

Examination of economies of scale in credit unions: a New Zealand study

Alexander Sibbald * and Lynn McAlevey **

Department of Management *, Department of Finance and Quantitative Analysis **,
The University of Otago (To be Published in Applied Economics Journal,)

1. INTRODUCTION

The increasing competition in the financial services sector heightens the desirability of institutions seeking efficiencies in order to maintain or increase market position, and increase profitably. One possible strategy is the pursuit of economies of scale, e.g. through takeovers and mergers. Examples in the banking industry in New Zealand are numerous, such as the Australia and New Zealand Bank (ANZ) acquiring Postbank, and Westpac merging with TrustBank.

The New Zealand credit union industry, as a relatively new player in the financial services sector, is also experiencing extensive growth and merger actions, partly as a means of seeking similar profitability aims, but also to demonstrate financial stability. Unfortunately, in recent years the industry has also suffered from the financial collapse of several credit unions. This pursuit of growth presents an opportunity to establish the presence, or otherwise, of economies of scale in this sector.

The methodology used in this research has aspects in common with previous studies, but differs in a very important and essential feature, in that the authors obtained a census. Thus differences that are found do actually exist. This makes an important and different contribution to the literature. The only question remaining is whether they represent true economic differences?

Previous studies, Kohers and Mullis (1988), McKillop et al. (1995) and Ferguson and McKillop (1997), have essentially employed the method of paired *t*-tests to analyse much of the data. There are inherent problems with such an approach. Firstly there is the issue of multiple testing; this occurs when several tests are made at the same time. Thus if (say) a 5% level of significance is made for each of *m* tests then a significant result can be expected on 5% of the tests by chance alone. With *m* large at

least one significant test result is likely to occur, even when the groups compared come from the same population. This means that as far as the combined tests are concerned, the probability of a Type I error (accepting a difference when none exists) is too high, while the probability of a Type II error (accepting that there is no difference when one exists) is extremely low. There is also the issue concerning robustness of the t statistics used, as some of the distributions would be expected to be non normal. All the papers above state the wrong formula (albeit a duplicated typo) for a paired t test; one suspects however that the authors used the correct form in the analysis.

There are some additional problems with the results of McKillop et al. (1995) and Ferguson and McKillop (1997). How exactly are credit unions paired on the basis of size differences? There are also inconsistencies with t values and associated levels of significance, and the sample sizes for the statistics are not consistent.

Additionally, there are problems in interpreting the multiple regression results. Despite the above issues the results found by the authors may to a large extent exist. The authors of this paper were able to obtain a census, and thus avoid issues of multiple testing.

II. BACKGROUND

Credit unions are member owned financial cooperatives, which at the most basic level provide savings and lending services to their members, principally in the small consumer loan market, although the larger ones also offer house mortgages, and small business loans. In essence, they are examples of a 'pure' cooperative as they are both owners of the organisation, and consumers of its output. They operate on the basis of open membership, democratic control, and the common bond. The latter concept is the glue that joins the membership together. A credit union can recruit members on the basis of their residency, such as living in the Otago region, or because they are employed by a particular company (industrial), e.g. an employee of the Fletcher Challenge company, or belong to a church, trade union, political party, profession, or some similar association (associational). In 1996, slightly under half (47%) of all credit unions were community based, a further 42% were industrial, and

the remainder were associational (Registrar of Friendly Societies and Credit Unions, (Registrar), 1997).

This cooperative ethos extends to the industry level, and in New Zealand credit unions have the opportunity to voluntarily belong to a trade association. There are two such bodies. The dominant one is the New Zealand Association of Credit Unions (NZACU). Secondly, 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 by means of a series of geographical divisions. However, these are not truly independent, in that outside bodies cannot join AMUCU.

These umbrella national organisations 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. NZACU represented 83% of all New Zealand credit unions, 70% of total membership, and 67% of total assets in 1996. In contrast, the AMUCU represented 9%, 9.5%, and 16.5% respectively. The remainder (8%, 20.5% and 16.5% respectively) operated independently, i.e. were unaffiliated to a trade association (Registrar, 1997). However, collaboration between the two umbrella organisations is minimal. In turn, national associations can join the World Council of Credit Unions (WOCCU), which in 1992 had a worldwide membership of 92.3 million in 85 countries, and total assets of \$463.9 billion US (MacPherson, 1999).

