio is its diversification and authors like Keeton & Morris (1988, footnote 8, p. 10)[74], Salas & Saurina (2002) and Pain (2003) all include

[74] Morris & Keeton (1988) decompose variations in loan losses into a variance due to differences in loan specialization and into variances due to different loss rates for the same type of loans.

diversification measures as bank-specific explanatory variables (Herfindahl index of the loan portfolio and relative size). If consistent segment lending data are missing (as in the case of Australasian banks), researchers have also simply used the size of the bank, typically relative to the sector as a whole as a crude measure of diversification. We present this proxy in more detail in section 5.4.2.4 below where it is also used it to gauge the level of market power.

5.4.2.3 Effectiveness of monitoring

Monitoring of borrowers is a key element of an effective credit policy. Berger & De Young (1997) employ Granger-causality techniques to test effects of cost efficiencies on subsequent loan losses. They find that measured cost efficiency precedes reductions in problem loans and thus conclude that "cost efficiency may be an important indicator of future problem loans and problem banks".

These results have been taken up by both Pain (2003) and Salas & Saurina (2002) who use the cost income ratio[75] (CIR) as a proxy for bank efficiency as an explanatory variable in their loan loss provision models. As shown in Hess & Francis (2007)[76], CIR as an efficiency measure is quite contentious because different business profiles may make it difficult to compare CIRs across a group of banks. Even though efficiency studies in banking are generally based on so-called X-efficiency methods (e.g. data envelopment analysis), CIR remains a widely used benchmark among bank practitioners and financial analysts. It is useful as a comparative yardstick as long as one compares institutions of similar funding and asset structure.

The expected sign for the CIR coefficient should be positive (i.e. inefficient banks have higher credit losses) but Pain (2003, p. 23) cautions that inefficient banks might be 'generally

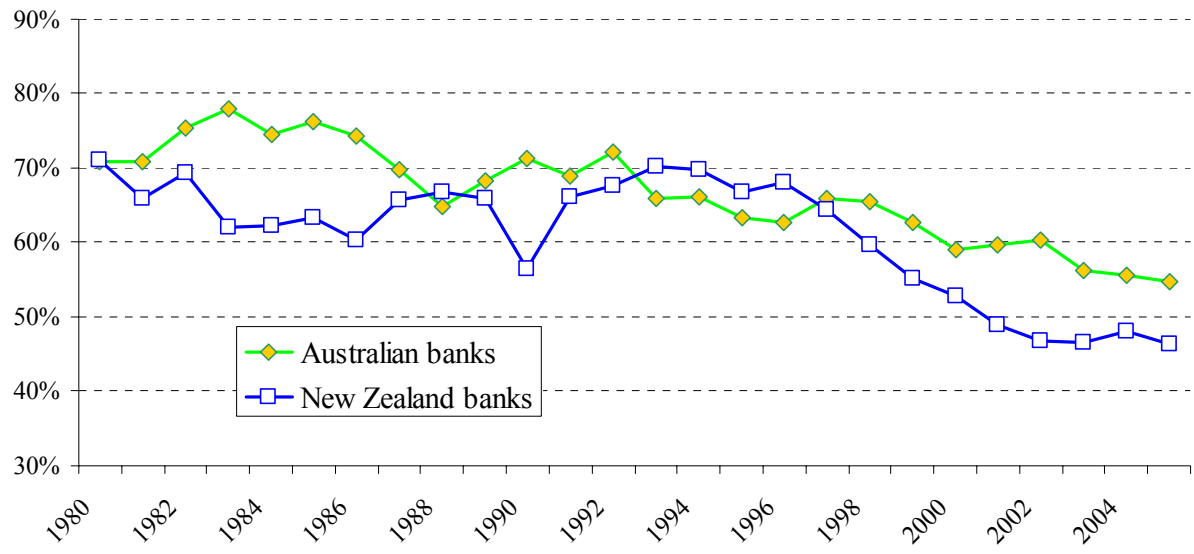
[75] CIR is defined as non-interest expense (essentially operational expense) over total operating income consisting of net interest income and other operating income.

[76] The authors (Figure 3) illustrate with a numerical example that a bank can improve its CIR without efficiency gains simply by shifting from a deposit to a wholesale funding structure (ceteris paribus).

inefficient' but not necessarily slack in their credit monitoring. Such banks might in fact put too many resources into credit quality screening and will thus exhibit below average credit losses.

Figure 5-22 illustrates that average CIRs for both Australian and New Zealand banks have been decreasing steadily over the observation period. A marked decline started in the mid 1990s. After the virtual disappearance of the cooperative and state banking sectors in Australasia, this trend seems to be driven by more shareholder value oriented corporate policies.

Figure 5-22 Cost income ratios (CIRs) of Australian and New Zealand banks 1980 to 2005



5.4.2.4 Market power

Some research postulates that the structure of the credit market can affect the banks' loan loss experience. Petersen & Rajan (1995) find that significantly more young firms obtain external financing in concentrated markets than in competitive markets. They argue that a monopolistic creditor shares in the future surplus generated by the firm through the future rents he is able to extract. This means he can backload interest payments over time, subsidizing the

firm when young or distressed and extracting rents later. Following this line of argument, one would expect a positive coefficient, i.e. increased provisions, associated with a bank's market power.

On the other hand, increased competition may induce banks to take on greater risks to offset the squeeze on margins. If this effect is stronger, banks with less market power would suffer greater credit losses (negative coefficient).

There are a number of approaches that have been employed to proxy the market power of banks. Salas & Saurina (2002, p. 213), for instance, calculate a branch market share in each Spanish province for each year and then derive a weighted average. Pain (2003, p. 29) uses total assets as a share of total UK banking sector assets. The approach employed here is similar to Pain. The first proxy ratio, the share of total system assets (SH_SYSASALL), uses total domestic assets of banks (SYSASALL_AU, SYSASALL_NZ) as reported in Reserve Bank statistics (RBA, RBNZ) as the denominator. The system asset series SYSASALL_NZ is not complete for New Zealand, however, as it starts in 1988 only[77]. Accordingly, we define a second proxy ratio, share of total system loans (SH_LNS), which uses private sector credit (PSC_AU, PSC_NZ) as denominator. The PSC series for both Australia are complete or can be reconstructed back to 1980. Unlike SH_SYSASALL which uses total assets of the bank as numerator, the numerator of the SH_LNS ratio is the bank's total loans in a particular year.

The above approach ensures that the market power of the banks is measured against assets and loans of all intermediaries in the financial system and not just those institutions included in the sample in line with selection criteria. On the other hand, the Reserve Bank statistics just report on domestic assets and loans. This implies that the denominator of these proxies will not consider overseas activities when gauging systemic importance of a bank. A substantial portion

[77] For Australia, RBA provide total asset series for banks bank back to 1975. Note that these figures include just domestic bank assets (RBA Table B02 – Banks Assets). For New Zealand where overseas operations of banks have played a comparably minor role, the time series are available from 1988 onwards only (RBNZ statistic C4 - Balance sheets: M3 institutions)

of assets and loans of the four major Australian banks have been tied up in overseas ventures, most notably their subsidiaries in New Zealand but also in Europe, Asia and North America. Unfortunately, the quality of reporting earlier in the observation period does not allow for a break-down of domestic vs. overseas assets and loans. This means the numerator of the two proxies cannot be adjusted consistently to take into account domestic activities only[78]. Overall, the effect of omitting overseas assets when calculating these ratios will still be limited since the domestic activities dominate for all banks in the sample and the smaller numerator has the decisive impact on the value of the ratio.

5.4.2.5 Other behavioural aspects

A final set of possible bank specific variables relate to behavioural factors. The credit policy adopted by banks (risk choice) is one, as discussed above. It has a direct bearing on the level of subsequent bad debts. There are, however, other behavioural variables which have been suggested as determinants for the level of reported loan loss provisions (see chapter 2 literature review for an extended discussion of these factors). It is not the main thrust of this thesis to explore them in detail but two major ones shall be considered for the model.

5.4.2.5.1 Income smoothing

Smoothing reported income by means of discretionary provisions was explored as one of the first topics in research on bad debt provisions (starting with Greenawalt & Sinkey Jr., 1988). Based on analytical results by Fudenberg & Tirole (1995), one would predict that for banks with good (poor) current performance and expected poor (good) future performance, managers will save income for (borrow income from) the future by reducing (increasing) current income

[78] Pain (2003) has the benefit of access to confidential raw data of domestic assets and loans reported by individual banks to the Bank of England in the 1980s. Such data form the basis for macro-economic money supply and banking system statistics on an aggregate basis.

through loan loss provisions (Kanagaretnam, Lobo, & Mathieu, 2003). This hypothesis would thus call for positive coefficients of an earnings proxy. We include earnings before taxes and loan loss provision over average total assets (EBTP_AS) and over equity respectively (EBTP_EQ) as potential explanatory variables[79]. It is likely that EBTP_AS and EBTP_EQ will only be suitable for models explaining CLE variables with a discretionary element (e.g. provisions expense, stock of general provisions).

Figure 5-23 and Figure 5-24 show the development of EBTP_AS and EBTP_EQ for both Australian and New Zealand banks. One observes a substantial shift in level for New Zealand banks (mainly for EBTP_EQ) after the crisis of the early 1990s. It is possible that the comparably abrupt financial liberalization in New Zealand starting in 1984 lured many financial institutions into higher margin, i.e. more risky, activities until the true extent of bad loans became apparent in the subsequent crises. Against this, the time series for Australian banks looks uneventful.

Note that for New Zealand, the EBTP_EQ time series is presented both including and excluding Westpac's NZ division (NZ Westpac) as it reported disproportionate values for some years (1995, 1996). Unlike its other overseas-owned peers, NZ Westpac has not been operating as a locally incorporated entity during the observation period. Its pro-forma capital was set at extremely low levels until it issued a subordinated equity instrument to a subsidiary of its Australian parent bank in 1997.

[79] This approach to earnings proxy modelling (using average assets) is widely used in the relevant literature, e.g. in Ahmed, Takeda, & Thomas (1999) and more recently Kearns (2004).

Figure 5-23 Mean annual earnings before provisions & taxes as % of average assets (EBTP_AS) for Australian and New Zealand banks 1980 to 2005

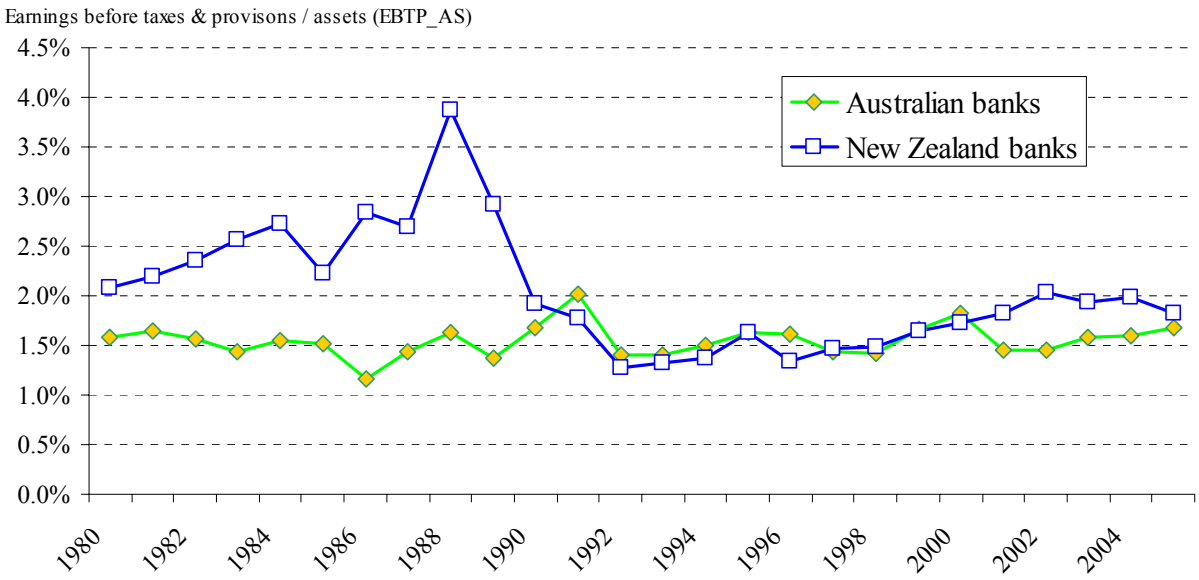
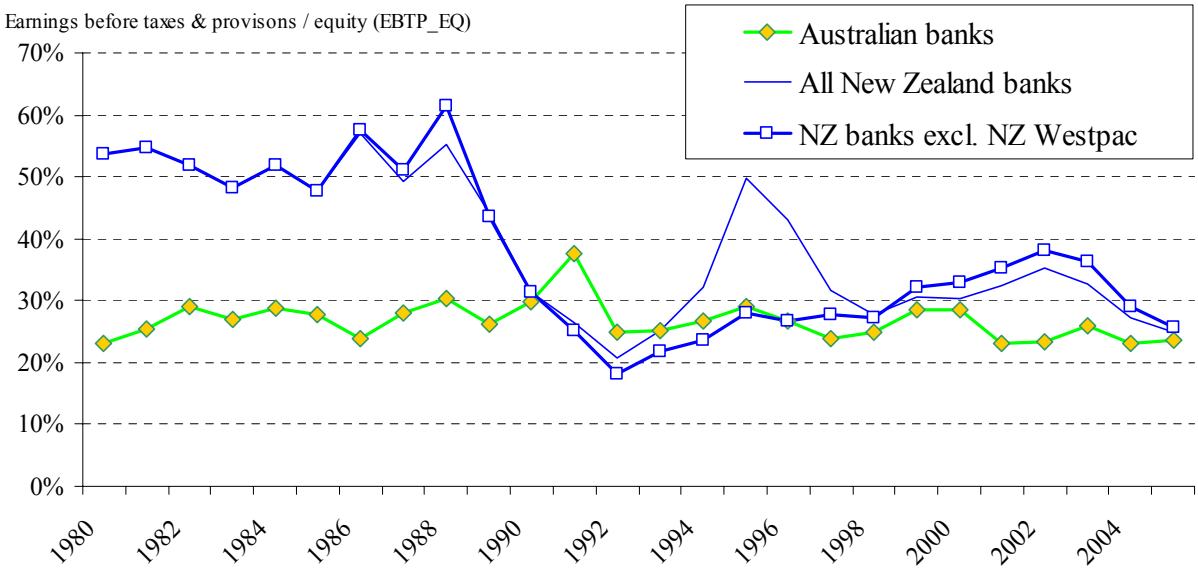


Figure 5-24 Mean annual earnings before provisions & taxes over assets (EBTP_EQ) for Australian and New Zealand banks 1980 to 2005



5.4.2.5.2 Capital management

A further important behavioural factor concerns the incentive to manage regulatory capital ratios. The stock of general provisions affects regulatory capital because it counts towards regulatory capital up to certain limits (since 1989 under Basel I rules). Consequently, there is an expectation that institutions with low capital ratios will increase provisions in order to raise capital adequacy ratios (negative coefficient on capital proxy). The first researcher to postulate such a connection for an earlier US capital ratio regime was Moyer (1990) and seminal work on the impact of the Basel capital adequacy rules is from Kim & Kross (1998) and Ahmed, Takeda, & Thomas (1999).

As shown in Figure 5-25 and Figure 5-26, most banks have been clearly exceeding the 8% minimum capital ratio since introduction of Basel I. Capitalization of New Zealand banks has been stronger on average. One notes extremely high maxima for New Zealand which are the ratios for small TSB Bank (mean 15.7% for 1988 to 2005). Other banks with consistently high ratios are Bank of Queensland (12.0%), Adelaide Bank (11.5%), Bendigo Bank (11.1%) and St. George Bank (11.0%). They can all be characterized as predominantly retail institutions which, according to the above hypothesis, would have little incentive to engage in capital management through provisioning. Traditional trading banks, on the other hand, exhibit slightly lower average ratios but still above 10%. One institution with lower ratios is ASB Bank (mean 9.6% for 1988 to 2005).

Figure 5-25 Basel I capital adequacy ratios Australian banks 1988 to 2005

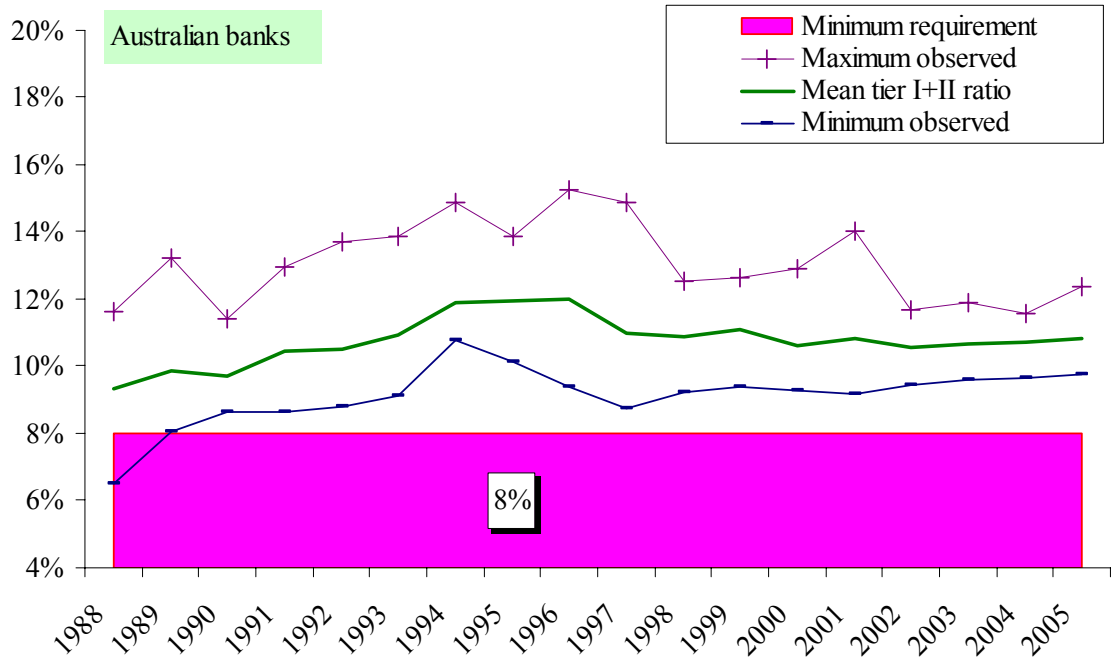
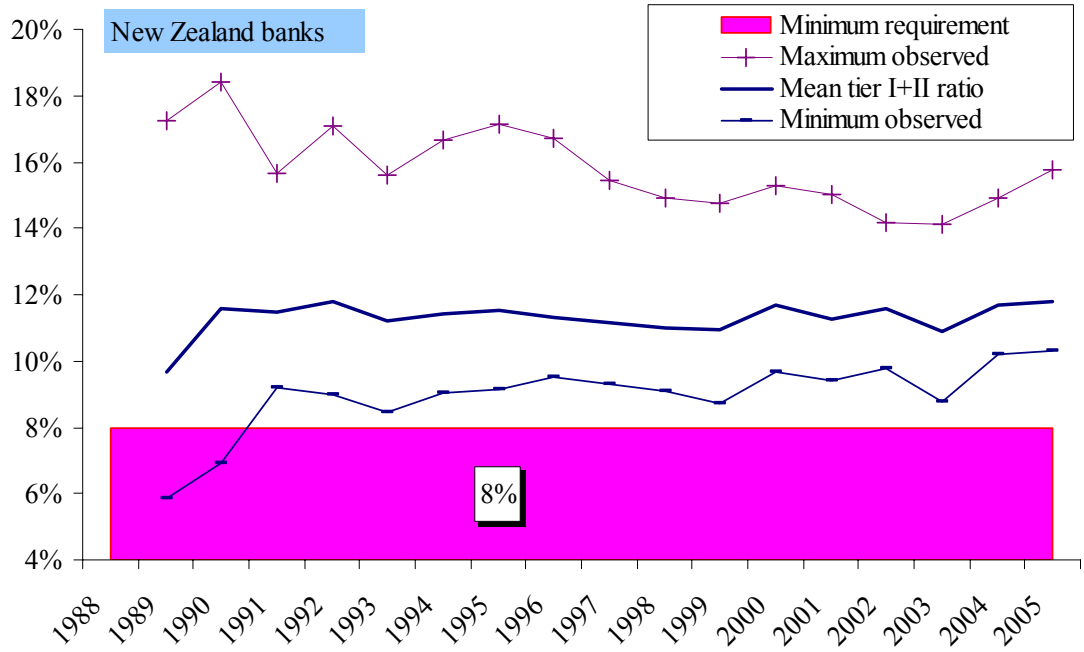


Figure 5-26 Basel I capital adequacy ratios New Zealand banks 1989 to 2005



5.4.2.6 Description and summary statistics of bank specific series

Table 5-18 provides an alphabetical list of all bank specific variables used in this thesis together with a description, method of calculation and data sources. Table 5-19 shows the corresponding summary statistics for these variables. Note that the two tables also include auxiliary series like ASSETS_AU and ASSETS_NZ used to derive other proxies.

