

# **New Zealand credit union mergers**

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## **Abstract**

Research into the benefits of mergers in small financial institutions, in particular credit unions is sparse. This study helps to fill these gaps by analysing recent intense merger activity in New Zealand credit unions. The major driver for these mergers was not the usual reason of attempting to increase efficiency for competitive purposes but rather enforced government action. Data envelopment analysis was used to explore changes in efficiency in merged credit unions between 1996 and 2001. Those credit unions not involved in merger activity were used as a control group. Overall credit unions have become more efficient over the period, with efficiency improvement notable in those that undertook mergers as opposed to those that had not. The Malmquist index indicates significant technological progress over the period but a slight regression in terms of efficiency.

**Key words;** mergers, credit unions, data envelopment analysis, Malmquist Index

## 1. Introduction

The last decade has seen extensive merger activity in the credit union industry in New Zealand. The effect has been to halve the number of credit unions over the period 1996 to 2002. This is not an isolated phenomena. Mergers of financial institutions both large and small have been widespread and have always created considerable interest to both policy makers and academics (see for example Berger *et al.* 1993, Berger and Humphrey 1997, Shaffer 1993, Grabowski *et al.* 1995, Kwast *et al.* 1997 and Berger *et al.* 1999). The main focus of research has been on large financial institution mergers, while those between small financial institutions, in particular credit union mergers, have received little attention in the academic literature. Credit union research has come essentially from three countries: the UK (see for example, McKillop *et al.* 1995, McKillop and Wilson 2003, Ward and McKillop 2005a, 2005b, Glass and McKillop 2006); the US (see for example Fried *et al.* 1993, 1999 and Kebede and Jolly 2001); and Australia (see for example Brown and O'Connor 1995, Garden and Ralston 1999, Esho 2001, Ralston *et al.* 2001, Worthington 1999, 2001 and 2004 and Brown, 2006).

The question of whether mergers are of benefit to credit unions is undecided. An extensive literature on banking mergers would indicate that potentially mergers can increase efficiencies (Berger and Humphrey 1992 and Shaffer 1993). However these are rarely found in practice, (Berger and Humphrey, 1997). In a US study of 1654 credit unions involved in mergers, Fried (1999) found that approximately half of the acquiring credit unions and 20% of the acquired unions experienced a decline in service efficiency. This research is complemented by three Australian studies. Using data envelopment

analysis (DEA) to provide x-efficiency and allocative efficiency measures, Garden and Ralston (1999) found that on average credit unions mergers did not result in increases in either of these measures relative to other credit unions. A similar result was found when technical and scale efficiencies were considered over a different period, namely mergers were not associated with improvements in efficiency superior to those from internal growth, Ralston *et al.* (2001). However using a larger data set, Worthington (2001) found that mergers appeared to have improved both technical efficiency and scale efficiency.

This paper adds to the existing literature in several ways. Firstly, it complements the US results of Fried *et al.* (1993) and (1999) and the Australian results of Garden and Ralston (1999), Ralston *et al.* (2001) and Worthington (2001) concerning the benefits or otherwise of mergers, while providing results from a different country. While there are two previous studies involving New Zealand credit unions - Sibbald, Ferguson, and McKillop (2002), which looked at the developmental process of credit unions, and Sibbald and McAlevey (2003), which considered economies of scale - neither analysed the extensive merger activity.

Secondly, the mergers occurred in a somewhat unique environment. Credit unions in the US and Australia attempted to increase their efficiencies through mergers to increase competitiveness against large bank rivals (Ralston *et al.*, 2001). This is not the case for these New Zealand mergers, which were enforced and not undertaken for the usual strategic reasons. In November 2001, the New Zealand Government revoked credit unions' exemption from the Securities Act, 1978, which had allowed them to operate

with unsecured deposits. From that date they were required to have a Trust Deed in place, with a trustee company which acts as a Prudential Supervisor, in addition to the Government Regulator – the Registrar. This repositions credit unions' deposits as first ranking securities,<sup>1</sup> but has come at a significant cost to the movement in terms of money, time, and the need to operate with superior prudential standards, such as increased capital reserves and liquidity levels. Many smaller credit unions found it impossible to comply, and thus sought mergers with larger ones, encouraged by both the trade associations and the Regulator. In view of past studies and the enforced nature of the mergers it would seem likely that mergers would be of limited value, although our results contradict this.

