Who is the Supervisor of New Zealand Banks?

William R. Wilson[1]

Lawrence C. Rose

John F. Pinfold

Department of Commerce

Massey University

Auckland, New Zealand.

2009

[1] Contact Author: w.r.wilson@massey.ac.nz, preliminary work please do not quote.

Abstract

The aim of this research has been to assess the effectiveness of New Zealand's regulation of registered banks. The New Zealand disclosure regime is unique, with the supervision of financial institutions the largely the responsibility of individual depositors. There is no direct prudential supervision of deposit taking institutions by any statutory body with the RBNZ relying on public disclosure to monitor banks. Instead, the New Zealand disclosure regime relies on public disclosure of information to moderate possible excessive risk taking by deposit takers. The government, until recently, offered no guarantees either explicit or implicit, and no system of deposit insurance was in place to protect depositors. The government's role was to ensure markets were informationally efficient, with depositors provided with sufficient information to enable them to make appropriate risk return decisions.

We find the 1996 disclosure regime was effective in moderating excessive risk taking in registered banks, with evidence of self-discipline being apparent. The results obtained in this research should give confidence to the New Zealand government, allowing them to lift the temporary depositor guarantee scheme when world credit markets regain some normality. More generally, the New Zealand 1996 registered bank disclosure regime provides evidence of the effectiveness of disclosure, in a market essentially free from regulatory distortions. Under these conditions, market-discipline is a viable alternative to regulator supervision for the moderation of excessive risk taking in banks.

1. Introduction

Banks, in their more general form, are the one institution in modern society that we all depend upon. Bank customers must have confidence in the banking institutions they entrust their funds to, in order to trust the financial system as a whole. The importance of a well functioning bank system is critical to the health of our corporate and ultimately our economies and is the reason for government regulation of banks, the aim of which is the moderation of 'excessive' risk taking by bank management. In 1996, New Zealand moved away from what would be considered a traditional regulation model as adopted by most countries, in which banks are subject to regulatory discipline, to a model with more emphasis on self and market-discipline, believing this would ensure a healthy banking system. We examine the effectiveness of this alternative regulatory model to determine whether the country is well served by it. Ultimately, the underlying research question to be answered is; can depositors in New Zealand registered banks have confidence in the institutions they entrust their capital?

There can be little debate as to the importance of the banking industry, as the payment system and financial intermediations are critical to the health of our modern economies. When a bank fails, the economy as a whole may be shaken. The cost of failure is not entirely born by the bank's shareholders and depositors, the entire economy is damaged. In many economies, it is believed banks play such an important role, their management cannot be left entirely to their own devices. In other words, banks must be regulated and supervised, to ensure depositors are and the economy as a whole, is protected. Consequently, banks in most countries[2] (Bank for International Settlements, 2006) are regulated and supervised, some more than others, with supervision normally the responsibility of the central bank of that country. Globalisation of the banking industry, occurring in the second half of the 20th century, has resulted in individual banks spanning a multitude of countries. Consequently there is now a need for the supervision of banks to be coordinated on an international basis.

[2] At the International Conference of Banking Supervisors held in Mérida, Mexico, on 4–5 October 2006, bank supervisors from central banks and supervisory agencies of 120 countries endorsed the updated version of the Basel Core Principles for Effective Banking Supervision and its Methodology. They declared their continued support for the implementation of international minimum standards for bank supervision in all countries.

To this end, G10 central bank governors established the Basel Committee on Banking Supervision in 1974. The Committee, although having no legal supervisory authority over individual banks, has evolved into a standard setting organisation, through its 1988 Capital Accord and the more recent Basel II update.

The Committee believes that the effective supervision of banking organisations is an essential component of a strong economic environment (Basel Committee on Banking Supervision, 1997). Basel II has set out a revised framework for the supervision of internationally active banks, comprising three mutually reinforcing pillars; minimum capital requirements, a supervisory review process, and market-discipline. The detail of the framework is contained in the 25 Core Principles, endorsed by 120 countries at the 2006 International Conference of Banking Supervisors (Bank for International Settlements, 2006). Although the 25 Core Principles are extensive, they are not prescriptive. That is, countries endorsing Basel II must implement banking regulations as they see fit to comply with Basel II.

It appears there is consensus, at least among bank regulators, that banks are critical to a healthy economy, and regulation should avoid damage occurring in the event of a bank crisis. There is, however, no consensus as to what regulation is appropriate, therefore, prudential regulation varies greatly from one country to another, along with obvious risks and benefits to the country.

Despite the widespread adoption of the 1988 Capital Accord and the continuing work of the Basel Committee on Banking Supervision, banks still fail, depositor funds are still at risk, and the economy as a whole still suffers. In 1998 the World Bank sponsored a global survey collecting detailed information on the regulation and supervision of banks, undertaken by Barth, Capiro and Levine (2001). In responses from 107 countries, they find little evidence to support the effectiveness of traditional methods of bank supervision. Instead, they suggest that, in order to promote bank development, performance, and stability, governments should design regulations and supervisory practices that; “1) Force accurate information disclosure, 2) Empower private-sector corporate control of banks, and 3) Foster incentives for private agents to exert corporate control” (Barth, Caprio, & Levine, 2004, pp. 245-246). These three factors to some extent address the adverse moral hazards resulting from poorly designed deposit insurance schemes.

The work of Barth et al. (2004) highlights two important questions. First, why are traditional systems of prudential regulation of banks ineffective? Second, given the importance of banking institutions to the economy, if traditional methods are ineffective, are there alternative ways of controlling banking activities?

The answer and solution, according to New Zealand's bank regulator; the Reserve Bank of New Zealand (RBNZ); lie in self-discipline and market-discipline, rather than regulator imposed discipline. Regulations that came into effect in 1996 were designed to address RBNZ concerns regarding the country's conventional bank supervision regime at the time. This regulation foreshadowed the findings of Barth et al. (2004) by replacing the private monitoring of banks by supervisors with a system requiring the comprehensive disclosure of financial information to the public. The regulation of banks in New Zealand has as its sole focus the protection of the financial system as a whole, with the new regime aimed at lowering compliance costs, reducing moral hazard, and promoting market-discipline, thereby alleviating the risk to taxpayers of bearing the cost of a bank crisis (Brash, 1995).

2. Regulation of New Zealand Banks

The Reserve Bank of New Zealand Act 1989 is the legislation under which New Zealand banks are registered and supervised. Amendments to this act came in to force on January 1, 1996, and replaced[3] most existing prudential regulation with a disclosure regime reliant on market-discipline. At the same time requirements for a bank's management and directors to manage in a sound and responsible manner were increased (Mortlock, 1996, p. 21). However, not all of the prudential regulation was removed; regulation still required locally incorporated banks to have a minimum capital of NZ$15 million and adopt the Basel Capital Accord provisions. Restrictions on exposure levels and lending to related parties were also retained. The RBNZ gives some discretion to overseas banks, but normally requires the bank to comply with the Basel standard as a minimum and all other requirements of the home country supervisor.

[3] The mechanism for the regime change was the Amendment Act 1995, which amended the Reserve Bank of New Zealand Act 1989.

The 1996 disclosure regime requires banks to issue two forms of disclosure statements to the public on a quarterly basis. The first is the Key Information Summary (KIS) for the bank. Designed primarily for retail depositors, KIS contains information about the bank's credit rating, Basel capital ratios, peak exposure concentrations and exposures to related parties, asset quality, and profitability. This summary must be displayed prominently in every branch and given freely when requested by customers. The RBNZ website also maintains an historical series of all KIS data, which is freely available to the public.

The second statement required to be issued by all banks is the General Disclosure Statement (GDS). The GDS adds considerable detail to the KIS; including corporate information, financial statements including a five-year summary, detailed information on capital adequacy and risk exposures, as well as fund management, securitisation, management systems, and market risk exposure. The GDS is the subject of a full external audit at balance date and a limited audit on a six monthly basis. In the other quarters, there are no audit requirements and a short form disclosure statement is issued. Disclosure statements are required to be timely, with audited statements published within 3-months, and other statements within 2-months. Statements are available on demand from the bank's head office, or within five days from any branch of the bank. In addition, banks are required to publish the current statement on their websites[4].

A key feature of the New Zealand disclosure regime is the requirements placed on bank directors to sign all disclosure statements attesting they comply with RBNZ prudential regulations, risk management systems are properly applied, there are no exposures to related parties that are contrary to the interests of the bank, all required disclosures are contained, and that they are not false, or misleading. Directors who sign a false or misleading disclosure statement may be jailed for up to three years, and/or face personal liability for creditor's losses.

Although the New Zealand bank regulation system relies heavily on the Basel Committee's third pillar of market-discipline, consideration is given to pillar one, since New Zealand incorporated banks are required to maintain minimum Basel capital adequacy ratios.

[4] The RBNZ does not publish GDS data.

Further, foreign incorporated banks, which are branches of overseas banks, are required to comply with the capital adequacy standards of the home country supervisor.

When it comes to the second Basel pillar, the supervisory review process, the RBNZ monitors published disclosure statements from individual banks as well as an annual meeting with bank management. There is no onsite inspection of banks, although the RBNZ retains the power to intervene where bank distress or failure, threatens the soundness of the New Zealand financial system.

The regulation of financial institutions in New Zealand appears to be light-handed, with much reliance on market-discipline relative to other countries. A survey undertaken in 1998 by Barth, Caprio and Levine (2001) on the regulation and supervision of banks in 107 countries confirms this observation. Survey questions, covered entry into banking, ownership, capital, activities, external auditing requirements, internal management/organisational requirements, liquidity and diversification requirements, depositor protection schemes, provisioning requirements, accounting and disclosure requirements, discipline problems and the exit of institutions, and supervision. Occurring two years after New Zealand's banking reform the survey details comparisons between New Zealand and international practice at the time.

The New Zealand market is open to foreign banks and others to establish new banks (over the period of this study only two NZ banks[5] had NZ owners). The RBNZ requires information to be supplied on bank's shareholders[6], as well as details of the experience of directors and senior management, before a new bank is registered. This requirement has not been an issue, with all previous applications approved. The minimum entry capital required for registration is NZ$15 million, with banks able to use borrowed funds, or assets other than cash, as capital. New Zealand banks are required to maintain a standard minimum capital asset ratio of 8%, risk weighted according to Basel guidelines. At the time of the survey,

[5] This was recently increased to three when Southland Building Society registered as a bank.

[6] There is no maximum percentage that can be owned by an individual, or a related party, and no restrictions on ownership of banks by non-bank firms.

1998, the average risk weighted capital ratio was 10.6%[7]. New Zealand banks are free to engage in non-bank activities, with no restrictions on activities involving securities, insurance, real estate, or guidelines given on asset diversification. There are no minimum liquidity requirements, or minimum reserve requirement. In an index of overall bank activities and ownership restrictiveness, Barth et al. (2001, p. 55, figure 6) ranks New Zealand equally with Aruba as being the least restrictive.

