A COMPARATIVE ANALYSIS OF ACCOUNTING AND FINANCIAL PRACTICES ASSOCIATED WITH EFFICIENCY OF COOPERATIVE RURAL BANKS IN SRI LANKA

A dissertation submitted by

Ariyarathna Jayamaha

B.Com (HONS), M.Com, ACA

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School of Accounting, Economics and Finance
University of Southern Queensland
Toowoomba
AUSTRALIA

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ABSTRACT

In Sri Lanka, the formal rural financial sector comprises a large number of small financial institutions (SFIs) that are highly criticised for weak performance. The weak performance has been attributed to poor governance. Consequently, the sustainability of these institutions is uncertain. This uncertainty adversely affects economic growth as investment in agriculture and small enterprises by poor rural households relies on the provision of microfinance services. Hence, the Sri Lankan Government and Central Bank of Sri Lanka have implemented legislation to strengthen SFIs. Further, attention to the efficiency of SFIs in Sri Lanka is of concern to the general public given the recent malpractice-related collapses of several formal and informal financial institutions.

The cooperative rural banks (CRBs) in Sri Lanka provide a comprehensive network throughout the country and make a substantial contribution to rural credit activities. As formal SFIs, these CRBs have gained an increasing share of financial assets, which has been particularly helpful for satisfying the growing demand for loans and advances from people living in rural areas. This study aims to evaluate the overall efficiency of CRBs in Sri Lanka. The study provides evidence on the accounting practices and financial practices of CRBs and some elements in the corporate governance mechanisms of financial institutions.

Data envelopment analysis (DEA) is used to measure efficiency. A comparative analysis of the efficiency of CRBs operating in Sri Lanka is undertaken. Two main approaches are used to evaluate efficiency. Input and output variables are selected for the intermediation and asset approaches. The results from both approaches show that relatively few CRBs operate efficiently. Further, the efficiency of CRBs in Sri Lanka has declined during the study period. Variables for CRBs specific characteristics are also tested for relationships with CRBs size.

The evaluation of accounting and financial practices reveals that most sample CRBs deviate from the normative benchmarks. Many CRBs provide accounting information only to fulfil legal requirements rather than with the objective of

providing information useful for decision-making purposes. With regards to financial practices, performance relative to best practice is below the benchmarks for most sample CRBs. In this context, the level of risk exposure of these CRBs is very high. As a consequence, the possibility of failure to meet the going concern criteria is raised, especially at a time when global financial crises are impacting all financial institutions.

Analysis of the associations of efficiency with accounting and financial practices shows that efficiency in intermediation is correlated with accounting practices and indicators of sound financial practice (assets quality, loan portfolio yield, operating efficiency and operating self-sufficiency). Further, efficiency in asset transformation is associated with capital adequacy, loan portfolio yield and operational self-sufficiency.

The findings of this study contribute to understanding the underlying problems for efficiency in particular CRBs in Sri Lanka. Further, they can assist regulators with the development of policies affecting the small financial institutions generally and CRBs in particular.

CERTIFICATION OF DISSERTATION

I certify that the ideas, experimental work, results, analyses and conclusions reported in this dissertation are entirely my own effort, except where otherwise acknowledged. I also certify that the work is original and has not been previously submitted for any other award, except where otherwise acknowledged.

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Signature of candidate Date

ENDORSEMENT

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Signature of the supervisor/s Date

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ADB	-	Asian Development Bank
ATM	-	Automated teller machines
BCC	-	Banker, Charnes, and Cooper
CAMELS	-	Capital adequacy, assets quality, management quality, earnings ability, liquidity of banks and sensitivity to market risk
CBSL	-	Central Bank of Sri Lanka
CCR	-	Charnes, Cooper, and Rhodes
CGAP	-	Consultative group to assist the poor
CRBs	-	Cooperative rural banks
CRS	-	Constant returns to scale
DEA	-	Data envelopment analysis
DFA	-	Distribution free approach
DMU	-	Decision making units
DRS	-	Decreasing returns to scale
E (A)	-	Efficiency in asset transformation
E (I)	-	Efficiency in intermediation
EDP	-	Electronic data processing
EFTPOS	-	Electronic fund transfer facilities
FDH	-	Free disposal hull
GAAP	-	Generally accepted accounting principles
IAS	-	International Accounting Standards
IASB	-	International Accounting Standard Board
ICASL	-	Institute of Chartered Accountants of Sri Lanka
IFRS	-	International financial reporting standards
IRS	-	Increasing returns to scale
JWGBA	-	Joint Working Group of Banking Association
MFI	-	Microfinance institutions
MPCS	-	Multipurpose cooperative society
NGO	-	Nongovernmental organisation
NPO	-	Non-profit making organisation

OECD	-	Organisation for Economic Co-operation and Development
PAT	-	Positive accounting theory
PFA	-	Production frontier approach
PFP	-	Partial factor productivity
PTE	-	Pure-technical efficiency
PTE (A)	-	Pure-Technical efficiency in asset transformation
PTE (I)	-	Pure-Technical efficiency in intermediation
RTGS	-	Real time gross settlement system
RTS	-	Nature of returns to scale
SE	-	Scale efficiency
SE (A)	-	Scale efficiency in asset transformation
SE (I)	-	Scale efficiency in intermediation
SFA	-	Stochastic frontier approach
SFI	-	Small financial institution
SLAS	-	Sri Lanka Accounting Standards
SLR	-	Sri Lanka rupees
SSS	-	Script-less securities settlement
TCCs	-	Thrift and credit cooperative societies
TE	-	Technical efficiency
TE (A)	-	Technical efficiency in asset transformation
TE (I)	-	Technical efficiency in intermediation
TFA	-	Thick frontier approach
TFP	-	Total factor productivity
UN	-	United nations
USA	-	United State of America
VRS	-	Variable returns to scale

CHAPTER ONE
INTRODUCTION

1.1 Background to the research

Economists and finance practitioners emphasise that the development of the financial services sector is a critical factor for the economic growth of a country (Goldsmith 1969; McKinnon 1973; King & Levine 1993; Rioja & Valeu 2002; Calderon & Liu 2003; Jeanneney, Hua & Liang 2006). Further, financial services sector development influences the economic, social, and political environment of a country (King & Levine 1993; Jalilian & Kirkpatrick 2001; Rioja & Valeu 2002). Hence, developing countries have made efforts to strengthen their financial services sectors (Rioja & Valeu 2002; Calderon & Liu 2003). A wide range of formal financial services is not available in developing countries, so households and small private organisations in these countries mostly rely on informal financial services (ADB 2000; Charitonenko & De Silva 2002). Therefore, small financial institutions (SFIs)[1] have become the providers of financial services in rural financial sectors, especially in the Asia-Pacific region (ADB 2000). Consequently, a large number of SFIs have been established to provide financial services in the rural financial sector in these countries in the last few decades, contributing to the development of the whole financial services sector (Seibel 1999; ADB 2000). The services provided by these institutions are important for the poor as an income generation tool in developing countries and for achieving the millennium development goals (UN 2005).

Even though most SFIs offer regular financial services, they are distinct in nature and operational activities from other commercial banks (ADB 2000). In particular, cooperative rural banks (CRBs) operate under cooperative objectives, where the members are the owners, depositors and borrowers. Further, CRBs operate with

[1] In this study, SFIs are classified as all financial institutions which provide financial services, in rural financial sector except commercial financial institutions. SFIs include cooperative rural banks, credit unions, rural banks and other types of microfinance institutions (MFIs) that lend to individuals and small businesses. Some SFIs obtain members deposits.

commercial purposes and for developing the community. Many CRBs have power to take members deposits (Abeyaratna 2007).

Institutional efficiency[2] is essential for the sustainability of these institutions even though they are small and distinct from other financial institutions (Gallardo 2002). Efficiency is also important to maintain public faith in the financial services system (Abeyaratna 2007). Efficiency leads to better service for consumers and promotes the confidence of depositors, borrowers, members and the general public. In an organisational context, efficiency relates to overall performance and, thus, affects the shareholders' wealth. In the long run, only healthy institutions have a chance of effectively servicing poor householders (Seibel 1999). Furthermore, efficiency is of major interest to managers, regulators and the general public because it can be used to lower service charges and increase the quality of services (Seibel 1999). However, many SFIs are not committed to efficiency, thereby contributing to the fragile nature of the financial services sector (ADB 2000; Rosenberg et al. 2003; Duflos et al. 2006).

Recently, the focus of many SFIs has shifted from that of grant-funded institutions to one of client-oriented commercialised institutions. As such, they seek efficiency and sustainability of operations (Seibel 1999; Robinson 2001; Charitonenko & De Silva 2002). Many SFIs are now more concerned about efficiency than they were before the 1980s (ADB 2000). Many developing countries are concerned with re-structuring by the current microfinance industry. They introduced re-structuring programmes for merging rural finance institutions with formal financial services providers. Therefore, a comprehensive study of the efficiency of such financial institutions in a developing country context is timely and important.

There is a demand for microfinance services for people living in the rural areas of Sri Lanka (ADB 2000). Consequently, a diversified microfinance system has

[2] The highest productivity level from each input level is recognised as the efficiency (Coelli, Rao & Battese 1998).

developed. The level of participation in microfinance activities has further increased due to large scale injection of foreign aid (provided by the multilateral funding agencies) with many commercial banks increasing their participation in microfinance activities over the last few decades (Ameer 2001).

Cooperatives play an important role in microcredit activities in Sri Lanka (Gant et al. 2002). CRBs were established in 1964 as SFIs, initially to provide microcredit facilities to rural communities (Gant et al. 2002). They have made significant contributions in terms of credit provisioning and savings mobilisation in the last forty years (Gant et al. 2002). The main goal of CRBs is to cater to the specific finance needs of those in rural areas and provide stronger institutional support for rural credit. CRBs have gained an increasing share of financial assets satisfying the growing demand for loans and advances for people living in rural Sri Lanka (Charitonenko & De Silva 2002). As at 2006, there were 310 Multi-Purpose Co-operative Societies (MPCSs) operating with 1608 island-wide branches (CRBs 2006). Total deposits in CRBs at the end of 2006 were SLR. 25,311 million[3] (US$ 246.67 million) and their total loans and advances were SLR 20,241.4 million (US$ 197.26 million) (CRBs 2006). CRBs, a type of formal SFIs, are currently the main provider of microcredit across the country.

The importance of SFIs in developing economies and of CRBs in particular, for the Sri Lankan financial servicers sector justifies the assessment of their financial strength. Given the collapse of several formal and informal financial institutions in Sri Lanka (Pramuka Bank and Gloden Key Credit Card Company, for example), this research is timely to assist stakeholders of CRBs in elevating their level of confidence in the system. Evidence on the financial transparency of SFIs is required to build the confidence of depositors and other stakeholders (Abeyaratna 2007).

[3] One US$ was equal to Sri Lanka Rupee (SLR) 102.61 as at 31.03.2006.

Furthermore, in the future, increasing competition from commercial banks entering the microfinance industry will increase pressures on CRBs to achieve sustainability while remaining financially viable (Abeyaratna 2007).

The Sri Lankan Government recognises that the rural financial sector in Sri Lanka is highly fragmented with most rural financial institutions displaying weak governance, weak supervision and recurring losses (Ministry of Finance 2001). The Government has introduced several restructuring programmes with the objective of establishing a sustainable rural financial sector. A principle goal of these changes has been to promote the efficiency of the rural financial sector (Ministry of Finance 2001). Central Bank of Sri Lanka (CBSL) considered implementation of regulatory obligations with the proposed *Microfinance Bill* (CBSL 2006). These institutional developments are expected to contribute to the effectiveness of CRBs as effective rural lending institutions in future.

Corporate governance in the regulation and supervision processes of banking institutions is of great importance for improving efficiency (Llewellyn 1999; Mullineux 2006). In particular, for developing countries where the capital markets are not well advanced, banks serve as a crucial fraction of the financial system by playing a dominant role in providing external finance for businesses (King & Levine 1993; Levine 1997; Arun & Turner 2004). Mullineux (2006) and Almario, Jimenez and Roman (2006) emphasise that good corporate governance of banks requires attention to conflicts of interest especially with respect to the clear information advantage banks have over their customers. Further, good governance will promote business, improve financial services operations and deepen the market (Mullineux 2006). Empirical studies provide evidence that performance and outreach improve for SFIs where good corporate governance mechanisms are developed (Labie 2001; Desrochersa & Lamberteb 2002; Hartarska 2005).

Accounting information (Mullineux 2006) and financial practices (Llewellyn 1998; Van Greuning, Gallardo & Randhawa 1999) form part of the good governance mechanism. They are critical to presenting institutions' operating results and risk profiles, fairly which are necessary conditions for improvements

in the efficiency of financial institutions. In this context, greater attention to corporate governance is necessary. In particular, sound accounting information and financial practices in the rural financial sector offer an effective tool for building confidence among depositors and to improve the efficiency of the industry. However, the lack of proper financial reporting has been noted for SFIs operating in many countries (Christen, Lyman & Rosenberg 2003). SFIs follow a large variety of financial reporting practices leading to confusion among practitioners, analysts and other user groups as well as to considerable distortions when comparing performance among institutions (Gant et al. 2002; Christen, Lyman & Rosenberg 2003).

However, there has been little research into the association between accounting and financial practices and efficiency in the rural financial sector of developing countries. Furthermore, CRBs in Sri Lanka have recently been widely criticised for their inefficient management, especially in the field of governance practices (accounting and finance). Such criticism arises as many CRBs consider the provision of accounting information only as the fulfilment of a statutory requirement (Charitonenko & De Silva 2002; Gant et al. 2002). Therefore, this study will investigate the accounting and financial practices of CRBs and the association of these practices with the efficiency of institutions.

A quantitative assessment of the efficiency of CRBs in Sri Lanka, and the association of accounting and financial practices with efficiency will shed light on the role of governance mechanisms in SFIs in the developing country context. Further, this analysis will be useful to managers and regulators in their efforts to maintain a sound system and to improve the efficiency of SFIs. This study investigates the efficiency of CRBs in Sri Lanka with a focus on accounting and financial practices to reduce this gap in research.

1.2 Objectives of the study

The main objective of this research is to examine the overall efficiency of CRBs in Sri Lanka. A comparative analysis is undertaken to identify the relative levels

of the efficiency of CRBs in Sri Lanka. Further, with controls for size and geographic areas of operations, this study focuses on the accounting and financial practices of CRBs as important elements of the corporate governance mechanism. The associations of variables with the efficiency of CRBs structure four further objectives of this study:

- to explore the potential impacts of institution size and geographic areas of operation on the efficiency of CRBs;
- to identify the existing accounting practices of CRBs in Sri Lanka. This will contribute to the understanding of the issues in financial statements reporting for SFIs in a developing country context and provide evidence on accounting practices as part of the governance mechanism. Further, the association of accounting practices of CRBs in Sri Lanka with the efficiency of these institutions will be investigated;
- to investigate the existing financial practices of CRBs in Sri Lanka. This will provide evidence on the financial health of CRBs relative to industry benchmarks. Financial practices and associated risk methodologies are the second important element in the corporate governance mechanism of financial institutions. Further, the association of financial practices of CRBs in Sri Lanka with the efficiency of these institutions will be investigated; and
- to provide recommendations for the improvement of accounting and financial practices in small financial institutions that can contribute to enhancing the efficiency of these institutions.

1.3 Hypothesis of the study

Efficiency research provides evidence that corporate governance has a significant impact on the efficiency of any type of financial institutions. This study hypothesises that the accounting and financial practices, as indicators of the corporate governance mechanisms, influence the efficiency of CRBs in Sri Lanka.

In addition, the institution-specific characteristics of CRBs (size and location) are investigated.

1.4 Expected contributions of the study

This study undertakes an evaluation of the efficiency of CRBs in Sri Lanka. The major contribution of the study is the provision of empirical evidence on the association between the corporate governance mechanism (accounting and financial practices) and efficiency in the rural financial sector of a developing country (Sri Lanka). This study contributes to the improvement of accounting and financial practices in CRBs in Sri Lanka that can contribute to enhancing the efficiency of these small financial institutions. Further, findings of this study are useful to the Government policy makers and regulators in Sri Lanka for enhancing overall rural financial sector. Further, this study contributes to the existing literature on the efficiency of SFIs in the rural financial sector with evidence on factors associated with the efficient provision of financial services.

1.5 Outline of the dissertation

This dissertation consists of seven chapters. This chapter presents the background to the study, the objectives, general hypothesis and identified the contributions.

The next chapter describes the development of financial institutions and their influence on the financial services sector in Sri Lanka. Theoretical considerations on the role of financial services sector development and economic growth in the alleviation of poverty in a developing country context are also discussed. The importance of microfinance institutions and other SFIs in the rural financial sector are reviewed. In addition, the role of CRBs in microcredit activities in Sri Lanka, their functions and governance mechanisms are described.

Chapter Three outlines various approaches for the measurement of efficiency in financial institutions with special reference to SFIs in the rural financial sector.

This chapter develops the rationale for the measure used for efficiency in this dissertation.

The importance of the corporate governance mechanism as a factor affecting the efficiency of financial institutions is discussed in Chapter Four. Two main bodies of corporate governance literature, accounting practices and financial practices, in financial institutions are explored. The chapter provides a description of current best practices in accounting and financial in relation to SFIs. Consequently, the chapter identifies the relevant variables for measurement of sound accounting and financial practices that are applied in the empirical analysis.

Chapter Five presents the research design, methodology and variables measurement. Hypotheses based on the literature review in prior chapters are developed. The methodologies used to analyse efficiency of CRBs in Sri Lanka are identified.

Chapter Six presents the data analysis undertaken. Empirical assessments of accounting practices, financial practices and efficiency are presented. The accounting and financial practices employed in CRBs in Sri Lanka and trends in estimated efficiency scores are described. The associations between accounting and financial practices and the efficiency of CRBs are then tested. Analysis of associations of institution-specific characteristics (size and location) and efficiency are also presented.

The final chapter discusses conclusions for this study. Based on these results, some recommendations are made to assist regulators responsible for the development of policy affecting the rural financial sector generally and CRBs in Sri Lanka in particular. Limitations of the study are discussed and potential areas for future research are identified.

CHAPTER TWO
THE FINANCIAL SERVICES SECTOR IN SRI LANKA

2.1 Introduction

The financial services sector[4] plays a vital role in economic development. Since 1977, the Sri Lankan Government has made considerable efforts to create a sound environment for the development of the financial services sector. Most of the Government's economic policies have had a direct impact on the development of this sector. However, as with most developing countries, the majority of low-income households still have minimal access to formal financial institutions in Sri Lanka. Formal financial institutions do not provide financial services to satisfy the variety of demands of low-income households because of high costs and high risks. Consequently, semi-formal small financial institutions (SFIs) such as cooperative rural banks (CRBs), Samurdhi Bank Societies, the Sanasa Development Bank, and a variety of microfinance institutions (MFIs) have emerged to cater for the under-serviced rural financial market in Sri Lanka. The evolution of SFIs in Sri Lanka has helped the poor by providing microfinance services to them over the past few decades.

The purpose of this chapter is to present a comprehensive review of the financial services sector in Sri Lanka, including the microfinance industry. The chapter consists of six sections. The next section describes the importance of financial services sector development for economic growth in a developing country context. The third section outlines the evolution of the microfinance industry generally and discusses the role of microfinance in a developing country context. It also reviews financially sustainable microfinance institutions and related issues. Section four describes the emergence of financial services institutions in Sri Lanka and their contributions to the national economy. The penultimate section

[4] Basically, banks, finance companies, insurance companies, and stock broking companies comprise the financial services sector in a country.

discusses the operations of cooperative rural banks (CRBs) and their impact on microfinance activities in Sri Lanka. The final section concludes the chapter.

2.2 The financial services sector and economic growth

Literature suggests that there is a strong relationship between the development of the financial services sector and economic growth (Levine 1997; Jalilian & Kirkpatrick 2001; Calderon & Liu 2003; Quartey 2005). Calderon and Liu (2003), using 109 developing and industrial countries, report that developing countries have more possibilities to enhance the economic growth through the development of financial services sector. Their findings further suggest that increasing the range of financial services provides capital accumulation that is a major component of economic growth in developing countries. In this section, financial institutions which provide financial services and their influence on the nation's capital accumulation and resource allocation processes are outlined.

2.2.1 The financial services sector and financial intermediation

The financial services sector comprises wholesale, retail, formal, and informal organisations offering financial services to consumers, businesses, and other financial institutions (Ghatak 1995). In the broadest definition, the financial services sector includes banks, non-banking institutions, finance companies, rural banks, credit unions, insurers, microfinance institutions, and informal moneylenders. A nation's financial services sector influences its capital accumulation [5] and allocation processes [6] throughout its economy (McKinnon 1973). These influences arise from the intermediation[7] role provided by financial institutions.

Levine (1997) identifies savings mobilisation, risk management, acquiring information on investment opportunities, monitoring borrowers, corporate control

[5] Increase of a country's net wealth
[6] Producing maximum output with given inputs at minimum cost
[7] Intermediation is the process of channelling loanable funds from savers to borrowers

and facilitating the exchange of goods and services as the basic functions of financial intermediation. Further, mobilisation of savings is the most obvious and important function of the financial services sector (Levine 1997). The provision of facilities enables households to save their money in secure places and allows savings to be used productively, thus encouraging capital accumulation. However, lack of access to formal savings facilities may lead households to save either through informal means such as individual moneylenders or by acquiring physical assets such as precious metals or property. Deviating these savings to formal channels, can help such funds to be utilised more productively; this would not only give positive returns to the savers but also make a contribution to economic growth (DFID 2004).

Moreover, most savers prefer to have multiple savings options. The financial intermediaries facilitate the selection of projects by collecting information on behalf of investors and investing their savings productively. Further, they assist in monitoring the performance of enterprises on behalf of savers/investors and exercising corporate control. As a result, savers are assured that they will receive expected positive returns. Consequently, intermediation will facilitate the investment of savings in long-term lending commitments or risky projects with higher expected returns (Obstfeld 1994). Accordingly, more capital is available for research and development activities by innovators, increasing technological change in the economy and consequently economic growth (King & Levine 1993). Moreover, financial intermediation facilitates the mobilisation of funds by providing proper mechanisms for transactions between households and businesses in the economy. The potential result is a reduction of transactions costs and an increase in net wealth to individuals and a country as whole (Levine 1997). Hence, the intermediation role in a financial services sector influences a nation's economic, social and political environments. In contrast to other financial services, microfinance services support householders in developing countries not only for developing microenterprises but also to a wide rage of cash needs that they required (UN 2005).

2.2.2 Economic growth through financial services

Financial intermediation, through financial services, plays a pivotal role in economic growth by affecting the mobilisation of savings and, thereby improving productivity and technical change (Levine 1997). Similarly, financial intermediation facilitates income growth generally and expands the supply of financial services which can be accessed by the poor. This could increase income growth for the poor and have a direct impact on poverty reduction in developing countries (Jalilian & Kirkpatrick 2001). While focusing on poverty alleviation in developing countries, the World Bank (2001) also recognises that improving access to financial services for the poor strengthens their productive assets and enhances the overall productivity of a country.

Having realised this significance, there has been a long-standing interest among economists and finance practitioners in the contribution that the financial services sector makes to economic growth (Gurley & Shaw 1967; Goldsmith 1969; McKinnon 1973; Jung 1986; King & Levine 1993; Calderon & Liu 2003). Such studies provide empirical evidence that is consistent with theoretical implications and supports the positive relationship between financial services sector development and economic growth. Their arguments provide justification for policy makers to aim at strengthening the financial services sector in order to promote economic growth, particularly in developing countries. Further, Rioja and Valeu (2002) argue that, in both developed countries and developing countries, the financial services sector has a positive effect on growth.

However, taking a more traditional view economists consider only factor accumulations as the main elements of economic growth. Goldsmith (1969) stresses that rising marginal productivity of capital contributes to growth. He further notes that increasing growth in the assets of financial institutions may raise gross national product in developed and developing countries. According to Goldsmith (1969), development may be measured by the proportion of financial assets held by financial institutions to the total financial assets in the economy. According to McKinnon (1973) and Shaw (1973), deregulation of interest rates is

intended to mobilise an increased volume of savings and to allocate capital to its most productive uses. As a result, this leads to an increase in the quantity and quality of overall investment in the economy and, thereby, contributes to economic growth.

According to more traditional views, growth in capital stocks shows diminishing returns to scale, limiting the impact of financial development on growth. However, financial development theory emphasizes that the development of the whole financial services sector, with wide-ranging structural changes and gradual financial deepening[8], are essential for successful economic growth. In this sense, the role of financial intermediation in raising productivity has been emphasised in the recent literature (King & Levine 1993; Levine 1997; Benhabib & Spiegel 2000; Calderon & Liu 2003; Jeanneney, Hua & Liang 2006). They note that, although increasing saving resources enhances efficiency, competitive financial services institutions balance the risk-return trade off[9], provide higher deposit rates resulting in more financial services institutions in the system and a wider range of financial intermediaries. Levine's theoretical and empirical research provides strong evidence that a more efficient and better functioning financial system leads to faster capital accumulation and higher productivity growth. Further, he stresses that the development of financial markets and institutions is a critical and inextricable part of economic growth.

More recently, Jeanneney, Hua and Liang (2006) found that financial development has significantly contributed to productivity growth, mainly through its favourable effect on the overall efficiency of a financial services sector. Further, they emphasise that, in order to improve efficiency, the development of private-sector oriented financial intermediaries and greater market access, is essential. The studies suggest that the contribution of financial services sector development to productivity growth is more important than factor accumulation. Moreover, Benhabib and Spiegel (2000) provide more evidence that both factor

[8] Increasing the range of financial services.
[9] The return rises with the level of risk and low return is associated with low risk.

accumulation and channels of productivity improvement are the main contributors to economic growth.

Most developing countries do not have a wide range of formal financial services accessible to the poor[10] (World Bank 1990; ADB 2000). Thus, most rural households and small private institutions in developing countries often are forced to rely on a narrow range of risky and costly semi-formal and informal financial services for their microfinance demands. Consequently, SFIs, such as cooperative rural banks, credit unions, and MFIs play a dominant role in providing financial services in rural areas (DFID 2004). Some of these semi-formal and informal financial institutions have had a significant impact on poverty reduction in developing countries (Hulme & Mosley 1996). In many developing countries, particularly in the Asia-Pacific region, these institutions have significantly expanded their outreach into microfinance markets in the last few decades (ADB 2000). However, most of these institutions have only limited coverage in a country and do not provide the wide range of services which poor people demand. Therefore, a new focus on widening access to financial services for more of the poor is particularly important in a developing country context.

2.3 Microfinance in developing countries

Microfinance has been recognised as an effective tool of poverty alleviation in developing countries. It is not only accepted as an income generation tool for the poor but also facilitates improved welfare for the poor living in developing countries (Littlefield, Morduch & Syed 2003). Policy makers believe that microfinance can significantly contribute to achieving the millennium development goals[11] which are to be achieved by 2015 (UN 2005). Hence, the

[10] The World Bank (1990) defined US$370 per capita income per year in 1990 as 'poor' and US$275 per capita income per year as 'extremely poor.'

[11] The United Nations Millennium project of 2000 adopted the targets to reduce poverty by 2015. The millennium development goals are: (1) eradicate extreme poverty and hunger; (2) achieve universal primary education; (3) promote gender equality and empower women; (4) reduce child mortality; (5) improve maternal health; (6) combat HIV/AIDS, malaria, and other diseases; (7) ensure environmental sustainability; and (8) develop a global partnership for development.

provision of microfinance in developing countries is important in this context for the development of an efficient microfinance industry.

2.3.1 Evolution of the microfinance industry

The Asian Development Bank (ADB) (2000, p.2) defines microfinance as 'The provision of a broad range of financial services that includes services such as deposits, loans payment services, money transfers, and insurance to poor and low income households and their microenterprises'. These financial services include savings, credit, payment facilities, remittances, and insurance (Rosenberg et al. 2003). The microfinance industry is composed of formal institutions, semi-formal institutions, and informal institutions (ADB 2000). The formal institutions include banks, rural banks, and cooperatives. The semi-formal institutions include non-government and government institutions that provide rural finance programmes (ADB 2000). However, the informal sector, which comprises small-scale moneylenders and pawnbrokers, is usually not organised.

Even though there has been much discussion and debate about microfinance in the last few decades, microfinance is not a new concept. The poor households in developing countries have always used traditional providers for their financial activities, such as personal money lenders and pawn brokers (Seibel 1999). In the Asia-Pacific region alone, about 1.9 billion people are poor and vulnerable in around 380 million households, mostly concentrated in rural areas (Fernando 2007). Consequently, the demand for financial services by these people is substantial. The importance of formal microfinance was recognized in the 1970s by multilateral agencies such as the World Bank and the Asian Development Bank, bilateral donor agencies such as AusAID (Australia) and USAID (USA), nongovernmental organisations (NGOs), and governments in developed and developing countries for a variety of reasons. These organisations emphasise that:

i. microfinance can be a critical element of an effective poverty reduction strategy in developing countries (Christen et al. 1995; ADB 2000);

ii. most poor households in developing countries continue to rely on informal sources of finance instead of permanent access to institutional microfinance (ADB 2000; Fernando 2007);

iii. microfinance provides effective ways to assist and empower women who make up a significant proportion of the poor and suffer disproportionately from poverty (ADB 2000); and

iv. the microfinance industry contributes to the development of the overall financial system through integration of financial markets (Seibel 1999; ADB 2000).

Having recognised these facts, donor agencies and governments encourage the provision of formal microfinance services in most parts of the world. Low-income households make use of a variety of microfinance services for their household and microenterprise purposes. Table 2.1 summarises the structure and characteristics of the demand for microfinance.

Given the variety of demands for financial services from rural people, developing countries have to create scope for financial intermediation. However, due to the high cost of small transactions and their low relative profitability, most commercial banks in developing countries are reluctant to promote microfinance. Thus, most rural people who have viable investment opportunities rely on traditional informal sources. In this setting, interest in institutional microfinance[12] has flourished in developing countries. This has resulted in the involvement of new formal sources in microfinance and the introduction of a wide range of microfinance programmes in commercial banks during the last few decades (Charitonenko & De Silva 2002). In addition, financial reforms introduced by many governments in developing countries also encourage the formalisation of microfinance programmes (ADB 2000). As a result, in the Asia- Pacific region, MFIs have expanded their outreach from a few thousand clients in the 1970s to over ten million in the late 1990s (ADB 2000). A worldwide inventory of

[12]Institutional microfinance is defined to include microfinance services provided by both formal and semi-formal institutions.

microfinance (Paxton 1996) indicated that just 200 of the 1000 MFIs had 13 million loans worth US$7 billion and 45 million deposit accounts worth US$19 billion in 1996. Given such evidence, most developing countries recognise that microfinance services help to increase poor households' wealth by providing the capacity for income generation activities (ADB 2000).

Table 2.1: Demand for microfinance in developing countries

Sources of demand	Products and services and characteristics of demand
Poorest households (rural and urban)	• Convenient access to safe and liquid deposit services • Passbook savings with unlimited withdrawal facility • Strong demand for consumption and emergency loans with no collateral • Small size loans for livelihood activities • Occasional loans to finance lumpy expenditures • Outlets at close proximity, simple procedures • Low transaction costs
Poor (rural and urban)	• Convenient access to safe, liquid deposit facilities with return on savings • Passbook savings with easy withdrawal facilities • Term deposits with small denominations and regular interest payments • Transfer services, payment services • Insurance services for livestock • Consumption and emergency loans, small loans for livelihood • Loans to finance lumpy expenditures, low transaction costs
Enterprises: micro farms (rural)	• Small loans for working capital (fertilizer, seeds) • Small loans for fixed capital (purchase of simple tools, land improvements, etc) • Below informal market interest rates • Easy access and minimal transaction costs • Seasonal demand • Deposit facilities (safe, liquid, convenient), return on deposits
Fisheries, livestock and poultry (mainly rural)	• Working capital loans for feed • Fixed capital loans (for tools, purchase of chicks) • Small loan size • Substantial demand from livestock sector • Deposit services (safe, liquid, convenient) • Insurance services
Non-farm (rural and urban)	• Deposit services (safe, liquid, and convenient) • Money transfer, payment services • Insurance and leasing services for a wide range of enterprises • Demand for loan is not seasonal • Demand is large for working capital loans • Relatively large loans within the confines of microcredit minimal • Transaction costs and easy access

Source: ADB (2000, p.46)

There have been a number of studies conducted to evaluate microfinance programmes (Hulme & Mosley 1996; Khandker 1998; Robinson 2001). Robinson emphasises that efficient facilities for savings and credits can build poor households' assets, assist in the development of their enterprises, enhance their income capacity and improve their quality of life. Khandker (1998) provides evidence that most of the microcredit programmes in Bangladesh help more rural people to 'lift out' of poverty every year. He also provides evidence that MFIs generate indirect benefits for rural economies by providing self-employment programmes. Hulme and Mosley (1996) find evidence that MFIs provide more financial services than other commercial banks and compete with other financial institutions. MFIs have a large number of clients and a wider production mix in developing countries. Further, microfinance services have a positive impact on reducing households' poverty and MFIs help to bring rural people into a formal financial system (Hulme & Mosley 1996).

The studies discussed above show that microfinance has a positive impact on the status of households in developing countries and that it retains credibility as a development agency. However, Khandker (1998) argues that poverty is the result of a number of factors, such as low economic growth coupled with high population growth and unequal distribution of resources. Therefore, in order to alleviate poverty, all of these factors need to be addressed. Robinson (2001) also emphasises that financial services are not a panacea for poverty alleviation. Thus, a microfinance system that reaches the poor will not be the only channel for poverty alleviation. However, Buckley (1997) notes that, even though most of these factors affect poverty in developing countries, microcredit and microfinance promote potential microenterprises and contribute to countries economic health.

However, many researchers argue that MFIs in most countries do not provide attractive services to their clients. The outreach of the microfinance industry is well below expectations in the Asia-Pacific region (Charitonenko & De Silva 2002). The rural Asia study (ADB 2000) states that about 95 percent of some 180 million people in the Asia-Pacific region still have little access to institutional financial services. In this context, understanding the challenges in the

microfinance industry is crucial in the provision of efficient services to rural people and for the development of sustainable institutions.

2.3.2 Sustainable microfinance

Given the rapid growth of various types of MFIs around the world, it is important to understand how sustainable growth of these institutions might be achieved. In the early 1970s, microfinance targeted only poverty alleviation. However, in the last two decades, microfinance has made important strides in the outreach and in the sustainability[13] of its institutions (Gallardo 2002). Some researchers argue that poverty reduction and the development of healthy financial institutions might be mixing up two diverging objectives (Seibel 1999). If the sustainability of institutions is the main concern, their may be a variety of objectives that may or may not include poverty reduction. If poverty alleviation is the primary concern, sustainable institutions may be unattainable (Seibel 1999). In the context of this research the self-sufficiency and sustainability of MFIs are viewed as major issues in the microfinance industry.

According to Gibbons and Meehan (1999 p.132) financial self-sufficiency is defined as ' the ability of an MFI to cover all actual operating expenses, as well as adjustments for inflation and subsidies, with adjusted income generated through financial services operations'. Thus, financially self-sufficient MFIs should be able to operate efficiently without subsidies from donor programmes or government. Gibbons and Meehan emphasise that a financial self-sufficiency approach benefits both borrowers and savers who are economically poor. Some authors define this process as the commercialisation of microfinance. The term commercialisation recognises the fact that market based principles are applied to microfinance with the realisation that MFIs achieve sustainability while fulfilling the demands of their clients (Charitonenko & De Silva 2002).

[13] Sustainability is consistent with long term survival and self-sufficiency.

Several authors consider that financial self-sufficiency is the only way MFIs will be able to serve the poor in developing countries (Gibbons & Meehan 1999; Seibel 1999; Robinson 2001; Charitonenko & De Silva 2002). Gallardo (2002) stresses that the primary concern of microfinance clients is access to microfinance services that are compatible with their requirements, rather than the cost of satisfying their requirements. Demand for savings services is strong, as is demand for credit facilities. Expanding savings services has a significant impact on an institution's sustainability (Gallardo 2002). Robinson (2001) also stresses that the financial self-sufficiency approach rather than the direct lending approach is the preferred way to reduce poverty.

In addition to the above views, the ADB (2000) reports that, in the last 15 years, the microfinance industry rapidly changed from 'subsidy dependent' to 'viable businesses' in developing countries. The ADB (2000 p.14-15) recognises that:

i. *MFIs and their clients have shown that the poor are creditworthy and financial services can be provided on a profitable basis.*
ii. *It is a myth that poor clients do not and cannot save, and it has been shown that savings can be successfully mobilised from poor households.*
iii. *Microfinance services have triggered a process toward the broadening and deepening of rural financial markets.*
iv. *Microfinance services have strengthened the social and human capital of the poor.*

Given these facts, sustainable delivery of microfinance services on a large scale has generated a positive impact on the further development of microfinance policies and practices (ADB 2000). However, hundreds of MFIs have failed to address the commercial aspects of their operations and most MFIs still depend on funds from donors or subsidies from governments (Charitonenko & De Silva 2002). In the majority of cases, the funds obtained from donors are on flexible terms with zero interest and no repayments. Thus, in most cases, MFIs fundamentally do not seek profits. This would be considered as distraction from their outreach objective. As a result, most MFIs fail to mobilise their resources, erode their capital bases with heavy losses and, eventually exit from the industry

(Seibel 1999). Buckley (1997) suggests that the real problems in the microfinance industry cannot be tackled solely by capital injections, but require fundamental structural changes.

The literature on microfinance provides the evidence that a financial self-sufficiency approach is suitable for MFIs and suggests that, eventually, more sustainable institutions would handle poor clients effectively (Seibel 1999; Dunford 2000). After examining 54 case studies in Asian countries, including Fiji and Papua New Guinea, Seibel (1999) reports that banking services to the poor can be profitable, viable and sustainable. Further, subsidy-dependent institutions can be transformed into formal financial institutions that rely on their own internal resources and cover their costs (Seibel 1999). Christen et al. (1995) examine eleven microfinance programmes in Bangladesh, Colombia, Costa Rica, the Dominican Republic, Indonesia, Kenya, Niger, and Senegal. They find that there is significant outreach to the poor including the very poor. Further, ten of the eleven institutions are operationally efficient. These institutions achieve their goals in a variety of settings and with a wide range of clientele (Christen et al. 1995).

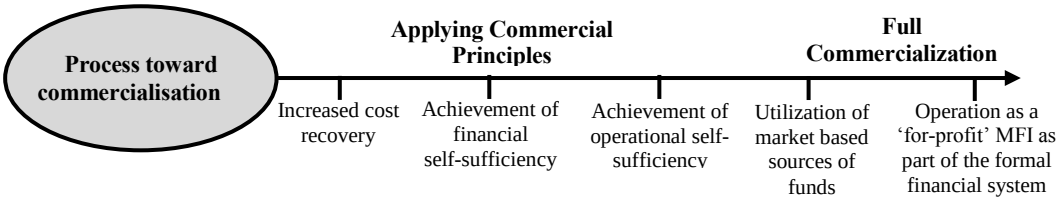
As noted earlier, there is still some debate as to whether sustainability is an achievable objective in microfinance. Hulme and Mosley (1996) find a trade-off between poverty alleviation and the sustainability of MFIs. The protagonists of commercialisation focus on profit and extend efforts to service clients (Hulme & Mosley 1996). However, Gibbons and Meehan (1999) provide empirical evidence from MFIs in Latin America, Asia and Africa that this trade-off is not inevitable. These findings demonstrate that financial services for the poor can be provided on a financially viable basis.

In order to achieve sustainability, MFIs need to diversify activities and increase their services, rather than depend on donor or government grants. This does not mean that MFIs should override their primary purposes and move to fully independent business operations. Rather MFIs should pursue the purpose for which they are established with financial self-sufficiently thus, achieving

sustainability is achieved. In this context the best way to reach institutional self-sufficiency and sustainability is to open debate. Traditional views suggest that liberalisation of financial services leads to an increase in the quantity and quality of overall investment in the economy (McKinnon 1973; Shaw 1973). Developing financial infrastructure, particularly regulation and supervision, becomes pertinent to the stability of the sector and the protection of depositors (Christen et al. 1995; Seibel 1999; ADB 2000). Furthermore, a financial development approach emphasises that provision of a wide range of activities and the adoption of profit oriented decisions in operations results in better performing institutions. Here, the management of financial structure is vital in order to control the risk profile (Van Greuning, Gallardo & Randhawa 1999). Thus, only MFIs operating with well-designed services and well-managed activities will reach sustainability and serve a large number of poor customers (Gibbons & Meehan 1999). In this context, understanding the determinants of microfinance sustainability is crucial.

2.3.3 Determinants of microfinance sustainability

From the discussions above, it follows that, with the increased interest in microfinance as a strategy for poverty alleviation, the focus of MFIs has shifted from government funded institutions to client-oriented, self-sufficient or profit-oriented commercial institutions seeking to maximise their outreach. Charitonenko and De Silva (2002) suggest that, in order to achieve maximum outreach, MFIs should operate within commercial principles that can lead to yield-increasing efficiencies and be beneficial to low income borrowers. Their view of the process is depicted in Figure 2.1.



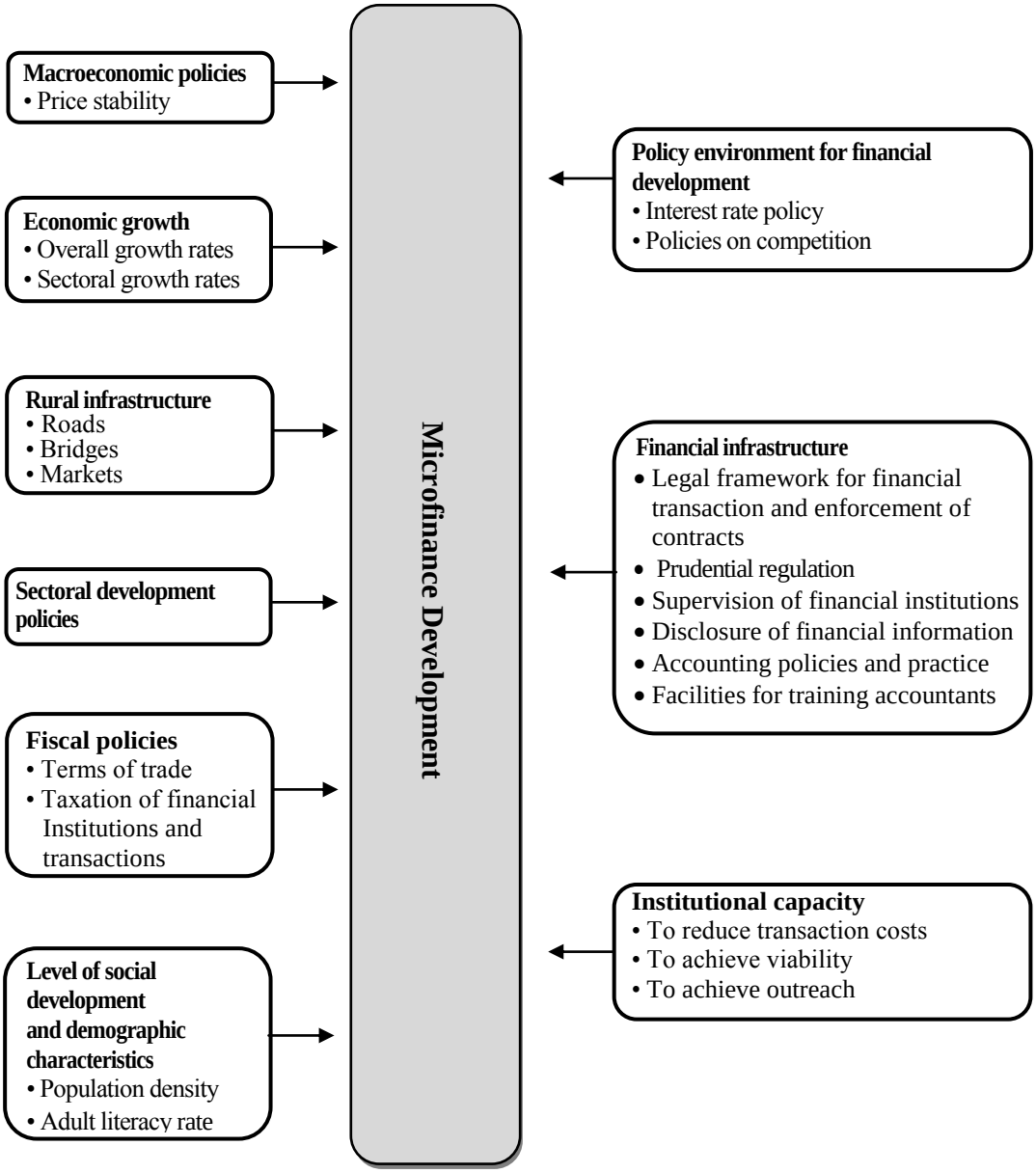
Source; Charitonenko and De Silva (2002 p. 2)

Figure 2.1: **Progression towards commercialisation of microfinance**

According to Charitonenko and De Silva (2002), the adoption of a profit orientation in administration and operations with the introduction of diversified demand-oriented financial products is the first step in the commercialisation process. Increasing cost-recovery and cost efficiency decisions should lead to expanding outreach and progress towards the sustainability of MFIs. Charitonenko and De Silva argue that the use of market-based funds, rather than subsidised funds, may be the most complete hallmark of MFIs' commercialisation. Further, they emphasise that some form of regulation and supervision that supports commercial MFIs should be integrated into the formal financial system.

The ADB (2000) also specifies the determinants of commercialisation of the microfinance industry. The policy environments for financial development, financial infrastructure and institutional capacity affect the market structure of the microfinance industry (ADB 2000). This view is illustrated in Figure 2.2 which shows the factors the ADB identifies as determinants of the development of microfinance in a country.

The ADB (2000) suggests that the market structure in the microfinance industry varies significantly across regions, depending on their stage of financial development, economic development and the policy environment. Further, the ADB provides evidence that the policy environment for microfinance in many countries remains unfavourable for sustainable growth in operations. For example, in China, Thailand and Vietnam, the ceilings on interest rates limit the ability of MFIs to provide permanent access for an increasing number of clients (ADB 2000).



Source: ADB (2000 p.47)

Figure 2.2: Determinants of microfinance development

On the other hand, subsidized interest rates and poor loan collection rates undermine the sustainable development of microfinance (ADB 2000). This discourages the entry of new service providers to the microfinance industry. Further, the ADB (2000) emphasises that mobilising savings and obtaining loans from commercial banks, instead of donor agencies, provides safety and attractive

returns to institutions. Further, an adequate delivery mechanism shows a visible commitment to financial self-sufficiency and sustainability (ADB 2000).

Moreover, ADB (2000) suggests that developing financial infrastructure is also crucial for the development of viable institutions. The legal framework for making financial transactions and enforcement of contracts is a key element in this background (ADB 2000). Further, the establishment of a regulatory and supervisory mechanism and the introduction of policies and practices that provide accounting information are important for improving transparency of operations, which will eventually facilitate effective monitoring and compliance with industry standards (ADB 2000). MFIs and microcredit portfolios cannot be safely funded for commercial services in the long-term unless appropriate performance standards, regulation and supervisory regimes are developed and enforced to protect public deposits (Charitonenko & De Silva 2002). Seibel (1999) also suggests that, within a sound regulation and supervisory process, MFIs can be integrated into the formal financial services sector. This would be in the interests of both MFIs and their clients.

According to Berger, Goldmark and Miller-Sanabria (2006), for the Latin American microfinance model, financial performance, financing and ownership are the important characteristics of the commercial orientation of MFIs' operations. The key features of this model are adaptability and responsiveness to customer demands. The application of this model to MFIs in Latin America, , has resulted in better sustainability and profitability than are found in other regions despite their rapid expansion during the last 20 years (Berger, Goldmark & Miller-Sanabria 2006). Profitability is already on par with major international banks operating in Latin America. This has allowed MFIs to attract more external financing and to expand their outreach (Berger, Goldmark & Miller-Sanabria 2006). Many of the 51 top MFIs worldwide are located in Latin America (Abrams 2005) and these performed well compared with the top global banking institutions in 2002. This evidence confirms that MFIs can perform activities as well as other commercial banks.

In addition, many studies support the view that the commercial concept of microfinance is the most appropriate for decisions about the regulation of MFIs. Seibel (1999) finds that the introduction of diversified market-oriented financial products to microfinance may speed the process of commercialisation. He also notes that expanding outreach, through cost recovery by setting interest rates, savings mobilisation and sound banking practices are important to any type of MFIs which operates on a commercial scale. Holden and Prokopenko (2001) state that, due to inadequate management and deficiencies in control of activities, MFIs are limited in their contribution to the formal finance sector. Hulme and Mosley (1996) study a number of different countries' microfinance programmes and conclude that microfinance will be a prime weapon against poverty reduction in developing countries that need sound administration and market oriented projects. However, several authors argue that there are some circumstances that curtail MFIs' progress towards commercialisation. These circumstances include:

i. weak institutional capacity and over-emphasis on social mission (Charitonenko & De Silva 2002; Meagher 2002);

ii. pervasive government presence in subsidized microfinance (ADB 2000; Charitonenko & De Silva 2002);

iii. ad hoc debt forgiveness damages the repayment culture necessary for commercialisation (Charitonenko & De Silva 2002);

iv. an inadequate regulatory framework (ADB 2000; Charitonenko & De Silva 2002; Meagher 2002);

v. most NGOs put clients' savings at risk and threaten to damage the credibility of the industry (Charitonenko & De Silva 2002; Meagher 2002);

vi. lack of supportive legal and regulatory framework (ADB 2000; Charitonenko & De Silva 2002);

This discussion provides strong reasons for the role of MFIs in the formal financial system in developing countries. It is evident that they play very useful roles in promoting economic development in developing countries, without being

engaged in traditional banking practices. However, the microfinance industry remains well below its potential outreach in these countries, particularly in the Asia-Pacific region. Furthermore, government interventions in their finance industry in these countries continue in different ways. Therefore, it is necessary to identify adequately the problems faced by MFIs and to remove impediments when designing market-oriented services for clients and expanding their outreach with sustainable institutions.

2.4 The financial institutions in Sri Lanka

This section provides a brief introduction to the institutional structures and operational environments of financial institutions in Sri Lanka. Prior to Sri Lanka becoming an independent state in 1948, the financial services sector was dominated by foreign banks. After the establishment of the Central Bank of Sri Lanka (CBSL) in 1950, direct Government control over financial activities began. This control was gradually increased during the period 1950 to 1960 due to the fact that most economic activities were carried out in a semi-planned[14] mixed economic environment. Direct investments by the Government in the banking sector were further enhanced by establishing two state-owned banks, namely, the Bank of Ceylon and the People's Bank (Karunasena 1999). Furthermore, government legislation supported the development of non-bank financial institutions in the 1960s such as a cooperative rural bank network.

In 1977, with the introduction of a market-oriented approach, the government implemented policies to deregulate the financial services sector. Some of the policies facilitated greater freedom to operate in a market driven environment. As a consequence, a large number of foreign banks, finance and leasing companies entered the financial market (Karunasena 1999). Further, the state-owned banks extended their services by establishing subsidiaries, such as the People's Leasing, the People's Merchant, Merchant Bank of Sri Lanka, and Merchant Credit of Sri

[14] This means an economy comprise of both private-owned and state-owned enterprises.

Lanka to match the growing and urgent needs for the development of institutional facilities (Jayasundara & Indrarathna 1991).

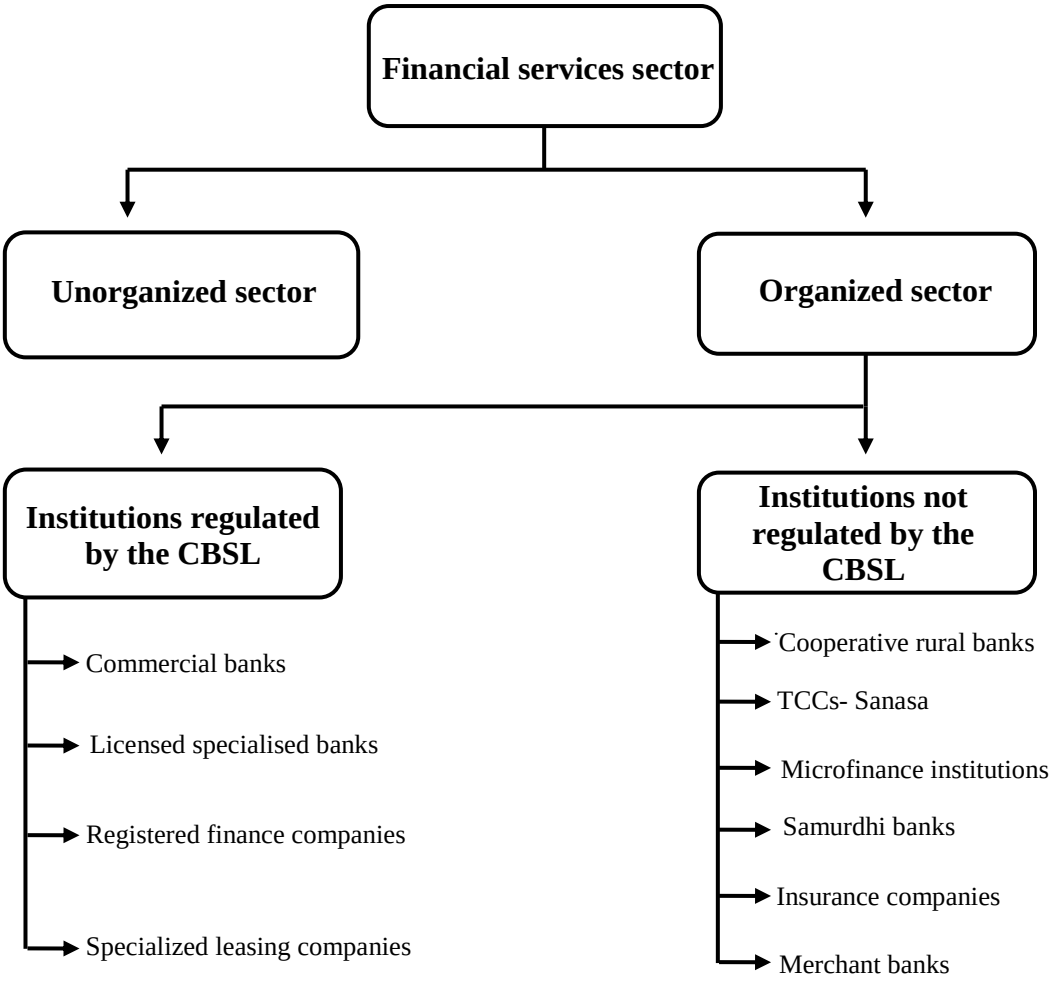
2.4.1 The structure of the financial services sector

Figure 2.3 and Table 2.2 illustrate the composition and overall development of the financial services sector in Sri Lanka. The sector consists of organised and unorganised sectors. The organised sector is comprised of diverse range financial services institutions. However, the unorganised sector only includes microscale lending institutions, with the majority of these being individual money lenders and pawn brokers (CBSL 2006).

The CBSL regulates licensed commercial banks, licensed specialised banks, registered finance companies, and specialized leasing companies. Licensed commercial banks have been permitted to provide all banking services. Hence, they play a central role within the financial services sector. They have the capacity to provide liquidity, and are also responsible for payment services, thereby enabling all entities to carry out financial transactions. In 2006, there were 23 commercial banks, comprising two state owned institutions, nine privately owned institutions and twelve foreign banks, operating with a total of 1530 branches throughout the country (CBSL 2006).

Licensed specialised banks provide specific banking services. These institutions are allowed to accept deposits, with the exception of demand deposits[15]. They do not have authority to provide all banking services but can provide housing and industrial loans to customers. At the end of 2006, there are two savings banks which operate as licensed specialised banks and these have 114 branches throughout the country (CBSL 2006).

[15] An account from which deposits can be withdrawn at any time without any notice to the institution.



Source: Developed from CBSL annual report 2006

Figure 2.3: **Composition of the financial services sector in Sri Lanka**

In addition, there are six regional development banks, operating with 201 branches, which are authorised to take long-term deposits and are limited to providing loans to long-term and medium-term entrepreneurs in regional areas (CBSL 2006). Several finance companies also operate limited commercial banking activities in the country. These finance companies are registered as limited liability companies under *Finance Companies Act No. 78 of 1988*. They provide financial services to entrepreneurs and have authority to accept deposits by issuing certificates under the Act. At the end of 2006,, there are 29 finance companies registered with the CBSL (CBSL 2006). Accordingly, as with most

developing countries, the banking sector dominates the financial services sector in Sri Lanka.