Finally, Figure 5-27, Figure 5-28 and Figure 5-29 show the data availability of the bank specific series through time for the full sample as well as the Australian and New Zealand sub-samples.

Table 5-18 Acronym, source and details on bank specific series (including auxiliary series) in alphabetical order

Acronym	Description, calculation	Source
ASGRW	Growth rate assets calculated as % changes in period end assets.	ASSETS_AU, ASSETS_NZ
ASSETS_AU	Total period end assets of Australian banks (in AUD)	From sample.
ASSETS_NZ	Total period end assets of NZ banks (in NZD) Auxiliary series to derive ASGRW and SH_SYSASALL	From sample
CIR	Cost income ratio defined as non-interest expense as % of total operating income (measure of cost efficiency)	From sample
DVLNGRW	Point deviation of a bank's loan growth (LNGRW) from system loans growth PSCGRW_AU,NZ (see macro series Table 5-15)	From sample, PSCGRW_AU,NZ
DVSYSALLGRW	Point deviation of a bank's asset growth (ASGRW) from system asset growth SYSASALLGRW_AU,NZ (see macro series Table 5-15)	From sample, SYSASALLGRW_AU,NZ
EBTP_AS	Earnings before taxes and loan loss provisions as % of average period assets	From sample
EBTP_EQ	Earnings before taxes and loan loss provisions as % of average period equity	From sample
HS_LN	Housing loans (Basel I definition) as % of total loans	From sample
LNGRW	Growth rate loans calculated as % changes in period end net loan balance	From sample
LOANS_AU	Total period end loans reported Australian banks (in AUD)	From sample.
LOANS_NZ	Total period end loans reported NZ banks (in NZD) Auxiliary series to derive LNGRW and SH_SYSLNS	From sample
NIM	Net interest margin calculated as interest income (annualized) as % of average period assets	From sample
SH_SYSASALL	The bank's total assets (ASSETS) as % of SYSASALL_AU, NZ Measure of systemic importance and asset diversification	ASSETS_AU,NZ, SYSASSALL_AU,NZ
SH_SYSLNS	The bank's total loans as % of PSC_AU, NZ Measure of systemic importance and asset diversification (see also macro series in Table 5-15)	LOANS_AU,NZ PSC_AU,NZ
TOIGRW	% increase in total operating income (annualized) from bank annual reports. Total operating income is defined as sum of net interest income (before credit provisions) and other operating income	From sample
TR1_RWA	Tier I capital as % of risk weighted assets (Basel I definitions)	From sample
TR12_RWA	Tier I+II capital as % of risk weighted assets (Basel I definitions)	From sample

Table 5-19 Summary statistics of bank specific series (including auxiliary series)

	Mean	Median	Maximum	Minimum	Std.Dev.	Skewness	Kurtosis	Obs.	Cross sect.
ASGRW	17.0%	14.1%	180.6%	-40.1%	19.1%	3.06	21.91	517	32
ASSETS_AU (AUD mil)	43,326	9,197	19,588	74	76,298	2.66	10.44	355	22
ASSETS_NZ (NZD mil)	11,945	6,351	85,301	217	13,853	1.90	7.96	192	10
CIR	65.0%	65.6%	131.7%	18.0%	12.3%	0.12	5.61	519	31
DVLNGRW	7.1%	3.3%	147.8%	-39.5%	20.7%	2.87	17.20	513	32
DVSYSALLGRW	4.9%	1.7%	170.7%	-50.1%	19.8%	3.33	22.89	456	32
EBTP_AS	1.7%	1.6%	17.0%	-1.5%	1.1%	7.14	88.87	477	32
EBTP_EQ	30.4%	27.1%	207.9%	-14.0%	20.2%	4.62	36.35	475	32
HS_LN	52.7%	54.1%	96.2%	0.0%	21.9%	-0.40	2.65	323	27
LNGRW	19.0%	15.4%	160.4%	-28.3%	20.6%	2.97	17.99	513	32
LOANS_AU (AUD mil)	28,466	6,893	260,053	36	48,657	2.53	9.33	349	22
LOANS_NZ (NZD mil)	9,559	4,433	69,139	102	11,612	1.90	7.59	187	10
NIM	3.34%	3.06%	11.07%	0.51%	1.43%	1.97	9.18	510	31
SH_SYSASALL	9.9%	4.3%	45.2%	0.1%	10.8%	0.98	2.81	489	32
SH_SYSLNS	8.0%	3.4%	34.4%	0.0%	8.3%	0.90	2.79	536	32
TOIGRW	16.5%	12.3%	256.7%	-100.2%	25.9%	3.52	28.5	494	31
TR1_RWA	8.1%	7.7%	16.5%	4.1%	2.2%	1.54	5.74	306	27
TR12_RWA	10.9%	10.6%	18.4%	5.8%	1.8%	1.22	5.36	325	28

Figure 5-27 Percentage of banks reporting bank specific proxies during observation period (**Full sample**)

AU+NZ	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
ASGRW	92%	86%	69%	79%	86%	80%	92%	93%	96%	93%	100%	96%	100%	100%	100%	100%	100%	100%	100%	89%	100%	100%	100%	100%	100%	100%
CIR	69%	79%	75%	89%	81%	88%	96%	96%	100%	100%	96%	100%	100%	100%	100%	96%	95%	95%	94%	95%	100%	100%	100%	100%	100%	100%
DVLNGRW	92%	86%	69%	79%	81%	76%	85%	89%	96%	93%	100%	96%	100%	100%	100%	100%	100%	100%	100%	95%	100%	100%	100%	100%	100%	100%
DVSYSALLGRW	69%	64%	50%	47%	48%	48%	54%	56%	59%	93%	100%	96%	100%	100%	100%	100%	100%	100%	100%	89%	100%	100%	100%	100%	100%	100%
EBTP_AS	69%	71%	56%	47%	48%	60%	77%	78%	89%	93%	93%	100%	100%	100%	100%	96%	95%	95%	94%	95%	100%	100%	100%	100%	100%	100%
EBTP_EQ	69%	71%	56%	47%	48%	60%	77%	78%	89%	93%	93%	100%	100%	100%	100%	96%	95%	95%	94%	95%	100%	100%	100%	100%	94%	94%
HS_LN	0%	0%	0%	0%	0%	12%	15%	19%	30%	39%	46%	56%	67%	96%	100%	96%	100%	100%	100%	95%	100%	100%	100%	100%	100%	100%
LNGRW	92%	86%	69%	79%	81%	76%	85%	89%	96%	93%	100%	96%	100%	100%	100%	100%	100%	100%	100%	95%	100%	100%	100%	100%	100%	100%
NIM	62%	71%	63%	74%	81%	88%	88%	93%	100%	100%	100%	100%	100%	100%	100%	96%	100%	100%	100%	100%	100%	100%	100%	88%	94%	94%
SH_SYSASALL	77%	79%	63%	58%	62%	60%	62%	63%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
SH_SYSLNS	92%	93%	94%	89%	90%	88%	96%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
TOIGRW	46%	64%	63%	63%	81%	68%	81%	85%	93%	93%	100%	96%	100%	100%	100%	96%	100%	100%	100%	95%	100%	100%	100%	100%	100%	100%
TR1_RWA	0%	0%	0%	0%	0%	0%	0%	0%	37%	50%	61%	56%	74%	96%	96%	88%	95%	95%	94%	89%	94%	94%	94%	88%	88%	88%
TR12_RWA	0%	0%	0%	0%	0%	0%	0%	4%	44%	68%	75%	70%	85%	96%	96%	88%	95%	95%	94%	89%	94%	94%	94%	88%	88%	88%
Total banks	13	14	16	19	21	25	26	27	27	28	28	27	27	25	24	24	20	19	18	19	17	17	17	17	16	16

Colour coding:

XX% 0 to 25% XX% 25% to 50% XX% 50% to 75% XX% more than 75%

Figure 5-28 Percentage of banks reporting bank specific proxies during observation period (**Australian sub-sample**)

Australia	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
ASGRW	90%	82%	80%	82%	77%	80%	88%	88%	94%	89%	100%	94%	100%	100%	100%	100%	100%	100%	100%	85%	100%	100%	100%	100%	100%	100%
CIR	70%	73%	80%	82%	69%	87%	100%	94%	100%	100%	100%	100%	100%	100%	100%	94%	92%	92%	92%	92%	100%	100%	100%	100%	100%	100%
DVLNGRW	90%	82%	80%	82%	77%	80%	88%	88%	94%	89%	100%	94%	100%	100%	100%	100%	100%	100%	100%	92%	100%	100%	100%	100%	100%	100%
DVSYSALLGRW	90%	82%	80%	82%	77%	80%	88%	88%	94%	89%	100%	94%	100%	100%	100%	100%	100%	100%	100%	85%	100%	100%	100%	100%	100%	100%
EBTP_AS	70%	73%	70%	64%	54%	73%	75%	76%	94%	94%	94%	100%	100%	100%	100%	94%	92%	92%	92%	92%	100%	100%	100%	100%	100%	100%
EBTP_EQ	70%	73%	70%	64%	54%	73%	75%	76%	94%	94%	94%	100%	100%	100%	100%	94%	92%	92%	92%	92%	100%	100%	100%	100%	91%	91%
HS_LN	0%	0%	0%	0%	0%	20%	25%	29%	41%	50%	61%	76%	82%	94%	100%	94%	100%	100%	100%	92%	100%	100%	100%	100%	100%	100%
LNGRW	90%	82%	80%	82%	77%	80%	88%	88%	94%	89%	100%	94%	100%	100%	100%	100%	100%	100%	100%	92%	100%	100%	100%	100%	100%	100%
NIM	70%	73%	70%	82%	77%	93%	94%	88%	100%	100%	100%	100%	100%	100%	100%	94%	100%	100%	100%	100%	100%	100%	100%	91%	91%	91%
SH_SYSASALL	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
SH_SYSLNS	90%	91%	90%	91%	92%	93%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
TOIGRW	40%	64%	70%	73%	69%	67%	81%	82%	88%	89%	100%	94%	100%	100%	100%	94%	100%	100%	100%	92%	100%	100%	100%	100%	100%	100%
TR1_RWA	0%	0%	0%	0%	0%	0%	0%	0%	53%	61%	78%	71%	82%	100%	100%	88%	100%	100%	100%	92%	100%	100%	100%	91%	91%	91%
TR12_RWA	0%	0%	0%	0%	0%	0%	0%	0%	53%	78%	83%	76%	94%	100%	100%	88%	100%	100%	100%	92%	100%	100%	100%	91%	91%	91%
Total banks	10	11	10	11	13	15	16	17	17	18	18	17	17	17	16	16	13	12	12	13	11	11	11	11	11	11

Colour coding:

XX% 0 to 25% XX% 25% to 50% XX% 50% to 75% XX% more than 75%

Figure 5-29 Percentage of banks reporting bank specific proxies during observation period (**New Zealand sub-sample**)

NZLD	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
ASGRW	100%	100%	50%	75%	100%	80%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
CIR	67%	100%	67%	100%	100%	90%	90%	100%	100%	100%	90%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
DVLNGRW	100%	100%	50%	75%	88%	70%	80%	90%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
DVSYSALLGRW	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
EBTP_AS	67%	67%	33%	25%	38%	40%	80%	80%	80%	90%	90%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
EBTP_EQ	67%	67%	33%	25%	38%	40%	80%	80%	80%	90%	90%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
HS_LN	0%	0%	0%	0%	0%	0%	0%	0%	10%	20%	20%	20%	40%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
LNGRW	100%	100%	50%	75%	88%	70%	80%	90%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
NIM	33%	67%	50%	63%	88%	80%	80%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	83%	100%	100%
SH_SYSASALL	0%	0%	0%	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
SH_SYSLNS	100%	100%	100%	88%	88%	80%	90%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
TOIGRW	67%	67%	50%	50%	100%	70%	80%	90%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
TR1_RWA	0%	0%	0%	0%	0%	0%	0%	0%	10%	30%	30%	30%	60%	88%	88%	88%	86%	86%	83%	83%	83%	83%	83%	83%	80%	80%
TR12_RWA	0%	0%	0%	0%	0%	0%	0%	10%	30%	50%	60%	60%	70%	88%	88%	88%	86%	86%	83%	83%	83%	83%	83%	83%	80%	80%
Total banks	3	3	6	8	8	10	10	10	10	10	10	10	10	8	8	8	7	7	6	6	6	6	6	6	5	5

Colour coding:

XX% 0 to 25% XX% 25% to 50% XX% 50% to 75% XX% more than 75%

5.5 Chapter summary and conclusion

This chapter firstly introduced the principal model to explore the credit loss dynamics in Australasian banking. It represents a reduced form approach to explaining the banks' credit loss experience (CLE) which is in line with the dominant body of literature in this area. This means we examine potential drivers of credit losses without modelling the precise mechanism by which such an effect is transmitted on CLE. This generic model will be the foundation for evaluating various functional forms in the subsequent estimation and results chapter.

Previous international literature has hardly explored the characteristics of various proxies available which can be used to gauge a bank's CLE. The historical data gathered for the Australasian banking system indicates that correlations among some of them are rather weak even though they have been employed by earlier research. It is found that CLE ratios using balance sheet items like total assets or loans as a reference appear more suitable as CLE proxies. They should be preferred over ratios based on income items (such as total operating income) because they are less sensitive to the vagaries of the denominator which is comparably large in the case of total loans or assets.

The review of CLE ratios also includes an analysis of loan write-off patterns with subsequent recoveries. In theory, impaired asset expense (loan provisioning) should eventually be followed by corresponding loan write-offs. Unlike Pain's UK sample, it is difficult to recognize a consistent lag pattern of loan write-offs for banks in Australasia. Due to the benign economic climate since the banking crisis of the early 90s, some banks have steadily increased their provisioning in line with growing loan portfolios but have not been faced with a corresponding need for write-offs. As to recoveries as the last stage in the life cycle of bad debts, 13.9% of bad debts written off are subsequently recovered but there is again a significant variability of this value among banks. Some appear more inclined for quicker write-offs (which then leads to higher recoveries) while others delay write-offs until a loss becomes virtually certain. Recovery rates also differ for various types of loans which could relate to the differences

in the predictability of losses in the various segments. A detailed exploration of causes which are at the root of such heterogeneity in debt write-off and recovery patterns is beyond the scope of this project. Such research could potentially provide interesting insights into behavioural factors affecting financial reporting by banking institutions.

The second part of this chapter presents explanatory variables of credit losses. We split them into aggregate macroeconomic or system factors and microeconomic or bank specific factors. They are summarized in Table 5-14 on page 222.

Aggregate factors include real GDP growth rate as the broadest measure of economic activity and the unemployment rate as a proxy of systemic imbalances and household economic distress. Moreover, the indebtedness of households and firms serves as a proxy for financial vulnerability in times of crises. In line with earlier studies, we also propose a number of asset price shock proxies including returns in the property and share markets as well as interest rate changes.

Microeconomic or bank specific factors firstly include the effect of past credit expansion which could have a positive or negative effect on credit losses. A bank with very fast growth might burden itself with unknown credit risk while low growth for some banks might indicate operational issues that lead to subsequent increase in credit losses.

Credit losses will also vary with the risk choice of the banking institution. They might engage in deliberate high risk lending which they then compensate with adequate pricing of such loans. As in previous research, the net interest margin is used to test for such effects. A further choice relates to the composition of the lending portfolio which will have a direct effect on the subsequent credit loss experience. Unfortunately, consistent reporting of segment credit exposure for Australian banks is missing so we use residential mortgage lending as a proportion of total loans as a proxy. Since housing loans are considered lower risk than other types of lending (consistent with our data series), they are awarded a 50% risk weight under Basel I capital adequacy rules. As a crude measure of portfolio diversification we propose systemic importance as a further proxy, calculated as the bank's assets as % of total system assets.

A bank's cost income ratio is a widely accepted yardstick for a bank's efficiency by practitioners. In line with literature, we employ it test the effect of inefficiencies, especially with regard to the monitoring of the loan portfolio, on subsequent losses.

Another bank specific factor tested is the potential effect of market power where Petersen & Rajan (1995) argue that a monopolistic lender will finance younger firms more easily because it will be able to extract future rents. This means market power should be associated with higher credit losses. We model market power as the percentage share of total system assets for the particular bank. This proxy thus has a dual function of gauging both market power and portfolio diversification.

We finally propose to test for the effect of income smoothing and capital management. Previous literature has explored such phenomena for provisions, i.e. a CLE ratio with a high element of discretion. For the effect of income smoothing, it is argued that a bank's manager will attempt to postpone above average earnings into the following year by setting higher loan loss provisions. Conversely, in times of weak results, the bank will be tempted to shore up its reported profit by lowering discretionary provisions. In a similar vein, weakly capitalized banks will be tempted to show higher general provisions since they count - up to a certain threshold - against the required minimum regulatory capital.

6 Model Estimation and Results

6.1 Introduction

This chapter conducts the estimation of determinants of credit losses in Australasia in line with the methodology of the previous chapter. The principal estimation model defined there (see Equation 6-1 below) is generic, encompassing a large number of potential functional forms.

Equation 6-1 Principal model

$$CLE_{it} = Const + \sum_{k=1}^{K}\sum_{s=0}^{z}\beta_{ks}x_{ki(t-s)} + \sum_{s=1}^{q}\delta_s CLE_{i(t-s)} + u_{it};\ \ i = 1,.....,n;\ t = q+1,....,T$$

Where

CLE_{it}	Credit loss experience for bank i in period t
x_{kit}	Observations of the potential explanatory variable k for bank i and period t
u_{it}	Random error term with distribution $N(0,\Sigma)$,
Σ	Variance-covariance matrix of σ_{it} error terms
n	Number of banks in sample
T	Years in observation period
K	Number of explanatory variables
z	Maximum lag of the explanatory variables of the model
q	Maximum lag of the dependent variable of the model

There are a number of potential proxies measuring a bank's credit loss experience (CLE) which have been presented in the methodology chapter. The model specification and major estimation is conducted for impaired asset expense (IAE_LN) as the dependent variable. Note that IAE_LN was chosen as the main proxy because it has sensible all-round properties and it is most widely used in the literature.[80]

[80] Examples listed in the literature review of this thesis include Arpa, Giulini, Ittner, & Pauer (2001), Pain (2003), Bikker & Hu (2001), Valckx (2004) among many others.

Next, a total of 20 macro- and bank specific explanatory variables have been identified as potential drivers of a bank's credit losses. This chapter conducts a primary evaluation and selection of regressors based on economic arguments in the spirit of Verbeek (2004). A basic model formulation, Equation 6-2 presented on page 273, includes three alternative macro-proxies for the state of the economy as regressors as well as a total of 7 other aggregate and bank-specific explanatory variables. It is estimated as a distributed lag model for the combined Australasian data sample over both the full 1980 to 2005 period and shorter 1990 to 2005 sample period. The latter period allows for a richer choice of bank-specific control parameters. Likewise, Equation 6-2 is estimated for separate Australian and New Zealand country samples.