Barth et al. (2001) also looked at the monitoring of established banks, firstly by official supervisors (New Zealand has 0.6 supervisors per bank), and then through private monitoring. New Zealand ranked in the bottom third of the index of official supervisory power and scores a zero out of seven in the prompt corrective action index. RBNZ supervisors have little direct contact with banks, apart from an annual off-site meeting. The RBNZ instead relies on the public quarterly disclosure statements when undertaking its supervisory function, with no private information available to it.

3. Literature

Governments attempt, through the application of regulation, to moderate excessive risk taking by banks. This is occurs because few governments are prepared to risk the destabilising effects of a significantly large bank failure. These effects could include not only the loss of the savings of individual citizens, but also the collapse of other financial institutions and ultimately businesses. Savings are protected by, regulations preventing banks from engaging in risky activities, a mandated minimum capital requirement, and in some countries through insurance.

Deposit insurance schemes are employed in the belief that destabilising bank runs won't occur if depositor funds are not at risk. While insured banks are still allowed to fail, they do so in an orderly manner and small depositors are not at risk. As banks have grown, many governments have decided that the destabilising effect of even an orderly failure is too great, as a result many apply some sort of *Too-Big-To-Fail* policy when it comes to bank

[7] There are only 18 countries (including Australia) with lower actual risk weighted capital ratios (Barth et al., 2001).

regulation. The problem with deposit insurance and Too-Big-To-Fail policies is that it increases moral hazard incentives in banks, encouraging even greater risk taking (Mishkin, 2000). This could explain the survey findings of Barth et al. (2004, p. 245), that there is increased bank fragility in countries with generous deposit insurance schemes, and a greater degree of bank regulation and restrictions.

Market-discipline is seen as a solution to the moral hazard incentives caused when traditional regulations have resulted in the provision of either an explicit, or implicit, safety net. Market-discipline must penalise either unwarranted risk taking, or simply poor management, in ways that government regulation is unable to (Calomiris, 1999). In its simplest form, market-discipline in banks is the absence of interference with banks by non-market participants. This sounds very much like the early free banking model adopted in the case of Scottish banks in the 1700s and early 1800s. A formal definition of market-discipline is given by De Ceuster and Masschelein (2003, p. 753) as, "Market-discipline is a regulatory mechanism that delegates the monitoring and disciplining task not only to the national and international regulator but also to the market participants whose wealth is affected by the banks' conduct. Consequently the continuous 'curse' of disciplinary measures by these market participants creates strong incentives for management to run their banks in a safe and sound way".

In its modern form though, market-discipline is a suite of policies designed to enhance the private monitoring of banks, whilst minimising distortions created by government regulation. Government regulation of banks should strive to overcome asymmetric information problems between bank and depositors by facilitating the free flow of information to depositors. The mechanics of market-discipline are such that a penalty is imposed by market participants on a bank engaging in unwarranted risk taking and/or is poorly managed. The penalty takes two forms; either a price penalty in which a bank faces an increase in the cost of its funds, or a reduction in the supply of funds available to the institution. Ultimately, this is more severe than any penalty imposed by a government regulator.

Market-discipline can be applied at three levels. First, retail depositors who, on detecting an increase in bank risk, should demand an increase in the interest rate as compensation, or else simply shift their funds to a competing institution. The ultimate

evidence of market-discipline at work is a *run* on bank funds. Deposit insurance designed to prevent bank runs is anathema to proponents of private monitoring and market-discipline. Even when information is freely available, two significant impediments to market-discipline include the inability of retail depositors to process highly complex financial information (Dewatripont & Tirole, 1994, p. 31) and the high cost of monitoring relative to the small size of deposits typically held by retail investors. It is these two impediments that are normally pointed to as justification for government supervision and/or deposit insurance. Kane (1987) refutes the claim of the inability of retail depositors to apply market-discipline, pointing to the actions of depositors in Ohio as evidence of discipline when *running* on Ohio thrift institutions after becoming concerned at the ability of the Ohio Deposit Guarantee Fund to support failing thrifts.

Second, wholesale depositors can apply market-discipline. Banks, which were in the past dependent on retail depositors as a source of funding, have come to place a greater reliance on wholesale debt funding. By comparing the yield of a bank's bond issue to that of a default free treasury issue of similar maturity, a measure of bank risk can be obtained. Evidence of support for wholesale market discipline has been found by many, such as Flannery and Sorescu (1996) in the US, Imai (2007) in Japan, and Sironi (2000) in Europe, as well as studies in numerous other markets.

Last, equity holders, the ultimate owners of banks, have the most at risk in the event of a bank crisis. Any suggestion of an increase in risk should result, almost immediately,[8] in a reduction in share price. Gropp, Vesala and Vulpes (2006) find both subordinated debt and equity markets are predictors of the distance to default in European Union banks. Furthermore, subordinated debt and equity signals[9] provide additional risk information to that contained in traditional accounting information models, reducing type II, or false negative, errors. As to which is more useful, they suggest that the equity market signal occurs approximately 6 months before the subordinated debt market signal. The disadvantage, though, is that the equity market signal is more difficult to interpret, whilst the subordinated

[8] Adjustment in stock price should occur more rapidly than an adjustment in bond price and yield ,because bank stocks are more widely and frequently traded than bank debt instruments.

[9] Using an option pricing model to calculate the distance to default.

market signals get stronger as time to default reduces. Cannata and Quagliariello (2005), in studying Italian banks, suggest that the four equity variables of daily prices, daily returns, historical volatility, and the option pricing distance to default, provide supplementary information to supervisors, although they do concede interpretation is difficult.

The value of market-discipline has, in the past, been discounted by those responsible for the prudential supervision of banks. The prevalence of this viewpoint has, however, diminished somewhat, with some now suggesting that market information could complement traditional supervisory techniques. The adoption by the Basel Committee of market-discipline as its third pillar has given further legitimacy to its use as a tool for bank supervisors.

3.1. Requirements of Market-discipline

Lane (1993) lists four general conditions considered necessary for market-discipline to be effective. First, financial markets must be free and open. Second, adequate information must be available about existing debts and the prospects of repayment. The third condition is that there is no possibility of a bail out in the event of a default. Last, the financial institution must respond to market signals before being excluded from the market.

Of Lane's (1993) four conditions for market-discipline there can be little argument that the first is present in New Zealand, as financial markets have been very open to new entrants since deregulation in the 1980s. Those wishing to use the term *bank* in their name must register with the RBNZ, which has quantitative requirements of a minimum $15 million of capital, and standard capital adequacy of 8% of total capital and 4% of tier 1 capital. Qualitatively, the RBNZ looks for adequate controls and systems, as well as at the reputation of the owners, directors, and senior management.

The second condition, of adequate information, is also satisfied. RBs publish quarterly disclosure statements (KIS and GDS), containing relevant risk information, in a timely manner. Further internationally respected agencies such as Standard & Poor's, or Moody's provide ongoing credit ratings to the marketplace.

The third condition, lack of a financial bail out in the event of a crisis is more problematic. The RBNZ was quite explicit introducing the 1996 disclosure regime that they would shoulder no responsibility if a RB collapsed. There is, however, the possibility that

they might intervene if the RB was considered to be systematically important. How this intervention would work is unknown, but one would suspect that it would possibly only involve the guaranteeing of transactions already in process. Don Brash (2001) suggests an insolvent bank without shareholder support could be placed under statutory management with existing creditors and deposits subject to a *haircut* in order to recapitalise the bank[10].

The final condition, that financial institutions must respond to market-discipline signals, is the subject of empirical testing. This condition relies on condition two, that investors have adequate information. Furthermore, investors must accept condition three, that they are at risk, and act on the information by either demanding an increased return to compensate for additional risk, or they must deposit their funds in an institution that offers an adequate risk adjusted return. An institution not responding to market-discipline signals could only do so for a limited period of time. Once liquid assets are exhausting failure would occur.

3.2. Empirical Tests of Market-discipline

A constant handicap facing empirical research of market-discipline is the availability of suitable data. A standard methodology employed is to take either equity, or debt, market prices for a group of banks and attempt to find a relationship with a variable attempting to proxy risk in banks. Traditional risk indicators are extracted from bank financial statements, a downgrade in the banks' credit ratings, or the ultimate risk indicator a bank failure.

A common perception is that few banks have publicly traded securities; this is likely the case in New Zealand as most banks are owned by foreign banks. Flannery (1998) however disputes this perception in the US, arguing that although only about 15% of US banks have publically traded assets, these banks have three trillion USD in assets, representing 75% of US banking system assets[11]. Market-discipline testing of equity prices has generally involved looking for a price reaction to an external event, one expected to impact on the riskiness of a group of bank stocks. For instance, Cornell and Shapiro (1986)

[10] Once the bank was re-opened the government would need to guarantee remaining funds in order to prevent a run on funds, until a new ownership structure was fully in place for the bank.

[11] This was the result of a sample collected on September 30, 1995 so is likely still relevant today.

used cross sectional regressions to assess the impact of two South American debt moratoriums in the 1980s, expecting the most exposed banks would have the greatest price movement. As information came to the market over a period of time, however, the effect was only significant in six month and annual returns, as opposed to monthly returns. Other tests have considered the impact of an announcement regarding the condition of one bank on others, with Docking et al. (1997) finding that a surprise increase in loan loss reserves at one US bank could impact negatively on others.

More extensive tests have been undertaken using US wholesale debt obligations, with Flannery and Sorescu (1996) reported that, for US banks over the 1983-1991 period, accounting measures of risk impact on subordinated debentures yields. Flannery (1998) also concluded, in his survey, that although there was some variation in results, most researchers found a relationship between market rates of certificates of deposits and bank risk indicators. These promising early results led to some, analysts such as the US Shadow Regulatory Committee, calling for the issue of mandatory subordinated debt as an aid to market-discipline of banks. Krishnan et al. (2003), however, caution against this, warning that previous studies have not considered the term structure of credit spreads, as credit spreads of different maturities may move in opposing directions, it is not appropriate to aggregate them in determining a risk premium.

Outside of the USA much work has been completed, with varied results. Sironi (2000) found Moody and Fitch bank credit ratings to be sensitive to subordinated debt spreads of European banks. In Italy, Cannata and Quagliariello (2005) found that abnormal returns of bank stocks seem to anticipate PATROL[12] ratings assigned annually by the Bank of Italy. In a study of European banks, Distinguin et al. (2006), using a logit model, suggest that accounting data and market indicators can improve the prediction of future bank financial distress (as evidenced by a credit rating downgrade). This result, though, was dependent on the frequency of bank assets trading.

[12] The PATROL rating system is similar to that of the US CAMEL rating system in focusing on five components of the bank performance; capital adequacy (PATrimonio), profitability (Redditivita`), credit risk (Rischiosita`), management (Organizzazione), and liquidity (Liquidita`).