Table 2.2: Development of financial institutions in Sri Lanka

Year	Licensed Commercial Banks	Savings Banks	Licensed specialised banks	Finance Companies	CRBs
1994	29 (912)	1 (90)	Na	26	304(1216)
1995	32 (913)	1 (96)	Na	24	304(1251)
1996	33 (943)	1 (99)	Na	24	304(1293)
1997	26 (987)	1(101)	6	25	305(1329)
1998	26 (1028)	1(102)	8	25	305(1351)
1999	26 (1047)	1(101)	12	25	305(1418)
2000	26 (1080)	2(101)	12	25	305(1476)
2001	25 (1117)	2(101)	12	25	305(1507)
2002	23 (1216)	2(103)	14	26	305(1554)
2003	23 (1325)	2(112)	14	26	305(1594)
2004	22 (1380)	2(112)	14	27	306(1539)
2005	22(1417)	2(114)	14	27	310(1650)
2006	23(1530)	2(114)	14	29	310(1608)

Sources: CBSL annual reports and CRB statistics hand book 2006

(Number of branches is indicated in brackets) (Na = Data are not available)

As an alternative to conventional banking, small financial institutions (SFIs) have developed to provide banking services in Sri Lanka. However, these specialised institutions provide only certain financial services, such as insurance services, stock broking, and microfinance services to customers. One class of small financial institution, cooperative rural banks (CRBs) has an extensive member base and network throughout the country. At the end of 2006, multipurpose cooperative societies (MPCS) operate 310 CRBs with 1608 branches (CBSL 2006). Approximately 8500 thrift and credit cooperative societies (TCCs-Sanasa) also contribute, particularly to the rural finance sector in the country. CRBs have been permitted to take deposits from the public and provide loans and advances under the *Cooperative Societies Act No. 5 of 1972*[16]. In addition, Samurdhi

[16] The first cooperative law in Sri Lanka was enacted in 1911. After several amendments, the *Cooperative Societies Act no.5 of 1972* remains the principal law at present.

banking societies, which operate under the Samurdhi Authority[17] of Sri Lanka, and a large number of other MFIs, focus on financial services in rural financial sector. Although these small financial institutions are not regulated or supervised by the CBSL, they play a vital role in the development of small businesses and microcredit demands particularly in rural parts of the country. Sections 2.4.4 and 2.5 discuss the contributions of microfinance institutions and CRBs respectively to the financial services sector in Sri Lanka.

2.4.2 Regulatory framework of the financial services sector

The financial system in Sri Lanka faces diverse forms of regulation which are dependent on business structures. Table 2.3 shows the institutional providers of financial services, their business structures, ownership, regulations, and services.

Supervision of the banking sector in Sri Lanka has much in common with practices in other countries. Commercial banks and other licensed banks are supervised by the CBSL. The regulatory and supervisory frameworks for commercial banks are specified in the *Banking Act of 1988, Exchange Control Act of 1953* and *Monetary Law Act of 1949.* This supervision is based on the internationally accepted standards recommended by the Basel II Committee for Banking Supervision (CBSL 2006). However, finance companies and licensed leasing companies are subject to regulation by the CBSL and are governed by the *Finance Company Act of 1988* and the *Finance Leasing Act of 2000* respectively.

At the time of completing this story (mid 2009), small financial institutions and other types of financial institutions, which provide rural finance and microfinance, are not regulated by CBSL. Nevertheless, such institutions are subject to the respective rules, standards and bylaws or come under the purview of specific regulators[18] and also rely on self-regulation to provide protection for their borrowing customers and the general public. The CBSL does not have

[17] Established under the *Samurdhi Authority Act No 30 of 1995*.
[18] Stock brokers and unit trusts come under the purview of the Security Exchange Commission and insurance companies are regulated by the Insurance Board of Sri Lanka.

responsibility for regulation and supervision of CRBs. Rather the purview of the Department of Cooperatives Development is responsible for CRBs under C*ooperative Societies Act no 5 of 1972* of the Central Government and the *Provincial Councils Act no 42 of 1987*. Under the C*ooperative Societies Act*, the Department of Cooperatives Development focuses mainly on the establishment of cooperative societies, the audit of accounts, maintaining internal controls and self-supervision practices.

Table 2.3: Institutional providers of financial services

Provider	Business structure	Ownership	Regulation	Services
Commercial banks	Limited liability/ Government institutions	Private sector/ Government	Regulated by CBSL	Full banking services
Regional development banks	Limited liability/ Government institutions	Private sector/ Government	Regulated by CBSL	Certificate deposits, loans and credits
Savings banks	Government institutions	Government	Regulated by CBSL	Savings and time deposits
Licensed specialised banks	Limited liability	Private sector	Regulated by CBSL	Certificate deposits and loans and credits
Registered Finance companies	Limited liability	Private sector	Regulated by CBSL	Certificate deposits and loans and credits
SFIs				
Cooperative rural banks	Cooperative organisations	Members	Regulated by Commissioners of Cooperative Development	Savings, time deposits and loans and advances members and non-members
TCCS-Sanasa	Cooperative organisations	Members	Regulated by Commissioners of Cooperative Development	Savings, time deposits and loans to members
Samurdhi banking societies	Cooperative organisations	Members	Regulated by Commissioner of Samurdhi Authority	Savings, time deposits and loans to members

Sources: Developed from CBSL (CBSL 2006), Abeyaratna, (2007) and GTZ ProMiS (2009).

SFIs =Small financial institutions.

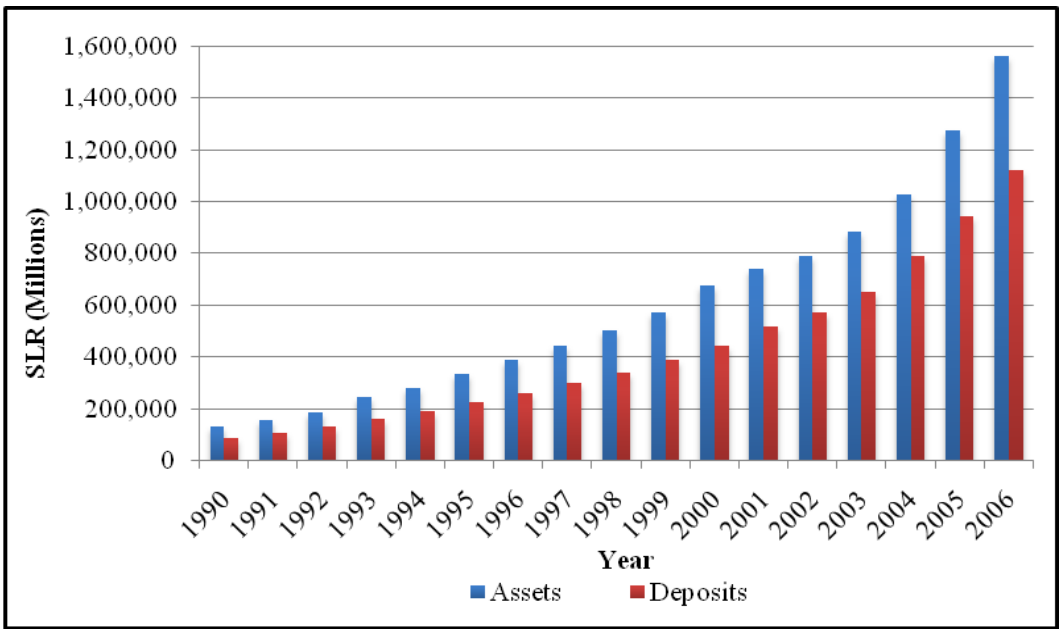
Further, all MFIs follow various legislations[19] but are not supervised or regulated by CBSL. At the same time the informal financial services sector is not regulated at all. It is generally accepted that the regulation and supervision of financial service institutions protects customers, promotes business activities and deepens the market (Christen & Rosenberg 2000; Meagher 2002; Almario, Jimenez & Roman 2006). However, due to lack of regulation for MFIs in Sri Lanka, customers face risks with respect to the safety and stability of the sector and face uncertainty with respect to going concerns for most of the institutions (Charitonenko & De Silva 2002). This has a negative impact on the supply of microfinance services to the broader society and on the growth of the rural financial sector (Abeyaratna 2007). Moreover, there is a danger that a number of unregulated financial institutions may liquidate, causing depositors to lose their savings if they are unable to adapt to the rapidly changing financial environment (Charitonenko & De Silva 2002). Such institutions are either restructured or liquidated, based on the extent to which they have deteriorated. Hence, the Government of Sri Lanka and donor agencies expect that the new regulatory framework proposed will help to overcome the current monitoring deficiencies and result in efficient operations in the future (Ministry of Finance 2001; CBSL 2006; GTZ ProMiS 2009). In addition, stakeholders expect that regulations facilitate transparency of information and enable them to compare information with that of competitors to ensure that the institutions comply with the standards necessary for going concerns (CBSL 2006).

2.4.3 Operations of financial institutions in Sri Lanka

Despite the rapid expansion of financial services in Sri Lanka during the last few decades, banks retain their dominant position in the sector. Consequently, assets and deposits increased dramatically during this period. Figure 2.4 exhibits the total assets and total liabilities in the commercial banking sector over the period from 1990 to 2006.

[19] A law to regulate MFIs is currently being discussed and it has been proposed in 2009 that the CBSL shall supervise MFIs.

Commercial banks grew in terms of assets and deposits (Figure 2.4). The growth was mainly achieved through several structural changes in the financial services sector, along with the establishment of wider operating activities in the commercial banking sector (CBSL 2006). Many banks introduced innovative service delivery mechanisms, such as automated teller machines (ATMs) and electronic fund transfer facilities (EFTPOS). These services used information and communication technologies, such as internet banking facilities and telephone-banking facilities. Further, this growth may also be due to the implementation of several new systems by CBSL in 2003, such as real time gross settlement (RTGS)[20] system and script-less securities settlement (SSS)[21]. Money market transactions now run more efficiently and have lower risk. According to the CBSL, total assets of the overall financial services sector reached SLR 2,276 billion[22] (US$ 22.18 billion) and in terms of deposits, reached SLR 1,521 billion (US$ 14.82 billion) at the end of 2006 (CBSL 2006).

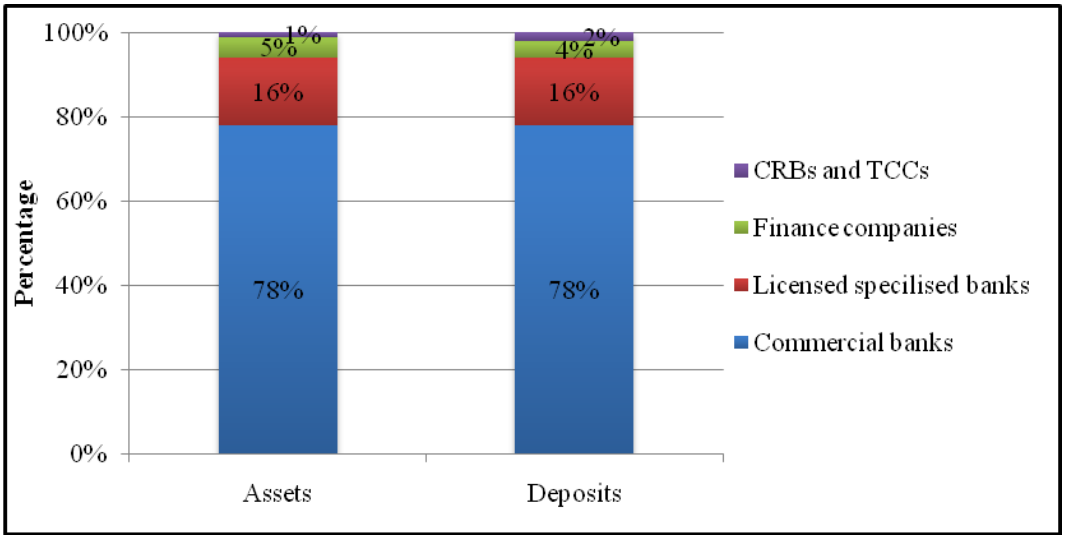


Source: CBSL annual report (2006)

Figure 2.4: **Total deposits and total assets of the commercial banks**

[20] In RTGS mechanism, the transfer of money from one bank to another bank process without any waiting period. The transaction is settled as they are processed.
[21] This system enables the Government securities transactions electronically.
[22] One US$ is equal to Sri Lanka Rupee (SLR) 102.61 as at 31.03.2006.

However, despite the large number of financial institutions, the stability of the financial services sector is primarily dependent on commercial banks. Assets and deposits of commercial banks comprise 78% of the total assets and deposits of the sector. Registered financial institutions and licensed specialised banks represent 21% of all assets of the sector. In terms of deposits, commercial banks dominated the sector. The importance of the rural financial sector's contribution is relatively low in comparison to other financial services sectors. Cooperative based financial institutions, CRBs and TCCs represent only 1% of total assets and 2% of the deposits of whole financial services sector (CBSL 2006). Figure 2.5 shows the comparison total assets base and total deposits base of the financial services sector institutions in 2006.



Source: CBSL annual report (2006)

Figure 2.5: Composition of assets and deposits of the main financial institutions

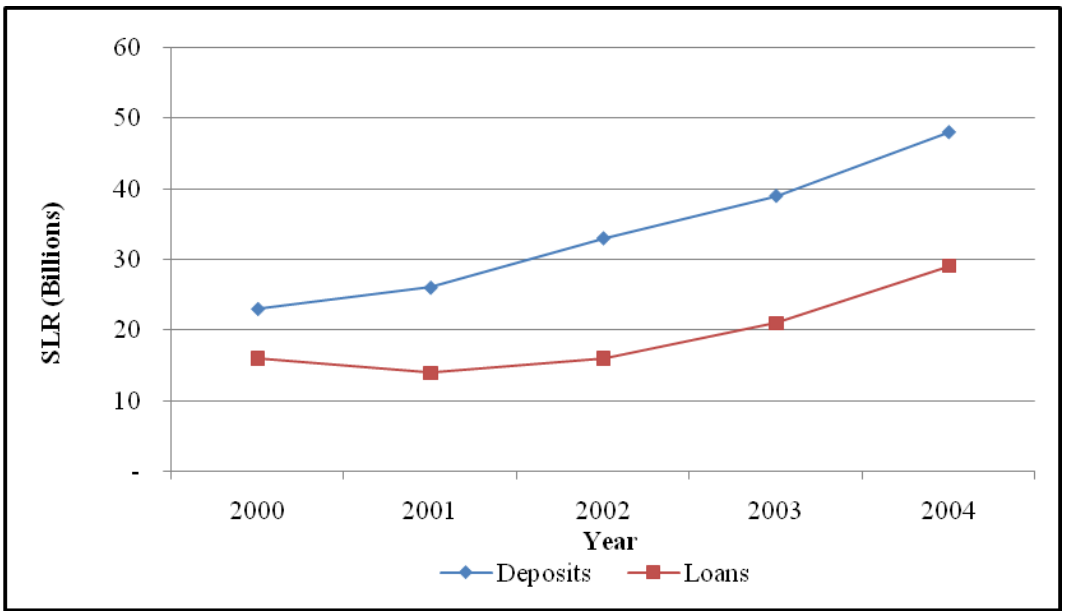
Overall, the above evidence shows that investment opportunities for the general public in formal financial institutions have expanded in the last few decades. This resulted in more money being channelled to the banking system and away from informal organisations and physical assets (Patabendige 2006). The financial position of the banks has improved without threat to the financial stability of the sector.

2.4.4 Microfinance institutions in Sri Lanka

In Sri Lanka, more than 70% of the population live in rural areas and most are involved in agricultural-related activities or are small scale farmers. In addition, some are involved in various microenterprises. The low income householders and their microenterprises have a demand for microfinance services (ADB 2000). Consequently, Sri Lanka has developed a widely diversified microfinance system (Gant et al. 2002). Currently, the formal microfinance services providers comprise of commercial banks including private and state-owned banks, regional development banks, and licensed specialised banks (supervised by the CBSL). The semi-formal institutions (currently not supervised by the CBSL) includes CRBs, TCCs Sanasa, Samurdi banking societies, local and international NGOs, post offices that collect savings, and Government rural credit programmes (Gant et al. 2002).

The formal institutions which provide microfinance and microcredit officially commenced operations in the early 1910s with the advent of the cooperative movements (Charitonenko & De Silva 2002). However, most microcredit activities were spread across the country before the 1900s with the operations of informal organisations. In the early 1960s, the establishment of CRBs was the most significant step in developing formal microfinance activities by the government since independence in 1948. Moreover, microfinance activities expanded during the 1990s with the introduction of Government poverty alleviation programmes. In this context, during the period 1990 to 1995, a number of small and medium enterprises were promoted. As a result, most financial institutions encouraged microfinance activities (Charitonenko & De Silva 2002). Commercial banks, such as the Hatton National Bank and the Seylan Bank have introduced many innovative microfinance programmes. These programmes were effective in most rural areas during the period 1991 to 1998 (Conroy 2000). Further, the Sanasa Development Bank, a small licensed specialised bank established on the model of TCCs, has also become involved in microlending activities in urban and rural areas since 1998 (Charitonenko & De Silva 2002). The number of these activities has further increased due to large scale foreign aid

from the multilateral funding agencies such as the Asian Development Bank, the World Bank and from bilateral agencies such as USAID, GTZ and AusAID since 2000 (Ameer 2001). Figure 2.6 shows the volume of deposits and volume of loans of the microfinance institutions during the period 2000 to 2004.



Source; Duflos et al. (2006)

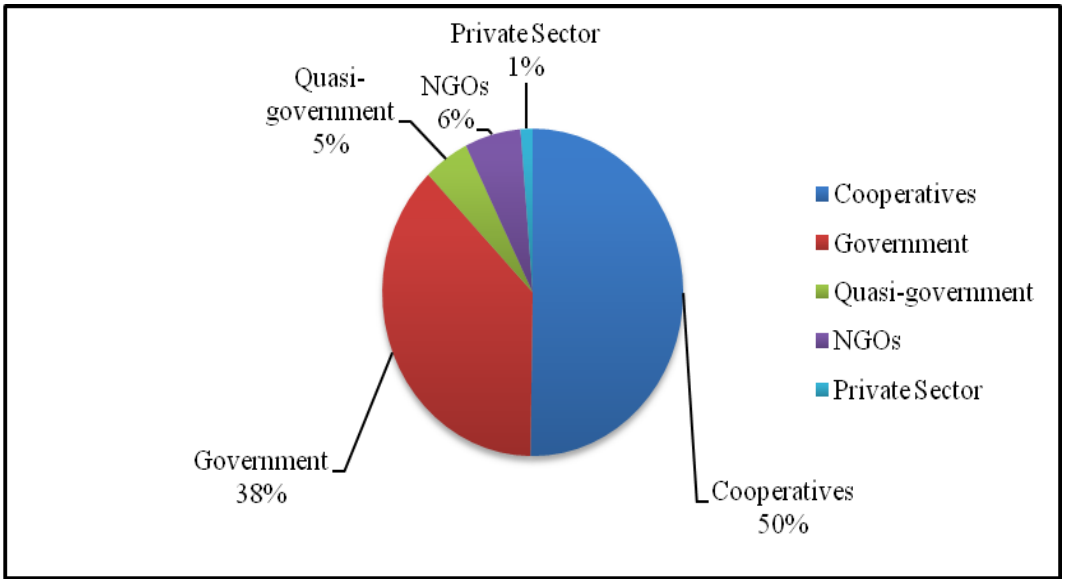
Figure 2.6: **Deposits and loans in microfinance institutions**

The number of loans grew by 37% and the loan portfolio more than doubled during the same period. For deposits, a significant expansion was achieved after 2000. The number of deposit accounts grew from 10 million in 2000 to 15 million by the end of 2004. The value of deposits more than doubled from 2000 to 2004. At the end of 2004, deposits were SLR 48 (US$ 0.44) billion and loans outstanding SLR 29 (US$ 0.26) billion (Duflos et al. 2006).

Having realised the importance of microfinance, many different types of institutions provide more activities, using a wide range of methods for achieving multiple purposes. The government also uses microfinance programmes as a tool for poverty alleviation (Charitonenko & De Silva 2002). Furthermore, other non-governmental organisations' microfinance programmes operate as a not-for-profit

or social and cultural development tool in areas affected by ethnic conflict (Gant et al. 2002). However, commercial banks and other non-banking institutions used microfinance activities simply as another commercial activity (Gant et al. 2002).

Despite the importance of commercial banks, organisations based on a cooperative model have been the dominant microfinance providers during the last few decades. Moreover, CRBs compete with other institutions in savings markets as well as lending markets holding 71% of total savings accounts and 60% of total savings at the end of 2000 (Gant et al. 2002). In terms of microcredits, CRBs also dominate the industry (Charitonenko & De Silva 2002). Figure 2.7 shows national microcredit activities by organisations in the year 2000.



Source : Charitonenko and De Silva (2002)

Figure 2.7: **Supply of microcredit, year ended-2000**

Cooperatives are responsible for providing microcredit for 50% of the country. CRBs account for 70% of the microcredit activity of cooperatives (Figure 2.7). Most MFIs are moving toward the supply of support services for micro entrepreneurs and the cooperative sector continues to dominate microcredit in Sri Lanka. Some CRBs have the option to become leading financial agencies for many rural based enterprises and households in particular locations (Charitonenko

& De Silva 2002). The CBSL is considering bringing the larger CRBs within their regulatory ambit to encourage the latent capabilities for savings mobilisation and lending (Conroy 2000).

Though the purposes of microfinance organisations in Sri Lanka are distinct, the soundness of every organisation is important as this contributes towards maintaining confidence in the system. Hence, providing efficient microfinance services can be a critical element of an effective poverty reduction strategy and can also contribute to the development of the overall financial system through integration of financial markets (ADB 2000). However, among the large number of MFIs there are a number of CRBs, and a few NGOs, who are on the edge of becoming operationally self-sufficient and are beginning to seek commercial refinancing (Gant et al. 2002).

Given this background, microfinance institutions in Sri Lanka need structural change for diversification of activities that will to enhance self-sufficiency and provide access for rural people. Charitonenko and De Silva (2002 pp. x-xi) give the following reasons for the diversification of microfinance activities in Sri Lanka.

i. *The microfinance industry in Sri Lanka is at a fairly early stage of commercialisation.*
ii. *Microcredit market saturation appears high at about 80%.*
iii. *Cooperatives are the domain of microfinance providers and many of them are sustainable.*
iv. *More than one third of the supply is provided through government programmes that can be considered supply-led and not commercially viable.*
v. *A few microfinance NGOs are attempting to commercialise their operations, but most remain unsustainable.*
vi. *There is limited involvement in microfinance by commercial banks.*
vii. *MFIs rely heavily on savings mobilisation to fund their loan portfolios, indicative of a fairly high level of commercialisation in terms of access to funding sources.*

Charitonenko and De Silva (2002) further stress that the commercialisation process allows MFIs greater opportunity to fulfil their social objective of providing the poor with increased access to an array of demand-driven microfinance products and services. Furthermore, the regulatory and supervisory frameworks are important in determining the needs and opportunities for a more efficient MFIs to progress towards commercialisation. The CBSL (2006) recognises the longstanding reasons for establishment of a regulatory and supervisory mechanism for MFIs. Funds held by MFIs are mainly those of the poor and vulnerable (CBSL 2006). If such persons lose their savings, they will inevitably sink further into poverty and lose confidence in the financial system, thereby impeding their savings activities. Further, failure of MFIs could pose a threat to the financial system's overall stability.

These circumstances provide directions for restructuring the rural financial sector in order to ensure effective utilisation of resources and to achieve the desired objectives. Further, Gant, et al. (2002) argue that MFIs in Sri Lanka suffers from weak governance, poor repayment rates, high transaction costs, recurring losses, and significant deficiencies in regulation and supervision. There is a doubt about strength and sustainability of most MFIs. The structural changes in MFIs in Sri Lanka should be designed to establish a finance environment favourable to access by the poor and to sustainable growth of the sector (Gant et al. 2002). Charitonenko and De Silva (2002) also stress that weakness in the legal and regulatory framework and impediments in policy environments are major concerns in the commercialisation process. They further state that internal constraints, such as lack of awareness of best practices in microfinance, weak institutional capacity and a negative perception of commercialisation, hamper the diversification of activities in MFIs in Sri Lanka.

While regulatory and supervisory practices have been strengthened in the financial services sector in recent years, they have not kept pace with the growth of financial intermediaries in small financial institutions (Charitonenko & De Silva 2002). Hence, regulations and supervision are needed for the sustainability of such institutions. This can lead to better services for consumers and an increase

confidence by depositors, borrowers, members of institutions, and the general public.

2.5 Cooperative rural banks in Sri Lanka

As discussed previously, although there was a large demand for microfinance services in Sri Lanka in the early 1900s, most households used informal sources to meet their funding needs because they lacked access to formal institutions. Hence, most households found it difficult to accumulate wealth through savings in formal institutions. With the inception of CRBs in 1964, the Government introduced formal banking concepts to rural people of Sri Lanka (Wickramapala 2007). Currently, despite the large number of institutions providing microfinance services, CRBs have experienced remarkable growth in the microcredit market (Gant et al. 2002).

2.5.1 Overview

The first CRB was established at the village of "Manikhinna" in the central part of Sri Lanka in 1964 (Gant et al. 2002). Though it was not established as a commercial bank, the word 'bank' was used among the rural community from the inception of these SFIs (Amerakoon 1992). Similar to Bangladesh's 'Grameen Bank' and Malaysia's 'Bum Puthra', it was a rare phenomenon to have a banking facilities among rural communities in Sri Lanka (Wickramapala 2007).

However, CRBs are not categorised as part of the commercial banking sector because they cannot offer all business banking services and are not regulated by the Central Bank (CBSL 2006). One of the CRBs' core businesses is accepting deposits from members and non-members (Co-op Rural Bank 2005). The main sources of income for CRBs are generated from providing loans and advances to customers. Thus, the main objective for the establishment of CRBs is to promote the economy by providing banking services to the people, particularly catering for the specific needs of those in rural areas and promoting institutional support for rural credit. Accordingly, CRBs provide a wide range of financial services to

customers[23] using the cooperative model[24] in order to accomplish their aims. The main functions of CRBs (Co-op Rural Bank 2005) are:

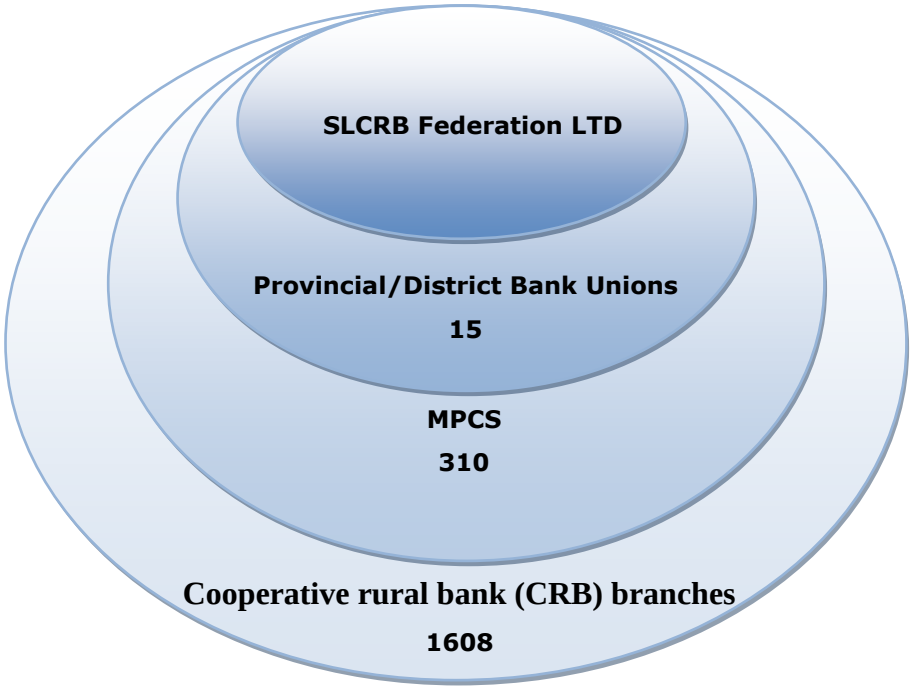
- mobilising savings;
- rendering loans and credits according to cooperative regulations;
- providing services to coordinate of the usage of loans;
- producing advice to manage rural resources;
- pawning activities; and
- money transfer services.

After several re-organisations of multipurpose cooperative societies (MPCS) during 1970s, every MPCS[25] had established one or more CRB in a particular urban area or village (Wickramapala 2007). CRBs serve, in most cases, as bankers to respective MPCSs by providing liquidity (Wickramapala 2007). However, for the smooth functioning of their services, CRBs were recognised as independent profit units and given semi-autonomy from MPCSs. At the initial stage, the state-owned People's Bank supervised the accounting and finance systems of CRBs (Gant et al. 2002). As a consequence, the People's Bank introduced accounting and finance systems appropriate for the CRB and also introduced a deposit insurance scheme to invest CRBs' excess savings in the People's Bank. CRBs have been an important source of liquidity for the People's Bank for many years. However, the relationship of the People's Bank with CRBs has been transformed in a number of re-organisation programmes over the period 1960 to 1990 (Gant et al. 2002). In 1992, all CRBs relationships with the People's Bank were terminated and, thereafter, CRBs have operated as independent financial institutions (Charitonenko & De Silva 2002).

[23] Their customers are members as well as non-members. However, more privileges are given to members.
[24] An organization owned and controlled equally by the people (members) who use its services or who work for the CRB.
[25] At the end of 2006, 310 MPCSs have established 310 CRBs with 1608 branches in the country (CBSL 2006).

2.5.2 Operating structure

Figure 2.8 shows the current operating structure of CRBs in Sri Lanka.



Source: Co-op Rural Bank (2005)

Figure 2.8: **Operating structure of cooperative rural bank system**

CRBs operate within a federated, four-tier cooperative structure with a network of fifteen district cooperative rural banking unions. The Sri Lanka Cooperative Rural Bank Federation Ltd (SLCRB) is the highest organisation of the movement and represents the National Co-operative Council. Each CRB in a particular district is a member of a district cooperative rural banking union. District unions provide financial guidance, innovative approaches to human resources development and advice on modern technology to enhance the productivity of its member CRBs. Further, they provide prudent direction for the development of resources of the cooperative movement (Co-op Rural Bank 2005). Having realised the success of this cooperative model, a few microfinance organisations are also following this

model in their operations in Sri Lanka, such as Sarvodaya, Janasakthi, Samurdhi and Sanasa (Conroy 2000).

In addition, a well defined internal organisation structure exists within the MPCS framework. Figure 2.9 shows the internal organisational structure of the MPCS and CRBs in Sri Lanka.

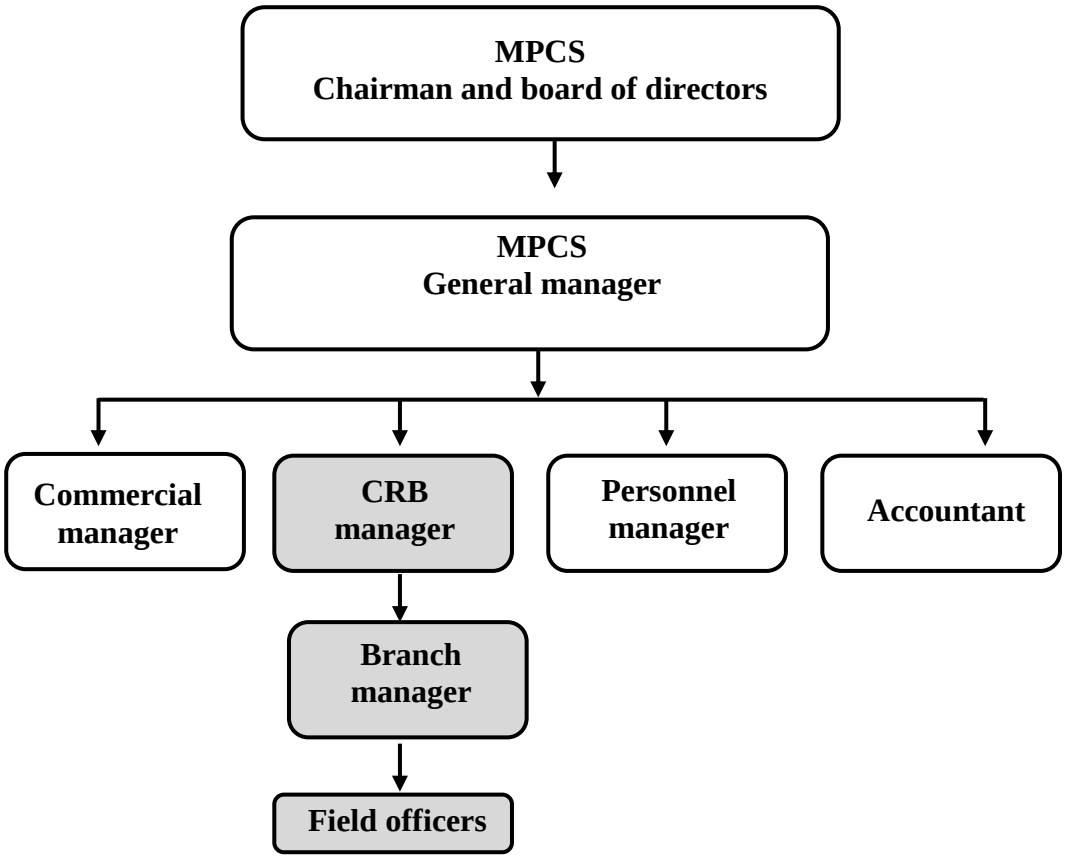


Figure 2.9: **Organisational structure of multipurpose cooperative societies**

A branch manager is appointed to each and every branch CRB. The manager of the CRB reports directly to the respective MPCS general manager and board of directors (Gant et al. 2002). The composition of the board of directors is based on the size of the membership of the respective constitution (bylaw) of the MPCS[26].

[26] As a statutory requirement, each CRB should prepare bylaws at the establishment.

The chairman and directors are elected as per the cooperative constitution. In addition, the general manager is a member of the board by ex-officio.

2.5.3 The board of governance

The board of the MPCS abides by the existing corporate governance rules, including bylaws and procedures. These rules and regulations are coordinated with *Cooperative Societies Act no.5 of 1972* and its amendments. The board of the MPCS is accountable to its members for the performance of the CRB and has the overall responsibility for meeting the expectations of its membership. The Department of Cooperative Development coordinates strategy and policy development, implementation, monitoring, reviewing of budgets and plans of MPCS operations, selecting and appointing employees, setting targets, reviewing performance, and reporting to members periodically (Department of Cooperative Development 2007). With respect to governance, the board of each respective MPCS establishes specific committees under bylaws, such as the management committee, credit committee, and audit and compliance committee. Each committee is responsible to members of the MPCS under the *Cooperative Societies Act* for the proper management and conduct of the office of the CRB. A major responsibility of each committee is to ensure decisions and actions are taken in the best interests of the institution. The structure and the membership of these committees are reviewed at the annual general meeting.

Despite a general improvement in management through the operation of specific committees, all bylaws of MPCS recognise that accounting and financial management systems have a vital role in controlling the financial affairs of the institution. Further, all financial and management systems are controlled by the respective MPCS under the supervision and control of the Commissioner of Cooperative Development (Department of Cooperative Development 2007). According to the regulations, annual reports should be prepared in a timely fashion and comply with regulatory requirements issued by the Department of Cooperative Development. MPCSs are required to prepare financial statements, which include a balance sheet, an income statement, and notes schedules and

explanatory material in conformity with the formats prescribed[27]. In addition, the Department of Cooperative Development evaluates internal control procedures on the identification of significant financial and non-financial risks to ensure that significant risk exposures are understood and managed appropriately (Department of Cooperative Development 2007).

2.5.4 Operational environment

CRBs grew to dominate microfinance activities in Sri Lanka by achieving significant outreach throughout the last forty years. The total number of CRBs at the end of 1964 was only three (Wickramapala 2007). The number of CRBs has gradually increased to 310 MPCSs that operate with 1608 CRBs (CBSL 2006) across all provinces as shown in Table 2.4. Interestingly, the growth of CRBs has not only been in agricultural development areas but also in urban areas. 432 CRBs branches (26%) operate in the Western province (CRBs 2006) .

With branch networks all over the country, CRBs explore possibilities for deeper penetration of the rural finance market in Sri Lanka (Gant et al. 2002). Currently, they show greater financial viability than was the case in the 1990s (CRBs 2006). They reach many rural clients because of the introduction of many microfinance products to rural finance markets which are neglected by formal financial institutions. This is confirmed by the increasing number of members and savings accounts during the last twelve years.

[27] Accounting standards or guidelines are not available for accounting for MFIs in Sri Lanka. Thus, accounting guidelines for the MFIs are currently (at the time of writing in mid 2009) being discussed by the Institute of Chartered Accountants of Sri Lanka, the sole accounting and auditing standards setting authority in Sri Lanka.

Table 2.4: Multi-purpose cooperative societies and cooperative rural banks- 2006

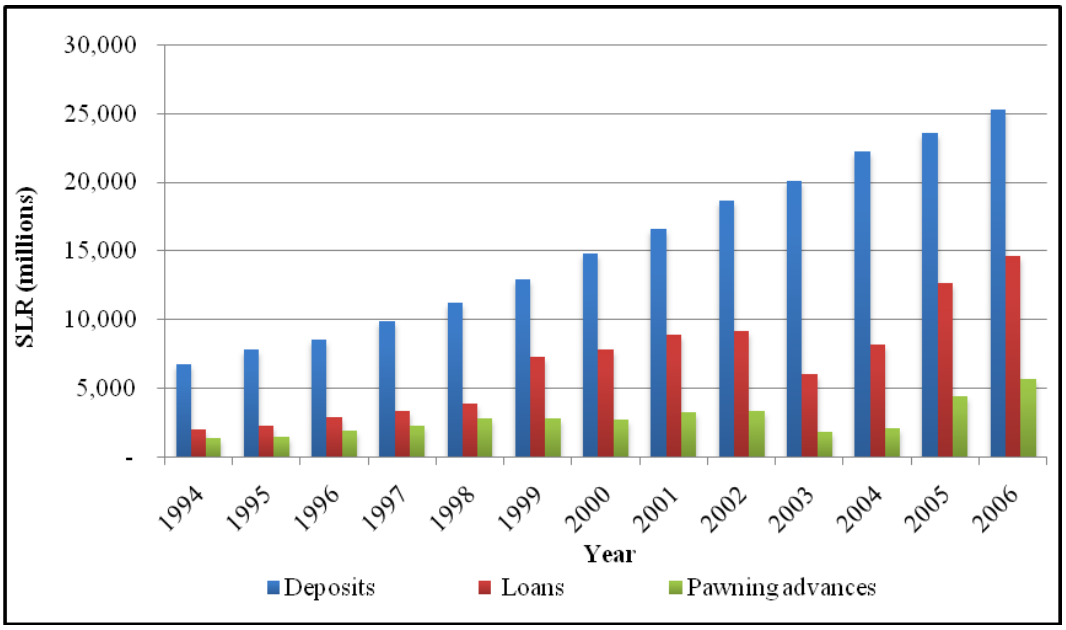
Province	District	Number of CRBs	Number of CRBs with branches
Western	Colombo	11	133
	Gampaha	17	216
	Kalutara	11	83
Central	Kandy	22	62
	Matale	11	32
	Nuwara Eliya	12	20
Southern	Galle	18	120
	Matara	9	105
	Hambantota	7	52
Nothern	Jaffna	26	42
	Manner	6	6
	Vauniya	4	4
	Mulativu	6	4
	Killinochchi	6	6
Eastern	Baticoloa	16	20
	Ampara	6	20
	Trincomalee	20	11
North West	Kurunegala	22	211
	Puttlama	12	71
North Central	Anuradhapura	19	57
	Polonnaruwa	9	23
Uva	Badulla	12	97
	Monoragala	5	27
Sabaragamuwa	Rathnapura	13	85
	Kegalle	10	101
Total		**310**	**1608**

Source: CBSL annual report (2006)

In 1996, there were about 2.3 million members and 4.4 million savings accounts being maintained by CRBs. At the end of 2006 there are 3.1 million members and effective mobilization of savings with 6.5 million individual savings accounts (CRBs 2006). Approximately one-sixth of the total population of the country[28] hold such accounts.

[28] The total population of Sri Lanka in 2006 was 19 million.

Moreover, the average deposit per account also gradually increased from SLR 1,722 in 1994 to SLR 3,899 in 2006 (US$ 16.78 to US$ 37.99) (CRBs 2006). As a result of this growth, CRBs gained an increasing share of financial assets. This has been particularly helpful in satisfying the growing demand for loans and pawning advances for people living in rural areas of Sri Lanka. During the last twelve years, total deposits, total loans, and pawning advances of CRBs have gradually increased (CRBs 2006). Figure 2.10 presents the deposits, loans and advances of CRBs from 1994 to 2006.

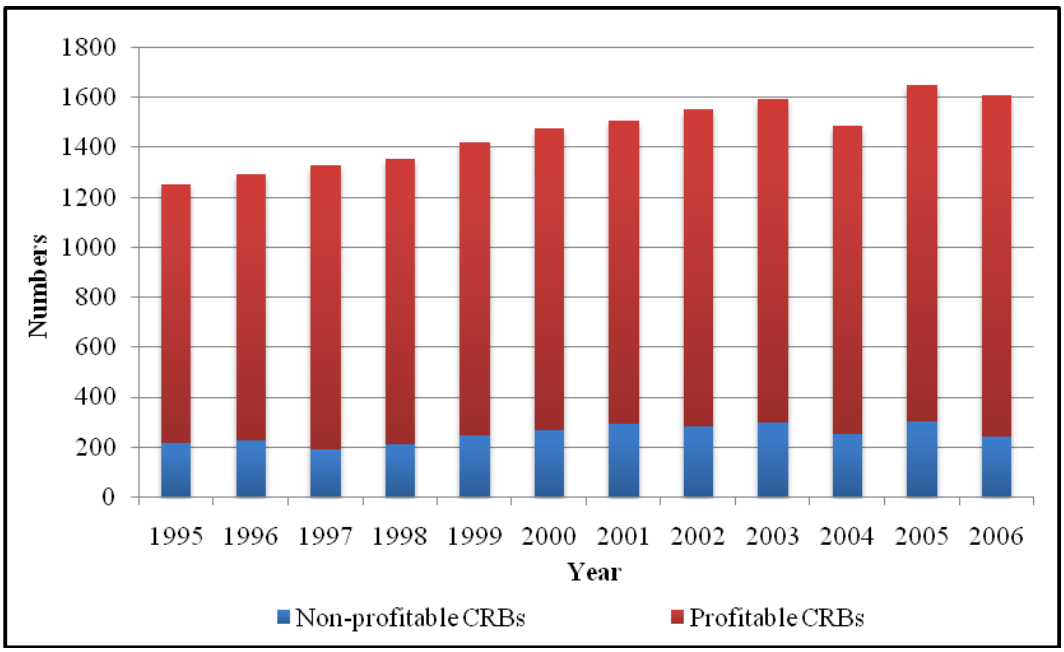


Source: CRBs' statistics hand book (2006)

Figure 2.10: **Deposits, loans and advances of cooperative rural banks, 1994-2006**

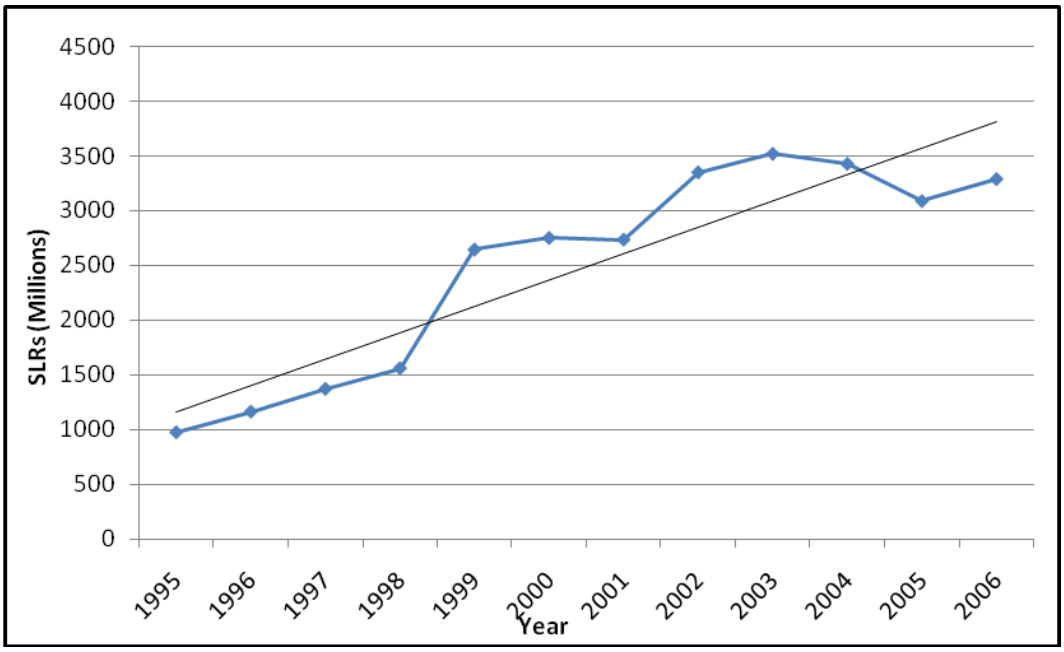
Total deposits in 1994 were SLR. 6,756.8 million (US$ 61.98 million) and increased to SLR 25,311 million (US$ 232.21 million) in 2006. Total loans were SLR 2,017.3 million (US$ 18.5 million) in 1994, increasing to SLR 14,620.4 million (US$ 134.12) in 2006. The advances on pawning were SLR 1,355.5 million (US$12.43 million) in 1994, increasing to SLR 5,621.0 million (US$ 51.5 million) in 2006 (CRBs 2006). Therefore, CRBs produced one-third of the country's total microcredit (Charitonenko & De Silva 2002).

The profitability of CRBs activities over the last twelve years in Sri Lanka has been impressive relative to their status in 1994. Though their main aim was not to operate as commercialised firms, CRBs' statistics for the year 2006 show 1,366 CRBs (85%) provided financial services all over the country on a profitable basis. Hence, only a small number of CRBs (242) remain financially fragile out of the 1608 CRBs (CRBs 2006). Figure 2.11 shows the number of profitable and non-profitable CRBs in Sri Lanka over the 1995-2006 period.



Source: CRBs' statistics handbook (2006)

Figure 2.11: **Profitability of cooperative rural banks, 1995-2006**



Source: CRBs' statistics handbook (2006)

Figure 2.12: **Accumulated profits of cooperative rural banks, 1995-2006**

Accordingly, CRBs' retained earnings consistently increased during the last 12 years. Figure 2.12 indicates the accumulated profits of CRBs from 1994 to 2006. This shows that profits increased consistently since 1994. However it started to fall in 2002. The accumulated profits of SLR 3,286 (US$30.1 million) at the end of 2006 (CRBs 2006).

Nonetheless, Charitonenko and De Silva (2002) stress that CRBs continue to suffer from a lack of efficient credit disbursement, supervision, and adequately trained staff in banking services. In addition, differences in accounting practices obscure the profitability measures of these institutions (Gant et al. 2002). Hence, appropriate regulation needs to be implemented to improve the efficiency of these institutions. The Government of Sri Lanka implemented a project with the help of the Asian Development Bank (ADB) to improve the governance of the rural financial sector in 2001 (Finance-Ministry 2001). One of the objectives of ADB project was to restructure CRBs in Sri Lanka to increase institutional strength and build capacity. One of the main issues identified in this project was to introduce accounting and financial guidelines for institutional strengthening and managing

risk profiles (Finance-Ministry 2001). These policy changes imply that CRBs will no longer see themselves as simple deposit-taking institutions and will have a positive impact on members, customers and the whole financial services sector. By redefining their businesses as rural transaction centres, CRBs intend to improve their strategic positions and to compete actively with their competitors (Finance-Ministry 2001).

2.6 Conclusion

This chapter examines the emergence of financial institutions and their influence on the financial services sector in Sri Lanka. The chapter also describes the emergence of SFIs involved in microfinance activities and their outreach and contribution to the rural financial sector, with special reference to Sri Lanka. Furthermore, the chapter reviews the establishment of CRBs and their impact on rural financial activities in Sri Lanka.

Currently, there are a range of institutions involved in microfinance activities in Sri Lanka. The focus of most institutions has shifted from operating on grant funding to client-oriented commercialised institutions. They now seek efficiency of operations. Policy makers in Sri Lanka have shown interest in re-defining the overall rural credit structure, and have introduced several re-structuring programmes expected to improve the efficiency of the rural financial sector. However, inadequate regulatory frameworks for these SFIs in Sri Lanka put poor customers at risk. Further these frameworks hamper commercial operations of SFIs. Therefore, a comprehensive study investigating the efficiency of SFIs is important for the development of an efficient rural financial sector in Sri Lanka. The next two chapters review the literature related to efficiency in financial institutions and relate this literature to the research methodology and the measurement of efficiency.

CHAPTER THREE
THE MEASUREMENT OF PRODUCTIVITY AND EFFICIENCY

3.1 Introduction

The concepts of productivity and efficiency have received a great deal of attention in many countries and organisations and by individuals in recent years. In any country, the growth of productivity and efficiency affects national income and inflation. Thereby, affects the quality of the life of individuals. In an organisational context, productivity and efficiency reflects overall performance. This could lead to increases or decreases in shareholders' wealth. Hence, governments, economists and professionals are concerned with defining and measuring the concepts of productivity and efficiency.

The aim of this chapter is to review the literature dealing with the concepts of productivity and efficiency and to review various techniques used in the measurement of these constructs. The chapter comprises of five sections. The next section defines productivity and efficiency. The third section reviews various approaches to the measurement of productivity and efficiency, focusing on the Data Envelopment Analysis (DEA) technique. The fourth section presents a literature survey of efficiency studies in financial institutions and also reviews the selection of inputs and outputs in financial institutions which are used in DEA approach. The final section is a conclusion.

3.2 Productivity and efficiency

At a basic level, productivity examines the relationship between input and output in a given production process (Coelli, Rao & Battese 1998). Thus, productivity is expressed in an output versus input formula for measuring production activities. It does not merely define the volume of output, but output obtained in relation to the

resources employed. In this context, the productivity of the firm can be defined as a ratio (Coelli, Rao & Battese 1998) as shown in equation 3.1.

$$PRODUCTIVITY = \frac{OUTPUT(S)}{INPUT(S)} \qquad \textbf{Equation 3.1}$$

The concept of productivity is closely related with that of efficiency. While the terms productivity and efficiency are often used interchangeably, efficiency does not have the same precise meaning as does productivity. While efficiency is also defined in terms of a comparison of two components (inputs and outputs), the highest productivity level from each input level is recognised as the efficient situation. Coelli, Rao and Battese (1998) further suggest that efficiency reflects the ability of a firm to obtain maximum output from a given set of inputs. If a firm is obtaining maximum output from a set of inputs, it is said to be an efficient firm (Rogers 1998).

Alternative ways of improving the productivity of the firm, for example, are by producing goods and services with fewer inputs or producing more output for the same quantity of inputs. Thus, increasing productivity implies either more output is produced with the same amount of inputs or that fewer inputs are required to produce the same level of output (Rogers 1998). The highest productivity (efficient point) is achieved when maximum output is obtained for a particular input level. Hence, productivity growth encompasses changes in efficiency, and increasing efficiency definitely raises productivity (Rogers 1998). Consequently, if the productivity growth of an organisation is higher than that of its competitors, or other firms, that firm performs better and is considered to be more efficient (Pritchard 1990).

3.2.1 Types of efficiency

Efficiency consists of two main components; technical[29] efficiency and allocative[30] efficiency (Coelli, Rao & Battese 1998). Generally, the term efficiency refers to technical efficiency. As discussed in the previous section, technical efficiency occurs if a firm obtains maximum output from a set of inputs.

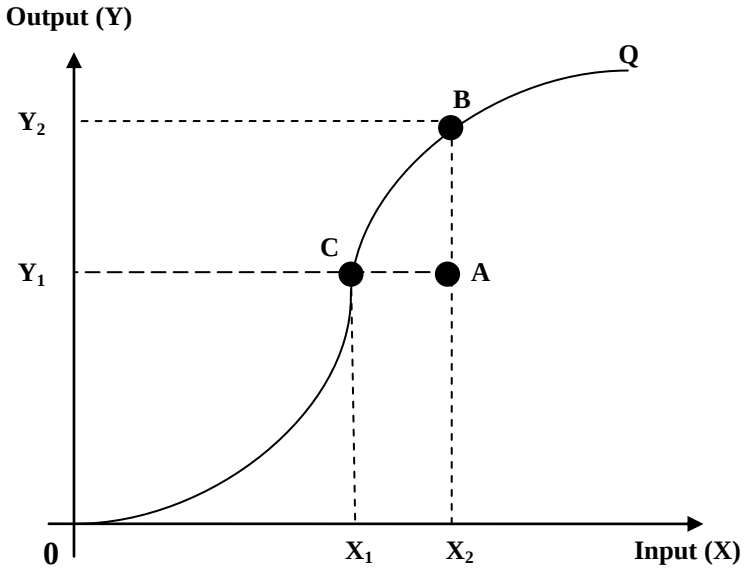
Allocative efficiency occurs when a firm chooses the optimal combination of inputs, given the level of prices and the production technology (Coelli, Rao & Battese 1998; Rogers 1998). When a firm fails to choose the optimal combination of inputs at a given level prices, it is said to be allocatively inefficient, though it may be technically efficient (Coelli, Rao & Battese 1998). Technical efficiency and allocative efficiency combine to provide overall efficiency (Coelli, Rao & Battese 1998). When a firm achieves maximum output from a particular input level, with utilisation of inputs at least cost, it is considered to be an overall efficient firm.

The concepts of productivity and technical efficiency are further illustrated in Figure 3.1 which describes a simple production process involving a single output (y) and a single input (x). Points A, B and C define the relationship between the input and the output of three different firms and these points represent the productivity level of each firm respectively. The line OQ represents the maximum level of output which can be attained with the use of each input level. This line is recognised as 'the production frontier' (Coelli, Rao & Battese 1998).

Firms that produce outputs on the production frontier are operating at maximum possible productivity and are recognised as technically efficient. Firms producing below the frontier line they are considered to be technically inefficient (Coelli, Rao & Battese 1998). Thus, firms which operate at points B and C on the production frontier are considered technically efficient firms. The firm operating at point A is considered inefficient because it could increase its productivity by

[29] Also called x efficiency
[30] Also called price efficiency

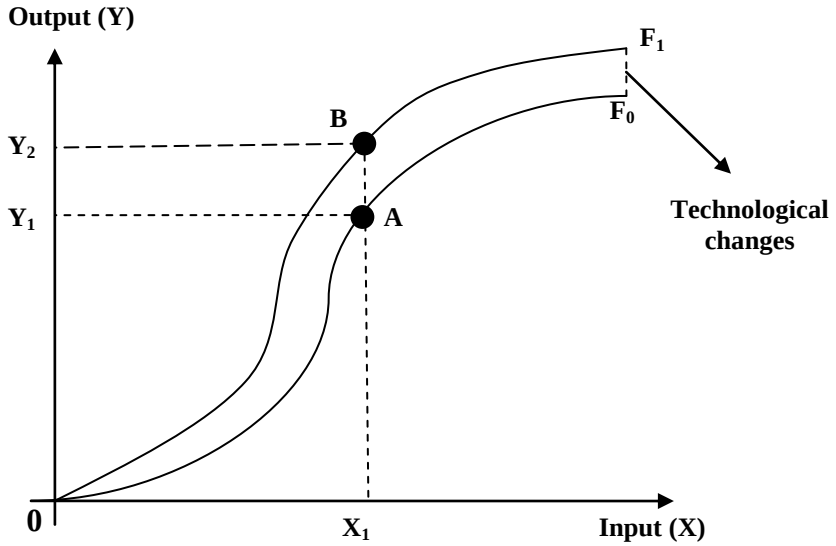
moving from output Y_1 to maximum productivity at output Y_2. The firm at point C produces output level Y_1 by using a lower input level X_1, while firm A produces the same output level Y_1 by using more inputs. Accordingly, firm A is considered as a technically inefficient firm. Technical efficiency is recognised by operating at maximum possible production, given the input level. The production frontier shows all points of technical efficiency (Coelli, Rao & Battese 1998).



Source: Coelli, Rao and Battese (1998, p.4)

Figure 3.1: Production frontier and technical efficiency

A shift outwards of a production frontier implies productivity growth (Coelli, Rao & Battese 1998). If productivity growth has been caused by advances of technology, the production frontier will shift upward to show a new set of efficient points (Coelli, Rao & Battese 1998). Figure 3.2 illustrates the movement of the production frontier caused by an advance of technology from OF_0 to OF_1. Firms produce relatively more output with production frontier OF_1 compared to OF_0, as shown by the change in output from Y_1 to Y_2 with constant inputs (Coelli, Rao & Battese 1998).



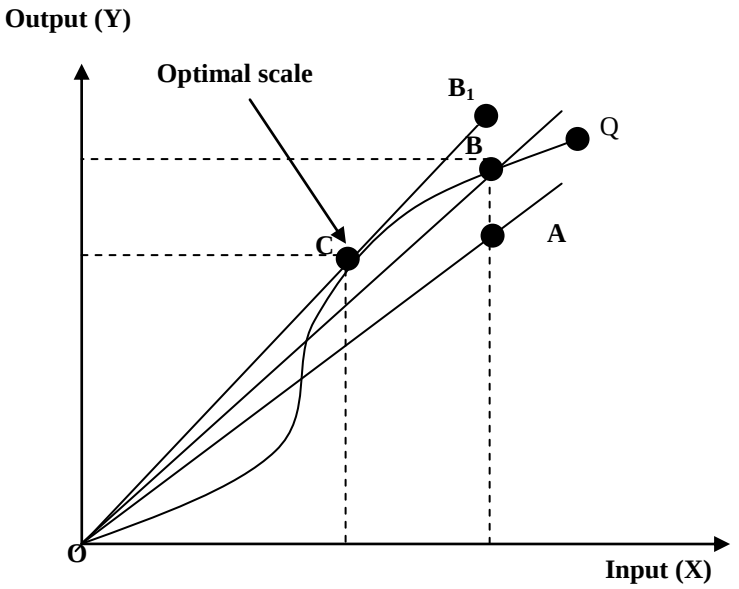
Source: Coelli, Rao and Battese (1998, p.6)

Figure 3.2: Productivity improvements with technological changes

However, the occurrence of technological change does not mean that the firm has gained the maximum level of productivity. As discussed earlier, all points on the production frontier are efficient points. The point of maximum possible productivity on the production frontier is considered as the technically optimal scale point (Coelli, Rao & Battese 1998). Operations at this point result in the maximum level of productivity whereas any other points on the production frontier show lower productivity, though all points represented are technically efficient (Coelli, Rao & Battese 1998). Thus, technically efficient firms may still need to achieve the optimal scale of productivity. Figure 3.3 illustrates productivity, technical efficiency and optimal scale of productivity.