Thirdly, studies in the US and Australia examine mature credit union industries. Ferguson and McKillop (1997) suggest that credit union industries develop in three stages from birth, i.e. nascent, through transition to maturity, with stages well defined characteristics. For example, attributes of maturity include a loose common bond, diversification of product and services, and well functioning deposit insurance mechanism – i.e. bank-like. In contrast, nascent characteristics are, for example, highly regulated, strong emphasis on voluntarism, and high commitment to traditional self-help ideals. A transition type environment characterises credit union industries showing less reliance on voluntarism, shifting towards product diversification and a need for professional management. Unlike the previous studies, these New Zealand credit unions are not mature but exhibit characteristics of a transition type industry.

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<sup>1</sup> This means that depositors rank ahead of other creditors, although these are not likely to be substantial.

Another feature of this study is that a census of New Zealand credit unions has been obtained over the period of the study. Thus those credit unions not involved in merger activity are used as a control group. Finally, as in the US and Australian studies data envelopment analysis is used, although we use the more recently developed, non-oriented slacks-based model, (Tone 2001).

The remainder of the paper is organised as follows. Section 2 considers the New Zealand credit union environment. The methodology and data are presented in Section 3. The results are discussed in Section 4, followed by a conclusion in Section 5.

## **2. The New Zealand Credit Union Background**

Credit unions are financial services mutual co-operatives, which at the most basic level provide savings and lending services to their members, principally in the small consumer loan market, although transition and mature ones also offer house mortgages, and small business loans. In essence they are examples of a 'pure' co-operative as they are both owners of the organization, and consumers of its output. They operate on the basis of open membership, democratic control, and the common bond, with the latter seen as the glue that joins the membership together. A credit union recruits members on the basis of their residency, or place of work, such as living or working in Auckland city, or because they are employed by a particular organization (industrial), e.g. New Zealand Firefighters, or belong to a church, trade union, political party, profession, or some similar association (associational), e.g. the Clerical and Industrial trade union. New

Zealand credit unions are regulated by the Friendly Societies and Credit Unions Act 1982 administered by a Registrar operating from the Companies Office in Auckland.

Most historians (Smith 1969, McLauchlan, 2002) trace the emergence of modern credit unions in New Zealand from the early 1940s, with the creation of one operating under the aegis of the Manchester Unity Independent Order of Oddfellows Friendly Society. Some small independent credit unions claimed to have established themselves in the nineteenth century, and the Credicare credit union, which operated from the 1930s, had its roots in the Post Office. Nonetheless, it was not until the 1960s that the New Zealand movement gained momentum.

The co-operative ethos of credit unions extends to the industry level, and in New Zealand, they voluntarily join a trade association. There are two such bodies. The dominant one is the New Zealand Association of Credit Unions (NZACU), which represented 79% of all NZ credit unions, 83.5% of total membership, and 80% of total assets in 2001 (Registrar, 2002).

Although the Association of Manchester Unity Credit Unions (AMUCU) is essentially a Friendly Society, it also provides credit union facilities to its members. This it does through a series of geographical divisions. The AMUCU, as the second trade association, represented 16% of credit unions, 14.5% of total membership, and 18% of total assets in 2001. The remaining three credit unions (5%, 2% and 2% respectively) are also Friendly

Societies, but operate independently of each other and the AMUCUs, and are unaffiliated to a trade association (Registrar 2002).