The version of this basic form which is found to provide the best explanatory power is designated as the 'preferred model' (Equation 6-3, page 286) to be used as the basis for some of the alternative specifications that test the robustness of the results for Equation 6-2. In particular, this model is estimated with alternative CLE variables including the level of provisions (PRV_LN), net and gross write-offs (NW_LN, GW_LN) as well as the level of impaired assets (IA_A). This should be of considerable interest to other researchers since to our knowledge no other study seems to have considered more than two alternative measures of CLE when exploring drivers of bank credit losses. The analysis potentially allows for novel insights into the characteristics of alternative CLE proxies applicable to a wide range of studies.

A further estimate of the preferred model analyses the particular effect of past bank expansion with the inclusion of long-lagged growth proxies into the model. There is a final estimate of the preferred model which is modified by the addition of a country dummy and interaction terms. This last analysis more formally examines country specific effects which might be present.

This chapter proceeds as follows. The next section 6.2 reviews regressor selection methods and panel estimation techniques employed in this thesis. Section 6.3 then presents the considerations for deriving a concrete formulation of the principal model as shown in Equation

6-1 above. Section 6.4 conducts the model estimates and discussion of results before section 6.5 concludes and summarizes the findings of the chapter.

6.2 Review of model selection and estimation methods

6.2.1 Regressor selection methods

When specifying a model, one has to consider in principle two potential misspecifications of the equation. On one hand, one may omit one of more variables which are relevant, i.e. have a non-zero coefficient. This can lead to 'omitted variable bias' in the OLS estimator. Alternatively, one may include too many irrelevant variables. At first glance, this may appear as less of a problem since estimates are unbiased and these redundant variables just show as insignificant parameters in the model results. However, such unrestricted formulations will usually have a higher variance and thus be less efficient.

Many methods have been proposed for selecting suitable explanatory variables in multiple regressions. There are two classical methods typically employed. Forward selection (or simple to general approach) starts with the regression constant only and then adds variables. By contrast, backward elimination for variable selection (general-to-specific modelling approach) involves the sequential deletion of variables by means of various error or information criteria. These are however purely data-based methods and it is generally argued (e.g. in Amemiya, 1980; Verbeek, 2004) that it is good practice to select the set of potentially relevant variables on the basis of economic arguments rather than statistical ones, i.e. mechanical reliance on goodness of fit should be avoided. Verbeek sees particular dangers of pure data mining with the forward selection method. He also warns against including too many initial variables in the backward elimination method since this is likely to lead to multicollinearity so that almost none of the variables appear significant.

In line with the above thoughts, the regressor selection process in this thesis is primarily driven by economic considerations. We will select a set of economically sensible base formulations of which the model with the best explanatory power is designated as the 'preferred form'. Explanatory power is assessed based on the adjusted R-square measure and information criteria. In particular, we consider the Akaike Information Criterion (AIC) and the Schwarz Bayesian Information Criterion (BIC) which take into account the trade-off between (1) the better fit of the model with many variables and (2) the model's complexity. Models with lower AIC and BIC are preferred (Akaike, 1974; Schwarz, 1978; Verbeek, 2004).

6.2.2 Form of regression model

The generic form of the principal model (Equation 6-1) allows for a variety of model forms. It is firstly open with regard to the number of lagged terms of a particular explanatory variable included in the model. In the spirit of regressor selection discussed above, we consider lags which, based on economic arguments, would sensibly have an impact on a bank's credit loss experience.

Secondly, the principal model allows for lags of the dependent CLE variable as explanatory variables. This autoregressive modelling approach has been used by a number of researchers (Pain, 2003, p. 31 (as an alternative to his main approach); Quagliariello, 2004, p. 18; Salas & Saurina, 2002, p. 214). It can be motivated as in Kim & Santomero (1993) as a consequence of Bayesian models used by banks when forecasting loan losses. Such models update projected loan losses as a function of new information obtained from the new audit and the historical variance of loan loss rates over the bank's previous history.

For the modelling in this thesis, no lagged terms of the dependent CLE variable have been included. Instead we capture dynamic effects by use of a distributed-lag (DL) model with current and lagged values of the explanatory variables as regressors. One can interpret this as replacing the lagged CLE variable by its own explanatory terms.

The choice of a DL model is also motivated econometric considerations. Wilson & Butler (2007), who review appropriate panel estimation techniques, note that no particular statistical complications arise in adding lagged values of the independent variables as opposed to adding lagged dependent variables (as long as the explanatory values are uncorrelated with the error term). Should these errors be auto correlated or heteroskedastic, they can be dealt with as they would be in the static model. On the other hand, including lagged terms of the dependent variable on the right hand side of the equation violates the exogeneity assumption for regressors so more sophisticated dynamic econometric techniques are required to provide unbiased estimates.[81]

6.2.3 Panel estimation techniques

Panel data are repeated observations on the same set of cross-section units, collected over a number of periods. Because one is repeatedly observing the same units, it is usually no longer appropriate to assume independence of observations. By using estimation methods for panel data, it is possible to control for unobservable individual heterogeneity.

6.2.3.1 Fixed and random effects

Models can be estimated with both fixed and random cross-sectional effects:

$$Y_{it} = Const + \beta_{it} X_{it} + \delta_i + \varepsilon_{it}$$

where Y_{it} is the dependent variable for cross-section i at time t, X_{it} is a vector of regressors, ε_{it} are the error terms for cross-sectional units observed for dated periods, *Const* is the overall constant in the model and δ_i represent cross-section specific effects (random or fixed). More generally, one could also include period effects in an analogous way. However, for this

[81] The method generally used is the generalised method of the moments (GMM) estimator inspired by Arellano & Bond (1991) to tackle dynamic panels.

investigation period effects have not been considered since in this case all regressors would have to vary across individual banks, e.g. no common GDP growth parameter for all Australian banks would be possible (Osbat, 2004, p. 8b).

The fixed effects portion of specifications is handled using orthogonal projections. In the simple one-way fixed effect specification, these projections involve the approach of removing cross-section specific means from the dependent variable and exogenous regressors, and then performing the specified regression on the demeaned data (Baltagi, 2001; Quantitative Micro Software, 2005, p. 863). More generally, the estimation software employed in this project (Eviews) applies the results from Davis (2002) for estimating multi-way error components models with unbalanced data. Eviews also provides tools to test for redundant coefficients and fixed effects (Wald test, Quantitative Micro Software, 2005, p. 926).

As an alternative to the bank-specific fixed effects model, estimates can be conducted with a country specific dummy variable (AU_DMY), set to one for Australian banks and zero for New Zealand banks. This design allows testing of country specific slopes of explanatory variables through addition of interaction terms in addition to a pure country-specific intercept. In the thesis this estimation method is applied for a formal test of potential country effects which might be present.

The random effects specification, finally, assumes that the corresponding effects are realizations of independent random variables with mean zero and finite variance. Most importantly, the random effects specification assumes that the effect δ_i is uncorrelated with the idiosyncratic residual ε_{it} (Quantitative Micro Software, 2005, p. 859-871).

6.2.3.2 White's heteroskedasticity consistent standard errors

White (2007) has derived a heteroskedasticity consistent covariance matrix estimator which provides correct estimates of the coefficient covariances in the presence of heteroskedasticity of unknown form, all provided that no serial correlation is present. All error

estimates use this adjustment instead of the standard OLS formula (see Quantitative Micro Software, 2005, p. 471-473).

6.3 Model formulation

This section presents the process for deriving a concrete formulation of the principal model shown as Equation 6-1 in the introduction to this chapter. Firstly, subsection 6.3.1 explains and justifies the choice of impaired asset expense (IAE_LN) as the major dependent CLE variable over a range of alternatives. Other CLE proxies are, however, employed for alternative model estimates as robustness checks later in this chapter. Subsection 6.3.2 then presents the selection of regressors.

6.3.1 Choice of dependent CLE variable

6.3.1.1 Impaired asset expense as primary CLE variable

The methodology chapter introduced and analyzed numerous potential proxies to measure a bank's credit loss experience (CLE). In this chapter, estimates are conducted for impaired asset expense as % of loans (IAE_LN) as the primary CLE variable. There are three reasons for this choice.

Firstly, IAE_LN is the most commonly used proxy of a bank's CLE in the literature.[82] The choice of IAE_LN will thus facilitate comparisons with previous studies.

Secondly, the methodology chapter presented an extended analysis of characteristics of CLE proxy variables. None of the proxies was found to have perfect properties, but IAE_LN

[82] Because of differing accounting notations, this proxy is, however, named in a number of different ways such as "new charge of total loan-loss provisions" in Pain (2003, p. 37), "risk provisions" in Arpa et al. (2001, p. 95) or simply "loan loss provisions" in Kanagaretnam, Lobo, & Yang (2005).

appeared to have the fewest deficiencies. For one, the pure stock of provisions (STK_PRV), or its changes between years, can be distorted (i.e. reduced) by write-offs of earlier year provisions while impaired asset expense will pick up loan-write-offs immediately following a default event. Similarly, the delayed nature of write-offs is the main reason why write-off based proxies (NW_LN, GW_LN) have limitations even though they more accurately reflect true ex-post credit losses. In fact, the methodology chapter showed that IAE_LN appears to overstate actual credit losses as only 75% of the impaired asset expense is written down in the following 4 years. Impaired assets based measures (e.g. IA_A), as for instance used by Salas & Saurina (2002), lack information about the severity of the impairment. The level of impairment for non-performing loans backed by residential mortgages, for example may not be comparable to impaired personal lending without tangible collateral.

Thirdly, the IAE_LN time series provides the maximum number of observations over the 1980 to 2005 period. It was one of the earliest data items related to credit losses reported by banks in Australasia. As shown in Table 6-1, there are 488 observations for 32 banks in the sample and only the static stock of provisions (PRV_LN) has a higher number of observations (511). This means IAE_LN provides a good coverage over the whole sample period, in particular covering the times of soaring credit losses in the late 80s and early 90s and the immediately preceding years.

6.3.1.2 Alternative CLE variables

With IAE_LN as the main dependent variable, this thesis nevertheless estimates models using alternative CLE variables. The purpose is to conduct robustness checks by gauging differences in the results created by the choice of the CLE variable. To our knowledge, no other study has looked at more than two alternative measures of CLE when exploring drivers of bank credit losses. This analysis provides novel insights into the characteristics of these proxies beyond the pure Australasian focus of this research.

One CLE variable used by some researchers is the stock of provisions. Recent examples include Bikker & Metzemakers (2003) and Kearns (2004) who both introduce levels of loan loss provisions (which they call "loan loss reserves") as an alternative to impaired asset expense. One can motivate this choice by the intuition that ongoing loan loss provisions (impaired asset expense) reflect discretionary managerial decisions at a point in time. Loan loss reserves, on the other hand, reflect the year-on-year accumulated net provisioning that ought to primarily reflect expected loan losses (Bikker & Metzemakers, 2003, p. 7). They argue that investors, regulators, management and auditors would see these loan loss reserves as important information regarding the credit portfolio's quality.

A third CLE variable explored in this thesis is the level of gross impaired assets (IA_A). Researchers who have employed it include Keeton (1999) who looks at determinants of the 'share of delinquent loans' and more recently Salas & Saurina (2002) who study the 'ratio of problem loans'. More importantly, it is also used by APRA researchers Esho & Liaw (2002, Table 3, p. 26) when they study the level of impaired assets of 16 Australian banks from 1991 to 2001 as part of an investigation into the appropriate level of risk weights for housing loans. The availability of this CLE variable is, however, severely restricted in the first decade of the 1980 to 2005 observation period. This means that only models with data from 1990 onwards can be estimated with IA_A.

A final CLE variable considered are net write-offs as % of loans. No other research appears to have used this variable as a dependent variable in a model explaining credit losses. Even though NW_LN will be closer to actual credit losses, it is a delayed measure relative to the time of the credit event (as mentioned above). One would expect longer lags of explanatory variables to be significant in comparison to estimates (of the same model) using impaired asset expense (IAE_LN) as a dependent variable.

Table 6-1 Observations and cross sections of selected CLE proxies over 1980-2005 period

CLE proxy	Description	Observations	Cross sections (banks)
IAE_LN	**Imp. Asset exp as % of loans**	**488**	**32**
IAE_NI	Impaired asset expense as % net interest income	478	31
IAE_GI	Impaired asset expense as % gross interest income	471	31
NW_LN	**Net debt write-offs as % of loans**	**475**	**32**
GW_LN	**Gross debt write-offs as % of loans**	**359**	**26**
RC_LN	**Recoveries as % of loans**	**355**	**26**
PRV_LN	**Provisions total as % of loans**	**511**	**32**
GE_LN	General provisions total as % of loans	462	30
SP_LN	Specific provisions total as % of loans	437	30
IA_A	**Impaired assets as % total assets**	**314**	**28**
PD_A	Past due loans as % total assets	244	25
GEE_LN	General provision expense as % of loans	306	25
SPE_LN	Specific provision expense as % of loans	329	26

Note: CLE variables in bold are used in the model estimates. Due to limited availability, IA_A and GW_LN are used for shorter period (1990 to 2005) estimates only. RC_LN, as the last stage in the life-cycle of a credit loss provision, is also used for model estimates (1990 to 2005 period only) to explore potential loss recovery patterns.

6.3.2 Selecting regressors

The methodology chapter listed a total of 20 macro- and bank specific explanatory variables which have been identified as potential drivers of a bank's credit losses. The selection of regressors will, in essence, follow the practice advocated by Verbeek (2004) with potentially relevant variables selected based on economic arguments. As shown in Table 6-2 (macroeconomic variables) and Table 6-3 (bank specific variables), they can in turn be grouped into economically relevant functional sub-groups in which proxies can be expected to measure similar effects.

Table 6-2 Grouping of drivers of a bank's CLE into functional groups: macro variables

Functional group	Regressor	Acronym	Expected sign
State of the economy (cycles, structural)	Real GDP growth	GDPGRW	-ve
	Unemployment rate (level, change)	UNEMP, ΔUNEMP	+ve
Vulnerability to economy	Liabilities of households and firms as % of disposable income	LIAB_INC	+ve
Asset price shock proxies	Effects of asset prices / interest rates		
	Return on leading share indices	RET_SHINDX	-ve
	Housing price index (changes)	HPGRW	-ve
	Point change nominal / real interest rates	NOMINTGRW / REALINTGRW	+ve
Other	% change in consumer price index	CPIGRW	+ve/-ve

6.3.2.1 Selection of macro variables

The macro variables GDPGRW and UNEMP in Table 6-2 measure the state of the economy, both cyclically (mainly GDPGRW and changes in UNEMP) and possibly structurally (level of UNEMP). At least one of these proxies has to be a cornerstone of any macro-prudential model formulation considered here.

As discussed in the methodology chapter, the level of indebtedness of private households (LIAB_INC) has steadily increased since 1990 while asset quality in the Australasian banking has improved at the same time. At first glance, this is counter-intuitive, implying that higher levels of debts in the economy reduce credit losses in the financial system. Rather, we interpret this result as an example of an endogeneity in which buoyant economic conditions both increase lending and decrease impaired asset expense. Moreover, it can be argued that a rise in household debt represents a rational response to the deregulation of the financial system, which allows consumers to smooth their consumption more efficiently over their life cycle (Australia Treasury, 2005, p. 54). These structural changes would then allow for higher level of borrowings without necessarily increasing credit risks. All in all, these complications do not make it advisable to include LIAB_INC as an exogenous driver of credit losses. Future research could look at models considering the endogeneities and structural factors affecting this variable.

Omitting this parameter from the final analysis has a precedence in Pain (2003, p. 29), who finds the variable not generally significant and thus drops it from the final regression specification.

There are a number of asset shock parameters among the macro proxies of which RET_SHINDX and HPGRW provide the most direct and immediate measure. They are the two primary candidates for inclusion into the preferred model.

The transmission effect of changes in interest rates on asset quality is more complex as financial institutions both pay and earn interest. One could expect non-linear effects as sudden increases will impact borrowers and thus loan defaults more than gradual and/or expected increases. Nominal interest rates are approximately a linear combination of real interest rates (NOMINT) and the percentage rate of CPI inflation (CPIGRW). The Fisher hypothesis (Fisher, 1930) generally associates an increase in CPI with an equivalent point increase in NOMINT[83]. It thus seems sensible to drop the point change in nominal interest rates (NOMINTGRW) as a variable in such regressions, replacing it with REALINTGRW and CPIGRW.

CPIGRW may have ambiguous effects on a bank's CLE since a rise in CPIGRW raises nominal interest rates, placing greater strains on debt servicing, while increasing asset values (but not liability values) so improving solvency of borrowers.

[83] See Fahmy & Kandil (2003) for further references of research into the Fisher effect.

Table 6-3 Grouping of drivers of a bank's CLE into functional groups: bank specific variables

Functional group	Regressor	Acronym	Expected sign
Past credit expansion proxies	Growth rate bank assets	ASGRW	+ve / (-ve)
	Growth rate bank loans	LNGRW	+ve / (-ve)
	Growth rate bank total income	TOIGRW	+ve / (-ve)
	Point deviation of a bank's loan growth (LNGRW) from system loans growth	DVLNGRW	+ve / (-ve)
	Point deviation of a bank's asset growth (ASGRW) from system asset growth	DVSYSALLGRW	+ve / (-ve)
Risk characteristics	Pricing of risks as measured by net interest margins	NIM	+ve/(-ve)
	Housing loans (Basel I definition) as % of total loans	HS_LN	-ve
Systemic importance / market power / diversification	Share of system assets	SH_SYSASALL	+ve/-ve
	Share of system loans	SH_SYSLNS	+ve/-ve
Other variables	Cost efficiency: Cost-income ratio (level)	CIR	+ve/(-ve)
	Income smoothing: Earnings before taxes and provisions as % of assets / as % of equity	EBTP_AS / EBTP_EQ	+ve
	Capital management / risk choice Tier I/II capital as % of risk weighted assets (Basel I definitions)	TR1_RWA, TR12_RWA	-ve

6.3.2.2 Selection of bank-specific variables

The first functional group of bank specific variables in Table 6-3 are proxies measuring past credit expansion (ASGRW, LNGRW, TOIGRW, DVLNGRW, DVSYSALLGRW[84]). It does not appear likely that these proxies would measure substantially different effects and not more than one should be included as a candidate for the preferred formulation.

[84] The series for DVSYSALLGRW, defined as the point deviation of a bank's asset growth (ASGRW) from system asset growth, is incomplete for New Zealand and thus needs to be omitted from further consideration.

The categorization into functional groups for the remaining bank specific variables is somewhat less clear-cut. Most of them gauge a variety of characteristics or effects.

NIM, HS_LN, SH_SYSASALL, SH_SYSLNS, TR1_RWA and TR12_RWA are all variables which give an indication of the institution's risk characteristic. SH_SYSLNS is preferred over SH_SYSASALL as data on total system credit are available for both Australia and New Zealand over the full 1980 to 2005 period.[85] A formulation over a shorter period should consider alternatives like HS_LN (available from 1990). Likewise, TR1_RWA and TR12_RWA, available after 1990, gauge the risk-adjusted capitalization of the bank.

Other bank-specific variables such as the earning proxies EBTP_AS and EBTP_EQ as well as cost efficiency CIR may also be considered as regressors. Earnings smoothing activities by means of discretionary provisions have been documented in a variety of studies (see chapter 5). High CIR may reflect inefficiencies that are symptomatic of poor bank management (in turn possibly poor risk management). Alternatively, a bank with a high CIR may devote substantial resources to monitoring and managing risks, so reducing CLEs. Thus the sign on CIR is indeterminate.