Most historians (Smith, 1969), trace the emergence of 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. Unfortunately, it was another twenty five years or so before the New Zealand movement gained any sort of major momentum. However, one of the largest credit unions (Unicare), which as an associational type has its roots in the old Post Office trade union, claims a life span from the late 1930s. Unicare operated unaffiliated in 1996 and prior to this date, but subsequently joined the NZACU two years later.

III. METHODOLOGY

Most economies of scale studies of credit unions are of American (Kohers and Mullis, 1988; Kim, 1986; Cox and Whigham 1984; Murray and White, 1983; Wolken and Novrath, 1980; Koot, 1978; Flannery, 1974; Taylor, 1971; Cargill and Vincell, 1969) or British origin (Ferguson and McKillop, 1997; McKillop et al., 1995). These various studies often give conflicting results. For example, Kohers and Mullis (1988), Koot (1978), and Flannery (1974), found no evidence of scale economies, in contrast to Ferguson and McKillop (1997), McKillop et al. (1995), Murray and White (1983), Wolken and Navrath (1980), who came to the opposite conclusion.

McKillop et al. (1995) point out that a cost function approach is the most accepted methodology for the existence or otherwise of scale economies. However, we found similar problems to them, in their study of the UK credit union movement, due to the voluntaristic nature of credit unions. Many New Zealand credit unions also depend upon donated capital (74%), and labour (30%) (Registrar, 1997), and thus their input costs relate solely to furniture, equipment, printing and stationery. A second problem concerns the lack of data on numbers of employees, for those credit unions which do report capital and labour expenditure in their annual reports, making it impossible to determine an input price, and similar items.

Therefore for the purpose of this study, and as with Ferguson and McKillop (1997), and McKillop et al. (1995), we draw upon the work of Kohers and Mullis (1988), and Cox and Whigham (1984), and use two features of efficiency, viz. a flow or income statement measure of operating costs (excluding interest and dividends paid to members) to operating income, and static or balance sheet measure of operating costs (excluding interest and dividends paid to members) to total assets.

To compensate for voluntary labour and the like in smaller unions, we have adjusted downward the financial ratios of all unions by removing from the numerators, remuneration (wages and salaries to employees, officer expenses and honorarium payments to Treasurers), thus providing more comparable ratios. This helps address the bias against finding economies of scale that donated capital introduces.

The period chosen for the study of economies of scale was at the annual return dates, mostly the end of September, reported during the year ended 30 June 1996 (Registrar, 1997). One hundred and twenty credit unions were registered for operation, although in effect eight were inactive leaving 112 for inclusion in the database for analysis.

IV. CREDIT UNIONS IN NEW ZEALAND

As a basis for analysis throughout this paper, we formed three groups by total assets size. Group one consists of those with total assets between \$55,000 and \$500,000 inclusive, group two contains unions between \$500,001 and \$2,500,000 inclusive, and group three for those organisations over \$2,500,000. Constructed in this manner the groupings gave a realistic and recognisable breakdown of small, medium sized, and large credit unions. Note, we do not analyse the data on the basis of trade association membership, or non-membership, and therefore do not report upon the performance of NZACU and AMUCU membership, or those unaffiliated to one. More than four fifths of all credit unions (83%) are members of NZACU (Registrar, 1997).

In trying to determine the existence, or otherwise, of economies of scale, this paper operates on three levels. Firstly, we adopt a broad brush macro approach, i.e. look at credit unions in aggregate, and examine the three asset groups in terms of membership, asset decomposition, cost structure, and operational efficiencies.

Secondly, we utilise a more rigorous statistical analysis by examining operational efficiencies of individual credit unions, i.e. a micro approach, within the same asset size categories as above. Finally, in contrast to the previous work, which examines data at a moment in time, we conduct a longitudinal investigation of the operational efficiencies of a large credit union over time, i.e. the last thirteen years of its development.

Assets and Members' Distribution

Table 1 below, shows the distribution of total assets, numbers of credit unions and membership for the three asset ranges.

.....Table 1 about here.....

Although only about 30% of the credit unions are in the highest asset category (Over \$2,500,000) they account for approximately three quarters (76%) of the total membership, and 82% of the total assets. In contrast, a sizeable minority (28%) are in the smallest asset base (\$55,700 to \$500,000), but only account for 2% of the total assets, and about 4% of the total membership.