As shown in Figure 3.3, OQ is the production frontier as defined earlier to measure technical efficiency. If the firm operating at point A was to move to efficient point B, which is a technically efficient point, there would be higher productivity. However, if the firm could reach point C, which is at a tangent to the production frontier, it would be at maximum possible productivity; C indicates the

point of optimal scale of productivity. All other points, except point C, on the production frontier represent lower productivity. Thus, all firms on the production frontier are technically efficient but may not achieve the optimal scale of productivity (Coelli, Rao & Battese 1998). Point B is technically efficient but not efficient in scale. The firm at point B can move to point B_1 without increasing inputs. This process is referred to as return to scale (RTS) and the difference between point B and B_1 is referred to as scale efficiency (Coelli, Rao & Battese 1998).

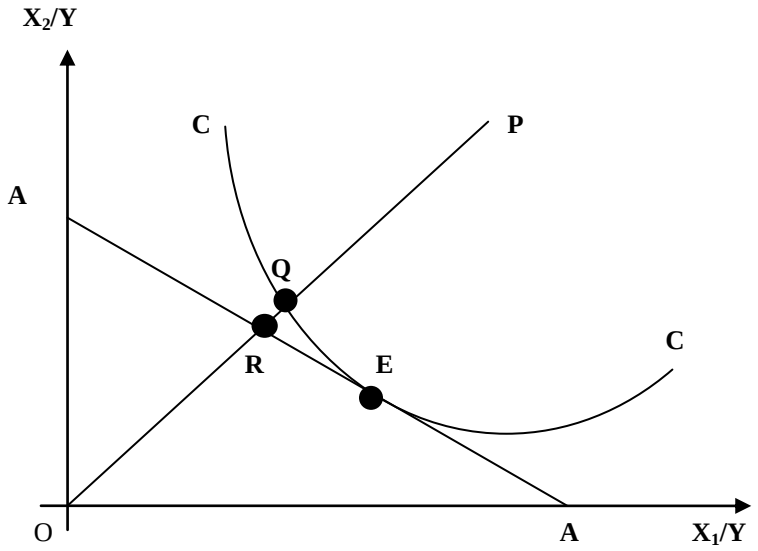


Source: Coelli, Rao and Battese (1998, p.5)

Figure 3.3: Technical efficiency and optimal scale of productivity

In the short run, a firm achieves technical efficiency by operating on the production frontier and, in the long run, may improve its productivity by exploiting the scale of operations. Thus, productivity growth may be attributed to improvements in technical efficiency, to technological improvements and to exploitation of scale of operation, or a combination of all three causes (Coelli, Rao & Battese 1998).

The above discussion focuses on technical efficiency without considering the costs of inputs. However, if the minimisation of costs is to be considered in efficiency and is to be achieved, costs of inputs must be taken into account. The assumption is that an organisation is already technically efficient; however, it may not choose the optimal mix of inputs[31] to produce at least cost. In this situation, allocative efficiency is to be considered. As discussed previously, allocative efficiency occurs when a firm chooses the combination of inputs that yield least cost production. Figure 3.4 illustrates technical efficiency and allocative efficiency.



Source: Coelli, Rao and Battese (1998 , p.135)

Figure 3.4: Technical efficiency and allocative efficiency

Consider a firm using two inputs X_1 and X_2 to produce a single output Y. The slope of the line AA illustrates the input price ratio, and the input combination required to produce a single output is shown by the slope of OP. The production frontier is given by CC. The curve is convex and suggests a different combination of input of X_1 and X_2 might be used to generate the same output. The firm that produces outside the frontier is considered inefficient for that particular output

[31] In the case of a multiple outputs industry, output mix may also be considered in the least cost.

level (Coelli, Rao & Battese 1998). The point Q would be technically efficient if the combination of inputs will produce the same output (Coelli, Rao & Battese 1998). However, on the production frontier, point Q is not optimal because this point does not represent least cost production as shown on the figure (Coelli, Rao & Battese 1998). Point E is the point representing the least cost for that particular output. Thus, the firm operating at point E achieves both technical efficiency and allocative efficiency; that is, it achieves overall efficiency[32] (Coelli, Rao & Battese 1998).

Improving productivity and efficiency[33] is one of the main goals considered in organisations in recent years, because productivity gains provide overall information about the firm's performance (Zhu 2003). Even where the firm's objective is other than profit making, efficiency measurements help to analyse the best allocation of inputs and outputs for the firm (Zhu 2003). The early history of efficiency measurement begins with Farrell's (1957) discussion, while it suggests that the efficiency of an industry is important to both economic theorists and economic policy makers. He further noted that the actual measurement of efficiency is important for testing theoretical arguments as to the relative efficiency of different economic systems. Equally, in a particular industry, it is important to know how far a given industry can be expected to increase output by simply increasing efficiency without absorbing further resources (Farrell 1957).

Moreover, Fried et al. (2002) notes that macroeconomic performance depends on microeconomic performance; thus identification of sources of inefficiency is essential to the design and implementation of public and private policies to improve performance. Further, in a competitive environment strong performance would be beneficial for the sustainability of organisations (Fried et al. 2002). When considering efficiency analysis in financial institutions, Berger and Humphrey (1997) stress that it is important to determine their efficiency because they are in a competitive environment and their strength is vital for solvency.

[32]Further economies of scope (scope efficiency) occur when there are cost savings arising by producing a joint product of two or more products.
[33] Generally, the term efficiency used in this dissertation means overall efficiency.

Further, efficiency analysis not only has important ramifications for institutions themselves, as evident in their competitiveness and solvency, it is also important for other interested parties, such as regulatory authorities and the general public (Berger & Young 1997).

Although the basic concepts of productivity and efficiency are clearly discernable measures that have been presented in the literature are diverse. The selection of the appropriate measurement depends on the purpose of the study.

3.3 Measurement of productivity and efficiency

Basically, for a single firm that produces one output using a single input, the ratio of output to input is a measure of the productivity level (Rogers 1998). In this case, productivity is relatively easy to measure. However, in the case of many outputs and many inputs in a production process, the measurement of an output-input ratio is difficult (Diewert 1992). In addition, productivity can be measured at the level of various decision making units (DMUs), such as plant, firm, industry or economy, each of which involves some specific issues (Rogers 1998). Recognising the exact units of inputs and outputs in various DMUs and the actual measurement of these are key problems in the analysis of productivity and efficiency (Rogers 1998). Many different approaches have been applied by many researchers to the measurement of productivity and efficiency changes in various types of institutions, and levels of DMUs as well. Appendix One provides details of these studies. Further, different approaches to productivity measurement give different numeric answers. Therefore, it is essential to select appropriate measurements for productivity and efficiency to avoid measurement bias in the results (Bozec, Dia & Breton 2006).

3.3.1 Partial factor productivity and total factor productivity

Figure 3.5 summarises the various approaches to the measurement of productivity and efficiency identified from the literature. In general, productivity and efficiency can be measured on a ‘partial’ factor or ‘total’ factor basis. Partial

factor productivity (PFP) refers to the change in output owing to the change in the quantity of one input, whereas total factor productivity (TFP) refers to the change in output owing to changes in the quantity of more than one input (Coelli, Rao & Battese 1998; Rogers 1998).

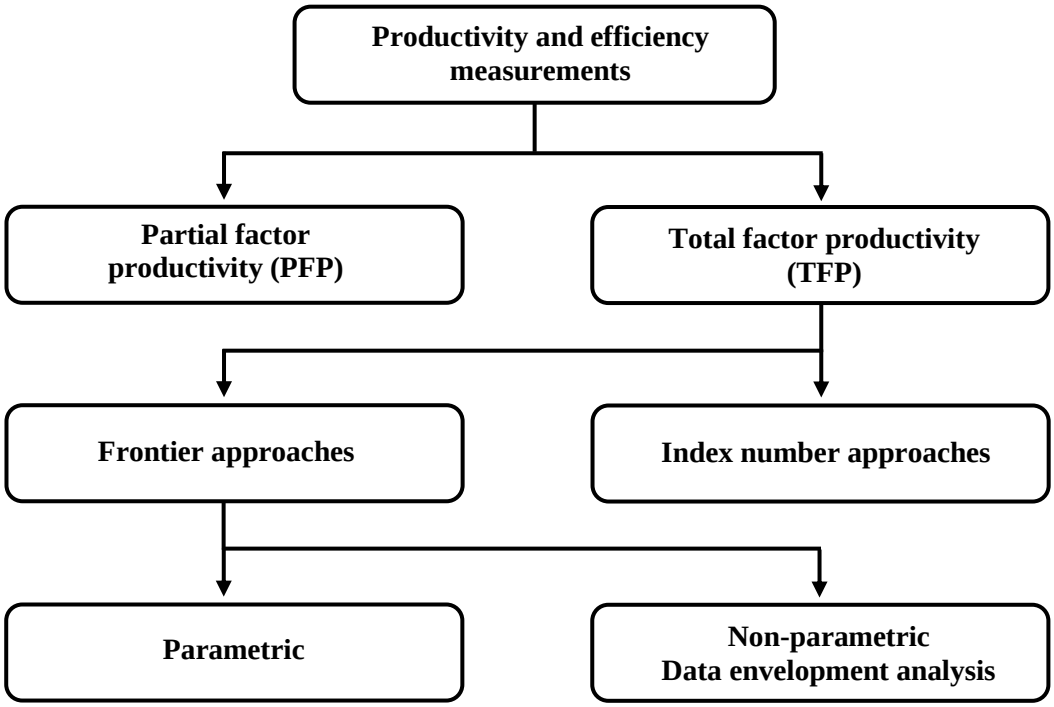


Figure 3.5: Approaches to the measurement of productivity and efficiency

Accordingly, the measurement of partial factor productivity considers only one factor and ignores the impact of changes in all other factors (Rogers 1998). Labour productivity, productivity of power and return on assets are a few examples of partial measures (Coelli, Rao & Battese 1998). If measures of productivity and efficiency are based on the return on assets, all other inputs involved in a firm's production are ignored, such as assets quality, capital adequacy, and liquidity (Zhu 2003). Coelli, Rao and Battese (1998) argue that partial measures provide a misleading indication of the overall productivity and efficiency of the firm because they provide an indicator for only one section of the firm. Nonetheless, Fried, Lovell and Schmidt (1993) note that PFP measures are

sometimes useful when the objectives of producers, or the constraints facing them, are either unknown or unconventional.

In general, in an industrial context, goods and services are produced by a combination of many factors or inputs. The output of goods and services can not be used as a measure of the productivity of any one of the inputs. The output is only a measure of the joint power of inputs to achieve results (Zhu 2003). This is the main disadvantage of measuring productivity and efficiency using the PFP approach. To overcome this shortcoming of PFP, TFP has been developed (Coelli, Rao & Battese 1998). TFP measures overall productivity and efficiency by considering all inputs and all outputs in the production process. Coelli, Rao and Battese state that the TFP approach provides a better understanding of an institutions productivity and efficiency than does the PFP approach.

3.3.2 The index number approach

In determining the productivity and efficiency of all factors, TFP can be measured in two ways, namely, the index number approach and the frontier approach (Coelli, Rao & Battese 1998; Rogers 1998). The index number approach obtains a single index by using all inputs and outputs. For example, a single index can show the movement in prices of goods over time, when there are many goods. The TFP index produces a measure of input quantity use over the output changes over a given period. The Laspeyres, Paasche, Fisher Ideal and Tornqvist indices are commonly used in productivity measurement[34] (Rogers 1998) . However, Diewert (1992) argues that index number applications are not dependable measures of productivity growth, as they are not based on any statistical theory. Therefore, their reliability cannot be tested using any statistical method. In addition, the problem associated with these index number approaches is specifying the functional forms for the indices of outputs and inputs (Diewert 1992).

[34] Diewert (1992) shows additional index number applications.

3.3.3 The production frontier approach

The production frontier approach (PFA) is more popular in empirical studies of productivity and efficiency than the index number approach. The majority of researchers have relied on relative productivity measures based on the PFA because the index number approach assumes that all firms are fully efficient. However, this would not be expected in reality (Rogers 1998). The PFA approach uses observed data to construct the production frontier for estimating productivity and efficiency. Construction of the production frontier assumes that firms operate with full technical efficiency, producing maximum potential output from the allocated inputs (Coelli, Rao & Battese 1998). Berger and Humphrey (1997) identify several advantages of frontier analysis as a tool for measuring productivity and efficiency. Firstly, frontier analysis selects the best performing firms within the industry. Secondly, it allows management to identify objectively areas of best practice within complex service operations. Although there are many possibilities, the frontier approach provides the best way to identify efficiency amongst comparable firms (Berger & Humphrey 1997). However, Farrell (1957) argues that, in the frontier approach, the efficient production function has to be recognized before discussing the significance of the efficiency measures. He suggests two approaches to the construction of a production frontier: the econometric (parametric) approach and linear programming (non-parametric) approach. The following section briefly discusses these two approaches.

3.3.4 Parametric and nonparametric approaches

The parametric approach to the construction of a production frontier and the measurement of productivity and efficiency differs from the non-parametric approach. The two approaches use different techniques to envelop data, more or less compactly, in different ways. Farrell (1957) notes that the parametric approach is a functional form that is specific and restrictive. Hence, parametric models can be categorised according to the type of data, such as cross section or panel, and the type of the variables used, such as quantities or prices (Farrell 1957). The most widely used models in the parametric approach are the single-

equation cross sectional model, the multiple-equation cross sectional model and the panel data model. The stochastic frontier approach (SFA), the distribution free approach (DFA) and the thick frontier approach (TFA) are some examples of the parametric approach (Fried, Lovell & Schmidt 1993). However, Favero and Papi (1995) argue that parametric approaches:

- use a specific functional form - the shape of the production frontier is pre-supposed;
- need to make a specific assumptions;
- make it impossible to implement diagnostic checking; and
- are difficult to implement in multiple input and multiple output settings.

Non-parametric approaches are often used in place of the parameterized counterparts when certain assumptions about the distribution of underlying population are questionable. In contrast, the parametric approach assumes that the population will fit any parameterized distribution. However, non-parametric approaches do not estimate population parameters and make no assumption about the frequency distribution of the variables being assessed (Fried, Lovell & Schmidt 1993). DEA develops a range of models in non-parametric approaches used for measuring productivity and efficiency. DEA produces benchmark indices for evaluating the relative productive efficiency of a firm in a given industry, or of sub-units in a firm (Cooper, Seiford & Tone 1999).

However, Berger and Mester (1997) highlight the weaknesses of this method of analysis. DEA does not allow for random error, ignores price information and only focuses on technical efficiency rather than the allocative efficiency (Berger & Mester 1997). Fried, Lovell and Schmidt (1993) also argue that while the parametric and non-parametric approaches differ in many ways, the essential differences and sources of the advantages of one approach over the other can be summarised by two characteristics (Fried, Lovell & Schmidt 1993 p. 19).

- *The econometric approach is stochastic and attempts to distinguish the effects of noise from the effects of inefficiency.*

The linear programming approach is non-stochastic and lumps noise and inefficiency together and calls the combination inefficiency.

- *The econometric approach is parametric and confounds the effects of mis-specification of functional form with inefficiency. The linear programming approach is nonparametric and less prone to this type of specification error.*

Although the above discussion focuses on the measurement of productivity and efficiency, there is no consensus of opinion on the best measurement method and many measurement obstacles remain. Neither approach strictly dominates the other (Rogers 1998). However, this discussion points to the obstacles and the way in which possible solutions could be developed.

3.3.5 Data envelopment analysis

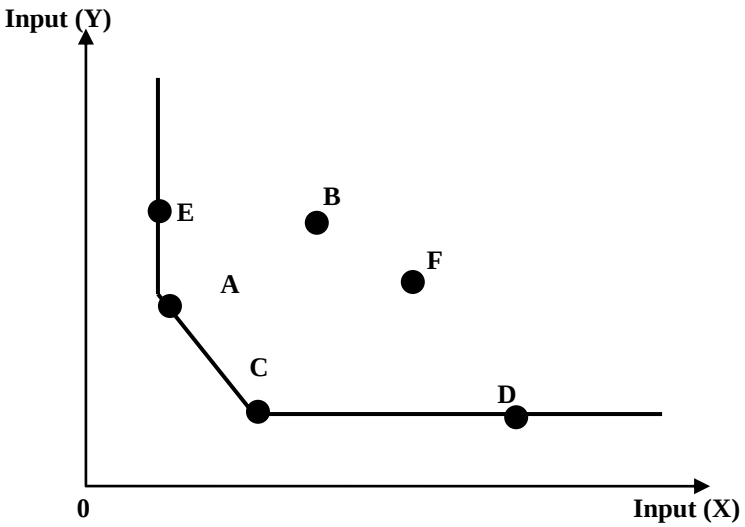
The DEA model for constructing a production frontier, and for the measurement of productivity and efficiency relative to the constructed formula, is an increasingly popular tool used in the nonparametric approach (Zhu 2003). Generally, DEA evaluates the efficiency of a given firm, in a given industry, compared to the best performing firms in that industry (Coelli, Rao & Battese 1998). Thus, it is a relative measurement technique. In efficiency analysis, most researchers generally use DEA to measure the efficiency in public sector organisations, non-profit making organisations and private sector organisations. Productivity indices for each firm are determined on the basis of the inputs and outputs of each firm. Such an index is called a DEA score. From these DEA scores, productivity and efficiency can be measured for a whole organisation or a unit within an organisation (Coelli, Rao & Battese 1998). The evaluation unit is also referred to as a decision-making unit (DMU). For example, one bank branch of the parent bank or a section, such as loan section, in a bank branch can be considered as a DMU.

In the production process, each DMU has a varying level of inputs and a varying level of outputs. DEA constructs a smooth curve based on the available data. The distribution of sample points is observed and a line is constructed enveloping

them (Fried, Lovell & Schmidt 1993), hence the term "Data Envelopment Analysis (DEA)". From this line, DEA shows which producers are more efficient and identifies the inefficiencies of other producers. Hence, Fried, Lovell and Schmidt (2002) suggest that DEA[35] is an appropriate method of measuring the relative efficiency of multiple decision-making units by enveloping observed input-output elements as tightly as possible. Further, it is useful to estimate relative efficiency for discussion of the relative importance of inputs and to observe the marginal contribution of each input (Fried et al. 2002).

In parametric analysis, the single optimised regression is assumed to apply to each DMU and requires the imposition of a specific functional form relating the independent variables to the dependent variables (Fried, Lovell & Schmidt 1993). In contrast, DEA optimises the performance measure of each DMU and does not require any assumption about the functional form (Charnes et al. 1997). DEA constructs the efficient frontier from the sample data (Coelli, Rao & Battese 1998). The DEA approach to evaluating productivity and efficiency is demonstrated in Figure 3.6. It presents a sample of six firms in an industry that use two inputs X and Y to produce one output.

[35]DEA is a linear programming methodology developed by Charnes, Cooper and Rhods in 1978. It was originally applied to public sector and non-profit making organisations.



Source: Coelli, Rao and Battese (1998, p.143)

Figure 3.6: The efficient frontier in data envelopment analysis

Based on each firm's usage of inputs, data are plotted in Figure 3.6. As a large difference in the combination of inputs for obtaining the output of these firms exists it is very difficult to evaluate their productivity and efficiency by a single score. However, a frontier line can be drawn using the firms closest to the origin. Thus, a line can be drawn from firms E, A, C to firm D. This frontier line envelops all the data points and approximates the efficient frontier line (Coelli, Rao & Battese 1998).

The efficiency frontier defines the best combinations of inputs that can be used to produce an output. The firms on the frontier line are assumed to be operating at best practices in the sample. The firms which are on the upper side of the frontier (B and F) are considered to be less efficient compared with the performance of the best practice firms. However, it is questionable whether firm E or A on the frontier line are efficient as firm E can reduce its use of the input Y to produce the same outputs as firm A produces. Hence, firm A is more efficient than firm E. This is considered an example of input slack or input excess in frontier analysis (Coelli, Rao & Battese 1998).

It is relatively easy to implement the DEA approach in this example because firms use only two inputs and produce only one output. However, when inputs and outputs are multiple, it becomes complex and it is necessary to use mathematical formulas and a computer package (Fried, Lovell & Schmidt 1993). In a preliminary DEA analysis, it is straightforward to classify efficient DMUs and inefficient DMUs. An important aspect of the DEA application is the estimation of a production frontier for a given industry. However, Li and Zhu (2005) argue that the efficient DMUs are not necessarily superior to inefficient DMUs in terms of overall performance. Hence, procedures can be useful to rank the efficient DMUs and inefficient DMUs exclusively.

In contrast to parametric approaches, which try to optimise a single regression function, DEA optimizes each individual observation with an objective function (Zhu 2003). DEA is a widely recognised and applied method to evaluate productivity and efficiency in many organisations, particularly in the financial services sector (Berger & Humphrey 1997). According to Ali and Seiford (1993), the DEA approach has been used extensively in over 400 efficiency studies. However, failure to understand the limitations of DEA can lead to systematic errors or sample selection bias (Brown 2001). Coelli, Rao and Battese (1998 p.180) highlight the following limitations in DEA measurements:

- *measurement error and other noise may influence the shape and position of the frontier;*
- *the selection of inputs and outputs;*
- *the measurement of the inputs and outputs; and*
- *the selection of a sample.*

It is, therefore, imperative in modelling productivity and efficiency to use the correct methodology so that results may be interpreted appropriately (Rogers 1998).

3.3.6 Data envelopment analysis models

Various models in DEA encompass a number of alternative approaches to efficiency analysis. The selection of an appropriate model facilitates the

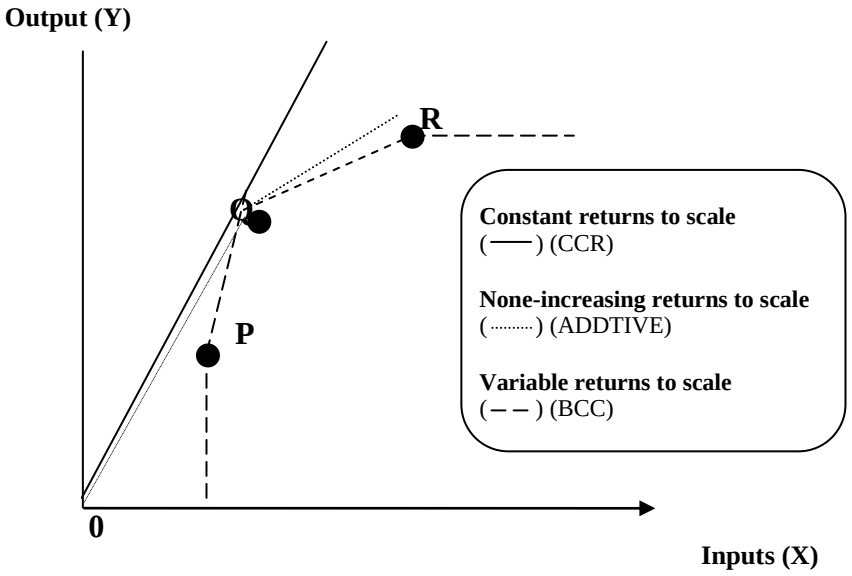
evaluation of the productivity and efficiency of firms (Fried, Lovell & Schmidt 1993). The DEA model discussed earlier in this chapter is known as the CCR model. This model was introduced by Charnes, Cooper and Rhodes (CCR) in 1978. Comprehensive reviews of the methodology of the CCR model are presented by Ali and Seiford (1993) in Fried, Lovell and Schmidt (1993). The CCR model uses an optimisation method of mathematical linear programming to generalise the single output/input technical measures to the multiple output/input cases (Fried, Lovell & Schmidt 1993). This model operates under the assumption of constant returns to scale (CRS). The CCR model determines efficiency by maximising the weighted outputs to inputs based on the condition that there is a similar ratio for all DMUs and all firms are operating at an optimal scale. Hence, if the activity is feasible, every positive scalar is also feasible. Any increase in output always involves increasing inputs in the same proportion (Coelli, Rao & Battese 1998).

The assumptions of the CCR model have been extended and different types of production possibilities have been incorporated by a number of researchers to overcome problems and weaknesses of the initial CCR specifications. The BCC model, proposed by Banker, Charnes and Cooper (1984), is one extension of the CCR model. The BCC model assumes variable returns to scale (VRS) for identifying the envelopment surface. Cooper, Seiford and Tone (1999) consider that the production frontier leads to variable returns to scale characteristics with:

- increasing returns-to-scale occurring in the first solid line segment;
- decreasing returns-to-scale in the second solid line segment; and
- constant returns-to-scale occurring at the point of transition from the first to the second segment.

The BCC model is appropriate when all firms are not operating at optimal scale. Hence, the production frontiers span the convex hull of the existing DMUs with variable returns to scale. The additive model has been formulated with the combination of the CCR model and BCC model specifications. The additive

model has the same production possibility set as the BCC model and its variants but treats the slack directly in the objective function. Figure 3.8 graphically illustrates the shape of envelopment surfaces for a single input-output case under CCR, BCC and additive models. Points P, Q and R represent the performance of DMUs. The straight line from P to Q is the production frontier of the CCR model, assuming that all firms are at optimal scale. The convex dashed line represents the BCC model and the dotted line represents the additive model. The BCC model allows benchmarking of the inefficient DMUs with similar sized DMUs (Cooper, Seiford & Tone 1999).



Source: Fried, Lovell and Schmidt (1993, p.29)

Figure 3.7: Returns to scale in data envelopment analysis

The CCR model (CRS specification) assumes that all firms are operating at the optimal scale. However, when all firms are not operating at the optimal scale, the results of technical efficiency (TE) in CRS specification combine with scale efficiency (SE). The BCC model (VRS specification) does not assume that all firms are at optimal scale and efficiency scores are completely devoid of scale effects. Hence, TE calculated with BCC (VRS specification) is called 'pure-technical efficiency' (PTE). The difference between the TE (from CRS) and PTE

(from VRS) indicates the scale efficiency (SE) (Coelli, Rao & Battese 1998). Table 3.1 summarises the CCR, BCC and the additive models in DEA and their features. In addition to these, alternative DEA models include:

- the Cone Ratio Model (Charnes et al. 1990);
- models for dealing with qualitative data (Cooper, Park & Paster 1999);
- the Free Disposal Hull Model (Thompson et al. 1990);
- Benchmarking Models (Zhu 2003);
- Super Efficiency Models (Zhu 2003); and
- models for evaluating value chains (Zhu 2003);

Table 3.1: The different models in data envelopment analysis

Model	Features
CCR model (1978) (Charnes, Cooper & Rhodes 1978)	Assumes that the production frontier has constant returns to scale. Yields an objective evaluation of overall efficiency and identifies the sources and estimates the amounts of inefficiencies. Further, assumes that all firms are operating at the optimal scale and scores represent TE.
BCC model (1984) (Banker, Charnes & Cooper 1984)	Assumes that the production frontier has variable returns to scale. The production possibilities are set by means of the existing DMUs and their convex hull. Scores represents PTE and avoid the scale effect.
Additive model (1985) (Charnes et al. 1985)	Deals with input excesses and output shortfalls simultaneously.

3.4 Application of data envelopment analysis

Many researchers have used the DEA technique in the productivity and efficiency analysis of several different types of DMUs including hospitals, educational institutions, cities, courts and financial institutions (Tavares 2002). Tavares (2002), in an analysis of efficiency studies during the period from 1978 to 2001, reports more than 3000 DEA applications in various forms of organisations. His bibliography includes 1259 journal articles, 50 books and 171 dissertations, written by 2152 distinct authors. Most of these studies are based on the analysis of the efficiency of service-oriented organisations, including financial services institutions. Berger and Humphrey (1997) identified 130 studies in 21 countries

which apply frontier efficiency analysis to different types of financial institutions, such as deposit taking institutions, commercial banks, savings banks, credit unions and insurance firms. Amongst these, 14 focused on savings associations and credit unions in the USA, the UK, Spain and Sweden. These studies provide evidence that researchers in a number of fields recognise that DEA is an appropriate methodology for efficiency analysis in various types of organisations. Moreover, the technique has become popular in evaluating efficiency in service sector institutions because it handles multiple variables and does not require price data (Ruggiero 2005).

DEA studies of banks and other financial institutions have been conducted in different countries in different contexts. For example, Taylor et al. (1997) investigate Mexican banks, Brockett et al. (1997) study American banks, Schaffnit, Rosen and Paradi (1997) analyse large Canadian banks, Soteriou and Zenios (1999) research on commercial banks in Cyprus, Kao and Liu (2004) explore Taiwanese commercial banks, Portela and Thanassoulis (2007) study of Portuguese banks while Spanish savings banks are analysed by Tortosa-Ausina, Emili et al. (2007). In addition, DEA has been used as an indicator of successful institutions in a competitive market.

Sathye (2001) uses cross sectional Australian data to analyse the efficiency of banks using DEA and the relationship between efficiency and the ownership of banks. Sathye (2001) finds that domestic banks are more efficient than foreign owned banks in Australia. Avkiran (1999) also studies the operating efficiency of Australian trading banks, using DEA to determine efficiency gains and the extent to which these are passed to the public.

The importance of productivity and efficiency in the institutions of developing countries has not received much attention in the empirical literature. However, in India, Bhattacharyya, et al. (1997) use DEA to study the efficiency of commercial banks. Their results show that publicly owned Indian banks are most efficient, followed by foreign banks. Sathye (1998) also investigates Indian banks' efficiency, using DEA to determine the relationship between ownership and

efficiency. In a study by Saha and Ravisankar (2000), Indian banks are rated by the level of achievement in each of the efficiency indicators from DEA analysis. In the Sri Lankan context, Seelanatha (2007) uses DEA to study the productivity and efficiency of commercial banks and reports that deregulation did not make a sustantial contribution to the improvement of efficiency.

The above discussion indicates that there has been an increase in the application of the DEA tool in measuring efficiency in financial services sector organisations. However, most prior research is based on data from developed countries and, in most cases, deal with country specific institutions. In a developing country context, most rural banks and MFIs provide general financial services, particularly in rural areas. However, as explained in Chapter Two, these institutions differ from other financial institutions as they are structured on cooperative principles. Mostly, the owners are depositors and are also borrowers. Moreover, these institutions' not-for-profit motives suggest the use of DEA as the most appropriate tool for efficiency analysis. However, a search of the literature does not indicate many efficiency studies that use the TFP measure. Many studies use PFP measures to analyse efficiency in cooperative model SFIs. For example, Tucker (2001) studies Latin American MFIs, and Tucker and Miles (2004) study African, Asian, European and Latin American MFIs using PFP measurements to analyse performance. Hesse and Cihak (2007) study the financial stability of cooperative banks in Europe banks using partial measures.

However, most recent efficiency studies in SFIs go beyond the PFP measurements to TFP measurements. Desrochersa and Lamberteb (2002) study cooperative banks in the Philippine's, Sharma and Kawadia (2006) study cooperative banks in India, Sufian (2006) investigates non-bank financial institutions in Malayasia and Gutiérrez-Nietoa, Serrano-Cincaa and Molinerob (2007) analyse Latin American MFIs. The advantage of using DEA to analyse efficiency in these types of institutions is that DEA performs a multiple comparison between a set of homogeneous units within the industry, which simple ratios do not explore. Further, cooperative model institutions have unique business features, thus

analysis of efficiency by comparing the same types of institutions becomes more important (Sharma & Kawadia 2006).

The above discussion shows the importance of DEA in the efficiency studies of financial institutions. However, research on methodological issues associated with DEA is important for the theoretical soundness and for accurate analysis in the research. As discussed previously, estimated efficiency entirely depends on the inputs and outputs included in the model. The input-output specifications, the selection of the number of inputs and outputs and the measurement of inputs and outputs are problems still to be resolved in DEA studies of financial institutions. The next section addresses these issues.

3.4.1 Application of input-output

A variety inputs and outputs are used to estimate the efficiency of financial institutions by the studies discussed in previous sections. In many industries, physical measures of inputs and outputs are readily available. In contrast, physical measures are not readily available in financial institutions (Humphrey 1991) and there is disagreement on the definition and measurement of inputs and outputs related to financial services; a problem still to be resolved in the literature. Hence, selection of input-output combinations in efficiency analysis of financial institutions has become crucial. Moreover, the selection of inappropriate inputs and outputs can lead to biased results in performance measurements (Ruggiero 2005). Often financial institutions have multiple activities and it is difficult to capture all activities of an institution. Different approaches for the selection of appropriate inputs and outputs based on the services provided by the financial institutions can be identified in the literature.

Berger and Humphrey (1997) provide a detailed discussion of problems involved in the selection of inputs and outputs to be used for evaluating the efficiency of financial institutions. They suggested two main approaches, namely the production and intermediation approaches that can be used to identify appropriate inputs and outputs in efficiency analysis. Furthermore, they suggest that the asset

approach, the user-cost approach and the value-added approach are also important in the measurement of efficiency. Similarly, Favero and Papi (1995) emphasise that the intermediation approach, the production approach, and the asset approach produce better input-output combinations than the other approaches in efficiency analysis. The intermediation approach, the production approach, and the asset approach have dominated the selection of inputs and outputs in the measurement of efficiency in the banking literature (Berger & Humphrey 1997).

The intermediation approach is appropriate for institutions where deposits are converted into loans. Funds are intermediated between savers and barrowers (Avkiran 1999). Yue (1992) also emphasises that the intermediation approach views banks as intermediaries whose core business is to borrow funds from depositors and lend for profit. Thus, deposits and loans are considered as outputs with loanable funds, interest expense and labour cost as inputs. This approach is used frequently in the literature for measuring efficiency in the banking industry (Sathye 1998; Avkiran 1999; Drake & Hall 2003; Kao & Liu 2004). With the frontier analysis of efficiency, the intermediation approach is more suitable for the minimisation of all costs to enable the maximisation of profits. In addition, this approach is important to banking institutions because the interest expense is used as a key input as it often comprises two-thirds of the total costs of financial institutions (Berger & Humphrey 1997).

The production approach views deposit taking institutions as producers of services for account holders. This approach assumes that these services are produced by utilizing capital and labour inputs (Berger & Humphrey 1997). Further, the production approach considers that financial institutions provide transactions on deposit accounts and also provide loans and advances. Thus, the number of accounts in different loans and deposit categories are generally taken to be the appropriate measures of outputs under this approach (Drake & Weyman-Jones 1992). Berger and Humphrey also stress this argument and suggest that the best measure of output is number and type of transactions for the period. However, this approach is inconvenient because all such data are not readily available. Hence, the production approach is more suitable for the evaluation of the relative

efficiency of single branches within the institution. Further, the production approach places less emphasis on the transfer of funds as the bank's main role as a financial intermediary. In contrast, the intermediation approach evaluates the entire institution (Berger & Humphrey 1997).

The assets approach, the value-added approach and the user-cost approach provide guidelines on how to identify variables in different ways. According to Favero and Papi (1995) in the assets approach, outputs are strictly defined by assets and mainly by the production of loans in which firms have advantages over other institutions in the industry. Under the asset approach, loans and other assets are considered as outputs, while deposits, other liabilities, labour and physical capital are considered as inputs (Drake & Weyman-Jones 1992). The value-added approach defines outputs as assets and liabilities, which add substantial value to the firm, while the labour and value of fixed assets are inputs. Moreover, Tortosa-Ausina (2002) reports a significant difference between the assets approach and the value-added approach in measuring bank efficiency. The user-cost method requires additional information on interest and other income and it is difficult to implement in some cases. In addition the value-added and the user-cost approaches give roughly similar results, but these results are not consistent (Berger & Humphrey 1997).

Even though the appropriateness of each approach varies according to the circumstances, there is agreement over the definition of most of the inputs and outputs of financial institutions. However, there is controversy about the treatment of deposits. Some researchers treat deposits as inputs because the financial institution pays for the deposits and so they are considered as the main expense of financial institutions (Brockett et al. 1997; Drake & Hall 2003; Kao & Liu 2004). However, other researchers treat deposits as outputs because they may be associated with the liquidity of an institution (Bhattacharyya, Lovell & Sahay 1997; Saha & Ravisankar 2000; Sathye 2001). These researchers argue that treating deposits as inputs makes financial institutions look artificially efficient. A summary of input and output variables identified from previous studies is presented in Table 3.2.

Table 3.2: Input and output variables in data envelopment analysis applications[36]

Authors	Inputs	Outputs
Aly et al (1989)	Labour Capital Loanable funds	Real estate loans Commercial and industrial loans Consumer loans Other loans Demand deposits
Athanassopoulos and Giokas (2000)	Labour hours Branch size Computer terminals Operating expenditure	Credit transactions Deposit transactions Foreign receipts
Avkiran (1999)	Interest expense Non-interest expense Deposits Staff numbers	Net interest income Non-interest income/Other income Net loans
Bhattacharyya, Lovell and Sahay (1997)	Interest expense Operating expenses	Advances Investments Deposits
Brockett et al. (1997)	Interest expense Non-interest expense Deposits Provision for loan losses	Net interest income Non-interest income/Other income Total loans Allowance for loan losses
Charnes et al. (1990)	Operating expenses Non-interest expense Provision for loan losses Actual loan losses	Total income Total interest income Total non- interest income Total net loans
Das and Ghosh (2006)	Deposits Capital rated operating expenses Labour Interest expenses	Advances Investments Deposits Interest income non-interest income
Desrochersa and Lamberteb (2003)	Deposits Capital Wages	Loans Investments
Drake and Hall (2003)	Deposits General administration expenses Fixed assets Problem loans	Non-interest income/Other income Loans and advances Liquid assets and other investments

[36] In addition to the discussion of this chapter, see Appendix One for further discussion of the approaches and associated issues.

Authors	Inputs	Outputs
Drake and Weyman-Jones (1992)	Labour Capital Retail funds and deposits Wholesale funds and deposits Number of branches	Loans Commercial assets Liquid assets
Elyasiani and Mehdian (1990)	Deposits Labour Capital	Loans Investment
Favero and Papi (1995)	Labour Capital Loanable funds	Loans to other banks and non-financial institutions Investment in securities and bonds Non-interest income
Gutiérrez-Nietoa, Serrano-Cincaa and Molinerob (2007)	Credit officers Operating expenses	Interest and fee income Gross loan portfolio Number of loans outstanding
Havrylchyk (2006)	Capital Labour Deposits	Loans Government bonds Off-balance sheet items
Kao and Liu (2004)	Interest expense Non-interest expense Deposits	Interest income Non-interest income Total loans
Miller and Noulas (1997)	Interest expenses Non-interest expenses Deposits	Total non-interest income Loans Investments
Neal (2004)	Loanable funds Bank branches	Non-interest income/other income Demand deposits Loans and advances
Park and Weber (2005)	Total deposits Capital/total assets	Commercial Loans Personal loans Securities
Saha and Ravisankar (2000)	Interest expense General administration expenses Fixed assets Non establishment expenses	Net interest income Non-interest income/other income Loans and advances Demand deposits Liquid assets and other investments
Sathye (2001)	Labour Capital Loanable funds	Demand deposits Loans and advances
Seelanatha (2007)	Interest expenses Personnel cost Establishment expenses Deposits Other loanable funds Number of employees	Loans and other advances Interest Income Other income Other earning assets

Authors	Inputs	Outputs
Sharma and Kawadia (2006)	Owners fund Operating expenses Physical assets	Deposits Advances Interest spread Net profit
Sufian (2006)	Total deposit Fixed assets	Non-interest income Total loans
Taylor et al. (1997)	Non-interest expense Total deposits	Total Income
Yue (1992)	Interest expense Non-interest expense Deposits	Interest income Non-interest income Total loans

The method of measurement of the variables is also an issue in the application of DEA analysis.

3.4.2 Number of inputs and outputs and their measurement

Humphrey (1991) suggests several approaches which could be used for the measurement of inputs and outputs. In terms of outputs, there is the flow measure (based on the number of transactions processed in deposit and loan accounts) and the stock measure (either the real monetary value of funds in the deposit and loan accounts or the number of deposit and loan accounts serviced by the bank). Humphrey argues that a financial institution's output is a flow, not a stock. Thus, flow measures are preferable and stock measures are used only if flow measures are unavailable. However, due to the inconvenience of obtaining data for flow measures and stock measures based on the number of accounts served by institutions, most researchers use stock measures based on the monetary value of transactions, assuming that there is a proportionality between stocks and flow (Humphrey 1991).

In terms of inputs, there is less controversy over measures. As per Table 3.2, the monetary value of inputs is used as measures in most studies. However, Drake and Hall (2003) argue that, although monetary value is convenient for the researcher, monetary value expenses may distort information in efficiency analyses. They further explain that, in terms of personnel expenses, some institutions pay higher salaries than other institutions for the same positions.

Hence, the use of personnel expenses, rather than employee numbers, could bias the analysis.

Moreover, the appropriate number of inputs and outputs and the sample size for DEA are other limitations to efficiency analysis. Dyson et al. (2004) suggest that, as a rule of thumb, the total number of inputs and outputs should be not more than 50% of the number of DMUs evaluated in order to achieve a reasonable level of discrimination. However, an adequate sample size depends on the goal of the research; otherwise, a definite link between sample size and the number of variables cannot be established (Ruggiero 2005). Smith (1997) found that efficiency results are more reliable when the production process is simple and sample size is relatively large. Yue (1992) also suggests that window analysis is preferable with the construction of a common formula for all observations to overcome the sample size problem. In addition, window analysis provides some evidence of the short-run evolution of efficiency for a firm over time (Yue 1992).

3.5 Conclusion

This chapter provides an overview of the approaches to productivity and efficiency measurement, particularly in financial institutions. The theoretical and empirical literature on productivity and efficiency is reviewed, with special reference to studies based on the DEA technique. While studying the overall efficiency of financial institutions, in addition to correct measurement, the identification of the factors affecting the overall efficiency is required. Therefore, discussion in this chapter provides the necessary background for the identification of the appropriate DEA model present in Chapter Five. The next chapter investigates the role of corporate governance in the efficiency of financial institutions.

CHAPTER FOUR
CORPORATE GOVERNANCE IN REGULATION AND SUPERVISION OF FINANCIAL INSTITUTIONS

4.1 Introduction

There is general consensus on the importance of strengthening the regulatory and supervision mechanisms in the financial services sector for the purposes of stability [37] , safety and soundness and thus, the protection of depositors (Furstenberg 1997; Llewellyn 1999). The implementation of good corporate governance in regulatory and supervision mechanisms for small financial institutions (SFIs) could help to develop efficient institutions and thus, strengthen the entire financial services sector (Macey & O'Hara 2003; Mullineux 2006).

In Sri Lanka, although the Government has implemented quite a range of reforms to strengthen regulation and supervision mechanisms over the last two decades, it has not paid much attention to the regulation and supervision of the rural financial sector which comprises of a wide range of small financial institutions (SFIs). This has not only affected confidence in the whole financial services sector but also the efficiency of these SFIs. In recent literature, corporate governance has been highlighted as an integral part of the regulatory and supervisory framework of financial institutions.

The aim of this chapter is to review the literature related to corporate governance issues in the regulation and supervision of financial institutions and to build a case for a policy framework with special reference to SFIs. The next section describes the importance of the regulation and supervision of the financial services sector. The third section describes a theoretical framework for corporate governance within the regulatory and supervisory requirements for SFIs and it reviews the literature on the corporate governance issues of these institutions. Section four

[37] A safe and secure financial system encourages financial institutions to function efficiently (CBSL 2006).

describes the importance of one element of the corporate governance mechanism, accounting information, and then, describes the basic components in the preparation and presentation of financial statements of SFIs. The penultimate section describes the role of the corporate governance mechanism in the risk management process, within the context of the regulatory and supervisory framework for these financial institutions. Section six concludes the chapter.

4.2 Regulation and supervision of the financial services sector

As the financial services sector influences most parts of a nation's economic, social and political environment, the governance of this sector is generally more pervasive than that of non-finance sectors (Llewellyn 1986). In a developing country context, governance is more important because a stable financial services sector is vital for poverty alleviation and economic growth (World Bank 2001). Many researchers emphasise that an appropriate regulatory and supervisory framework helps to create stability and sustainability in the financial services sector (Llewellyn 1999; Brownbridge 2002; Brownbridge & Kirkpatrick 2002). In this context, understanding the definitions and rationale for the implementation of appropriate regulation and supervision for financial services is vital.

4.2.1 Regulation and supervision

Regulation is defined by Christen, Lyman and Rosenberg (2003 p.1) as 'binding rules governing the conduct of legal entities, and individuals, whether they are adopted by a legislative body (Law) or an executive body (Central bank)'. This definition restricts the regulation process only to the rules of governing bodies. However, according to Llewellyn (1986), regulation is not only imposed by the government, it may be performed by the industry itself for its own stability. Further, Llewellyn emphasises regulation as a body of specific rules or agreed behaviour, either imposed by government or an external agency or self-imposed by explicit or implicit agreement within an industry that limits activities and business operations of financial institutions. In this setting, the regulation of institutions provides a consistent way to operate a healthy business. Furstenberg

(1997) further emphasises that financial services regulation not only consists of rules, as it is often justified in terms of prevention of market failure, but is also used to protect the industry or parts thereof. Thus, regulation creates efficient and sustainable institutions within an industry.

In a broad sense, the term 'regulation' and the term 'supervision' are used with the same meaning by many researchers, though these two terms have different characteristics. According to Christen, Lyman and Rosenberg (2003) supervision is external oversight aimed at determining and enforcing compliance with regulation. Llewellyn (1986) also notes that supervision is the process of monitoring to determine if the institutions are conducting their business in accordance with the regulations. Accordingly, supervision refers to prudential regulation, which is that part of the regulation process aimed specifically at protecting the sector as a whole, as well as protecting the safety of deposits in individual institutions. When a financial institution becomes insolvent, deposit holders lose and public confidence in the system falls. Therefore, prudential regulation involves protecting the deposits and overseeing the financial soundness of the system by (for example) introducing capital adequacy norms, liquidity requirements and asset quality (Llewellyn 1999). Thus, supervision is the process of monitoring prudential regulation to ensure financial institutions comply.

In addition to prudential regulation, there are two types of regulation that exist in the financial services sector. These are the conduct of business regulation (non-prudential regulation) and systemic regulation. Prudential regulation always requires an authority to implementation them, whereas business regulation may often be largely self-governed and can often be dealt with by bodies other than financial authorities (Christen, Lyman & Rosenberg 2003). Llewellyn (1999) also emphasises that the conduct of business regulations focuses on how financial institutions conduct business with their customers. Further, Llewellyn focuses on mandatory information disclosure, the honesty and integrity of firms and their employees, fair business practices, and the threshold of standards for supplying financial services. Overall, conduct of business regulation is designed to establish rules and guidelines for appropriate behaviour and business practices (Llewellyn

1999). Most non-prudential regulation issues are relevant to MFIs as they have unique features in their businesses. Disclosure of financial information is a particularly important element under non-prudential regulation (Christen, Lyman & Rosenberg 2003). However, some business regulations are accomplished under general law or administrated by government agencies. For example, in Sri Lanka, all conventional registered banks should prepare and disclose financial information in accordance with Sri Lanka Accounting Standards (SLAS) which have been authorised by the *Sri Lanka Accounting and Auditing Standard Act no. 15 of 1995*.

In addition to non-prudential regulation, systemic regulation applies to a whole financial services sector. They may be implemented by the authority or self-executed. Developing policies on interest rates, the management of sources of capital and maintaining deposit insurance schemes are good examples of systemic regulation as they promote the safety and soundness of a financial system (Llewellyn 1999).

In summary, regulation refers to a set of enforceable rules, whereas supervision exists to ensure institutions comply with rules. Both regulation and supervision play important roles in maintaining the stability of financial services sector of a country.

4.2.2 The rationale for regulation and supervision in the financial services sector

Since financial institutions are closely linked to each other and with other businesses, an adverse coordination or a failure of these institutions may lead to breakdown of a whole sector (Llewellyn 1999). Failure of one financial institution due to a systemic event affects not only an institution but the whole sector because depositors may panic. For example, the unexpected withdrawal of deposits from one institution may cause a run on other institutions. Hence, there should be a way to accomplish systemic stability in a financial services sector and ensure the safety of deposits. Otherwise, a loss of confidence for market participants could trigger a

collapse of an entire market and affect an overall economy (Llewellyn 1999). Hence, an appropriate regulatory and supervisory structure is required to prevent systemic risk, to constrain a risk exposure of financial institutions and consequently, to reassure depositors a system is sound (Loretan 1997; Brownbridge & Kirkpatrick 2002). Authors emphasise that, although a wider framework might be set by regulatory agencies, the general purpose of regulation and supervision of a financial services sector is to:

i. sustain systemic stability (Dow 1996; Furstenberg 1997; Llewellyn 1999);
ii. maintain safety and soundness of financial institutions;

(Furstenberg 1997; Llewellyn 1999; Brownbridge & Kirkpatrick 2002); and

iii. protect consumers (Furstenberg 1997; Llewellyn 1999).

On the other hand, it is not always clear that regulation and supervision are designed only for the above purposes. Moreover, Brownbridge (2002) emphasises on diagnosis and prediction of bank failures with the help of an early warning system is another key concern in regulation and supervision. Through regulation an industry enhances market activities more efficiently and creates competition amongst the institutions (Brownbridge 2002). Consequently, it would differentiate stronger institutions from weaker ones. Furstenberg (1997) emphasises that regulation creates efficient institutions in an industry and promotes sustainability. Llewellyn (1999) stresses that regulation should not impede competition but should enhance a market by addressing information asymmetries to make institutions more effective in a market place. Consumers can better understand the behaviour of institutions when they have access to higher quality information.

In financial institutions, savers have relatively small information endowments and low incentives to acquire new information (Loretan 1997). They face information asymmetry issues. According to Godfrey et al. (2006) information asymmetry is the difference in quality and quantity of information available to a firm's managers compared with information that is available to outsiders. As a result, correct decisions are not made by consumers. In this sense, regulation and

supervision helps to reduce or eliminate information asymmetry problems by providing standard guidelines or mandating information which may give assurance to customers' of service quality (Llewellyn 1999).

Llewellyn (1999) emphasises that many banking failures around the world point to deficiencies in existing governance for such institutions. Trading risk management has become increasingly vital in the financial services sector and regulators are more concerned about internal risk management procedures in regulation and supervision structures (Garcia & Nieto 2005). The Basel Committee on Banking Supervision (2006) has encouraged improvements in risk management to strengthen and stabilise the whole finance system. Further, Jobst (2007) and Janabi (2008) highlight that regulation of risk management approaches are essential to reduce bank failures and strengthen systemic stability. They further emphasise that, instead of overall supervision of the financial services sector, internal risk management rules should be developed to strengthen institutions.

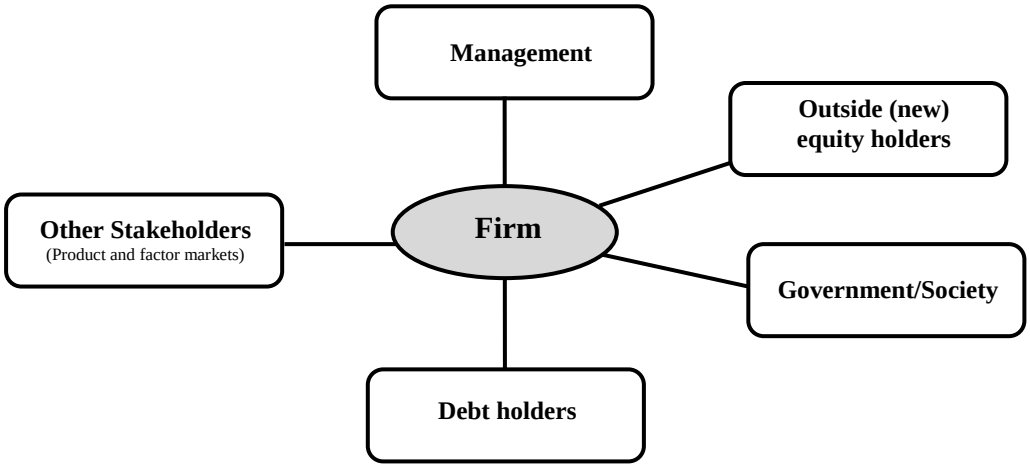
Taking a theoretical perspective on regulation, Stigler (1971) explains that there are two major alternative views of regulation of an industry. These are the private interest and public interest theories. The public interest theory suggests that regulation is instituted for public interest and establishes a legal framework to realise specific regulatory objectives. Thus, regulation is necessary to avoid market failure and maximise social welfare (Llewellyn 1986). However, private interest theory suggests that the state's coercive power can be used to benefit individuals through economic regulation (Stigler 1971). Basically, both theoretical and empirical studies suggest that regulation and supervision are to safeguard the stability of the financial services sector and protect deposits. Further, recent literature emphasise that in addition to the stability of the sector, regulation and supervision help the internal efficiency of financial institutions and the sustainability of their operations.

4.3 Corporate governance in the regulatory framework

Corporate governance is defined by John and Senbet (1998 p.372) 'as dealing with mechanisms by which stakeholders of a corporation exercise control over corporate insiders and management such that their interests are protected'. The Organisation for Economic Co-operation and Development (OECD) (2004) identifies that corporate governance as a set of relationships between a company's management, its board, its shareholders and other stakeholders. According to these definitions, it is clear that the corporate governance mechanism guides the procedure for managing and implementing the duties of responsible persons so as to enhance a company's results and safeguard stakeholders' rights.

The separation of ownership from control is the origin of the need for corporate governance. Managers control the organisation by taking effective decisions with the intention of protecting the interest of the owners (John & Senbet 1998). Management's responsibility is to take relevant measures to maximise shareholders' wealth and achieve corporate objectives. Owners require assurances from those controlling the organisation that they are safeguarding their investments and fairly reporting financial outcomes (John & Senbet 1998).

Fama (1980) further emphasises that agency theory helps to develop good governance mechanisms within the firm. Agency theory is predicated on the contractual agreements of principal and agents (Fama 1980). Managers enter contracts that align their interests with those of the owners. Hill and Jones (1992) emphasise that under agency theory, owners expend resources to guarantee managers do not take certain actions that result in wealth loss to owners. Figure 4.1 illustrates a network of contracts among the stakeholders of a firm.



Source: John and Senbet (1998 p.376)

Figure 4.1: The firm as a network of contracts

According to the framework in Figure 4.1 a firm should consider internal management and other stakeholders such as equity holders, debt holders, government, and the public. Hence, there is a challenge to align the motives of agents with those of the principal and all other stakeholders' interests (John & Senbet 1998). In this context, corporate governance provides a structure to minimise conflicts between principal and agents (John & Senbet 1998). In implementing a corporate governance mechanism, objectives of a firm are set and the means of attaining those objectives with the monitoring of performance are determined in relation to stakeholders' interests. Good corporate governance should embody proper incentives to impel management to achieve their objective by means consistent with the best interests of the firm and its stakeholders (John & Senbet 1998).

The OECD (2004) addresses this principle-agent issue by recognizing the importance of satisfying long-term objectives of a wider group of stakeholders. They emphasise that a corporate governance framework should encourage active co-operation between corporations and stakeholders in creating wealth, jobs, and sustainable and financially sound enterprises.

More recently, interest in corporate governance has gone beyond stakeholders and a company's interests. As companies play a pivotal role in a country's economy, they rely on effective organisations (OECD 2004). Corporate governance provides an effective supervisory mechanism that encourages organisations to the best use of resources, promotes efficiency, raises competitiveness and enhances the contribution to a nation's productivity (John & Senbet 1998). With this background, policy makers are now more aware of the corporate governance mechanism in regulatory and supervision frameworks. Hence, understanding the principles of corporate governance is important to implement effective corporate governance mechanisms to achieve these objectives.

4.3.1 Corporate governance principles

In recent years, different corporate governance principles have been developed by different organisations. The OECD (2004) and the Basel Committee on Banking Supervision (2006) provide the recognised corporate governance principles for banking institutions. In 1999, the OECD introduced the principles of corporate governance which became the international benchmark for policy makers. The Basel Committee on Banking Supervision (2006) published corporate governance practices in 1999. These drew from the OECD guidelines issued in that same year. The principles are a 'living instrument' offering non-binding standards and good practices as well as guidance on the implementation of regulation and supervision in developed and developing countries (OECD 2004). The principles further provide guidance and suggestions for the regulatory system, legal system, institutions, and other parties that have a role in the process of developing good corporate governance practices (OECD 2004). The OECD (2004 p.17-25) principles include:

i. Ensuring the basis for an effective corporate governance framework

The corporate governance framework should promote transparent and efficient markets, be consistent with the rule of law and clearly articulate the division of responsibilities among different supervisory, regulatory and enforcement authorities.

ii. The rights of shareholders and key ownership functions

The corporate governance framework should protect and facilitate the exercise of shareholders' rights.

iii. The equitable treatment of shareholders

The corporate governance framework should ensure the equitable treatment of all shareholders, including minority and foreign shareholders. All shareholders should have the opportunity to obtain effective redress for violation of their rights.

iv. The role of stakeholders in corporate governance

The corporate governance framework should recognise the rights of stakeholders established by law or through mutual agreements and encourage active co-operation between corporations and stakeholders in creating wealth, jobs, and the sustainability of financially sound enterprises.

v. Disclosure and transparency

The corporate governance framework should ensure that timely and accurate disclosure is made on all material matters regarding the corporation, including the financial situation, performance, ownership, and governance of the company.

vi. The responsibilities of the board

The corporate governance framework should ensure the strategic guidance of the company, the effective monitoring of management by the board, and the board's accountability to the company and the shareholders.