6.4 Estimates and discussion of results

This section firstly presents estimation results for a set of base models (Equation 6-2 in section 6.4.1) formulated in line with the considerations of the previous section. The base model with the best explanatory power is then designated as the 'preferred' model, Equation 6-3, and employed in alternative formulations as robustness checks. Specifically, Equation 6-3 is estimated with alternative CLE proxies as dependent variables in section 6.4.2 and with additional bank growth proxies added in section 6.4.3. Section 6.4.4, finally, conducts a more

[85] Note that that the total amount of banking system assets is available for New Zealand from 1986 onwards only.

formal test of country effects through the addition of a country dummy and interaction terms (formulation of Equation 6-4).

As an overview, Table 6-4 below lists all the models and results tables shown in this section.

Table 6-4 Overview of models estimated

Acronym	Results table	Description	Estimation methods
Eq6_2_1980_2005	Table 6-5, p. 275	Base formulation (Equation 6-2) Combined data sample 1980 to 2005	White, cross-section fixed and random effects
Eq6_2_1980_2005 Australia / NZ	Table 6-6, p. 276	Base formulation (Equation 6-2) 1980 to 2005 with separate estimation for Australian and New Zealand banks	White, cross-section fixed effects
Eq6_2_1990_2005	Table 6-7, p. 277	Base formulation (Equation 6-2) Combined data sample 1990 to 2005	White, cross-section fixed and random effects
Eq6_3_1980_2005 Alternative CLEs	Table 6-8, p. 287	Preferred model (Equation 6-3) Combined data sample 1980 to 2005 for CLE variables (IAE_LN, PRV_LN, NW_LN)	White, cross-section fixed effects
Eq6_3_1990_2005 Alternative CLEs	Table 6-9, p. 288	Preferred model (Equation 6-3) Combined data sample 1990 to 2005 for CLE variables (IAE_LN, PRV_LN, IA_A, NW_LN, GW_LN, RC_LN)	White, cross-section fixed effects
Eq6_3_Growth	Table 6-10, p. 293	Preferred model (Equation 6-3) with additional lagged bank-specific growth variables (ASGRW, TOIGRW, DVLNGRW) Combined data sample for 1980 to 2005 and 1990 to 2005.	White, cross-section fixed effects
Eq6_4_1980_2005	Table 6-11, p. 299	Preferred model with country-specific interaction terms (Equation 6-4) Combined data sample 1980 to 2005	White (no fixed effects)

6.4.1 Estimates of basic model form

6.4.1.1 Description of basic model form

The first set of estimates is conducted with the basic formulation of Equation 6-2 which explains impaired asset expense as % of loans (IAE_LN) as a function of three alternative sets of macro variables proxying the state of the economy: GDPGRW, change in UNEMP (ΔUNEMP) and level of UNEMP. Each set includes the contemporaneous and two lagged (annual) values to capture dynamic effects of these explanatory variables. There are two asset shock variables (RET_SHINDX, HPGRW) which are considered in this model. The impact of interest rate moves (REALINTGRW) is omitted from the basic model because (1) this proxy lacked explanatory power on a stand-alone basis (results not shown but available on request) and (2) it correlates quite strongly with the above economic state variables as shown in the appendix to this chapter in Table 6-12 for Australia and Table 6-13 for New Zealand. CPIGRW, on the other hand, is included as a macro explanatory variable.

As to bank-specific variables, the basic form includes the earnings proxy EBTP_AS with up to two lags[86], the size proxy SH_SYLNS (no lags[87]), the net interest margin (NIM) and the efficiency measure CIR (2 lags each). Bank growth parameters (e.g. ASGRW) were not included in the model because the effects of expanding the loan portfolio are likely more delayed than the other parameters. This implies that one would need to test their impact for possibly up to four lags, which, in turn, leads to a loss of more than 10% of pooled observations because of the many shorter bank data series in the sample. The effect of past credit expansion will be tested later in this chapter as a separate investigation.

[86] EBTP_AS was chosen over EBTP_EQ. It provides a more stable measure and does not rely on at times erratic equity values reported by some of the subsidiary banks (e.g. Westpac shown in Figure 5-24)

[87] No lags have been included for the relative size proxy SH_SYSLNS because dynamic aspects of growth are better captured with asset growth proxies.

Some important bank-specific variables have been consistently reported only after 1990. These include information on the composition of the lending portfolio such as the share of housing loans (HS_LN) and measures related to the Basel I risk ratios such as TR1_RWA. Accordingly, these two control variables have been added in Equation 6-2 for estimates of the more recent 1990 to 2005 observation period.

The appendix to this chapter shows the contemporaneous correlations amongst all the bank-specific variables in Table 6-14. Moreover, Table 6-15 presents the contemporaneous and 1-year lagged correlations of the two major macro variables (GDPGRW, ΔUNEMP) with these bank-specific variables.

Equation 6-2 Basic model form

$$
\begin{aligned}
& CLE_{i,t} = Const \\
& + \beta_{1.0} GDPGRW_{i,t} + \beta_{1.1} GDPGRW_{i,t-1} + \beta_{1.2} GDPGRW_{i,t-2} \\
& + \beta_{2.0} \Delta UNEMP_{i,t} + \beta_{2.1} \Delta UNEMP_{i,t-1} + \beta_{2.2} \Delta UNEMP_{i,t-2} \\
& + \beta_{3.0} UNEMP_{i,t} + \beta_{3.1} UNEMP_{i,t-1} + \beta_{3.2} UNEMP_{i,t-2} \\
& + \beta_{4.0} RET\_SHINDX_{i,t} + \beta_{4.1} RET\_SHINDX_{i,t-1} + \beta_{4.2} RET\_SHINDX_{i,t-2} \\
& + \beta_{5.0} HPGRW_{i,t} + \beta_{5.1} HPGRW_{i,t-1} + \beta_{5.2} HPGRW_{i,t-2} \\
& + \beta_{6.0} CPIGRW_{i,t} + \beta_{6.1} CPIGRW_{i,t-1} + \beta_{6.2} CPIGRW_{i,t-2} \\
& + \beta_{7.0} EBTP\_AS_{i,t} + \beta_{7.1} EBTP\_AS_{i,t-1} + \beta_{7.2} EBTP\_AS_{i,t-2} \\
& + \beta_{8} SH\_SYSLNS_{i,t} \\
& + \beta_{9.0} NIM_{i,t} + \beta_{9.1} NIM_{i,t-1} + \beta_{9.2} NIM_{i,t-2} \\
& + \beta_{10.0} CIR_{i,t} + \beta_{10.1} CIR_{i,t-1} + \beta_{10.2} CIR_{i,t-2} \\
& + \beta_{11} HS\_LN_{i,t} \\
& + \beta_{12} TR1\_RWA_{i,t} \\
& + u_{i,t}
\end{aligned}
$$

Alternative macro factors for state of economy

Other macro proxies

Bank-specific proxies

Additional proxies for 1990 to 2005 period

Error term

Where
$CLE_{i,t}$ is the major CLE variable IAE_LN (impaired asset expense as % of loans) for bank i at time t and the explanatory variables on the right hand side of the equation are as explained in Table 6-2 and Table 6-3.

6.4.1.2 Estimation results for basic model form

The following three tables present the estimation results for the basic formulation of Equation 6-2. Table 6-5 firstly estimates the model for the combined Australasian sample over the full 1980 to 2005 sample period. There are estimates using each of the alternative economic state variables (GDPGRW, ΔUNEMP, UNEMP) and each set is estimated with both fixed and random effects models. Table 6-6 repeats these estimates separately for the group of Australian, respectively New Zealand, banks (fixed effects model estimation only). Table 6-7, finally, conducts the same estimates as in Table 6-5 but for the shorter 1990 to 2005 period. It includes two additional bank-specific control variables (HS_LN and TR1_RWA) as discussed above.

The discussion of results in the following sections is structured as follows. Section 6.4.1.3 first reviews the results for the macro factors and section 6.4.1.4 the results for bank-specific factors. Section 6.4.1.5 specifically discusses the results for the short sample estimated in Table 6-7.

Table 6-5 Estimation results for alternative forms of basic model Equation 6-2 for combined Australasian sample, full 1980 – 2005 sample period

Eq6_2_1980_2005	1	Signif.	t-Stat	2	Signif.	t-Stat	3	Signif.	t-Stat	4	Signif.	t-Stat	5	Signif.	t-Stat	6	Signif.	t-Stat
Independent	IAE_LN			IAE_LN			IAE_LN			IAE_LN			IAE_LN			IAE_LN		
Sample Group	**Full sample 1980 - 2005, all banks**																	
Constant	**-0.0222**	**	-3.24	**-0.0225**	**	-3.40	**-0.0276**	**	-4.35	**-0.0200**	**	-3.39	**-0.0212**	**	-4.19	**-0.0263**	**	-4.76
GDPGRW	-0.0178		-0.41							-0.0138		-0.33						
GDPGRW(-1)	-0.0447		-1.28							-0.0400		-1.25						
GDPGRW(-2)	-0.0202		-0.57							-0.0070		-0.20						
UNEMP-UNEMP(-1)				0.0711		0.78							0.0921		1.07			
UNEMP(-1)-UNEMP(-2)				**0.1373**	*	2.36							**0.1465**	**	2.86			
UNEMP(-2)-UNEMP(-3)				**0.0920**	*	2.05							**0.0885**	*	1.99			
UNEMP							0.0394		0.37							0.0572		0.52
UNEMP(-1)							0.1891		1.44							0.1616		1.34
UNEMP(-2)							**-0.1192**	*	-2.07							**-0.1320**	*	-2.39
RET_SHINDX	**-0.0121**	*	-2.19	**-0.0147**	*	-2.32	**-0.0142**	*	-2.21	**-0.0116**	*	-2.11	-0.0124		-1.88	-0.0127		-1.93
RET_SHINDX(-1)	-0.0012		-0.35	0.0009		0.21	0.0013		0.31	-0.0005		-0.15	0.0025		0.64	0.0022		0.54
RET_SHINDX(-2)	0.0037		0.61	0.0088		1.27	0.0047		0.74	0.0035		0.61	0.0086		1.36	0.0044		0.73
HPGRW	-0.0128		-1.32	-0.0170		-1.76	-0.0147		-1.50	-0.0127		-1.44	-0.0152		-1.71	-0.0124		-1.24
HPGRW(-1)	-0.0027		-0.41	-0.0017		-0.22	0.0018		0.20	-0.0030		-0.47	0.0018		0.26	0.0049		0.56
HPGRW(-2)	-0.0033		-0.50	-0.0013		-0.20	0.0060		0.81	-0.0016		-0.26	0.0024		0.39	0.0090		1.36
CPIGRW	-0.0317		-0.86	-0.0028		-0.07	-0.0270		-0.61	-0.0373		-0.96	-0.0067		-0.17	-0.0344		-0.72
CPIGRW(-1)	0.0514		0.80	0.0417		0.78	0.0712		1.23	0.0517		0.84	0.0429		0.82	0.0673		1.20
CPIGRW(-2)	**0.0550**	*	2.40	0.0361		1.63	**0.0461**	*	2.01	**0.0531**	*	2.27	0.0213		1.16	0.0245		1.35
EBTP_AS	**1.1170**	**	12.29	**1.0935**	**	12.18	**1.1258**	**	12.78	**1.0921**	**	12.42	**1.0748**	**	12.16	**1.0982**	**	12.88
EBTP_AS(-1)	-0.1560		-1.60	-0.1565		-1.61	-0.1476		-1.57	-0.1701		-1.91	-0.1706		-1.89	-0.1653		-1.90
EBTP_AS(-2)	-0.1293		-1.62	-0.1416		-1.73	-0.1284		-1.59	-0.1472		-1.76	-0.1547		-1.88	-0.1527		-1.87
SH_SYSLNS	0.0369		1.85	**0.0395**	*	2.06	**0.0416**	*	2.15	0.0083		0.66	0.0046		0.54	0.0053		0.62
NIM	**-0.2351**	*	-2.31	**-0.2059**	*	-2.01	**-0.2872**	**	-2.94	**-0.2411**	*	-2.20	-0.2238		-1.89	**-0.2758**	*	-2.50
NIM(-1)	0.0656		0.56	0.0218		0.18	0.0583		0.49	0.0759		0.66	0.0316		0.26	0.0649		0.54
NIM(-2)	-0.1734		-1.84	-0.1616		-1.71	-0.1769		-1.91	**-0.1847**	*	-2.31	**-0.1674**	*	-2.18	**-0.1680**	*	-2.18
CIR	**0.0580**	**	4.55	**0.0573**	**	4.58	**0.0536**	**	4.13	**0.0601**	**	4.60	**0.0613**	**	4.64	**0.0582**	**	4.47
CIR(-1)	-0.0058		-0.49	-0.0075		-0.64	-0.0086		-0.72	-0.0049		-0.40	-0.0070		-0.57	-0.0068		-0.57
CIR(-2)	-0.0154		-1.64	-0.0155		-1.65	-0.0173		-1.90	**-0.0165**	*	-2.05	-0.0153		-1.87	**-0.0164**	*	-2.07
HS_LN																		
TR1_RWA																		
Estimation code	Estimated with cross-section fixed effects									Estimated with cross-section random effects								
Cross-sections included	29			29			29			29			29			29		
Observations	401			396			401			401			396			401		
Adjusted R^2	0.714			0.729			0.720			0.698			0.713			0.705		
F-Statistics	**20.929**	**		**22.298**	**		**21.523**	**		**42.924**	**		**45.552**	**		**44.459**	**	
Schwarz criterion	-6.163			-6.201			-6.184			0.000			0.000			0.000		
Akaike info criterion	-6.671			-6.714			-6.692			0.000			0.000			0.000		
Durbin-Watson stat	1.923			2.032			1.950			1.800			1.803			1.751		

Notes:
** significant at 1% level, * at 5% level
Variables as defined in Table 6-1 (dependent variable), Table 6-2 and Table 6-3 (explanatory variables)
All t-statistics use White diagonal standard errors (d.f. corrected).

Table 6-6 Estimation results for alternative forms of basic model Equation 6-2 for Australian and New Zealand banks sample, full 1980 – 2005 sample period

Eq6_2_1980_2005 Australia / NZ	1	Signif.	t-Stat	2	Signif.	t-Stat	3	Signif.	t-Stat	4	Signif.	t-Stat	5	Signif.	t-Stat	6	Signif.	t-Stat
Independent	IAE_LN			IAE_LN			IAE_LN			IAE_LN			IAE_LN			IAE_LN		
Sample Group	**Australian banks 1980 - 2005**									**New Zealand banks 1980 - 2005**								
Constant	**-0.0182**	*	-2.15	**-0.0193**	*	-2.46	**-0.0334**	**	-3.98	**-0.0251**	**	-3.55	**-0.0257**	**	-3.70	**-0.0270**	**	-3.97
GDPGRW	**-0.1527**	**	-2.63							0.0750		1.01						
GDPGRW(-1)	-0.0726		-1.54							-0.0440		-1.08						
GDPGRW(-2)	-0.0239		-0.58							-0.0676		-1.26						
UNEMP-UNEMP(-1)				**0.2384**	**	2.96							-0.2289		-1.26			
UNEMP(-1)-UNEMP(-2)				**0.1840**	*	2.37							0.0822		0.80			
UNEMP(-2)-UNEMP(-3)				**0.2208**	**	4.04							0.1052		1.27			
UNEMP							**0.2582**	**	3.02							-0.2099		-1.18
UNEMP(-1)							0.0529		0.51							0.3452		1.88
UNEMP(-2)							-0.1025		-1.48							-0.0387		-0.29
RET_SHINDX	-0.0085		-1.65	**-0.0203**	**	-3.91	-0.0097		-1.74	-0.0192		-1.72	-0.0196		-1.81	-0.0201		-1.80
RET_SHINDX(-1)	**0.0109**	*	2.04	**0.0142**	**	2.77	0.0084		1.50	-0.0072		-1.39	-0.0050		-0.95	-0.0043		-0.81
RET_SHINDX(-2)	0.0117		1.59	**0.0275**	**	3.87	0.0063		0.90	-0.0007		-0.11	-0.0002		-0.03	-0.0027		-0.42
HPGRW	-0.0155		-1.52	**-0.0392**	**	-4.29	-0.0125		-1.33	-0.0086		-0.66	-0.0041		-0.31	-0.0101		-0.71
HPGRW(-1)	0.0141		1.75	0.0085		1.00	**0.0233**	*	2.05	0.0055		0.41	0.0035		0.29	0.0037		0.29
HPGRW(-2)	0.0077		1.04	0.0016		0.20	0.0143		1.55	0.0036		0.30	-0.0036		-0.27	0.0016		0.12
CPIGRW	**-0.1154**	**	-2.64	-0.0570		-1.79	-0.0655		-1.90	-0.0113		-0.17	-0.0770		-0.75	-0.0753		-0.72
CPIGRW(-1)	0.0669		1.13	**0.1320**	**	2.87	**0.0862**	*	2.07	0.0762		0.92	0.1111		1.22	0.1318		1.24
CPIGRW(-2)	0.0080		0.22	-0.0572		-1.89	-0.0171		-0.58	0.0380		0.97	0.0840		1.22	0.0940		1.24
EBTP_AS	**1.0692**	**	7.17	**1.0449**	**	7.37	**1.0963**	**	7.54	**1.1441**	**	8.12	**1.1471**	**	8.26	**1.1619**	**	8.38
EBTP_AS(-1)	**-0.3934**	**	-2.76	**-0.3863**	**	-2.85	**-0.3685**	**	-2.61	-0.1351		-1.38	-0.1264		-1.30	-0.1300		-1.36
EBTP_AS(-2)	0.0539		0.51	0.0488		0.49	0.0364		0.34	**-0.2187**	*	-2.30	**-0.2032**	*	-2.22	**-0.2035**	*	-2.26
SH_SYSLNS	0.0067		0.29	0.0293		1.83	0.0223		0.96	0.0486		1.40	0.0494		1.45	0.0517		1.46
NIM	-0.1774		-1.14	-0.1726		-1.16	-0.2250		-1.57	-0.2335		-0.81	-0.3126		-1.19	-0.3457		-1.40
NIM(-1)	0.1016		0.53	0.0499		0.25	0.0916		0.43	-0.0126		-0.08	0.0411		0.27	0.0513		0.37
NIM(-2)	-0.1822		-1.14	-0.1883		-1.19	-0.2488		-1.47	-0.0596		-0.56	-0.0931		-0.82	-0.1011		-0.89
CIR	**0.0681**	**	4.70	**0.0646**	**	4.84	**0.0616**	**	4.37	**0.0684**	**	4.65	**0.0656**	**	4.62	**0.0610**	**	3.23
CIR(-1)	-0.0048		-0.41	-0.0091		-0.82	-0.0093		-0.81	-0.0337		-1.35	-0.0295		-1.32	-0.0329		-1.41
CIR(-2)	-0.0181		-1.65	**-0.0191**	*	-1.99	**-0.0214**	*	-2.18	-0.0081		-0.47	-0.0095		-0.57	-0.0114		-0.70
Estimation code	Estimated with cross-section fixed effects																	
Cross-sections included	20			20			20			9			9			9		
Observations	271			267			271			130			129			130		
Adjusted R^2	0.648			0.691			0.658			0.790			0.794			0.792		
F-Statistics	**13.129**	**		**15.522**	**		**13.694**	**		**17.130**	**		**17.488**	**		**17.354**	**	
Schwarz criterion	-6.198			-6.307			-6.228			-5.761			-5.773			-5.772		
Akaike info criterion	-6.757			-6.872			-6.786			-6.445			-6.460			-6.456		
Durbin-Watson stat	1.856			2.120			1.946			2.106			2.085			2.092		

Notes:
** significant at 1% level, * at 5% level
Variables as defined in Table 6-1 (dependent variable), Table 6-2 and Table 6-3 (explanatory variables)
All equations estimated with cross-section fixed effects. All t-statistics use White diagonal standard errors (d.f. corrected).