Further examination of Table 1 shows those larger credit unions are considerably wealthier than smaller ones, with a marked downward trend, such that in the former group, assets per member are \$2,089, and \$1,567 in the middle asset range, falling to \$915 for the smallest ones. Overall, this averaged out at \$1,937 for all credit unions. Clearly, there is a significant relationship between size and wealth within the sectors, and this may demonstrate economies of scale. McKillop et al. (1995) found similar findings for the UK credit union movement. Our later less descriptive statistical analysis sheds more light on this suggestion.

Asset Decomposition

The asset structure of credit unions is given in Table 2, again on the basis of asset size, as follows

.....Table 2 about here.....

Examination of Table 2 shows that for all asset categories, the largest proportion of assets are loans to members, with the highest figures being for the largest sized and middle sized groups (77% and 75%) respectively, while the smallest sized group of credit unions showed 68%. The latter also hold the largest proportion of their assets in cash (23%), which is about twice the level of the other asset categories (10% largest sized and 12% middle sized group.) This high level may be due to liquidity

constraints, and/or because their largely volunteer staff do not make offering loans to members a high priority. Again economies of scale may be at work here.

Cost Structure

Analysis of cost structure of credit unions is problematic, as small and/or industrial credit unions can cover their obligations with voluntary unpaid staff, and free premises. This voluntary nature is part of the ethos of the movement (Sibbald et al., 1999). In contrast, larger credit unions, because of their very nature, are unable to operate their business without paid staff, and buying, renting or leasing premises. Consequently, the true cost of operation for smaller credit unions will probably exceed the actual cost to a greater extent than for larger ones.

Later on in the paper, see Tables 5 and 6, we adjust for this problem by subtracting remuneration (wages and salaries of employees, officer expenses and honorarium to Treasurer) from operating costs in the statistical treatment of the operational efficiency ratios. In Table 4, operating costs both include and exclude remuneration. The following Table 3 shows the results from a cost structure analysis.

.....Table 3 about here.....

A relatively bigger share of the larger unions' total (i.e. operating) costs go towards remuneration and occupancy costs. The largest and middle sized categories reported a similar sizeable proportion spent on remuneration, i.e. 40% and 38% respectively.

The smallest credit unions, as expected, spent about half of the other two groups (21%). Note that all credit unions in the top group, and 75% in the middle group, engaged paid staff, compared to 42% in the smallest asset size: that is nearly three fifths (58%) of the latter relied entirely on volunteer staff to run their organisations (Registrar, 1997).

With respect to occupancy costs, the largest group spent (relatively) considerably more than the other two groups (4% of total costs compared to 0.7% and 1.5% respectively). One might have expected that the proportion for the middle group would have been higher and produced a ranking from large through medium to small

unions in keeping with previous findings. However, caution needs to be exercised with this data. Other costs in the above table include two items, 'other expenditure' and 'other administration costs', the exact nature of which are indeterminable from the raw data given in the annual returns. Although they are included in the 'other costs' category in Table 3, it is possible they may include remuneration and occupancy costs. Other expenditure and other administration costs together totalled around 70% of the other costs item in Table 3, for each of the three asset groups. The total of remuneration and occupancy costs moved downwards from 44% for the largest sized asset category to 39% for the middle group, and 22.5% for the smallest (group one). It can be concluded that the true cost of operation exceeds the actual cost to a greater extent for smaller credit unions than for larger ones, and in consequence may result in a downward bias in scale economies estimates.

Operational Efficiencies

The ratio of operating costs to income (operating costs/income) measure in Table 4 below suggests that economies of scale may be at work, as it shows values of 0.939, 0.528, and 0.498 for small, medium and large sized groups respectively. Excluding remuneration from the calculation, for the reason stated earlier, showed a similar ranking (0.788, 0.332, and 0.298 respectively), but does indicate again that the efficiency of the smaller credit unions is artificially boosted by the use of unpaid volunteer labour. But these are aggregate figures, and in order to get a clear picture of the existence or otherwise of scale economies, we subject the data to more rigorous analysis later on in the paper.

.....Table 4 about here.....