The two umbrella national organizations represent the interests of their membership to government and regulators, act as a central bank, and in the case of NZACU provide technological services such as debit cards (EFTPOS), Automated Teller Machines (ATM) and electronic funds transfer capabilities, internet and telephone, including mobile, banking to its membership. However, collaboration between the two umbrella organisations was historically minimal. As indicated also in the AMUCU 2002 annual report;

“The NZ Association of Credit Unions have continued to lobby for changes to the [Friendly Societies and /Credit Unions] Act. At a recent meeting it became clear that this legislation does not have a high ranking with the government but that they would like the NZACU and their associated lobbyists to go quickly and quietly away.” (AMUCU, 2002:1)

Merger activity in New Zealand was pronounced between 1996 and 2001, driven by the impending imposition of trust deed requirements. The number of credit unions halved from 111 to 56 over the period (Registrar, 1997, and 2002.). However, the pressure by the credit union membership for increasingly sophisticated, but expensive, electronic technological services, and the poor financial performance of some credit unions, were also factors driving the merger activity over the period 1996 to 2001.

The realization that a trust deed would have a costly effect on the New Zealand movement stirred merger action before “vesting” day in 2001. Consequently, the proportion of community credit unions fell from 37% in 1996 to 34% in 2001, with a reduction in industrial ones from 43% to 38% but an increase in associational from 20% to 28% (Registrar, 1997 and 2002). An overview of merger activity by credit union type is given in table 1.

----- **Table 1 about here** -----

These changes are reflected in donated capital and labour cost items. A feature of industrial credit unions, and less so associational, is that traditionally employers, trade unions and religious groups, donated capital and provided free labour. Thus credit union input costs relate solely to furniture, equipment, printing and stationery. Ensuing merger activity meant that in 2001 just over half of the 56 credit unions (55% equal to 31), received donated capital, as opposed to 74% in 1996. For labour costs, the respective figures were 11% and 30%. These significant reductions over the two time periods in the proportions receiving capital and/or labour subsidies reflect the effect of the trust deed upon credit union operation.

Of the thirty one credit unions receiving donated capital (31) or labour (6) in 2001, 17 are industrial or associational, and are affiliated to NZACU. Eight of the nine members of AMUCU, and all three of the associational independents received donated capital and /or labour. Only three of the 31 receiving assistance are community based. However,



sixteen receiving subsidies of one form or another are large credit unions with total assets greater than \$2.5 million and six of these had assets between \$5.01 million and \$9.9 million.

Breaking the 2001 data down in more detail shows that of the six credit unions paying no remuneration to staff, and which also benefited from free occupancy, three of them were in the largest total assets bracket, four were AMUCU members, and one was an independent Friendly Society credit union. This demonstrates the continuing support for big as well as small credit unions from their employers, and the voluntary nature of credit union operation, even in a period of rapid growth, professionalism, and maturity. However, no credit union in New Zealand paid a salary to its directors, although they were reimbursed expenses whilst on credit union business.

The major reduction in the number of credit unions from 1996 to 2001 (111 to 56) resulted in a small reduction in total membership (-3.1%) but total assets increased by 34% (Registrar, 1997 and 2002). By 2000, as a result of the merger activity, 14 new merged credit unions operated, which had acquired 38 credit unions; the “acquirer” was much larger than the “target”. Nearly three quarters (72%) of these 14 involved multiple mergers, the maximum being six. Thus of those credit unions operating in 1996, nearly half (47%) were involved in merger activity by 2001, while 38% were not. The remainder (15%) had either liquidated, or voluntarily closed.

Thus, comparing 2000 with 1996 gives a quite different picture, and is the result of major and rapid mergers in the industry due essentially to the industry gearing up for the imposition of the trust deed in 2001.<sup>2</sup>

Further analysis reveals the average total assets per credit union in 2001 was \$7.5 million in 2001 compared to \$3.2 million in 1996. In terms of total assets per member, credit unions in 2001 averaged out at \$2334, compared with \$1937 in 1996. Clearly there is a significant relationship between size and wealth within the sectors in both time periods. The important question is to what extent the above figures indicate a less than proportionate increase in costs, i.e. potential economies of scale.