Table 6-7 Estimation results for alternative forms of basic model Equation 6-2 for combined Australasian sample, short 1990 – 2005 sample period

Eq6_2_1990_2005	1	Signif.	t-Stat	2	Signif.	t-Stat	3	Signif.	t-Stat	4	Signif.	t-Stat	5	Signif.	t-Stat	6	Signif.	t-Stat
Independent	IAE_LN			IAE_LN			IAE_LN			IAE_LN			IAE_LN			IAE_LN		
Sample Group	**Short sample 1990 - 2005, all banks**																	
Constant	0.0034		0.27	0.0032		0.26	0.0033		0.27	**-0.0146**	**	-2.71	**-0.0156**	*	-2.37	**-0.0191**	**	-3.22
GDPGRW	-0.0495		-1.13							-0.0313		-0.56						
GDPGRW(-1)	-0.0342		-0.71							-0.0197		-0.41						
GDPGRW(-2)	-0.0353		-1.17							-0.0243		-0.76						
UNEMP-UNEMP(-1)				0.0185		0.30							0.0589		0.91			
UNEMP(-1)-UNEMP(-2)				0.1124		1.62							0.1231		1.69			
UNEMP(-2)-UNEMP(-3)				**0.1380**	*	2.40							**0.1382**	*	2.33			
UNEMP							0.1476		1.39							0.0943		1.13
UNEMP(-1)							0.1477		1.43							0.1754		1.76
UNEMP(-2)							-0.1078		-1.39							**-0.1903**	*	-2.42
RET_SHINDX	-0.0010		-0.12	-0.0004		-0.06	-0.0023		-0.34	-0.0026		-0.37	-0.0030		-0.54	-0.0051		-0.83
RET_SHINDX(-1)	0.0007		0.10	0.0044		0.90	0.0038		0.75	0.0013		0.18	0.0049		0.93	0.0030		0.57
RET_SHINDX(-2)	0.0078		1.39	0.0112		1.86	0.0065		0.97	**0.0084**	*	2.10	**0.0093**	*	2.07	0.0050		0.80
HPGRW	-0.0031		-0.37	**-0.0125**	*	-2.02	-0.0104		-1.72	-0.0056		-0.53	-0.0124		-1.90	-0.0084		-1.30
HPGRW(-1)	-0.0149		-1.50	-0.0131		-1.55	-0.0061		-0.54	**-0.0222**	*	-2.34	-0.0121		-1.60	-0.0106		-0.92
HPGRW(-2)	-0.0124		-1.56	-0.0113		-1.45	-0.0017		-0.20	-0.0066		-0.97	-0.0051		-0.74	0.0040		0.48
CPIGRW	0.0482		1.08	0.0518		1.05	0.0677		1.38	0.0560		1.50	0.0470		1.03	0.0712		1.61
CPIGRW(-1)	-0.0024		-0.05	0.0728		1.84	0.0334		0.96	-0.0087		-0.15	0.0686		1.66	0.0147		0.40
CPIGRW(-2)	0.0923		1.69	0.0557		1.33	0.0526		1.18	**0.1413**	**	3.18	0.0475		1.46	0.0428		1.07
EBTP_AS	**0.9517**	**	5.23	**0.9515**	**	5.25	**0.9275**	**	5.39	**1.1519**	**	9.70	**1.1541**	**	9.27	**1.1537**	**	9.81
EBTP_AS(-1)	**-0.3785**	**	-3.35	**-0.3803**	**	-3.33	**-0.3774**	**	-3.45	**-0.4100**	**	-4.02	**-0.4095**	**	-3.95	**-0.4148**	**	-4.08
EBTP_AS(-2)	-0.0269		-0.24	-0.0182		-0.15	-0.0396		-0.34	0.1327		1.54	0.1148		1.21	0.1231		1.43
SH_SYSLNS	**0.0361**	*	2.47	**0.0292**	*	2.12	**0.0332**	*	2.22	-0.0068		-1.32	-0.0014		-0.19	-0.0065		-1.29
NIM	**-0.3225**	**	-3.04	**-0.3370**	**	-3.00	**-0.4157**	**	-3.52	**-0.4170**	**	-3.80	**-0.4168**	**	-3.96	**-0.3902**	**	-3.29
NIM(-1)	-0.0028		-0.02	-0.0102		-0.08	-0.0479		-0.38	0.1023		0.79	0.0591		0.48	0.0798		0.64
NIM(-2)	0.1048		0.90	0.0724		0.64	0.0343		0.30	-0.0669		-0.70	-0.0467		-0.47	-0.0923		-1.02
CIR	**0.0437**	**	5.47	**0.0428**	**	5.42	**0.0360**	**	4.46	**0.0611**	**	5.70	**0.0611**	**	5.84	**0.0608**	**	5.61
CIR(-1)	-0.0115		-1.22	-0.0140		-1.44	-0.0178		-1.81	-0.0160		-1.66	-0.0164		-1.67	-0.0173		-1.80
CIR(-2)	-0.0109		-1.23	-0.0120		-1.38	-0.0170		-1.96	-0.0126		-1.44	-0.0103		-1.17	-0.0150		-1.75
HS_LN	**-0.0160**	*	-2.29	**-0.0155**	*	-2.29	**-0.0138**	*	-2.08	-0.0031		-1.23	-0.0048		-1.49	-0.0028		-1.09
TR1_RWA	**-0.0801**	*	-2.39	**-0.0761**	*	-2.25	**-0.0854**	*	-2.57	-0.0248		-1.27	-0.0293		-1.13	-0.0191		-0.98
Estimation code	Estimated with cross-section fixed effects									Estimated with cross-section random effects								
Cross-sections included	26			26			26			26			26			26		
Observations	266			266			266			266			266			266		
Adjusted R^2	0.794			0.802			0.803			0.747			0.744			0.756		
F-Statistics	**21.878**	**		**22.919**	**		**23.078**	**		**33.554**	**		**33.097**	**		**35.279**	**	
Schwarz criterion	-6.618			-6.657			-6.663			n.a.			n.a.			n.a.		
Akaike info criterion	-7.292			-7.331			-7.337			n.a.			n.a.			n.a.		
Durbin-Watson stat	2.115			2.171			2.205			1.684			1.887			1.707		

Notes:
** significant at 1% level, * at 5% level
Variables as defined in Table 6-1 (dependent variable), Table 6-2 and Table 6-3 (explanatory variables)
All t-statistics use White diagonal standard errors (d.f. corrected).

6.4.1.3 Discussion of results: macro factors

As shown in Table 6-5, GDP growth and both the change and level of the unemployment rate have the expected effects on a bank's annual loan loss provisions with the coefficients showing the expected signs for lag zero and one. The result is virtually the same as found by Kearns (2004, p. 118) for a smaller and shorter sample of Irish banks. He writes: "the level of provisioning increases contemporaneously with the unemployment rate but not with the current rate of GDP growth. GDP growth affects the level of provisioning with a lag of one year; the unemployment rate is the most significant macroeconomic factor affecting the rate of provisioning".

Other research generally finds similar qualitative results (e.g. signs of coefficients) but the concrete sensitivities of impaired asset expense to GDP growth and changes to unemployment often remain unreported (e.g. in Kearns, 2004 cited above). In this thesis they turn out to be an (annualised) decline in IAE_LN in the range of 5-6% per percentage point increase in the past two year cumulative GDP growth rate, respectively a 21-24% rise for each point increase in the unemployment rate (cumulative increase over a two year period[88]). It is generally difficult to compare these sensitivities to results of other studies due to differences in model design (e.g. alternative dependent CLE variables and different variable transformations). The sensitivities in Australasia seem nonetheless lower with regard to GDP growth compared with the international studies of Bikker & Hu (2001, Table 3, p. 12) for banks from 29 countries from 1979-1999 and Valckx (2004, Table 1, p. 7) with data drawn from OECD bank profitability statistics for all 15 EU countries from 1979 to 2001.

As to country-specific differences between Australia and New Zealand, Australia's estimation results are in line with the findings above but show greater sensitivities to GDP growth (see Table 6-6, columns 1 to 3). Conversely, for the New Zealand sample, the effects of

[88] The % sensitivity ranges are determined as the sum of the contemporaneous and one-year lagged coefficients for GDPGRW, respectively ΔUNEMP, for each the fixed and random effects models.

GDPGRW, ΔUNEMP and UNEMP seem less pronounced and more delayed as none of the contemporaneous proxies shows the expected sign of the coefficient or any significance (see Table 6-6, columns 4 to 6).

The return on the national share indices ASX, respectively NZX, is one of the asset shock proxies included in the basic model form of Equation 6-2. Its contemporaneous term is found significant for the overall sample. It is slightly less significant for the sub-samples of Australian banks and New Zealand banks but shows the expected negative sign.

HPGRW, the other asset shock proxy, appears to have a comparably lower explanatory power as none of the coefficients shows significant t-statistics. This result makes intuitive sense as the major banking crisis in Australasia around 1990 was not triggered by asset shocks emanating from the housing market but rather by asset quality problems in the corporate and commercial property sector.

The base formulation of Equation 6-2 also considers the growth of CPI (CPIGRW) as a proxy. Interestingly, the results in Table 6-5 show coefficients without consistent signs or significance for the contemporaneous and one year lagged term of CPIGRW. There is thus no indication of short-term beneficial effects of inflation on bank credit losses. On the contrary, a significant adverse long-term impact on a bank's CLE emerges as the two-year lagged CPIGRW shows a positive sign and is generally significant. Despite potential short-term improvements of credit quality due to inflation, our results are consistent with the research which postulates costs of inflation in the long-run (e.g. Lucas, 2000).

6.4.1.4 Discussion of results: bank specific factors

Estimates in Table 6-5 show consistently positive relationships between the level of provisioning (IAE_LN) and the banks' pre-provision earnings (EBTP_AS), confirming previous results for other markets supportive of an income smoothing pattern (e.g. Arpa, Giulini, Ittner, & Pauer, 2001, p. 107 for Austria; Bikker & Hu, 2001 for 26 OECD countries; Bikker & Metzemakers, 2003 for US, EU; Cavallo & Majnoni, 2001 for G10 countries; Greenawalt &

Sinkey Jr., 1988 for US; Kearns, 2004 for Ireland). Lagged terms of EBTP_AS show negative and often significant coefficients which support the theory that necessary provisions are postponed into the following year if earnings are low in that particular time period.

While these results are roughly consistent across the Australian and New Zealand sub-samples, Australian institutions seem to postpone required provisions for shorter periods (the first lag of EBTP_AS is significant in Table 6-6, columns1-3) while New Zealand banks seem to smooth over longer cycles (the second lag is significant in Table 6-6, columns 4-6). One could hypothesize that Australian banks, which are mostly exchange listed, have less discretion in smoothing income as opposed to their (mostly) non-listed New Zealand counterparts. This question could warrant further investigation.

The size proxy, SH_SYSLNS, defined as the share of a bank's system loans, gauges both risk diversification and market power of banks. It is consistently positive for all estimates, indicating higher levels of provisioning for larger banks. The coefficient values are significant at 5% for the fixed effect ΔUNEMP and UNEMP equations shown in Table 6-5, columns 2 and 3. We see this result as a reflection of structural heterogeneity of the sample as smaller banks are predominantly housing lenders with comparably lower levels of provisioning requirements. However, we cannot rule out the market power hypothesis which postulates that monopolistic market structure promotes lending by larger banks to young firms which then leads to higher credit losses (Petersen & Rajan, 1995).

The positive coefficient indicates that size does not appear to be a suitable proxy for risk diversification (and thus lower overall provisions) as smaller banks, though not diversified, have gravitated towards lower risk activities. Overall it is important to include this variable in the model as it helps control for institution specific characteristics. Note that a size proxy has also been used by Pain (2003, Table 7, p. 28) who finds no significance for contemporaneous but some positive significance for one year lagged size for a more homogenous and smaller balanced sample of seven UK commercial banks.

The coefficients for the net interest margin (NIM) in Table 6-5 generally turn out negative and mostly significant for the contemporaneous and twice-lagged term. Few researchers have included net interest margin proxies into their formulations. Pain (2003) finds consistently positive and in some regressions[89] significant coefficients for the lagged level of net interest margins. This reflects the timing between the pricing of past loans and subsequently realized credit losses.

The interpretation of our results is somewhat more ambiguous. Negative coefficients for lagged terms could in principle be attributed to behavioural incentives which induce low margin banks to seek greater risks (as argued by Pain, 2003, p. 24). This would, however, not explain the negative coefficients of the contemporaneous terms. An intuitive explanation may be of a structural nature as larger banks tend to exhibit lower interest rate margins as indicated by a negative and significant correlation of -22% between size (SH_SYSLNS) and NIM (see Table 6-14 in the chapter appendix). Larger banks derive a higher portion of their profit through off-balance sheet business while smaller players rely more on their lending income.

Other researchers have also been faced with conflicting results for the NIM coefficients. Salas & Saurina (2002, Table 2, p. 218) report positive but insignificant values for lagged NIM terms of Spanish commercial banks but a significant negative value for the sub-sample of savings banks. Given such inconclusive results, the effect of net interest margins will require further exploration.

Highly significant contemporaneous coefficients of the cost-income ratio proxies (CIR) and generally negative coefficients for lagged terms indicate that high and increasing cost-income ratios (lower operational efficiencies) are associated with higher levels of impaired assets. The results, which are consistent across the overall (Table 6-5) and country sub-samples (Table 6-6), lend support to the hypothesis that operational problems at banks (high CIR) go

[89] For a sub-sample of 5 UK mortgage banks Pain (2003, Table 8, p. 30) finds high significance for one-year lagged NIM.

hand in hand with poor credit risk management and thus higher loan losses. Conversely, they appear to reject the alternative theory which postulates that extensive costly monitoring (high CIR) leads to better asset quality (i.e. negative coefficient for CIR).

Our results for CIR support Berger & De Young (1997) who found 'cost efficiencies to precede reductions in problem loans'. The results are also generally in line with Salas & Saurina (2002, Table 2, p. 218) who find positive, but not always significant coefficients. Mixed results were, however, reported by Pain (2003, Table 7 & 8, p. 28,30) with positive coefficients for UK commercial banks but negative and significant coefficients for mortgage banks.

The significance found here makes it imperative to use the CIR as a control parameter even though the cost-income ratio, which is widely used by practitioners, is contentious as an efficiency measure. For one, it is not a relative efficiency measure as illustrated in the earlier Figure 5-22 (chapter 5) which shows CIR declining for both Australian and New Zealand banks brought about by factors such as technical innovation and revisions of business models. The short-comings of this measure are, for example, reviewed in Hess & Francis (2007, Figures 1 and 3), who conclude that, among other things, this ratio is affected by the characteristics of the bank's operation and high CIR banks might easily achieve similar returns for their shareholders as they more efficiently use their balance sheets (higher capital efficiency). One could look into replacing CIR by alternative measures of bank efficiencies like the ones used in frontier efficiency analysis (X-efficiency) derived through parametric and non-parametric techniques.[90]

6.4.1.5 Discussion of results: model over shorter 1990-2005 sample period

The results found in Table 6-7 for the shorter 1990 to 2005 sample period are broadly consistent with the results discussed in the previous two sections. This section discusses the few

[90] Berger & Humphrey (1997) review the wide literature which has applied such techniques for bank efficiency studies. For Australia, Avkiran (2000) uses Malmquist productivity indices to explore productivity of the four major and six regional Australian banks over a 1986 to 1995 period.

differences observed and reviews the results for the additional explanatory variables added to the shorter period model.

The sensitivity of credit losses to the two-year cumulative changes in the unemployment rate ($\Delta UNEMP_t + \Delta UNEMP_{t-1}$) appears slightly lower (range of 13-18%) but the model based on ΔUNEMP still appears to be the one with the best explanatory power based on coefficient t-statistics and information criteria.

Of the asset shock proxies, RET_SHINDX loses its significance and even the expected negative coefficient for the lagged terms. On the other hand, developments in the property sector (HPGRW) have more significant effects on loan losses in the banking sector. Moreover, coefficients of HPGRW are consistently negative for this sample period. One could argue that the effect of the 1987 share crash could have affected the results for the overall sample period. A smooth share market may thus have a weaker effect on credit losses in the banking system.

The regressions of Table 6-7 include two additional explanatory variables (HS_LN, TR1_RWA) which only became available with the introduction of the Basel I capital accord. As can be seen in Table 6-14 in the chapter appendix, there is a positive and statistically significant positive correlation of 42% between these two parameters which indicates comparably higher capitalization for banks lending predominantly to the housing sector.[91]

The results show that lower risk banks as measured by healthier (higher) Tier I capital ratios (TW1_RWA) report significantly lower loan loss provisions as shown in the fixed effects model column 1 to 3. Note that one finds equally negative coefficients when running these regressions with the overall capital ratio including both Tier I and II capital (TW12_RWA, results not reported). For perspective, annual impaired asset expense increases by about 8% for each percentage point decrease in the Tier I capital adequacy ratio.

[91] Basel I capital adequacy rules grant 50% risk weights to housing portfolios which tends to lift capital adequacy ratios.

A potential interpretation for the negative sign of the capital ratio is provided by the capital management hypothesis. General provisions have counted towards Basel I minimum capital and weaker banks might thus have been tempted to engage in capital management through provisioning. Our results would thus confirm some of the effects found by Kim & Kross (1998) and Ahmed, Takeda, & Thomas (1999) in studying the impact of the Basel capital adequacy rules.

It seems, however, doubtful whether Basel I rules contribute materially to the patterns found in Australasia. Most banks have been consistently far above the minimum levels of capital required (as shown in Figure 5-25 and Figure 5-26 in chapter 5) and would hence have limited incentive to supplement their capital via provisions. Moreover, research into the determinants of bank capital ratios such as Alfon, Argimon & Bascuñana-Ambrós (2004) for the UK identifies a myriad of factors which affect capital holding of banks. Alfon et al. (2004, p.12) for example report an inverse relationship between bank size and capital which can also be found in this sample of Australasian banks. This inverse relationship becomes apparent in Table 6-14 which shows a significant correlation coefficient of minus 39% between TR1_RWA and SH_SYLNS, the size proxy of banks in the sample.

The negative and significant coefficient for HS_LN (share of housing loans in portfolio) is very intuitive since these loans generally require lower provisions. One notes that smaller institutions have a preponderance of home lending as can again be seen in Table 6-14 (correlation HS_LN with SH_SYSLN is minus 31%).

6.4.2 Estimates for alternative CLE variables

Section 6.3.1.2 introduced a number of alternative CLE variables, some of which have been used by earlier research. In this section, we estimate one version of the base formulation of Equation 6-2 with these alternative dependent variables. The model version is selected based on the best explanatory power found for the regressions with the impaired assets expense proxy (IAE_LN) in the previous section. It is designated as the 'preferred model'

6.4.2.1 Selection of a preferred model form

Based on the estimation results for the base formulation of Equation 6-2, we select the preferred model form of Equation 6-3. These results reveal that the change in unemployment (ΔUNEMP) appears to have the best explanatory power among the three major state of the economy proxies. As shown in Table 6-5, its coefficients are more significant and the model shows a better fit with higher adjusted r-squared values. Likewise, the information criteria (Schwarz, Akaike) for equations estimated with ΔUNEMP are lower.

Even though we have concluded that ΔUNEMP is the preferred regressor for the state of the economy, the explanatory power of GDPGRW and particularly the level of unemployment (UNEMP) are of almost equivalent quality. This is illustrated by the fact that, when the same equations as shown in Table 6-5 are estimated for the shorter 1990 to 2005 observation period in Table 6-7, one finds that UNEMP has slightly better explanatory power.