A problem with much of the existing empirical research of market-discipline is it has been conducted in markets where banks are subject to significant supervisor discipline, bank deposits are insured to some extent, or there was some other implicit, or explicit, guarantee of banks, any or all of which will contaminate the result and lessen the effectiveness of market-discipline, if not completely negating it. It is not really possible to determine the true impact market-discipline is having on banks when they are also influenced by other protections. This is illustrated by Imai (2007, p. 1443), who found that it was only after the Japanese Government allowed Hokkaido Takushoku Bank to fail, did subordinated debt holders begin requiring higher interest rates from riskier banks. New Zealand, with no deposit insurance, limited regulatory presence, and a stated policy of no Government guarantee, therefore, provides an environment in which market-discipline can be empirically tested.

3.3. Previous Studies of Market-discipline in New Zealand

A number of limitations exist in assessing the impact of market-discipline in the New Zealand market. A fundamental problem is the scarcity of data, with limited wholesale debt data available[13] and with all New Zealand banks owned by large foreign banks, except for two small banks which are unlisted there is no equity price data available either. Combined with the small size of the New Zealand bank market, the result is research in the New Zealand market is of low interest to researchers in other parts of the world. We dispute the irrelevance of the New Zealand market and argue the New Zealand market provides a unique environment in which market-discipline can be assessed free from the distortions inherent in other markets.

As a result of the above limitations, little empirical research has been undertaken in testing market-discipline in New Zealand. One relevant study was undertaken by Wilson et al. (2003), using event study methodology to assess how changes in Tier 1 capital impacted on retail deposit rates. No evidence of market-discipline was reported as we find in this study many factors impact on deposit rates. Other studies conducted using the New Zealand market focussed on Non-Bank Financial Intuitions (NBFIs). The first of these, by Hess and Feng

[13] Some bank debt is listed on the NZDX but is infrequently traded, other debt is listed in foreign markets but there are difficulties in constructing a time series of interest rates due to differences in the various offerings.

(2007) found some support for market-discipline, supplying evidence of a negative relationship between deposit interest rates and total assets, which they claim is a proxy for the diversification of the loan portfolio. However, this research was conducted prior to the first collapse of a NBFI in 2006. Poskitt (2008) had the benefit of a number of failed NBFIs to enrich his research, reporting neither the deposit rate, nor the volume of deposits, were significant when a logit model was developed to measure the probability of firm default. Poskitt concludes the result is different to studies in other markets, due to the reliance of NBFIs on deposits from unsophisticated retail investors.

In empirically testing of the effectiveness of the New Zealand's bank disclosure regime, market discipline literature suggests we test for a relationship between bank risk indicators and either or both the value of bank capital and changes in the volume of capital. If market discipline is effective, there should be a statistically significant relationship between bank risk indicators and bank capital. Research in overseas markets has normally used either or both publically listed subordinated debt or equity. Research in these markets is however often limited, by the availability of suitable risk indicators. CAMEL indicators in the US are confidential and bank financial statements are typically only issued on a six monthly basis, with publication often delayed. The situation in New Zealand is the reverse of this, as disclosure statements provide risk indicators in a standardised format, comparable across the industry, in a frequent and timely manner. The difficulty faced however is in finding data from which a risk premium can be extracted, as the equity of New Zealand banks is not listed and subordinated debt that is not held or guaranteed by the parent bank is listed in a myriad of markets, currencies and terms, making the extraction of a risk premium impossible. To overcome this difficulty we propose to extract the risk premium from retail term deposit rates offered by New Zealand banks.

4. The New Zealand Banking Sector

The New Zealand banking sector is divided between sixteen banks, seven New Zealand incorporated banks and nine other banks that operate as branches of overseas incorporated banks (Table 1). The sector is dominated by four large Australian owned banks; ANZ National Bank (ANZNat), ASB Bank (ASB), Bank of New Zealand (BNZ), and Westpac Bank (WBC); who between them comprise 82% of total New Zealand bank assets. The only New Zealand owned banks are Kiwi Bank (Kiwi) and TSB Bank (TSB), which

comprise 1.8% and 0.9% of total bank assets, respectively. All other banks are owned by foreign banks.

The suggestion has been made, given the extremely high level of foreign bank ownership in New Zealand, that bank regulation in New Zealand is irrelevant. Instead, New Zealand should rely on overseas regulators to ensure the safety and soundness of banks operating in New Zealand. While it is true that overseas regulators monitor the health of bank assets held in New Zealand subsidiaries, or branches, they are responsible only for their own financial systems and to their own depositors[14]. The RBNZ is the only central bank concerned about the health of the New Zealand banking system and, consequently, the New Zealand economy.

Table 1 NZ Registered Banks (Source: RBNZ Sept 2007 KIS)

New Zealand Incorporated Bank	Total assets (NZ$m)	%	First*** Registered	S&P Rating
ANZ National Bank Limited	$ 107,787	33.5%	1/04/87	AA
ASB Bank Limited	$ 53,915	16.7%	11/05/89	AA
Bank of New Zealand	$ 56,375	17.5%	1/04/87	AA
Kiwibank Limited	$ 5,671	1.8%	29/11/01	AA-
Rabobank New Zealand Limited	$ 4,830	1.5%	7/07/99	AAA
TSB Bank Limited	$ 3,005	0.9%	8/06/89	BBB+
Westpac New Zealand Limited	$ 45,995	14.3%	31/10/06	AA
	$ 277,578	86.2%		
Overseas Incorporated Bank NZ Branch				
ABN AMRO Bank NV	$ 1,826	0.6%	2/03/98	AA-
Citibank N A	$ 3,543	1.1%	22/07/87	AA
Commonwealth Bank of Australia*	$ 5,556	1.7%	23/06/00	AA
Deutsche Bank A G	$ 5,950	1.8%	8/11/96	AA
Kookmin Bank	$ 406	0.1%	14/07/97	A
Rabobank Nederland*	$ 1,622	0.5%	1/04/96	AAA
The Bank of Tokyo-Mitsubishi UFJ	$ 608	0.2%	1/03/04	A+
The Hongkong and Shanghai Banking Corp	$ 6,386	2.0%	22/07/87	AA
Westpac Banking Corporation*	$ 18,712	5.8%	1/04/87	AA
	$ 44,609	13.8%		
Bank Total Assets	**$ 322,187**	**100%**		

*Adjusted for assets held in NZ incorporated subsidiary bank
**JPMorgan Chase Bank NA registered 1/10/07
***April 1987 was when the Registered Bank designation was first introduced
ANZ, BNZ, Westpac were Trading Banks prior to this. ASB and TSB were Savings Banks

[14] Australian bank regulation gives priority to domestic depositors over foreign depositors in the event of an Australian bank liquidation.

The RBNZ has a policy of local incorporation for all banks judged to be *systemically important* and, in 2006, required Westpac Bank to locally incorporate their New Zealand branch. Local incorporation gives the RBNZ the ability and legal jurisdiction to take over the management of a failing bank. Systemically important is defined as being those banks whose failure could be contagious to the banking sector. Specifically, this would include banks with New Zealand liabilities greater than NZ$15 billion (RBNZ Staff, 2007).

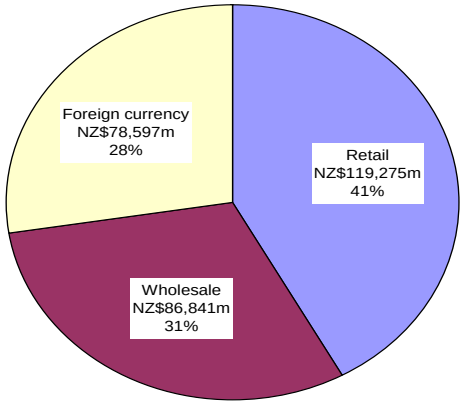
It is incorrect to consider that the supervision of New Zealand banks is the responsibility solely of the RBNZ. While they have a systemic interest in banks, they were quite clear that their purpose was not to prevent a registered bank from failing, or to protect individual depositors from suffering a loss in a bank failure. Bank safety and soundness is the responsibility of bank directors. Depositors with funds to invest are individually responsible for making appropriate investment decisions. The combined actions of many depositors ensure that bank directors act prudently, thereby providing for the safety and soundness of New Zealand banks.

Figure 1 shows that, at September 2007, New Zealand banks in their Standard Statistical Returns (SSR) reported total funding of NZ$285 billion, of which NZ$119 billion, or 41%, was from retail customers, with the remaining wholesale funding split between NZ$ (31%) and foreign currency[15] funding (28%). This compares with the NZ$16 billion directly invested by households in New Zealand listed companies as at December 2006[16]. Therefore, New Zealand bank depositors clearly have a vested interest in monitoring the condition of the banks in which they invest.

[15] Banks typically swap their foreign currency funding into NZ$ to avoid them carrying the currency risk.

[16] Source RBNZ Household financial assets and liabilities.

Figure 1 NZ Registered Bank Funding Sept 2007 (RBNZ Staff, 2008c)



With the move to local incorporation by Westpac in October 2006, all systemically important banks (ANZNat, ASB, BNZ, and WBC) are now locally incorporated. Generally, banks operating as branches of their overseas parent have confined their activities to the business banking market. Locally incorporated banks are also those most active in the retail market, with all but Rabobank[17] having extensive branch networks. ANZNat, ASB, BNZ, and WBC have the most extensive branch networks and service both retail and business customers. KIWI Bank, which is a recent entrant, has established its nationwide branch network by opening in its parent's (NZ Post) network of Post Shops, servicing mostly retail and small business customers. While TSB is based in the province of Taranaki, it also offers some branches in larger cities, as well as an online presence. The remaining overseas incorporated banks have tended to restrict their activities to business customers, with only limited branch networks. The focus of this research is those banks operating in the retail banking market, as these banks are the backbone of the New Zealand economic system.

The New Zealand market place is a competitive and profitable environment for retail banks. Taking as a benchmark 1% net profit as a percentage of total assets, only Kiwibank at 0.7% was below this threshold in the 12 months to September 2007, with the BNZ reporting

[17] Rabobank is active in business sectors specialising in agricultural and food business, but recently it has moved into the online market, with Raboplus offering high interest savings and term deposits, as well as access to managed funds, for retail clients.

1.3%, whilst the remaining banks reported 1.1%[18]. Competition for market share has been fierce, with the Government owned[19] Kiwibank entering the market in 2001 by opening branches located in New Zealand Post Shops. In 2003, St George Bank, which is the fifth largest bank in Australia, entered the New Zealand market by utilising the Foodstuffs chain of supermarkets as its branch network and operating under the brand Superbank. St George Bank and Superbank were less than successful, eventually leaving the market in 2006. The other significant event that occurred was the sale in 2003 of the National Bank of New Zealand, by Lloyds TSB to the ANZ Banking Group. Since this sale, the National Bank has been merged financially with the ANZ Bank, although it still operates a brand and branch network in competition with the ANZ Bank. ANZ National is registered as one bank by the RBNZ and a consolidated set of financial statements and disclosure statements are produced.