Another measure of operating efficiency, taking the operating cost (i.e. total costs in Table 3) per number of loans into account, shows that on average the largest credit unions (Over \$2,500,000 total assets) are less efficient than the middle group, but more efficient than the smallest unions (\$194, \$167, and \$254 respectively). Eliminating remuneration from the operating cost per number of loans calculations makes no difference to these relative comparisons, but increases the gap between largest and smallest sized groups (\$115, \$103, and \$202 respectively). The number of loans used in the calculations was 90,990 for group three, 20,773 for group two, and

3,113 for group one. Interestingly, Ferguson and McKillop (1997) found the opposite effect in their study of the UK credit union movement.

Results of Statistical Analysis

In this section, we adopt a micro approach, and statistically look at operational efficiencies for individual credit unions in each asset class, rather than aggregated figures, as in the previous sections. As in all data analysis it is informative to view the results first.

Figure 1 below shows the ratio of operating cost to total assets for the three different total assets groups. It is of interest to see the existence of some outliers from the plots.

There is always debate on how best to handle outliers; informed statistical practice is to retain them in an analysis, if after research they represent real data points. We conducted an investigation of outliers, and found no reason to exclude them, so all were retained for analysis.

The most prominent outlier, i.e. that most different from surrounding data points, is in group three (Over \$2.5 million total assets). It was in fact a union where fraud had recently occurred. At the time of writing it is still in existence, and is reportedly returning a profit. The ratios are a snapshot of the industry at that particular point in time, and it is likely that some outliers will always be found, and indeed are most likely to have been present in the other reported studies.

..... Figure 1 about here.....

From the graph we see group one (\$55,000 to \$500,000 total assets) showing the largest variation as expected, because it contains the smallest unions. In group two the variation has markedly reduced; group three exhibits somewhat similar properties, and has an obvious outlier. Overall the results do not show economies of scale across the three groups. Diseconomies of scale, for example markedly increased occupancy costs, auditing fees and the like, occur after a certain size. The outliers also have some effect. A corresponding graph, but not shown here, for the ratio of operating costs to income, gives plots that are very similar, again with the same outlier for group three.

The results for the above two efficiency ratios for each of the three groups are given in Table 5 (operating costs to total assets), and Table 6 (operating costs to operating income) below. The median is used as the measure of central tendency, as it is less sensitive to outliers than the mean.

Operating Costs to Total Assets

We find that the ratio of costs to assets below in Table 5, decreases from group one to group two (0.0491 to 0.0358), and then increases to group three (0.0390). It is of interest to explicitly consider the effect of the outlier in the latter. Removing it from the analysis, for economic reasons, gives a median of 0.0377, and thus there is no change to the results.

.....**Table 5 about here**.....

Exactly the same pattern is found if the mean had been used as a measure of central tendency (values 0.0615, 0.0391, and 0.0434 respectively). Also worthy of note is that using the mean as the measure for central tendency, and omitting the outlier in this case, actually decreases the mean value for group three to 0.0391, which is the same as for group two.

Operating Costs to Operating Income

We treated the ratio of operating costs to operating income in the same manner as above, and as shown in Table 6 below. Here the ratio (i.e. using the median as the measure) decreases as expected in going from group one to group two (0.4678 to 0.3148), and a further slight decrease is found from group two to group three (0.3148 to 0.3113). An analysis with means would have seen a similar pattern (0.5054, 0.3251, and 0.3272 respectively).

The data was again analysed to see the effect of the dominant outlier in group three. Removing it gives a further decrease in the median to 0.3077. Using means, and eliminating the outlier, gives a new value of 0.3042.

.....**Table 6 about here**.....

In summary we find clear evidence of decreasing ratios on going from group one to group two. Using the median as our measure shows an increase in the operating costs to total assets ratio (8.9%) on going from group two to group three. For the ratio of operating costs to income there is a decrease between the two groups (1.1%).

For both efficiency ratios we note the standard deviation decreases from group one to group two as is expected. From group two to group three there is an increase. Removing the dominant outlier from group three still results in an increase in the operating costs to total assets ratio, giving a new standard deviation of 0.0224. However a slight decrease is found for the operating costs to operating income ratio (0.1248).

Interquartile range (i.e. Q3 - Q1) are also of interest: they measure where the middle 50% of observations lie. Here we find the operating costs to total assets in Table 5 give 0.0387, 0.0255 and 0.0273 respectively. Thus the middle 50% of values become more concentrated by group two then diverge a little for group three. This can also be discerned from Figure 1. The corresponding values are 0.2713, 0.1857 and 0.1425 respectively, for the operating costs to operating income ratio, showing here a more central concentration across the three groups.