By drawing on the basic principles of the OECD (2004) the scope of corporate governance can be either narrowly or broadly defined. The narrow scope of corporate governance mainly covers the responsibilities of management, measures to adhere to best practices in a company's operations, and high quality standards for accounting information (OECD 2004). The broad scope includes the establishment of regulatory institutions, mergers and acquisitions, and the enforcement of other laws and regulations (OECD 2004). In this setting, stringent corporate governance will be beneficial to improve the efficiency of an enterprise. It will also help to imbue managers with a more professional attitude towards taking responsibility.

4.3.2 Corporate governance of financial institutions in developing countries

In developing countries, where capital markets are not well advanced, financial institutions serve as a crucial part in their respective financial services sector by playing a dominant role in providing external finance for businesses (Arun & Turner 2004). Hence, these institutions require regulations to protect shareholders, depositors, and other stakeholders as well as the sector itself (Brownbridge 2002). Mullineux (2006) emphasises that all countries' financial institutions are by far the most important sources of external finance for small and medium enterprises which are effectively dependent on them for external finance. Finally, this may have an indirect impact on the whole economy.

Corporate governance in developing countries has been a popular topic in recent literature (Lavine 2003; Macey & O'Hara 2003; Arun & Turner 2004). These researches identify a number of reasons that corporate governance is important in this context. They are as follows:

i. Financial institutions are dominant sources of external finance in several countries and have a dominant position in the financial system (Lavine 2003; Arun & Turner 2004).
ii. Financial institutions are generally more opaque than non-financial firms (Lavine 2003).
iii. Governments are frequently concerned about financial institutions' regulations because of the opacity of their assets, their activities and they are a main source of fiscal revenue (Lavine 2003).
iv. Financial institutions tend to have very little equity relative to debt (Macey & O'Hara 2003).
v. Financial institutions' liabilities are largely in the form of deposits (which are mostly available on demand), while their assets take the form of loans that have longer maturities. Hence, they have a fiduciary duty to depositors as well as shareholders (Lavine 2003; Macey & O'Hara 2003).

vi. Financial institutions' transactions and financial reporting accounts are relatively more complicated (Mullineux 2006; Florendo 2007).

vii. In an environment where there is deposit insurance, moral hazard can arise and taxpayers need protection from abuse of the system (Mullineux 2006; Florendo 2007).

Mullineux (2006) specifically indicates that good corporate governance of financial institutions requires attention to conflicts of interest especially because of the clear information advantage of institutions over their customers and management as well. Further, Mullineux (2006) indicates that information asymmetry exists in financial institutions because one party has inadequate information about the other party in financial transactions. In other words, information asymmetry is that borrower knows more about their credit worthiness than a lender. Consequently, regulators wish to promote the provision of quality information for the efficient performance of financial markets (Mullineux 2006). With adequate information, lenders will be able to weed out risky firms and those most likely to engage in risky activities. In addition, savers will be able to assess the soundness of banks that are holding their money thereby preventing a financial panic (Mullineux 2006). There is also a need to protect depositors who are more risk-averse than shareholders (Macey & O'Hara 2003; Mullineux 2006).

Macey and O'Hara (2003) argue that a broader view of corporate governance should be adopted in the case of financial institutions. This would encapsulate depositors as well as shareholders. Further, government intervention is essential in order to restrain the behaviour of an institution's management. Bhattacharya, Boot and Thakor (1998) also argue that depositors should know the true value of a business's portfolio. As a consequence of this asymmetric information, managers of financial institutions have an incentive to invest money in risky assets or make investments in brand name or reputed capital (Mullineux 2006).

Arun and Turner (2004) state that, through corporate governance, the moral hazard problem (which is part of asymmetric information), can be ameliorated.

This can be achieved by providing asset restrictions, interest rate ceilings and separation of banking activities (Arun & Turner 2004). Arun and Turner (2004) emphasise that, with these regulations, government limits abilities of managers to over-issue liabilities or divert assets into high-risk ventures. They further state that, due to the special nature of financial institutions activities, public protection of depositors from opportunistic management is required. However, Arun and Turner (2004 p.9) argue that the ability of developing economies to strength their prudential supervision is questionable because they:

i. *should have sustainability higher capital requirement than banks in developed economies;*
ii. *lack trained supervisors to examine the banks;*
iii. *typically lack political independence which may undermine their ability to coerce banks to comply with prudential requirements and improve suitable penalties; and*
iv. *have no accurate and timely accounting information and there is a paucity of information disclosure requirements. The bank managers will find it easier to expropriate funds from depositors and deposit insurance providers.*

However, Arun and Turner (2004) emphasise that, in developing countries, financial institutions become the dominant providers of external funds in small and medium enterprises. Thus, prudential regulations will typically result in institutions raising more equity in order to comply with capital norms (Arun & Turner 2004). Hence, prior to regulating the financial services sector much attention is to be paid to the speedy implementation of robust corporate governance mechanism in order to protect shareholders. Moreover, Mullineux (2006) notes that the quality of information that firms generate may be adequate for them to access direct finance from capital markets. Having now addressed the role of corporate governance for financial institutions in developing countries, the next section explores the role of corporate governance in SFIs.

4.3.3 Regulation of small financial institutions through corporate governance

As discussed in Chapter Two, SFIs have been significant contributors to the financial services sectors of developing countries during the last few decades, although they may have been integrated in the formal financial services sector. Most commercial banks in these countries typically serve less than 20% of the microfinance demand. The rest of the demand is met from semi-formal or informal financial sources (Van Greuning, Gallardo & Randhawa 1999). Although these SFIs operate by borrowing funds from the public and using these funds for loans and investments, they are not classified as banks and are not, therefore, regulated or supervised by regulatory agencies in most developing countries.

However, as discussed earlier, the overall objective of regulation and supervision of a financial services sector is stability of the system and protection of depositors. Further, the corporate governance mechanism, as a part of regulation and supervision, helps to manage internal risk which will increase efficiency and improve sustainability of institutions. SFIs are also concerned with these objectives as they undertake similar types of operations. Hence, the corporate governance mechanism can provide support to SFIs, helping to solve management problems thus having the potential to contribute to safeguarding poor deposit holders.

Accordingly, regulation and supervisory frameworks for SFIs have become an important topic for researchers in the last few years. Many authors agree that some policy support is required to facilitate regulatory processes for SFIs, even though they are excluded from the formal financial system. Reasons proposed for regulation in these institutions include the following.

i. As SFIs are looking to fund themselves, most institutions need to be regulated in order to access deposits from the public (Christen & Rosenberg 2000; Chiumya 2006).

ii. MFIs believe that regulation will promote their business, improve operations and deepen the market (Christen & Rosenberg 2000; Meagher 2002; Almario, Jimenez & Roman 2006).

iii. Some governments and donors need financial regulations in order to expand savings services for the poor and speed the emergence of sustainable and profitable institutions (Christen & Rosenberg 2000; Almario, Jimenez & Roman 2006; Chiumya 2006).

iv. The central bank's motivation to protect depositors encourages licensing of deposit taking institutions (Christen & Rosenberg 2000; Meagher 2002).

v. Governments may view interest rates as exploitative by some institutions and protection is needed for small borrowers from usury (Christen & Rosenberg 2000; Meagher 2002).

vi. Negative perception with the coordination and supervision, it is required to aware the significance (Christen & Rosenberg 2000; Meagher 2002).

vii. Governments and donors are worried about non-performing loans which will have a negative effect SFIs (Christen & Rosenberg 2000; Schreiner & Colombet 2001).

Taking these reasons into account, most governments in developing countries have introduced governance policies to develop rural financial sectors. Almario, Jimenez and Roman (2006) explain that, in the Philippines, the market strategy for microfinance was created based upon the development of an enabling policy environment and adherence to market oriented financial and credit policies. With the implementation of these strategies Almario, Jimenez and Roman (2006) expect that markets contribute more service to their financial services sector.

However, Brownbridge and Kirkpatrick (2002) argue that even though regulation and supervision promote a more efficient financial services sector, institutional impediments to effective regulation in developing countries include weak

accounting standards, poor quality of information and a shortage of professional skills. Policy makers therefore relate to specific methods of regulations for SFIs in developing countries. Brownbridge and Kirkpatrick consider that regulations introduced by developing countries have broadly similar patterns although the details and scope of regulations vary between countries. Therefore, debate exists as to whether governments should establish common regulations over all financial institutions or formulate separate frameworks for the rural financial sector.

Van Greuning, Gallardo and Randhawa (1999) argue that there are risks from imposing a common regulatory structure for all types of financial institutions because organisational and operational characteristics vary for SFIs. They note that risk management characteristics of SFI operations differ from those of banking in the following ways (Van Greuning, Gallardo & Randhawa 1999 p.17).

- *Loan delinquency rates are more volatile.*
- *Level of loan delinquency is likely to impact on their cash flows more adversely than other banks.*
- *Most SFIs operate on higher administration and operating costs.*
- *There is a limited capacity of increasing their capitalisation.*
- *There is a lack of experienced bank employees working in SFIs.*

Van Greuning, Gallardo and Randhawa (1999) propose two approaches to the regulation of SFIs:

- internal regulation through governance; and
- external regulation by a supervision agency.

Van Greuning, Gallardo and Randhawa (1999) emphasise that these approaches are based on risk exposures of institutions. Internal governance can be viewed as a framework of checks and balances designed to ensure that no party within an institution impedes the attainment of corporate objectives by diverting resources for private gain (Van Greuning, Gallardo & Randhawa 1999). This internal governance mechanism is one which a regulatory authority considers in preparing a framework for overall regulation.

In addition to internal governance, Van Greuning, Gallardo and Randhawa (1999) emphasise that external regulation and supervision are important in the regulation process of SFIs. These regulations, for the purposes of sharing good practice techniques, evaluate the quality of internal self-regulation and supervision and disseminate standards and measures for improved management and operations. However, Van Greuning, Gallardo and Randhawa further emphasise that internal regulation through governance and external regulation should be closely linked to each other. Jong et al. (2001) consider that, in an appropriate regulatory environment, there is a key role for self-regulation within an organisation and within the industry. Thus, corporate governance provides an ideal setting to investigate the role of self-regulation. Jong et al. results suggest that self-regulation, which relies on monitoring without enforcement by either exchanges or governments, or situations where there are limited or no outside monitoring, are unlikely to be successful. Moreover, Van Greuning, Gallardo and Randhawa suggest three categories of SFIs, (classified according to their nature and characteristics) would be helpful for appling different regulations in different situations:

- NGOs, that are totally funded by donor agencies;
- institutions which are operating members funds and deposits such as CRBs
- institutions which are non-banking institutions

Table 4.1 provides details of regulations of activities for each of these different types of SFIs.

Table 4.1: Regulations of different types of microfinance institutions

Type	Activity that determines regulatory status	Proposed of external regulation	Regulatory agency
CATEGORY A			
Type 1 Basic non profit non-governmental organisation (NGO)	Making microfinance loans not in excess of grants and donated/concessional funds	None – voluntary registration with self-regulatory organization	None, or self-regulatory organization
Type 2 Non profit NGO with limited deposit-taking	Taking minor deposits, e.g. forced savings or mandatory deposit schemes, from microfinance clients in the community.	None - exemption or exclusion provision of banking law; compulsory registration with self regulatory organization	Self-regulatory organization
Type 3 NGO transformed into incorporated MFI	Issuing instruments to generate funds through wholesale deposit substitutes (Commercial paper, large-value certificates of deposit, investment placement notes).	Registration as a corporate legal entity; authorization from securities & exchange agency, with limitations on size, term and tradability of commercial paper instruments	Companies' registry agency; securities & exchange agency
CATEGORY B			
Type 4 Credit union, savings & credit cooperative society	Operating as closed- or open-common bond credit union or savings & credit cooperative society; deposit-taking from member-clients in the community, workplace or trade	Notification to and registration with cooperatives authority or bank supervisory authority; or certification and rating by a private independent credit rating agency	Cooperatives authority, or bank supervisory agency or credit rating entity
CATEGORY C			
Type 5 Specialized bank, deposit-taking institution, or finance company	Taking limited deposits (e.g. savings & fixed deposits) from general public beyond minor deposits exemption in banking law microfinance activities. More extensive than NGOs but operations not on scale of licensed banks	Registration and licensing by bank supervisory authority, with a limitation provision (e.g., savings & fixed deposits, smaller deposits/capital multiple, higher liquidity reserves, limits on asset activities and uses)	Bank supervisory authority
Type 6 Licensed mutual-ownership bank **Type 7** Licensed equity bank	Non-restricted deposit-taking activities, including generating funds through commercial paper and large-value deposit substitutes, from the general public, investors and other banks	Registration and full licensing by bank supervisory authority as a mutual-ownership or equity bank; compliance with capitalization capital adequacy requirements, loan loss provisioning and full prudential regulations	Bank supervisory authority

Source: Van Greuning, Gallardo and Randhawa (1999 p.11)

According to the Table 4.1, SFIs that depend on external finance (category A) should be self-regulated. However, institutions depending on members' funds and deposit taking institutions (categories B and C) should be supervised by a supervisory agency. In particular, credit unions, savings and credit cooperative societies (category B), should be supervised by a supervisory agency similar to that for banks. They have authority to obtain deposits from community members and their objectives should include protecting external depositors. In these settings it is important to understand which regulations are important in different types of small finance institutions. A further question is, should governance relate to an organisation's capacity to effectively regulate itself or whether regulators should introduce legislation.

Kirkpatrick and Maimbo (2002) argue that the reform of non-prudential regulation is probably essential to enhance services sustainable delivery of services in a microfinance market. Almario, Jimenez and Roman (2006) also note that as the microfinance industry becomes commercialised, a regulatory framework should be developed to ensure sustainable institutions. However, the appropriate level of regulation in microfinance institutions is to be identified. Christen and Rosenberg (2000) point out that there are special issues a government should consider when regulating and supervising MFIs. The absence (or a lesser amount) of owners' capital, the absence of corrective steps in lending modalities such as lending moratoria, the lack of accounting information, and the high cost of supervision all impact on the overall governance of these institutions.

The role of corporate governance in SFIs is a new area for empirical research. The performance of these institutions has been under discussion since the UN Year of Microcredit in 2005 and the Nobel Prize awarded to Mohamed Yunis, founder of the Grameen Banks in 2006. Empirical studies provide evidence that the performance of these types of institutions increases, as does their outreach, with good corporate governance mechanisms (Labie 2001; Hartarska 2005).

Desrochersa and Lamberteb (2002) report that efficient rural banks have better control of their agency costs. However, they fail to find conclusive evidence of

corporate governance mechanisms applied in cooperative rural banks in the Philippines. These results are consistent with those of Shleifer and Vishny (1997). Hartarskska (2005) investigates the role of corporate governance mechanisms in financial performances of Eastern European MFIs during the period from 1998 to 2002. He considers that the corporate governance mechanism encompasses broad characteristics, including CEO compensation and ownership type of an MFI. Hartarska (2005) finds that MFIs with more independent boards performance better and boards with employee directors have lowers financial performance. Mersland and Strom (2007) analyse the relationship between the corporate governance mechanism and performance by examining both internal and external governance. They find that top management characteristics and ownership type affect performances of institutions.

The literature on corporate governance in SFIs provides evidence that transparency (Cayanan 2007), strategic internal guidance of the company (Mersland & Strom 2007), and effective monitoring of management by the board (Hartarska 2005) are key elements of sound corporate governance practices. Florendo (2007) develops a model based on Eshanis (2006) to establish factors which influence the corporate governance of banks in the Philippines. This model includes the legal system, the regulatory system, the judiciary system, and the financial reporting standards as factors which affect the practice of good corporate governance in SFIs.

Several corporate governance mechanisms remain unexplored in the rural financial sector. The above studies do not assess the influence of accounting information on the performance of SFIs. Further they do not examine internal risk management practices which are major component of corporate governance in regulation and supervisory structures for SFIs. These elements are discussed in the following sections.

4.4 Accounting information in corporate governance

Accounting information is a key element in the governance process of banking institutions (Mullineux 2006). Stakeholders in financial institutions need information for their decision making purposes to mitigate information asymmetry. Bushman and Smith (2001) identify financial accounting information as a channel that enhances efficient investment decisions of potential investors and enhances the productivity and efficiency of institutions. Further, they emphasise that a financial accounting system which generates accounting information provides direct input to an internal corporate governance mechanism. They also argue that it provides indirect input to the corporate governance mechanism by contributing to information available to all stakeholders. Proper accounting information is the product of a good corporate governance mechanism and useful information contributes to the enhancement of the overall efficiencies of institutions. In this context, understanding the main elements of accounting practices and reporting in financial institutions is essential for building the theoretical framework.

4.4.1 Rationale for financial reporting practices

Accounting was developed to serve a stewardship role for an owner-manager relationship in an organisation (Horngren, Sundem & Elliott 1996). Hence, in the early 1950s, accounting was emphasised only as a record keeping function of an organisation (Godfrey et al. 2006). However, the growth of corporate activity in the 20th century has seen the field of accounting increase in importance greatly and with many improvements in theory and techniques (Godfrey et al. 2006). Today, accounting is one element of the management discipline and serves every part of an organisation (Otley, Emmannul & Kenneth 1985; Horngren, Sundem & Elliott 1996). Accounting information answers a broad range of questions from technical measurement issues to social and political issues and consequently, the regulation of accounting practices and reporting to reduce the information asymmetry arising from agency conflicts (Deegan 2003). Hence, accounting practices are identified as a major part of corporate governance.

The key product of accounting systems is a set of financial reports, called financial statements. The general purpose of financial reporting is to provide quantitative economic information that will be useful for making economic decisions. Many professional accounting bodies have developed conceptual frameworks which provide guidance on how and when elements of accounting are recognized, measured and finally presented to a wide range of users for making economic decisions, (AICPA 1970; ICASL 2003; IASB 2004). These frameworks are developed to produce better financial information and enhance the transparency of reported results for organisations.

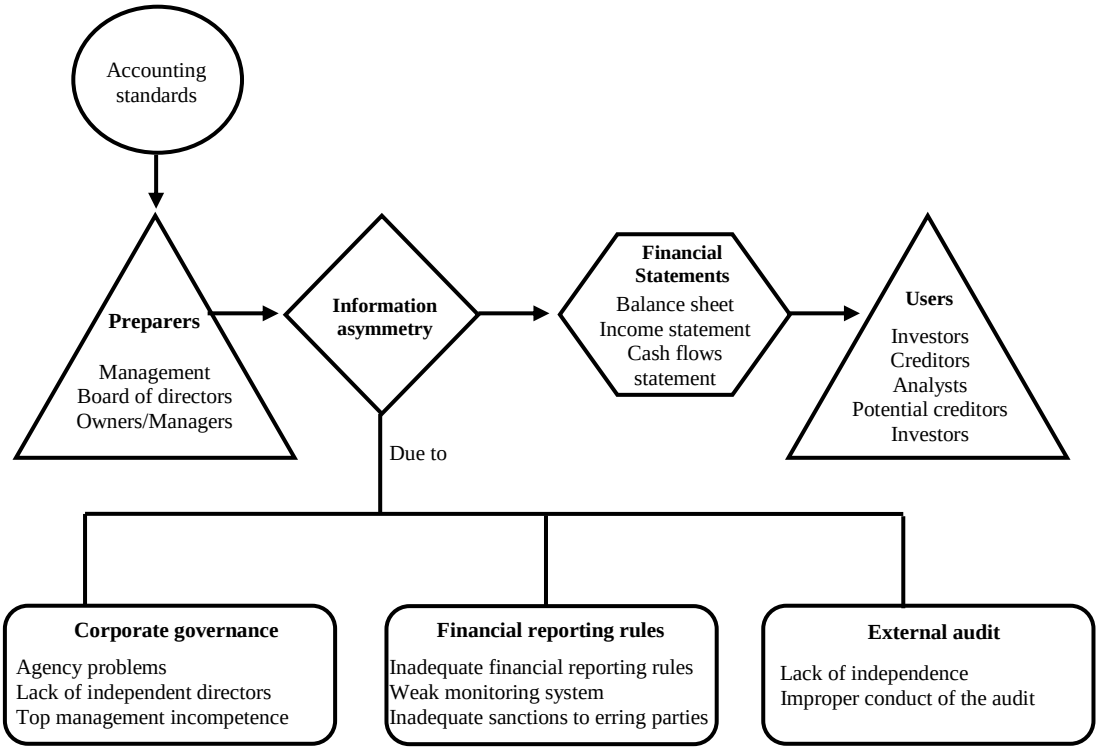
As such, accounting information is the principal basis for planning, controlling, co-ordinating and communicating the economic and financial affairs of a firm (Birt et al. 2005). Otley, Emmannul and Kenneth (1985) consider that accounting information is important to managers as a guide to the implementation of objectives and those who have privileged information have incentives to take correct decisions. Thus, users of financial statements utilise accounting information to satisfy some of their needs. In particular, investors obtain most of the information from financial reports before making investment decisions (Otley, Emmannul & Kenneth 1985). Regulators expect that financial reports provide decision-useful information to users (IASB 2004).

The International Accounting Standard Board (IASB) (2004) framework for the preparation and presentation of financial statements identifies four principle qualitative characteristics of understandability, relevance, reliability and comparability for accounting information that is useful for decision making. However, Walker and Jones (2003) consider relevance and reliability as primary criteria, as other qualities are likely to be present if an agreed framework is adopted and followed in practice. The Joint Working Group of Banking Associations (JWGBA) (1999) believe that the needs of users of a bank's financial statements will only be satisfied if information possesses all qualities identified by the IASB (2004).

There have been a number of attempts to identify qualitative characteristics of financial statements. As stated in the previous section, the IASB (2004) identifies relevance, reliability, understandability and comparability as decision useful criteria. Vickrey (1985 p.122) states that data are relevant if they 'confirm expectations, lead to changes in expectations, generate changes in decisions'. Data are reliable if they 'represent the economic conditions, events that they purport to represent, verifiable, representatively faithful, and are free from bias toward any particular predetermined results (Vickrey 1985 p.122). The higher the quality of financial reporting the more useful it is for business decision making by users (Fraser & Ormiston 2007). Fraser and Ormiston (2007 p.23) consider that 'accounting choices, estimates, choices, revenues and expenses recognitions, discretionary expenses, and non recurring and non operating gains and losses that do not match with cash flow' influence reported earnings.

In this sense, standards setters focus on the decision-usefulness of information in creating quality standards and most current conceptual frameworks are developed through continuous discussions with users' inputs (Jonas & Young 1998). Accordingly, accounting information is useful in solving the problem of the trade-off between the information role and stewardship role in agency theory. Figure 4.2 shows a conceptual framework which identifies how management reports satisfy the information needs of different stakeholders.

As shown in Figure 4.2, preparers, in the process of conveying the financial information of a firm to users, mitigate information asymmetry (Cayanan 2007). Corporate governance, financial reporting rules and external audit are considered as major elements in this process. Application of proper governance and reporting rules in the preparation and presentation of financial statements are highlighted in this process.



Source: Cayanan (2007, p. 2)

Figure 4.2: Sources and users of information asymmetry

Moreover, Bushman and Smith (2001) argue that financial accounting information affects the performance of a firm in ways other than a reduction of information asymmetry. They suggest that better identification of appropriate investments by managers is a major use of accounting information. The governance role in accounting information operates particularly through investment selection decisions of shareholders (Bushman & Smith 2001). The absence of reliable information in an economy impedes the flow of capital towards good investments and away from bad investments and thus affects overall performance.

Proponents of positive accounting theory (PAT) argue that financial statements are not useful for decision making purposes unless they provide information for changing environments (Watts & Zimmerman 1978 ; Godfrey et al. 2006). They suggest that, even in the absence of regulators, the provision of valuable information about organisational performance is important. PAT aims at providing an understanding of how the world works rather than prescribing how

the world should work (Godfrey et al. 2006). In order to determine the needs of users, accountants should use theories which are most consistent with observed phenomena (Watts & Zimmerman 1986). The annual report of the organisation can be viewed as a formal public document providing accounting information as a response to reporting requirements (Stanton and Stanton 2002). The accountant should determine the importance of the contents of an annual report to communicate the reality of an organisation and people will then act on the basis of that reality (Hines 1988).

4.4.2 Financial reporting practices and information asymmetry

When managers play an active role in their contractual agreements with stakeholders by providing relevant and reliable information, a user-management relationship will emerge (Godfrey et al. 2006). An agency problem arises when managers expropriate shareholders' investments by breaking their contractual agreements (Fields, Lys & Vincent 2001; Healy & Palepu 2001) affecting the capacity for survival of a business organisation.

There are two components in information asymmetry: moral hazard and adverse selection. Moral hazard arises when one party cannot observe the behaviour of the other party. Here the unobserved party does not behave properly. Moral hazard influences the stewardship role and the reliability of accounting information. In contrast, adverse selection happens when one party has information that is not possessed by the other (Scott 2006). This will result in poor decisions being made by the party with less information.

Watts and Zimmerman (1986) state that problems of contracting and information roles are not mutually exclusive but neither are they entirely compatible. In contrast, Ormrod and Cleaver (1993) argue that characteristics of accounting information which may be appropriate for signalling, may not be equally appropriate for contracting. However, both are relevant for corporate accountability. Financial reports can help to reduce these problems by achieving a balance between providing relevant and reliable information to its stakeholders.

On the other hand, appropriate information incorporated in financial reports helps stakeholders to make informed decisions.

Agency theory explains that firms themselves are a nexus of contractual agreements with principal and agents. Agency theory predicts that agents spend more resources and guarantees managers would not take certain actions that would harm a principal (Hill & Jones 1992). Managers are able to maximise firm value and efficiently align the interests of themselves and other stakeholders. In reporting financial information, management will adopt particular accounting methods to reflect the strongest economic performance of an entity (Deegan 2003). Consequently, the outcome may be beneficial to a firm as well as managers themselves (Godfrey et al. 2006). Empirical studies on this perspective report that efficient selection of mechanisms by management minimises agency costs of firms (Morris 1984; Beatty, Chamberlain & Magliolo 1995; Chi-Chun Liu & Ryan 1995; Kim & Kross 1998).

Agency theory has been primarily concerned with managers and shareholders rather than taking the broader stakeholder perspective (Fama 1980). In addition to managers and shareholders, many parties such as employees, customers, suppliers, creditors, and the general public have an interest in accounting information (Godfrey et al. 2006). Stakeholders' theory provides a mechanism to analyse all stakeholder participation in managerial policy making (Deegan 2003). Stakeholder theory posits that management should consider the power of stakeholders and identify the level of importance of stakeholders and respond in reporting accordingly (Gray, Owen & Adams 1996). Based on the degree of control, a stakeholder group has power to influence management disclosure and provision of information (Ullmann 1985). Hence, an organisation will have incentives to disclose information to achieve stakeholders' satisfaction.

Management actions in reporting information are bound by social responsibilities. Deviating from these boundaries may negatively affect the efficiency of organisation (Deegan 2003). However, Godfrey et al. (2006) state that PAT is not prescriptive and it does not help to develop better accounting practices. PAT only

provides some understanding of the role of accounting and assists in the development of normative theories to improve practice of accounting (Godfrey et al. 2006).

The purpose of the accounting system is to not only to meet the needs of internal users but also to generate financial reports used by external parties. As discussed previously, accounting information has relevance to regulatory requirement in financial institutions. In order to ensure sound financial reporting practices in the financial services sector, it is important to understand the underlying factors that influence reporting quality. This next section attempts to identify factors that might impact on these qualitative characteristics, especially in SFIs.

4.4.3 Sound financial reporting practices in small financial institutions

For financial institutions, accounting information should provide clear standardised information that can be used to determine operational efficiency (Rosenberg et al. 2003) and facilitate effective supervision and market discipline (Basel Committee on Banking Supervision 1999). McGuire (1996) states that, particularly in MFIs, accounting information serves both as an internal management tool, supporting the drive to efficiency and sustainability as well as indicators of progress for owners and external parties. Most SFIs depend on funding from commercial sources so they will need to convince potential lenders that they operate on a sound financial basis (McGuire 1996). Hence, the accounting and reporting functions are different for financial institutions when compared with other commercial organisation (IAS30 1991; SLAS23 1992).

Many professional institutions in various countries issue standards for the preparation and presentation of financial statements of financial institutions. Accordingly, the IASB issued International Accounting Standard 30[38] (IAS30) 'Disclosures in financial statements of banks and similar financial institutions' to provide guidelines for the preparation and presentation of financial statements

[38] IAS 30 has been superseded by International Financial Reporting Standards (IFRS) "financial instruments" with effect from 1st January 2007.

(IAS30 1991). The Institute of Chartered Accountants of Sri Lanka (ICASL) issued an accounting standard for the preparation and presentation of financial statements for banks (SLAS23 1992) in compliance with IAS 30 (1991). This standard should be applied to the recognition of revenue and for disclosures in financial statements of banking institutions. Some of these requirements are also relevant to institutions which engage in financial services on a small scale.

However, for the preparation and presentation of financial statements of SFIs, no accepted standard has been issued by a Sri Lankan professional body or the IASB. In the absence of international or national standards, many countries use generally accepted accounting principles (GAAP) and industry practice to guide the preparation and presentation of financial statements for SFIs. However, Rosenberg et al. (2003) provide disclosure guidelines[39] for MFIs. These guidelines identify the important factors in preparing and presenting financial statements of SFIs. Although they are not comprehensive accounting standards, the guidelines are widely accepted by most SFIs internationally in the absence of international standards (Rosenberg et al. 2003).

In Sri Lanka, the guidelines issued by the ICASL in 2006, 'Sri Lanka statement of recommended practice for non-profit making organisations (NPOs)' provides some guidance in preparation and presentation for financial statements of all NPOs including non-governmental organisations (NGOs). However, these guidelines do not adequately provide information relevant to those institutions engaged in offering financial services (SLSoRP-NPO 2006). Table 4.2 outlines the issues in disclosures for SFIs based on related standards and guidelines. Further, Appendix Three details the disclosures in preparing financial statements of MFIs according to CGAP guidelines and the relationship with international financial reporting standards (IFRS) and the Sri Lanka accounting standards (SLAS).

[39] These are called the CGAP guidelines for financial reporting for microfinance institutions. The consultative group to assist the poor (CGAP) is a consortium of 33 public and private development agencies working together to expand access to financial services for the poor in developing countries (CGAP 2006). CGAP was created in 1995 by these aid agencies and industry leaders to help create permanent financial services for the poor on a large scale (CGAP 2006).

Table 4.2: Important issues in disclosures for small financial institutions

Standard/guideline	Important issues in disclosures	The standard or guideline design
IAS 30 (1991) Disclosures in financial statements of banks and similar financial institutions	• Revenue from performing assets • Revenue from non-performing assets • Interest expenses • Provisions for loan losses • Write-off loan losses	Banks and similar financial institutions
SLAS 23 (1992) Revenue recognition and disclosures in the financial statements of banks	• Revenue from performing assets • Revenue from non-performing assets • Interest expenses • Provisions for loan losses • Write-off loan losses	Commercial banks in Sri Lanka
Rosenberg et al. (2003) CGAP guidelines	• Provisions for loan loss allowances • Write-off loan losses • Interest expenses • Interest accruals on late loans • Accounting policies	Microfinance institutions

Accordingly, all standards and guidelines require that as a minimum, financial statements should include both a balance sheet and an income statement with accompanying notes[40]. Further, IFRS also requires a cash flow statement[41] as well as a statement of changes in equity. As shown in Table 4.2, the following categories of information are important and require each to be addressed in appropriate detail in disclosure:

- revenue from performing loans;
- revenue from non-performing loans;
- interest expenses;
- provisions for loan losses; and
- write-off loan losses.

[40] A balance sheet presents a summary of financial position at a particular date and the income statement presents income, expenses and net profit or loss for a period of time.
[41] A cash flow statement presents a summary of cash inflows and cash outflows during the reporting period.

4.4.4 Revenue from performing and non-performing loans

Revenue recognition is important in financial institutions because interest income is the main source of income (Rosenberg et al. 2003). Accordingly, interest income is divided into two components; revenue from performing loans[42] and revenue from non-performing loans. In order to present fair and prudent information in the income statement, revenue from performing loans should be recognised on an accrual basis and disclosed in the income statement as interest income. The 'receivable' components of interest income should be disclosed in the balance sheet under current assets.

Revenue from non-performing loans should be recognised only on a cash basis from the date of classification as a non-performing loan (SLAS23 1992; Rosenberg et al. 2003). Interest from non-performing loans should be recognised as income and be credited to a suspense account namely, the interest on suspense account (Rosenberg et al. 2003). The net amount of non-performing loans, after deducting the interest on suspense account, should be disclosed in the balance sheet. For any non-performing loans that regain their performing states, the interest income component of the loan should be transferred to the income account. Accounting policy underlying the recognition of income should be disclosed as a note to the financial statements (SLAS23 1992; SLAS10 2005). However, many MFIs continue to recognise interest income on a loan as it comes due even when the interest has not been received because payment is late (Rosenberg et al. 2003).

[42] According to SLAS 23, a non-performing loan is a loan which is six months or more in arrears for principal or interest payment or on which payments of capital or interest in the immediately preceding twelve months are less than fifty percent of amounts due. A performing loan is a loan other than a non-performing loan. However, in MFIs, loans are classified as non-performing after 90 days.

4.4.5 Interest expenses

Recognition of interest expense it is straightforward and should be on an accrual basis [43] and disclosed in the income statement as an expense. The payable component of interest expense should be disclosed in the balance sheet under current liabilities. The underlying accounting policy should be disclosed as a note to the financial statements (SLAS10 2005).

4.4.6 Provisions for loan losses and write-off of loan losses

Literature on the provision for loan losses in financial institutions identifies this as the most influential factor in financial institutions' efficiency, particularly in SFIs (Rosenberg et al. 2003). Moreover, accounting treatments for loans affect the accuracy of financial information of financial institutions. The judgements of management relating to the recognition and measurement of the provision for loan losses and the write-off of loan losses should ensure that loan assets are fairly and prudently stated in the balance sheet (Rosenberg et al. 2003). The loan portfolio is usually the largest asset held by SFIs while loan repayment is typically the most serious risk. Hence, accuracy and clarity for reporting these is crucial, especially since SFIs tend to underestimate eventual loan losses (Rosenberg et al. 2003).

According to CGAP guidelines (Rosenberg et al. 2003) any provision expense related to an actual or anticipated loss should be shown separately in the income statement. A percentage of the unpaid balance of all loans overdue should be accounted for as a provision for loan losses and the expense should be transferred to the income statement periodically. The accumulated amount of loan loss provisions should be disclosed in the balance sheet. The accounting policy underlying provisions should also be disclosed in financial statements (SLAS10 2005). The accounting policy underlying the recognition of such provision for loan losses should be clearly disclosed (Rosenberg et al. 2003).

[43] Accrual accounting recognises the effects of transactions when they occur and not as cash is received or paid, recording them in the accounting records and reporting them in financial statements of the periods to which they relate.

The amount of loan write-off during the period should be shown separately in the income statement and the policy governing this should be disclosed. In addition, the loan portfolio, the loan loss allowance at the beginning and end of the period, the loan loss provision expense during the period, and write-offs of uncollectible loans during the period should be disclosed separately as notes to the financial statements (Rosenberg et al. 2003). Write-off of non-performing loans after a particular period, possibly after eighteen months in MFIs, is common practice in SFIs. The policy governing the amount written-off should be disclosed clearly in financial statements.

4.4.7 Application of financial reporting practices

Issues in financial reporting practices have been investigated in various types of organisations (Beatty, Chamberlain & Magliolo 1995; Chi-Chun Liu & Ryan 1995; Collins, Shackelford & Wahlen 1995; Kim & Kross 1998). A summary of selected empirical studies on reporting practices is continued in Appendix Two.

Management discretion in accounting choice is used to influence the outcome of the accounting system, as well as plays a key role in the communication process (Fields, Lys & Vincent 2001). Management discretion in accounting choice is applied mostly within industry-specific regulations (Chi-Chun Liu & Ryan 1995). In the banking industry, there is evidence that managers attempt to avoid the capital adequacy ratio guidelines by adjusting loan loss provisions or write-offs, or by manipulating accruals (Chi-Chun Liu & Ryan 1995; Kim & Kross 1998). Beatty et al. (1995) also report that accounting choices of banks influence the taxes, capital and earnings of the firm. Loan loss provisions and loan write-off are events which impact on accounting report decisions in banks (Beatty, Chamberlain & Magliolo 1995). Collins, Shackelford and Wahlen (1995) explore the same idea by examining individual bank characteristics (including size, growth, and profitability). They find these characteristics are associated with capital, earnings and tax pressures.

Adams and Hossain (1998) explore disclosure decisions in the insurance industry and find these are linked to managerial discretion. Further, their results indicate that organisational form, size, diversity and distribution systems are positively related to the level of voluntary disclosure as implied by the managerial discretion hypothesis. McNally, Eng and Hasseldine (1982) examine corporate financial reporting in a sample of New Zealand manufacturing companies. They identify the relationship of corporate characteristics to the quality of disclosures. McNally, Eng and Hasseldine (1982) focus on 41 items of disclosure of financial and non-financial information that affects the financial position and operating perfomance of the firm. The quality of information in financial statements in the US is examined by Singhvi and Desai (1971), Buzby (1974) , Chandra (1974) and Buzby (1975).

Jones, Romano and Smyrnios (1995) and Jones and Ratnatunge (1997) conduct evaluations of the decision usefulness of cash flow statements by Australian companies. They find that the cash flow statement conveys important information to major user groups and it is perceived to be relevant to a wide range of decision contexts, including liquidity and solvency evaluation, monitoring and prediction functions, strategic decision making and performance evaluation tasks. These studies extend prior US research into decision relevance and the utility of cash flow statements (McEnroe 1989) and UK research (Lee 1981). Magness (2006) finds that voluntary disclosures are relatively more attractive to shareholders than mandated disclosures in relation to environmental disclosures. Further, Magness finds financial performance is associated with increased levels of disclosure and that larger firms disclosure slightly more than small firms. Accounting professionals have been discussing the idea that financial information needs of private organisations too are important to their users. Small companies have generally been subject to the same reporting requirements as public companies (Falk, Gobdel & Naus 1976; Zanzig & Flesher 2006).

Prior SFI research shows that many rural banks do not present proper financial reports and do not keep adequate financial records (Gant et al. 2002). Most users rely on financial statements for information on MFIs. However, most institutions

do not provide much information in their financial statements (Rosenberg et al. 2003). A worldwide inventory of microfinance institutions (Paxton 1996) reports a wide range of accounting practices used by MFIs that result in implausible aggregate results. Cayanan (2007) analyses financial reports for banks in the Philippines. Most of the variables he investigates are included in CGAP guidelines. He finds that non-performing loans are not disclosed and loan portfolio details do not comply with requirements. The sample banks studied vary in the degree of details supplied (Cayanan 2007). Financial reporting violations, some of which resulted in overstatements of assets and net income, indicate that improvements to financial reporting practices are necessary (Cayanan 2007) and that corporate governance should be strengthened. Levine (1997) considers that transparent financial information facilitates development of financial markets thus improving economic growth by reducing information asymmetry, mobilising savings and facilitating resource allocations.

Hence, effective accounting information systems are critical in preparing and presenting reliable operating results and risk profiles of financial institutions. This is vital for SFIs in particular because of the wide range of stakeholders involved in these institutions. However, prior literature does not constitute a comprehensive theory of managers' responsibilities or stakeholders' needs. Past research collectively makes a significant contribution to the development of a framework to improve the decision-usefulness of financial reporting practices. Based on recent developments in the rural banking sector, it is seen that reporting practices are required for the advancement of the banks' various stakeholders' goals, and thereby help to improve efficiency. Since SFIs are fraught with problems of information asymmetry the need for effective reporting structures is heightened. This is especially true for SFIs as they are most often run on a cooperative model where owners are not heavily involved in running the business (Rosenberg et al. 2003; Florendo 2007).

4.5 Risk management procedures in corporate governance

In addition to accounting information as a major component in the corporate governance mechanism of financial institutions, the role of risk management processes are also vital. A risk-based approach helps SFIs to operate efficiently and allows the evolution of a formal financial system (Llewellyn 1998; Van Greuning, Gallardo & Randhawa 1999). Risk management systems are useful for establishing proper governance and self-supervision mechanisms within institutions and, in addition, result in a sound financial control system for the development of sector stability (Van Greuning, Gallardo & Randhawa 1999). Almario, Jimenez and Roman (2006) note that the application of a risk management self-supervisory mechanism as part of the corporate governance mechanism maintains a high level of performance within the institution, thus achieving efficiency with a wide range of services and a broad client base, particularly in the rural financial sector.

Management is responsible for ensuring that the financial institution has an appropriate risk assessment procedure as part of the corporate governance mechanisms (OECD 2004). However, the risk features of SFIs are different from other financial institutions as are their nature and management. Hence, the identification of risk features appropriate to SFIs is essential (Van Greuning, Gallardo & Randhawa 1999). The relevant question is which variables are associated with effective financial control and risk management procedures in SFIs.

4.5.1 Risk management in small financial institutions

Risk is present whenever there is uncertainty in relation to future outcomes (Bishop et al. 2004). Since an institution operates in an uncertain world, operations are subject to risk from many sources (Van Greuning, Gallardo & Randhawa 1999). Generally, risk is divided into two categories: business and financial risk (Frino et al. 2004). Business risk is inherent in a firm's operations and arises from sources such as the quality of competitors, the asset base and

regulations (Frino et al. 2004). Financial risk is a function of the corporate degree of leverage and arises from the manner in which the firm is financed (Frino et al. 2004).

Although, SFIs do not provide the same financial services as large commercial banks, they are exposed to business and financial risks of financial intermediaries. Thus, the adoption of risk management principles and practices would improve the performance of microfinance markets. The responsibility for risk management relies principally on voluntary regulation through governance, rather than on external supervision. Particularly in SFIs, financial risk can be managed through the governance mechanism. There are six risk variables which SFIs face in their business operations (Van Greuning, Gallardo & Randhawa 1999). Table 4.3 summarises these risk factor categories.

Table 4.3: The major categories of risk for small financial institutions

Risk category	Explanation
Balance sheet structure risk	Past and future risks resulting from intended or unintended changes in the size, structure and composition of the balance sheet.
Profitability risk	Risks resulting from changes in the composition of various sources of income and expense categories which affect the efficiency of the institution.
Solvency/ capital adequacy risk	The risk that the institution will have insufficient capital to continue operating, at its average risk weighted asset profile, as well as the risk of non-compliance with internally set or externally prescribed minimum capital standards.
Credit risk	Credit risk the risk that a counterparty (including a sovereign counterparty) to a credit agreement will not be able or willing to service the interest or repay the principal.
Treasury risk	Includes liquidity, interest, market and currency risks
Liquidity risk	The risk that the institution has insufficient funds on hand to meet its obligations. This risk includes concentration of large depositors/funders, reliance on volatile deposits/funds, and the currency structure of deposits/funds.
Interest rate risk	The risk of an adverse flow of income and expenses and the ultimate diminution in the institution's net equity as the result of adverse changes in interest rates.
Market risk	The risk of capital gain or loss resulting from investments in commodity, fixed interest, equity or currency markets.
Currency risk	The risk of changes in exchange rates having a negative impact on foreign receivables and foreign payables, when the institution has foreign currency-denominated balance sheet items.
Operational risk	The risk from non-financial areas such as accounting, electronic data processing (EDP), loss of market share, employee relations, or physical events causing a financial loss or stoppage in operations.

Source: Van Greuning, Gallardo and Randhawa (1999 p.20)

4.5.2 Application of risk management methodologies

Bank regulators and researchers have made considerable efforts to understand the determinants of risk in banking institutions (Robison & Barry 1977; Kwan & Eisenbeis 1997; Pastor 1999). In practice, there are a number of mechanisms available to understand the risk position of financial institutions. According to

Van Greuning, Gallardo and Randhawa (1999), balance sheet structures and changes in income and expense categories are affected by risk in SFIs. Horngren, Sundem and Elliott (1996) note that the balance sheet represents all the assets owned by the institution at a particular date and the claims of the membership against those assets. Hence, it is a snap shot of the financial position of the operations. The income statement depicts the operational results for a particular period. Intended and unintended changes in sources of income, expenses, assets and liabilities reflect the efficiency of the position in SFIs (Van Greuning, Gallardo & Randhawa 1999). Long term debts as a percentage of capital and liquid assets as a percentage of total assets are two ratios that indicate risk factors in the balance sheet (Jansson & Taborga 2000). The return on average assets and operating expenses as a percentage of assets are two income statement based indicators (Jansson & Taborga 2000).

Moreover, Van Greuning, Gallardo and Randhawa's (1999) framework indicates that an adequate capital base and liquidity requirements provide investors with confidence in institutions. Further, portfolio risk and the management of loan delinquency becomes crucial because SFIs collapse when sound practices are not maintained (Van Greuning, Gallardo & Randhawa 1999).

The CAMELS methodology is a commonly used framework for evaluating the risk position of financial institutions. CAMELS is an acronym for six measures (capital adequacy, assets quality, management soundness, earnings, liquidity, and sensitivity to market risk) (Hilbers, Krueger & Moretti 2000). This framework involves the analysis of these six indicators that reflect the soundness of the institution. CAMELS is used as an external supervisory tool for many financial institutions (Hilbers, Krueger & Moretti 2000). However, most financial institutions use this methodology as a governance mechanism to identify their risk positions internally (Demirg'uc-Kunt 1989). The CAMEL[44] methodology was originally adopted by North American Bank regulators to evaluate financial and managerial soundness of U.S. banking institutions (Saltzman & Salinger 1998).

[44] Originally this methodology includes five areas (i.e. it did not include sensitivity to market risk).

Based on the original CAMEL conceptual framework, ACCION developed its own instrument to evaluate MFIs. ACCION CAMEL reviews the same main five areas as the original CAMEL (Saltzman & Salinger 1998). However, some of the methods and standards for assessment differ substantially from that applicable to conventional banks.

In addition to the CAMELS methodology, there are several other methodologies for identifying, monitoring and evaluating SFIs. The World Council of Credit Unions (WOCCU) PEARLS (Richardson 2002), PlaNet Rating's GIRAFE (1999), MICRORATE (1996) and M-CRIL (1998) have been developed by private organisations to assess any type of MFIs. Table 4.4 summarises the main features and indictors used by these methodologies.

A set of performance indicators has also been introduced by a consultative group to assist the poor (CGAP) (2003) to evaluate the financial soundness of MFIs. Many of the indicators are standardised (CGAP 2003). The CGAP indicators fall into four categories - sustainability/profitability, assets/liquidity management, portfolio quality and efficiency/productivity. Jansson and Taborga (2000) produce several benchmark indicators to evaluate MFIs. They explore nineteen benchmark indicators in six major categories; profitability, capital, assets quality, liquidity, productivity, and growth. These indicators offer a relatively complete overview of an institution's financial structure, operational structure and performance (Jansson & Taborga 2000).

Table 4.4: Risk methodologies and their indicators

Methodology	Main features	Main indicators
ACCION CAMEL (Saltzman & Salinger 1998)	Provide qualitative and quantitative indicators Created as a supervisory tool	Capital adequacy Asset quality Management Earnings Liquidity management
WOCCU's PEARLS (Richardson 2002)	Provide an evaluation on quantitative indicators through financial structure Used as a tool for internal and external supervision	Protection Effective financial structure Assets quality Rates of return Liquidity Sign of growth
PlaNet Rating's (GIRAFE 1999)	Measurement and control of risk	Governance and decision making process Information and management tools Risk analysis and control Assets including loan portfolio Funding Efficiency and profitability
MICRORATE (1996)	Risks of MFIs operations affect an institution's creditworthiness Compare performance	Lending operations Organisations Financial position
M-CRIL (1998)	More towards credit risk and repayment capacity. Generate a database for benchmarking purposes	Organisational and governing Managerial and resource strength Financial performance

The National Credit Council and the Philippine Central Bank have developed a uniform set of performance standards for all types of SFIs (Almario, Jimenez & Roman 2006). These standards ensure portfolio quality, efficiency, sustainability and outreach of institutions. These standards provide the user with the necessary tools to facilitate an evaluation and assessment of an institution's operations. They can also be used to compare financial performances of financial institutions regardless of whether they are banks, cooperatives or NGOs (Almario, Jimenez & Roman 2006). Further, these benchmarks aid regulators in assessments of institutions' operations that are under supervision.

The above discussion shows that indicators of capital adequacy, liquidity, asset quality, effective financial structure, profitability, and efficiency in the management of financial institutions are commonly used in all methodologies.

The literature also provides some empirical justification for the use of the variables identified. Most studies have attempted to identify the effect of these factors on the overall efficiency of the firm. A summary of selected empirical research related to assessing financial system soundness in banking institutions is provided in Appendix Four.

Capital adequacy is a major factor in determining risk in financial institutions. The objective of capital adequacy analysis is to measure the financial solvency of an institution by determining whether the risks it has incurred are adequately offset with capital to absorb potential losses (Saltzman & Salinger 1998). Evans et al. (2000) consider that capital adequacy determines robustness of financial institutions to shocks to their balance sheets and this ratio provides lagged indicators of many problems in financial institutions. Thus, it is useful to track capital adequacy ratios as these take into account the most important financial risks including credit risks, interest rate risks and foreign exchange risk by assigning risk weightings to institution's assets (Hilbers, Krueger & Moretti 2000).

Bhattacharyya, Lovell and Sahay (1997) find that capital adequacy does not have a significant impact on the performance of public sector banks in India. However, they observed that there was an improvement in the performance of foreign banks while that of the Indian public sector banks declined during their observation period. Indian banks with low risk portfolios, as indicated by a higher capital ratio, are less efficient because they prefer safer and lower earning portfolios over riskier higher earning portfolios (Bhattacharyya, Lovell & Sahay 1997). However, Kwan and Eisenbeis (1997) find that institutions with more capital operate more efficiently than less capitalised bank organisations.

Quality of assets is another risk indicator for financial institutions commonly used in the surveyed methodologies. The reliability of capital ratios depends on the reliability of asset quality indicators (Jansson & Taborga 2000). Evans et al. (2000) state that risks of financial institutions often derive from the impairment of assets, so it is important to monitor asset quality. The current credit portfolios and

non-performing loans directly reflect the quality of assets of financial institutions (Evans et al. 2000). Hence, adequate loan classifications and the accounting treatment of non-performing loans are essential for maintaining asset quality.

Recent research investigates the relationship between loan quality and the efficiency of financial institutions. Miller and Noulas (1997) identify that asset and liability management and the quality of assets affect performance. Larger banks experience poor performance due to the declining quality of their loan portfolio (Miller & Noulas 1997). Robison and Barry (1977) state that rural banks often experience liquidity problems, which arise from seasonal flows of loans and deposits. Therefore, concentrating on risk and liquidity components of portfolio is very important. Robison and Barry suggest that banks with low risk portfolios are less efficient than those with high-risk portfolios. Quality of assets and availability of liquidity may help to reduce risk (Robison & Barry 1977). Demirg'uc-Kunt (1989) and Whalen (1991) emphasise that asset quality and non-performing loans are significant indicators of bank insolvency. Further, Berger and Young (1997) suggest that high loan quality has a positive effect on bank efficiency.

Das and Ghosh (2006) explore the association of capital adequacy, asset quality and profitability with banks efficiency. Banks reporting higher profitability attract customers, create more deposits, lending and are efficient in intermediation activities (Das & Ghosh 2006). They find a close relationship between bank efficiency and the financial soundness of a bank. Further, technically more efficient banks maintain on average, less non-performing loans. Berger and Young (1997)suggest that the relationship between loan quality and cost efficiency run in both directions. Increases in non-performing loans tend to be followed by decreases in measured cost efficiency. Further, there is evidence that decreases in the capital ratio generally increase non-performing loans and substantially affect the efficiency of a bank (Berger & Young 1997). Eisenbeis, Ferrier and Kwan (1999) emphasise that portfolio risk has a positive relationship with efficiency. A large number of problem loans, low capital and a weak liquidity position are directly related to the quality of the portfolio and, eventually

affect the efficiency of a institution. It is therefore interesting to examine how capital adequacy, asset quality, liquidity, and profitability influence the efficiency of financial institutions. Misra (2006) explores bank performance with two sets of factors, (i.e. internal and external factors). Internal factors originate from financial statements of a bank, while external factors are systematic forces that reflect an economic environment (Misra 2006). Misra reports that loan portfolio management and investment portfolio contribute positively to financial performances of rural banks.

Indicators of management quality are also key elements of performance of financial institutions. Most indicators used in assessing the quality of management are subject to a country's economic situation. However, several indicators are used as proxies. Jansson and Taborga (2000) provide 40 indicators to identify the quality of management in MFIs. Evans et al. (2000) stresses that declining trends in profitability indicate problems of financial soundness in financial institutions. Liquidity indicators, especially short term liquidity, provide evidence on the efficiency of financial institutions (Saltzman & Salinger 1998). Liquidity management evaluates an institution's ability to accommodate decreases in funding sources and increases in assets and the payment of expenses at a reasonable cost (Saltzman & Salinger 1998). Hilbers, Krueger and Moretti (2000) emphasise that initially solvent financial institutions may be driven towards closure by poor management of short term liquidity.

CGAP (2006 p.29) emphasises that, although good financial practices improve efficiency of MFIs, these institutions face some challenges when implementing these practices. The challenges include:

i. *comparable, widely accepted and cost-effective indicators of the different dimensions of social performance which have not yet been agreed;*
ii. *many financial service providers lack the capacity of knowledge about how to translate their social mission into operations; and*
iii. *funding to develop and apply methodologies is in short supply.*

Nevertheless, work is underway to meet these challenges by developing a set of cost-efficient tools, training curricula, and social rating methodologies to develop an efficient industry (CGAP 2006).

4.6 Conclusion

This chapter reviews the theoretical and empirical literature of regulation and supervision in financial institutions, with special reference to SFIs in the rural financial sector. The importance of the corporate governance mechanism in the regulation process is also addressed. Attention has been given to the importance of accounting information and risk management procedures in SFIs. Sound practices for accounting information and sound financial practices, improve transparency, accountability, promote savings mobilisation and improve the efficiency of SFIs.

The literature discussed in this and previous chapters provide insights for the study of efficiency in SFIs. Chapter Three provides various measure of efficiency while Chapter Four identifies the variables affecting the efficiency of SFIs. The next chapter builds on this prior research by developing an analytical framework for assessing the relationships between accounting and financial practices and the efficiency of CRBs in Sri Lanka.

CHAPTER FIVE

RESEARCH DESIGN AND METHODOLOGY

5.1 Introduction

This study aims to evaluate the efficiency of CRBs in Sri Lanka, one of the main types of small financial institution (SFI) operating in Sri Lanka. Accounting and financial practices are explored as potential factors affecting the efficiency of cooperative rural banks (CRBs). Consequently, this study aims to identify the relevance of existing accounting and financial practices in CRBs with a view to developing mechanisms that will increase the efficiency of the rural financial sector in Sri Lanka. This chapter details the research design and methodology which is based on the prior literature discussed in chapters Three and Four.

This chapter includes eight sections. The next section describes the main research question, related hypothesis, and conceptual model. The third section describes the institution-specific characteristics which are expected to impact on the efficiency and related hypotheses. The fourth section presents the research questions relating to accounting and financial practices in CRBs and their associated hypotheses. Section five describes the sample for the study. In the sixth section, the measurement and analysis of efficiency are outlined and justified. The seventh section discusses measurement and analysis of variables associated with efficiency. The final section concludes the chapter.

5.2 Main research question, conceptual model, and hypothesis

This section provides an overview of the framework for assessing the efficiency of CRBs in Sri Lanka. The main research question and the main hypothesis are presented.

Policy makers view microfinance as one solution to the growing demand for financial services by poor householders, particularly in developing countries

(ADB 2000; UN 2005). Most formal commercial banks in these countries are reluctant to provide financial services their rural sectors due to high risks, high costs involved in small transactions, and perceived low profitability. Hence, most people in rural areas acquire their financial needs from SFIs such as rural banks, credit unions, MFIs, or other informal organisations (ADB 2000) .

Consequently, SFIs serve a large number of customers, deal with a large amount of funds and contribute to the financial services sectors in developing countries. In this context, institutional efficiency is necessary because in the long run, only healthy institutions can offer continuous service to poor householders. The efficiency of these SFIs is of interest not only to householders, but also to managers, regulators and the general public because efficiency assures the smooth functioning of operational activities of institutions (Seibel 1999). The importance of efficiency has been highlighted recently in Sri Lanka with the collapse of several formal and informal financial institutions. The failure of Pramuka Bank in 2002 (a licensed specialised bank) and the collapse of Golden Key Credit Card Company in 2008 (a registered finance company and a member of a leading group of companies in Sri Lanka) are two examples. It is postulated that poor governance and a lack of transparency are the primary reasons for these failures. Hence, a question arises with respect to the identification of which institutions provide financial services efficiently and which do not. A second question relates to how financial institutions can provide services more efficiently.

As discussed in Chapter Two, as formal microcredit providers, CRBs in Sri Lanka have contributed significant improvements in microfinance activities throughout the last few decades. In Sri Lanka, the activities of CRBs make these institutions more approachable, people oriented and more attractive to small clients compared with other commercial banks (Charitonenko & De Silva 2002). Consequently, more government and donor agency funds have been directed to CRBs to serve the needs of the rural financial sector of the economy (Ministry of Finance 2001). Moreover, the Sri Lankan Government expects to enhance the rural financial

sector through several restructuring programmes[45]. A principle goal of these changes has been to promote efficient and sustainable service to the rural financial sector.