4.1. Sample Bank Data

The time period of this study is determined by the availability of data, whilst bank KIS data is freely available on a quarterly basis on the RBNZ website interest rate data is not as readily available. The most complete source found was the IRG database, which lists retail bank term deposit rates from June 2001 until June 2006[20]. This data was supplied to New Zealand newspapers, who publish weekly tables of New Zealand retail deposit rates and mortgage lending rates. We use the 3-month deposit rate as the basis for analysis because New Zealand banks as shown in Appendix 1 rely heavily on short term funding,[21] with NZ$37 billion in retail deposits of maturities between 2 days and 90 days, suggesting there is likely to be strong competition amongst banks for 3-month term deposits.

[18] NPAT as reported in respective KIS for September 2007.

[19] Kiwibank is owned and operated by New Zealand Post, which is a State Owned Enterprise. NZ Post guarantees Kiwibank deposits and, as NZ Post is government owned, it could be inferred that deposits are government guaranteed.

[20] IRG was sold in 2006 and the new owner discontinued the collection of interest rate data.

[21] A portion of the NZ$53 billion at call is likely to be in non interest bearing transaction accounts, although online only call accounts offering interest rates similar to term deposits are becoming more popular with retail investors.

Sample banks in this study are those active in the New Zealand retail deposit market. However; Kiwibank was excluded from the sample of banks as in an earlier study of the same period, Wilson (2008) found the new entrant status of Kiwibank severely skewed[22] its financial data, thus invalidating comparative analysis. The remaining sample includes both ANZ and NBNZ prior to the 2004 merger, following their merger they are treated as a single bank, ANZNat. Also included are the ASB, BNZ, WBC, and TSB banks. Although restricted to five banks, this sample comprises over 85% of all banking assets in New Zealand and close to 98% of all retail bank assets. No New Zealand banks have publicly traded equity and the New Zealand debt market has limited bank bonds, which are seldom traded.

Financial data used in this study is as reported by the RBNZ. This data is freely available on the RBNZ website, where the RBNZ maintains two excel spreadsheets,[23] containing all KIS data for New Zealand Registered Banks going back to the introduction of the disclosure regime in 1996. The architects of New Zealand's 1996 disclosure regime believed that the KIS and GDS disclosure provided sufficient information for depositors, with Brash (1995) saying of the new regime that, "it would require the disclosure of all significant risk dimensions of a bank" (p.30) and "provide a basis on which creditors could make relatively informed judgements about the financial soundness of a bank and to compare one bank with another" (p.32). Data contained in the KIS includes profitability, credit exposure concentrations, credit rating, capital adequacy, size, and asset quality. To supplement this, data from each banks' General Disclosure Statement (GDS), the risk weighted asset data was extracted,[24] from which a measure of liquidity[25] could be calculated.

Much work has been undertaken on the risk assessment of financial institutions, with the most widely known system being the Uniform Financial Institutions Rating System

---

[22] For example, Tier 1 capital in 2001 was 558% and Profit was -19%. By September 2007 Tier 1 capital had fallen to 7.6% and profit had risen to 0.7%.

[23] Key Information Summary (KIS) of New Zealand Registered Banks Locally Incorporated (RBNZ Staff, 2008a) and New Zealand Registered Banks Overseas Incorporated (RBNZ Staff, 2008b).

[24] This was extracted by Dr David Tripe, Centre of Banking Studies, Massey University.

[25] The liquidity measure calculated was (Cash + ST & LT Govt + Bank & Public Sector) over (Cash + ST & LT Govt + Bank & Public Sector + Residential Mortgages + Other)

(CAMELS), as used by US bank examiners[26]. The CAMELS system is based on an extensive set of both quantitative and qualitative data points, from which component scores are calculated, with each component represented by one letter of the acronym CAMELS[27]. The system was revised and extended in 1997 to include a sixth component addressing sensitivity to market risk[28] (Federal Financial Institutions Examination Council, 1996). Data which is available in New Zealand for KIS and GDS analysis is limited in comparison to that available to US bank examiners, but it supposedly meets the necessary requirement for risk evaluation of New Zealand banks[29]. With this in mind, the following variables were selected as possible indicators of risk; Profit (NPAT/Assets), Tier 1, Total Capital[30], Growth (quarterly increase in assets), Imp Assets (Impaired Assets/Assets), Spec Prov (Specific Provisions/Assets), Size (Total Assets), and Liquidity ((Cash +Govt Stock + Bank + Public Sector Debt)/Total Assets). With the exception of Size, Spec Prov, and Liquidity, we used ratios as presented in each bank's KIS, which are, therefore, readily available to depositors. A log transformation was applied to total assets to normalise the data. Spec Prov, as reported in a KIS is (Specific Provisions/Impaired Assets). As this ratio is to a large extent driven by a bank's decisions on impaired assets, it is not appropriate to compare across banks. Instead, a better option was to standardise Spec Prov by examining it over Total Assets. Liquidity is not reported in the KIS. As it is a factor in CAMEL analysis it was calculated from data extracted[31] from bank GDSs. These eight variables will be used as the risk indicators in Equation 1.

Equation 1 Risk Premium in Registered Banks

$$RP_{rf} = C + \beta_1 RI_1 + \beta_2 RI_2 + ... + \beta_n RI_n + \varepsilon_{rf}$$

[26] The system is used by the three federal banking supervisors; the Federal Reserve, the FDIC, and the OCC.

[27] Capital, Asset quality, Management, Earnings, Liquidity, and Sensitivity to market risk.

[28] We have no measure of the sensitivity of NZ Banks to market risk and have not attempted to proxy it.

[29] The RBNZ has no access to private data from banks and, instead, relies on this public data for their monitoring of NZ banks.

[30] Total capital consists of tier one capital (equity), plus other capital (e.g., revaluation reserves, redeemable preference shares, and subordinated debt less unrealised revaluation losses).

[31] We thank Dr David Tripe from the Centre for Banking Studies, Massy University for supplying the GDS data.

To assist in understanding their likely impact on a bank risk premium they have been loosely fitted into a CAMEL framework. The CAMEL analysis and model sensitivities are confidential to bank examiners, with the CAMEL rating itself only released to senior management of the bank concerned. Consequently US research that looking directly at CAMEL ratings is limited, being undertaken in-house by regulatory agencies, as is the case in Whalen and Thomson (1988). Other studies have generally used data extracted from quarterly call reports, with Cole and Gunther (1998) utilising seven variables, standardised as a percentage of gross assets, to represent four of the five CAMEL components (management is not reported on in call reports). Call reports containing financial data are required of all federally insured banks (Consolidated Report of Condition and Income), with savings and loans and other thrift institutions required to file a TFR (Thrift Financial Report). Reports since 2001 are available on the website maintained by the Federal Financial Institutions Examination Council (FFIEC).

The first component, Capital, is measured by Tier 1 Capital and Total Capital. Tier 1 Capital is equivalent to ordinary equity, all others things being equal, with lower levels of equity considered as indicators of increased risk. A similar conclusion was reached by Cole and Gunther (1998) and confirmed by Koetter et al. (2007), who in a study of approximately 1,000 German bank mergers found that an increase in a bank's capitalisation ratio led to a reduction in the probability of a bank belonging to the distressed group, as defined by the Bundesbank.

A fundamental reason for bank failures is the making of bad loans. This is represented by the Asset quality variables Impaired Asset Provision and Specific Provision Expense. Higher levels of these two variables indicate that a bank is having difficulty with its loan portfolio. Therefore, its risk level is greater, with Cole and Gunther (1998) also expecting a positive relationship with the likelihood of bank failure. Clair (1992) also finds that increased lending, above what would be considered normal, lowers lagged loan quality. So, Growth can be grouped under Asset quality.

The impact of Management is difficult to quantify. US bank examiners assess management and board directors on a broad range of qualitative factors, such as the level and quality of oversight, ability in respective roles, conformance with internal policies, and the adequacy of internal audit trails (Federal Financial Institutions Examination Council, 1996).

Academic research has often used key performance indicators, such as the cost to income ratio being used to proxy management quality. Koetter et al. (2007) argues, however, that this indicator is a poor proxy, as it is affected by market circumstances and external shocks.

The variable size affects more than one CAMEL component, playing a part in asset quality, managerial effectiveness, and earnings. While there can be some negative effects from size, the overall affect is expected to be positive. Increased size leads to a greater diversification of loans, with loans spread over more customers and business sectors. Diversification reduces risk at little cost once an organisation is over a certain size. Therefore, size should increase asset quality, with larger banks having a lower risk premium.

Size could also be taken as a proxy for managerial quality, as it is expected that larger banks will be better managed, as they have improved reporting and other management systems in place and are likely to attract staff of a higher calibre. The cost of high quality management, while greater, would be spread over a larger asset base, giving economies of scale and leading to increased efficiency. A counter viewpoint could be held that large size leads, instead, to a reduction in management quality (and/or efficiency), due to increased bureaucracy, the prevalence of management perks, and the remoteness of the head office. Research employing efficiency techniques (DeYoung, 1998, p. 7) has yielded mixed results as to which viewpoint is correct.

Additionally, large banks could exert greater market power, having the ability to maintain earnings, while offering lower interest rates to depositors. The second variable impacting on the Earnings component profitability is the KIS report's net profit over tax for the previous year, as a percentage of assets. The expectation is that higher profitability would allow the bank to meet debt repayments as more free cash flow would be generated.

The final variable included is Liquidity. A normative expectation is that banks with higher levels of liquidity should be able to cope with unexpected withdrawals and, therefore, should be less risky. Peria and Schmukler (2001) find support for this view, with depositors asserting market-discipline in response to reduced liquidity. Several other studies have, however, found that liquidity does not serve well as an early warning indicator. One of the earlier studies in this area, Martin (1977), reports that liquidity predicts US bank failures in some periods (1971-72), but not in others (1975-76).

Table 2 summarises how the chosen risk variables would fit into a CAMEL framework, their expected sign as a risk indicator in determination of a risk premium for depositors, and a brief intuition as to why that should be the case. The Asset Quality variables of Imp Assets, Spec Prov, and Growth indicate a lack of Asset Quality. Therefore, their expected relationship to the risk premium is positive. All other variables (including the other Asset Quality variable of Size) are expected to have a negative relationship with any risk premium.

Table 2 RB Risk Indicators Fitted into a CAMEL Framework

Category	Risk Indicator	Expected Sign	Intuition behind expected relationship
Capital	Tier 1	-ve	Capital offers an alternative repayment source in a crisis, providing a buffer to debt investors.
	Tot Capital	-ve	
Asset Quality	Imp Assets	+ve	Indicate doubtful debts and bad debts, with higher levels suggesting low asset quality.
	Spec Prov	+ve	
	Growth	+ve	Financial institutions are expected to grow steadily, however, increased lending above the normal level lowers loan quality.
	LnSize	-ve	Greater diversification lowers risk.
Management	LnSize	-ve	Larger banks are expected to be better managed, with personnel of a higher calibre and improved reporting.
Earnings	Profit	-ve	Higher earnings mean the Bank is more able to make debt repayments.
Liquidity	Liquidity	-ve	Higher liquidity indicates the ability to meet obligations.