Using both the results from measures of central tendency, and the variability with the three groups, we find evidence of scale economies in this situation. Efficiency in general increases as expected, while the central observations tend to become more concentrated, although our concerns about measures, outliers, and ratios need to be borne in mind. Thus, outcomes depend not only on measures, i.e. median or mean, but on the exclusion or inclusion of outliers, and also the efficiency ratios used, as above.

V. A LONGITUDINAL CASE STUDY

The ratio analysis in all studies found in the literature, and also in this paper so far, have been on a cross-sectional basis. It must be remembered that the two ratios used are dynamic and not perfectly correlated with each other, or the asset base. Bearing this in mind, we wanted to try and establish any possible indication of economies of

scale over time, as all other studies relate to a moment in time. For a preliminary longitudinal analysis, we selected Credit Union Otago, as the subject for our analysis, because one of the authors is a Director, and accurate records were readily available.

It is one of the largest credit unions in New Zealand, and is community-based with, as at the end of the financial year 1999/00, seven thousand eight hundred and six members, total assets of \$18.8 million, and net worth of \$2.0 million. Five small industrial credit unions merged together in 1987 to form this enlarged community-based movement. For all years of analysis in this study, Credit Union Otago was a group three category, i.e. total assets greater than \$2.5 million.

Table 7 below, shows the ratios for operating costs to income, and operating costs to total assets, for the period 1988-00, utilising the information given in the annual reports. Operating costs excluded remuneration (staff wages and salaries, dividends and interest to members, officer expenses) in both ratios.

.....Table 7 about here.....

Both measures in Table 7 indicate continuing economies of scale from \$4 million up to about \$7 million total assets. The operating costs/income ratio shows diseconomies from there on to about \$11 million. Thereafter, efficiency starts to increase again up to its present asset base of \$18.8 million. The operating costs to total assets ratio stays steady from about \$7 million to about \$11 million in assets. From there on this ratio, in contrast to operating costs/income, increases up to \$18.8 million, revealing diseconomies of scale.

VI. CONCLUSIONS

From this study, significant efficiency gains are likely for small credit unions (group one) to medium sized (group two) through the adoption of an asset growth policy. So although larger credit unions find it necessary to employ full time staff, which initially affects their cost efficiency adversely, once they achieve significant critical mass, i.e. assets in excess of \$500,000, further and much enhanced levels of operational efficiency are achieved. However, the evidence is conflicting for group

three (large credit unions), dependent upon the measures and ratios used, and the inclusion or exclusion of outliers.

From a cost efficiency perspective these results tend to support continued asset growth up to a point. Much merger activity in New Zealand has resulted over the last three years or so, because of government regulations, and perhaps the belief in the doctrine of economies of scale. For example, the number of credit unions in New Zealand fell 13.5% from 1996 to 1998. On the contrary, the figures for membership and total assets increased (1.0% and 12.5% respectively). Of those credit unions no longer trading, some became insolvent, but most transferred their engagements (merged) to other credit unions (Registrar, 1999).

However, an important factor driving this merger activity has been pressure from the government and regulator (Ministry of Commerce) to comply with much more severe and stringent financial guidelines. For example, the Registrar (1999:1) wrote:

“My main aims are the promotion of rationalisation and efficiency within...credit unions. I therefore concentrated on encouraging continuing solvency ...by assisting those having difficulties to leave the market...and compliance with obligations imposed...particularly in relation to financial reporting.”

Currently, credit unions are exempt from having a trust deed for their securities under the Securities Act, 1978. However, as from April 2001, they will be required to provide one or go out of business.

In 1999, the NZACU, on behalf of its members, and at a considerable development cost, with yearly ‘maintenance’ costs to follow, signed an agreement with the Tower Trust company to provide such insurance back-up. In effect the latter become a prudential supervisor with somewhat draconian powers, but on the credit side, it means that the members’ shares are secured in the event of liquidation. Currently they are unsecured deposits, which is seen as an impediment to growth as potential investors feel unhappy about the security of their capital. The prudential supervisor

will give the movement a credibility it previously lacked. Non-association members are currently considering joining the NZACU trust deed scheme. For these organisations, which in 1996 constituted 17% of all New Zealand credit unions (Registrar, 1997), the only real alternatives are to go out of business, merge with an NZACU member if unaffiliated, or provide a trust deed of their own, which would be an even more costly exercise than the document agreed between NZACU and Tower Trust. The resulting compliance costs, the ensuing hassle, and costly professional advice, have helped drive the smaller ones out of business.