Finally, the government initiated merger activity in New Zealand is in contrast to the Australian and US credit union industries' experiences over the same period. As mutuals, credit unions cannot attract capital from the market place, and thus acquire it either through internal growth, or by merger, or by demutualization. We can understand credit union mergers in New Zealand in the context of industry development. Ralston *et al.* (2001) suggest that both Australian and United States credit unions, as mature industries, are driven by the need to compete with banks, and seek both technical and economic efficiencies. Additionally, Davis (2003) suggests mature credit union industry mergers are ripe for demutualisation and take-over by joint-stock companies. So do these

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<sup>2</sup> Further changes to the structure of New Zealand's credit unions have been underway since 2006, reflecting the effect on the credit union movement of the failures of many finance companies. Associated with this is new legislation. The credit unions will now require credit ratings, and will be regulated by the Reserve Bank. This has resulted in changes to common bonds as a preliminary to increased merger activity over the past year, as evidenced by Credit Union Otago merging with other South Island credit unions to form Credit Union South, covering the whole of the South Island. These changes have yet to have their full effect, however, and are thus outside the scope of what is covered in this research.

drivers equally apply to transition type industries like New Zealand, or a nascent one like the UK?

An overview giving the distribution of total assets, numbers of credit unions and membership at the end of the 2001/2 financial year is given in Table 2.

----- **Table 2 about here** -----

This size categorisation was arrived at in consultation with industry experts and is used to represent small, medium and large credit unions in the New Zealand environment. Just under one quarter (23%) of the credit unions are in the highest asset category, accounting for approximately 62% of the total membership, and 65% of the total assets. The middle category by asset size contains 30% of the credit unions and has 24% of the total assets. The smallest asset size category contains approximately 46% of the credit unions and 13% of the total membership. It is interesting to note that had these same size groupings been in place at the beginning of the period (1995/6) the percentages of credit unions in these categories would have been approximately 10%, 17% and 73% respectively. This is a reflection of the extent of mergers in the industry, due essentially to the imposition of the Trust Deed.

### **3. Methodology and Data**

Data for the period of the intense merger activity is typically not publicly available. Through private communication the authors were able to obtain the financial statements

of all New Zealand credit unions at the annual return dates, giving data for the end of the financial years 1995/6 and 2001/2, (Registrar, 1997, 2002). These dates spanned a period of intense merger activity, 1997-2001 in which the number of credit unions reduced from 111 to 56. There were 17 credit unions that dissolved, 38 credit unions were acquired by 14 acquirers while 42 credit unions remained unchanged. In all cases we have been able to identify the 'acquirer' and thus are able to track its performance. There were 42 credit unions not undergoing merger activity during the period, which in effect constitute a control group, absence of which was argued as being a flaw in Fried *et al.*'s (1999) methodology (Peristiani, 1999).

The method used for this study is the non-parametric programming technique of Data Envelopment Analysis (DEA). As with other approaches to the measurement of efficiency, efficiency scores will be in the range zero to one, with a score of one indicating that a decision making unit (DMU) is fully efficient, in that outputs cannot be increased with an increase in inputs, and inputs cannot be decreased without a decrease in the production of outputs.

Measuring efficiency is not only consistent with the literature on deposit taking institutions, (for a comprehensive survey of studies using both parametric and non-parametric methods see Berger and Humphrey 1997), but it has also been used for credit unions (see for example Fried *et al.* 1999, Garden and Ralston (1999), Esho (2001), Ralston *et al.* (2001) and Worthington (1999, 2001 and 2004)).

The traditional approaches to DEA are the CCR (constant returns to scale) model of Charnes *et al.* (1978) and the BCC (variable returns to scale) model of Banker *et al.* (1984). These models have their deficiencies, however, in that they propose that DMUs should be either minimising inputs (the input-oriented model) or maximising outputs (the output oriented model). Credit unions should be doing both of these, and their relatively small share of economy-wide financial intermediation means that they are not constrained by the aggregate size of the market, which is a common reason for the use of an input-oriented model for the study of banks. This provides justification for use of a non-oriented model.