4.2. Risk Indicator Data

Summary statistics for risk indicators, over the entire sample period, are reported in Table 3 for all banks. In the main, much of the variation in summary statistics is attributable to the inclusion of TSB Bank; a smaller, community owned retail bank. Possibly as a consequence of its ownership structure, Tier 1[32] (14.19%) and Total Capital (15.03%) ratios are greater than for other banks in the sample. It also has lower[33] asset quality ratios, in terms of Impaired Asset Provision (0.02%) and Specific Provisions Expense (0.00%). This might

[32] Tier 1 and Total Capital are measured as a % of total risk weighted credit exposures.

[33] There is a positive relationship between impaired asset expense and specific provisions to risk. Lower ratios of impaired asset expense and specific provisions imply better quality loans.

be explained by its loan book comprising mainly of housing mortgages[34]. Despite these differences, TSB Bank is still profitable (1.23%), returning significant dividends by way of grants to its community, while still maintaining funds for geographic expansion to areas outside of the Taranaki province.

Table 3 Registered Bank Descriptive Statistics

	Mean	Min	Max	Std Dev
Tier 1 %	8.91	6.10	15.67	2.69
Total Capital %	11.34	8.80	16.32	1.89
Imp Assets %	0.15	0.00	0.63	0.12
Spec Prov %	0.0006	0.0000	0.0024	0.0006
Growth in Assets%	15.12	-6.70	172.20	28.54
Total Assets NZ$m	34614	1422	94747	21318
LnSize	10.03	7.26	11.46	1.21
Profit %	1.25	0.60	1.80	0.20
Liquidity %	0.18	0.08	0.40	0.08

Table 3 reveals a maximum value of 172.2% for the Growth in Assets variable suggesting the presence of a possible outlier, to check Growth was plotted against Risk Premium as shown in Appendix 2. Four outliers were revealed, were growth was between 152% and 172%, examination of the data points showed this occurred when the ANZ purchased the NBNZ. The high growth is shown over four quarters as Growth in Assets is calculated as the change in assets over the previous year. Rather than excluded these outliers, growth in these four quarters was adjusted by combining the ANZ and the NBNZ asset values when calculating the growth. This resulted in annual growth between 4.9% and 13.4% in the 4 quarters which was not due directly to the takeover. We use this adjusted growth variable in our later regression analysis. Descriptive statistics for all individual banks are reported in Appendix 3.

4.3. Risk Premium Data

The dependent variable, risk premium (RP) is generated by subtracting the average 3-month Bank Bill rate from each banks 3-month retail deposit rate. We use retail deposit

[34] Other banks in the sample have a greater proportion of business banking customers compared to TSB.

rates[35] as advertised by our sample banks, sourced from the IRG interest rate database for 3-month term deposits. This data is supplied to New Zealand newspapers, which list tables on a weekly basis of New Zealand retail deposit rates and mortgage lending rates, enabling potential depositors to compare rates offered by a number of institutions. It is of course possible that customers could negotiate better rates than these, but for most the advertised rate would be the default. The Bank Bill rate is used as the de facto risk free rate in preference to the 3 month NZ T-bill rate, as it is more actively traded. It is also more commonly used by banks for funding and investment. Ultimately it makes little difference which rate is used as Appendix 4 shows they are very similar. Wholesale interest rates in this period moved through a range of 300 basis points.

Table 4 Registered Bank Risk Premium%

	Mean	Min	Max	Std Dev
ANZ	-0.5491	-0.8100	-0.2700	0.2023
ANZNat	-1.0100	-1.3000	-0.6100	0.2421
ASB	-0.8290	-1.8400	0.1200	0.5141
BNZ	-0.9065	-1.6500	-0.0300	0.4379
NBNZ	-0.4673	-0.7600	0.1200	0.2657
TSB	-0.7057	-1.3000	-0.3400	0.3136
WBC	-0.9486	-2.0500	0.0700	0.5983
Summary All Banks	-0.7940	-2.0500	0.1200	0.4489

Risk Premium% = NZBB90D - 3 month Bank Term Deposit Rate

Summary statistics for Registered Banks, as reported in Table 4, show the mean risk premium for 3 month deposits is -0.79%. Although at first it appears to be a contradiction in terms to have a negative risk premium, this occurs as retail investors are not able to invest in the Bank Bill market. Effectively, banks are able to attract funds at a discount to the risk free rate, which depositors are prepared to accept for the convenience of ready access to bank deposits. We have no way of knowing the magnitude of this discount, and as it is likely to be the same for all banks, it is assumed not to influence the results of this study.

Second, the correlations are calculated (reported in Appendix 5) between the leading 3-month deposit risk premium and the CAMEL risk indicators. The most significant

[35] The series runs on a weekly basis from June 2001 until it was discontinued in 2006 when the IRG was sold.

correlation obtained with the Risk Premium is with Liquidity at 0.2742***, and is opposite to the sign hypothesised in Table 2. Of the other risk indicators Impaired Assets 0.1762*, Specific Provisions 0.2170** and LnSize -0.1979** are significant and of the expected sign.

Examination of correlations between other pairs of risk indicators show the Liquidity variable is highly correlated with Tier 1 0.7621***, Total Capital 0.8166*** and LnSize -0.9081***. As well Tier 1 and Total Capital are highly correlated at 0.9391***, as are the Imp Asset provision and Spec Prov expense, at 0.7221***. High correlations suggest there may be a problem with collinearity if pairs of variables with high correlations are included in the regression analysis as they could be measuring the same variation. This is more likely to the case with the capital variables Tier 1 and Total Capital and Asset Quality variables Imp Assets and Spec Prov expense than is the case with Liquidity which is clearly different from other risk indicator variables.

To address this, a trial OLS regression, using the leading 3 month deposit risk premium, is calculated and VIF collinearity parameters[36] are calculated, with resultant values of 16.364 and 14.141 for Tier 1 and Total Capital providing confirmation of the problem. Looking at the definitions of capital, Tier 1 capital is ordinary equity. It is also commonly recognised that any business with a lower level of equity is riskier, as it has a smaller buffer to absorb losses. Total Capital on the other hand adds revaluation reserves, redeemable preference shares, and subordinated debt, to Tier 1. As it is not possible to include both variables in the regression it was decided to exclude Total Capital from further analysis as Tier 1 is comparable to ordinary equity commonly used to judge risk in other businesses.

The VIF parameters for asset quality variables Imp Asset provision and Spec Prov expense were 2.711 and 2.621, respectively, providing some evidence[37] of collinearity. As both are measuring a similar factor and the VIF parameters are not optimal it was decided only one should be included in the OLS regression. An additional concern held is both

[36] The variance inflation factor measures how much the variance of a coefficient is increased because of collinearity. It is derived from the OLS regression for each beta using the equation $VIF(\hat{\beta}_i) = \frac{1}{1-R_i^2}$.

[37] A common rule of thumb is that VIF parameters above 10 provide clear evidence of collinearity problems. Values above 2.5 may also be of concern, however.

variables could be influenced by management, especially in regards to timing. It is believed that there is less potential for management interference with Specific Provision expense, as opposed to the provision for Impaired Assets. So, the Impaired Asset provision is removed from further analysis.

Of the other variables available, the VIF parameters for LnSize 14.204 and Liquidity 6.654 are also both high, but it is considered that these variables measure factors different to any others in the regression, so they are retained for further analysis.

4.4. Regression Analysis

Banks used for regression analysis were therefore ANZ, NBNZ, ANZNat, ASB, BNZ, Westpac, and TSB over the period June 2001 to June 2006, giving at most twenty-one observations per bank. The ordinary least squares Equation 2 shows the dependent variable was the risk premium calculated for each bank, after inclusion of a constant term the independent variables and their expected coefficient signs were –ve Tier1, +ve Spec Prov %, +ve Growth in Assets (adjusted), -ve LnSize, -ve Profit, and -ve Liquidity. Because of the obvious differences between TSB and the remaining sample banks, a dummy variable was included to indicate TSB[38].

Equation 2 OLS Risk Premium in Registered Banks

$$RP = C - \beta * Tier1 + \beta * SpecProv + \beta * Growth - \beta * LnSize - \beta * Profit - \beta * Liquidity + \beta * TSB + \varepsilon$$

Risk indicators are published, in disclosure statements, approximately one quarter after balance date, they are therefore not available to depositors at the balance date of the disclosure statement. To address this we lag all risk indicator variables in Equation 2 by one quarter as shown in Equation 3. As a result the Risk Premium and Risk Indicators are those available at the same quarter.

[38] The TSB dummy was a (1,0) variable taking a value of (1) when the bank was the TSB, else (0).

Equation 3 OLS Leading Risk Premium in Registered Banks

$$RP_{t=1} = C - \beta * Tier1_{t=0} + \beta * SpecProv_{t=0} + \beta * Growth_{t=0} - \beta * LnSize_{t=0} - \beta * Profit_{t=0} - \beta * Liquidity_{t=0} + \beta * TSB + \varepsilon$$

Results presented in Table 5 show the OLS regression explains 35.4% of the variation in bank risk premium, adding the TSB dummy variable, which is highly significant, increases the model's explanatory power to 41.1%. The coefficient of the Liquidity risk indicator (2.7741*** and 3.5801***) is of the opposite sign to that originally hypothesised in Table 2, all other coefficients are as hypothesised (apart from growth which is negative but not statistically significant). Although the explanatory value of the second model, in which the TSB dummy is included, increases the Tier 1 coefficient is no longer significant. The lack of significance is an indication of the difference between the TSB Bank and the other retail banks in the sample. TSB has a mean Tier 1 of 14.19% (Appendix 3) where as the mean of the remaining banks is around 8% (within a range of 7.2% to 10.2%). The other change in our second model is the increase in significance of the Profit coefficient which is now statistically significant at a 5% level. Residual plots shown in Appendix 7 and Appendix 8 confirm that the error term for the regression is normally distributed and independent.

To sum this model therefore, there is a clear difference between the TSB and other banks. The most important risk indicators are Specific Provisions, LnSize and Liquidity (though of the wrong sign). Profitability is of some importance, once the inclusion of the TSB has been controlled for and growth is of no importance. An R-square of 41.1% confirms the value of disclosure risk indicators in assessing New Zealand banks. However, the exception is the Liquidity risk indicator which is counter to what would be expected if it was measuring risk. In a market-discipline context it is nonsensical to believe that depositors would reward banks for reducing their liquidity.