Equation 6-3 Preferred model form

$$
\begin{aligned}
CLE_{i,t} &= Const \\
&+ \beta_{2.0}\Delta UNEMP_{i,t} + \beta_{2.1}\Delta UNEMP_{i,t-1} + \beta_{2.2}\Delta UNEMP_{i,t-2} \\
&+ \beta_{4.0}RET\_SHINDX_{i,t} + \beta_{4.1}RET\_SHINDX_{i,t-1} + \beta_{4.2}RET\_SHINDX_{i,t-2} \\
&+ \beta_{5.0}HPGRW_{i,t} + \beta_{5.1}HPGRW_{i,t-1} + \beta_{5.2}HPGRW_{i,t-2} \\
&+ \beta_{6.0}CPIGRW_{i,t} + \beta_{6.1}CPIGRW_{i,t-1} + \beta_{6.2}CPIGRW_{i,t-2} \\
&+ \beta_{7.0}EBTP\_AS_{i,t} + \beta_{7.1}EBTP\_AS_{i,t-1} + \beta_{7.2}EBTP\_AS_{i,t-2} \\
&+ \beta_{8}SH\_SYSLNS_{i,t} \\
&+ \beta_{9.0}NIM_{i,t} + \beta_{9.1}NIM_{i,t-1} + \beta_{9.2}NIM_{i,t-2} \\
&+ \beta_{10.0}CIR_{i,t} + \beta_{10.1}CIR_{i,t-1} + \beta_{10.2}CIR_{i,t-2} \\
&+ \beta_{11}HS\_LN_{i,t} \\
&+ \beta_{12}TR1\_RWA_{i,t} \\
&+ u_{i,t}
\end{aligned}
$$

Macro proxies

Bank-specific proxies

Additional proxies for 1990 to 2005 only

Error term

Where
$CLE_{i,t}$ is one of the dependent CLE variables IAE_LN, PRV_LN, IA_A, NW_LN, GW_LN, RC_LN for bank i at time t as explained in Table 6-1. Explanatory variables as defined in Table 6-2 and Table 6-3.

6.4.2.2 Estimation results for alternative CLE dependent variables

The following tables present the results of estimating the preferred form of Equation 6-3. Table 6-8 estimates the model for impaired assets expense (IAE_LN), stock of provisions (PRV_LN) and net write-offs (NW_LN) with observations of the whole 1980 to 2005 period. Further potential dependent variables were reported consistently only later so Table 6-9 estimates the preferred model for the shorter 1990 to 2005 period with the level of impaired assets (IA_AS) and gross-write-offs (GW_LN) in addition to the above dependent variables. Moreover, Table 6-9 (column 6) estimates Equation 6-3 with loss recoveries (RC_LN) as dependent variable to analyse potential patterns in the recovery of lost loans.

Table 6-8 Estimation results for alternative CLE variables (Equation 6-3, 1980-2005)

Eq6_3_1980_2005 Alternative CLEs	1	Signif.	t-Stat	2	Signif.	t-Stat	3	Signif.	t-Stat
Independent	IAE_LN			PRV_LN			NW_LN		
Sample Group	**Full sample 1980 - 2005, all banks**								
Constant	**-0.0225**	**	-3.40	**-0.0409**	**	-3.13	**-0.0384**	**	-2.81
UNEMP-UNEMP(-1)	0.0711		0.78	0.1148		0.96	0.0578		0.79
UNEMP(-1)-UNEMP(-2)	**0.1373**	*	2.36	0.0658		0.67	0.0424		0.56
UNEMP(-2)-UNEMP(-3)	**0.0920**	*	2.05	**0.1968**	**	2.77	**0.1582**	**	2.96
RET_SHINDX	**-0.0147**	*	-2.32	**-0.0128**	*	-2.09	-0.0049		-1.19
RET_SHINDX(-1)	0.0009		0.21	-0.0133		-1.91	-0.0013		-0.36
RET_SHINDX(-2)	0.0088		1.27	0.0002		0.02	-0.0010		-0.21
HPGRW	-0.0170		-1.76	-0.0085		-0.91	-0.0028		-0.46
HPGRW(-1)	-0.0017		-0.22	0.0049		0.42	-0.0096		-1.50
HPGRW(-2)	-0.0013		-0.20	-0.0160		-1.55	0.0066		0.59
CPIGRW	-0.0028		-0.07	-0.0122		-0.27	0.0227		0.95
CPIGRW(-1)	0.0417		0.78	0.0166		0.36	-0.0392		-1.47
CPIGRW(-2)	0.0361		1.63	0.0045		0.10	-0.0239		-1.06
EBTP_AS	**1.0935**	**	12.18	**0.7598**	**	4.45	0.3208		1.54
EBTP_AS(-1)	-0.1565		-1.61	**0.3594**	**	3.42	**0.1678**	*	2.10
EBTP_AS(-2)	-0.1416		-1.73	0.1402		1.18	**0.4088**	*	2.22
SH_SYSLNS	**0.0395**	*	2.06	**0.0708**	*	2.15	0.0070		0.50
NIM	**-0.2059**	*	-2.01	0.0000		0.00	-0.1866		-1.17
NIM(-1)	0.0218		0.18	-0.1898		-1.18	-0.0072		-0.05
NIM(-2)	-0.1616		-1.71	-0.1707		-1.38	-0.1919		-1.31
CIR	**0.0573**	**	4.58	**0.0514**	**	2.62	0.0480		1.68
CIR(-1)	-0.0075		-0.64	0.0237		1.32	0.0353		1.29
CIR(-2)	-0.0155		-1.65	-0.0081		-0.79	-0.0153		-1.34
HS_LN									
TR1_RWA									
Estimation code	Estimated with cross-section fixed effects								
Cross-sections included	29			29			29		
Observations	396			396			391		
Adjusted R^2	0.729			0.698			0.478		
F-Statistics	**22.298**	**		**19.282**	**		**8.155**	**	
Schwarz criterion	-6.201			-5.589			-6.010		
Akaike info criterion	-6.714			-6.102			-6.527		
Durbin-Watson stat	2.032			0.879			1.449		

Notes:
** significant at 1% level, * at 5% level
Variables as defined in Table 6-1 (dependent variables), Table 6-2 and Table 6-3 (explanatory variables)
All equations estimated with cross-section fixed effects. All t-statistics use White diagonal standard errors (d.f. corrected)

Table 6-9 Estimation results for alternative CLE variables (Equation 6-3, 1990-2005)

Eq6_3_1990_2005 Alternative CLEs	1	Signif.	t-Stat	2	Signif.	t-Stat	3	Signif.	t-Stat	4	Signif.	t-Stat	5	Signif.	t-Stat	6	Signif.	t-Stat
Independent	IAE_LN			PRV_LN			NW_LN			IA_A			GW_LN			RC_LN		
Sample Group	**Short sample 1990 - 2005, all banks**																	
Constant	0.0032		0.26	-0.0426		-1.52	-0.0088		-0.49	-0.0504		-1.55	-0.0171		-0.85	-0.0013		-1.78
UNEMP-UNEMP(-1)	0.0185		0.30	-0.1417		-0.72	-0.0844		-0.93	-0.1785		-0.79	-0.0960		-0.90	-0.0105		-1.89
UNEMP(-1)-UNEMP(-2)	0.1124		1.62	0.0457		0.22	0.0675		0.65	0.1578		0.72	0.0343		0.27	**-0.0124**	*	-2.28
UNEMP(-2)-UNEMP(-3)	**0.1380**	*	2.40	0.2857		1.76	**0.1697**	*	1.99	**0.6258**	**	3.75	0.2073		1.96	**0.0098**	*	2.45
RET_SHINDX	-0.0004		-0.06	-0.0071		-0.70	0.0138		1.89	0.0151		1.17	**0.0196**	*	2.13	-0.0001		-0.18
RET_SHINDX(-1)	0.0044		0.90	-0.0112		-1.04	-0.0064		-1.12	-0.0081		-0.58	-0.0097		-1.39	0.0003		0.64
RET_SHINDX(-2)	0.0112		1.86	-0.0095		-0.67	0.0049		0.87	0.0134		0.86	0.0031		0.44	0.0001		0.22
HPGRW	**-0.0125**	*	-2.02	-0.0070		-0.40	-0.0035		-0.44	-0.0293		-1.50	-0.0013		-0.14	-0.0004		-0.60
HPGRW(-1)	-0.0131		-1.55	-0.0182		-0.80	**-0.0231**	*	-2.27	-0.0327		-1.23	**-0.0295**	*	-2.55	-0.0006		-1.00
HPGRW(-2)	-0.0113		-1.45	-0.0225		-1.52	-0.0127		-1.43	**-0.0404**	*	-2.37	-0.0176		-1.60	-0.0009		-1.94
CPIGRW	0.0518		1.05	0.0659		0.71	**0.1468**	**	3.00	0.1785		1.74	**0.1751**	**	3.11	-0.0032		-1.07
CPIGRW(-1)	0.0728		1.84	0.1477		1.14	-0.0094		-0.16	0.2819		1.94	-0.0134		-0.20	0.0067		1.59
CPIGRW(-2)	0.0557		1.33	-0.0271		-0.31	0.0479		1.08	0.0491		0.45	0.0830		1.60	0.0002		0.06
EBTP_AS	**0.9515**	**	5.25	**0.8146**	**	4.02	-0.1101		-0.45	**1.0347**	**	4.38	-0.0815		-0.32	0.0079		1.61
EBTP_AS(-1)	**-0.3803**	**	-3.33	**0.4506**	**	3.18	0.1886		1.20	**0.6280**	**	3.36	0.1761		1.01	0.0041		0.90
EBTP_AS(-2)	-0.0182		-0.15	-0.0239		-0.11	**0.4530**	**	2.97	**-0.8510**	**	-2.92	**0.4338**	**	2.61	-0.0049		-0.67
SH_SYSLNS	**0.0292**	*	2.12	**0.1397**	**	2.98	0.0029		0.16	**0.1756**	**	3.67	0.0025		0.13	**0.0021**	*	2.50
NIM	**-0.3370**	**	-3.00	-0.2037		-1.14	0.2672		1.91	0.0035		0.01	**0.3249**	*	2.45	**0.0225**	**	2.65
NIM(-1)	-0.0102		-0.08	**-0.4178**	*	-2.37	-0.2264		-1.56	**-0.7908**	*	-2.54	-0.2723		-1.62	-0.0069		-0.70
NIM(-2)	0.0724		0.64	0.1228		0.73	**-0.4283**	**	-3.66	0.3857		1.46	**-0.4645**	**	-3.61	**-0.0178**	*	-2.16
CIR	**0.0428**	**	5.42	**0.0777**	**	4.28	0.0035		0.35	**0.1102**	**	4.41	0.0054		0.51	0.0008		1.30
CIR(-1)	-0.0140		-1.44	0.0139		1.13	**0.0618**	**	3.51	**0.0392**	*	2.19	**0.0683**	**	3.99	**0.0010**	*	2.29
CIR(-2)	-0.0120		-1.38	0.0062		0.32	-0.0255		-1.68	-0.0356		-1.49	-0.0252		-1.49	0.0008		1.50
HS_LN	**-0.0155**	*	-2.29	**-0.0332**	**	-4.25	-0.0129		-1.76	**-0.0459**	**	-3.81	-0.0127		-1.63	-0.0004		-1.23
TR1_RWA	**-0.0761**	*	-2.25	-0.0624		-1.50	-0.0312		-0.96	-0.0657		-1.05	0.0058		0.15	0.0022		1.01
Estimation code	Estimated with cross-section fixed effects																	
Cross-sections included	26			26			26			25			21			21		
Observations	266			266			266			251			224			223		
Adjusted R^2	0.802			0.744			0.825			0.835			0.844			0.715		
F-Statistics	**22.919**	**		**16.723**	**		**26.433**	**		**27.301**	**		**28.512**	**		**13.667**	**	
Schwarz criterion	-6.657			-5.853			-6.556			-5.395			-6.494			-12.546		
Akaike info criterion	-7.331			-6.527			-7.229			-6.083			-7.179			-13.233		
Durbin-Watson stat	2.171			0.555			1.724			0.878			1.773			1.218		

Notes:
** significant at 1% level, * at 5% level
Variables as defined in Table 6-1 (dependent variables), Table 6-2 and Table 6-3 (explanatory variables)
All equations estimated with cross-section fixed effects. All t-statistics use White diagonal standard errors (d.f. corrected)

6.4.2.2.1 Stock of provisions or level of impaired assets as dependent variables

The stock of provisions (PRV_LN) represents the accumulation of annual net provisions over the previous years. This means, unlike impaired asset expense as a point in time estimate of new net provisions, PRV_LN is a 'memory' measure of all asset quality problems of the current and past years which have not yet been resolved through write-offs. This characteristic can be detected in the comparatively higher significance of longer lag terms of explanatory variables in Table 6-8. Contemporaneous and one-year lagged changes in unemployment, for instance, have little significance for current levels of provisions which are driven by changes in unemployment in the more distant past (column 2 of Table 6-8). Similar observations can be made for the effect of share price and housing market performance, pre-provision earnings (EBTP_AS) and to some extent also for the other bank-specific explanatory variables.

Impaired assets represent the gross book value of these assets composed of the specific provisions made plus the assets' net realizable value.[92] Accordingly, Table 5-6 in chapter 5 illustrated that the ratio of impaired assets to total assets (IA_A) correlates more strongly with specific provisions (SP_LN) than with overall provisions (PRV_LN). At the same time, this definition reveals the major weakness of IA_A because the extent of impairment will vary between loan types and possibly other factors. This issue is highlighted in Figure 6-1 which shows the 'provision content' of impaired assets for Australian and New Zealand banks through time.[93] In this figure, the specific provisions as % of gross impaired assets range from below 25% to above 45%. These are annual average values across the Australian, respectively New Zealand, banks. It does not reveal the even greater variance across single institutions.

[92] This definition is generally used but some banks (e.g. St. George Bank) do not seem to report all assets as impaired for which specific provisions were shown.

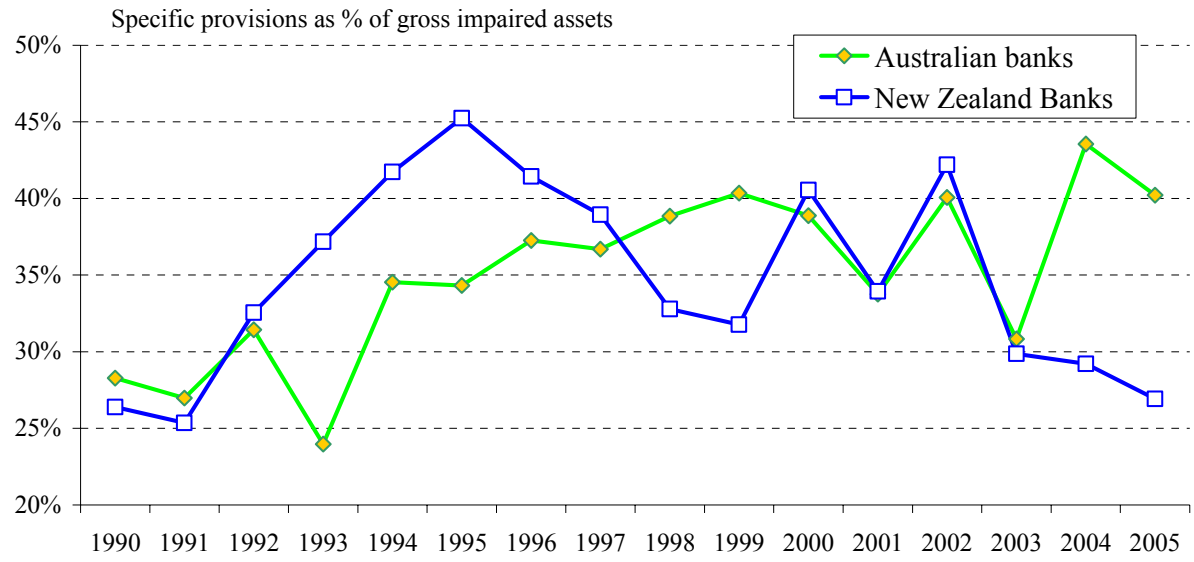
[93] Even though specific provisions as % of impaired assets were comparably low earlier in the period, this is probably due to the fact that banks seem to have used a more extensive definition of impaired asset than later, when purely assets with specific provisions are reported as impaired.

The regression results for IA_A shown in column 4 of Table 6-9 thus reveal great similarity with those for the stock of provisions. One again notices a memory effect because impaired assets may be the consequence of events in earlier periods.

An alternative proxy would be first differences in IA_A which would address the high positive serial correlations present in the pooled equations of this level variable (as indicated by the value of the DW statistics below 1). However, this approach would suffer from uncertainties as to factors which determine the removal of impaired assets from the balance sheet. The same considerations apply to PRV_LN. Serial correlation is also present there but first differences are affected by the erratic nature of write-offs which reduce the level of provisions without actual improvement in credit quality.

In summary, the IAE_LN proxy appears to have superior properties capturing the CLE of a bank compared to the level proxies PRV_LN and IA_A.

Figure 6-1 Specific provision component of gross impaired assets for Australian and New Zealand Banks 1990 to 2005



6.4.2.2.2 Net and gross write-offs (NW_LN, GW_LN) as dependent variables

This section discusses the results of equations estimated for the write-off proxies NW_LN and GW_LN (column 3 in Table 6-8, columns 3 and 5 in Table 6-9).

In theory, GW_LN appears superior for measuring write-offs compared to net write-offs (NW_LN) which is affected by recoveries of debts written off in earlier years. In practice, however, results for the two variables reviewed below are almost identical, given that recoveries represent a relatively small amount.

Chapter 5 identified the typical lag patterns of write-offs following provisioning for bad debt. It was found that approximately 75% of annual provision expense is written off over the subsequent four years. The delayed nature of write-offs shows up in the estimation results of Table 6-8 and Table 6-9. Just as for the level of provisions, longer lags of explanatory variables become more significant relative to the IAE_LN regressions. This can best be seen for the sets of coefficients for ΔUNEMP and EBTP_AS.

6.4.2.2.3 Recoveries of previous year bad debts (RC_LN) as dependent variable

For completeness, column 6 of Table 6-9 also shows the model estimated for debt recoveries (RC_LN). Recoveries are the last stage in the life cycle of a bad debt provision and, whatever effect is found for IAE_LN, should thus appear with even more distant lags. All expected signs should be reversed as recoveries can be seen as negative write-offs. Given that the preferred model contains explanatory variables with a maximum lag of two, it is not surprising that relatively few coefficients in this regression turn out significant.

The interesting result relates to the observation that recoveries in good (bad) times seem to be higher (lower) which is also observed for recovery rates on defaulted bonds. This can be seen by negative coefficients for the contemporaneous and one year lagged coefficients of ΔUNEMP in column 6 of Table 6-9 (one-year lagged coefficient significant at 5% level). This phenomenon can likewise be detected if one employs GDPGRW as the main macro state variable in which

case the contemporaneous coefficient becomes positive (results not shown but available on request).

Time varying characteristics of bond recoveries with some evidence of lower recoveries during recession have been documented by Altman & Kishore (1996, Table 1, p. 58) but Allen & Saunders (1999, p. 17-21), who review the literature on cyclical effects affecting the severity of credit losses, note a general lack of research in this area.[94] Accordingly, further analysis of recovery rates of banks through the cycles could deepen the understanding of this important issue for credit risk modelling.

6.4.3 Assessing the effect of a bank's past expansion

This section explores the effect of a bank's past credit expansion on subsequent credit losses. Intuitively, rapid growth of bank lending is associated with lower monitoring efforts or with a decision to relax credit criteria which is then followed by a deterioration of the quality of loan portfolios.

We conduct our estimates with the preferred formulation of Equation 6-3 to which we add contemporaneous and lagged terms of a bank growth proxy. We pick ASGRW, TOIGRW and DVLNGRW of the five bank growth proxies shown in the earlier Table 6-3. ASGRW provides an absolute balance sheet growth measure while TOIGRW gives an indication of net interest and non-interest income growth. DVLNGRW is chosen as a relative growth proxy. Lags of up to four years of these proxies are added to Equation 6-3. The long lags are chosen because the implications of imprudent lending in times of strong expansion might not become apparent for some time. Impaired asset expense (IAE_LN) is again the dependent variable.