A further consideration is that the CCR and BCC models discussed above focus only on radial slacks and do not deal satisfactorily with non-radial slacks.<sup>3</sup> This provides a basis for use of a slacks-based model, as described by Tone (2001). This provides a measure of what is termed mix-inefficiency, which is a product of input and output inefficiencies. Efficiency scores generated must thus be less than or equal to those generated under CCR or BCC models, with these lower efficiency scores providing greater discriminatory power. Tone further notes that the dual of the slacks based model is profit-maximisation, as opposed to either input (cost) minimisation or output (revenue) maximisation.

The type of DEA model used in this research is thus the non-oriented slacks based model, provided in the DEA-Solver software, based around the work of Cooper *et al.* (2000).<sup>4</sup>

The main reported results are generated using a variable returns to scale model, to take

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<sup>3</sup> This is particularly applicable where the input and output variables do not have the same dimensions. See the discussion in Avkiran (2006).

<sup>4</sup> Use of a non-oriented slacks-based model is also justified by Avkiran & Rowlands (2008).

account of the diversity of size among the credit unions, although we also run constant returns to scale models to allow estimation of scale efficiencies.

The other major methodological issue is in modeling the credit unions' production process, for the selection of inputs and outputs. Prior research in banking has focused on two main models of the production process for the measurement of efficiency, the production and intermediation approaches (Berger & Humphrey, 1997). Because credit unions have different objectives to banks, these approaches will not always be appropriate to the study of credit unions, and it is therefore better to be guided by the protocols outlined by Dyson *et al.* (2001). Inputs and outputs should cover the full range of resources used, capture all activity levels, and be common to all units, with environmental variables taken account of as necessary.

Credit union objectives can be summarised as: obtaining a good credit rating, being financially sound, having its deposits secured by the government, remaining a New Zealand owned mutual, expanding its products range, growing both internally and by merger, and being the members' primary financial services provider. Clearly some of these attributes are not mutually exclusive, and neither are they readily amenable to measurement as part of analysis of credit union efficiency.

In the inputs and outputs selected for this analysis, we have sought to comply with these protocols as far as possible. The inputs identified are thus the number of members, administrative costs, and reserves, while outputs are shares (deposits by members), loans,

investments and non-interest income. We considered using physical capital as an input, but this was likely to artificially increase the estimated efficiency of industrial and other credit unions where physical resources have been provided by employers. Physical capital resources will also often be leased, meaning that the use of resources may not be appropriately reflected in accounting numbers.

----- **Tables 3 and 4 about here** -----

Summary statistics for the inputs and outputs, and correlations between them, are reported in Tables 3 and 4. Note that the data for 1996 and 2001 are analysed together, against a common frontier, as we wished to be able to see how efficiency scores had changed over the passage of time during which the consolidation of credit unions was taking place.

A super-efficiency model was used to check for any outliers in the data set, and one was found. Investigation through private communication revealed that particular credit union was in poor financial position and in fact undergoing stabilisation support. It was not considered necessary or appropriate to remove this credit union for that year from the data set.<sup>5</sup>

#### **4. Results**

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<sup>5</sup> We investigated the effect of removing this credit union for the relevant year from the analysis, but there was minimal impact on overall efficiency scores.

The first results compare the efficiencies estimated using a variable returns to scale model. The 56 credit unions in 2001 are composed of 14 that were acquirers i.e. they were the acquirer and survived, and 42 that remained unchanged i.e. they were not acquired and survived as a single entity. The median efficiency scores are reported in Table 5. Mann-Whitney tests were run to determine if there were significant differences for the acquirers and those credit unions that remained unchanged across the period 1996 – 2001, as well as for the combined group of credit unions as a whole.

----- **Table 5 about here** -----

The  $p$  - value (two – tailed) is reported in the 3<sup>rd</sup> column of Table 5. By inspection we can see that there is no significant difference in efficiencies for credit unions that have survived unchanged, the null hypothesis that the samples come from populations with identical distributions cannot be rejected. This is not the case for the acquiring credit unions where we see evidence of a significant improvement ( $p$  – value = 0.0244). Finally the credit unions as a whole show significant improvement ( $p$  – value = 0.0289). No doubt this is a reflection of the increased efficiencies in those credit unions that were involved in acquiring other credit unions as opposed to those that took no part in merger activity. Thus, contrary to previous research, involvement in acquiring other credit unions lead to an improvement in efficiency.