Many institutions engaging in microfinance activities around the world are not committed to financial transparency, a factor that contributes to the fragile nature of institutions (Desrochersa & Lamberteb 2003; Rosenberg et al. 2003; Duflos et al. 2006; Florendo 2007). However, no published research into the importance of SFIs as CRBs in Sri Lanka has been identified from reviews of the literature. As highlighted in Chapter Two, many financial institutions introduced a wide range of financial services to the rural financial sector after 2000 and many SFIs entered the market. The large number of participating institutions may have resulted in greater competition and may have affected the overall efficiency of CRBs activities. Hence, an evaluation of their financial strength is of much importance to the developing rural financial sector. Therefore, a quantitative assessment of the efficiency of CRBs in Sri Lanka fills this gap. The main research question of this study is:

- Do CRBs in Sri Lanka operate efficiently in providing microcredit activities?

The efficiency of institutions is influenced by many internal and external factors. In this study, institution-specific characteristics and corporate governance characteristics (accounting and financial practices) are identified as key corporate governance factors associated with the efficiency of a CRB. A conceptual model which frames this study is presented in Figure 5.1. The factors and hypotheses are discussed in the following sections.

[45] The Ministry of Finance in Sri Lanka launched the CRBs restructuring project and the rural finance development project in 2006. These projects were funded by ADB to provide an efficient and sustainable financial service that contributes to the economic growth of the rural community.

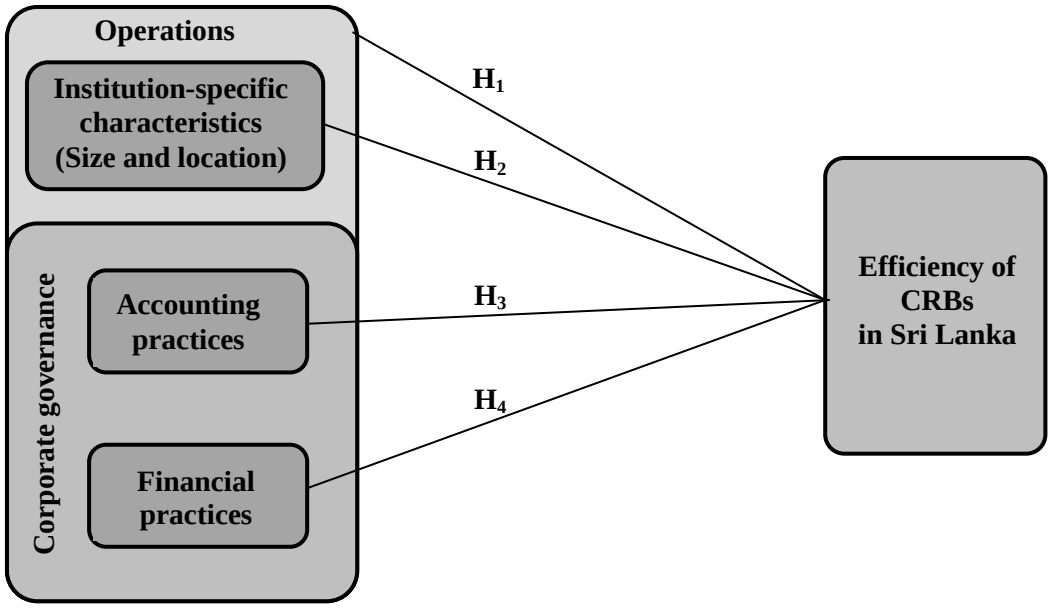


Figure 5.1 Conceptual model of the study

This study proposes that CRBs in Sri Lanka operate efficiently in providing microcredit activities in Sri Lanka. Therefore, the first hypothesis (H_1) predicts:

H_1 CRBs in Sri Lanka operate efficiently in providing microcredit activities.

The methodology to test H_1 is described in section 5.6.

5.3 Institution-specific characteristics and efficiency

Prior literature provides evidence that the institution's size influence efficiency. Drake and Hall (2003) use data envelopment analysis (DEA) to assess the efficiency of Japanese banks and report that larger banks tend to operate above the minimum efficient scale. Hughes et al. (1996) find geographic diversification and deposit diversification enhance efficiency. The number of deposits and branches are positively related to performance (Hughes et al. 1996). In their sample of German cooperative banks, Lang and Welzel (1996) find that bank size deviates considerably from the best practice frontier. Neal (2004) finds that regional

Australian banks are less efficient than national banks. Further, Neal (2004) finds that the Australian banking institutions were less efficient in 1999 than they had been in 1995. Elyasiani and Mehdian (1990) find that US commercial banks with more branches are more efficient than those with small numbers of branches. In contrast, Eisenbeis, Ferrier and Kwan (1999) and Drake and Hall argue that efficiency has a negative relationship with bank size in cooperatives.

As stated in Chapter Two, CRBs in Sri Lanka are located across the country. They operate in urban areas and in the rural regions. Hence, this study explores how regional disparities impact on the efficiency of these SFIs. Further, there are differences in the number of operating branches, the number of members, income, deposits, the number of employees, loans, and investments of sampled institutions. Thus the second research question is:

- Do the specific characteristics of size and location affect the efficiency of CRBs in Sri Lanka?

Two hypotheses are used to address the second research question:

H_{2a} CRB size and efficiency are positively related.

H_{2b} CRB location and efficiency are positively related.

The methodology used to test these hypotheses is described in section 5.7.1.

5.4 Corporate governance and efficiency

Prior literature, discussed in Chapter Four, emphasises that good corporate governance mechanisms in financial institutions reduce financial risks thereby allowing the provision of a broader range of services to customers (King & Levine 1993; Arun & Turner 2002; Lavine 2003; Macey & O'Hara 2003). Recognising the importance of this corporate governance mechanism, several international bodies such as the OECD, the Basel Committee on Banking

Supervision and CGAP have issued best practice guidelines which contribute to enhancing of the efficiency of financial institutions.

Empirical studies provide evidence that implementing a good corporate governance mechanism is necessary to increase efficiency in rural financial institutions (Morduchl 1999; Labie 2001; Desrochersa & Lamberteb 2002; Hartarska 2005) In addition, a good corporate governance mechanism with adequate regulatory and supervisory mechanisms results in greater competition among institutions improving their efficiency (Rock, Otero & Saltzman 1998; Labie 2001; Hartarska 2005).

As regards the effect on efficiency, some researchers argue that providing decision useful accounting information and maintaining effective financial control processes contribute to sound corporate governance mechanisms (OECD 2004; Mullineux 2006; Fernando 2007). Most of the problems the rural financial sector faces at present arise from poor corporate governance, particularly non-application of adequate accounting and financial practices (Gant et al. 2002; Rosenberg et al. 2003). As discussed in Chapter Four, many professional institutions issue guidelines for accounting and finance in SFIs. However, an evaluation of the impact of sound accounting and financial practices on the efficiency of SFIs has not been carried out in Sri Lanka. Hence, there is a need to identify effective countermeasures that could be implemented to address the challenges faced by these institutions. This could also help to enhance the efficiency of the rural financial sector and validate the relevance of these guidelines for SFIs. In these contexts, this study addresses corporate governance issues relating to the accounting and financial practices of CRBs in Sri Lanka and analyses the impact of these on their efficiency.

5.4.1 Accounting information and efficiency

As discussed in Chapter Four, financial reporting provides quantitative economic information which will be useful for economic decisions. The conceptual frameworks developed by many professional bodies provide guidelines for best

practice in the recognition, measurement and presentation of economic events. These frameworks have the objective of providing better information to users, with enhanced transparency, leading to efficient institutions (ICASL 2003; IASB 2004). Greater transparency of accounting information in financial institutions facilitates the mobilisation of savings and facilitates resource allocation by reducing information asymmetry (Levine 1997). Particularly, when SFIs follow sound accounting and reporting standards, they provide evidence to potential lenders and donor agencies that they operate on a sound financial basis (McGuire 1996). However, most SFIs, particularly those in developing countries, do not provide sufficient information in their financial statements to satisfy users' needs (Gant et al. 2002; Rosenberg et al. 2003; Cayanan 2007). Most show discrepancies in the details of important elements included in their financial statements (Paxton 1996). Further, there is no accounting standard or guideline, issued for the preparation and presentation of financial statements of SFIs in Sri Lanka. Hence, their accounting practices are based on management discretion and are generally more diffuse than other financial institutions (Gant et al. 2002). Therefore, the third research question in this dissertation is:

- Do CRBs apply appropriate accounting practices in the recognition, measurement and preparation of financial statements and do appropriate accounting practices have a favourable affect the efficiency of CRBs?

As financial statements are the primary mechanism for delivering information for decision-making purposes, providing relevant and reliable information to users enhances confidence in the decision usefulness of information. Hence, accounting information enhances efficiency by providing useful information that enables managers as well as investors to identify value creation opportunities with less error. Moreover, the governance role in financial reporting promotes the efficiency of institutions (Bushman & Smith 2001). Hence, this study explores how accounting practices affect information asymmetry and the allocation of capital by investors and thus, the overall efficiency of CRBs in Sri Lanka. Hypothesis three (H_3) tests this relationship and predicts that CRBs using appropriate accounting practices achieve higher efficiency than those that do not.

H_3. CRBs that maintain appropriate accounting practices will have higher levels of efficiency.

The methodology adopted for H_3 is described in section 5.7.2.

5.4.2 Financial practices and efficiency

As discussed in Chapter Four, financial soundness has a close relationship with the efficiency of financial institutions (Berger & Young 1997; Das & Ghosh 2006). Many risk methodologies discussed in Chapter Four show that capital adequacy, liquidity, asset quality, maintaining effective financial structures, profitability, and efficiency of management are key indicators of financial soundness. These indicators have an affect on the efficiency of financial institutions (Robison & Barry 1977; Berger & Young 1997; Bhattacharyya, Lovell & Sahay 1997; Kwan & Eisenbeis 1997; Miller & Noulas 1997; Eisenbeis, Ferrier & Kwan 1999; Jansson & Taborga 2000; Das & Ghosh 2006; Seelanatha 2007). Although, interpretations of indicators and categories vary between studies, these indicators are important for maintaining financial strength with risk management processes.

The above argument also applies to SFIs. Although they are small, transparency is necessary to build the confidence of customers (Llewellyn 1998; Van Greuning, Gallardo & Randhawa 1998). With respect to SFIs, inadequate management that results in deficiencies in control of activities, creates programmes that do not provide efficient services in developing countries and these may be unsustainable (Hulme & Mosley 1996; Holden & Prokopenko 2001). In Sri Lanka, the recent financial institution collapses could signal that ineffective financial practices were applied within these institutions. This leads to the fourth research question of this study.

- Do CRBs apply sound financial practices in their operations and does a higher level of financial strength have a favourable effect the efficiency of CRBs in Sri Lanka?

This study proposes that CRBs use sound financial practices to maintain financial strength and thus, achieve higher efficiency. Therefore, hypothesis four (H_4) of this study predicts:

H_4 CRBs with higher financial strength will have higher levels of efficiency.

The methodology used to test H_4 is described in section 5.7.3. Overall, this study predicts relationships between the efficiency of CRBs in Sri Lanka and accounting quality, financial soundness and the specific characteristics of CRBs.

5.5 Sample and data

There are 310 CRBs operating in Sri Lanka at the time this study was conducted. Of these, 48 that operate in the Northern Province are excluded as data could not be obtained given the prevailing situation at the time of data collection. The sample of 108 CRBs represents 35% of the population. The sample is determined with convenience sampling due to time and cost constraints. Seven out of nine provinces in the country and twelve out of twenty five districts are selected based on judgement and the availability of data. Appendix Five presents the name of each sampled CRB. The general characteristics of the sample are discussed in Chapter Six.

Secondary data are used to analyse the efficiency of 108 CRBs. Data are obtained from the annual financial statements for the three years from 2003 to 2005. As these financial statements are audited, they are considered to have an acceptable level of reliability (Neuman 1997). Other relevant data are obtained from various internal reports and other official documents of CRBs.

5.6 Measurement and analysis of efficiency

Consistent with prior literature, the non-parametric frontier approach of DEA is used in this dissertation to evaluate the efficiency of CRBs in Sri Lanka. Efficiency scores are then used to test H_1 and are further used in the tests of

association for the remaining hypotheses. DEA is used in prior studies on the efficiency of financial institutions to examine the impact of some specific changes such as financial reforms, the impact of financial practices and the impact of different ownership groups. Gutiérrez-Nietoa, Serrano-Cincaa and Molinerob (2007) use DEA to analyse the efficiency of Latin American MFIs.

In addition to the support for the DEA approach in prior literature, a further reason for the application of DEA in this study is the relatively small sample size. DEA assesses the efficiency frontier on the basis of all input and output information from the sample (Rogers 1998). This would help to estimate the relative efficiency of firms operating in the same industry (Fried et al. 2002). Hence, identification of performance indicators in CRBs is useful for identifying a benchmark for the whole industry. Moreover, the DEA methodology has the capacity to analyse multi-inputs and multi-outputs to assess the efficiency of institutions (Coelli, Rao & Battese 1998). Many efficiency studies of SFIs use traditional financial ratios (Gibbons & Meehan 1999; Jansson & Taborga 2000; Tucker & Miles 2004). As highlighted in Chapter Three, these ratios provide only partial measures of efficiency which can be misleading with respect to drawing conclusions about the overall efficiency of institutions (Berger & Humphrey 1997; Coelli, Rao & Battese 1998). This constraint does not apply with the DEA approach.

5.6.1 Data envelopment analysis model formulation

The selection of an appropriate model is an important factor in the application of DEA. As discussed in Chapter Three, various DEA models have been used in the literature. The basic DEA model focuses on the productivity ratio, which is measured as a single input to a single output. Equation 5.1 illustrates this basic DEA model.

$$e_o = \frac{\sum_{r=1}^{s} u_r y_r}{\sum_{i=1}^{m} v_i x_i} = \frac{u_1 y_1 + u_2 y_2 + \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots + u_s y_s}{v_1 x_1 + v_2 x_2 + \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots + u_m y_m} \qquad \textbf{Equation 5.1}$$

where

y_r = Amount of output $_r$
u_r = Weight assigned to output $_r$
x_i = Amount of input $_i$
v_i = Weight assigned to input $_i$ $\qquad (r = 1,\ldots\ldots\ldots s)(i = 1\ldots\ldots\ldots m)$

Source: Cooper, Seiford and Tone (2004 , p.15)

In this model, where e_0 is the relative efficiency, x and y are the input and output vectors respectively while, u_r and v_i are the weights assigned to output r and input i respectively. Equation 5.1 can be used for decision making units (DMUs) which have a unique set of inputs and outputs (Cooper, Seiford & Tone 2004). However, where different input and output combinations are used, the Charnes, Cooper, and Rhodes (CCR) model suggests that each DMU assigns equivalent weights for the input and output weights (Cooper, Seiford & Tone 2004). Moreover, the weights are chosen in a manner that assigns a best set of weights to each DMU (Cooper, Seiford & Tone 2004).

The basic input oriented CCR model, initially produced by Charnes, Cooper and Rhodes (1978), is used in this study to assess technical efficiency. Efficiency is estimated as a maximum of a ratio of weighted outputs to weighted inputs. This denotes that the more outputs produced for a given level of inputs, the more efficient is the process (Coelli, Rao & Battese 1998). The frontier line designates the performance of the best DMUs and measures of efficiency for other DMUs are determined by deviation from the line. However, it is difficult to identify a unique set of weights for all DMUs (Cooper, Seiford & Tone 2004). Thus a fractional programme to obtain values for input weights and output weights is used (Cooper, Seiford & Tone 2004). Multiple inputs to multiple outputs are reduced to single virtual input and a single virtual output by optimal weights (Cooper, Seiford &

Tone 2004). The efficiency measure is then a function of multipliers of the virtual input-output combination. In dealing with multiple inputs and multiple outputs, Equation 5.2 is used.

5.6.2 The basic CCR formulation

$$Max\ e_o = \frac{\sum_{r=1}^{s} u_r y_r}{\sum_{i=1}^{m} v_i x_i} \qquad \textbf{Equation 5.2}$$

Subject to:

$$\frac{\sum u_r y_{ri}}{\sum v_i x_{ij}} \leq 1, \qquad (j = 1,.....n)$$

$$u_r, v_i \geq 0 \qquad (r = 1,.....s)(i = 1.....m)$$

Source: Cooper, Seiford and Tone (2004)

In Equation 5.2, e_0 is the relative efficiency while *x* and *y* are the input and output vectors. The weight assigned to outputs *r* and inputs *i* are u_r and v_i respectively. The number of DMUs is denoted by *n*, *s* and *m*. The objective is to obtain weights (v_i) and (u_r) that maximise the ratio of DMU_0. According to Cooper, Seiford and Tone (2004), the constraints of this model are:

i. the optimal objective value is one;
ii. all inputs and outputs weights are equal or more than zero; and
iii. equal weights for all DMUs.

The fractional programme problem is then transformed into a linear programming model, as illustrated Equation 5.3. This form is known as the multiplier form of the linear programming problem (Cooper, Seiford & Tone 2004).

5.6.3 The basic CCR formulation (multiplier form)

$$Max\ e_o = \sum_r u_r y_{rjo} \qquad \textbf{Equation 5.3}$$

Subject to:

$$\sum_r v_i x_{ijo} = 1$$

$$\sum_r u_r y_{rj} - \sum_r v_i x_{ij} \le 0 \qquad (j = 1,.....n)$$

$$u_r \ge 0 \qquad (r = 1,.....s)$$

$$v_i \ge 0 \qquad (i = 1,.....m)$$

Source: Cooper, Seiford and Tone (2004)

The objective function in Equation 5.3 is the same as the factional programme, that is to obtain weights v_i and u_r that maximise the ratio of DMU_0 where DMU_0 is the unit being evaluated. This linear programming problem maximises the weighted outputs of DMU_0, subject to virtual inputs of the DMU_0 (Cooper, Seiford & Tone 2004). Efficient firms have $w_o = 1$ and inefficient firms have $w_o < 1$. Using the duality in linear programming, an equivalent envelopment form of this problem is presented in Equation 5.4.

5.6.4 The basic CCR formulation (dual problem/envelopment form)

$$Min\theta - \varepsilon\left(\sum_{j=1}^{m} s_j^{-} + \sum_{r=1}^{s} s_r^{+}\right) \qquad \textbf{Equation 5.4}$$

Subject to:

$$\sum_{j=1}^{n} \lambda_j x_{ij} + s^{-} = \theta x_{io} \quad (i = 1, \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots, m)$$

$$\sum_{j=1}^{n} \lambda_j y_{rj} - s_r^{+} = y_{ro} \quad (r = 1\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots, s)$$

$$\lambda_j \geq 0 \qquad (j = 1\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots, n)$$

Source: Zhu (2003, p.13)

In this Equation 5.4, θ denotes the efficiency of DMU_j. while y_{rj} is the amount of r^{th} outputs produced by DMU_j using x_{ij} amount of i^{th} input. Both y_{rj} and x_{ij} are exogenous variables and λ_j represents the benchmarks for a specific DMU under evaluation (Zhu 2003). Slack variables are represented by s_i and s_r. According to Cooper, Seiford and Tone (2004) the constraints of this model are:

i. the combination of the input of firm *j* is less than or equal to the linear combination of inputs for the firm on the frontier;

ii. the output of firm j is less than or equal to a linear combination of inputs for the firm on the frontier; and

iii. the main decision variable θ_j lies between one and zero.

As discussed in Chapter Three, the production frontier has constant returns to scale in the CCR model. Further, the model assumes that all firms are operating at an optimal scale. However, imperfect competition and constraints to finance may cause some firms to operate at some level different to the optimal scale (Coelli,

Rao & Battese 1998). Hence, the Banker, Charnes and Cooper (1984) BCC model is developed with a production frontier that has variable returns to scale. The BCC model forms a convex combination of DMUs (Coelli, Rao & Battese 1998). Then the constant returns to scale linear programming problem can be modified to one of variable returns to scale by adding the convexity constraint $\sum_{\lambda j} = 1$ (Zhu 2003). Equation 5.5 illustrates this.

5.6.5 The basic BCC formulation (dual problem/envelopment form)

$$Min\,\theta - \varepsilon\left(\sum_{j=1}^{m} s_j^{-} + \sum_{r=1}^{s} s_r^{+}\right) \qquad \textbf{Equation 5.5}$$

Subject to:

$$\sum_{j=1}^{n} \lambda_j x_{ij} + s^{-} = \theta x_{io} \qquad (i = 1, \ldots\ldots\ldots\ldots\ldots\ldots\ldots, m)$$

$$\sum_{j=1}^{n} \lambda_j y_{rj} - s_r^{+} = y_{ro} \qquad (r = 1\ldots\ldots\ldots\ldots\ldots\ldots\ldots, s)$$

$$\lambda_j \geq 0 \qquad (j = 1\ldots\ldots\ldots\ldots\ldots\ldots\ldots, n)$$

$$\sum_{j=1}^{n} \lambda_j = 1$$

Source: Zhu (2003 , p.13)

This approach forms a convex hull of intersecting planes (Coelli, Rao & Battese 1998). These planes envelop the data points more tightly than the constant returns to scale (CRS) conical hull. As a result, the variable returns to scale (VRS) approach provides technical efficiency (TE) scores that are greater than or equal to scores obtained from the CRS approach (Coelli, Rao & Battese 1998). Moreover, VRS specifications will permit the calculation of TE decomposed into two components: scale of efficiency (SE) and pure technical efficiency (PTE). The relationship of these concepts is shown in Equation 5.6. Hence, this study

first uses the CCR model to assess TE then applies the BCC model to identify PTE and SE in each DMU.

$$TE_{CRS} = PTE_{VRS} * SE \qquad \textbf{Equation 5.6}$$

where

TE_{CRS} = Technical efficiency of constant returns to scale
PTE_{VRS} = Technical efficiency of variable returns to scale
SE = Scale of efficiency

Source: Coelli, Rao and Battese (1998)

5.6.6 The selection of inputs and outputs

Discussion in Chapter Three identified the selection of inputs and outputs as an important factor in the application of the DEA technique. There is considerable debate in the empirical literature about the selection of input and output combinations. Three basic approaches for financial institutions are used in DEA research. These are the intermediation, production and asset approaches. The intermediation approach views financial institutions mainly as mediators of funds between savers and investors (Yue 1992; Avkiran 1999). The production approach emphasises the role of financial institutions as providers of service for account holders (Drake & Weyman-Jones 1992). With the asset approach, outputs are strictly defined by assets and the productivity of loans (Favero & Papi 1995).

Two models are used in this study to assess the efficiency of CRBs in Sri Lanka and to test $H_{1,}$ shown in section 5.2 of this chapter. Model one is based on the intermediation approach and model two is based on the assets approach. The production approach has not been used as the appropriate internal data for DMUs is unavailable to the researcher. The efficiency scores are estimated for individual CRBs and mean efficiency scores are calculated for the sample as a whole. The annual trends in estimated efficiency are also examined with mean estimated scores over the study period. Table 5.1 presents the input-output specification for

model one, the intermediation approach, applied in this study. These inputs and outputs have been identified from prior studies conducted in different contexts.

Table 5.1: Input-output specifications used in intermediation approach[46]

Variables	Definition	Input	Output
Total expenses	Amount paid as interest on deposits, wages and other benefits to employees, and expenses incurred on other facilities	Input	
Loans	Amount of loan provided		Output
Pawning	Amount of advances provided on pawning		Output
Interest income	Income received on investments as interest		Output
Other income	Income received on other investments		Output

Interest income and other income are selected as outputs. Total expenses include interest expenses, personnel costs and establishment costs. Data for input and output variables have been extracted from the CRB financial statements at the end of 2003, 2004 and 2005.

To assess the different aspects of efficiency, a different combination of inputs and outputs is used. Therefore, model two (the asset approach) is used to assess different aspects of financial institution efficiency. This approach is strictly defined by assets and the production of loans, areas where financial institutions have advantages over other firms (Favero & Papi 1995). Table 5.2 presents the input-output specification for model two identified from prior studies in other contexts.

Loans, and pawning advances, and investments are considered as outputs while deposits and other loanable funds and the number of employees are taken as inputs. All input and output variables other than number of employees have been extracted from financial statements at the end of 2003, 2004 and 2005. The

[46] Input-output variables in DEA analysis in prior researches are indicated in Table 3.2.

number of employees is collected as secondary data from district unions. Therefore, the specification of inputs and outputs is largely limited to the information available in financial statements.

Table 5.2: Input-output specifications used in asset approach

Variables	Definition	Input	Output
Deposits	Amounts collected as deposits	Input	
Other funds	Funds received from other sources	Input	
No. of employees	Full time workers in the bank	Input	
Loans	Amount of loans provided		Output
Pawning	Amount of advances provided on pawning		Output
Investments	All investments in the banks		Output

5.7 Measurement and analysis of variables associated with efficiency

This section discusses the rationale for testing of relationships between the institution-specific characteristics of CRBs and efficiency. The specific measures of the corporate governance proxies are then addressed.

5.7.1 Specific characteristics of financial institution

Previous studies report that the size of financial institutions influences their efficiency (Elyasiani & Mehdian 1990; Hughes et al. 1996; Lang & Welzel 1996; Bhattacharyya, Lovell & Sahay 1997; Kwan & Eisenbeis 1997; Eisenbeis, Ferrier & Kwan 1999; Drake & Hall 2003; Neal 2004). Size is measured in terms of total income (Demirg'uc-Kunt 1989; Desrochersa & Lamberteb 2003), total assets (Miller & Noulas 1997; Sharma & Kawadia 2006), or number of branches (Elyasiani & Mehdian 1990). Larger institutions operate more efficiently than smaller institutions so a positive relationship is predicted here. Geographic location and local economic conditions are associated with financial institution

efficiency (Bhattacharyya, Lovell & Sahay 1997; Brown 2001; Neal 2004). The institution-specific characteristics and hypothesised relationships with efficiency are defined in Table 5.3.

Table 5.3: Institution-specific characteristics

Variable	Definition	Hypothesised relationship to efficiency	Prior studies
Branches	Number of branches operating at the end of 2005	Positive	(Elyasiani & Mehdian 1990; Hughes et al. 1996; Bhattacharyya, Lovell & Sahay 1997)
Members	Number of members at the end of 2005	Positive	-
Income	Average income earned during the study period in Sri Lanka rupees (SLR)	Positive	(Demirg'uc-Kunt 1989; Desrochersa & Lamberteb 2002)
Deposits	Average deposits obtained during the study period in SLR	Positive	(Hughes et al. 1996; Brown 2001)
Employees	Number of employees at the end of 2005	Positive	(Das & Ghosh 2006)
Loan	Average loans outstanding during the study period in SLR	Positive	(Kwan & Eisenbeis 1997)
Investments	Average investments during the study period in SLR	Positive	-
Location	District of operations	Efficiency differences	(Bhattacharyya, Lovell & Sahay 1997; Brown 2001; Neal 2004)

Data for income, deposits, loans, and investments have been extracted from financial statements. Other relevant data are obtained from various internal reports and other official documents of CRBs. The main implications from previous studies are that the relationship between size and efficiency is positive. No prior research analysing the relationship of the number of members or investments and efficiency has been identified. However, several studies use total assets or investments as size variables. In the cooperative model, members of the institution are the main stakeholders. This study predicts a positive association for the number of members and efficiency.

This study hypothesizes (section 5.3, H_2) that larger CRBs (in terms of number of branches, number of members, income, deposits, employees, loan, and

investments) operate more efficiently. In order to assess how regional disparities affect efficiency, CRBs are categorised by district. The prediction is that efficiency differs by location, where any differences may be attributable to the level of economic development.

Correlation coefficients are used to test the association between size and efficiency (H_{2a}). Kruskal-Wallis statistical test for differences is used to test for efficiency attributable to geographic location (H_{2b}).

5.7.2 Accounting soundness

As stated in Chapter Four, in the absence of accepted standards for the preparation and presentation of financial statements, generally accepted accounting principles for financial institutions are considered as the most appropriate benchmark for CRBs in Sri Lanka. Chapter Four identifies the following accounting practices[47] as indicative of quality accounting practices (IAS30 1991; ICASL 2003; Rosenberg et al. 2003):

- revenue from performing assets;
- revenue from non-performing assets;
- interest expenses;
- provisions for loan losses; and
- write-off loan losses.

As discussed in chapter Four, prior research has investigated the importance of the provisioning for loan losses, write-off of loan losses, and the manipulation of accruals (Beatty, Chamberlain & Magliolo 1995; Chi-Chun Liu & Ryan 1995; Kim & Kross 1998). Cayanan (2007) assesses non-performing loans and write-off of loan losses in preparing and presenting financial statements for financial institutions. Results show these practices are important for institutions to mitigate information asymmetry and to facilitate the efficient flow of resources. However

[47] Accounting practices are certain accounting rules to follow when presenting financial statements. When such practices are applied by an entity, they are considered as accounting policies of the entity.

no prior research that analyses all of these practices in financial institutions has been identified.

In addition to the above accounting practices, cash flow information also has potential relevance to the information requirements of financial statements (Jones, Romano & Smyrnios 1995; Jones & Ratnatunge 1997). This study posits that disclosure of cash flows from operating activities, investing activities, and financing activities presented in the cash flow statement are important for decision making.

5.7.3 External verification of the accounting practices rating scheme

This research determines the soundness of accounting systems in CRBs, using the previously identified six accounting practices. A total of 108 financial statements for the sample institutions were assessed covering the period from 2003 to 2005 to determine the extent of their compliance with these practices. The rating scheme used in this assessment is presented in Appendix Six. Ten variables are included to assess the extent to which each accounting practice is used. Two variables relate to recognition, three variables relate to application, three variables relate to disclosure of financial statements, and two variables relate to reviewing of each accounting practice. In total 60 variables are contained in the scheme. For analytical purposes, each variable is weighted equally where there are no differences in the relative importance of each accounting practice in this study.

The mean value is considered to determine the extent of usage of each accounting practice in the sample. An alternative measure of the extent of usage using a four point scale is presented in Appendix Seven. To confirm the sufficiency of the rating scheme to assess the accounting practices, face to face interviews were held with responsible officers of CRBs, districts unions, and the federation[48] of CRBs.

[48]As seen in Figure 2.8 the Sri Lanka Cooperative Rural Bank Federation Ltd is the highest level organisation in the organisational structure of the movement. 13 districts unions currently operate in 13 districts.

The respondents were chosen on a random basis. However, for practical reasons, interviews were limited to the districts of Kalutara, Gampha, and Kurunegala (46% of the sample).

5.7.4 Variables affecting sound accounting information

As discussed in section 5.4.1, the governance role in financial reporting promotes the efficiency of institutions (Bushman & Smith 2001). The proposition in this dissertation is that maintaining sound accounting practices and providing sufficient information to users enhances confidence in the decision usefulness of information. This enables an enhancement of efficiency by institutions. This study hypothesises (section 5.4.1, H_3) that CRBs maintaining appropriate accounting practices will have relatively higher levels of efficiency. Therefore, appropriate measurement and adequate disclosures are expected to have positive relationships with efficiency. The hypothesised relationships for accounting practices in financial institutions and efficiency are illustrated in Table 5.4. Correlation coefficients are estimated to test the predicted relationship in H_3.

Table 5.4: Variables affecting sound accounting information

Variable	Hypothesised relationship to efficiency
Revenue from performing assets	Positive
Revenue from non-performing assets	
Interest expenses	
Provisions for loan losses	
Write-off loan losses	
Cash flow information	

5.7.5 Financial soundness

Based on theoretical and empirical research discussed in Chapter Four, the financial strengths of SFIs are assessed using capital adequacy, liquidity, asset quality, effective financial structures, profitability, and efficiency of management. Efficiency of management is decomposed further and assessed using the loan portfolio yield (CGAP 2003), operational efficiency (Jansson & Taborga 2000;

CGAP 2003; Almario, Jimenez & Roman 2006), and operational self-sufficiency (McGuire 1996; CGAP 2003). Each variable is measured using ratios based on financial statement data. The ratios are measured as means for each CRB over the study period. The definition of each variable and the hypothesised relationships with efficiency are defined in Table 5.5.

Table 5.5: Variables affecting sound financial strength

Variable	Definition	Hypothesised relationship to efficiency	Prior studies /Authors
Capital adequacy	Equity capital to total assets	Positive	(Bhattacharyya, Lovell & Sahay 1997; Kwan & Eisenbeis 1997; Das & Ghosh 2006; Seelanatha 2007)
	Equity to customer deposits	Positive	
Liquidity	Liquid assets to liabilities	Negative	(Eisenbeis, Ferrier & Kwan 1999; Jansson & Taborga 2000)
Asset quality	Non-performing loans to total loans	Negative	(Berger & Young 1997; Miller & Noulas 1997; Das & Ghosh 2006; Seelanatha 2007)
Loan to deposit structure	Loans to deposits	Negative	(Robison & Barry 1977)
Profitability	Return on total assets	Positive	(Jansson & Taborga 2000; Das & Ghosh 2006; Seelanatha 2007)
Loan portfolio yield	Interest income to loan outstanding	Negative	(CGAP 2003)
Operational efficiency	Operating cost to loans	Negative	(Jansson & Taborga 2000; Das & Ghosh 2006)
	Operating cost to deposits	Negative	
Operational self-sufficiency	Income to expenses	Positive	(McGuire 1996; CGAP 2003)

This study hypothesises (5.4.2, H_4) that CRBs with greater financial strength will have higher levels of efficiency. Correlation coefficients are used to test H_4.

5.8 Conclusion

This Chapter formulates the research design and methodology used to investigate efficiency and the impacts of accounting and financial practices on the efficiency

of CRBs in Sri Lanka. DEA will be used to assess efficiency. Two models, the intermediation approach and asset approach, are used to determine inputs and outputs because CRBs act mainly as mediators of funds. Relevant accounting practices and financial practices are identified from the literature. Correlation coefficients will be used to examine the impact of accounting and financial practices on efficiency.

The sample consists of 108 CRBs which operate in urban and rural districts in Sri Lanka. The study period is from 2003 to 2005. Controls for the size and geographical location are also considered. To assess the differences in usage of accounting and financial practices by CRB size, Kruskal-Wallis tests are used. The next chapter analyses the data and presents a discussion of the results.

CHAPTER SIX
DATA ANALYSIS

6.1 Introduction

This chapter presents the data analysis and results for the investigation of the efficiency of cooperative rural banks (CRBs) in Sri Lanka using the methodologies developed in Chapter Five. In addition, this chapter presents a detailed analysis of the accounting, financial and institution specific characteristics (size and location) of CRBs in Sri Lanka. This chapter comprises of seven sections. The next section presents the characteristics of the sample. Section three analyses the efficiency of CRBs in Sri Lanka based on the estimated scores from the application of the DEA technique. In the fourth section examination of the associations between institution specific characteristics of the CRBs and efficiency is undertaken. The fifth and sixth sections assess the accounting practices and the financial practices of CRBs in Sri Lanka. The final section concludes the chapter.

6.2 Characteristics of the sample

In this section, the sample characteristics, geographical location and size of the CRBs are described. The classification system used to group CRBs by size is also presented.

6.2.1 Geographical location

Table 6.1 presents the geographical location of CRBs in the sample by province and by district.

Table 6.1: Geographical location of CRBs in the sample

Province	District	No. of CRBs	Sampled districts	Sample selected as percentage of population	percentage of sampled districts
Western	Colombo	11	0	0%	0%
	Gampaha	17	17	100%	16%
	Kalutara	11	8	73%	7%
Central	Kandy	22	0	0%	0%
	Matale	11	0	0%	0%
	Nuwara Eliya	12	0	0%	0%
Southern	Galle	18	0	0%	0%
	Matara	9	1	11%	1%
	Hambantota	7	0	0%	0%
Nothern	Jaffna	26	0	0%	0%
	Manner	6	0	0%	0%
	Vauniya	4	0	0%	0%
	Mulativu	6	0	0%	0%
	Killinochchi	6	0	0%	0%
Eastern	Baticoloa	16	0	0%	0%
	Ampara	6	4	67%	4%
	Trincomalee	20	0	0%	0%
North West	Kurunegala	22	22	100%	20%
	Puttlama	12	12	100%	11%
North Central	Anuradhapura	19	10	53%	9%
	Polonnaruwa	9	9	100%	8%
Uva	Badulla	12	5	42%	5%
	Monoragala	5	5	100%	5%
Sabaragamuwa	Rathnapura	13	11	85%	10%
	Kegalle	10	4	40%	4%
Total		**310**	**108**		**100%**

As shown in Table 6.1, the sample includes twelve districts (out of twenty-five in the country) and seven provinces (out of nine in the country). In terms of the selection, the sample represents all CRBs in the districts of Gampaha, Kurunegala, Puttlam, Polonnaruwa and Monaragala. In terms of representativeness, more than 50% of the sample is drawn from the districts of Kurunegala (20%), Gampaha

(16%), and Puttlam (11%) and Ratnapura (10%). A small percentage of the sample comes from the district of Matara (1%). Thirty-one percent of the sample comes from the North Western province. Overall, the sample of 108 CRBs represents 35% of the population of Sri Lankan CRBs. For analytical purposes, the sample is further categorised by CRB size, as discussed in the next section.

6.2.2 Size of CRBs

Seven metrics are used to measure the size of CRBs: number of operating branches, number of members, income, deposits, number of employees, loans, and size of investments. Table 6.2 presents descriptive statistics for CRB size. Panel A shows the minimum, maximum, mean, standard deviation, median and Kolmogorov-Smirnov tests of normality for each size metric. Kolmogorov-Smirnov statistics are used to test the distribution of size metrics. A three tier size classification system is defined in Panel B. the percentage of the sample for the small, medium and large categories for each size metric are also shown.

As shown in Panel A of Table 6.2, sample CRBs have branch numbers ranging from one to twenty-eight. Based on the number of operating branches, the majority (63%) of the sample are small scale CRBs. Medium scale CRBs provide 17% of the sample while the remaining 20% are large scale CRBs. There is also a noticeable proportion (32%) of small CRBs (less than 6,000 members), while large scale CRB (44% of the sample) have memberships ranging from 15,000 to 56,000. As shown in Panel A, 14% of the CRBs have an average income over SLR 15 million, 69% have income below SLR 7.5 million with 17% reported income between SLR 7.5 million and SLR 15 million annually. Deposits over SLR 100 million are reported by 39% of the sample. Loan balances over SLR 50 million are reported by 33% of the sample and 40% have investments over SLR 50 million. The majority of the sample (65%) has more than 15 employees. The Kolmogorov-Smirnov test statistics and associated *p* values show that, with the exception of numbers of branches, each size metric makes a significant departure from the normal distribution at the conventional level.

Table 6.2: The size of CRBs in the sample

Panel A

Size metric	N	Minimum	Maximum	Mean	Std. Dev.	Median	Kolmogorov-Smirnov statistics	
							Z value	*p*-value
Number of operating Branches	108	1	28	8	4.81	7	1.35	.052*
Number of Members	108	497	123,941	17,564	18,100	12,646	1.80	.003
Income	108	199	49,058	7,135	7,567	4,890	1.90	.001
Deposits	105	1,131	746,900	112,485	119,681	76,310	1.80	.003
Number of Employees	108	2	89	27	19.72	20	1.55	.016
Loans	102	0.820	268,255	47,915	55,492	28,039	2.06	.000
Investments	103	0.056	434,720	57,486	69,459	39,665	2.07	.000

**p>0.05 significnat*

Panel B

Size metric	N	Large	Medium	Small	Scale
Number of operating branches	108	20%	17%	63%	Large = more than 10 Medium = 8 to 10 Small = below 8
Number of members	108	44%	24%	32%	Large = more than 15,000 Medium = 6,000 to 15,000 Small = below 6,000
Income	108	14%	17%	69%	Large = over SLR 15 million Medium = SLR 7.5 million to 15 Small = below SLR 7.5 million
Deposits	105	39%	22%	39%	Large = over SLR 100 million Medium = SLR 60 million to 100 Small = below SLR 60 million
Number of employees	108	65%	22%	13%	Large = more than 15 Medium = 8 to 15 Small = below 8
Loans	102	33%	19%	48%	Large = over SLR 50 million Medium = SLR 25 million to 50 Small = below SLR 25 million
Investments	103	40%	15%	45%	Large = over SLR 50 million Medium = SLR 25 million to 50 Small = below SLR 25 million
Average		37%	19%	44%	

N= number of observations. All figures (other than percentages) are in SLR thousands except number of branches, number of members and number of employees.

As shown in Panel B specific size categories have been determined at the researcher's discretion. These size categories are employed in the analysis presented in sections 6.3.4, 6.3.8, 6.48 and 6.5.9. Broadly speaking, 37% of the sample is represented by large CRBs while medium and small CRBs represent 19% and 44% respectively (based on an average of all measurements).

6.3 Efficiency of cooperative rural banks

Chapter Five (section 5.2) raises the question of whether CRBs in Sri Lanka operate efficiently in providing microcredit activities in Sri Lanka. The following analysis addresses this main research question.

The data envelopment analysis (DEA) methodology is used to evaluate the efficiency of CRBs in Sri Lanka. DEA efficiency scores are estimated using 'DEA-Solver software V6'. Different numbers of observations are used for each model in each year due to the availability of data. For model one (efficiency in intermediation, [E (I)]) 78 observations for CRBs are available in 2003, 97 in 2004, and 101 in 2005. Thus a total of 276 observations are available for DEA efficiency analysis in model one. For model two (efficiency in asset transformation, [E (A)]) 83 sample CRBs are available in 2003, 102 in 2004 and 100 in 2005. Thus, in aggregate, 285 observations are available for DEA efficiency analysis in model two. This study uses window analysis (Charnes et al. 1985; Avkiran 1999) with separate production frontiers constructed on the pre-determined window periods; 2003, 2004 and 2005. The following sections present and discuss descriptive statistics for all input and output variables as well as DEA efficiency scores based on both the intermediation approach [E (I)] and the asset transformation [E (A)] approach.

6.3.1 Descriptive statistics of inputs and outputs in DEA models

Tables 6.3 and 6.4 present the Spearman[49] correlation coefficients of input and output variables in model one [E(I)] and model two [E(A)] respectively.

Table 6.3: Spearman correlation of input and output variables in model one

Inputs and outputs	Total expenses			Loans			Pawning			Interest income		
	2003	2004	2005	2003	2004	2005	2003	2004	2005	2003	2004	2005
Loans	0.67**	0.56**	0.67**									
Pawning	0.62**	0.23*	0.43**	0.66**	0.41**	0.61**						
Interest income	0.74**	0.93**	0.94**	0.78**	0.58**	0.68**	0.62**	0.20**	0.42**			
Other income	0.66**	0.70**	0.68**	0.64**	0.26**	0.41**	0.63**	0.12	0.38**	0.71**	0.62**	0.61**

**Correlation is significant at the 0.01 level

*Correlation is significant at the 0.05 level

Table 6.4: Spearman correlation of input and output variables in model two

Inputs and outputs	Deposits			Other funds			Employees			Loans			Pawning		
	2003	2004	2005	2003	2004	2005	2003	2004	2005	2003	2004	2005	2003	2004	2005
Other funds	0.58**	0.23**	0.30**												
Employees	0.86**	0.85**	0.86**	0.53**	0.26**	0.30**									
Loans	0.93**	0.89**	0.86**	0.52**	0.26**	0.29**	0.83**	0.74**	0.78**						
Pawning	0.73**	0.55**	0.68**	0.64**	0.23*	0.32**	0.67**	0.50*8	0.63**	0.66**	0.41**	0.61**			
Investments	0.89**	0.75**	0.86**	0.58**	0.20*	0.30**	0.77**	0.69**	0.78**	0.84**	0.58**	0.68**	0.62**	0.56**	0.57**

**Correlation is significant at the 0.01 level

*Correlation is significant at the 0.05 level

The correlation coefficients show all variables have positive and significantly associations. In regard to the estimated coefficients in model one, all output variables (loans, pawning, interest income, and other income) are positively significant correlated with total expenses. In particular, the association between interest income and total expenses has a very high correlation of 0.940 in 2005. Loans and total expenses also have relatively high correlations with coefficients

[49] Spearman correlations (rather than Pearson) are reported given the non-normal distributions of these variables.

greater than 0.50 in all years. This result indicates that loans production represents the greater share of costs of the CRBs which is to be expected.

In the asset transformation model, all output variables (loans, pawning and deposits) are significantly positively correlated with inputs. In other words, these positive correlations reveal that increasing any input is expected to result in expanding the bank's production. These statistically significant and positive correlations among the variables in both models provide further support for the appropriateness of the selected variables in the DEA models. Overall, the correlation results show that change in one variable can be expected to impact the overall efficiency of the CRBs. The reminder of this section discusses the efficiency of CRBs based on estimated DEA scores.

6.3.2 Efficiency in intermediation

The estimated efficiency scores for each DMU and the estimated mean efficiency scores for the three-year window (2003, 2004 and 2005) for each DMU are presented in Appendix Eight. TE (I) represents technical efficiency (intermediation) in the Charnes, Cooper, and Rhodes (CCR) model [Constant returns to scale (CRS) specification]; PTE (I) represents pure-technical efficiency (intermediation) in the Banker, Charnes, and Cooper (BCC) model [Variable returns to scale (VRS) specification]; and SE (I) represents scale efficiency (intermediation) with VRS. As stated in Chapter Three, CRS ignores scale differences and assumes that all CRBs are operating at the optimal scale. In contrast, VRS assesses efficiency after controlling for scale differences. Efficiency scores are calculated for both CRS and VRS to shed light on the potential impacts of scale differences on efficiency. The summary of estimated results for efficiency in intermediation is presented in Table 6.5.

Table 6.5: Summary of efficiency analysis in intermediation

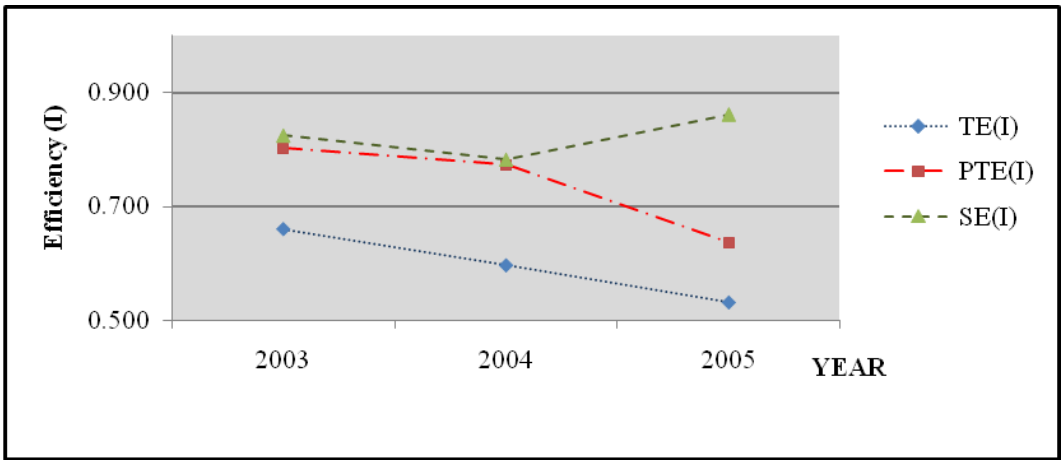
Description	2003			2004			2005		
	TE(I)	PTE(I)	SE(I)	TE(I)	PTE(I)	SE(I)	TE(I)	PTE(I)	SE(I)
No. of evaluated CRBs	78	78	78	97	97	97	101	101	101
No. of efficient CRBs	8	24	8	5	18	5	6	18	7
No. of inefficient CRBs	70	54	70	92	79	92	95	83	94
Mean score	0.660	0.802	0.820	0.597	0.774	0.780	0.532	0.637	0.860
Standard deviation	0.194	0.195	0.120	0.172	0.184	0.150	0.194	0.231	0.170
Maximum score	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Minimum score	0.336	0.352	0.510	0.213	0.223	0.380	0.163	0.236	0.270

TE (I) = Technical efficiency in intermediation. PTE (I) = Pure technical efficiency in intermediation.

SE (I) = Scale efficiency in intermediation.

The TE (I) scores in Table 6.5 show eight CRBs (10%) in 2003, five (5%) in 2004 and six (6%) in 2005 are efficient as indicated by efficiency scores which equal to 1.00. The PTE (I) scores show 24 (30%) CRBs are efficient in 2003, 18 (19%) in 2004 and 18 (18%) in 2005. The number of efficient CRBs on SE (I) are consistent with the TE (I) except for 2005.

Figure 6.1 graphs mean efficiency scores in intermediation during the period 2003 to 2005. As far as mean scores are concern, there is a downward trend in average TE (I) from 2003 to 2005 (66.0% in 2003, 59.7% in 2004 and 53.2% in 2005). A similar trend exists for PTE (I) (80.2% in 2003, 77.4% in 2004 and 63.7% in 2005). However, although SE (I) declines from 82.0% to 78.0% from 2003 to 2004, it recovers to 86.0% in 2005. The average efficiency scores of the least efficient CRBs in the sample are also continuously declining over the study period. This is evident in the minimum efficiency scores reported in the Table 6.5. The minimum score for TE (I) in 2003 (33%) fell to 16% in 2005. Although the estimated average efficiency scores for all CRBs show a declining trend throughout the study period, there was a slight upward trend in SE (I). This is attributed to scale differences in the CRBs. These results suggest that CRBs do not use their inputs efficiently and they could produce the same outputs while reducing inputs.



TE (I) = Technical efficiency in intermediation. PTE (I) = Pure technical efficiency in intermediation.
SE (I) = Scale efficiency in intermediation. Efficiency (I) = Efficiency in intermediation.

Figure 6.1: Mean efficiency in intermediation, 2003-2005

6.3.3 Returns to scale in efficiency in intermediation

Returns to scale (RTS) reflects the changes in output subsequent to a proportional change in all inputs (Coelli, Rao & Battese 1998). If output increases by that same proportional change in inputs, there are constant returns to scale (CRS) (Coelli, Rao & Battese 1998). If output increases by less than that proportional change, there are decreasing returns to scale (DRS). If output increases by more than the proportional change in inputs, there are increasing returns to scale (IRS) (Coelli, Rao & Battese 1998). In this study, efficiency in intermediation is further extended to estimate the RTS of the sample. Table 6.6 presents the nature of returns to scale information for efficiency in intermediation in each year.

Table 6.6: Returns to scale in efficiency in intermediation

Year	IRS		CRS		DRS		Total CRBs
	Efficient	Projected	Efficient	Projected	Efficient	Projected	
2003	4	8	10	0	10	46	78
2004	3	23	5	0	10	56	97
2005	1	15	6	0	11	68	101
Total	8	46	21	0	31	170	276

IRS = Increasing returns to scale. CRS = Constant returns to scale. DRS = Decreasing returns to scale. DMUs = Decision making units

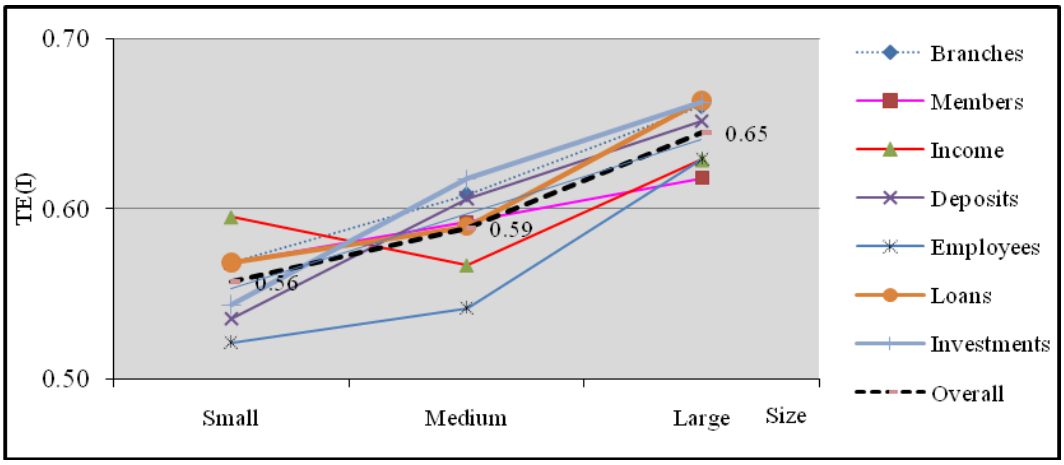
Results (Table 6.6) indicate that the majority of efficient and inefficient (projected) CRBs operate at DRS during the period of the study. These results confirm that the main cause of inefficiency of CRBs is the excessive scale of operations. In 2005, in particular, the number of CRBs with DRS has increased. These RTS results imply that inefficient and efficient CRBs can adjust their scale of operations to improve their RTS. All CRBs which achieved CRS (21), the most productive scale, were technically efficient. In order to understand the differences in efficiency across CRBs' size, the calculated efficiency scores are disaggregated in the next section.

6.3.4 Efficiency in intermediation by CRB size

Figures 6.2, 6.3 and 6.4 show the efficiency in intermediation of CRBs by size. The CRBs are categorised as large, medium and small as described in Table 6.2. CRBs size is measured alternatively with the number of branches, number of members, income deposits, employees, loans, and investments of each bank. The mean DEA scores for 2003, 2004 and 2005 for each CRB are employed in this analysis. These figures illustrate the variation of efficiency with respect to size.

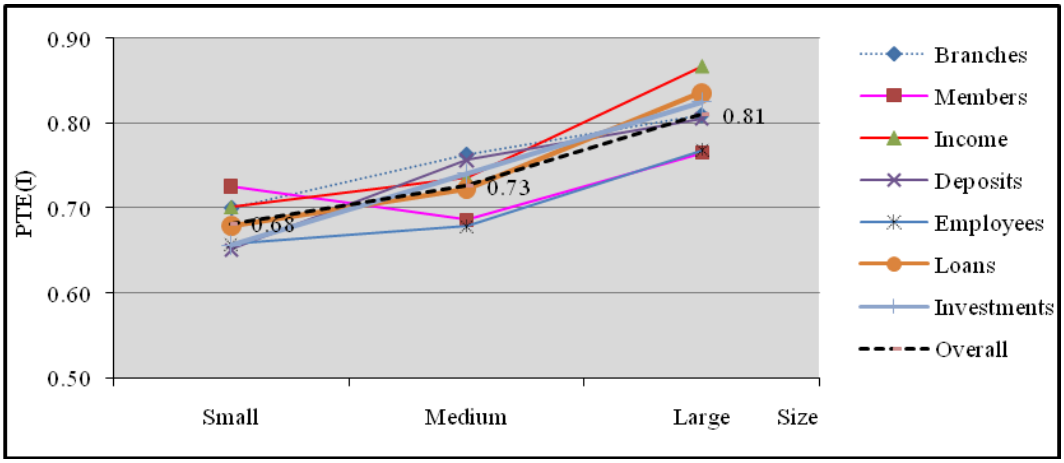
Table 6.7 presents the results of the Kruskal-Wallis test for differences in mean efficiency (measured by model one) attributable to size[50]. Figures 6.2 to 6.4, illustrate efficiency in intermediation and bank size in terms of all size metrics.

[50] Mean efficiency and Kruskal-Wallis statistics are reported using only three metrics, number of branches, number of employees and loans. With the exception of the 'members' measure of size, results for other size metrics (income, deposit and investments) are broadly consistent with those reported here for efficiency in intermediation. Appendix xiii presents the Kruskal-Wallis statistics for all metrics.



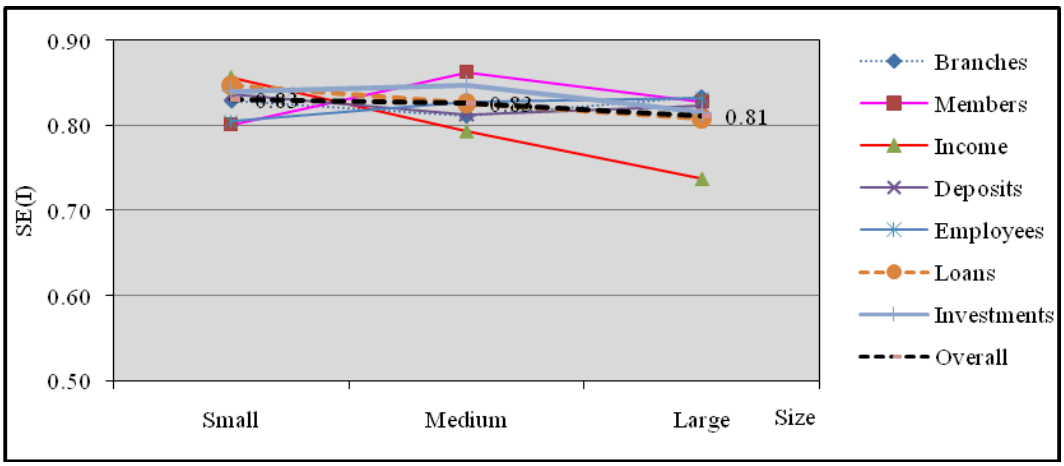
TE (I) = Technical efficiency in intermediation.

Figure 6.2: Technical efficiency in intermediation and CRB size



PTE (I) = Pure technical efficiency in intermediation.

Figure 6.3: Pure technical efficiency in intermediation and CRB size



SE (I) = Scale efficiency in intermediation.

Figure 6.4: Scale efficiency in intermediation and CRB size

Small CRBs (in terms of all metrics) had a TE (I) efficiency score of 56%, a PTE (I) score of 68% and a SE (I) score of 83% during the period of 2003 to 2005 (Figures 6.2 to 6.4). Medium scale CRBs had TE (I) scores of 59%, PTE (I) scores of 73%, and SE (I) scores of 83%. Scores of TE (I) 65%, PTE (I) 81% and SE (I) 81% are reported for large scale CRBs. According to the above results, the estimated overall means of TE (I), and PTE (I) scores are higher for larger CRBs compared to small and medium size CRBs. Small size CRBs are the least efficient in terms of all efficiency scores. However, SE (I) scores are slightly better in small CRBs than large and medium size CRBs.