[94] They conclude that "it is unclear whether generally observed higher loss given default (LGD) during a recession are only a bad realization on a fixed loss distribution or represent an actual shift in ex ante LGD".

Table 6-10 Estimation results with bank growth variables added to Equation 6-3

Eq6_3_Growth	1	Signif.	t-Stat	2	Signif.	t-Stat	3	Signif.	t-Stat	4	Signif.	t-Stat	5	Signif.	t-Stat	6	Signif.	t-Stat
Independent	IAE_LN			IAE_LN			IAE_LN			IAE_LN			IAE_LN			IAE_LN		
Sample Group	**Full sample 1980 - 2005, all banks**									**Short sample 1990 - 2005, all banks**								
Constant	**-0.0256**	**	-3.71	**-0.0266**	**	-3.77	**-0.0244**	**	-3.66	0.0034		0.27	0.0028		0.22	0.0061		0.48
UNEMP-UNEMP(-1)	-0.0376		-0.43	-0.0342		-0.37	-0.0139		-0.16	-0.0230		-0.33	0.0778		1.09	0.0174		0.21
UNEMP(-1)-UNEMP(-2)	**0.2442**	**	3.76	**0.1512**	*	2.17	**0.2565**	**	3.87	0.1348		1.93	0.1557		1.90	0.1474		1.79
UNEMP(-2)-UNEMP(-3)	0.0519		1.04	0.1132		1.90	0.0734		1.37	0.0962		1.63	0.1070		1.78	0.1263		1.86
RET_SHINDX	**-0.0144**	*	-2.34	**-0.0126**	*	-2.10	**-0.0147**	*	-2.17	-0.0008		-0.14	-0.0032		-0.60	-0.0007		-0.10
RET_SHINDX(-1)	-0.0017		-0.33	0.0008		0.13	-0.0021		-0.36	0.0065		1.24	0.0029		0.68	0.0062		1.19
RET_SHINDX(-2)	0.0085		1.23	0.0086		1.07	0.0110		1.48	0.0117		1.82	0.0054		1.09	0.0129		1.69
HPGRW	-0.0190		-1.86	-0.0211		-1.88	-0.0198		-1.76	-0.0126		-1.95	**-0.0224**	**	-3.45	**-0.0155**	*	-2.06
HPGRW(-1)	-0.0045		-0.61	-0.0101		-1.35	-0.0043		-0.61	-0.0131		-1.38	-0.0049		-0.63	-0.0112		-1.07
HPGRW(-2)	0.0056		0.79	0.0035		0.52	0.0069		0.98	-0.0090		-1.21	-0.0048		-0.69	-0.0085		-1.09
CPIGRW	0.0005		0.01	-0.0345		-0.60	-0.0029		-0.06	0.0395		0.75	0.0031		0.08	0.0357		0.62
CPIGRW(-1)	0.0641		1.22	0.1111		1.65	0.0716		1.20	0.0623		1.47	0.0760		1.86	0.0728		1.49
CPIGRW(-2)	0.0167		0.63	0.0383		1.23	0.0298		1.22	0.0662		1.38	-0.0243		-0.91	0.0648		1.23
EBTP_AS	**1.0481**	**	10.16	**1.1022**	**	10.64	**1.0506**	**	10.29	**0.9578**	**	5.71	**1.0482**	**	7.55	**0.9518**	**	5.83
EBTP_AS(-1)	**-0.2148**	*	-2.19	-0.1464		-1.27	**-0.1998**	*	-1.99	**-0.4095**	**	-3.66	**-0.4589**	**	-4.11	**-0.3955**	**	-3.85
EBTP_AS(-2)	-0.1719		-1.73	-0.1178		-1.31	-0.1406		-1.51	0.0028		0.02	0.0895		0.73	0.0074		0.06
SH_SYSLNS	**0.0511**	*	2.28	**0.0504**	*	2.33	**0.0488**	*	2.24	**0.0401**	*	2.24	0.0249		1.80	**0.0367**	*	2.09
NIM	-0.1619		-1.24	-0.1327		-0.97	-0.2441		-1.84	**-0.3016**	**	-2.79	-0.2434		-1.96	**-0.3361**	**	-3.05
NIM(-1)	0.0764		0.57	-0.0215		-0.13	0.1352		0.86	0.0116		0.08	0.0866		0.62	-0.0218		-0.13
NIM(-2)	**-0.2233**	*	-2.14	-0.2377		-1.84	**-0.2735**	*	-2.25	0.0647		0.52	-0.1686		-1.16	0.0750		0.55
CIR	**0.0635**	**	4.65	**0.0579**	**	4.72	**0.0631**	**	4.81	**0.0448**	**	5.95	**0.0597**	**	7.19	**0.0443**	**	5.68
CIR(-1)	-0.0080		-0.57	-0.0076		-0.65	-0.0068		-0.50	-0.0162		-1.66	-0.0187		-1.93	-0.0176		-1.80
CIR(-2)	**-0.0193**	*	-2.02	-0.0126		-1.33	**-0.0197**	*	-2.04	-0.0130		-1.43	-0.0164		-1.65	-0.0123		-1.36
HS_LN										**-0.0170**	*	-2.37	**-0.0175**	*	-2.42	**-0.0173**	*	-2.42
TR1_RWA										**-0.1059**	*	-2.52	-0.0657		-1.82	**-0.1003**	*	-2.39
ASGRW	-0.0028		-1.10							**-0.0027**	*	-2.11						
ASGRW(-1)	-0.0015		-0.73							-0.0018		-0.80						
ASGRW(-2)	0.0034		1.45							0.0026		1.77						
ASGRW(-3)	**0.0042**	*	2.17							0.0035		1.85						
ASGRW(-4)	**0.0068**	**	2.75							**0.0069**	*	2.29						
TOIGRW				-0.0027		-1.00							-0.0042		-1.74			
TOIGRW(-1)				-0.0025		-0.77							-0.0041		-1.03			
TOIGRW(-2)				-0.0003		-0.17							0.0011		0.66			
TOIGRW(-3)				0.0016		0.70							0.0010		0.59			
TOIGRW(-4)				**0.0047**	*	2.37							**0.0042**	*	2.42			
DVLNGRW							-0.0016		-0.53							-0.0022		-1.33
DVLNGRW(-1)							-0.0013		-0.65							-0.0012		-0.59
DVLNGRW(-2)							**0.0056**	*	2.07							0.0030		1.83
DVLNGRW(-3)							**0.0041**	*	2.11							0.0029		1.61
DVLNGRW(-4)							**0.0083**	**	2.65							0.0068		1.71
Estimation code	Estimated with cross-section fixed effects																	
Cross-sections included	28			27			28			25			25			25		
Observations	362			348			358			256			264			254		
Adjusted R^2	0.748			0.766			0.758			0.817			0.809			0.814		
F-Statistics	**20.831**	**		**22.462**	**		**21.663**	**		**22.438**	**		**22.080**	**		**21.926**	**	
Schwarz criterion	-6.088			-6.147			-6.112			-6.606			-6.598			-6.579		
Akaike info criterion	-6.680			-6.745			-6.708			-7.354			-7.329			-7.331		
Durbin-Watson stat	2.119			2.099			2.117			2.192			2.121			2.158		

Notes: ** significant at 1% level, * at 5% level

Variables as defined in Table 6-1 (dependent variable), Table 6-2 and Table 6-3 (explanatory variables)

All equations estimated with cross-section fixed effects. All t-statistics use White diagonal standard errors (d.f. corrected)

Table 6-10 reports on the results of these estimates. Columns 1 to 3 are separate estimates for each of the above growth proxies for the 1980 to 2005 period. Columns 4 – 6 repeat estimates for the shorter 1990 to 2005 period. One notes that around 10% of observations are lost for the ASGRW regression (Table 6-10, column 1) compared to the estimates without asset growth proxies in column 1 of the earlier Table 6-8. Even more observations are lost for estimates with the TOIGRW and DVLNGRW proxies. This can be explained by the many banks in the sample with shorter data series, particularly earlier in the observation period. Accordingly, fewer observations are lost for the short period model in columns 4-6 as the structure of the Australasian banking industry became more settled.

An interesting result emerges in Table 6-10 as signs and significance of the coefficients are affected by the lags considered. Contemporaneous growth appears to be associated with lower credit losses (negative coefficients). On the other hand, terms lagged 2 years and more generally have the expected unfavourable effect (positive coefficient). These positive coefficients are moreover generally significant. This pattern is most pronounced for the ASGRW and DVLNGRW proxies. One could thus conclude that at the time of the expansion, management has a too optimistic judgment of the true risks associated with their strategy, an assessment which has to be corrected in subsequent years.

Our findings appear to explain some of the controversy in the literature regarding the effect of past credit growth as these studies typically look at one or just two lags of the growth parameter. Pain (2003, p. 29), for instance, discovered negative and in some cases significant coefficients for his one-period lagged growth proxy even though he notes that the coefficients are "very small". Likewise Cavallo & Majnoni (2001, p. 20) state that "the loan growth rate has a negative sign implying that provisions tend to decrease as a share of total assets when the increase of new lending and the decrease of monitoring tend to reinforce the risk exposure of banks portfolios." Note that Cavallo & Majnoni (2001) use contemporaneous loan growth as their proxy. This means both Pain (2003) and Cavallo & Majnoni (2001) have apparently

measured effects of current lending growth as opposed to the impact of banks 'buying market share' at the expense of subsequent asset quality as studied in work of Clair (1992).

Our results are similar to Salas & Saurina (2002, Table 2, p. 218) who also study lags up to 4 years and generally find negative coefficients for shorter lags but positive coefficients for longer lags of asset and branch network growth. While partially significant, their results are less clear-cut since they use an alternative CLE proxy in the form of a 'problem loan ratio', corresponding to the level of impaired assets IA_A in this thesis. As mentioned above, this level variable is likely to provide a blurred picture of the credit events in a particular period since the level of impaired assets will be the consequence of loan defaults and debt workouts possibly many years ago.

6.4.4 Formal test of country-specific effects

Table 6-6 showed estimates for the separate sub-samples of Australian and New Zealand banks. This section sets out to test country-specific effects more formally. For this purpose, the preferred model Equation 6-3 is modified by the addition of a country dummy variable (AU_DMY) set to one for Australian banks and zero for New Zealand banks. This is to test for a fixed effect across all Australian banks relative to their New Zealand counterparts in the sample. Moreover, interaction terms are added to explore whether regression coefficients found in the earlier models are significantly different for banks in the two countries. If they were significant, it would be questionable whether data from both countries should be used in a pooled sample. This modified model is shown as Equation 6-4 below.

Equation 6-4 Preferred model 1980 to 2005 with country-specific interaction terms

$$
\begin{aligned}
CLE_{i,t} &= Const \\
&+ \beta_{2.0}\Delta UNEMP_{i,t} + \beta_{2.1}\Delta UNEMP_{i,t-1} + \beta_{2.2}\Delta UNEMP_{i,t-2} \\
&+ \beta_{4.0}RET\_SHINDX_{i,t} + \beta_{4.1}RET\_SHINDX_{i,t-1} + \beta_{4.2}RET\_SHINDX_{i,t-2} \\
&+ \beta_{5.0}HPGRW_{i,t} + \beta_{5.1}HPGRW_{i,t-1} + \beta_{5.2}HPGRW_{i,t-2} \\
&+ \beta_{6.0}CPIGRW_{i,t} + \beta_{6.1}CPIGRW_{i,t-1} + \beta_{6.2}CPIGRW_{i,t-2} \\
&+ \beta_{7.0}EBTP\_AS_{i,t} + \beta_{7.1}EBTP\_AS_{i,t-1} + \beta_{7.2}EBTP\_AS_{i,t-2} \\
&+ \beta_{8}SH\_SYSLNS_{i,t} \\
&+ \beta_{9.0}NIM_{i,t} + \beta_{9.1}NIM_{i,t-1} + \beta_{9.2}NIM_{i,t-2} \\
&+ \beta_{10.0}CIR_{i,t} + \beta_{10.1}CIR_{i,t-1} + \beta_{10.2}CIR_{i,t-2} \\
&+ \beta_{11}AU\_DMY_{i} \\
&+ \beta_{2x.0}AU\_DMY_{i} \times \Delta UNEMP_{i,t} + \beta_{2x.1}AU\_DMY_{i} \times \Delta UNEMP_{i,t-1} \\
&\qquad + \beta_{2x.2}AU\_DMY_{i} \times \Delta UNEMP_{i,t-2} \\
&+ \beta_{4x.0}AU\_DMY_{i} \times RET\_SHINDX_{i,t} + \beta_{4x.1}AU\_DMY_{i} \times RET\_SHINDX_{i,t-1} \\
&\qquad + \beta_{4x.2}AU\_DMY_{i} \times RET\_SHINDX_{i,t-2} \\
&+ \beta_{5x.0}AU\_DMY_{i} \times HPGRW_{i,t} + \beta_{5x.1}AU\_DMY_{i} \times HPGRW_{i,t-1} \\
&\qquad + \beta_{5x.2}AU\_DMY_{i} \times HPGRW_{i,t-2} \\
&+ \beta_{6x.0}AU\_DMY_{i} \times CPIGRW_{i,t} + \beta_{6x.1}AU\_DMY_{i} \times CPIGRW_{i,t-1} \\
&\qquad + \beta_{6x.2}AU\_DMY_{i} \times CPIGRW_{i,t-2} \\
&+ \beta_{7x.0}AU\_DMY_{i} \times EBTP\_AS_{i,t} + \beta_{7x.1}AU\_DMY_{i} \times EBTP\_AS_{i,t-1} \\
&\qquad + \beta_{7x.2}AU\_DMY_{i} \times EBTP\_AS_{i,t-2} \\
&+ \beta_{8x}AU\_DMY_{i} \times SH\_SYSLNS_{i,t} \\
&+ \beta_{8x.0}AU\_DMY_{i} \times NIM_{i,t} + \beta_{8x.1}AU\_DMY_{i} \times NIM_{i,t-1} \\
&\qquad + \beta_{8x.2}AU\_DMY_{i} \times NIM_{i,t-2} \\
&+ \beta_{9x.0}AU\_DMY_{i} \times CIR_{i,t} + \beta_{9x.1}AU\_DMY_{i} \times CIR_{i,t-1} \\
&\qquad + \beta_{9x.2}AU\_DMY_{i} \times CIR_{i,t-2} \\
&+ u_{i,t}
\end{aligned}
$$

Preferred model Equation 6-3

Country fixed effect dummy

Interaction terms macro factors

Interaction terms bank specific factors

Error term

Where
AU_DMY_i is a dummy variable set to one for Australian banks and zero for New Zealand banks.
$CLE_{i,t}$ is the major CLE variable IAE_LN (impaired asset expense as % of loans) for bank i at time t and the explanatory variables on the right hand side of the equation are as explained in Table 6-2 and Table 6-3.

Results of estimating versions of Equation 6-4 are shown in Table 6-11. The first specification in column 1 of Table 6-11 introduces just a country-specific intercept which is found to be significant and positive. This means that the level of provisioning has, on average, been significantly higher for Australian banks. This is not unexpected since the New Zealand banking sector has, for the most part, been dominated by Australian parent banks which have conducted their more risky commercial and international lending through their head banks. This effect possibly shows up here because there is a limited choice of proxies to control for loan portfolio composition.

Next, formulations including interaction terms are considered. These results are shown in columns 2 to 4 of Table 6-11. In general, there are few individual country-specific effects present for the majority of proxies, in particular for bank-specific variables. Moreover, the country-specific intercept (coefficient of AU_DMY) becomes insignificant in regressions including all interaction terms (Table 6-11, column 4).

There are some notable exceptions, however, where one observes significant interaction terms. These mainly concern the impact of macro-variables on bank credit loss experience.

Firstly, changes in unemployment appear to have different effects on Australian and New Zealand banks (Table 6-6, columns 2 and 4). This is reflected in a significant positive coefficient for the interaction term of contemporaneous ΔUNEMP (Table 6-11, column 4). This confirms our observation in the earlier discussion of section 6.4.1.3 that effects of macro state variables seemed slightly more delayed for the New Zealand compared to the Australian sample. Moreover, results for New Zealand were found to be less pronounced which could be due to lower test power resulting from fewer observations, making it harder to reject the null hypothesis of a zero effect.

The second difference between Australia and New Zealand relates to the effect of the asset price shock proxies. While the contemporaneous effect of RET_SHINDX has been similar in both countries, booming share markets have led to significantly higher provisioning at Australian banks in subsequent years (first and second lag interaction terms are significantly positive). This

effect is not noticeable for New Zealand banks. Housing price developments have the expected effect on credit losses in Australia (negative significant coefficients of contemporaneous term for HPGRW) while this effect is again hardly detectable for the New Zealand banks.

For the bank-specific variables, there is only one significant interaction term for the two-year lagged earnings proxy of EBTP_AS. This confirms our observation of different income smoothing patterns for Australian versus New Zealand banks (as discussed in section 6.4.1.4).

All in all, one can nevertheless conclude that the pooling of Australian and New Zealand data appears to be a sensible approach. The differences observed mainly relate to timing differences for impacts of macro variables but there do not appear to be fundamentally different effects present.