Additional analysis (not reported) was carried out to see whether the dissolved credit unions were significantly different in terms of efficiencies than those that survived, but no statistically significant difference was found.

Spearman correlation coefficients were calculated for both the variable returns to scale model and the constant returns to scale models across the two time periods. The  $p$  – values of these are shown in Table 6.

----- **Table 6 about here** -----

While overall under both measures the rankings are highly correlated, a cursory inspection of the  $p$  – values reveals that this is not the case for those credit unions that have merged, where the rankings are no longer correlated.

Scale efficiency was also investigated, firstly for the acquiring credit unions and those that remained unchanged for the two time periods 1996 and 2001. Testing was undertaken by looking at the differences between the constant returns to scale and variable returns to scale efficiency scores, using the Mann-Whitney test. The only significant scale inefficiency result found was at the 10% level (  $p$  - value 0.0628) for those that has acquired other credit unions, for 2001.

It is interesting that these credit unions were not found to display significant scale inefficiency in 1996, and in fact, the median scale efficiency was higher in 1996 than in 2001. This can be interpreted as meaning that the observed efficiency improvements were

overwhelmingly a result of improvements in technical (X-) efficiency: the credit unions that undertook mergers were able to improve their internal operation without this being an effect of increased scale.

Criticism may be levelled at this analysis because the data has been analysed at two points in time only, 1996 and 2001. There is some anecdotal evidence that merged credit unions may show initial efficiency gains only lose these over time. In the merger literature there is a divergence of opinion as to whether short term measures (market based) or longer term performance measures (accounting based) should be used as measures of operating performance. Sirower (1997, p 123) investigated short-window event studies on acquisitions compared to longer-term performance measures and found them equivalent. A longer time period would not only reduce the sample but also allow for the introduction of potentially spurious effects from endogenous variables.

Finally a Malmquist Index was run, allowing an investigation of total factor productivity and decomposing this into efficiency change and frontier shift. There was a significant improvement in total factor productivity. The results show significant technological progress over the 1996 – 2001 period (median = 1.6048) while the change in efficiency has seen a slight decline (median = 0.9624).

## **5. Conclusion**

The recent wave of credit unions mergers in New Zealand brought about by Government action essentially halved the number of credit unions. The effect of these mergers on

efficiencies was examined using data envelopment analysis. Those surviving credit unions not involved in mergers were able to be used as a control group in the analysis. Overall we find the credit unions have become more efficient over the period, in particular those that undertook mergers as opposed to those that did not. Additionally, a Malmquist index analysis indicates that there has been significant technological progress over the period while there has been a slight fall in terms of technical efficiency.

These results were contrary to previous international research, but may be attributed to the special nature of the mergers, in that they were not undertaken for the usual strategic reasons but were forced upon the credit unions by government action. Many credit unions had only limited time in which to merge with a former possible competitor. One would have suspected that the main cornerstones of synergy, namely strategic vision, power and culture, systems integration and operational strategy could not be sufficiently developed in such a short period. These credit unions were not mature industries as in US and Australian credit union studies, but are of a transitory type, exhibiting characteristics between nascent and mature credit unions. This feature may have impacted on the results. Areas for further research include firstly how the movement has responded to another wave of mergers within the industry. Consideration should also be given to the impact of further regulatory changes now in the pipeline and thirdly to an analysis of differences between different types of credit union. Finally credit union performance should be compared to that of other non-bank institutions.

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Table 1. Merger activity by credit union type, 1996 to 2000.

|               | Dissolved | Merged<br>(Acquired) | Survived<br>merged<br>(Acquirer) | Survived<br>unchanged | Total   |
|---------------|-----------|----------------------|----------------------------------|-----------------------|---------|
| Associational | 3 (18)    | 3 (8)                | 2 (14)                           | 14 (33)               | 22 (20) |
| Community     | 8 (47)    | 14 (37)              | 11 (79)                          | 8 (19)                | 41 (37) |
| Industrial    | 6 (35)    | 21 (55)              | 1 (7)                            | 20 (48)               | 48 (43) |
| Total         | 17        | 38                   | 14                               | 42                    | 111     |

Column percentages are given in brackets.