Table 6.7: Mean efficiency and Kruskal-Wallis test scores in intermediation by CRBs size

Category	Size metric	TE (I)	PTE (I)	SE (I)
Small	Branches	0.569	0.701	0.830
	Employees	0.522	0.658	0.805
	Loans	0.569	0680	0847
Medium	Branches	0.609	0.764	0812
	Employees	0.542	0.678	0.828
	Loans	0.590	0723	0826
Large	Branches	0.661	0.810	0.834
	Employees	0.629	0.768	0.832
	Loans	0.664	0836	0.808
Test	Branches			
Kruskal-Wallis Chi-Square		6.709	7.366	.966
p-value		0.035	0.025	0.617
Test	Employees			
Kruskal-Wallis Chi-Square		10.906	8.266	0.346
p-value		0.004	0.016	0.841
Test	Loan			
Kruskal-Wallis Chi-Square		8.848	17.379	1.425
p-value		0.012	0.000	0.490

The Kruskal-Wallis statistics in Table 6.7 show there are significant differences ($p< 0.05$) in TE (I) and PTE (I) for all CRBs' sizes. Medium size CRBs have marginally efficient scores compared with all CRBs efficiency scores. The medium size CRBs' mean score is almost the same as the efficiency scores of all

CRBs. Overall, the results show that there are efficiency gaps between large scale CRBs and small and medium CRBs operating in Sri Lanka.

6.3.5 Efficiency in intermediation by district

Efficiency scores are examined to see whether regional disparity affects the efficiency of the sample CRBs. Table 6.8 presents the mean efficiency score in intermediation by district and Kruskal-Wallis test statistics.

Table 6.8: Mean efficiency and Kruskal-Wallis test scores in intermediation by district

District	No. of CRBs	TE(I)	PTE(I)	SE(I)
Ampara	4	0.532	0.770	0.698
Anuradapura	10	0.549	0.677	0.830
Badulla	5	***0.390***	***0.463***	0.867
Gampaha	17	***0.749***	0.809	***0.932***
Kalutara	8	0.500	0.665	0.780
Kegalle	4	0.492	0.702	0.760
Kurunegala	22	0.638	0.811	0.802
Matara	1	0.423	***1.000***	***0.423***
Monaragala	5	0.464	0.578	0.816
Polonnaruwa	9	0.502	0.605	0.842
Puttlam	12	0.694	0.804	0.872
Ratnapura	11	0.623	0.818	0.771
All CRBs	**108**	**0.596**	**0.734**	**0.828**
Test				
Kruskal-Wallis Chi-Square		54.29	39.24	32.42
ρ -value		0.000	0.000	0.001

TE (I) = Technical efficiency in intermediation. PTE (I) = Pure technical efficiency in intermediation.
SE (I) = Scale efficiency in intermediation.

The Kruskal-Wallis test scores (Table 6.8) show that there are significant differences in TE (I) for the sample districts. Gampaha, Puttlum, Kurunegala, and Ratnapura districts record the highest estimated TE (I) scores of 74.9%, 69.4% 63.8% and 62.3%, respectively. The PTE (I) scores also show significant differences by districts. Matara district records the highest PTE (I) (100%), While

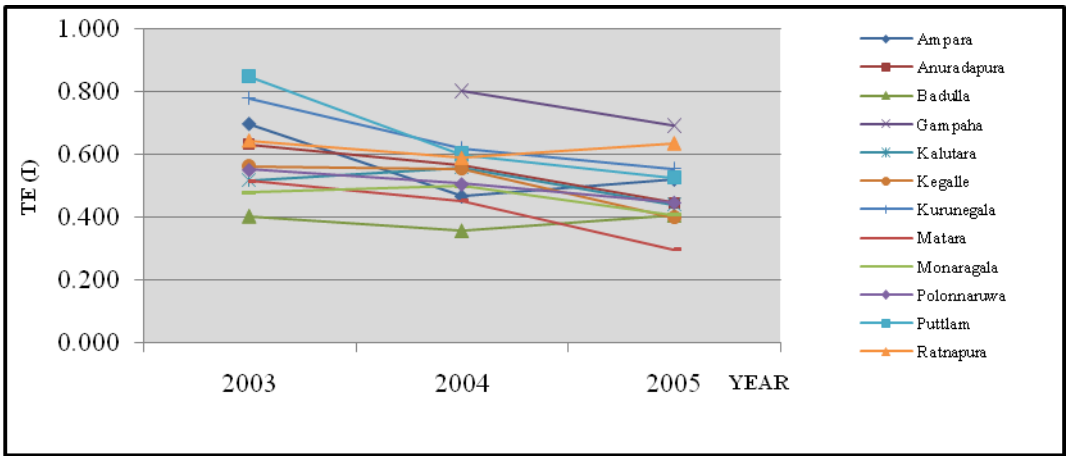
Kurunegala, Ratnapura, Gampaha and Puttlum districts records PTE (I) scores of 81.1%, 81.8%, 80.9%, and 80.4% respectively. These are all greater than the sample mean. SE (I) scores are also significantly different among regions. The estimated efficiency scores indicate that the most efficient CRBs are located in urban areas. In contrast, rural CRBs are the smallest CRBs and they tend to have the lowest efficiency scores. These significant differences in the efficiency of CRBs in different geographical locations are consistent with CRBs facing different operational environments in different geographical locations. However, given the association of CRB size and location, these differences will, in part, be attributable to among size.

The estimated means of all efficiency scores in intermediation are further analysed to examine the trend in efficiency during the three-year period, 2003 to 2005. Table 6.9 presents the efficiency scores in intermediation by district and by year. (Figure 6.5, 6.6, and 6.7).

Table 6.9: Efficiency in intermediation by district and year

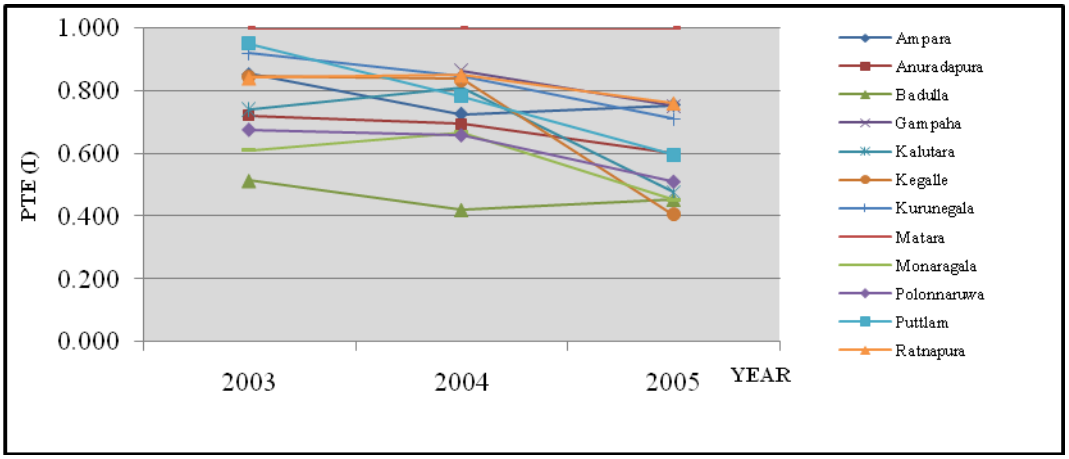
District	TE(I)			PTE(I)			SE(I)		
	2003	2004	2005	2003	2004	2005	2003	2004	2005
Ampara	0.698	0.467	0.521	0.854	0.727	0.756	0.821	0.661	0.702
Anuradapura	0.633	0.568	0.448	0.722	0.695	0.601	***0.893***	0.838	0.777
Badulla	0.404	0.359	0.407	0.514	***0.421***	0.454	0.799	0.886	0.915
Gampaha	NA	***0.804***	***0.694***	***0.000***	0.865	0.752	***0.000***	***0.933***	***0.931***
Kalutara	0.519	0.559	0.442	0.742	0.811	0.478	0.702	0.691	0.928
Kegalle	0.564	0.555	0.401	0.847	0.837	***0.407***	0.666	0.673	0.983
Kurunegala	***0.779***	0.621	0.556	0.920	0.848	0.712	0.850	0.737	0.818
Matara	0.517	***0.454***	***0.298***	***1.000***	***1.000***	***1.000***	0.517	***0.454***	***0.298***
Monaragala	***0.481***	0.501	0.409	0.611	0.669	0.454	0.784	0.753	0.910
Polonnaruwa	0.553	0.508	0.449	0.675	0.658	0.511	0.827	0.791	0.877
Puttlam	0.849	0.602	0.527	0.950	0.783	0.596	0.889	0.780	0.913
Ratnapura	0.645	0.589	0.636	0.842	0.850	0.761	0.764	0.697	0.851
All CRBs	**0.660**	**0.597**	**0.532**	**0.802**	**0.774**	**0.637**	**0.824**	**0.783**	**0.861**

TE (I) = Technical efficiency in intermediation. PTE (I) = Pure technical efficiency in intermediation. SE (I) = Scale efficiency in intermediation.



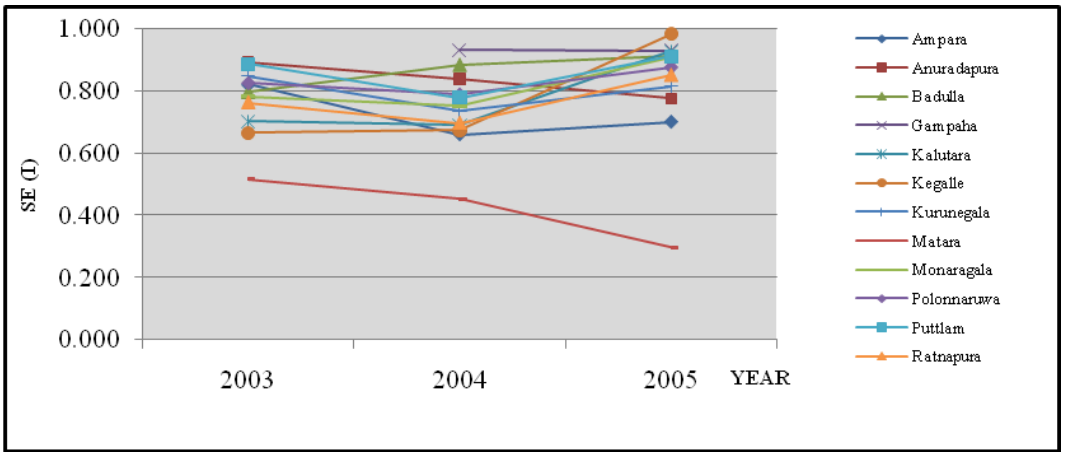
TE (I) = Technical efficiency in intermediation.

Figure 6.5: Technical efficiency in intermediation by district and year



PTE (I) = Pure technical efficiency in intermediation.

Figure 6.6: Pure technical efficiency in intermediation by district and year



SE (I) = Scale efficiency in intermediation.

Figure 6.7: Scale efficiency in intermediation by district and year

During the period of analysis, all districts except for Ratnapura and Ampara districts show a downward trend in TE (I). PTE (I) scores also reveal a downward trend in all districts except for a slight upward movement for Badulla district. However, SE (I) scores show a downward trend for some districts in 2004, with slight upward movement in most districts in 2005. Taken together, these results suggest that there is a downward trend in TE(I) and PTE(I) in all districts over the study period (Table 6.9 and Figures 6.5, 6.6 and 6.7).

6.3.6 Efficiency in asset transformation

In addition to evaluating efficiency in intermediation, this study evaluates efficiency in the asset transformation process. Asset transformation requires the maximisation of the usage of assets turning idle assets into working capital for income generation purposes. CRBs maximising the usage of assets perform better than those that don't. The evaluation of efficiency in asset transformation of CRBs based on estimated efficiency scores from model two are presented in this section.

TE (A) represents technical efficiency in asset transformation from the CCR model (CRS specification). PTE (A) represents pure-technical efficiency in asset transformation from the BCC model (VRS specification). SE (A) represents scale efficiency in asset transformation from the VRS model. Appendix Nine presents the estimated efficiency scores in asset transformation. The estimated efficiency scores for each DMU and the estimated mean efficiency scores in the three year window for each DMU are shown. Table 6.10 presents a summary of estimated efficiency results in asset transformation model.

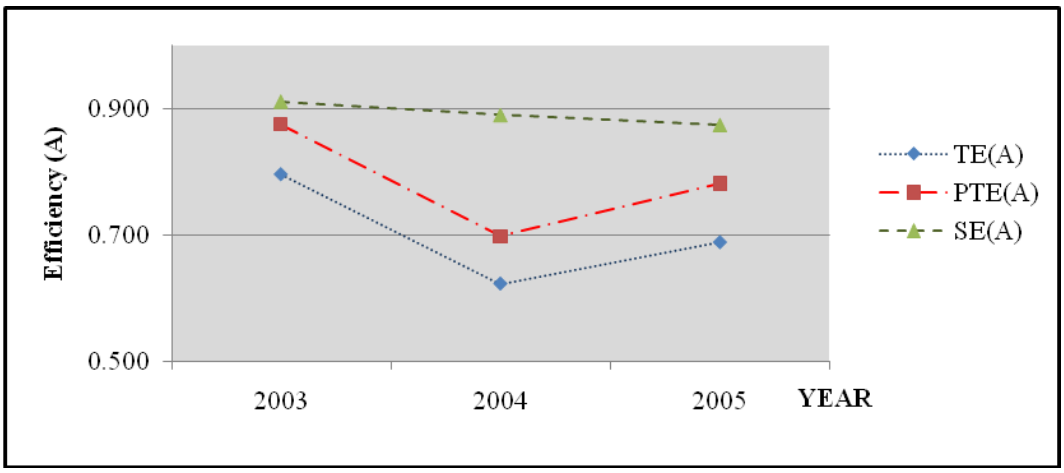
According to TE (A) scores in Table 6.10, 22 CRBs (27%) in 2003, 17 (20%) in 2004 and 18 (18%) in 2005 were efficient. A similar trend exists for PTE (A) scores; 40 (48%) CRBs were efficient in 2003, 25 (25%) in 2004, and 31 (31%) were efficient in 2005. SE (A) scores, too, show a very similar trend for CRBs during this period.

Table 6.10: Summary of efficiency results in asset transformation

Description	2003			2004			2005		
	TE(A)	PTE(A)	SE(A)	TE(A)	PTE(A)	SE(A)	TE(A)	PTE(A)	SE(A)
No.of evaluated DMUs	83	83	83	102	102	102	100	100	100
No. of efficient DMUs	22	40	23	17	25	19	18	31	21
No. of inefficient DMUs	61	43	60	85	77	83	82	69	79
Mean score	.796	.875	.911	.622	.698	.890	.688	.781	.874
Standard deviation	.220	.163	.151	.249	.239	.153	.249	.208	.185
Maximum score	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Minimum score	.067	.486	.067	.089	.222	.089	.084	.265	.084

TE (A) = Technical efficiency in asset transformation. PTE (A) = Pure technical efficiency in assets transformation. SE (A) = Scale efficiency in assets transformation.

Further, Table 6.10 presents the means of TE (A), PTE (A) and SE (A) estimated by DEA, while Figure 6.8 presents mean efficiency scores in asset transformation during the period from 2003 to 2005.



TE (A) = Technical efficiency in asset transformation. PTE (A) = Pure technical efficiency in assets transformation. SE (A) = Scale efficiency in assets transformation. Efficiency (A) = Efficiency in asset transformation.

Figure 6.8: Mean efficiency in asset transformation, 2003-2005

Figure 6.8 shows a downward trend in average TE (A) from 2003 to 2004 (79.6% in 2003 and 62.2% in 2004) and a little recovery to 68.8% in 2005. A similar trend exists for PTE (A); 87.5% in 2003, 69.8% in 2004 and 78.1% in 2005. SE (A) declines from 91.1% in 2003 to 89.0% in 2004, and to 87.4% in 2005. Generally, estimated average efficiency scores for all CRBs show a decrasing

trend throughout the study period. These results suggest that with respect to efficiency in asset transformation, CRBs do not maximise the usage of their assets and their performance in this area is deteriorating.

6.3.7 Returns to scale in efficiency in asset transformation

The RTS in efficiency in asset transformation for each year indicate that the majority of efficient CRBs experience constant returns to scale (CRS), the most productive scale (Table 6.11). In terms of asset transformation, some CRBs experience CRS even though they are not technically efficient. A large number of inefficient CRBs have increasing returns to scale (IRS) during the period of study.

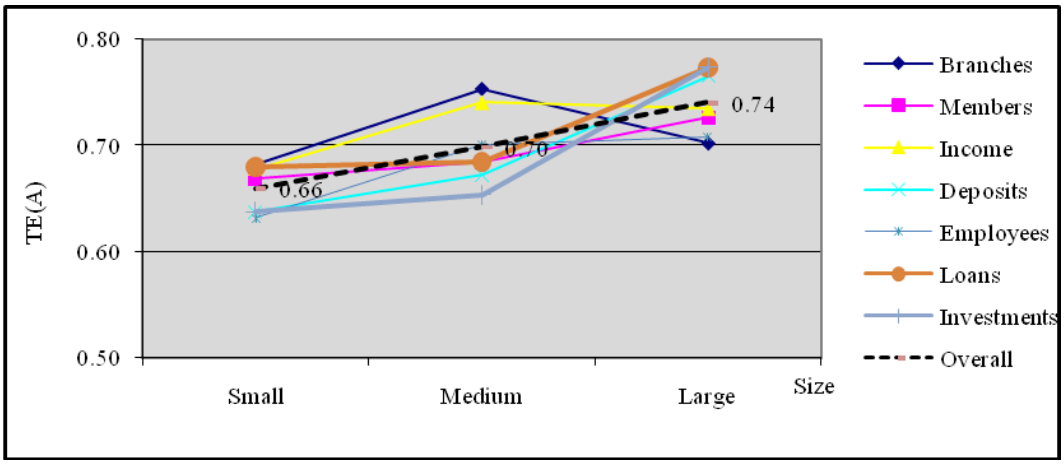
Table 6.11: Returns to scale in efficiency in asset transformation

Year	IRS		CRS		DRS		Total CRBs
	Efficient	Projected	Efficient	Projected	Efficient	Projected	
2003	8	22	22	4	10	17	83
2004	4	41	17	17	4	19	102
2005	11	58	18	5	2	6	100
Total	23	121	57	26	16	42	285

IRS = Increasing returns to scale. CRS = Constant returns to scale. DRS = Decreasing returns to scale. DMUs = Decision making units

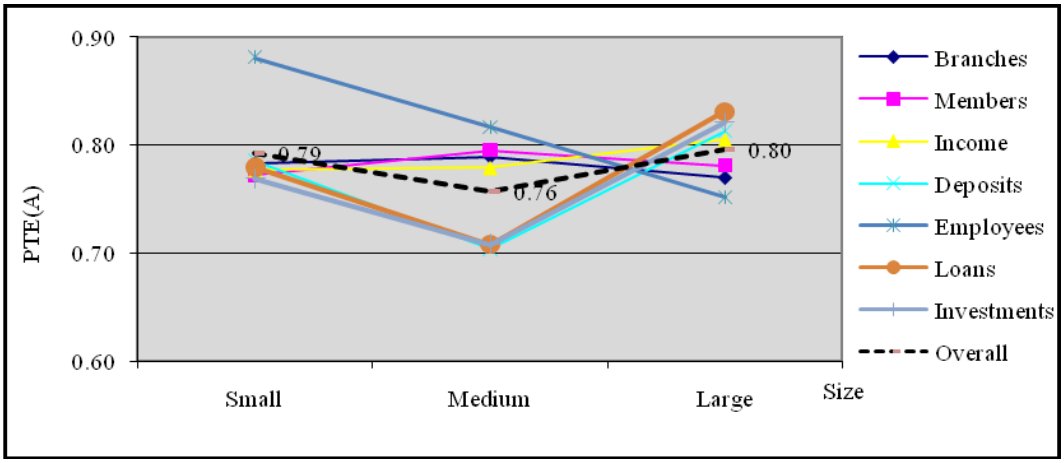
6.3.8 Efficiency in asset transformation by CRB size

Efficiency scores in the asset transformation model also are calculated for the CRBs' size categories. The mean DEA scores for 2003, 2004 and 2005 for each CRB are considered for this analysis. Figures 6.9, 6.10 and 6.11 present efficiency in asset transformation of CRBs by size in terms of all metrics.



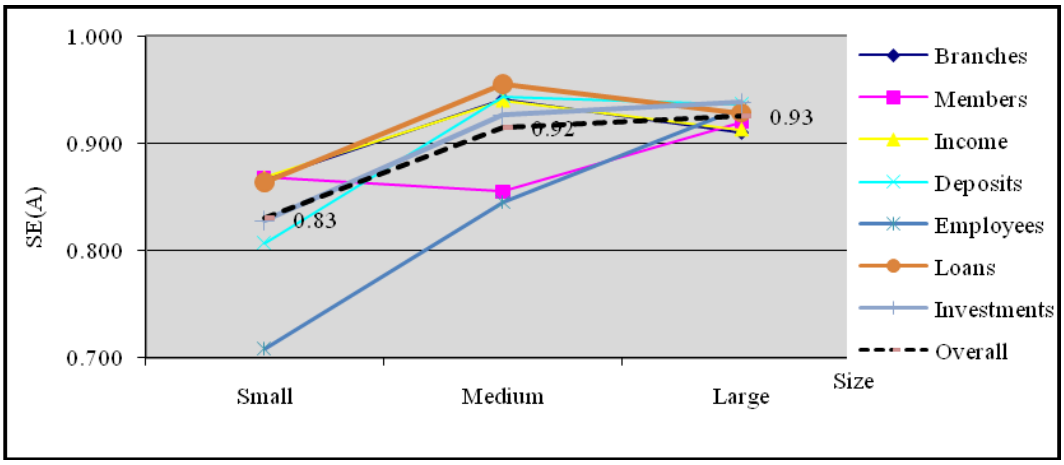
TE (A) = Technical efficiency in asset transformation.

Figure 6.9: Technical efficiency in asset transformation and CRB size



PTE (A) = Pure technical efficiency in assets transformation.

Figure 6.10: Pure technical efficiency in asset transformation and CRB size



SE (A) = Scale efficiency in assets transformation.

Figure 6.11: Scale efficiency in asset transformation and CRB size

TE (A) mean efficiency score of small CRBs in all metrics was 66%, the PTE (A) score was 79% and the SE (A) score was 83% during the period 2003 to 2005. Medium scale CRBs reported scores of: TE (A) 70%, PTE (A) 76% and SE (A) 92%. Large scale CRBs reported scores of: TE (A) 74%, PTE (A) 80% and SE (A) 93%. The estimated overall means of TE (A), PTE (A) and SE(A) scores were higher for larger CRBs compared to small and medium size CRBs (Figures 6.9, 6.10 and 6.11). Table 6.12 presents the mean efficiency and Kruskal-Wallis statistics in asset transformation by CRBs size.

Table 6.12: Mean efficiency and Kruskal-Wallis test scores in asset transformation by CRB size[51]

Category	Size metric	TE (A)	PTE (A)	SE (A)
Small	Branches	0.682	0.783	0.866
	Employees	0.632	0.881	0.709
	Loans	0.679	0.780	0.863
Medium	Branches	0753	0.789	0.941
	Employees	0701	0.818	0.845
	Loans	0.684	0.708	0.955
Large	Branches	0702	0.770	0.910
	Employees	0708	0.752	0.933
	Loans	0.773	0.831	0.928
Test	Branches			
Kruskal-Wallis Chi-Square		1.081	0.147	2.593
p -value		0.582	0.929	0.273
Test	Employees			
Kruskal-Wallis Chi-Square		1.633	7.305	20.695
p -value		0.442	0.026	0.000
Test	Loans			
Kruskal-Wallis Chi-Square		4.839	5.915	9.408
p -value		0.089	0.052	0.009

However, the Kruskal-Wallis statistics in Table 6.12 show ($p > 0.05$) there are no substantial differences in TE (I) and PTE (I) for CRB size (except size metric in

[51] Mean efficiency and Kruskal-Wallis statistics are reported using only three metrics, number of branches, number of employees and loans. With the exception of the 'investments' measure of size, results for other size metrics (income, deposit and members) are broadly consistent with those reported here for efficiency in asset transformation. Appendix xiii presents the Kruskal-Wallis statistics for all metrics.

numbers of employees). However, there is a substantial difference in SE (A) with changes of number of employees and loans. Although gaps in efficiency were identified between large scale CRBs and small and medium CRBs for efficiency in intermediation (Section 6.3.4), the evidence for asset transformation is less clear.

6.3.9 Efficiency in asset transformation by district

Table 6.13 presents the mean efficiency scores and the Kruskal-Wallis test scores in asset transformation by district.

Table 6.13: Mean efficiency and Kruskal-Wallis test scores for asset transformation by district

District	No. of CRBs	TE (A)	PTE (A)	SE (A)
Ampara	4	0.734	0.992	***0.743***
Anuradapura	10	0.707	0.892	0.782
Badulla	5	***0.425***	***0.518***	0.829
Gampaha	17	0.829	0.856	0.961
Kalutara	8	0.788	0.811	0.951
Kegalle	4	0.706	0.726	0.963
Kurunegala	22	0.603	0.711	0.849
Matara	1	***0.978***	***1.000***	***0.978***
Monaragala	5	0.678	0.758	0.906
Polonnaruwa	9	0.731	0.799	0.904
Puttlam	12	0.665	0.792	0.847
Ratnapura	11	0.698	0.727	0.953
All CRBs	**108**	**0.697**	**0.782**	**0.888**
Test				
Kruskal-Wallis Chi-Square		27.149	27.841	28.065
ρ - value		0.004	0.003	0.003

TE (A) = Technical efficiency in asset transformation. PTE (A) = Pure technical efficiency in assets transformation. SE (A) = Scale efficiency in assets transformation.

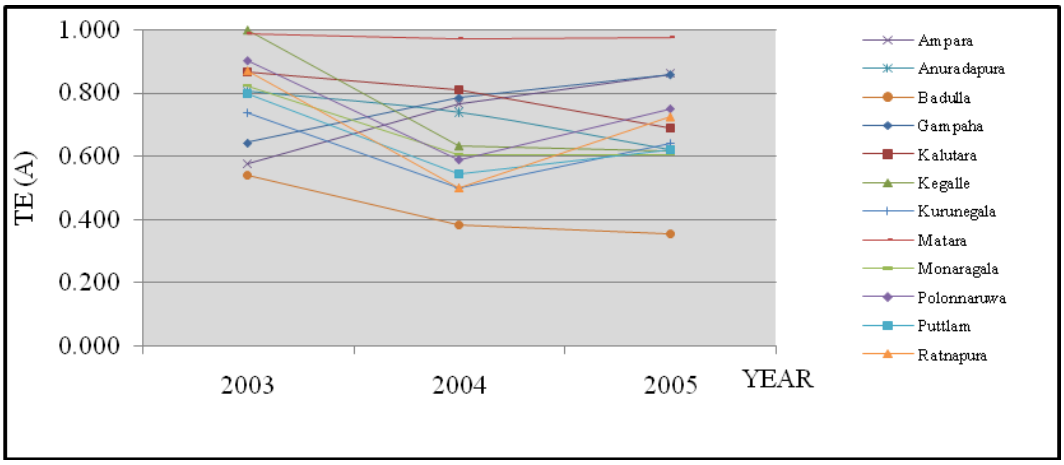
The Kruskal-Wallis scores reported in Table 6.13 indicate that there are significant differences among *($p<0$ .05)* TE (A), PTE (A) and SE (A), in respect

of efficiency in intermediation for different geographical locations.The Matara and Gampaha districts record estimated TE (A) scores of 97.8% and 82.9% respectively (Table 6.11). In addition, Ampara, Anuradarura, Kalutara, Kegalle and Polonnaruwa record high efficiency scores (over 70%). This indicates that CRBs in these districts operate above the mean of all other CRBs in other districts. According to PTE (A) scores, Matara district recorded 100%, Ampara 99.2%, Anuradapura 89.2%, Gampaha 85.6%, Kalutara 81.1% Poloannaruwa 79.9%, and Puttalam 79.2%. These districts efficiency scores were greater than the mean for all CRBs of 78.2%. SE (I) scores were greater than 74.0% in all districts. Again, disparate operational environments also may have affected these efficiency differences. However, given the association of size and location, a definitive rationale cannot be provided by this analysis. The estimated mean scores in asset transformation are further analysed to discover the trend in efficiency during the study period. Table 6.14 presents the efficiency scores in asset transformation by district and by year (Figure 6.12, 6.13 and 6.14).

Table 6.14: Mean efficiency for asset transformation by district and year

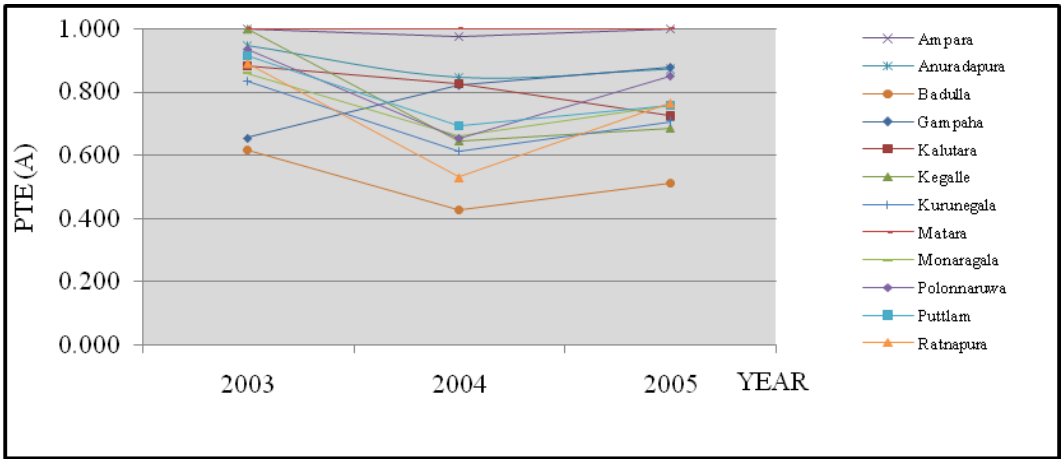
District	TE (A)			PTE (A)			SE (A)		
	2003	2004	2005	2003	2004	2005	2003	2004	2005
Ampara	0.578	0.766	0.860	***1.000***	0.975	***1.000***	***0.578***	***0.790***	0.860
Anuradapura	0.806	0.739	0.619	0.948	0.846	0.873	0.835	0.854	***0.705***
Badulla	***0.539***	***0.382***	***0.353***	***0.616***	***0.426***	***0.512***	0.877	0.903	0.706
Gampaha	0.643	0.785	0.858	0.655	0.821	0.878	0.981	0.942	***0.971***
Kalutara	0.864	0.809	0.691	0.881	0.826	0.727	0.977	0.971	0.905
Kegalle	***1.000***	0.634	0.618	***1.000***	0.646	0.686	***1.000***	***0.973***	0.901
Kurunegala	0.738	0.499	0.638	0.833	0.613	0.707	0.893	0.836	0.894
Matara	0.986	***0.972***	***0.974***	***1.000***	***1.000***	***1.000***	0.986	0.972	0.974
Monaragala	0.823	0.605	0.607	0.858	0.659	0.758	0.962	0.929	0.828
Polonnaruwa	0.902	0.590	0.750	0.933	0.653	0.849	0.963	0.893	0.877
Puttlam	0.797	0.543	0.620	0.915	0.692	0.757	0.876	0.802	0.845
Ratnapura	0.870	0.499	0.724	0.888	0.530	0.764	0.978	0.937	0.943
All CRBs	**0.796**	**0.622**	**0.688**	**0.875**	**0.698**	**0.781**	**0.911**	**0.890**	**0.874**

TE (A) = Technical efficiency in asset transformation. PTE (A) = Pure technical efficiency in assets transformation. SE (A) = Scale efficiency in assets transformation.



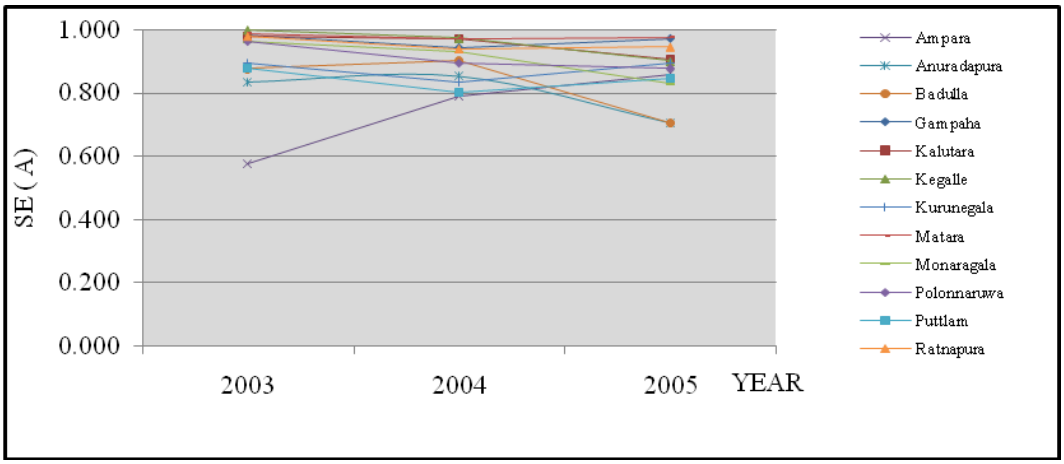
TE (A) = Technical efficiency in asset transformation.

Figure 6.12: Technical efficiency in asset transformation by district and year



PTE (A) = Pure technical efficiency in assets transformation.

Figure 6.13: Pure technical efficiency in asset transformation by district and year



SE (A) = Scale efficiency in assets transformation.

Figure 6.14: Scale efficiency in asset transformation by district and year

As seen in Table 14 and Figures 6.12 to 6.14, the districts of Ampara, Gampaha, Kurunegala, Polonnaruwa and Ratnapura record an upward trend in TE (A). The Kegale district records a TE (I) score of 1.00 over the study period. In regard to PTE (A) scores, all districts except Kalutara, record an upward trend. However, SE (A) scores do not appear to have changed over the study period.

6.3.10 Synthesis of the efficiency analysis

Only eight (10% of the sample) CRBs with TE (I) scores of 1.00 could be classified as very strong in terms of the intermediation process whereas twenty-two (27% of the sample) CRBs with TE (A) scores of 1.00 were operating at the optimal scale of asset transformation in 2003. The mean of estimated efficiency scores in both models show that most of the CRBs over the study period did not use their inputs efficiently. Mean scores for efficiency in intermediation and efficiency in assets transformation over the study period show a continuous decline. This indicates that the majority of CRBs have become less efficient over the study period. Recorded efficiency scores for both models are well below 100% (TE (I) of 53.2% and TE (A) of 68.8% in 2005), indicating that the majority of the CRBs in the sample did not maintain a high level of intermediation and asset transformation during the study period. These results indicate that CRBs can save more than 30% of their inputs while maintaining the same levels of outputs.

As stated in Chapter Two, new financial institutions entered the rural finance market in Sri Lanka and other commercial banks diversified their activities to include microfinance services after 2000. In addition, several structural changes occurred in the financial sector along with the establishment of wider operating activities in the commercial banking sector. Many financial institutions introduced innovative service delivery mechanisms in financial services to attract customers (CBSL 2006). However, internal constraints such as lack of awareness of best practices in microfinance, weak institutional capacity and a negative perception of the commercialisation decision hamper diversification of activities of MFIs and result in decreasing membership (Charitonenko & De Silva 2002). These

circumstances appear to have adversely affected CRBs functions and their efficiency.

However, when analysing CRBs of different sizes, a different picture emerges. In terms of efficiency scores in intermediation model, larger and medium CRBs (56% of the sample, which dominates the rural financial sector in Sri Lanka) are most efficient, followed by medium then small CRBs. The higher efficiency scores for large and medium CRBs indicate that large and medium size CRBs managed their inputs and outputs efficiently. These results reveal efficiency gaps between large and small scale CRBs in Sri Lanka. However, in terms of the asset transformation model, the Kruskal-Wallis tests do not provide clear indications of differences in efficiency on asset transformation by CRB size.

In terms of efficiency in regional operations, the Kruskal-Wallis statistics indicate statistically significant differences in efficiency (TE PTE and SE) in both intermediation and asset transformation. Examination of the mean scores for different locations shows that CRBs operating in urban areas perform better than those operating in rural locations. This may be due to the governance practices existing in several district unions of CRBs. As discussed in Chapter Two, CRB district unions provide financial guidance, innovative approaches to human resources development and advice on modern technology to enhance the efficiency of their member CRBs. CRBs that operate in urban areas apply more innovative approaches to diversify their activities than CRBs operating in rural areas. In addition, all CRBs operating in different geographical locations showed a continuous decline in efficiency from 2003 to 2005.

6.3.11 Testing of hypothesis on efficiency

The objective of this section is to test hypothesis one (H_1) developed in Chapter Five (Section 5.2).

H_1 of the study is: CRBs in Sri Lanka operate efficiently in providing microcredit activities.

The analysis in this section shows only eight CRBs could be classified as very strong in terms of the intermediation process. Further, only 22 CRBs with TE (A) scores of 1.00 were operating at the optimal scale of asset transformation. The number of efficient CRBs in terms of TE in intermediation and asset transformation decreased over the study period. Overall, there is no substantive improvement in efficiency in either the intermediation or asset transformation processes. This negative trend in efficiency over the period suggests that on the whole, CRBs have become less efficient. Therefore, H_1 is rejected and it is concluded that overall, CRBs in Sri Lanka do not operate efficiently in providing microcredit activities.

6.4 Institution-specific characteristics and efficiency

The second research question asks if efficiency is related to the institution-specific characteristics of size and location. Results from testing H_{2a} and H_{2b} (Section 5.3) are discussed in this section.

H_{2a} of the study is:

CRB size and efficiency are positively related.

As described in section 5.7.1 (Table 5.3), the number of branches, the number of members, average income, average deposits, the number of employees, average loans, and average investments are the size metrics of CRBs in this analysis. Spearman correlation coefficients are calculated to test for associations of size and efficiency (Table 6.15).

Table 6.15: Spearman correlation coefficients between CRBs' size and efficiencies

Institution-specific characteristic	Hypothesised correlation to efficiency	Correlation coefficient TE (I)	Support the hypothesis	Correlation coefficient TE (A)	Support the hypothesis
Number of branches	Positive	**0.240***	Yes	0.037	No
Number of members	Positive	0.165	No	0.09	No
Income	Positive	-0.012	No	0.131	No
Deposits	Positive	**0.325****	Yes	**0.217***	Yes
Number of employees	Positive	**0.317****	Yes	0.038	No
Loans	Positive	**0.283****	Yes	0.179	No
Investments	Positive	**0.400****	Yes	**0.271****	Yes

** Correlation is significant at the 0.01 level
*Correlation is significant at the 0.05 level
TE (I) = Technical efficiency in intermediation. TE (A) = Technical efficiency in asset transformation.

With the exception of the number of members and income, the results confirm that the CRB size metrics and efficiency in intermediation [TE (I)] have significant positive correlations. This provides some support for H_{2a} which predicts CRB size variables are related to efficiency of CRBs. On balance, the evidence is consistent (section 6.3.4) with larger CRBs being more efficient with respect to TE (I).

Support for H_{2a} is weaker when efficiency is measured by the asset transformation [TE (A)] model. Here, significant positive correlations for efficiency and deposits and investments are observed. This shows that larger CRBs (in terms of deposits and investments) are more efficient in TE (A). However, TE (A) scores are uncorrelated with number of branches, number of members, income, number of employees, and loans. The results show that CRB size metrics do not affect the efficiency in asset transformation process.

H_{2b} of the study is: CRB location and efficiency are positively related.

The districts of CRBs' operations are used to identify location. The Kruskal-Wallis statistics are used to test for differences in the efficiency of CRBs operating in different geographical locations (Table 6.16).

Table 6.16: The Kruskal-Wallis statistics for CRBs' location and efficiencies

Test		Support the hypothesis	Test	Support the hypothesis
Kruskal-Wallis Chi-Square	54.29	Yes	27.14	Yes
p - value	0.000		0.004	

The Kruskal-Wallis scores *($p<0.05$)* in Table 6.16 indicate that there is a statistically significant difference in efficiency scores for both the TE (I) and TE (A) models. The results suggest that a difference in the operational environment contributes to differences in CRBs' efficiencies. Hypothesis H_{2b} is supported, although size may be a confounding variable in this analysis.

This result is consistent with those from DEA assessment (discussed in sections 6.3.4 and 6.3.8). The predicted positive relationship for size and efficiency is supported with the efficiency in intermediation measure. However, the differences are less marked with the asset transformation efficiency measure. Size is associated with efficiency in intermediation. The evidence for an association between size and efficiency in asset transformation is only provided where size is measured by deposits and investments.

6.5 Accounting practices

The accounting practices of CRBs are assessed in order to address research question three of this study (section 5.4.1); whether or not appropriate accounting practices are applied in the preparation and presentation of financial statements of CRBs in Sri Lanka and whether or not these practices have a favourable affect on their efficiency. This section analyses the accounting practices of CRBs in Sri Lanka.

In compliance with the requirement of the Department of Cooperative Development in Sri Lanka, all CRBs in the sample prepare financial statements annually. These include a balance sheet and an income statement. Moreover, fifty-eight CRBs (54% of the sample) voluntarily prepare cash flow statements in addition to other financial statements (Table 6.17).

Table 6.17: Preparation of financial statements

Financial statements	Frequency	Percentage
Balance sheet	108	100%
Income statement	108	100%
Cash flow statement	58	54%

Statutory requirements do not mandate the preparation of separate financial statements for banking activities of multipurpose cooperative societies (MPCS). Hence, most MPCSs are not encouraged to prepare separate financial statements for their respective CRBs. Forty-eight CRBs (44% of the sample) prepare separate financial statements and the rest present the accounting information for CRB activities in MPCS amalgamated financial statements. The MPCS amalgamated financial statements contain CRBs' operational activities within the operational activities of MPCSs. However, income and expenses for CRBs' activities are separately disclosed as notes to income statement. Table 6.18 presents data on the preparation of separate sets of financial statements for CRBs in Sri Lanka.

Table 6.18: Preparation of separate sets of financial statements

Description	Frequency	Percentage
Separate financial statements for CRBs	48	44%
Amalgamated financial statements	60	56%
Total	**108**	**100%**

6.5.1 Usage of accounting practices

As discussed in Chapter Four, generally accepted accounting principles and guidelines available for MFIs are the appropriate benchmarks for accounting for CRBs. Therefore, they are used as benchmarks for this study. The accounting practices listed in Table 5.4 (section 5.7.2) are identified as best practices of accounting for CRBs in Sri Lanka. The extent of usage of each accounting practice by sample CRBs is assessed by the application of the rating scheme presented in Appendix Six. Scores ranging from zero to ten for each accounting practice are given according to the recognition, adequate applications, and disclosures and periodical revision of each accounting practice in balance sheets, income statements and cash flow statements. Table 6.19 presents the descriptive statistics for the usage of accounting practices in the preparation of the sampled CRBs' financial statements.

Table 6.19: Descriptive statistics of the usage of accounting practices

Accounting practice	Mean	Median	Maximum	Minimum	Standard deviation
Revenue recognition on performing loans	5.47	6.00	9.00	1.00	3.09
Revenue recognition on non-performing loans	3.48	2.00	8.00	0	3.04
Interest expenses	6.11	6.00	10.00	2.00	3.03
Provision for loan losses	4.81	5.00	9.00	0	3.33.
Write-off of loan losses	4.20	6.00	8.00	0	3.47
Cash flow information	3.09	3.00	7.00	0	2.95

Usage of each accounting practice by CRBs in the sample ranges from 3.09 to 6.11 (based on means reported in Table 6.19). Most CRBs in the sample (median = 6) use appropriate accounting practices for revenue recognition on performing loans, interest expenses, and loan loss write-off. However, with a median of score (2.00) the majority of CRBs do not treat revenue from non-performing loans adequately.

To analyse whether there is a correlation among the usage of accounting practices in the sample, Spearman correlation coefficients are estimated (Table 6.20).

Table 6.20: Correlation coefficients among the usage of accounting practices

Accounting practices	Number	Revenue recognition on performing loan	Revenue recognition on non-performing loan	Interest expenses	Provision for loan losses	Write-off of loan losses
Revenue recognition on non-performing loans	108	0.77**				
Interest expenses	108	0.76**	0.91**			
Provision for Loan Losses	108	0.76**	0.87**	0.93**		
Write-off loan losses	108	0.79**	0.91**	0.92**	0.95**	
Cash flow information	108	0.79**	0.90**	0.92**	0.94**	0.99**

**Correlation is significant at the 0.01 level.

As can be seen (Table 6.20) coefficients, there are highly significant associations between the usage of specific accounting practices in the sample CRBs. These relatively high correlation coefficients confirm that the CRBs which have used one recommended accounting practice tend to use others in their accounting process. Therefore, Sri Lankan CRBs either apply the majority of recommended accounting practices or apply very few when preparing their financial statements. Furthermore, these high correlations justify the appropriateness of each practice in maintaining sound accounting processes of CRBs in Sri Lanka. The application of specific accounting practices are examined further in the following sub-sections.

6.5.2 Revenue recognition on performing loans

Thirty-nine CRBs in the sample (36%) did not recognise revenue on performing loans on an accrual basis as shown in Figure 6.15. Rather, interest on performing loans is recognised on a cash basis. However, a similar number of CRBs (36% of the sample) recognise performing loan interest on an accrual basis with adequate disclosure of the revenue and periodic review of the practice.

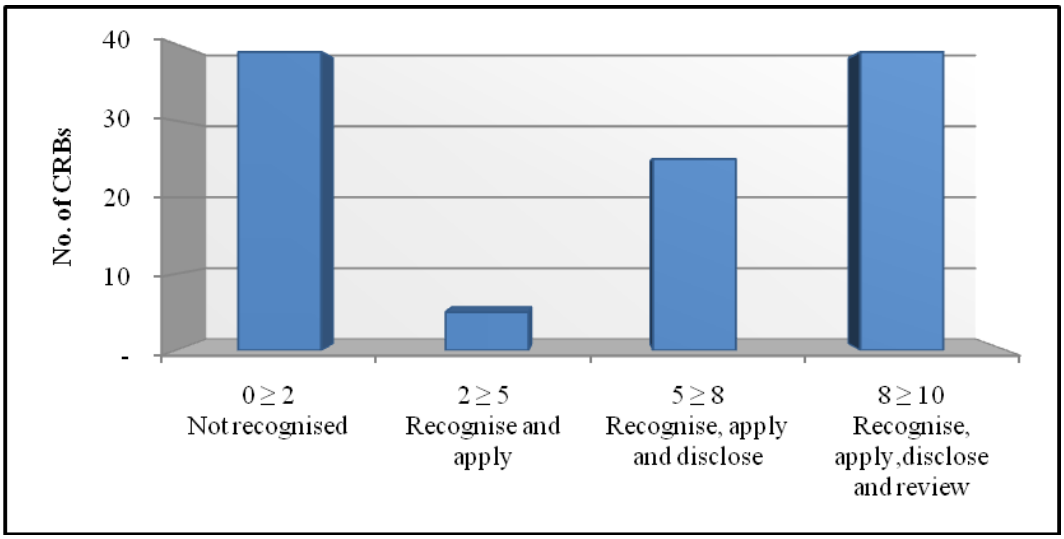


Figure 6.15: Usage of revenue recognition on performing loans

6.5.3 Revenue recognition on non-performing loans

The majority of the sample CRBs (75 CRBS or 69%) do not recognise revenue on non-performing loans. Therefore, most of the CRBs do not use accrual accounting for income on non-performing loans. Thirty-three CRBs (31%) recognise revenue on non-performing loans on a cash basis (Figure 6.16). Hence, no CRB in the sample maintains an 'interest on suspense' account.

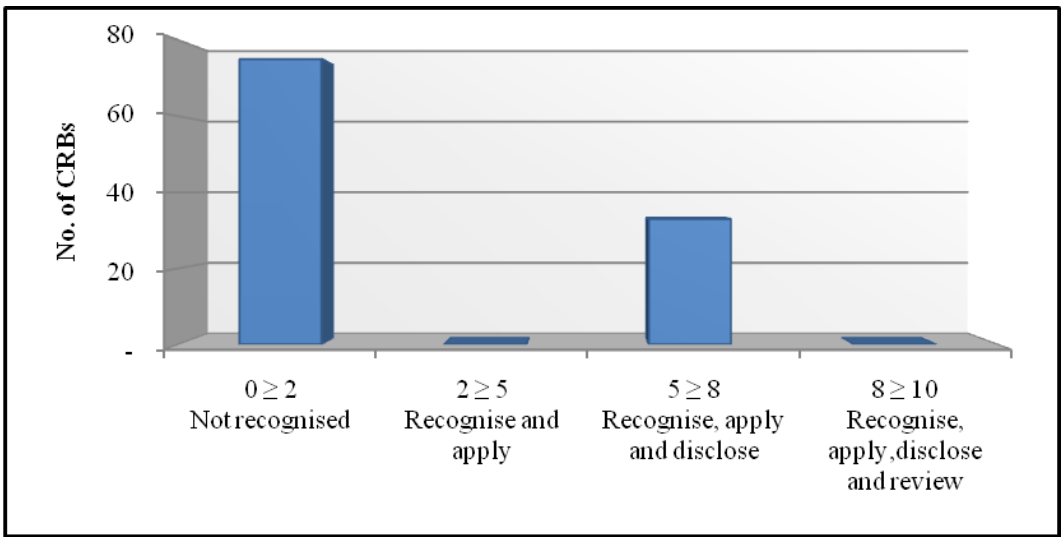


Figure 6.16: Usage of revenue recognition on non-performing loans

6.5.4 Interest expenses on loans

The majority of the sample (69%) recognises and appliy interest expenses on an accrual basis or provide other relevant disclosures in the financial statements adequately, while 26 CRBs (24%) do not. Further, 33 CRBs (31%) of the sample CRBs consistently applied this practice each year when preparing their financial statements (Figure 6.15).

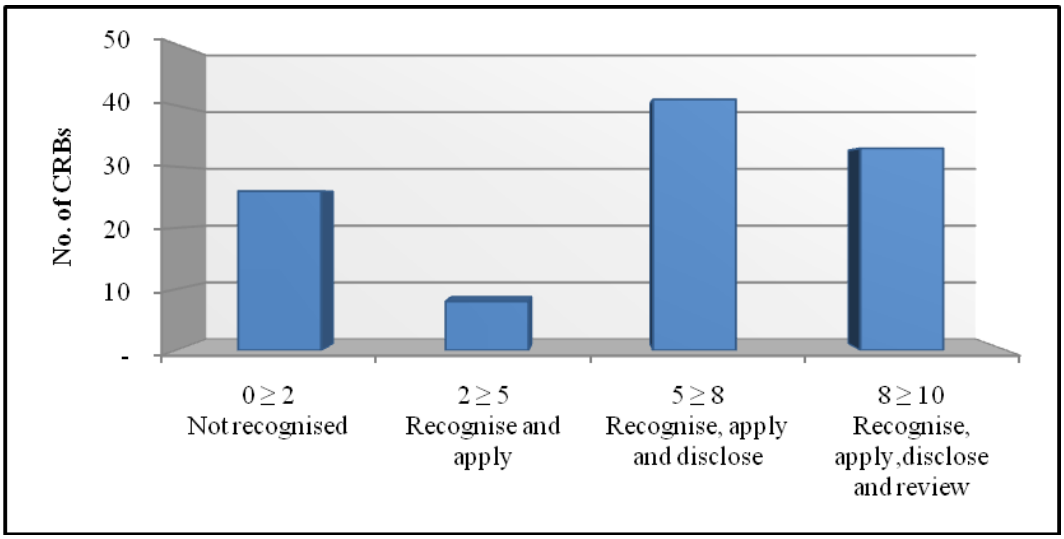


Figure 6.17: Usage of interest expenses on loans

6.5.5 Provision for loan losses

There is considerable variation across the sample with respect to the accounting practice on the provision for loan losses (Figure 6.18). Figure 6.18 shows 34 CRBs (31% of the sample) does not adopt any policy on loan loss provision. However, the same number of CRBs provides loan loss provisions and adequate accounting treatments in their financial statements. Further investigation of previous years' financial statements shows that the 34 CRBs (31%) with a policy on loan loss provisions do not consistently apply that policy.

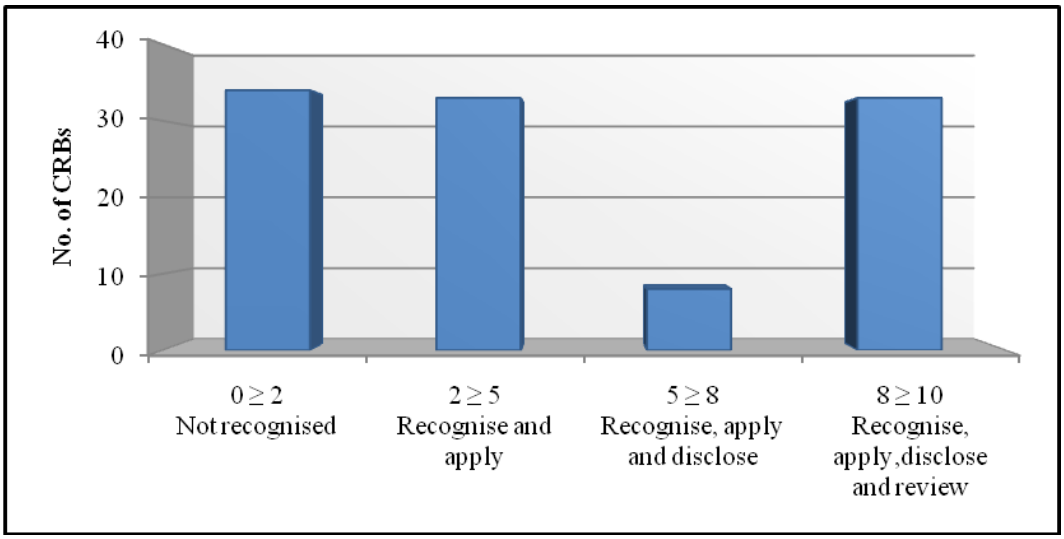


Figure 6.18: Usage of loan loss provision

6.5.6 Write-off of loan losses

Evaluation of the financial statements shows most CRBs in Sri Lanka do not have a policy on loan loss write-off. Figure 6.19 shows 42 CRBs (39%) do not write-off loan losses in their accounting processes. Even though a few CRBs in the sample consistently write-off of loan losses at a static annual percentage, none of these review the adequacy of this percentage periodically.

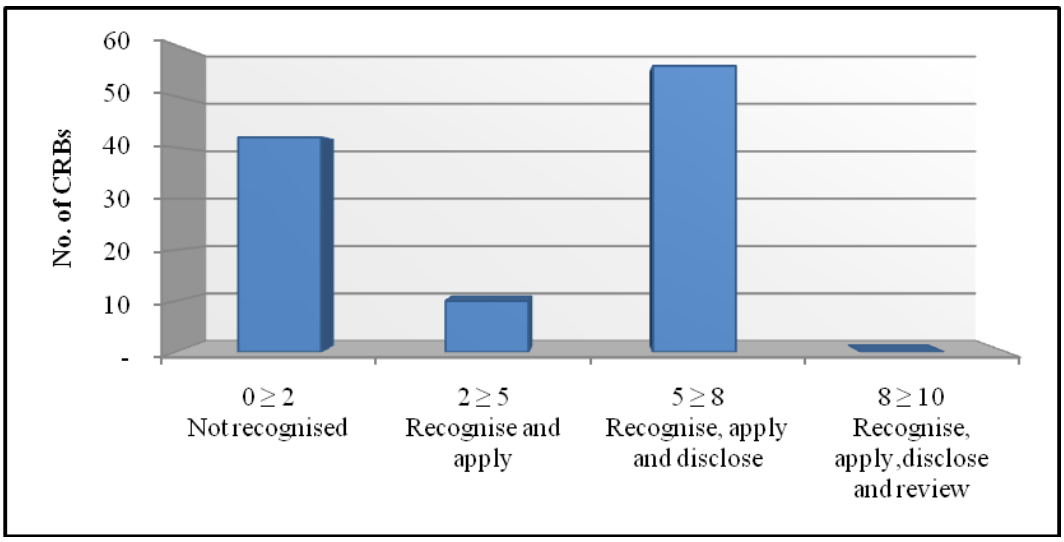


Figure 6.19: Usage of write-off of loan losses

6.5.7 Cash flow information

Figure 6.20 shows 47 CRBs (44%) do not present cash flow information with other financial statements. Even though 35 CRBs (32%) produce cash flow information, the form of presentation does not satisfy accepted guidelines. Cash flows from operating, investing, and financing activities are not separately disclosed.