Table 6-11 Estimation with country effects (Equation 6-4)

Eq6_4_1980_2005	1	Signif.	t-Stat	2	Signif.	t-Stat	3	Signif.	t-Stat	4	Signif.	t-Stat
Independent	IAE_LN			IAE_LN			IAE_LN			IAE_LN		
Sample Group	**1980-2005, all banks**											
Constant	**-0.0239**	**	-4.77	**-0.0275**	**	-5.61	**-0.0136**	*	-2.35	**-0.0185**	**	-2.65
UNEMP-UNEMP(-1)	0.0825		0.99	-0.1846		-1.17	0.1073		1.24	-0.1983		-1.18
UNEMP(-1)-UNEMP(-2)	**0.1335**	*	2.57	0.1294		1.50	**0.1083**	*	2.02	0.0807		0.80
UNEMP(-2)-UNEMP(-3)	**0.0856**	*	2.00	0.0710		1.16	**0.0941**	*	2.10	0.0958		1.32
RET_SHINDX	**-0.0141**	*	-2.19	**-0.0193**	*	-2.02	**-0.0152**	*	-2.29	-0.0200		-1.93
RET_SHINDX(-1)	0.0007		0.17	**-0.0093**	*	-2.25	0.0007		0.20	-0.0078		-1.83
RET_SHINDX(-2)	0.0070		1.09	0.0008		0.15	0.0070		1.08	-0.0009		-0.17
HPGRW	-0.0138		-1.56	0.0095		0.96	-0.0142		-1.54	0.0011		0.09
HPGRW(-1)	0.0014		0.20	0.0094		0.80	0.0041		0.58	0.0102		0.88
HPGRW(-2)	0.0007		0.11	-0.0031		-0.23	-0.0036		-0.61	-0.0030		-0.22
CPIGRW	-0.0049		-0.12	-0.0406		-0.48	-0.0043		-0.10	-0.0639		-0.67
CPIGRW(-1)	0.0435		0.83	0.0903		1.10	0.0447		0.86	0.1055		1.20
CPIGRW(-2)	0.0212		1.17	0.0355		0.82	0.0221		1.15	0.0530		0.93
EBTP_AS	**1.0840**	**	12.49	**1.0841**	**	11.36	**1.0269**	**	10.96	**1.0419**	**	7.24
EBTP_AS(-1)	-0.1679		-1.85	**-0.1837**	*	-2.06	-0.1319		-1.78	**-0.1668**	*	-2.18
EBTP_AS(-2)	-0.1511		-1.89	-0.1492		-1.88	**-0.3167**	**	-3.88	**-0.2929**	**	-3.40
SH_SYSLNS	0.0088		1.24	0.0122		1.72	0.0159		0.82	0.0179		0.91
NIM	**-0.2318**	*	-1.97	**-0.2779**	*	-2.29	-0.1252		-0.46	-0.2185		-0.88
NIM(-1)	0.0362		0.31	0.0887		0.75	-0.0333		-0.25	0.0678		0.48
NIM(-2)	**-0.1567**	*	-2.09	-0.1498		-1.87	-0.0900		-0.93	-0.1050		-0.98
CIR	**0.0609**	**	4.68	**0.0590**	**	4.58	**0.0630**	**	2.94	**0.0583**	**	3.93
CIR(-1)	-0.0068		-0.57	-0.0072		-0.60	-0.0197		-0.79	-0.0216		-1.06
CIR(-2)	-0.0152		-1.87	-0.0128		-1.51	-0.0221		-1.55	-0.0129		-0.94
AU_DMY	**0.0030**	**	3.63	**0.0071**	**	3.59	-0.0096		-1.32	-0.0028		-0.33
AU_DMY*(UNEMP-UNEMP(-1))				**0.3997**	*	2.30				**0.4419**	*	2.39
AU_DMY*(UNEMP(-1)-UNEMP(-2))				0.0690		0.62				0.0853		0.70
AU_DMY*(UNEMP(-2)-UNEMP(-3))				**0.1573**	*	1.97				0.1261		1.44
AU_DMY*RET_SHINDX				-0.0003		-0.03				0.0010		0.09
AU_DMY*RET_SHINDX(-1)				**0.0226**	**	3.82				**0.0215**	**	3.60
AU_DMY*RET_SHINDX(-2)				**0.0248**	**	3.21				**0.0257**	**	3.00
AU_DMY*HPGRW				**-0.0475**	**	-3.73				**-0.0366**	*	-2.55
AU_DMY*HPGRW(-1)				-0.0028		-0.18				-0.0001		-0.01
AU_DMY*HPGRW(-2)				0.0100		0.65				0.0045		0.29
AU_DMY*CPIGRW				-0.0160		-0.18				0.0173		0.17
AU_DMY*CPIGRW(-1)				0.0499		0.55				0.0241		0.25
AU_DMY*CPIGRW(-2)				-0.0939		-1.79				-0.1074		-1.68
AU_DMY*SH_SYSLNS							-0.0095		-0.50	-0.0086		-0.42
AU_DMY*EBTP_AS							0.0439		0.28	0.0175		0.09
AU_DMY*EBTP_AS(-1)							-0.2458		-1.56	-0.2247		-1.46
AU_DMY*EBTP_AS(-2)							**0.4263**	**	3.42	**0.3994**	**	3.19
AU_DMY*NIM							-0.0731		-0.21	0.0177		0.06
AU_DMY*NIM(-1)							0.1011		0.44	-0.0024		-0.01
AU_DMY*NIM(-2)							-0.1331		-0.70	-0.0966		-0.54
AU_DMY*CIR							0.0068		0.26	0.0113		0.56
AU_DMY*CIR(-1)							0.0100		0.37	0.0104		0.45
AU_DMY*CIR(-2)							0.0043		0.25	-0.0054		-0.32
Cross-sections included	29			29			29			29		
Observations	396			396			396			396		
Adjusted R^2	0.717			0.728			0.725			0.734		
F-Statistics	**44.596**	**		**31.174**	**		**32.613**	**		**25.207**	**	
Schwarz criterion	-6.490			-6.379			-6.395			-6.279		
Akaike info criterion	-6.732			-6.741			-6.737			-6.742		
Durbin-Watson stat	1.790			1.849			1.823			1.854		

Notes: ** significant at 1% level, * at 5% level

AU_DMY is a dummy variable set to one for Australian banks and zero for New Zealand banks. Other variables as referenced in Equation 6-4. All t-statistics use White diagonal standard errors (d.f. corrected)

6.5 Chapter summary and conclusions

This chapter presents and discusses the estimation results for a variety of models of impaired asset expense and alternative CLE variables for the Australasian banking system.

Impaired asset expense as % of loans (IAE_LN) is chosen as the major dependent CLE variable because it measures estimated credit losses in a particular period and it is a data item reported by banks in Australasia for most of the 1980 to 2005 observation period. Accordingly, the model is primarily derived and estimated with this CLE variable but a preferred model form is then also estimated with alternative CLE proxies.

The results confirm that economic cycles and changes in asset prices are an important influence on loan loss provisioning. Of the three state variables considered, the change in unemployment was found to possess superior explanatory power. The returns on the respective national share markets show the expected negative sign, with coefficients that are mostly significant. The performance of the housing market also has an impact even though this phenomenon is mainly observed for the sub-sample of Australian banks. Rises in CPI appear to drive increases of provisions in the banking system with a delay of two years.

The most significant results for bank specific variables are found for the pre-provision earnings proxy (EBTP_AS). This is in line with findings in previous literature lending support to the income smoothing hypothesis which postulates that banks tend to increase (decrease) discretionary provisions in good (weak) years. Efficient banks, as measured by the cost-income ratio (CIR), show distinctively lower provisions. This implies that efficient banks also have their credit risk management under control. The comparative size of a bank (SH_SYSLNS) and the net interest margin (NIM) also turned out as significant control parameters. Larger banks show, on average, higher provisions and wider net interest margin (a characteristic of smaller retail banks / housing lenders) brings about lower provisioning requirements.

Two additional specific risk proxies became available with the introduction of the Basel capital accord in 1988 as banks started reporting capital adequacy ratios. One finds that better

capitalized banks (as measured by the Basel I risk adjusted capital ratio) and banks with lower risk housing loans have, on average, suffered lower credit losses.

To gauge country specific effects, separate estimates are conducted for the sub-sample of Australian, respectively New Zealand, banks. One generally finds similar dynamics for both countries which provides justification for pooling all Australasian banks into one sample. On average, Australian banks have shown higher provisions. The New Zealand banking sector has, for the most part, been dominated by Australian parent banks which apparently have conducted their more risky commercial and international lending through their head banks.

A special investigation is conducted on the effects of past expansion, which makes it meaningful to include bank past growth proxies over many lags. It is found that faster growth is reflected in higher subsequent credit losses with a delay of 2 to 3 years as expanding banks seem to loosen lending criteria but are not able to accurately appraise required provision at the time.

The estimates for alternative CLE variables reveal the 'memory character' of both the stock of provisions (PRV_LN) and impaired assets (IA_A), two level variables which are affected by credit events possibly many years back. Accordingly, the effect of changes in credit quality is less apparent and somewhat delayed in the results for these CLEs. Both results for net and gross write-off proxies are very similar. One observes the lagged nature of write-offs which, even though more certain than initial credit provisions, will be affected by earlier year credit provisions.

6.6 Chapter appendix tables

Table 6-12 Correlations between macro variables Australia

	CPIGRW_AU	GDPGRW_AU	HPGRW_AU	LIAB_INC_AU	REALINTGRW_AU	RET_ASX	UNEMP_AU	ΔUNEMP_AU
CPIGRW_AU	1.000							
GDPGRW_AU	-0.331	1.000						
HPGRW_AU	0.109	0.293	1.000					
LIAB_INC_AU	-0.565**	0.089	-0.018	1.000				
REALINTGRW_AU	-0.028	0.496*	0.071	-0.029	1.000			
RET_ASX	-0.061	0.210	-0.051	0.003	-0.145	1.000		
UNEMP_AU	0.042	-0.362	-0.208	-0.659**	-0.295	0.020	1.000	
ΔUNEMP_AU	0.328	-0.807**	-0.318	-0.232	-0.275	-0.430*	0.402*	1.000

Note:
** significant at 1% level, * at 5% level.
Correlations between non-pooled country series

Table 6-13 Correlations between macro variables New Zealand

	CPIGRW_NZ	GDPGRW_NZ	HPGRW_NZ	LIAB_INC_NZ	REALINTGRW_NZ	RET_NZX	UNEMP_NZ	ΔUNEMP_NZ
CPIGRW_NZ	1.000							
GDPGRW_NZ	-0.151	1.000						
HPGRW_NZ	0.603**	0.369	1.000					
LIAB_INC_NZ	-0.642**	0.208	-0.088	1.000				
REALINTGRW_NZ	0.177	0.369	0.348	-0.253	1.000			
RET_NZX	0.277	0.348	0.357	-0.107	-0.035	1.000		
UNEMP_NZ	-0.620**	-0.298	-0.707**	-0.060	-0.361	-0.330	1.000	
ΔUNEMP_NZ	0.192	-0.605**	-0.194	-0.447*	0.293	-0.253	0.145	1.000

Note:
** significant at 1% level, * at 5% level.
Correlations between non-pooled country series.

Table 6-14 Correlations between selected bank-specific variables

	ASGRW	CIR	EBTP_AS	NIM	SH_ SYSLNS	HS_LN	TR1_RWA
ASGRW	1.000						
CIR	0.030	1.000					
EBTP_AS	-0.083	-0.362**	1.000				
NIM	0.148**	0.041	0.371**	1.000			
SH_SYSLNS	-0.058	-0.288**	0.087	-0.218**	1.000		
HS_LN	0.031	0.028	-0.228**	-0.059	-0.313**	1.000	
TR1_RWA	0.025	-0.188**	0.055	0.278**	-0.386**	0.421**	1.000

Note:
** significant at 1% level, * at 5% level.
Correlations for balanced pooled sample (pairwise missing deletions)

Table 6-15 Contemporaneous / lagged correlations of GDPGRW and ΔUNEMP with selected bank-specific variables

	GDPGRW	GDPGRW(-1)	GDPGRW(-2)	ΔUNEMP	ΔUNEMP(-1)	ΔUNEMP(-2)
ASGRW	0.028	0.035	0.040	-0.023	-0.014	0.027
CIR	-0.060	-0.069	-0.085	0.121**	0.135**	0.097*
EBTP_AS	-0.112*	-0.070	-0.015	0.138**	0.043	-0.021
NIM	-0.137**	-0.120**	-0.085	0.170**	0.155**	0.142**
SH_SYSLNS	0.002	0.001	0.001	-0.038	-0.036	-0.030
HS_LN	0.131*	0.052	-0.054	-0.196**	-0.135*	0.007
TR1_RWA	0.175**	0.084	0.006	-0.190**	-0.135*	-0.054

Note:
** significant at 1% level, * at 5% level.
Correlations for balanced pooled sample (pairwise missing deletions)

7 Thesis summary and conclusions

This thesis studies the key drivers of credit losses in the Australasian banking system. An understanding of such factors is of importance for financial industry and regulatory authorities alike. Banks require this information for managing their credit risk exposure while agencies in charge of macro-prudential supervision are concerned with parameters affecting overall system stability.

7.1 The data base

This thesis compiles, presents and analyses a comprehensive data sample of financial and credit loss information of 23 Australian and 10 New Zealand banks for the period 1980 to 2005. The sample includes all registered banks operating during this time with activities in retail and/or rural banking but excludes institutions that are predominantly wholesale and/or merchant banks. Because databases of third party providers do not have the required coverage and do not supply information so far back, the data needs to be extracted from original financial accounts published by banks. The observation period allows a data analysis encompassing the major banking system crises in both New Zealand and Australia which occurred in the late 1980s and early 1990s.

The thesis illustrates how reporting of credit provisioning and loss information has been subject to great variations both amongst banks and through time. Initial reporting is thinner with often just the stock of provisions shown. Later reports benefit from a wider range of credit loss related information including the level of impaired assets, geographical and sectoral break-downs of provisions, write-offs and recoveries. One notes that exchange listed banks generally provide a superior disclosure quality compared to public-sector owned and cooperative type institutions which were numerous and often key players of the banking system in the first half of the observation period.

This heterogeneity requires a standardized way of capturing this information. For this purpose, we propose a typology in chapter 4 which classifies (1) the reporting of stock of

provisions, (2) the type of transactions shown in the provisioning accounts, (3) the nature of accounting for write-offs and (4) the way recoveries of claims previously written off are shown. A total of 27 reporting types are identified which allows extracting these data along equivalent informational content into a standardized template. The typology and data template developed here should be equally useful for application in other geographic areas. The study of credit risks requires long data series typically not available from standard sources and this is where the techniques developed in this thesis will provide value to a range of researchers.

7.2 The principal model and evaluation of dependent variables

We propose a principal model which represents a reduced form approach to explaining banks' credit losses. Thus we study potential drivers of credit losses without modelling the precise mechanism by which these proxies affect credit losses. The advantage of this approach is the ability to include a wider range of explanatory variables whose actions on the dependent variable are often complex and indirect.

An important issue in the formulation of this model relates to the choice of an appropriate proxy to track credit losses of a bank. Candidates include flow parameters such as impaired asset expense and write-offs and level variables such as the stock of provisions (both general and specific component) and impaired assets. Virtually no comparative analysis on the properties of these proxies has been conducted by existing literature even though our investigation reveals that, among other things, some of them correlate rather poorly. This means one would have to exercise caution when comparing results of previous research if they have employed different dependent CLE proxies.

It is found that credit loss experience (CLE) ratios using balance sheet items like total assets or loans as a denominator to be appropriate CLE proxies. They are preferred over ratios based on income items (such as total operating income) because they are less sensitive to the vagaries of the denominator which is comparably large in the case of total loans or assets.

Overall, the ratio of impaired assets as % of loans (IAE_LN) seems to have the most desirable properties for the empirical research undertaken, despite not being a completely accurate picture of credit losses in an ex-post sense. Advantages of this ratio are that it gauges perceived credit losses at the time of the actual event, it has good data availability throughout the observation period and it is widely used in the literature which allows for a comparison of results.

7.3 Empirical results

The principal model explains credit losses as a function of both aggregate macro and bank-specific explanatory variables. For the empirical investigation it is formulated in the form of a distributed lag (DL) model which captures the dynamics of the system through the inclusion of contemporaneous and lagged terms of the explanatory variables.

The results confirm results of earlier literature for other geographic regions that economic cycles and changes in asset prices are an important influence on loan loss provisioning. Of the state of the economy parameters, changes in unemployment show a slightly better explanatory power than GDP growth and level of unemployment.

A proxy tracking the return of share markets is included as an asset price shock proxy. Results show negative and partially significant coefficients but it becomes less significant for estimates over a shorter observation period 1990 to 2005 where share markets have experienced a smoother run (unlike the 1987 share market crash). Another proxy tracking the performance of markets is the housing price index. Overall it has slightly poorer explanatory power than the share market but shows higher significance in estimates for the Australian sub-sample. A further macro variable, lagged CPI growth, has a significant negative long-term impact on a bank's CLE, raising credit losses.

Bank-specific variables include the pre-provision & tax earnings proxy (EBTP_AS) which is significant and positive, meaning that Australasian banks appear to use bad debt provisions for income smoothing activities.

Further bank-specific variables control for institution specific characteristics. There is a size proxy with a positive coefficient, indicating that larger banks are provisioning more on average. The net income margin, both contemporaneous and lagged, has a negative coefficient, i.e. banks with higher interest margins suffer lower credit losses.

The analysis also finds significantly positive contemporaneous coefficients of the cost-income ratio proxies (CIR), indicating that high and increasing cost-income ratios (lower operational efficiencies) are associated with higher levels of impaired assets. The results lend support to the hypothesis that operational problems at banks (high CIR) go hand in hand with poor credit risk management and thus higher loan losses. Conversely, they seem to reject the alternative theory postulating that extensive costly monitoring (high CIR) leads to better asset quality (i.e. negative coefficient for CIR).

For estimates of the shorter 1990 to 2005 sample period there is the choice of two further bank-specific variables which only became available with the introduction of the Basel capital accord in 1988. One finds that better capitalized banks (Basel I risk adjusted capital ratio) and banks with lower risk housing loans have, on average, suffered lower credit losses. All these results are intuitive since retail banks focussed on residential housing lending are typically smaller, have a greater reliance on balance sheet business (net interest margin) and benefit from preferential treatment of their assets under Basel I (lower risk weights for housing loans).

Clear results are found for the effects of past bank expansion where our test design includes bank past growth parameters with up to four (annual) lags. Faster growth is reflected in higher subsequent credit losses with a delay of 2 to 3 years as expanding banks appear to loosen lending criteria but are not able to accurately appraise required provision at the time. By contrast, previous literature like Cavallo & Majnoni (2001) and Pain (2003) had found inconclusive results when they just included single short lagged growth proxies into their equations. Our approach could thus help detect similar effects of rapid bank growth in other international bank samples.

The sample includes banks from both Australia and New Zealand whose credit loss patterns could be different. One finds generally similar dynamics for both countries which provides justification for pooling banks into one sample. On average though, Australian banks have shown higher provisions than New Zealand banks. The New Zealand banking sector has, for the most part, been dominated by Australian parent banks which have conducted their more risky commercial and international lending through their head banks.

An important part of the empirical investigation relates to estimating the models for alternative CLE proxies instead of the main proxy impaired asset expense as discussed above. The analysis reveals the 'memory character' of level CLE variables such as stock of provisions and impaired assets which may be affected by credit events many years into the past. Accordingly, the effect of explanatory variables appears less distinct and also somewhat delayed. The delayed nature of both net and gross write-off proxies are even more pronounced. While they may provide a more accurate picture of actual ex-post credit losses, the discretion of banks of when to derecognize lost claims limits the sensible use of write-off proxies in such models.

7.4 Reflections on contributions of this thesis and further directions of research

The contributions of this thesis are best placed into two key areas. The first one relates to the Australasian focus of this research which is the first of its kind in terms of the comprehensiveness of the bank sample and the length of the time period studied. Secondly, there are findings in this thesis which may potentially find applications for comparable research in other banking markets.

The dynamic of credit losses in the Australasian banking system is a comparably little researched area. Either this market has been covered as part of a global, more general study (e.g. in Bikker & Hu, 2001; Bikker & Metzemakers, 2003; Cavallo & Majnoni, 2001) or as part of some specific study on aspects of loan quality in Australasia, e.g. APRA's investigation into the relative riskiness of loan assets in the various Basel I risk buckets (Esho & Liaw, 2002). The

time period covered in all of the above studies has never exceeded 10 years but for insights into the nature of credit cycles. Longer periods, such as the 26 years used in this thesis, appear more sensible. Ideally the observation horizon should be extended even further into the past. As specific reporting of credit losses is virtually non-existent in those times, future research would thus have to identify suitable credit loss proxies, e.g. derived from general bank profitability, to gain insights into longer-term dynamics of credit losses in banking.

To study such long time horizons, it is necessary to compile a dedicated database. Earlier research has mostly relied on external data providers to obtain both financial and credit loss related information. While this saves time, it leaves control over how these data are extracted to a third party and, more importantly, such data would not generally be available before about 1990. This thesis turns to the original published accounts of the comprehensive sample of Australasian banks. It develops and implements a methodology of extracting the credit loss data with equivalent informational content, a method which could find applications in other banking markets as well. The main benefit is a richer selection of data items related to the credit loss experience of the banks. This then allows for a comparative analysis of the many potential CLE dependent variables. Results indicate that one has to exercise caution when comparing such studies using differing definitions of CLE. Continued research might thus look into relationship patterns of such CLE proxies using larger, possibly global data samples. In particular, one might seek methods of extracting loan loss recovery rates from such data as this parameter is a key input of credit risk models.

Further avenues of research lie in the continued refinement of the modelling approach applied in this thesis. We pointed to the advantage of our reduced form model approach which provides the possibility of including a range of explanatory variables whose actions on the dependent variable are often complex and indirect. It has, however, its limitations as it does not explicitly link the drivers of loan losses to the loan loss experience itself. This issue emerges when we compare our results with those for other banking markets. We generally observe qualitatively similar effects of key macro and bank-specific variables but their significance

and/or the timing can often be rather different. This means our approach is very suitable for an overall perspective of loss drivers but for more specific research questions into the mechanism of how slower economic growth, for instance, translates into credit losses one will need structural models. The standard structural credit risk models derived from Merton (1974) discussed in reference works such as Saunders & Allen (2002), Crouhy, Galai, & Mark (2001) or Schmid (2000) will provide a starting point.

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