In accepting the need for a trust deed the credit union movement expected the previous government to remove the restriction on deposits, which, at the moment, limits each member to a maximum of \$40,000. It failed to do so. However, at the time of writing, the new Labour/Alliance coalition government has instigated more sympathetic and proactive measures to encourage credit union growth in the shape of extending member shares to a maximum of \$250,000. Regulations that inhibit growth, and the imposition of this \$40,000 cap are seen as a major restriction on scale economies, are also viewed as inimical to market efficiency.

The results from this research shows there is no conclusive evidence of continuing economies of scale in New Zealand credit unions. Caution needs to be exercised by policy makers if using the findings as a basis for future developments, bearing in mind the qualification made earlier about the effect of measures, ratios and outliers on the results. Moreover, such a strategy can conflict with the movement's roots as smallness means that the officials and management are on first name terms with the membership. This becomes progressively difficult with increasing size. Growth for the sake of growth could be seen to sail close to strategies adapted by banks through rationalisation, resulting in the closing down of branches, which is a particular problem in rural New Zealand.

So credit union directors and industry leaders have to decide if they want to trade off closeness to the membership in the pursuit of doubtful cost efficiencies. However, given the increasing compliance costs, and regulator pressures, they may be forced to seek rationalisation, whether or not operational efficiencies occur, as a result of this action. On the other hand, economies of scope may be present, in terms of the products and services offered to members (Kim, 1986; Murray and White, 1983).

VII. FINAL COMMENTS

In mid 1996, the top ten credit unions in the NZACU commenced offering debit card services to their members, utilising technology such as ATMs (Automatic Teller Machines) and Eftpos (Electronic Funds Transfer at Point of Sale), by making an arrangement with the two Eftpos suppliers, and the major banks to use their electronic services, but at a cost. Only now is the service being taken up by other

members, about 20 other credit unions in 1999, and others outside the association network, are also considering joining the system. The continuing proliferation of services suggests a study in scope economies would be a worthwhile exercise.

The NZACU is also currently pursuing other possible options for scale economies. One strategy being explored is the creation of a New Zealand wide administration headquarters, which would process commonly occurring activities, such as sending out notices to members, or auditing arrangements, across the whole national movement. This comes close to becoming one New Zealand wide credit union, and if it came to pass, would mean the demise of the NZACU. Not surprisingly, the proposal met resistance from some credit unions, particularly industrial ones, as they felt this went against the voluntaristic ethos, and removed control from local staff. It also shows contradictions, in that credit unions were founded, so that people could help each other and work cooperatively (Sibbald, et al., 1999), yet occasionally at the industry level they view each other with suspicion, and do anything but work cooperatively.

ACKNOWLEDGMENTS

The authors thank Warren Sloan ex Registrar of Friendly Societies and Credit Unions for his help in the analysis of the raw data.

REFERENCES

Cargill, T.F. and Vincell, D.C. (1969) Costs and profits of California credit unions, *presented at the Western Economic Association*, Long Beach California.

Cox, W.N. and Whigham, P. V. (1984) What distinguishes larger and more efficient credit unions? *Economic Review*, Federal Reserve Bank of Atlanta, **69**, pp. 34-40.

Kohers, T. and Mullis, D. (1988) An update on economies of scale in credit unions, *Applied Economics*, **20**, pp. 1653-1659.

Ferguson, C. and McKillop, D. (1997) *The strategic development of credit unions*, Wiley, Chichester.

Flannery, M.J. (1974) *An economic evaluation of credit unions in the United States*, Federal Reserve Bank of Boston, Research Report No. 54.

Fried, H.O. Knox, Lovell, C.A. Von Eeckhout, P. (1993) Evaluating the performance of US credit unions, *Journal of Banking and Finance*, **17**, pp. 251-265.

Kim, H.Y. (1986) Economies of scale and economies of scope in multiproduct financial institutions; further evidence from credit unions, *Journal of Money, Credit and Banking*, **18**, pp. 220-226.

Kohers, T. and Mullis, D. (1988) An update on economies of scale in credit unions, *Applied Economics*, **20**, pp. 1653-1659.