Table 5 Model Results Equation 3 OLS Leading Risk Premium in Registered Banks

Expected	Risk Indicator		Unstandardised Coefficient		Unstandardised Coefficient	
	(Constant)		3.3729		5.1419	
		(t-Stat)	2.2401	**	3.3557	***
-ve	Tier1 %		-0.1532		-0.0615	
		(t-Stat)	-4.6333	***	-1.4693	
+ve	SpecProv %		387.5791		370.6871	
		(t-Stat)	5.6095	***	5.6011	***
+ve	Growth% (adj)		-0.0038		-0.0093	
		(t-Stat)	-0.5497		-1.3565	
-ve	LnSize		-0.3044		-0.5347	
		(t-Stat)	-2.8091	***	-4.2977	***
-ve	Profit%		-0.3549		-0.4506	
		(t-Stat)	-1.5919		-2.0976	**
-ve	Liquidity%		2.7741		3.7805	
		(t-Stat)	2.6181	**	3.5801	***
	TSB Dummy				-1.5079	
		(t-Stat)			-3.3348	***
Dependent Variable:			RP Dep 3m (Leading)		RP Dep 3m (Leading)	
Adjusted R Sq			0.354		0.411	
F Statistic			11.144	***	12.062	***

*Significant at 10% level.

**Significant at 5% level.

***Significant at 1% level.

To further explore the relationship between risk indicators and the risk premium further, we model Equation 2. In Equation 2 the regression relationship is between the risk premium and risk indicators at balance date, approximately one quarter prior to publication. The explanatory power of Equation 2, shown in Table 6, are surprising as the R-square has increased in both regressions to 38.8% and 44.4%, indicating it is better able to explain the variability in the risk premium. All coefficients are significant, with the exception of Tier 1 which is only significant in the regression model which does not control for the inclusion of TSB in the sample. Again the Liquidity coefficient is of the opposite sign to that originally hypothesised in Table 2. This result is counter intuitive from a risk premium perspective. If relying on risk to explain the positive coefficient it could only be that, a bank, on recognising that it has become riskier, has prudently increased its liquidity.

Table 6 Model Results Equation 2 OLS Risk Premium in Registered Banks

Expected	Risk Indicator	Unstandardised Coefficient		Unstandardised Coefficient	
	(Constant)	4.0308		5.6881	
	(t-Stat)	2.7516	***	3.8437	***
-ve	Tier1 %	-0.1509		-0.0608	
	(t-Stat)	-4.6876	***	-1.4984	
+ve	SpecProv %	360.0107		345.0068	
	(t-Stat)	5.0895	***	5.1044	***
+ve	Growth% (adj)	-0.0140		-0.0186	
	(t-Stat)	-2.0897	**	-2.8533	***
-ve	LnSize	-0.3244		-0.5453	
	(t-Stat)	-3.0443	***	-4.5178	***
-ve	Profit%	-0.5725		-0.6489	
	(t-Stat)	-2.8658	***	-3.3830	***
-ve	Liquidity%	2.4486		3.4312	
	(t-Stat)	2.2803	**	3.2245	***
	TSB Dummy			-1.4650	
	(t-Stat)			-3.3902	***
Dependent Variable:		RP Dep 3m		RP Dep 3m	
Adjusted R Sq		0.388		0.444	
F Statistic		12.738	***	13.651	***

*Significant at 10% level.

**Significant at 5% level.

***Significant at 1% level.

The increased explanatory power of Equation 2 demonstrates the risk premium, or deposit interest rate, moves before publication of bank disclosure information. As risk indicators are not observable by the public prior to publication then the relationship cannot be because of market-discipline.

5. Discussion

From results obtained in Table 5 and Table 6, it is clear there is a significant relationship between a bank's risk premium and its disclosure risk indicators. But this relationship is not due to market discipline applied by retail depositors. Retail market discipline cannot be used to explain why the risk return relationship is stronger prior to publication of risk indicators or why the coefficient of liquidity is of the wrong sign. So we believe any risk return relationship found is due to bank management self-discipline not market-discipline. The increase in explanatory power of risk indicators prior to their

publication as well as the unexpected sign of the liquidity coefficient is the result of bank management action.

Bank disclosure statements should not offer surprise information to bank management and directors. It is reasonable to presume that banks would be fully aware of their financial position on a daily basis. Bank management aware of changes in financial ratios are likely to move deposits rates in advance of the disclosure of information to customers. This would suggest, New Zealand's disclosure regime is effective in disciplining New Zealand banks and moderating bank risk because bank management moves in anticipation of it. Simply, the relationship found is due to self-discipline rather than market-discipline.

The positive coefficient for liquidity also has a straightforward explanation that is not due to risk. Looking at the composition of the measure of liquidity used, the numerator[39] is (Cash + Govt Stock + Bank + Public Sector Debt); it is likely the positive relationship between Liquidity and the risk premium is a result of banks managing their liquidity position by manipulating their interest rates. For example, a bank that considers its liquidity to be too high, could reduce deposit rates (lower the risk premium) and, as deposit growth falls (or slows); it would consume existing liquid assets in place of deposits. From Appendix 1 we see that New Zealand banks rely heavily on short term funding, a bank managing its liquidity position will most likely do so by adjusting its 3-month term deposit rate. We contend, liquidity would only impact on the risk premium if it were to fall to such low levels as to threaten the viability of the bank.

One concern has been the lack of significance of Tier 1 capital as most recognise low levels of equity indicate higher risk. Tier 1 was significant when TSB was included, but lost significance once the TSB dummy was included in the regression model. TSB with a mean Tier 1 of 14.19% is clearly different from the other banks in the sample with a mean Tier 1 of 7.78%. Although TSB is riskier than the other banks, as measured by its S&P rating of BBB+ in contrast to the AA rating of other banks in the sample (Table 1), its high Tier 1 is likely a legacy of its history as a community owned savings bank and its lack of overseas funding rather than its riskiness. With regard to other banks in the study, there is little variability in

[39] The denominator was total assets.

equity levels. Management are likely to only have indirect control over equity levels and it would take time to change the level of equity. Finally, it may be normal for bank equity to be in a band of 6% to 8%, with the equity level only being of concern if it were to approach the mandated bank minimum of 4% and little benefit from levels of equity above 8%.

6. Conclusion

The aim of this research has been to assess the effectiveness of registered bank regulation in New Zealand. We judge it to be effective and provide valuable contributions to the ongoing debate as to the effectiveness of market discipline. Fundamentally, bank disclosure and resultant market discipline is effective in moderating excessive risk taking by banks, when depositors are unable to shelter behind deposit insurance and/or government guarantees. A secondary finding was that levels of tier 1 capital and liquidity were not significant in determining a bank's risk premium. The only caveat to this finding was that tier 1 capital and liquidity must be within normal bounds.

A fundamental precept of market discipline is for risky institutions to be required to pay an increased premium for risk. We provide evidence of the risk return relation in New Zealand registered banks, confirming published disclosure statements can be a valuable resource for depositors wishing to make risk return comparisons among banks. As the study showed the risk return relationship is strongest prior to the publication of disclosure statements, however, we judge this to be as a result of self discipline by bank management, not the application of market discipline by depositors. As self-discipline is believed to be more effective[40] than market (or regulator) discipline, New Zealanders can have confidence as to the safety and soundness provided by its bank disclosure regime. This finding is a significant and valuable contribution, especially in a time of financial turmoil when many are calling for greater regulation and supervision of banks. We suspect that the recent failure of a number of banks in overseas markets was because the market relied too much on regulation and regulatory supervision, a task the regulator was not able to complete satisfactorily. A better alternative for the supervision of banks is to subject them to "the continuous 'curse' of

[40] Self-discipline is superior, as the information on which it is based is more timely and accurate, resulting in prompt corrective action being applied more directly.

disciplinary measures by market participants" as outlined by De Ceuster & Masschelein(2003, p. 753). Ultimately, market-discipline can apply penalties, for excessive risk taking by banks, more severe than any imposed by a government regulator.

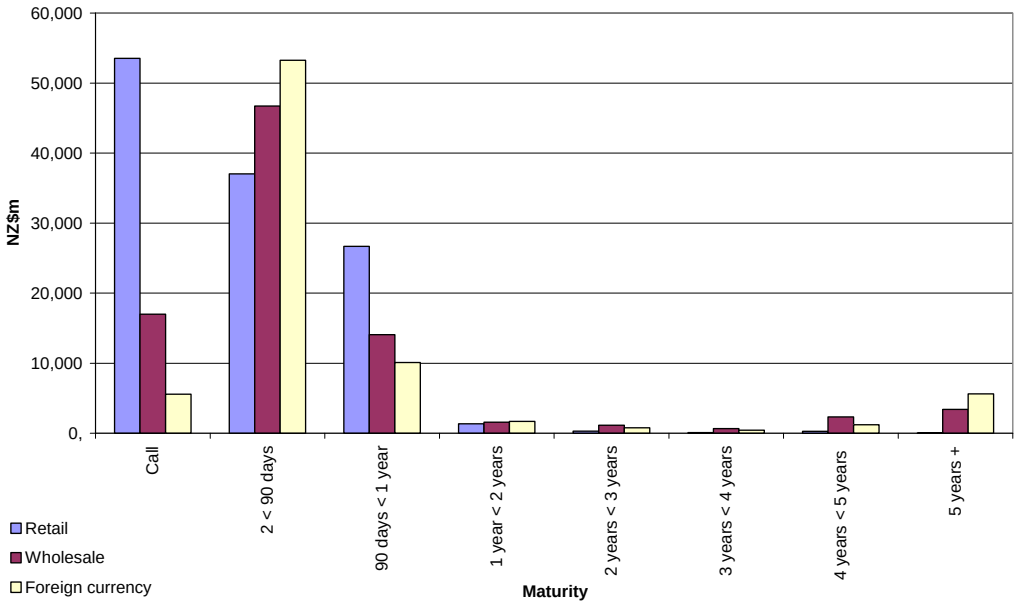
Advice to Governments and regulators, seeking to enhance the safety and soundness of banks, that can be taken from this research is they should do all within their powers to foster market discipline. If looking for a prescription as to how market discipline can be fostered, they should ensure the general conditions of Lane (1993), of free and open financial markets, the provision of adequate information to market participants and no possibility of a bail out in the event of a bank default, apply. If these three conditions hold in their market then financial institutions have little option other than to respond to market signals, or be excluded from the market.

Depositors can take comfort from this research, as we show bank management are prudent stewards of the funds entrusted to them. Self discipline by banks is also evidence of Lane's (1993) fourth precondition of market-discipline; that the institution must respond to market signals; holding in the New Zealand registered bank deposit market. The application of self-discipline in New Zealand banks demonstrates the success of the New Zealand disclosure regime in moderating excessive risk taking by bank management, providing New Zealand with a sound and efficient financial system. This should give confidence to the New Zealand government, and allow them to lift the temporary depositor guarantee scheme, when world credit markets regain some normality, without fear of damaging the economy.