Table 2. Assets and members of New Zealand credit unions, 2001/2.

| Asset range NZ\$    | Total assets NZ\$ | Group assets as a percentage | Number of credit unions | Number of members |
|---------------------|-------------------|------------------------------|-------------------------|-------------------|
| Over 9,500,000      | 272,243,249       | 65.1                         | 13                      | 111,431           |
| 3,000,001-9,500,000 | 101,353,589       | 24.3                         | 17                      | 44,447            |
| Below 3,000,000     | 44,401,019        | 10.6                         | 26                      | 23,193            |
| Total               | 417,997,857       | 100.0                        | 56                      | 179,071           |

Notes:

Excludes ten credit unions either disbanded (6) or in liquidation (3) or under investigation  
(1)

Source: Registrar of Friendly Societies and Credit Unions (2002)

Table 3: Summary statistics for credit unions (those existing in both 2001 and 1996 only).  
 Figures in NZ\$ (except for number of members).

|                    | Members  | Administrative costs | Reserves | Shares   | Loans    | Investments | Non-Interest Income |
|--------------------|----------|----------------------|----------|----------|----------|-------------|---------------------|
| Maximum            | 14726    | 2107806              | 5049045  | 34905323 | 29845927 | 15881933    | 1875119             |
| Minimum            | 151      | 10917                | -404161  | 0        | 0        | 29880       | -6282               |
| Average            | 2898.83  | 401885.5             | 700494.2 | 5238826  | 4498315  | 1564136     | 134744.7            |
| Standard Deviation | 3310.727 | 478619               | 947530.8 | 6462714  | 5724598  | 2166249     | 281650.1            |

Table 4: Correlations between inputs, outputs and between inputs and outputs.

|                     | Members | Administrative costs | Reserves | Shares | Loans  | Investments | Non-Interest Income |
|---------------------|---------|----------------------|----------|--------|--------|-------------|---------------------|
| Members             | 1       | 0.8284               | 0.7771   | 0.8143 | 0.9009 | 0.6866      | 0.5020              |
| Admin costs         | 0.8284  | 1                    | 0.7585   | 0.7122 | 0.7981 | 0.4570      | 0.8329              |
| Reserves            | 0.7771  | 0.7585               | 1        | 0.7899 | 0.8633 | 0.5725      | 0.4523              |
| Shares              | 0.8143  | 0.7122               | 0.78992  | 1      | 0.9416 | 0.7742      | 0.3803              |
| Loans               | 0.9009  | 0.7981               | 0.86330  | 0.9416 | 1      | 0.7078      | 0.4412              |
| Investments         | 0.6866  | 0.4570               | 0.57247  | 0.7742 | 0.7078 | 1           | 0.2232              |
| Non-Interest Income | 0.5020  | 0.8329               | 0.45227  | 0.3803 | 0.4412 | 0.2232      | 1                   |

Table 5 Median efficiency scores by credit union status

|                                     | 1996   | 2001   | <i>p</i> – value (difference) |
|-------------------------------------|--------|--------|-------------------------------|
| Survived unchanged ( <i>n</i> = 42) | 0.2644 | 0.3782 | 0.1498                        |
| Survived merged ( <i>n</i> = 14)    | 0.2373 | 0.4369 | 0.0244                        |
| Combined ( <i>n</i> = 56)           | 0.2458 | 0.4037 | 0.0289                        |

Table 6 Spearman correlation coefficients ( $p$  –values) for the variable returns to scale and constant returns to scale model.

|                                 | Variable<br>returns to<br>scale | Constant<br>returns to<br>scale |
|---------------------------------|---------------------------------|---------------------------------|
| Survived unchanged ( $n = 42$ ) | 0.0205                          | 0.0052                          |
| Survived merged ( $n = 14$ )    | 0.4424                          | 0.5320                          |
| Combined ( $n = 56$ )           | 0.0181                          | 0.0031                          |