Koot, R.S. (1978) On economies of scale in credit unions, *Journal of Finance*, **33** (4), September, pp. 1087-1094.

McKillop, D. Ferguson, C., and Nesbitt, D. (1995) Paired difference analysis of size economies in UK credit unions, *Applied Economics*, **27**, pp. 529-537.

MacPherson, I. (1999) *Hands around the globe*, Horsdal and Schubart, Victoria, British Columbia.

Murray, J.D. and White, R.W. (1983) Economies of scale and economies of scope in multiproduct financial institutions; a study of British Columbia credit unions, *Journal of Finance*, **38**, pp. 887-902.

Registrar of Friendly Societies and Credit Unions (1999) *Report for the year ended 30 June 1999*, Ministry of Commerce, Auckland.

Registrar of Friendly Societies and Credit Unions (1997) *Credit union annual reports for the year ended 30 June 1996*, Ministry of Commerce, Wellington.

Sibbald, A. Ferguson, C. and McKillop, D. (1999) A comparative analysis of selected features affecting credit union industry development with special reference to the UK and New Zealand. *Financial Services Research Forum*, The Queen's University of Belfast and University of Ulster, <http://ubs1.ubs.ulst.ac.uk/~charlie/fsrf.htm>.

Smith, C. (1969) Credit unions in New Zealand. In N. Runcie, *Credit unions in the South Pacific: Australia, Fiji, New Zealand, Papua New Guinea*, London University Press, London.

Taylor, R. (1971) Economies of scale in large credit unions, *Applied Economics*, **4**, pp. 33-40.

Wolken, J.D. and Navrath, F.J. (1980) Economies of scale in credit unions: further evidence, *Journal of Finance*, **35** (3), June, pp. 769-777.

World Council of Credit Unions (1996) *Statistical report*, Madison, Wisconsin.

Table 1 Assets and members of NZ credit unions, 1996

| Assets range | Total | Group assets | Number | Number |
|--------------|-------|--------------|--------|--------|
|--------------|-------|--------------|--------|--------|

| (\$) | Assets (\$) | as a Percentage | of credit unions | of members |
|---------------------|----------------|--------------------|---------------------|---------------|
| Over 2,500,000 | 294,818,348 | 82.3 | 34 | 141,127 |
| 500,001 - 2,500,000 | 56,031,149 | 15.7 | 47 | 35,757 |
| 55,700 - 500,000 | 7,258,366 | 2.0 | 31 | 7,936 |
| Total | 358,107,863 | 100.0 | 112 | 184.820 |

Notes:

- Excludes eight credit unions with zero assets, seven of which were unaffiliated to a trade association. Inactivity can be explained by transfer of engagement (merger) to another credit union, going into liquidation, and disbanding.
- * Source: from annual returns provided by the Registrar, 1997.

Table 2 NZ credit unions' asset decomposition, 1996

| Asset range (\$) | Net loans to members (\$) | Investments (\$) | Cash in hand & at bank (\$) | Other assets (\$) | Total Assets (\$) |
|---------------------|---------------------------------|---------------------|--------------------------------------|-------------------------|-------------------------|
| Over 2,500,000 | 226,158,209 | 27,081,258 | 29,605,332 | 11,973,549 | 294,818,348 |
| 500,001 - 2,500,000 | 42,260,973 | 6,111,268 | 6,479,215 | 1,179,693 | 56,031,149 |
| 55,700 - 500,000 | 4,968,024 | 547,606 | 1,633,163 | 109,573 | 7,258,366 |
| Total | 273,387,206 | 33,740,132 | 37,717,710 | 13,262,815 | 358,107,863 |

Notes:

- Investments include: government securities; local authority and state owned enterprise securities; investments in NZACU (members only); other investments.
- Other assets include: land and buildings; loans to other credit unions; sundry debtors; miscellaneous assets.
- Source: from annual returns provided by the Registrar, 1997.