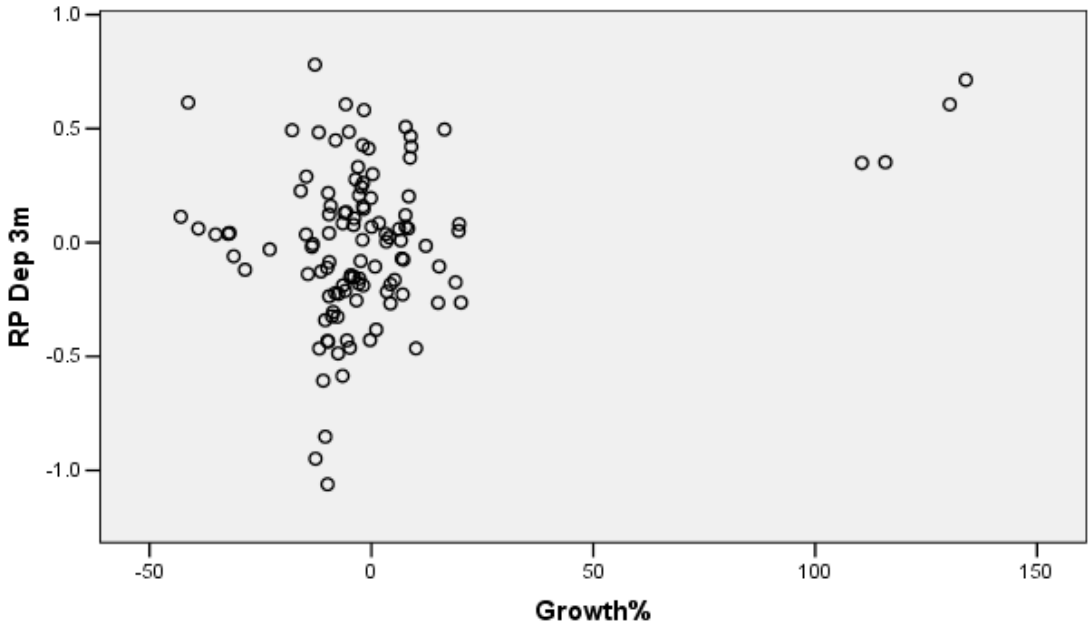
Finally, the answer to the question posed in our title "Who is the Supervisor of New Zealand Banks?" It is the banks themselves.

Appendices

Appendix 1 NZ Registered Bank Funding by Maturity Sept 2007 (Source: RBNZ SSR Part b1)



Appendix 2 Regression Plot RP Dep3m & Growth%

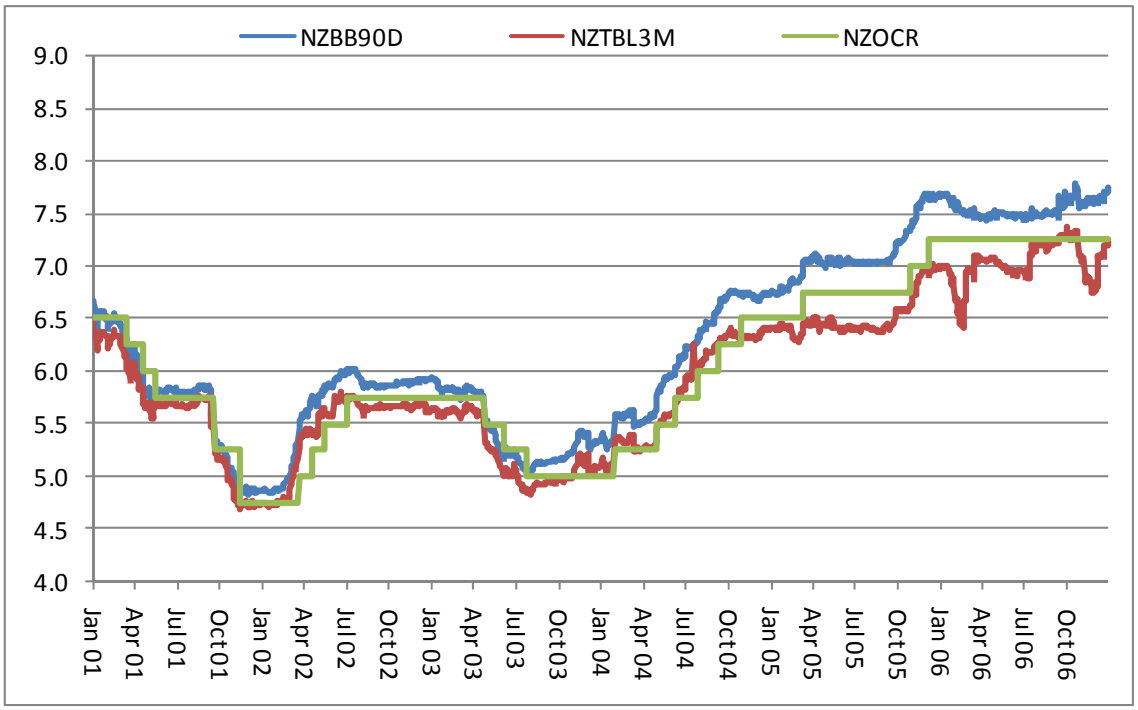


Appendix 3 Registered Bank Descriptive Statistics

	Bank	Mean	Min	Max	Std Dev
Tier 1 %					
	ANZ	7.25	6.53	8.30	0.47
	ANZNat	8.07	7.85	8.50	0.20
	ASB	8.52	6.80	10.20	1.05
	BNZ	7.57	6.10	8.26	0.56
	NBNZ	8.52	6.80	9.50	0.86
	TSB	14.19	12.73	15.67	0.84
	WBC	6.77	6.10	7.20	0.39
Total Capital %					
	ANZ	10.52	9.50	11.29	0.58
	ANZNat	10.56	10.15	11.00	0.26
	ASB	10.48	9.90	11.60	0.47
	BNZ	11.18	10.40	12.29	0.59
	NBNZ	10.52	8.80	11.70	0.92
	TSB	15.03	14.09	16.32	0.58
	WBC	9.85	9.30	10.50	0.35
Imp Assets %					
	ANZ	0.17	0.10	0.41	0.11
	ANZNat	0.19	0.10	0.30	0.06
	ASB	0.09	0.00	0.20	0.06
	BNZ	0.18	0.08	0.63	0.12
	NBNZ	0.29	0.20	0.40	0.07
	TSB	0.02	0.00	0.08	0.02
	WBC	0.20	0.10	0.50	0.11
Spec Prov %					
	ANZ	0.0009	0.0003	0.0014	0.0003
	ANZNat	0.0010	0.0008	0.0011	0.0001
	ASB	0.0002	0.0000	0.0004	0.0001
	BNZ	0.0005	0.0003	0.0009	0.0002
	NBNZ	0.0019	0.0015	0.0024	0.0003
	TSB	0.0000	0.0000	0.0002	0.0001
	WBC	0.0004	0.0001	0.0015	0.0004
Growth in Assets%					
	ANZ	30.06	-3.10	172.20	66.25
	ANZNat	42.81	2.70	157.00	63.75
	ASB	17.58	13.40	21.10	2.32
	BNZ	5.93	-6.70	17.20	6.77
	NBNZ	9.39	2.10	15.60	3.60
	TSB	13.47	10.80	22.11	2.84
	WBC	6.81	-1.90	17.50	5.01

	Bank	Mean	Min	Max
Total Assets NZ$m				
ANZ	35994	26931	77170	18920
ANZNat	83300	74212	94747	7656
ASB	31322	20122	44568	7748
BNZ	40260	35783	50327	4253
NBNZ	38716	33722	43354	2984
TSB	2016	1422	2694	381
WBC	42057	35717	54064	4904
LnSize				
ANZ	10.40	10.20	11.25	0.39
ANZNat	11.33	11.21	11.46	0.09
ASB	10.32	9.91	10.70	0.25
BNZ	10.60	10.49	10.83	0.10
NBNZ	10.56	10.43	10.68	0.08
TSB	7.59	7.26	7.90	0.19
WBC	10.64	10.48	10.90	0.11
Profit %				
ANZ	1.46	1.20	1.60	0.13
ANZNat	1.03	0.90	1.20	0.12
ASB	1.04	0.97	1.10	0.05
BNZ	1.34	1.15	1.66	0.15
NBNZ	1.19	0.60	1.40	0.26
TSB	1.23	1.09	1.32	0.06
WBC	1.38	1.13	1.80	0.19
Liquidity %				
ANZ	0.15	0.13	0.18	0.01
ANZNat	0.10	0.08	0.12	0.01
ASB	0.15	0.10	0.19	0.03
BNZ	0.14	0.08	0.25	0.04
NBNZ	0.13	0.09	0.16	0.02
TSB	0.33	0.28	0.40	0.04
WBC	0.18	0.10	0.25	0.04

Appendix 4 NZ Interest Rates% mid price (Source Datastream)



Appendix 5 Registered Bank Pearson Correlations

	RP Dep 3m (Lead)	Tier1 %	Total Capital %	Imp Assets %	SpecProv %	Growth% (adj)	LnSize	Profit%	Liquidity%
RP Dep 3m (Lead)	1.0000								
Tier1 %	0.0202	1.0000							
Sig. (2-tailed)	0.8317								
Total Capital %	0.0979	0.9391 ***	1.0000						
Sig. (2-tailed)	0.3023	0.0000							
Imp Assets %	0.1762 *	-0.5423 ***	-0.4968 ***	1.0000					
Sig. (2-tailed)	0.0619	0.0000	0.0000						
SpecProv %	0.2170 **	-0.3767 ***	-0.4150 ***	0.7221 ***	1.0000				
Sig. (2-tailed)	0.0215	0.0000	0.0000	0.0000					
Growth% (adj)	-0.0420	0.3392 ***	0.1733	-0.2642 ***	-0.2208 **	1.0000			
Sig. (2-tailed)	0.6589	0.0002	0.0594	0.0037	0.0163				
LnSize	-0.1979 **	-0.9003 ***	-0.9097 ***	0.5214 ***	0.4601 ***	-0.2563 ***	1.0000		
Sig. (2-tailed)	0.0357	0.0000	0.0000	0.0000	0.0000	0.0049			
Profit%	0.0111	-0.1133	0.0425	0.0770	-0.0244	-0.5455 ***	0.0069	1.0000	
Sig. (2-tailed)	0.9070	0.2200	0.6466	0.4050	0.7932	0.0000	0.9403		
Liquidity%	0.2742 ***	0.7621 ***	0.8166 ***	-0.4440 ***	-0.4903 ***	0.2151 **	-0.9081 ***	0.0553	1.0000
Sig. (2-tailed)	0.0033	0.0000	0.0000	0.0000	0.0000	0.0188	0.0000	0.5506	

*Correlation is significant at the 0.10 level (2-tailed).