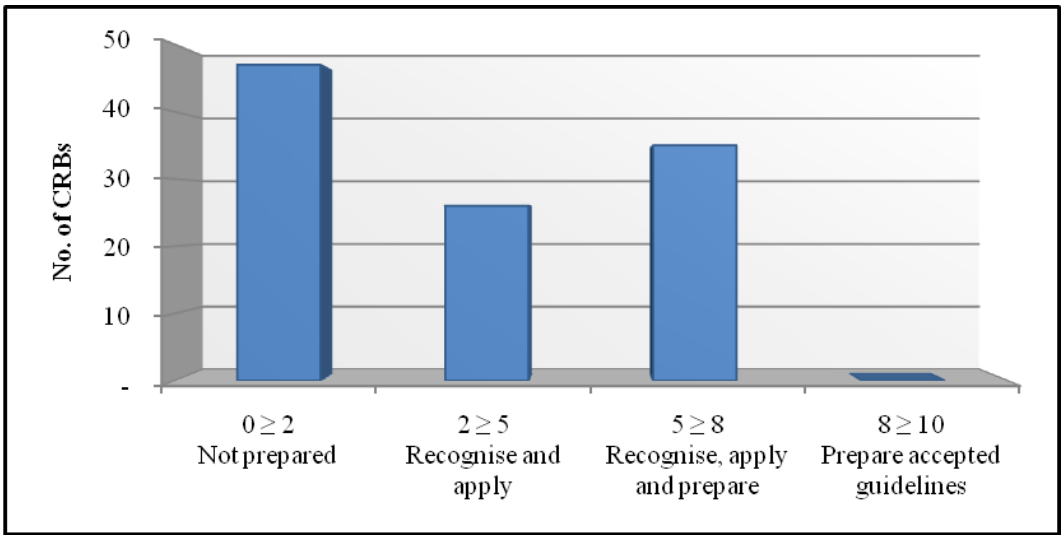


Figure 6.20: Presentation of cash flow information

6.5.8 Accounting practices and specific characteristics of CRB

A positive association between the disclosure of accounting information and specific firm characteristics is identified in the literature review in Chapter Five. Large firms generally cover large geographical areas and have many stakeholders interested in their accounting information which may drive them to follow best practices and provide more information. In particular, large financial institutions are more closely monitored by the government and donor agencies than are smaller institutions. An examination is made in this study to assess the extent of the association between the usage of specific accounting practice and the size of CRB.

Consistent with earlier analysis in this chapter, CRB size is categorised by the number of branches, the number of members, operating income, deposits, number of employees, loans, and investments. Location is determined by operating districts. Spearman correlations and Kruskal-Wallis tests scores are used to assess differences in size and location. Table 6.21 provides the Spearman correlation coefficients and Table 6.22 presents the Kruskal-Wallis statistics[52].

Table 6.21: Spearman correlation coefficients for accounting practices with specific characteristics

Specific characteristics		Revenue recognition on performing loans	Revenue recognition for non-performing loans	Interest expenses	Provision for Loan Losses	Write-off loan losses	Cash flow information
Number of branches		0.309**	0.373**	0.313**	0.370**	0.367**	0.392**
	n	108	108	108	108	108	108
Number of members		0.492**	0.522**	0.453**	0.445**	0.475**	0.502**
	n	108	108	108	108	108	108
Income		0.378**	0.444**	0.398**	0.357**	0.401**	0.386**
	n	108	108	108	108	108	108
Deposit		0.332**	0.406**	0.374**	0.410**	0.438**	0.456**
	n	105	105	105	105	105	105
Number of employees		0.358**	0.344**	0.325**	0.405**	0.403**	0.439**
	n	108	108	108	108	108	108
Loans		0.392**	0.436**	0.387**	0.368**	0.413**	0.421**
	n	102	102	102	102	102	102
Investments		0.287**	0.314**	0.287**	0.357**	0.381**	0.408**
	n	104	104	104	104	104	104

**Correlation is significant at the 0.01 level
n = number

Table 6.21, shows highly significant positive correlations ($\rho=0.01$) between incidence of the application of accounting practices and size. The significant positive correlations of accounting practices with all size metrics shows that larger

[52] Kruskal-Wallis statics are calculated on only three metrics, number of branches, number of employees and loans to analyse size differences.

CRBs apply a larger number of recommended accounting practices than smaller CRBs.

The Kruskal-Wallis statistics *($p<0.05$)* (Table 6.22) indicate that there is a statistically significant difference in usage of each accounting practice for the three size metrics and for location. These findings confirmed that the extent of usage of accounting practices is significantly associated with the specific characteristics of the sampled CRBs. Further, the highly significant Kruskal-Wallis statistics (Table 6.22) demonstrate that the usage of accounting practices varies with operating location of the CRB.

Table 6.22: Kruskal-Wallis statistics for usage of accounting practices by CRB size and location

Category	Size metric	Revenue recognition on performing loans	Revenue recognition for non-performing loans	Interest expenses	Provision for Loan Losses	Write-off loan losses	Cash flow information
Test	Branches						
Kruskal-Wallis Chi-Square		11.031	15.292	10.953	15.256	15.514	17.182
p -value		0.004	0.000	0.004	0.000	0.000	0.000
Test	Employees						
Kruskal-Wallis Chi-Square		14.129	12.716	11.601	18.392	17.647	20.939
P -value		0.001	0.002	0.003	0.000	0.000	0.000
Test	Loans						
Kruskal-Wallis Chi-Square		15.532	19.356	15.119	13.669	17.278	17.929
p -value		0.000	0.000	0.001	0.001	0.000	0.000
Test	Location						
Kruskal-Wallis Chi-Square		84.84	70.04	71.72	66.26	69.77	74.44
p -value		0.000	0.000	0.000	0.000	0.000	0.000

6.5.9 Synthesis of accounting practices

In summary, analyses of data collected for this research show that while all CRBs in Sri Lanka prepare financial statements annually, the majority do not fully apply

sound accounting practices in their accounting processes. The most frequently neglected accounting practices relate to the revenue recognition on performing and non- performing loans, provision for loan losses, and the write-off of loans. As a result, the information in the financial statements of Sri Lankan CRBs is unlikely to be adequate for decision-making purposes. These results are very similar to those of Cayanan's (2007) study of Philippines' banks.

Sri Lankan CRBs appear to prepare financial statements simply to fulfil the requirements rather than with a view to satisfying stakeholders' needs for decision-making purposes. Failure to apply generally accepted accounting practices indicates that corporate governance mechanisms of CRBs should be strengthened. As previously discussed, the provision of accounting information is vital to the governance mechanism in financial institutions. Interestingly, some CRBs in the sample apply adequate accounting practices in their accounting processes. Thus the next section tests for an association between the usage of sound accounting practices and the efficiency of CRBs.

6.5.10 Accounting practices and efficiency

The objective of this section is to test hypothesis three (H_3) developed in Chapter Five (Section 5.4.1).

H_3 of the study is;

CRBs that maintain appropriate accounting practices will have higher levels of efficiency.

To test the association of usage of accounting practices and efficiency, Spearman correlation coefficiencts are calculated for both technical efficiency in intermediation [TE(I)] and technical efficiency in assets transformation [TE(A)]. (Table 6.23).

Highly significant correlations between TE (I) and sound accounting practices in CRBs in Sri Lanka are observed. Further, the correlations are in the predicted direction (positive). These results indicate that CRBs which maintain sound accounting practices provide better information to stakeholders and maintain higher efficiency than those that do not produce such information. This supports H_3, that CRBs which maintain appropriate accounting practices have higher levels of efficiency. However, when efficiency is measured as asset transformation [TE (A)], H_3 is not supported. Thus accounting practices are not associated with efficiency in asset transformation.

Table 6.23: Spearman correlation coefficients for accounting practices and efficiency

Accounting practice	Hypothesised correlation to efficiency	Correlation coefficient	Support the hypothesis	Correlation coefficient	Support the hypothesis
		TE (I)		TE(A)	
Revenue recognition on performing loans	Positive	**0.436****	Yes	-0.033	No
Revenue recognition for non-performing loans	Positive	**0.301****	Yes	-0.007	No
Interest expenses	Positive	**0.312****	Yes	0.01	No
Provision for loan losses	Positive	**0.317****	Yes	0.012	No
Write-off loan losses	Positive	**0.349****	Yes	0.034	No
Cash flow information	Positive	**0.359****	Yes	0.014	No

** Correlation is significant at the 0.01 level
TE (I) = Technical efficiency in intermediation. TE (A) = Technical efficiency in asset transformation.

6.6 Financial practices

As discussed in Chapter Four, maintaining sound financial practices is expected to influence the efficiency of financial institutions. Therefore, the financial practices of CRBs are assessed to address research question four (section 5.4.2); Do CRBs apply sound financial practices in their operations and does a higher level of

financial strength have a favourable effect on the efficiency of CRBs in Sri Lanka?

As discussed in section 5.7.2, capital adequacy, liquidity, asset quality, loan to deposit ratio, profitability, loan portfolio yield, operational efficiency, and operational self-sufficiency are considered as variables determining sound financial practices in financial institutions. These ratios provide an overview of an institution's financial strength. Many of these ratios have accepted benchmarks. These benchmarks are identified in the following sections, where relevant, and are compared to the ratios for sampled CRBs. The sampled firms' ratios are calculated as the average of annual figures from financial statements for the three years 2003, 2004 and 2005. Appendix X presents the financial practices of each CRB in the sample.

Table 6.24: Descriptive statistics for financial practices of CRBs

Financial practices	Number	Minimum	Maximum	Mean	Median	Standard Deviation	Kolmogorov-Smirnov test	
							Z value	*p*-value
Capital adequacy on assets	48	-11.27%	36.04%	12.23%	10.15%	11.82%	7.53	0.622
Capital adequacy on deposits	48	-16.55%	64.50%	19.27%	12.42%	20.32%	1.10	0.177
Liquidity of assets	96	-3.52%	13.35%	3.01%	2.34%	2.92%	1.72	0.005
Assets quality	78	0.00%	98.21%	26.19%	18.53%	25.36%	1.33	0.056
Loan to deposit	102	4.11%	131.32%	47.21%	39.77%	28.15%	1.33	0.058
Return on assets	104	-2.90%	9.57%	1.77%	1.68%	1.91%	1.97	0.001
Loan portfolio yield	102	0.67%	36.85%	13.26%	12.94%	8.01%	1.12	0.159
Operational efficiency on loans	102	0.63%	31.05%	11.94%	11.48%	7.16%	0.731	0.659
Operational efficiency on deposits	105	0.78%	25.11%	8.02%	7.62%	4.57%	.811	0.527
Operational self-sufficiency	108	63.50%	245.52%	129.07%	123.78%	30.05%	1.38	0.043

Significant = $p>0.05$

Descriptive statistics (Table 6.24) show substantial variations in most of the variables with relatively high standard deviations. Some CRBs in the sample neglect to maintain adequate capital adequacy on assets (minimum -11.27%), capital adequacy on deposits (minimum -16.55%), liquidity of assets (minimum -

3.52%), and return on assets (minimum -2.90%). The Kolmogorov-Smirnov statistics (Table 6.24) show the liquidity of assets, return on assets, and operational self-sufficiency variables make significant *(p>0.05)* departures from the normal distribution. The empirical findings of these financial practices are discussed in the following sub-sections.

6.6.1 Capital adequacy

As stated in section 5.7.3, this study determines capital adequacy in two ways; equity capital to total assets and equity capital to deposits. As previously discussed only 48 CRBs of the 108 sampled MPCS provide separate financial statements for CRB activities. While the income and expenses for CRBs are disclosed in notes to MPCS amalgamated accounts, the data necessary to calculate all financial practices' ratios are not separately disclosed. Therefore, the capital adequacy ratios are calculated for the 48 CRBs which prepare separate financial statements. Table 6.24 shows that the capital adequacy on assets ranges from -11.27% to 36.04%. The average capital adequacy on assets of the sample is 12.3% and median is 10.15%. Capital adequacy on deposits ranges from (negative) -16.55% to 64.50%. The average capital adequacy on deposits is 19.27% and median 12.42%. The wide ranges and substantial differences between means and medians indicate substantial variation in the sampled CRBs as indicated by standard deviations.

Van Greuning, Gallardo and Randhawa (1998) suggest that a minimum capital ratio of 4% of assets and 3.5% of total liabilities is adequate for credit cooperative financial institutions. Thirty-four CRBs (71%) maintain this benchmark minimum capital ratio for assets and thirty-eight CRBs (77%) maintain the benchmark minimum capital ratio for deposits. Further, prudential standards (Basel Committee on Banking Supervision 1999) specify the capital adequacy ratio for financial institutions be at least 8% of total assets. Based on the data, 29 of 48 CRBs (60%) achieve this benchmark for capital adequacy. Overall, these results show that the majority of CRBs in Sri Lanka maintain adequate capital ratios.

6.6.2 Liquidity

As discussed in Chapter Five, liquidity refers to a bank's capacity to cover expenses and any outlays or net withdrawals expected to occur in the near future (Jansson & Taborga 2000). Liquidity is measured by the ratio of cash on hand plus bank balances to deposits. The liquidity ratio ranges from -3.52% to 13.35%. The average and the median of the ratio of liquid assets to deposits are 3.01% is 2.34% respectively (Table 6.24).The benchmark for liquidity ratio as a percentage of deposits for member-based small financial institutions is 10% to 15% (Van Greuning, Gallardo & Randhawa 1999). Only five sampled CRBs (5%) maintain the benchmark range. These figures indicate that the liquidity position of CRBs in Sri Lanka is precarious with the majority of CRBs having below the standard range of 10% to 15% (Van Greuning, Gallardo & Randhawa 1998) .

6.6.3 Asset quality

As discussed in Chapter Four, maintaining the quality of assets is another key financial practice in financial institutions. As shown in Table 5.5, the quality of assets is determined by the ratio of non-performing loans to the total loan balance. Data for non-performing loans are available in the financial statements for 78 CRBs. Table 6.24 shows that the ratio of non-performing loans to total loans ranges from 0.00% to 98.21%. Further, the average ratio is 26.19% and the median is 18.53%.

The accepted benchmark for the non-performing loan ratio is below five percent for small financial institutions (Van Greuning, Gallardo & Randhawa 1998; Almario, Jimenez & Roman 2006) while Jansson and Taborga (2000) suggest one to three percent. The majority of CRBs (59 of 78 or 76%) do not achieve the five percent benchmark. Only 19 CRBs (24%) manage to maintain non-performing loans below five percent while 15 CRBs (19%) maintain tha same below 3%. Further, the non-performing loans ratio of 14 CRBs (18%) is more than 50%. This reveals that the majority of CRBs in Sri Lanka do not achieve an

acceptable non-performing loan ratio and their quality of assets is far below the accepted benchmark.

6.6.4 Loan to deposit

The loan to deposit ratio is determined by the ratio of loans to total deposits (Table 5.5). Table 6.24 shows that the minimum for this ratio is 4.11% while the maximum is 131.32% for sampled CRBs. The average is 47.21% while median is 39.77%. Further analysis shows 65 CRBs (64%) in the sample maintain the loan deposit ratio at less than 50.0% while 37 CRBs (36%) maintain the same between 51% and 131%.

Loans are the highest yielding asset in small financial institutions. Therefore, CRBs should maximise the usage of deposit as loans. There is no clear benchmark for this ratio. However, these data reflect that sampled CRBs have high long term liquidity position in terms of deposit to loan ratio.

6.6.5 Return on assets

The return on assets ratio is determined as net profit to assets. Loans, advances and investments are identified as CRB assets. Return on assets for sampled CRBs ranges from -2.90% to 9.57%. The average return on asset is 1.77% while the median is quite close to this at 1.68% (Table 6.24).

The accepted benchmark for return on assets is above three percent (Van Greuning, Gallardo & Randhawa 1999) for small financial institutions while Jansson and Taborga (2000) suggest a range of two to five percent. Based on the data, 56 CRBs (54%) have return on assets higher than the two percent benchmark and seven CRBs (6%) have ratios greater than five percent. Therefore, most CRBs use their assets profitably according to the Jansson and Taborga (2000) benchmark. However, 78 CRBs (75%) maintain return on assets ratio below the Van Greuning, Gallardo and Randhawa (1999) benchmark of three percent.

6.6.6 Loan portfolio yield

In this study, the loan portfolio yield is determined as income to loans and advances (see Table 5.5). The loan portfolio yield ranges from 0.67% to 36.85%. The mean loan portfolio yield is 13.26% where as its median is 12.94% (Table 6.24).

The accepted benchmark for the loan portfolio yield (Van Greuning, Gallardo & Randhawa 1999) for small financial institutions is 19% to 25%. In this Sri Lankan sample, 84 CRBs (82%) have a loan portfolio yield below 19% while only 18 CRBs (17%) maintain the accepted benchmark range. Therefore, the majority of sample CRBs perform well below the benchmark for loan portfolio yield.

6.6.7 Operational efficiency

In this study, operational efficiency is determined in two ways; first as the ratio of total expenses to loans then as total expenses to deposits. The rationale for this approach is that the majority of expenses stem from the institution's lending and deposit activities. Table 6.24 shows that the operational efficiency on loans ranges from 0.63% to 31.05%. The mean operational efficiency on loans for the sample is 11.94% while the median is 11.48%. The operational efficiency on deposits ranges from 0.78% to 25.11%. The average operational efficiency on deposits is 8.02% and the median is 7.62%.

The standard ratio for operational efficiency on loans should not exceed 20% (Jansson & Taborga 2000) for small financial institutions. The data show that 88 CRBs (86%) in the sample are operationally efficient with respect to the ratio of total expenses to loans while 14 CRBs (13%) are not. However, in relation to the expenses on deposits ratio, 63 CRBs (60%) fall below 10%. There is no identified benchmark for this ratio. It appears that CRBs have room for improvement in their control over expenses.

6.6.8 Operational self-sufficiency

If the total income to total expenses ratio (the measure of operational self-efficiency) is greater than 100%, the institution is operationally self-sufficient (McGuire 1996). Van Greuning, Gallardo and Randhawa (1999) suggest that this ratio should be at least 115% while Almario, Jimenez and Roman (2006) suggest that the ratio be greater than 120%. Table 6.24 reveals the ratio ranges from 63.5% to 245.52%. The average ratio of the sampled CRBs is 129.07% and median is 123.78%. From the data, 80 CRBs (74%) in the sample maintain operational self-sufficiency and only a few CRBs (26% of the sample) fall below the benchmark.

The analyses and discussions in the previous sub-sections show a large degree of variability in the financial stability of CRBs. Thus, members of CRBs are affected by a number of variables including CRB size.

6.6.9 Financial practices CRB size and location

The number of branches, the number of members, operating income, deposits, number of employees, loans, and investments are the size metrics. Kruskal-Wallis statistics are calculated to identify differences in financial practices attributable to CRBs' sizes. These tests are also used to identify differences in financial practices in different locations. Table 6.25 provides the Spearman correlation coefficients and Table 6.26 provides Kruskal-Wallis statistics.

Table 6.25: Spearman correlation coefficients of financial practices with CRB size

Financial practices		Number of Branches	Number of Members	Income	Deposit	Number of Employees	Loans	Investments
Capital adequacy on assets		-0.202	0.057	-0.115	-0.237	-0.181	-0.17	-0.188
	n	48	48	48	48	48	48	47
Capital adequacy on deposits		-0.193	0.017	-0.082	-0.216	-0.213	-0.127	-0.192
	n	48	48	48	48	48	48	47
Liquidity		-0.416**	-0.461**	-0.166	-0.532**	-0.450**	-0.453**	-0.527**
	n	96	96	96	96	96	94	95
Assets quality		-0.226*	-0.427**	-.0444**	-0.443**	-0.355**	-0.509**	-0.392**
	n	78	78	78	78	78	78	77
Loan to deposit		0.007	0.115	0.082	-0.138	-0.285**	0.207*	-0.229*
	n	102	102	102	102	102	102	101
Return on assets		-0.158	-0.154	0.263**	-0.079	-0.052	-0.048	-0.117
	n	104	104	104	104	104	102	103
Loan portfolio yield		-0.163	-0.066	0.320**	-0.085	-0.018	-0.166	-0.07
	n	102	102	102	102	102	102	101
Operational efficiency on loans		-0.246*	-0.200*	0.146	-0.176	-0.085	-0.286**	-0.128
	n	102	102	102	102	102	102	101
Operational efficiency on deposits		-0.461**	-0.382**	-0.078	-0.588**	-0.478**	-0.473**	-0.584**
	n	105	105	105	105	105	102	104
Operational. self sufficiency		0.086	0.078	0.202*	0.19	0.15	0.17	0.224*
	n	108	108	108	105	108	102	104

n = number
**Correlation is significant at the 0.01 level
*Correlation is significant at the 0.05 level

Asset quality has significant negative associations with all size metrics shown in Table 6.25. This relationship is confirmed by the significant Kruskal-Wallis test statistics for size and asset quality (Table 6.26). A significant correlation between size variables and asset quality ratio reveals that lager CRBs have more control over loan losses than smaller CRBs in the sample.

Liquidity and operational efficiency on deposits also have significant negative correlations with the size metrics (with the exception of the 'income' measure).

Again, this relationship is supported by significant Kruskal-Wallis statistics (Table 6.26). The relationship between size and the loan to deposit ratio and operational efficiency on loans is less clear as it depends on the specific size metric. There is no support for a relationship between size and operational self-efficiency, the loan portfolio yield, and return on assets. Results from the Kruskal-Wallis statistics are broadly supportive of this lack of relationship. Further, the capital adequacy ratios are uncorrelated with size and the Kruskal-Wallis statistics support these results showing that no differences for these ratios relationships with size.

Table 6.26: Kruskal-Wallis statistics for financial practices by CRB size

Financial practices	Branches		Employees		Loans		Location	
	Kruskal-Wallis Chi-Square	***p*-value**	**Kruskal-Wallis Chi-Square**	***p*-value**	**Kruskal-Wallis Chi-Square**	***p*-value**	**Kruskal-Wallis -Chi-Square**	***p*-value**
Capital adequacy on assets	1.929	0.381	1.569	0.456	1.1557	0.459	9.27	.320
Capital adequacy on deposits	1.760	0.415	2.190	0.335	1.077	0.524	11.53	.173
Liquidity	16.534	0.000	21.255	0.000	19.338	0.000	42.50	.000
Assets quality	6.674	0.036	10.022	0.007	20.943	0.000	31.55	.000
Loan to deposit	0.040	0.980	13.808	0.001	5.411	0.067	28.81	.002
Return on assets	2.802	0.246	4.344	0.114	2.358	0.308	29.31	.002
Loan portfolio yield	6.858	0.032	7.180	0.028	8.655	0.013	53.78	.000
Operational efficiency on loans	8.516	0.014	2.962	0.227	11.754	0.003	66.17	.000
Operational efficiency on deposits	23.403	0.000	24.669	0.000	22.601	0.000	75.65	.000
Operational. self sufficiency	.890	0.641	2.656	0.265	3.021	0.221	24.09	.012

In terms of location, the Kruskal-Wallis scores *($p<0.05$)* (Table 6.26) indicate that there is a statistically significant difference in each financial practice except capital adequacy ratio. Differences in operational environments have affected the CRBs in different geographical locations. However, capital adequacy ratios do not significantly differ across districts.

6.6.10 Synthesis of financial practices

Analyses of the financial practices of CRBs in Sri Lanka show a substantial proportion of CRBs have minimal capital on assets and capital on deposits ratios (71% and 77% respectively). However, CRBs in the sample do not maintain sufficient liquidity of assets while investing a large amount of funds in loans and advances. In relation to the asset quality of CRBs, they do not maintain adequate provision for non-performing loans as the median non-performing loans ratio of 18.53% deviate from the benchmark. Further, many CRBs (64%) do not maintain effective loan to deposit structures. They do not optimise the use of their inputs. Many CRBs, (at the median) only 39% of deposits are converted to loan and advances. The most notable finding is that CRBs manage to maintain, on average, a profitability ratio of 1.68% on their assets and many CRBs (86% of the sample) maintain healthy operational efficiency in relation to loans. Further, 80 CRBs maintain an interest income to total expenses ratio of greater than 115% indicating that these financial institutions are operationally self-sufficient.

A significant correlation between size variables and asset quality and liquidity ratio reveals that lager CRBs have more control over loan losses and short term liquid assets than smaller CRBs in the sample. Further, the Kruskal-Wallis statistics indicate that there are statistically significant differences in financial practices (except capital adequacy) in different geographical locations.

6.6.11 Financial practices and efficiency

The objective of this section is to test H_4 developed Section 5.4.2.

H_4 of the study is;

CRBs with higher financial strength will have higher levels of efficiency.

Eight predictions are formulated in this study for the correlation between the financial variables and the efficiency of CRBs. The predicted relationships for

efficiency and the financial practices (capital adequacy, liquidity, asset quality, loan to deposit structure, profitability, loan portfolio yield, operational efficiency, and operational self sufficiency) were presented in Table 5.5. Spearman correlation coefficients are presented in Table 6.27, which indicate which hypothesised relationships are supported by the analysis.

Table 6.27: Spearman correlation coefficients between financial practices and efficiency

Financial practices	Definition	Hypothesised correlation to efficiency	Correlation coefficient TE (I)	Support the hypothesis	Correlation coefficient TE (A)	Support the hypothesis
Capital adequacy	Equity to total assets	Positive	0.199	No	0.263	No
	Equity to deposits	Positive	0.265	No	**0.310***	Yes
Liquidity	Liquid assets to liabilities	Negative	-0.147	No	-0.174	No
Asset quality	Non-performing loans to total loans	Negative	**-0.347****	Yes	-0.141	No
Loan to deposit structure	Loans to deposits	Negative	0.006	No	0.108	No
Profitability	Return on total assets	Positive	0.180	No	-0.052	No
Loan portfolio yield	Interest income to loans outstanding	Negative	**-0.517****	Yes	**-0.272****	Yes
Operational efficiency	Operating cost to loans	Negative	**-0.641****	Yes	**-0.393****	Yes
	Operating cost to deposits	Negative	**-0.590****	Yes	-0.042	No
Operational self-sufficiency	Income to expenses	Positive	**0.672****	Yes	0.169	No

** Correlation is significant at the 0.01 level
* Correlation is significant at the 0.05 level
TE (I) = Technical efficiency in intermediation. TE (A) = Technical efficiency in asset transformation.

Capital adequacy (equity to assets) has the predicted positive correlation with TE (I) and TE (A) but is not significant (Table 6.27). Capital adequacy (equity to deposits) has a significant positive correlation with efficiency scores from TE (A). However, the predicted sign for the association with TE (I) on the coefficients is achieved but is not significant. These results provide some evidence that CRBs maintaining a higher level of capital (which reflects the higher financial strength)

operate at higher efficiency in asset transformation [TE (A)] than CRBs with lower capital ratios.

Higher asset liquidity was predicted to be negatively correlated with efficiency as it reduces the income generating capacity of CRBs. Table 6.27 shows a negative correlation between liquid assets and the efficiency of CRBs in both models but the associations lack significance. Therefore, these results provide no evidence of a relationship between liquidity ratio and efficiency.

As discussed in Chapter Five, prior empirical research suggests that asset quality is indicated by the level of the non-performing loans of CRBs. Therefore, a negative correlation is predicted. Table 6.27 shows that TE (I) and asset quality have a highly significant and moderately sized negative correlation of -0.347. Further, it shows that TE (A), too, has a negative correlation of -0.141 with asset quality but this is not significant. These results indicate that CRBs maintaining well-managed, non-performing loan provisions have greater financial strength and are more efficient in intermediation [TE (I)]. This supports the findings of Berger and Young (1997), Das and Ghosh (2006) that asset quality is closely related to efficiency of a financial institution.

The higher the ratio of loans to deposits, the more the bank is relying on relatively more expensive borrowed funds. Hence, a negative relationship is predicted for this ratio and CRB efficiency. Table 6.27 shows positive correlations between TE (I) and TE (A) and the loan to deposit structure of CRBs. As the coefficients lack significance and are not in the expected direction, the hypothesised relationship is rejected.

More profitable CRBs are predicted to be more efficient. This analysis reveals that the correlation coefficient between profitability and TE (I) is positive but not significant. Further, there is no evidence to support the predicted relationship between profitability and TE (A) (Table 6.27). Therefore, the hypothesised relationship is rejected.

A negative correlation between loan portfolio yield and the efficiency of CRBs is predicted. The associations between portfolio yield and efficiency are highly significant, although the association is stronger for intermediation (TE (I), ρ = *-0.517* than TE (A), ρ = *-0.272*). These results indicate support for the hypothesised relationship.

The operational cost to loans and operational cost to deposits ratios are predicted to have negative relationships with efficiency. The results in Table 6.27 show that TE (I) and TE (A) scores have highly significant negative correlations with operational cost to loans. The correlation coefficient is larger (ρ = *-0.641*) between the intermediation model compared to that for the assets transformation model (ρ =*-0.393*). The operating cost to deposit ratio has a highly significant negative correlation with efficiency in the intermediation model. However, while the predicted negative correlation is observed for the asset transformation model, it is not significant. Overall, these results indicate strong relationships for operational efficiency measured as the ratio of operating costs to loans and TE (I) and TE (A) measures of efficiency. When measured as operational costs to deposits, efficiency is associated with TE (I) but not TE (A).

A positive correlation between operational self-sufficiency (defined as the ratio of income to expenses) and efficiency is predicted. As shown in Table 6.27 the correlation coefficient is highly significant for the intermediation model but not for the asset transformation model. Therefore, the evidence for the hypothesised relationship is mixed.

Overall, the correlation coefficients presented in Table 6.27 indicate asset quality, loan portfolio yield, operational efficiency, and operational self-sufficiency are correlated with the overall efficiency of CRBs when efficiency in intermediation is measured. However, the asset transformation model efficiency measures show significant associations only with capital adequacy (the ratio of equity to deposits), loan portfolio yield, and operational efficiency (the ratio of operating costs to loans). Overall these correlations confirm that the greater the financial strength the higher the efficiency of CRBs in Sri Lanka. Hypothesis four of this

study; that CRBs with higher financial strength will have higher levels of efficiency has strong support for the TE (I) efficiency measures. The evidence is less compelling for the TE (A) efficiency measures.

6.7 Conclusion

The first objective in this chapter was to assess the efficiency of CRBs using the DEA technique. The second objective was to identify the use of accounting and financial practices of CRBs in Sri Lanka. The third was to investigate the associations of accounting practices, financial practices and CRB specific characteristics with efficiency.

The estimated efficiency scores calculated using the DEA technique show that most CRBs have not used their inputs effectively over the study period. Further, efficiency has been gradually declining over the period from 2003 to 2005. The larger CRBs dominated the rural financial sector. Their efficiency is higher than that of medium and small CRBs in intermediation. Further, there is a significant difference in the efficiency of CRBs operating in different geographical locations.

The analysis finds that best accounting practices are not used by CRBs in preparing their financial statements. In particular, loan loss provisions and the write-off of loans which influence the intermediation efficiency of financial institutions, are not applied on a consistent basis in most CRBs. As a result, the information in the financial statements of these CRBs is not fairly presented for decision-making purposes, which is the main objective of the preparation of financial statements. Further, accounting practices are inconsistent with CRBs operating in different areas.

In terms of financial practices, there is substantial variation in the sample. A large proportion of CRBs maintain the minimum capital adequacy ratio. However, many CRBs in the sample do not maintain adequate liquidity ratios. In relation to asset quality, it was found that many CRBs do not achieve an accepted non-performing loans ratio as shown by the deviation from the accepted benchmark.

Further, loan-deposit structures are not in accordance with accepted standards and CRBs do not make optimum use of their inputs: only an average of 47% of deposits is converted to loans and advances. The most notable finding is that many CRBs in the sample achieve a profitability ratio of about 1.6% on their assets. Further, the ratio of interest income to total expenses is greater than 115% for 74% of the sample, reflecting the fact that these financial institutions are operationally self-sufficient. Further, financial practices (except for capital adequacy ratios) vary with the location of operations for CRBs.

Spearman correlations are used for identifying the association of financial practices and the efficiency of CRBs. With the two models, only a few variables are able to produce statistically significant coefficients. There is a correlation between asset quality, loan portfolio yield, operational efficiency, and operational self-sufficiency and the efficiency in intermediation. Further ther is a correlation with capital adequacy loan portfolio yield and operational efficiency between efficiency in asset transformation. These findings reveal that CRBs with higher financial strength are more likely to operate at higher levels of efficiency.

This chapter presented the data analysis on accounting and financial practices as well as CRBs' specific characteristics and efficiencies of CRBs in Sri Lanka. Overall, it was highlighted that CRBs which apply sound accounting practices in their accounting processes, and have financial strength, are more efficient. Further, these findings indicate that accounting and financial practices which are major elements of a corporate governance mechanism in CRBs, should be further strengthened in the rural financial sector in Sri Lanka. The next chapter presents the implication from the findings of these analyses for further improvement in the efficiency of the rural financial sector in Sri Lanka.

CHAPTER SEVEN
FINDINGS AND POLICY IMPLICATIONS

7.1 Introduction

The primary purpose in this study is to assess efficiency of CRBs in Sri Lanka. The data envelopment analysis (DEA) technique is employed to determine the efficiency of 108 Cooperative Rural Banks (CRBs) in Sri Lanka during a three year period from 2003 to 2005. The relationships between CRB size and location of operation are then determined. Moreover, the research examines some elements of the corporate governance mechanism - accounting and financial practices and the efficiency of these institutions. Best accounting and financial practices in small financial institutions (SFIs) are identified. Sample CRBs are assessed to determine the extent of application of best practices in CRB operations. Finally, an analysis is undertaken to see if accounting and financial practices are related to the efficiency of these financial institutions. This study provides empirical evidence on the corporate governance mechanism and efficiency of SFIs in the Sri Lankan rural financial sector, a developing country context. Further, the results of this study provide some directions for achieving efficient financial services in the rural financial sector.

This dissertation includes seven chapters. Chapter One presents the introduction. Chapter Two presents the relevant institutional setting for financial institutions in Sri Lanka. Chapter Three presents the literature review for the concepts and measurements of efficiency in financial institutions. Chapter Four reviews literature on accounting and financial practices and some main variables relating to the corporate governance mechanism in financial institutions. The research design and methodology are presented in Chapter Five. Chapter Six presents the data analysis and tests of hypotheses. DEA is used to measure efficiency and correlations are used to test for relationships between accounting and financial practices while Kruskal-Wallis tests are used to identify differences in groups. This final chapter examines the policy implications of the results.

This final chapter comprises six sections. The next section presents the findings of the study addressing each objective, the research questions and the hypotheses. The third section discusses contributions to policy and recommendations. Section four presents the contributions to practice made by the study. The penultimate section presents the limitations and the final section presents potential avenues for further research.

7.2 Findings

The aim of this section is to revisit the research objectives (stated in Chapter One), research questions and hypotheses (discussed in Chapter Five), and to then discuss the findings.

7.2.1 Overall efficiency

As stated in section 1.2 in Chapter One, the main research objective in this study is to examine the overall efficiency of CRBs in Sri Lanka. Hypothesis one of the study is:

H_1 CRBs in Sri Lanka operate efficiently in providing microcredit activities.

This hypothesis is rejected. The intermediation and asset transformation DEA models are used to analyse the overall efficiency of CRBs. Efficiency scores from both models indicate that the majority of the CRBs in the sample do not maintain high levels of efficiency intermediation and asset transformation during the study period. CRBs in the sample do not use their inputs efficiently. The results suggest that CRBs can save more than 30% of their inputs while maintaining the same levels of outputs. Compared to other studies [Australian credit unions efficiency score of 76% (Brown 2001)], the relatively low levels of efficiency here imply a need for CRBs to further improve efficiency to achieve world best practice.

As discussed in Chapter Two, the rural financial sector in Sri Lanka expanded substantially after 2000. In addition to new entrants, some commercial banks

diverted their activities to rural financial services. Internal constraints, such as lack of awareness of best practices, weak institutional capacity and a negative perception of commercialisation decisions, may have hampered the diversification of CRBs' activities and resulted in loss of membership. Many CRBs did not concentrate on market structure and competition during the study period due to limited autonomy as a result of commercialisation of their activities. These circumstances may have adversely affected the functions of CRBs and their efficiencies.

7.2.2 Institution-specific characteristics and efficiency

As stated in section 1.2, the second objective in this study is to examine the impacts of size and geographic areas of operation on the efficiency of sampled CRBs. Two hypotheses relate to the second research question. The first of these is:

H_{2a}. CRB size and efficiency are positively related.

Results from this research provide some support for this hypothesis. The higher efficiency scores from the intermediation model reveal that large and medium size CRBs manage their inputs and outputs efficiently. Large and medium sized CRBs perform better than small CRBs. This indicates that larger CRBs compete well with other institutions in their areas. Further, small CRBs do not fully utilise their capacity and there are efficiency gaps between large and small CRBs in Sri Lanka. The higher efficiency in larger CRBs may be attributable to greater customer confidence in these institutions. This supports the findings of Drake and Hall (2003), Lang and Welzel (1996), and Elyasiani and Mehdian (1990) that large financial institutions perform better than small ones do. However, in terms of efficiency scores from the asset transformation model, there are no significant differences in efficiency by CRBs size. This indicates that CRB size does not affect the assets transformation process for this sample.

The second hypothesis relating to the research question on institution-specific characteristics and efficiency is:

H_{2b} CRB location and efficiency are positively related.

Results from this research provide some support for this hypothesis. There is a significant difference in the efficiency of CRBs operating in different geographical locations. This finding is similar to the findings of Hughes et al. (1996) that geographic diversification affect efficiency. The causes may be due to differential governance practices in the district unions of CRBs. As stated in Chapter Two, CRBs district unions provide financial guidance, different approaches to human resources development, and advice on modern technology to enhance the efficiency of members CRB. Some district unions maintain good governance practices in terms of supervision of members and this may favourably influence the efficiency of those CRBs.

7.2.3 Accounting practices

The third objective of this study is to assess the usage of accounting practices in CRBs in Sri Lanka and determine if the quality of accounting practices is related to efficiency. The third research question is 'do the CRBs apply appropriate accounting practices in the recognition, measurement and preparation of financial statements and do the appropriate accounting practices have a favourable effect on the efficiency of CRBs?' The third hypothesis of this study is:

H_3 CRBs that maintain appropriate accounting practices will have higher levels of efficiency.

Results show some support for this hypothesis. The association between efficiency and accounting practices shows highly significant correlations between efficiency in intermediation and sound accounting practices in CRBs in Sri Lanka. This indicates that CRBs that maintain sound accounting practices and provide better information to the stakeholders maintain higher efficiency than those that

do not produce such information. However, in terms of efficiency scores from the asset transformation, there are no associations with any accounting practices.

In order to test H_3, analysis of the current accounting practices of CRBs has been undertaken. This analysis has highlighted several shortcomings in current practice. Firstly, all CRBs prepare an income statement and balance sheet annually to fulfil the statutory requirement. Only fifty-eight CRBs (54% of the sample) prepare a cash flow statement. Further, only 44% of the sample voluntarily prepare separate financial statements for CRB activities as this is not a mandatory requirement for CRBs. Secondly, accounting best practices for revenue recognition of performing loans, revenue recognition of non-performing loans, provision for loan loss provisions, and write-off of loan are not always adequately accounted for when preparing and presenting financial statements of CRBs.

The main reason for not applying adequate accounting practices in these CRBs may be the non-availability of proper guidelines for preparing and presenting financial statements. Even though guidelines are available in preparing financial statements of all other banking institutions in Sri Lanka, these may not be applied in CRBs due to a lack of awareness by employees and management. The violation of significant accounting practices indicates that CRBs' governance mechanisms in terms of accounting information should be strengthened for regulation and supervisory purposes. These finding are similar to those of Cayanan (2007) for Philippines' banks.

Large CRBs tend to use best accounting practices more often. Further, CRBs operating in metropolitan and urban areas apply best accounting practices more rigorously than CRBs operating in rural areas. Large CRBs are more closely monitored by the Government and donor agencies. The activities of district unions in providing guidance to their members may also be a factor. This further indicates that adequate guidelines and awareness of these are important for the sector as whole.

7.2.4 Financial practices

The fourth research question is 'do CRBs apply sound financial practices in their operations and does the higher level of financial strength favourably affect the efficiency of CRBs in Sri Lanka?' To address this issue, finance soundness is determined using financial ratios. Capital adequacy, liquidity, assets quality, loans to deposit, profitability, loan portfolio yield, operational efficiency, and operational self-sufficiency ratios are considered as variables determining sound financial practices in these institutions. Hypothesis four of the study is:

H_4 CRBs with higher financial strength will have higher levels of efficiency.

Results show some support for this hypothesis. The significant correlations between operational efficiency on loans and efficiency indicate that CRBs that control their expenses achieve higher levels of efficiency in intermediation and asset transformation. Further, operating self-sufficiency which determines income to expenses is more than 115% (the accepted benchmark) in many highly significant correlations show that CRBs maintaining sound operating self-sufficiency achieve higher levels of efficiency in intermediation.

The significant correlations of the loan portfolio yield ratio and efficiency in both models show that the higher the loan portfolio yield the higher efficiency of CRBs. As the loan portfolio yields tend to be below the benchmark, there is scope for sample CRBs to achieve efficiency gains with improvements in the loan portfolio yield.

However, an interesting finding was that there is no significant correlation between financial practices and the size of CRBs in many cases except liquidity, asset quality and operating efficiency. There appears to be no significant difference between larger and smaller CRBs in the application of most financial practices. Significant differences in financial practices (except for capital adequacy) are identified for different locations.

In order to test H_4, an analysis of current financial practices of CRBs has been undertaken. Where benchmarks are available, the financial practices of CRBs have been assessed against these. The capital adequacy ratios show that CRBs maintain capital adequacy in terms of assets and deposits compared to the accepted norms. Further, results reveal that some CRBs in the sample have capital adequacy ratios above the benchmark which indicates that the strength of the capital buffer is very high in these CRBs.

The majority of sampled CRBs do not meet the benchmarks for liquidity. However, liquidity is uncorrelated with efficiency in both models. In relation to asset quality, CRBs in Sri Lanka do not maintain acceptable non-performing loan ratios. The significant correction coefficients in intermediation efficiency show that CRBs with lower levels of non-performing loans achieve higher levels of efficiency in intermediation but no difference is observed for efficiency in asset transformation. These results suggest that the efficiency in CRBs in different functions, intermediation and asset transformation, are dissimilar.

Overall, the results of this research show that CRB operations are not efficient in microcredit activities in Sri Lanka. Further, CRB accounting practices are not consistent with accepted accounting practices for SFIs. Many CRBs lag behind benchmarks for a number of financial ratios. Nevertheless, some CRBs operate consistent with accepted accounting and financial practices and their efficiency is higher than that of the other CRBs. Further, these findings suggest that accounting and financial practices, which are major elements of the corporate governance mechanism, exert a strong influence on the efficiency of CRBs in Sri Lanka. This also supports the findings of Das and Ghosh (2006) that financial soundness of a financial institution has a close relationship with efficiency. Thus, management of CRBs and government policy makers should concentrate on these variables to develop a governing mechanism which will enhance the efficiency and sustainability of Sri Lankan CRBs.

7.3 Contributions to policy and recommendations

As discussed in Chapter Two, most economists argue that the financial services sector plays a vital role in economic development. In developed countries as well as in developing countries, the financial services sector influences most parts of the nation's economic, social, and political environment (Levine 1997). After the introduction of market oriented policies in Sri Lanka in 1977 the Government has made a number of efforts to create a sound financial services sector (Jayasundara & Indrarathna 1991). As a result, the Government has implemented deregulation of the financial services sector. However, as with most developing countries, low income householders in Sri Lanka have minimal access to formal financial services (ADB 2000). The majority of people living in rural areas obtain their financial services from informal sources. Further, due to high costs and low profitability in regional areas, most formal financial institutions are reluctant to provide microfinance services in Sri Lanka (ADB 2000). In this setting, informal and formal small financial institutions which provide microfinance services and microcredit activities have flourished during the last few decades, which is consistent with patterns observed in the Asia Pacific region (ADB 2000).

However, the financial viability of SFIs has been an issue in Sri Lanka recently (Abeyaratna 2007). Some of these institutions have collapsed while others have recurring losses and questions have been asked about their sustainability due to ineffective utilisation of resources. The collapse of some large finance companies could signal systemic problems in the financial services sector. Researchers have found evidence that, in a wide range of financial activities with the adoption of profit oriented decision making, SFIs can compete with other commercial banks while achieving efficiency and increased outreach (Christen et al. 1995; Hulme & Mosley 1996; Seibel 1999). However, internal constraints, such as lack of awareness of best practices in governance and a negative perception of commercialisation hamper the diversification of activities by SFIs in Sri Lanka (Charitonenko & De Silva 2002). Further, this study shows that sound financial practices are not effectively embedded within the risk management processes in

CRBs, one of the main groups of SFIs in Sri Lanka, and thus, their risk exposures are very high. [This study hypothesises that (H_1) CRBs in Sri Lanka operate efficiently in providing microcredit activities].

As formal institutions, CRBs in Sri Lanka make significant contributions in terms of credit provision and savings mobilisation in the rural financial sector since their inception in 1964. CRBs (despite of size) have consistently provided services, especially microcredit services, on a profitable basis in past decades. Further, CRBs show that financial services in urban and rural areas can be provided in a commercial manner if appropriate financial strategies to achieve efficiency are implemented. [This study hypothesises that (H_{2a}) CRB size and ($H_{2b)}$ location affects efficiency].

However, as with most SFIs, inadequate corporate governance mechanisms, particularly, proper accounting information systems and proper regulatory and supervisory frameworks, constrain the overall efficiency of these institutions in Sri Lanka. [This study hypothesises (H_3) CRBs that maintain appropriate accounting practices will have higher levels of efficiency and (H_4) CRBs with higher financial strength will have higher levels of efficiency].

Consistent with recommendations in prior literature, it is suggested that improved accounting and financial practices in corporate governance are critical for efficiency of financial institutions. Improving the quality of accounting and financial practices makes institutions more transparent and accountable to stakeholders of institutions. Accounting information must be acknowledged for its critical role in the corporate governance mechanism and is implicitly used to monitor management. Further, it is useful to stakeholders in their decisions. Accordingly, decision useful information is necessary for solving the problem of a trade-off between the information role and stewardship role in agency theory. In this study, the analysis of accounting and financial practices of CRBs in Sri Lanka show that the neglect of best practices in financial reporting and maintenance of financial stability affects efficiency.

Thus, policy makers should concentrate on strategies and policies to enhance efficiency with the objective of achieving sustainability for these institutions. A main objective of this study is to identify strategies and policies based on sound accounting and financial practices for SFIs that can enhance efficiency. The following sub-sections present contributions and recommendations for improvements.

7.3.1 Improvement to accounting systems

The empirical analysis demonstrates that accounting practices have a direct impact on efficiency of CRBs in Sri Lanka. The absence of proper guidelines for the recognition, measurement, and preparation of financial statements need to be rectified. Policy makers are advised to consider the following accounting policies when framing guidelines for the preparation and presentation of financial statements of CRBs in Sri Lanka.

The majority of MPCSs do not prepare separate financial statements for their CRBs' operational activities. According to the statutory requirements, it is not mandatory to prepare separate financial statements for respective CRBs in MPCS. Hence, the amalgamated financial information of all operational activities of MPCS obscures the performance and position of CRBs activities. The **first recommendation from this research is a statutory requirement for the preparation of separate financial statements for CRBs' operations.**

Of those CRBs with separate financial statements, most do not include a separate cash flow statement. The cash flow statement, which presents cash inflows and cash outflows in categories, is important for decision making purposes, particularly in financial institutions. Therefore, **the second recommendation of this research is that cash flow statements be reported in addition to other statements presently produced by these institutions**. CRBs that prepare cash flow statements do not conform to the accepted standard format for banking institutions. Therefore, it is recommended that cash flow statements present

separate cash flows from operating, investing, and financing activities (SLAS 9 1996).

Revenue recognition practices in most CRBs do not follow accepted practices of financial institutions. Therefore, **the third recommendation is that interest on performing loans be recognised on an accrual basis and disclosed in the income statement as interest income**. The receivable component of interest income should be disclosed in the balance sheet and the recognition policy should be disclosed as a note to the accounts (SLAS23 1992; Rosenberg et al. 2003; SLAS10 2005).

The majority of CRBs do not recognise accurately revenue on non-performing loans. The **fourth recommendation is that interest on non-performing loans be recognised on a cash received basis when loans have been indentified as non-performing assets. However, the interest due from the date of classification as a non-performing loan should be recognised each year and credited to separate "interest on suspense" account.** The net of non-performing loans deducting interest on suspense account should be disclosed in the balance sheet. When any non-performing loan is reclassified as a performing loan, the interest component in interest on suspense account should be transferred to the income account. Further, these practices should be applied on a consistent basis with disclosure of the policy in the notes to the accounts (SLAS23 1992; Rosenberg et al. 2003; SLAS10 2005).

Empirical analysis reveals that there is considerable variation in the accounting practices for the provision for loan losses and write-off of loan losses across CRBs. **Recommendation (five) is that adequate loan loss provisions and a clearly specified policy for loan losses should be applied on a consistent basis. with disclosure of the policy in the notes to the accounts** (SLAS10 2005).

An adequate level of balance sheet disclosure is identified in financial statements of some CRBs. The **sixth recommendation is that the quality of information can be improved with relevant notes**. For example, a portfolio report providing

information about the lending and saving activities and statements of significant accounting policies, would contribute to enhance the reliability of information available for decision making purposes (SLAS10 2005).

Some CRBs use accounting practices that are on par with those accepted by global financial institutions even though no specific guidelines exist for Sri Lankan CRBs. This situation suggests that compliance officers in some provincial areas do not have sufficient knowledge of appropriate practices. It is therefore **recommended (seven) that these staff be trained to identify best practices in accounting.** They should be armed with accounting guidelines that are accepted by CRBs as necessary for their long-term sustainability.

7.3.2 Improvements to financial practices

The empirical analysis in Chapter Six shows that several financial practices have significant associations with the efficiency of CRBs in Sri Lanka. This confirms that efficient CRBs maintain good financial practices which contribute to the higher levels of efficiency. These findings point to policy recommendations that will formulate good financial practices to enhance efficiency. Thus, policy makers should consider the following recommendations for financial practices to enhance the efficiencies of CRBs. Further, these practices will provide a self-regulation mechanism as well as supervisory tools for regulators.

The results of this research show that non-performing loans to total loans ratio is significantly correlated with efficiency in intermediation. The levels of the non-performing loans of a majority of CRBs are well below the benchmark. Hence, it is **recommended (seven) that CRBs increase their efforts to maintain control over loans.** In addition, CRBs should monitor their ratios progressively to control loan losses, and cease making loans when this ratio exceeds the benchmark level. Further, it is **preferable to provide loan-loss provisions on an individual loan basis rather than as a general provision (recommendation eight).** Results also show that the liquidity positions of CRBs are poor. Managing liquidity is essential for CRBs since client withdrawal demands may be higher for them than those for

other commercial banks. Thus, **recommendation nine is that an appropriate level of liquidity be set for CRBs and be monitored by District Unions.**

Empirical analysis suggests that average loan to deposit ratio is not at an acceptable level. Even though they maintain high liquidity on loans they do not use deposits productively. This was further confirmed in Chapter Two (Figure 2.14) where deposits increased ten-fold over the 1990 to 2006 period. Loans however, increased by only six-fold. This difference reveals a huge surplus in savings in CRBs. It **is recommended (ten) that the loan to deposit ratio be increased to an acceptable level and again be monitored by District Unions.**

Further, the empirical analysis suggests that the operating cost to loan and income to expenses ratios have highly significant correlations with efficiency in intermediation of CRBs. Therefore, to maintain an effective monitoring system, it is necessary to establish benchmarks for these standard financial ratios. **An analytical procedure using the agreed benchmarks should be applied periodically by CRBs as self-regulations (recommendation eleven).** Such a process will increase the regulator's understanding of CRB profitability, solvency, and risk management processes. Any significant deviations from the predicted ratios should be discussed with management as part of the supervisory mechanism by District Unions or some other authority. It is therefore **recommended (twelve) that district unions be involved in this process, using the ratios as a supervisory tool.**

7.4 Contributions to practice

The findings of this study, although only suggestive of certain relationships, could help bank managers and other authorities to understand the underlying problems of efficiency of CRBs. In essence, this study highlights that accounting and financial practices can impact on efficiency of SFIs. The findings of this study provide guidance for the management of CRBs to formulate proper governance mechanisms to enhance the efficiency of their institutions.

The findings may convince industry decision makers to establish more comprehensive policy settings for promoting SFIs in the Sri Lanka rural financial sector. In particular, given no proper guidelines are currently available, accounting and finance for SFIs, finding of this study could provide guidance to help accounting and finance professionals enhance their knowledge in targeted practices to support SFIs.

In addition, the findings of this study could help to provide directions for efficient financial services in the rural financial sector which is one of the ways to alleviate poverty in the country.

7.5 Limitations of the study

Analyses and findings of this study are subject to the following limitations.

As is the case in many studies, this research faces data limitations. Forty-eight CRBs that operate in the Northern Province were excluded as data could not be obtained given the prevailing situation at the time of data collection. Time and cost constrains have limited data collection to a sample of 108 CRBs over the period 2003 to 2005. This study is based on secondary data collected from annual reports which was located in MPCSs and some District Unions. Further, data sourced from CRBs' financial statements, while audited, may not be strictly accurate and comparable. The level of variation in disclosure across the sample is also a limitation. For instance, not all CRBs provide cash flow statements and separate balance sheets. Some CRBs did not provide sufficient details of income and expenses in their income statements. The inconsistencies of data in financial statements limited the preparation of the data set. Hence, the sufficiency, reliability, and validity of data are subject to the above limitations.

The methodology undertaken in this study has been confined to correlation coefficients and testing for differences between groups. Multivariate testing could not be conducted due to the small sample size. Thus no cause relationships could be tested.

This study focused on only one type of SFI, namely CRB. No attempt has been made to assess the efficiency of different types of SFIs operating in Si Lanka. Other types of SFIs such as TCCs Sanasa, Samurdi Banking Societies, and different microfinance institutions may or may not have similar issues, but this study does not attempt to provide evidence for other SFIs.

In general, subject to the data limitations discussed above, the analysis of efficiency in this study is based on CRBs and difficult to generalise for the whole rural financial sector so the results obtained must be treated with caution.

7.6 Future research

The findings from this study suggest avenues for a number of future studies. This study investigates efficiency of CRBs in Sri Lanka by using a sample. In the absence of a uniform set of accounting standards for CRBs in Sri Lanka, inconsistencies in reporting data on financial statements did not provide a complete picture of some institutions, thus, affect the results. Data collections from primary sources and generated over a long period may provide better results for future research. By increasing the sample size, there is an opportunity to apply multivariate analysis to enrich future quantitative findings.

Further, this study investigates the efficiency of only one type of SFIs represented by a sample of CRBs operating in Sri Lanka. Future studies could assess different types of SFIs in different institutional settings especially with respect to different legislation. Thus, there are future research opportunities for assessing efficiency in different types of SFIs in Sri Lanka, which may lead to a better understanding of the efficiency of the entire rural financial sector. This research was also limited to Sri Lanka. Efficiency scores from similar studies in other developing countries, such as India and Philippines, especially those with different institutional settings, could provide a fruitful avenue for future research.