Table 3 NZ credit unions cost structure, 1996

| Asset range (\$) | Remuneration | Occupancy Costs (\$) | Other costs (\$) | Total costs (\$) |
|---------------------|--------------|-------------------------|---------------------|---------------------|
| Over 2,500,000 | 7,096,303 | 739,263 | 9,774,541 | 17,610,107 |
| 500,001 - 2,500,000 | 1,321,437 | 22,635 | 2,118,555 | 3,462,647 |
| 55,700 - 500,000 | 162,342 | 10,735 | 619,088 | 792,165 |
| Total | 8,580,082 | 726,653 | 12,512,184 | 21,864,921 |

Notes:

- Remuneration includes: honorariums to Treasurer; salaries and wages to staff; officer expenses.
- Occupancy costs include: depreciation on properties, expenses on properties.
- Other costs include: depreciation on fixed assets; association dues, (where relevant); loan and savings insurance; loans written off; other expenditure; other administration costs.
- Source: from annual returns provided by the Registrar, 1997.

Table 4 NZ credit unions' operational efficiencies, 1996

| Asset range (\$) | Operating (a) costs/income | Operating (a) costs-remuneration(b)/income | Number of credit unions |
|---------------------|----------------------------|--|-------------------------|
| Over 2,500,000 | 0.498 | 0.298 | 34 |
| 500,001 - 2,500,000 | 0.528 | 0.332 | 47 |
| 55,700 - 500,000 | 0.939 | 0.788 | 31 |

Notes:

- (a) Operating costs exclude dividends and interest paid on members' deposits (shares), but includes remuneration costs.
- (b) Remuneration costs include an honorarium to Treasurer, officer expenses and wages/salaries paid to staff.
- Source: from annual returns provided by the Registrar, 1997.

Table 5 New Zealand credit unions - Operating costs to total assets, 1996

| | \$55,000-500,000 Group One (n = 31) | \$500,001-2,500,000 Group Two (n = 47) | Over \$2,500,000 Group Three (n = 34) |
|---------------------|-------------------------------------|--|---------------------------------------|
| Maximum | 0.1838 | 0.1045 | 0.1863 |
| Upper Quartile (Q3) | 0.0707 | 0.0502 | 0.0518 |
| Median | 0.0491 | 0.0358 | 0.0390 |
| Lower Quartile (Q1) | 0.0320 | 0.0247 | 0.0245 |
| Minimum | 0.0171 | 0.0093 | 0.0057 |
| Standard deviation | 0.0395 | 0.0201 | 0.0338 |

Notes:

- Operating costs: excludes remuneration, dividends and interest.
- Source: from annual returns provided by the Registrar, 1997.

Table 6 New Zealand credit unions - Operating costs to operating income, 1996

| | \$55,000- 500,000 Group One (n = 31) | \$500,001- 2,500,000 Group Two (n = 47) | Over \$2,500,000 Group Three (n = 34) |
|---------------------|---|--|--|
| Maximum | 1.2368 | 0.6037 | 1.0903 |
| Upper Quartile (Q3) | 0.5914 | 0.4086 | 0.3683 |
| Median | 0.4678 | 0.3148 | 0.3113 |
| Lower Quartile (Q1) | 0.3201 | 0.2229 | 0.2258 |
| Minimum | 0.2050 | 0.0928 | 0.0541 |
| Standard deviation | 0.2540 | 0.1313 | 0.1839 |

Notes:

- Operating costs: excludes remuneration, dividends and interest.
- Source: from annual returns provided by the Registrar, 1997.

Table 7 Credit Union Otago - Operational efficiency measures, 1988-00

| Year ending | Operating costs/ income | Operating costs/ total assets | Total assets (\$ millions) |
|-------------|----------------------------|----------------------------------|-------------------------------|
| 1988 | 0.361 | 0.051 | 4.0 |
| 1989 | 0.338 | 0.041 | 5.4 |
| 1990 | 0.280 | 0.035 | 6.7 |
| 1991 | 0.262 | 0.036 | 7.7 |
| 1992 | 0.297 | 0.037 | 9.4 |
| 1993 | 0.310 | 0.037 | 10.5 |
| 1994 | 0.399 | 0.045 | 11.3 |
| 1995 | 0.359 | 0.041 | 12.7 |
| 1996 | 0.388 | 0.048 | 13.8 |
| 1997(a) | 0.333 | - | 15.0 |
| 1998 | 0.379 | 0.058 | 14.8 |
| 1999 | 0.383 | 0.054 | 18.0 |
| 2000 | 0.367 | 0.056 | 18.8 |

Notes

- (a) Six month period in 1997; the financial year end changed from September to March, so operating costs/total assets not calculated.

* Source: Credit Union Otago annual reports.