**Correlation is significant at the 0.05 level (2-tailed).

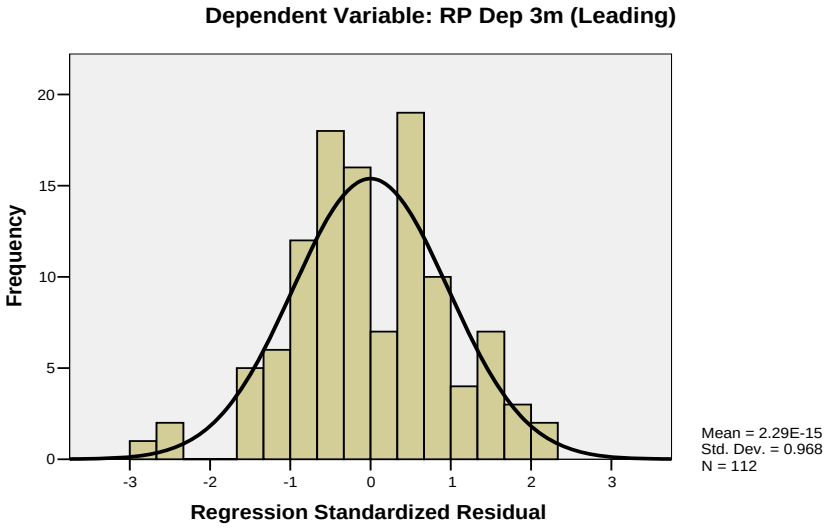
***Correlation is significant at the 0.01 level (2-tailed).

Appendix 6 Trial Regression and Collinearity Statistics

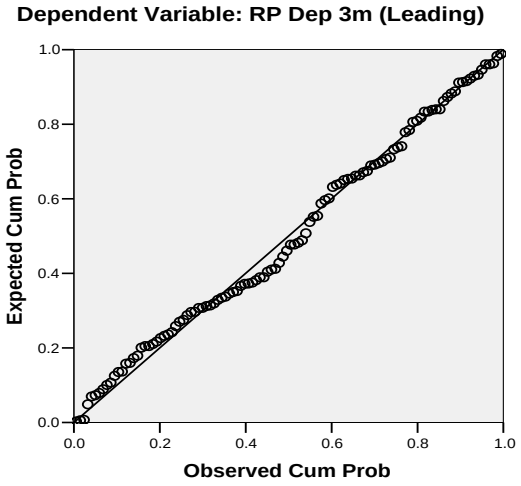
	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations			Collinearity Statistics	
	B	Std. Error	Beta			Zero-order	Partial	Part	Tolerance	VIF
(Constant)	2.725	1.595		1.709	0.091					
Tier1 %	-0.207	0.053	-1.216	-3.934	0.000	0.017	-0.361	-0.300	0.061	16.364
Total Capital %	0.089	0.070	0.363	1.264	0.209	0.095	0.124	0.097	0.071	14.141
Imp Assets %	-0.271	0.477	-0.072	-0.569	0.571	0.180	-0.056	-0.043	0.369	2.711
SpecProv %	434.007	95.829	0.560	4.529	0.000	0.217	0.408	0.346	0.382	2.621
Growth% (adj)	0.000	0.008	-0.003	-0.025	0.980	-0.043	-0.002	-0.002	0.474	2.110
LnSize	-0.289	0.109	-0.762	-2.648	0.009	-0.197	-0.252	-0.202	0.070	14.204
Profit%	-0.378	0.224	-0.167	-1.686	0.095	0.011	-0.164	-0.129	0.595	1.682
Liquidity%	2.597	1.098	0.466	2.365	0.020	0.275	0.227	0.181	0.150	6.654

Dependent Variable: RP Dep 3m (Leading)

Appendix 7 Histogram RP Dep 3m (Leading) Residual Distribution



Appendix 8 Normal P-P Plot of Regression Standadised Residual



References

Bank for International Settlements. (2006, 5 October). Bank Supervisors from 120 Countries Endorse Updated International Principles for Effective Banking Supervision. Basel: Bank for International Settlements.

Barth, J. R., Caprio, J. G., & Levine, R. (2001). The Regulation and Supervision of Banks around the World: A New Database. *Brookings-Wharton Papers on Financial Services, 0*(0), 183-240.

Barth, J. R., Caprio, J. G., & Levine, R. (2004). Bank Regulation and Supervision: What Works Best? Bank Capital Adequacy Regulation Under the New Basel Accord. *Journal of Financial Intermediation, 13*(2), 205-248.

Basel Committee on Banking Supervision. (1997). Core Principles for Effective Banking Supervision: Bank for International Settlements.

Brash D T. (2001). Promoting Financial Stability: The New Zealand approach. *Reserve Bank of New Zealand Bulletin, 64*(2).

Brash, D. T. (1995). Banking Supervision in New Zealand. *Economic Affairs, 15*(2), 28.

Calomiris, C. W. (1999). Building an Incentive-compatible Safety Net. *Journal of Banking & Finance, 23*(10), p1499, 1421p.

Cannata, F., & Quagliariello, M. (2005). The Value of Market Information in Banking Supervision: Evidence from Italy. *Journal of Financial Services Research, 27*(2), 139-162.

Clair, R. T. (1992). Loan Growth and Loan Quality: Some Preliminary Evidence from Texas Banks. *Federal Reserve Bank of Dallas Economic Review*, 9-22.

Cole, R. A., & Gunther, J. W. (1998). Predicting Bank Failures: A Comparison of On- and Off-Site Monitoring Systems. *Journal of Financial Services Research, 13*(2), 103-117.

Cornell, B., & Shapiro, A. C. (1986). The Reaction of Bank Stock Prices to the International Debt Crisis. *Journal of Banking & Finance, 10*(1), 55-73.

De Ceuster, M. J. K., & Masschelein, N. (2003). Regulating Banks through Market Discipline: A Survey of the Issues, *Journal of Economic Surveys* (Vol. 17, pp. 749-766): Blackwell Publishing Limited.

Dewatripont, M., & Tirole, J. (1994). *The Prudential Regulation of Banks*. Cambridge, Mass: MIT Press.

DeYoung, R. (1998). Management Quality and X-Inefficiency in National Banks. *Journal of Financial Services Research, 13*(1), 5-22.

Distinguin, I., Rous, P., & Tarazi, A. (2006). Market Discipline and the Use of Stock Market Data to Predict Bank Financial Distress. *Journal of Financial Services Research, 30*(2), 151-176.

Docking, D. S., Hirschey, M., & Jones, E. (1997). Information and Contagion Effects of Bank Loan-loss Reserve Announcements. *Journal of Financial Economics, 43*(2), 219-239.

Federal Financial Institutions Examination Council. (1996). *Uniform Financial Institutions Ratings System*. Retrieved. from http://frwebgate6.access.gpo.gov/cgi-bin/PDFgate.cgi?WAISdocID=464605285491+0+1+0&WAISaction=retrieve.

Flannery, M. F. (1998). Using Market Information in Prudential Bank Supervision: A Review of the U.S. Empirical Evidence. *Journal of Money, Credit & Banking, 30*(3), p273, 233p.

Flannery, M. J., & Sorescu, S. M. (1996). Evidence of Bank Market Discipline in Subordinated Debenture Yields: 1983-1991. *Journal of Finance, 51*(4), 1347-1377.

Gropp, R., Vesala, J., & Vulpes, G. (2006). Equity and Bond Market Signals as Leading Indicators of Bank Fragility. *Journal of Money, Credit & Banking, 38*(2), 399-428.

Hess, K., & Feng, G. (2007). Is There Market Discipline for New Zealand Non-Bank Financial Institutions? *Journal of International Financial Markets, Institutions and Money, 17*(4), 326-340.

Imai, M. (2007). The Emergence of Market Monitoring in Japanese banks: Evidence from the Subordinated Debt Market. *Journal of Banking & Finance, 31*(5), 1441-1460.

Kane, E. J. (1987). Who Should Learn What From the Failure and Delayed Bailout of the ODGF? *National Bureau of Economic Research Working Paper Series, No. 2260*.

Koetter, M., Bos, J. W. B., Heid, F., Kolari, J. W., Kool, C. J. M., & Porath, D. (2007). Accounting for Distress in Bank Mergers. *Journal of Banking & Finance, 31*(10), 3200-3217.

Krishnan, C. N. V., Ritchken, P. H., & Thomson, J. B. (2003). Monitoring and Controlling Bank Risk: Does Risky Debt Help? *FRB of Cleveland Working Paper, 0301*.

Lane, T. D. (1993). Market Discipline. *International Monetary Fund Staff Papers, v40*(1), p53(36).

Martin, D. (1977). Early Warning of Bank Failure : A Logit Regression Approach. *Journal of Banking & Finance, 1*(3), 249-276.

Mishkin, F. S. (2000). Prudential Supervision: Why is it Important and What are the Issues? *SSRN*.

Mortlock, G. (1996). New Disclosure Regime for Registered Banks. *RBNZ Bulletin, 59*(1).

Peria, M. S. M., & Schmukler, S. L. (2001). Do Depositors Punish Banks for Bad Behavior? Market Discipline, Deposit Insurance, and Banking Crises. *Journal of Finance, 56*(3), 1029-1051.

Poskitt, R. (2008). Market Discipline in the Finance Company Sector in New Zealand. *New Zealand Finance Colloquium, 12*.

RBNZ Staff. (2007). *Statement of Principles: Bank Registration and Supervision Financial Stability. Banking System Handbook*

Wellington: The Reserve Bank of New Zealand.

RBNZ Staff. (2008a). G1 Information extracted from the Key Information Summaries of locally incorporated banks. Retrieved February 2008, from http://www.rbnz.govt.nz/statistics/banksys/g1/hg1.xls

RBNZ Staff. (2008b). G2 Information extracted from the Key Information Summaries of overseas incorporated banks. Retrieved February 2008, from http://www.rbnz.govt.nz/statistics/banksys/g2/hg2.xls

RBNZ Staff. (2008c). SSR Part B1 - Funding by maturity and by non-resident source. 3/9/2008, from http://www.rbnz.govt.nz/statistics/monfin/rbssr/rbssrpartb1/data.html

Sironi, A. (2000). Testing for Market Discipline in the European Banking Industry: Evidence from Subordinated Debt Issues. *FEDS Working Paper, 2000*(40).

Whalen, G., & Thomson, J. B. (1988). Using Financial Data to Identify Changes in Bank Condition. *Federal Reserve Bank of Cleveland Review*(Q 2).

Wilson, W. R. (2008). *New Zealand's Experiment with Prudential Regulation: Can Depositors Moderate Excessive Risk in Deposit Taking Financial Institutions?* . Massey University, North Shore City.

Wilson, W. R., Rose, L. C., & Pinfold, J. F. (2003). *Market Discipline: New Zealand's Experiment in Banking Regulation.* Paper presented at the Academy of Financial Services Annual Conference, Denver, USA.