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APPENDICES

Appendix I: Studies on the application of DEA in the financial services sector

Researcher (Year)	Issue	Approach	Inputs	Outputs
Aly et al. (1989)	Efficiency of banking	Intermediation	Labour Capital Loanable funds	Real estate loans Commercial and industrial loans Consumer loans Other loans Demand deposits
Athanassopoulos and Giokas (2000)	Efficiency in bank branch	Production	Labour hours Branch size Computer terminals Operating expenditure	Credit transactions Deposit transactions Foreign receipts
Avkiran (1999)	Bank mergers and deregulations	Intermediation	Interest expense Non-interest expense Deposits Staff numbers	Net interest income Non-interest income/Other income Net loans
Bhattacharyya, Lovell and Sahay (1997)	Liberalisation and efficiency	Intermediation	Interest expense Operating expenses	Advances Investments Deposits
Brown (2001)	Issues in the financial servicers sector (Credit unions)	Intermediation/assets	Operating costs	Loans Deposits Interest paid Interest received
Brockett et al. (1997)	Risk coverage and efficiency	Intermediation	Interest expense Non-interest expense Deposits Provision for loan losses	Net interest income Non-interest income/Other income Total loans Allowance for loan losses

Researcher (Year)	Issue	Approach	Inputs	Outputs
Charnes et al. (1990)	Methodology	Intermediation	Operating expenses Non-interest expense Provision for loan losses Actual loan losses	Total Income Total Interest Income Total Non- Interest Income Total Net loans
Das and Ghosh (2006)	Deregulation and efficiency	Intermediation, value added and operating	Deposits Capital rated operating expenses labour Interest expenses	Advances Investments Deposits Interest income non-interest income
Desrochersa and Lamberteb (2002)	Efficiency and expense preference cooperative rural banks	Production and intermediation	Deposits Capital Wages	Loans Investments
Drake and Hall (2003)	Mergers and problem loans	Intermediation	Deposits General Ad. Expenses Fixed assets Problem loans	Non-interest income/Other income Loans and advances Liquid assets and other investments
Drake and Weyman-Jones (1992)	Technical and scale efficiency in building societies	Intermediation/Assets	Labour Capital Retail funds and deposits Wholesale funds and deposits Number of branches	Loans Commercial assets Liquid assets
Elyasiani and Mehdian (1990)	Technological change	Intermediation	Deposits Labour Capital	Loans Investment
Favero and Papi (1995)	Productive specification, size and location	Intermediation and asset	Labour Capital Loanable funds	Loans Investment in securities and bonds Non-interest income

Researcher (Year)	Issue	Approach	Inputs	Outputs
Gutiérrez-Nietoa, Serrano-Cincaa and Molinerob (2007)	Efficiency in MFIs	Production and intermediation	Credit officers Operating expenses	Interest and fee income Gross loan portfolio Number of loan outstanding
Havrylchyk (2006)	Efficiency of banking		Capital Labour Deposits	Loans Government bonds Off-balance sheet items
Kao and Liu (2004)	Bank performance	Intermediation	Interest expense Non-interest expense Deposits	Interest income Non-interest income Total loans
Lang and Welzel (1996)	Efficiency and technical progress cooperative banks	Intermediation	Labour Physical capital Deposits	Short-term and long-term loan to non-banks Inter-banking assets Fees and commission Revenue from sales
Miller and Noulas (1997)	Technical efficiency	Intermediation	Interest expenses Non-interest expenses Deposits	Total non-interest income Loans Investments
Neal (2004)	Efficiency and productivity change	Intermediation	Loanable funds Bank branches	Non-interest income/Other income Demand deposits Loans and advances
Park and Weber (2005)	Technological change		Total Deposits Capital/total assets	Commercial Loans Personal loans Securities
Saha and Ravisankar (2000)	Performance/Methodological	Production	Interest expense General administration Fixed assets Non establishment expenses	Net interest income Non-interest income Loans and advances Demand deposits Liquid assets /other investments

Researcher (Year)	**Issue**	**Approach**	**Inputs**	**Outputs**
Sathye (2001)	Deregulation and mergers	Intermediation	Labour Capital Loanable funds	Demand deposits Loans and advances
Seelanatha (2007)	Deregulation and efficiency	Intermediation	Interest expenses Personnel cost Premises and establishment expenses	Loans and other advances Interest Income Other income
Seelanatha (2007)	Deregulation and efficiency	Asset	Deposits Other loanable funds Number of employees	Loans and other advances Other earning assets
Sharma and Kawadia (2006)	Efficiency and size-cooperative banks	Value added	Owned fund Operating expenses Physical assets	Deposits Advances Interest spread Net profit
Sufian (2006)	Efficiency of non-banking	Intermediation/Assets	Total deposit Fixed assets	Non-interest income Total loans
Taylor et al. (1997)	Management and efficiency	Intermediation	Non-interest expense Total deposits	Total Income
Yue (1992)	Performance	Intermediation	Interest expense Non-interest expense Deposits	Interest Income Non-Interest Income Total loans

Appendix II: Studies on accounting practices

Researcher (year)	Sample	Issues addressed	Findings
Adams and Hossain (1998)	New Zealand life insurance industry	Managerial discretion and voluntary disclosure	Disclosure decisions of life insurance companies are likely to be linked with managerial discretion.
Beatty, Chamberlain and Magliolo (1995)	US banks	The influence of taxes, regulatory capital, and earnings	Accounting choices of a bank influence the taxes, capital and earnings of the firm. Loan loss provisions and loan charge-off are the events which impact on accounting report decisions.
Bushman and Smith (2001)	US firms	Financial accounting information and corporate governance	Financial reporting as the use of externally reported accounting data in control mechanisms promote the efficient governance of firms.
Buzby (1975)	US companies	Company size, listed versus unlisted stocks and the extent of financial disclosure	Disclosure is positively associated with size of the company's assets not affected by listing status.
Cayanan (2007)	Philippine Banks	Corporate governance and financial reporting	Non-performing loans were not disclosed and loan portfolio break downs were not complied with the requirements. Found financial reporting violations of overstatement of assets and net income.
Chandra (1974)	Accountants	Disclosure among public accountants and security analysts	Accountants do not value information for equity investments decisions the same as security analysts do
Chi-Chun liu and Ryan (1995)	US banks	Loan portfolio composition on the market reaction to and anticipation of loan loss provisions	The market anticipation of the loan loss provision is stronger in banks. The market reaction to an increased loan loss provision is negative for banks with relatively more small.

Researcher (year)	Sample	Issues addressed	Findings
Collins, Shackelford and Wahlen (1995)	US banks	Bank differences in the coordination of regulatory capital, earnings, and taxes	Capital influences loan loss provisions and loan charge-offs. There is a relationship between capital, earnings, and taxes and security gains and losses.
Falk, Gobdel and Naus (1976)	American banks	Disclosure for closely held corporations	The small companies have generally been subject to the same reporting requirements as the public companies.
Gant et al. (2002)	MFIs in Sri Lanka	Microfinance study of Sri Lanka: survey of practices and policies	Financial statements are not prepared properly in most MFIs.
Jones, Romano and Smyrnios (1995)	Australian reporting entities	Decision usefulness of cash flow statements	Cash flow statement is important for a wider variety of internal and external decision context. Operating profit was not considered as a measure of business performance.
Jones and Ratnatunge (1997)	Listed companies in Australia	Decision usefulness of cash flow statements	Cash flow statements are more relevance in decision making
Kim and Kross (1998)	US banks	Change in bank capital standards on loan loss provisions and loan write-offs	Banks with low capital ratios reduced their loan loss provisions and increased write-offs. Banks with high capital ratios exhibited no difference in loss provisions, but did significantly increase loan write-offs.
Lee (1981)	Scotland accountants	Accountants' opinions on cash flow reporting	Cash flow statements are useful for decision making.
Magness (2006)	Canadian firms	Strategic posture, financial performance and environmental disclosure	Disclosures content is not moderated by financial performance.
Mayers and Smith (1994)	Insurance companies	Managerial discretion, regulation, and stock insurer ownership structure.	Organisation form, size, diversity and distribution systems are positively related to the level of voluntary disclosures as implied by the managerial discretion.
McEnroe (1989)	Partners of the US public accounting firms	Cash flow accounting	Cash flow information is much important to bankers, lenders, shareholders and suppliers.

Researcher (year)	Sample	Issues addressed	Findings
McNally, Eng and Hasseldine (1982)	Corporate financial reporting in New Zealand	User preferences, corporate characteristics and disclosure practices for discretionary information	Stock brokers perceive as important the voluntary disclosures. Voluntary disclosures are closely related with the size of the company. Considerable divergence between the degree of disclosure practiced and the level of disclosure perceived by external users.
Singhvi and Desai (1971)	Corporations in the United States	Analysis of the quality of corporate financial disclosure	Disclosure increases the variation of market price and earnings.
Ullmann (1985)	United State's firms	Social performance, social disclosure and economic performance	Social disclosures are based on the performance of the firm. Social disclosures depend on size and industry.
Zanzig and Flesher (2006)	Individual stakeholders	GAAP requirements for non public companies	Recognised set of standards be established as GAAP for private companies

Appendix III: Accounting for small financial institutions

The comparison of relevant guidelines for microfinance institutions and other financial institutions is indicated in the following table.

Features	Requirements	Consistent with
Financial statements	At a minimum, financial statements should include both a balance sheet and an income (profit and loss) statement, with accompanying notes.	IAS 1[53]; SLAS 3; CGAP (rule1)
	Statements should show financial information for both the current year and at least the previous year. They should also include a comment on any unusual movements.	IAS 1; SLAS (Framework); CGAP (rule1)
	A cash flow statement.	IAS 7; SLAS 9
Segment reporting for multi-service	An MFI that offers both financial and material non-financial services should provide a separate income statement for the financial service operations, in addition to a consolidated income statement and balance sheet for the institution as a whole. The methods used to allocate shared costs or revenues between financial and non-financial services should be clearly explained. Specific accounts in the balance sheet of a multi-service MFI that are tied to microfinance services (segment assets) should be clearly identified.	IAS 14; SLAS 28: CGAP (Rule2)

[53] In addition, IAS and SLAS require statement of changes in equity.
IAS (International accounting standards); SLAS (Sri Lanka accounting standards); CGAP (Disclosure guidelines for financial reporting by microfinance institution

Features	Requirements	Consistent with
Donation	The amount of any current-period donations should be shown. If the donations are reported as revenue on the income statement, such revenue should be shown separately from income generated by an MFI's financial operations. The source and amount of any current-period donations should be reported. The method of accounting for donations should be explained. Material in-kind donations or subsidies should be disclosed and an estimate of the additional expense the MFI would incur in their absence should be provided.	IAS 20; SLAS 24,10; CGAP (Rule3)
	OPTIONAL. The cumulative amount of all donations to an MFI's financial operations in all prior periods should be shown. (This guideline rule is optional—while strongly commended, it is not required.)	IAS 20;;CGAP (Rule3) (new; industry specific)
Accounting issues	Any provision expenses related to actual or anticipated loan losses should be shown separately from other expenses in the income statement. The accounting policy underlying the recognition and amount of such loan loss expenses should be clearly described. The amount of the allowance for loan losses should be shown. The provisioning policy underlying the determination of this allowance should be clearly described.	IAS 30, 32, 39; SLAS 23,10; CGAP (Rule4)
	The amount of loans written off during the period must be shown. The policy governing the amount written off should be stated clearly and in detail, including how other accounts are affected by the write-off.	IAS 30; SLAS 23,10; CGAP (Rule4)
	The financial presentation should include a table that reconciles the accounts affecting the loan portfolio, including: • Loan portfolio at the beginning and end of the period • Loan loss allowance at the beginning and end of the period • Loan loss provision expenses recognised during the period • Write-offs of uncollectable loans during the period	IAS 30;SLAS 23,10; CGAP (Rule4)

Features	Requirements	Consistent with
Accounting issues	If an MFI accrues unpaid interest on late loans, there should be a clear and thorough explanation of its policies on this matter, especially the point at which further accrual of unpaid interest ceases and previous accruals are either reversed out of income or expensed.	IAS 18, 30; SLAS 23,10; CGAP (Rule4)
	Income from investments should be shown separately from interest, fees, or other loan income collected from borrowers.	IAS 30,39; SLAS 23; CGAP (Rule4)
Portfolio quality and management	A portfolio report should show the extent of late payment on loans for the current reporting period. The measure(s) of late payment should be thoroughly explained, including precise definitions of the numerator and the denominator of any ratio measuring loan portfolio quality.	IAS 1,32; SLAS 23; CGAP (Rule5)
	A portfolio report should clearly describe an MFI's approach to allowing, tracking, and provisioning for the renegotiation of delinquent loans, as well as the outstanding balance of renegotiated loans.	IAS 32; SLAS 23; CGAP (Rule5)
	Related-party ("insider") disclosures loans—whether to members of an MFI's management, governing body, or parties related to them—should be fully disclosed, including outstanding amounts, interest rates, collateral, and repayment status. Small loans generally available to all employees can be reported showing only the total amount, number, interest rate, and degree of late payment on such outstanding loans. Policies on both types of insider loans should be described precisely.	IAS 24; SLAS 30; CGAP (Rule5)

Features	Requirements	Consistent with
Liabilities and equity	The following information should be provided for all loans to an MFI that are material in relation to total liabilities: • Source of the liability • Terms of the loan—amount, repayment schedule (including grace periods), interest rate, and (if applicable) the foreign currency in which it is to be repaid • Guarantee mechanisms used to obtain the loan, including the percentage of the loan covered by the guarantee • Average outstanding principal balance of the liability during the reporting period, calculated on a monthly or at least quarterly basis • Interest expense during the reporting period, including cash payments and accruals • Full details of any arrears if the MFI has failed to make a payment when due during the period or is not current on the loan at the end of the reporting period.	IAS 32; CGAP (Rule 6); SLAS23
	Any type of deposit account that is tied to the ability of MFI clients to obtain loans should be shown separately from other deposits. A general description of the conditions of the account and its linkage to loans should also be provided.	IAS 1; SLAS23; CGAP (Rule 6)
	Long-term deposits (i.e., deposits that are not potentially payable within one year) should be shown separately from other deposits.	IAS 1; CGAP (Rule 6)
	If an MFI requires clients to make an equity investment (e.g., share capital in financial cooperatives) in order to access loans or other services, such capital should be shown separately and the requirement should be described.	IAS 32; CGAP (Rule 6);
Other significant accounting policies	Accounting policies on the accrual or deferral of income or expenses should be briefly explained.	IAS 1;SLAS 10; CGAP (Rule 6)

Features	Requirements	Consistent with
Cash flow statement	Cash flows from operating activities, investing activities and financing activities	IAS 7;SLAS 9

Source: adapted Rosenberg et al.(2003 p.51) modified with inputs from SLAS.

Appendix IV: Studies on financial practices

Researcher (year)	Sample	Features	Findings
Berger and Young (1997)	Banks in the USA	Problem loans and cost efficiency	The relationships between loan quality and cost efficiency run in a both directions.
Bhattacharyya, Lovell and Sahay (1997)	Commercial Banks in India	Productivity efficiency	Capital adequacy has an insignificantly impact on the performance of public sector banks. Banks with low-risk portfolio, as measured by a higher capital ratio, have been less efficient.
Das and Ghosh (2006)	Banks in India	Financial deregulation and efficiency	Close relationship between bank efficiency and financial soundness of the bank.
Demirg'uc-Kunt (1989)	Deposit-institutions failures	A review of empirical literature	Capital adequacy, earnings and asset quality are found to be significant indicators of financial trouble.
Eisenbeis, Ferrier and Kwan (1999)	Banks in the USA	Cost efficiency and other measures of bank holding company performance	Portfolio risk has a positive relationship with the banks efficiency. Large number of problem loans, low capital and weak liquidity positions are directly related to quality portfolio and finally affect the efficiency of a firm.
Gibbons and Meehan (1999)	Microfinance institutions in Philippines, Bolivia and Uganda banks	Institutional financial self-sufficiency	Important to take necessary steps to increase institutional efficiency through cost-effective targeting management information system maintain of portfolio quality and customising financial products.
Hesse and Cihak (2007)	Cooperative banks in Europe	Financial sustainability	Cooperative banks are more stable than commercial banks due to the lower volatility of the returns, which more than offsets their lower profitability and capitalisation.
Jansson and Taborga (2000)	Latin American microfinance industry	Efficiency study	Many microfinance institutions perform well compared with the region's commercial banks. Particularly, loan delinquency rates, return on assets, return on equity.

Researcher (year)	Sample	Issues addressed	Findings
Kwan and Eisenbeis (1997)	Banks in the USA	Bank risk, capitalisation and operating efficiency	More capital results in higher efficiency than less capitalised bank organisations.
Miller and Noulas (1997)	Banking institutions in the USA	Portfolio mix and bank profitability	Large banks present poor performance because of a declining quality of a loan portfolio, loan loss provision and profitability.
Misra (2006)	Regional rural banks in India	Overall performance	Loan portfolio and investment portfolio contribute positively to the financial performance.
Robison and Barry (1977)	Rural Banks	Port-folio adjustments	Risk and liquidity components are important factors in rural banks.
Tucker (2001)	Financial performance in MFIs , Latin America	Financial performance	The best MFIs achieve superior performance by employing superior business practices.
Tucker and Miles (2004)	MFIs in Africa, Asia, Europe and Latin America	Self-sufficiency of MFIs	The majority of MFIs are very weak and need of continued subsidies.

Appendix V: The names of CRBs in the sample

Name of the CRB	Name of the CRB	Name of the CRB	Name of the CRB	Name of the CRB	Name of the CRB
Agalawatta	Dankotuwa	Ja-Ela	Kolonnakorale	Monaragala	Puttalam
Alawwa	Dehiwinipalatha	Jayanthipura	Konaoathirawa	Munwatta (East)	Rajangana-Giribawa
Ampara Udapalatha	Dehiyaththakandiya	Kabithigollawa	Kotadeniyawa	Munwatta (West)	Rathnapura
Anamaduwa	Dimbulagala	Kagama	Kotapola	Naththandiya	Redeegama
Anuradhapura	Divulapitiya	Kakirawa	Kuliyapitiya	Nawagaththegama	Saliyapura
Arachchikattuwa	Dompe	Kalawana	Kurunegala	Negambo	Sandalankawa
Aranayaka	Elehera	Kalpitiya	Madampe	Nikawaratiya	Senapura-Katiyawa
Aththanagalla	Galgamuwa	Kalutara	Madawachchiya	Nochchiyagama	Shwawasthipura
Babarabotuwa	Galigamuwa	Karuwalagaswewa	Madirigiriya	Palugasdamana	Udapalatha
Balangoda	Galnewa	Katana	Madurankuliya	Panadura	Ududbaddawa
Beruwala	Galoya Mitiyawatha	Katuganpola	Mahara	Panama	Uvaparanagama-North
Bibile	Gampaha	Kaudulla	Maho	Panduwasnuwara	Uvaparanagama-South
Bingiriya	HaliEla	Kegalle	Maradankadawala	Pannilpaththu	Vijitha
Biyagama	Higurakgoda	Kehelwella	Mathugama	Pelmadulla	Wariyapola
Buttala	Hiriyala	Kelaniya	Hemmathagama	Polgahawela (MPCS)	Wattala
Chilaw	Horana	Kiriella	Mawathagama	Polgahawela (RBS)	Welimada
Dalugama	Horonbawa	Kirindiwela	Meerigama	Polonnaruwa	Wellawaya
Dambadeniya	Imbulpe	Kobaigane	Minuwangoda	Polpithigama	Wennappuwa

Appendix VI: The rating scheme

1	**Revenue recognition for performing loans**	**score**
i.	Does the bank have accounting policy for recognition for performing loans?	
ii.	If Yes, does the bank adjusted revenue recognition for performing loans on accrual basis?	
iii.	Has the bank applied the policy consistently every loan?	
iv.	Has the bank applied the policy consistently every time?	
v.	Has the bank applied the policy consistently every year?	
vi.	Does the bank disclose interest income separately in the income statement?	
vii.	Does the bank disclose receivable interest income separately in the balance sheet?	
viii.	Does the bank disclose the policy in the financial statements?	
ix.	Does the bank review the policy regularly?	
x.	Does the bank have any qualified audit opinion relates to this?	
2	**Revenue recognition for non-performing loans (NPL)**	**score**
i.	Does the bank have accounting policy for recognition for NPL?	
ii.	Does the bank recognise interest income on NPL separately, when become due?	
iii.	If Yes, does the bank adjusted revenue recognition for performing loans on cash basis?	
iv.	Has the bank applied the policy consistently every loan?	
v.	Has the bank applied the policy consistently every time?	
vi.	Has the bank applied the policy consistently every year?	
vii.	Does the bank maintain interest on suspense account?	

viii.	Does the bank disclose the policy in the financial statements?	
ix.	Does the bank review the policy regularly?	
x.	Does the bank have any qualified audit opinion relates to this?	
3	**Interest expenses**	**score**
i.	Does the bank have accounting policy for interest expenses?	
ii.	If Yes, does the bank adjusted interest expenses on accrual basis?	
iii.	Has the bank applied the policy consistently every loan?	
iv.	Has the bank applied the policy consistently every time?	
v.	Has the bank applied the policy consistently every year?	
vi.	Does the bank disclose interest expenses separately in the income statement?	
vii.	Does the bank disclose payable interest expenses separately in the balance sheet?	
viii.	Does the bank disclose the policy in the financial statements?	
ix.	Does the bank review the policy regularly?	
x.	Does the bank have any qualified audit opinion relates to this?	
4	**Provision for loan losses**	**score**
i.	Does the bank have accounting policy for estimation for allowances for loan losses?	
ii.	If Yes, does the bank adjusted allowances for loan loss in conformity with accepted practices? i.e. months 6-12 =20%	
iii.	Has the bank applied specific and general provision for NPL?	
iv.	Has the bank applied the policy consistently every time?	
v.	Has the bank applied the policy consistently every year?	
vi.	Does the bank disclose adjusted allowance separately in the Income statement?	

vii.	Does the bank disclose accumulated allowance separately in the balance sheet?	
viii.	Does the bank disclose the policy in the financial statements?	
ix.	Does the bank review the policy regularly?	
x.	Does the bank have any qualified audit opinion relates to this?	
5	**Write-off of loan losses**	**score**
i.	Does the bank have accounting policy for write-off loans for non-performing loans?	
ii.	If Yes, does the bank adjusted write-off loans, in conformity with accepted practices?	
iii.	Has the bank applied specific and general write-off for NPL?	
iv.	Has the bank applied the policy consistently every time?	
v.	Has the bank applied the policy consistently every year?	
vi.	Does the bank disclose separately write-off loans in the Income statement?	
vii.	Does the bank disclose loans after write-offs separately in the balance sheet?	
viii.	Does the bank disclose the policy in the financial statements?	
ix.	Does the bank review the policy regularly?	
x.	Does the bank have any qualified audit opinion relates to this?	
6	**Cash flow Statement (CFS)**	**score**
i.	Is there any requirement to prepare CFS?	
ii.	If Yes, does the bank prepare CFS?	
iii.	Has the bank applied the policy consistently every year?	
iv.	Does the bank disclose cash flows from operating activities in CFS?	
v.	Does the bank disclose cash flows from investing activities in CFS?	

vi.	Does the bank disclose cash flows from financing activities in CFS?	
vii.	Does the bank disclose corresponding cash flows in current CFS?	
iii.	Does the bank follow standard accounting practices in preparing CFS?	
ix.	Does the bank review the policy regularly?	
x.	Does the bank have any qualified audit opinion relates to this?	

Appendix VII: The scales for measurement of usage of accounting practices

The financial statements were assessed by ten variables for each accounting practice (the scheme is presented in Appendix Six). A total number of sixty variables were contained in the scheme. Each variable is weighted equally as there were no differences in the relative importance in each accounting practice in this study. The usage of consideration is measured based on the following scale method.

Score range	Usage of accounting practice
0 > 2	No accurate recognitions of accounting practice
2 > 5	Accurate recognitions and adequate applications of accounting practice
5 > 8	Accurate recognitions, adequate applications and sufficient disclosures in financial statements
8 > 10	Accurate recognitions, adequate applications, sufficient disclosures in financial statements, and periodically review the accounting practice

Appendix VIII: Efficiency scores – Intermediation model

DMU No	DMU Name	Year 2003			Year 2004			Year 2005			Mean		
		TE	PTE	SE	TE	PTE	SE	TE	PTE	SE	TE	PTE	SE
1	Agalawatta	0.686	1.000	0.686	0.709	1.000	0.709	0.488	0.489	0.997	**0.628**	**0.830**	**0.797**
2	Alawwa	0.695	0.968	0.718	0.419	0.840	0.499	0.437	0.697	0.627	**0.517**	**0.835**	**0.615**
3	Ampara Udapalatha	0.569	0.682	0.833	0.499	0.559	0.892	0.325	0.360	0.904	**0.464**	**0.534**	**0.877**
4	Anamaduwa	0.802	0.896	0.895	NA	NA	NA	0.389	0.390	0.997	**0.596**	**0.643**	**0.946**
5	Anuradhapura	0.338	0.352	0.960	0.741	0.765	0.969	0.313	0.368	0.850	**0.464**	**0.495**	**0.926**
6	Arachchikattuwa	1.000	1.000	1.000	NA	NA	NA	0.692	0.819	0.846	**0.846**	**0.909**	**0.923**
7	Aranayaka	NA	NA	NA	NA	NA	NA	0.317	0.325	0.976	**0.317**	**0.325**	**0.976**
8	Aththanagalla	NA	NA	NA	0.591	0.679	0.871	0.509	0.510	0.998	**0.550**	**0.594**	**0.934**
9	Babarabotuwa	0.514	0.753	0.683	0.489	0.666	0.734	0.419	0.507	0.825	**0.474**	**0.642**	**0.747**
10	Balangoda	0.501	0.731	0.685	0.545	0.793	0.688	0.459	0.460	0.997	**0.502**	**0.661**	**0.790**
11	Beruwala	0.459	0.644	0.712	0.677	0.902	0.750	0.386	0.435	0.889	**0.507**	**0.660**	**0.784**
12	Bibile	0.591	0.681	0.867	0.349	0.518	0.673	0.380	0.510	0.745	**0.440**	**0.570**	**0.761**
13	Bingiriya	0.782	0.803	0.974	0.575	0.675	0.852	0.383	0.385	0.995	**0.580**	**0.621**	**0.940**
14	Biyagama	NA	NA	NA	0.889	0.897	0.992	0.747	0.757	0.986	**0.818**	**0.827**	**0.989**

DMU No	DMU Name	Year 2003			Year 2004			Year 2005			Mean		
		TE	PTE	SE	TE	PTE	SE	TE	PTE	SE	TE	PTE	SE
15	Buttala	0.508	0.656	0.775	0.547	0.685	0.798	0.410	0.417	0.985	**0.489**	**0.586**	**0.853**
16	Chilaw	0.928	0.972	0.955	NA	NA	NA	0.501	0.511	0.979	**0.714**	**0.742**	**0.967**
17	Dalugama	NA	NA	NA	1.000	1.000	1.000	0.350	0.357	0.980	**0.675**	**0.678**	**0.990**
18	Dambadeniya	0.803	1.000	0.803	0.648	1.000	0.648	1.000	1.000	1.000	**0.817**	**1.000**	**0.817**
19	Dankotuwa	0.643	0.737	0.872	0.584	0.711	0.821	0.456	0.456	1.000	**0.561**	**0.635**	**0.898**
20	Dehiwinipalatha	0.435	0.674	0.645	0.401	0.637	0.630	0.383	0.413	0.928	**0.406**	**0.575**	**0.735**
21	Dehiyaththakandiya	0.790	0.881	0.897	0.492	0.759	0.648	1.000	1.000	1.000	**0.761**	**0.880**	**0.848**
22	Dimbulagala	0.420	0.592	0.709	0.516	0.652	0.792	0.458	0.484	0.947	**0.465**	**0.576**	**0.816**
23	Divulapitiya	NA	NA	NA	0.589	0.599	0.984	0.512	0.519	0.985	**0.550**	**0.559**	**0.985**
24	Dompe	NA	NA	NA	0.877	0.915	0.959	0.712	0.729	0.977	**0.795**	**0.822**	**0.968**
25	Elehera	0.666	0.822	0.810	0.560	0.779	0.719	0.399	0.480	0.833	**0.542**	**0.693**	**0.787**
26	Galgamuwa	0.765	0.766	0.999	0.699	0.916	0.763	0.666	0.681	0.977	**0.710**	**0.788**	**0.913**
27	Galigamuwa	NA	NA	NA	0.586	1.000	0.586	NA	NA	NA	**0.586**	**1.000**	**0.586**
28	Galnewa	0.611	0.670	0.911	0.568	0.738	0.770	0.397	0.503	0.790	**0.525**	**0.637**	**0.823**
29	Galoya Mitiyawatha	NA	NA	NA	0.379	0.707	0.537	0.295	0.785	0.375	**0.337**	**0.746**	**0.456**
30	Gampaha	NA	NA	NA	0.702	0.714	0.984	1.000	1.000	1.000	**0.851**	**0.857**	**0.992**

DMU No	DMU Name	Year 2003			Year 2004			Year 2005			Mean		
		TE	PTE	SE	TE	PTE	SE	TE	PTE	SE	TE	PTE	SE
31	HaliEla	0.352	0.399	0.881	0.364	0.409	0.891	0.447	0.527	0.848	**0.388**	**0.445**	**0.873**
32	Higurakgoda	0.440	0.540	0.816	0.503	0.684	0.735	0.538	0.660	0.814	**0.494**	**0.628**	**0.788**
33	Hiriyala	0.570	0.967	0.590	0.555	1.000	0.555	0.430	0.674	0.637	**0.518**	**0.880**	**0.594**
34	Horana	NA	NA	NA	0.490	0.905	0.541	0.351	0.529	0.663	**0.420**	**0.717**	**0.602**
35	Horonbawa	1.000	1.000	1.000	1.000	1.000	1.000	0.640	0.817	0.783	**0.880**	**0.939**	**0.928**
36	Imbulpe	0.601	0.727	0.827	0.567	0.810	0.700	0.863	1.000	0.863	**0.677**	**0.846**	**0.797**
37	Ja-Ela	NA	NA	NA	0.801	0.803	0.997	0.761	0.824	0.924	**0.781**	**0.813**	**0.961**
38	Jayanthipura	0.344	0.360	0.956	0.340	0.351	0.968	0.167	0.236	0.707	**0.284**	**0.316**	**0.877**
39	Kabithigollawa	NA	NA	NA	0.534	0.743	0.718	0.670	0.970	0.690	**0.602**	**0.857**	**0.704**
40	Kagama	0.691	1.000	0.691	0.564	0.736	0.766	0.354	0.387	0.914	**0.536**	**0.708**	**0.790**
41	Kakirawa	0.747	0.748	0.999	0.544	0.556	0.978	0.520	0.656	0.793	**0.604**	**0.653**	**0.923**
42	Kalawana	0.706	0.943	0.749	0.702	1.000	0.702	0.828	1.000	0.828	**0.745**	**0.981**	**0.760**
43	Kalpitiya	1.000	1.000	1.000	0.461	0.528	0.873	NA	NA	NA	**0.731**	**0.764**	**0.936**
44	Kalutara	0.411	0.580	0.709	0.564	0.783	0.720	0.426	0.437	0.973	**0.467**	**0.600**	**0.801**
45	Karuwalagaswewa	0.836	0.894	0.935	NA	NA	NA	0.466	0.517	0.901	**0.651**	**0.706**	**0.918**
46	Katana	NA	NA	NA	0.700	1.000	0.700	0.573	1.000	0.573	**0.636**	**1.000**	**0.636**

DMU No	DMU Name	Year 2003			Year 2004			Year 2005			Mean		
		TE	PTE	SE	TE	PTE	SE	TE	PTE	SE	TE	PTE	SE
47	Katuganpola	0.466	0.551	0.846	0.615	0.969	0.634	0.411	0.439	0.937	**0.497**	**0.653**	**0.806**
48	Kaudulla	0.665	0.709	0.938	0.748	0.750	0.998	0.550	0.570	0.965	**0.654**	**0.676**	**0.967**
49	Kegalle	0.462	0.693	0.666	0.555	0.815	0.681	NA	NA	NA	**0.508**	**0.754**	**0.674**
50	Kehelwella	NA	NA	NA	1.000	1.000	1.000	0.673	0.722	0.932	**0.836**	**0.861**	**0.966**
51	Kelaniya	NA	NA	NA	0.635	1.000	0.635	1.000	1.000	1.000	**0.818**	**1.000**	**0.818**
52	Kiriella	0.812	1.000	0.812	0.623	1.000	0.623	0.770	1.000	0.770	**0.735**	**1.000**	**0.735**
53	Kirindiwela	NA	NA	NA	0.944	0.947	0.997	0.784	0.820	0.955	**0.864**	**0.884**	**0.976**
54	Kobaigane	0.778	0.783	0.995	NA	NA	NA	0.383	0.395	0.970	**0.581**	**0.589**	**0.982**
55	Kolonnakorale	0.603	0.772	0.781	0.583	0.824	0.707	0.778	0.933	0.835	**0.655**	**0.843**	**0.774**
56	Konaoathirawa	NA	NA	NA	NA	NA	NA	0.546	0.594	0.920	**0.546**	**0.594**	**0.920**
57	Kotadeniyawa	NA	NA	NA	0.910	1.000	0.910	0.571	0.731	0.782	**0.741**	**0.865**	**0.846**
58	Kotapola	0.517	1.000	0.517	0.454	1.000	0.454	0.298	1.000	0.298	**0.423**	**1.000**	**0.423**
59	Kuliyapitiya	0.659	0.925	0.712	0.550	0.752	0.732	0.520	0.521	0.998	**0.576**	**0.733**	**0.814**
60	Kurunegala	0.825	1.000	0.825	0.765	0.939	0.815	0.762	0.786	0.970	**0.784**	**0.908**	**0.870**
61	Madampe	1.000	1.000	1.000	NA	NA	NA	0.543	0.544	0.997	**0.772**	**0.772**	**0.999**
62	Madawachchiya	0.716	0.796	0.899	0.439	0.476	0.921	0.385	0.392	0.983	**0.513**	**0.555**	**0.934**

DMU No	DMU Name	Year 2003			Year 2004			Year 2005			Mean		
		TE	PTE	SE	TE	PTE	SE	TE	PTE	SE	TE	PTE	SE
63	Madirigiriya	0.657	0.933	0.704	0.518	0.677	0.765	0.478	0.479	0.999	**0.551**	**0.696**	**0.823**
64	Madurankuliya	1.000	1.000	1.000	0.959	1.000	0.959	0.585	0.633	0.924	**0.848**	**0.878**	**0.961**
65	Mahara	NA	NA	NA	0.859	0.875	0.981	0.549	0.560	0.981	**0.704**	**0.717**	**0.981**
66	Maho	0.991	1.000	0.991	0.580	0.769	0.755	0.850	1.000	0.850	**0.807**	**0.923**	**0.865**
67	Maradankadawala	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	**1.000**	**1.000**	**1.000**
68	Mathugama	NA	NA	NA	0.567	0.733	0.773	0.466	0.474	0.982	**0.516**	**0.604**	**0.877**
69	Mawanella-Hemmathagama	0.666	1.000	0.666	0.523	0.697	0.751	0.485	0.489	0.991	**0.558**	**0.729**	**0.802**
70	Mawathagama	NA	NA	NA	0.648	0.828	0.783	0.555	0.911	0.610	**0.602**	**0.869**	**0.696**
71	Meerigama	NA	NA	NA	0.850	0.858	0.991	0.620	0.634	0.978	**0.735**	**0.746**	**0.984**
72	Minuwangoda	NA	NA	NA	0.730	0.800	0.913	0.589	0.652	0.903	**0.659**	**0.726**	**0.908**
73	Monaragala	0.362	0.494	0.732	0.517	0.645	0.801	0.382	0.397	0.962	**0.420**	**0.512**	**0.832**
74	Munwatta (East)	NA	NA	NA	0.637	0.984	0.648	0.468	0.468	0.999	**0.553**	**0.726**	**0.823**
75	Munwatta (West)	NA	NA	NA	0.341	0.514	0.663	0.512	0.515	0.995	**0.426**	**0.514**	**0.829**
76	Naththandiya	0.885	1.000	0.885	NA	NA	NA	0.711	1.000	0.711	**0.798**	**1.000**	**0.798**
77	Nawagaththegama	0.435	0.475	0.917	NA	NA	NA	NA	NA	NA	**0.435**	**0.475**	**0.917**
78	Negambo	NA	NA	NA	1.000	1.000	1.000	0.940	1.000	0.940	**0.970**	**1.000**	**0.970**

DMU No	DMU Name	Year 2003			Year 2004			Year 2005			Mean		
		TE	PTE	SE	TE	PTE	SE	TE	PTE	SE	TE	PTE	SE
79	Nikawaratiya	1.000	1.000	1.000	0.450	0.585	0.769	0.296	0.302	0.980	**0.582**	**0.629**	**0.916**
80	Nochchiyagama	0.336	0.399	0.843	0.331	0.383	0.865	0.163	0.315	0.518	**0.277**	**0.366**	**0.742**
81	Palugasdamana	0.525	0.738	0.712	0.476	0.675	0.705	0.411	0.413	0.994	**0.471**	**0.609**	**0.804**
82	Panadura	NA	NA	NA	0.484	0.669	0.724	NA	NA	NA	**0.484**	**0.669**	**0.724**
83	Panama	0.734	1.000	0.734	0.500	0.882	0.567	0.464	0.879	0.527	**0.566**	**0.920**	**0.609**
84	Panduwasnuwara	0.660	0.863	0.765	0.708	0.865	0.818	0.511	1.000	0.511	**0.626**	**0.909**	**0.698**
85	Pannilpaththu	0.726	0.887	0.819	0.618	0.954	0.648	0.691	0.877	0.788	**0.678**	**0.906**	**0.752**
86	Pelmadulla	0.727	0.886	0.821	0.644	0.911	0.707	0.518	0.656	0.791	**0.630**	**0.817**	**0.773**
87	Polgahawela (MPCS)	NA	NA	NA	0.481	0.843	0.570	0.406	0.795	0.511	**0.444**	**0.819**	**0.541**
88	Polgahawela (RBS)	0.871	1.000	0.871	0.477	0.997	0.478	0.408	1.000	0.408	**0.585**	**0.999**	**0.586**
89	Polonnaruwa	0.464	0.577	0.803	0.498	0.738	0.675	0.430	0.504	0.852	**0.464**	**0.606**	**0.777**
90	Polpithigama	0.820	0.964	0.850	0.427	0.557	0.767	0.397	0.402	0.989	**0.548**	**0.641**	**0.869**
91	Puttalam	0.652	1.000	0.652	0.350	0.914	0.383	NA	NA	NA	**0.501**	**0.957**	**0.518**
92	Rajangana-Giribawa	1.000	1.000	1.000	0.746	0.782	0.954	0.532	0.557	0.956	**0.760**	**0.780**	**0.970**
93	Rathnapura	0.610	0.875	0.697	0.534	0.696	0.768	0.399	0.413	0.965	**0.515**	**0.662**	**0.810**
94	Redeegama	0.799	1.000	0.799	0.621	0.801	0.776	0.544	1.000	0.544	**0.655**	**0.934**	**0.706**

DMU No	DMU Name	Year 2003			Year 2004			Year 2005			Mean		
		TE	PTE	SE	TE	PTE	SE	TE	PTE	SE	TE	PTE	SE
95	Saliyapura	NA	NA	NA	0.352	0.383	0.919	0.565	0.622	0.908	**0.458**	**0.502**	**0.913**
96	Sandalankawa	0.971	1.000	0.971	0.677	0.728	0.930	NA	NA	NA	**0.824**	**0.864**	**0.950**
97	Senapura-Katiyawa	0.735	1.000	0.735	0.426	1.000	0.426	0.270	1.000	0.270	**0.477**	**1.000**	**0.477**
98	Shwawasthipura	0.527	0.530	0.995	0.536	0.552	0.972	0.405	0.422	0.962	**0.490**	**0.501**	**0.976**
99	Udapalatha	0.418	0.481	0.869	0.372	0.376	0.991	0.567	0.680	0.833	**0.452**	**0.512**	**0.898**
100	Ududdawa	0.543	0.800	0.679	0.584	0.816	0.716	0.353	0.364	0.969	**0.493**	**0.660**	**0.788**
101	Uvaparanagama-North	0.365	0.491	0.743	0.213	0.223	0.954	0.234	0.238	0.985	**0.271**	**0.318**	**0.894**
102	Uvaparanagama-South	0.452	0.526	0.858	0.446	0.461	0.965	0.405	0.413	0.980	**0.434**	**0.467**	**0.934**
103	Vijitha	0.634	0.791	0.801	0.567	0.892	0.635	0.479	0.655	0.732	**0.560**	**0.779**	**0.723**
104	Wariyapola	0.536	0.967	0.554	0.838	1.000	0.838	1.000	1.000	1.000	**0.791**	**0.989**	**0.797**
105	Wattala	NA	NA	NA	0.588	0.624	0.942	0.911	0.978	0.932	**0.749**	**0.801**	**0.937**
106	Welimada	0.446	0.615	0.725	0.509	0.612	0.831	0.404	0.413	0.979	**0.453**	**0.547**	**0.845**
107	Wellawaya	0.500	0.609	0.820	0.585	0.883	0.662	0.470	0.535	0.878	**0.518**	**0.676**	**0.787**
108	Wennappuwa	0.765	1.000	0.765	NA	NA	NA	0.513	0.648	0.791	**0.639**	**0.824**	**0.778**
Mean		**0.660**	**0.802**	**0.820**	**0.597**	**0.774**	**0.780**	**0.532**	**0.637**	**0.860**	**0.596**	**0.734**	**0.820**

NA= Data not available .

Appendix IX: Efficiency scores – Asset transformation model

DMU No	DMU Name	Year 2003			Year 2004			Year 2005			Mean		
		TE	PTE	SE	TE	PTE	SE	TE	PTE	SE	TE	PTE	SE
1	Agalawatta	0.973	1.000	0.973	0.668	0.713	0.936	0.467	0.500	0.933	**0.703**	**0.738**	**0.947**
2	Alawwa	0.781	1.000	0.781	0.346	0.510	0.679	0.763	0.886	0.861	**0.630**	**0.799**	**0.774**
3	Ampara Udapalatha	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4	Anamaduwa	1.000	1.000	1.000	0.404	0.408	0.989	0.360	0.421	0.855	**0.588**	**0.610**	**0.948**
5	Anuradhapura	0.336	0.591	0.568	0.222	0.583	0.382	0.269	0.663	0.406	**0.276**	**0.612**	**0.452**
6	Arachchikattuwa	0.996	1.000	0.996	0.764	0.775	0.986	1.000	1.000	1.000	**0.920**	**0.925**	**0.994**
7	Aranayaka	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
8	Aththanagalla	0.643	0.655	0.981	0.161	0.237	0.681	0.383	0.446	0.858	**0.396**	**0.446**	**0.840**
9	Babarabotuwa	1.000	1.000	1.000	0.694	0.742	0.935	0.643	0.643	1.000	**0.779**	**0.795**	**0.978**
10	Balangoda	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	**1.000**	**1.000**	**1.000**
11	Beruwala	0.492	0.559	0.881	0.422	0.490	0.860	0.604	0.690	0.875	**0.506**	**0.580**	**0.872**
12	Bibile	0.877	1.000	0.877	0.853	1.000	0.853	0.442	0.986	0.448	**0.724**	**0.995**	**0.726**
13	Bingiriya	0.540	0.744	0.726	0.422	0.452	0.934	0.434	0.443	0.979	**0.465**	**0.546**	**0.880**
14	Biyagama	NA	NA	NA	0.842	0.842	1.000	1.000	1.000	1.000	**0.921**	**0.921**	**1.000**
15	Buttala	1.000	1.000	1.000	0.744	0.799	0.931	0.909	0.968	0.940	**0.884**	**0.922**	**0.957**
16	Chilaw	1.000	1.000	1.000	1.000	1.000	1.000	0.651	0.788	0.827	**0.884**	**0.929**	**0.942**
17	Dalugama	NA	NA	NA	0.500	0.501	0.998	1.000	1.000	1.000	**0.750**	**0.750**	**0.999**
18	Dambadeniya	0.810	1.000	0.810	0.711	0.785	0.906	0.734	0.842	0.871	**0.752**	**0.876**	**0.862**
19	Dankotuwa	0.774	0.863	0.897	0.358	0.401	0.894	0.702	0.711	0.988	**0.612**	**0.658**	**0.926**
20	Dehiwinipalatha	0.509	0.553	0.921	0.393	0.399	0.987	0.265	0.312	0.850	**0.389**	**0.421**	**0.919**

DMU No	DMU Name	Year 2003			Year 2004			Year 2005			Mean		
		TE	PTE	SE	TE	PTE	SE	TE	PTE	SE	TE	PTE	SE
21	Dehiyaththakandiya	0.314	1.000	0.314	0.618	1.000	0.618	0.905	1.000	0.905	**0.612**	**1.000**	**0.612**
22	Dimbulagala	0.852	0.852	0.999	0.497	0.538	0.925	0.675	0.703	0.959	**0.675**	**0.698**	**0.961**
23	Divulapitiya	NA	NA	NA	1.000	1.000	1.000	1.000	1.000	1.000	**1.000**	**1.000**	**1.000**
24	Dompe	NA	NA	NA	0.771	0.777	0.992	0.631	0.676	0.935	**0.701**	**0.726**	**0.963**
25	Elehera	1.000	1.000	1.000	0.576	0.632	0.912	0.963	0.986	0.976	**0.846**	**0.873**	**0.963**
26	Galgamuwa	1.000	1.000	1.000	0.407	0.584	0.697	0.858	1.000	0.858	**0.755**	**0.861**	**0.852**
27	Galigamuwa	NA	NA	NA	1.000	1.000	1.000	NA	NA	NA	**1.000**	**1.000**	**1.000**
28	Galnewa	1.000	1.000	1.000	1.000	1.000	1.000	0.532	0.794	0.670	**0.844**	**0.931**	**0.890**
29	Galoya Mitiyawatha	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
30	Gampaha	NA	NA	NA	0.779	0.841	0.926	1.000	1.000	1.000	**0.889**	**0.921**	**0.963**
31	HaliEla	0.688	0.749	0.918	0.421	0.459	0.919	0.540	0.700	0.771	**0.550**	**0.636**	**0.869**
32	Higurakgoda	1.000	1.000	1.000	0.619	0.706	0.876	0.756	0.821	0.921	**0.792**	**0.842**	**0.932**
33	Hiriyala	0.877	1.000	0.877	0.485	0.924	0.524	1.000	1.000	1.000	**0.787**	**0.975**	**0.801**
34	Horana	0.978	1.000	0.978	1.000	1.000	1.000	0.984	1.000	0.984	**0.987**	**1.000**	**0.987**
35	Horonbawa	0.450	0.486	0.927	0.559	0.579	0.966	0.352	0.425	0.827	**0.454**	**0.497**	**0.907**
36	Imbulpe	0.907	0.916	0.990	0.448	0.509	0.879	0.838	0.921	0.909	**0.731**	**0.782**	**0.926**
37	Ja-Ela	NA	NA	NA	1.000	1.000	1.000	0.839	0.852	0.985	**0.920**	**0.926**	**0.992**
38	Jayanthipura	0.668	0.866	0.771	0.470	0.632	0.744	0.402	0.849	0.473	**0.513**	**0.783**	**0.663**
39	Kabithigollawa	NA	NA	NA	0.800	0.979	0.817	0.426	1.000	0.426	**0.613**	**0.989**	**0.622**
40	Kagama	0.731	1.000	0.731	1.000	1.000	1.000	0.531	1.000	0.531	**0.754**	**1.000**	**0.754**
41	Kakirawa	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	**1.000**	**1.000**	**1.000**
42	Kalawana	0.654	0.654	1.000	0.353	0.355	0.992	0.587	0.638	0.920	**0.531**	**0.549**	**0.971**

DMU No	DMU Name	Year 2003			Year 2004			Year 2005			Mean		
		TE	PTE	SE	TE	PTE	SE	TE	PTE	SE	TE	PTE	SE
43	Kalpitiya	0.703	0.755	0.931	0.130	0.222	0.586	NA	NA	NA	**0.417**	**0.489**	**0.758**
44	Kalutara	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	**1.000**	**1.000**	**1.000**
45	Karuwalagaswewa	0.844	0.922	0.915	0.333	0.418	0.796	1.000	1.000	1.000	**0.726**	**0.780**	**0.904**
46	Katana	NA	NA	NA	0.910	1.000	0.910	1.000	1.000	1.000	**0.955**	**1.000**	**0.955**
47	Katuganpola	0.543	0.563	0.964	0.378	0.414	0.914	0.759	0.759	0.999	**0.560**	**0.579**	**0.959**
48	Kaudulla	1.000	1.000	1.000	0.700	0.769	0.911	0.654	0.703	0.931	**0.785**	**0.824**	**0.947**
49	Kegalle	NA	NA	NA	0.419	0.454	0.922	NA	NA	NA	**0.419**	**0.454**	**0.922**
50	Kehelwella	NA	NA	NA	0.977	1.000	0.977	1.000	1.000	1.000	**0.988**	**1.000**	**0.988**
51	Kelaniya	NA	NA	NA	1.000	1.000	1.000	1.000	1.000	1.000	**1.000**	**1.000**	**1.000**
52	Kiriella	0.907	0.924	0.981	0.508	0.530	0.958	0.997	0.997	1.000	**0.804**	**0.817**	**0.980**
53	Kirindiwela	NA	NA	NA	0.943	0.955	0.987	0.736	0.766	0.961	**0.840**	**0.861**	**0.974**
54	Kobaigane	0.668	0.669	0.998	0.545	0.556	0.981	0.451	0.484	0.933	**0.555**	**0.570**	**0.971**
55	Kolonnakorale	0.679	0.779	0.873	0.448	0.450	0.994	0.588	0.611	0.963	**0.572**	**0.613**	**0.943**
56	Konaoathirawa	NA	NA	NA	NA	NA	NA	0.185	0.705	0.262	**0.185**	**0.705**	**0.262**
57	Kotadeniyawa	NA	NA	NA	1.000	1.000	1.000	0.725	0.760	0.954	**0.862**	**0.880**	**0.977**
58	Kotapola	0.986	1.000	0.986	0.972	1.000	0.972	0.974	1.000	0.974	**0.978**	**1.000**	**0.978**
59	Kuliyapitiya	0.538	0.552	0.974	0.437	0.443	0.987	0.775	0.789	0.982	**0.583**	**0.595**	**0.981**
60	Kurunegala	0.849	0.983	0.864	0.560	0.805	0.697	0.666	0.672	0.991	**0.692**	**0.820**	**0.850**
61	Madampe	0.939	1.000	0.939	0.695	0.717	0.969	0.538	0.561	0.959	**0.724**	**0.759**	**0.956**
62	Madawachchiya	1.000	1.000	1.000	0.486	0.541	0.898	0.932	1.000	0.932	**0.806**	**0.847**	**0.943**
63	Madirigiriya	1.000	1.000	1.000	0.951	0.973	0.977	0.933	0.999	0.934	**0.961**	**0.991**	**0.970**
64	Madurankuliya	0.840	0.951	0.883	0.690	0.939	0.735	0.807	1.000	0.807	**0.779**	**0.964**	**0.808**

DMU No	DMU Name	Year 2003			Year 2004			Year 2005			Mean		
		TE	PTE	SE	TE	PTE	SE	TE	PTE	SE	TE	PTE	SE
65	Mahara	NA	NA	NA	0.703	0.803	0.875	0.663	0.700	0.947	**0.683**	**0.752**	**0.911**
66	Maho	0.797	0.848	0.940	0.375	0.376	0.998	0.668	0.700	0.954	**0.613**	**0.641**	**0.964**
67	Maradankadawala	0.912	1.000	0.912	0.518	0.613	0.844	0.540	0.626	0.862	**0.657**	**0.746**	**0.873**
68	Mathugama	0.988	1.000	0.988	0.919	0.938	0.979	1.000	1.000	1.000	**0.969**	**0.979**	**0.989**
69	Mawanella-Hemmathagama	1.000	1.000	1.000	0.483	0.484	0.998	0.618	0.686	0.901	**0.700**	**0.723**	**0.966**
70	Mawathagama	0.678	0.881	0.769	0.414	0.581	0.713	0.563	0.564	0.999	**0.552**	**0.675**	**0.827**
71	Meerigama	NA	NA	NA	0.538	0.538	1.000	1.000	1.000	1.000	**0.769**	**0.769**	**1.000**
72	Minuwangoda	NA	NA	NA	0.681	0.854	0.798	0.717	0.768	0.934	**0.699**	**0.811**	**0.866**
73	Monaragala	0.694	0.727	0.955	0.424	0.475	0.892	0.551	0.625	0.881	**0.556**	**0.609**	**0.909**
74	Munwatta (East)	1.000	1.000	1.000	0.464	0.469	0.989	1.000	1.000	1.000	**0.821**	**0.823**	**0.996**
75	Munwatta (West)	0.483	0.486	0.994	1.000	1.000	1.000	0.326	0.360	0.906	**0.603**	**0.615**	**0.967**
76	Naththandiya	0.906	1.000	0.906	0.474	0.712	0.666	0.608	0.616	0.988	**0.663**	**0.776**	**0.853**
77	Nawagaththegama	0.619	0.678	0.913	NA	NA	NA	NA	NA	NA	**0.619**	**0.678**	**0.913**
78	Negambo	NA	NA	NA	1.000	1.000	1.000	1.000	1.000	1.000	**1.000**	**1.000**	**1.000**
79	Nikawaratiya	0.578	0.583	0.991	0.459	0.460	0.999	0.862	0.869	0.992	**0.633**	**0.637**	**0.994**
80	Nochchiyagama	NA	NA	NA	0.644	1.000	0.644	0.485	1.000	0.485	**0.565**	**1.000**	**0.565**
81	Palugasdamana	0.937	0.941	0.996	0.682	0.691	0.987	0.700	0.778	0.899	**0.773**	**0.803**	**0.961**
82	Panadura	1.000	1.000	1.000	1.000	1.000	1.000	0.143	0.265	0.540	**0.714**	**0.755**	**0.847**
83	Panama	0.842	1.000	0.842	0.914	0.949	0.963	0.814	1.000	0.814	**0.857**	**0.983**	**0.873**
84	Panduwasnuwara	0.837	0.969	0.864	0.545	0.639	0.854	0.658	0.665	0.989	**0.680**	**0.758**	**0.902**
85	Pannilpaththu	0.861	0.884	0.973	0.309	0.318	0.973	0.527	0.573	0.921	**0.566**	**0.592**	**0.956**
86	Pelmadulla	0.822	0.838	0.981	0.362	0.382	0.947	0.508	0.598	0.849	**0.564**	**0.606**	**0.926**

DMU No	DMU Name	Year 2003			Year 2004			Year 2005			Mean		
		TE	PTE	SE	TE	PTE	SE	TE	PTE	SE	TE	PTE	SE
87	Polgahawela (MPCS)	NA	NA	NA	0.238	0.409	0.582	0.198	0.487	0.406	**0.218**	**0.448**	**0.494**
88	Polgahawela (RBS)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	**1.000**	**1.000**	**1.000**
89	Polonnaruwa	1.000	1.000	1.000	0.645	0.646	0.998	0.781	0.794	0.983	**0.809**	**0.813**	**0.994**
90	Polpithigama	0.885	0.954	0.928	0.332	0.333	0.997	0.430	0.475	0.905	**0.549**	**0.587**	**0.943**
91	Puttalam	0.067	1.000	0.067	0.089	1.000	0.089	0.084	1.000	0.084	**0.080**	**1.000**	**0.080**
92	Rajangana-Giribawa	0.633	0.652	0.970	0.555	0.578	0.961	0.985	1.000	0.985	**0.724**	**0.743**	**0.972**
93	Rathnapura	1.000	1.000	1.000	0.367	0.485	0.756	0.829	0.893	0.929	**0.732**	**0.793**	**0.895**
94	Redeegama	0.767	0.946	0.811	0.622	0.833	0.746	0.563	0.574	0.981	**0.651**	**0.785**	**0.846**
95	Saliyapura	NA	NA	NA	0.381	0.517	0.737	0.434	0.736	0.591	**0.408**	**0.626**	**0.664**
96	Sandalankawa	0.726	0.751	0.967	0.882	0.948	0.930	NA	NA	NA	**0.804**	**0.849**	**0.948**
97	Senapura-Katiyawa	0.541	1.000	0.541	1.000	1.000	1.000	1.000	1.000	1.000	**0.847**	**1.000**	**0.847**
98	Shwawasthipura	0.924	0.994	0.930	0.715	0.749	0.954	0.474	0.647	0.733	**0.705**	**0.797**	**0.872**
99	Udapalatha	0.421	0.531	0.792	0.297	0.356	0.836	0.339	0.579	0.587	**0.352**	**0.488**	**0.738**
100	Ududdawa	0.618	0.663	0.932	0.481	0.490	0.980	0.473	0.500	0.946	**0.524**	**0.551**	**0.953**
101	Uvaparanagama-North	0.543	0.556	0.977	0.316	0.333	0.949	0.268	0.362	0.740	**0.376**	**0.417**	**0.889**
102	Uvaparanagama-South	0.536	0.689	0.778	0.480	0.583	0.824	0.354	0.604	0.585	**0.457**	**0.626**	**0.729**
103	Vijitha	1.000	1.000	1.000	0.633	0.659	0.960	0.953	0.970	0.983	**0.862**	**0.876**	**0.981**
104	Wariyapola	0.782	1.000	0.782	0.580	1.000	0.580	0.505	0.507	0.997	**0.622**	**0.836**	**0.786**
105	Wattala	NA	NA	NA	0.538	0.616	0.873	0.897	0.961	0.933	**0.717**	**0.789**	**0.903**
106	Welimada	0.755	0.771	0.979	0.496	0.500	0.992	0.501	0.534	0.938	**0.584**	**0.602**	**0.970**
107	Wellawaya	0.790	0.790	0.999	0.509	0.520	0.979	0.632	0.678	0.933	**0.644**	**0.663**	**0.970**
108	Wennappuwa	1.000	1.000	1.000	NA	NA	NA	0.976	0.976	0.999	**0.988**	**0.988**	**1.000**

	Year 2003			Year 2004			Year 2005			Mean		
	TE	**PTE**	**SE**	**TE**	**PTE**	**SE**	**TE**	**PTE**	SE	TE	PTE	SE
Mean	**0.796**	**0.875**	**0.911**	**0.622**	**0.698**	**0.890**	**0.688**	**0.781**	**0.874**	**0.697**	**0.782**	**0.888**

NA= Data not available.

Appendix X: Financial practices in sample cooperative rural banks

No	DMU NAME	Capital adequacy on equity	Capital adequacy on deposits	Liquidity of assets	Assets quality	Loan-deposit structure	Return on assets	Loan portfolio yield	Operational efficiency on loan	Operational efficiency on deposits	Operational self-sufficiency
1	Agalawatta	NA	NA	2%	NA	NA	NA	28%	18%	7%	159%
2	Alawwa	NA	NA	2%	30%	30%	1%	17%	15%	7%	115%
3	Ampara Udapalatha	NA	NA	NA	NA	NA	NA	NA	NA	NA	118%
4	Anamaduwa	NA	NA	4%	26%	45%	1%	17%	14%	7%	122%
5	Anuradhapura	3%	3%	6%	6%	35%	3%	26%	24%	11%	116%
6	Arachchikattuwa	NA	NA	5%	55%	16%	3%	5%	3%	3%	181%
7	Aranayaka	NA	NA	NA	NA	NA	NA	NA	NA	NA	80%
8	Aththanagalla	NA	NA	1%	NA	NA	3%	NA	NA	4%	146%
9	Babarabotuwa	1%	0%	0%	14%	4%	1%	33%	27%	2%	126%
10	Balangoda	0%	0%	2%	33%	47%	2%	16%	13%	9%	129%
11	Beruwala	0%	0%	3%	NA	26%	2%	24%	21%	7%	123%

No	DMU NAME	Capital adequacy on equity	Capital adequacy on deposits	Liquidity of assets	Assets quality	Loan-deposit structure	Return on assets	Loan portfolio yield	Operational efficiency on loan	Operational efficiency on deposits	Operational self-sufficiency
12	Bibile	28%	43%	12%	96%	97%	0%	9%	10%	11%	96%
13	Bingiriya	NA	NA	3%	5%	45%	1%	10%	9%	6%	114%
14	Biyagama	NA	NA	1%	30%	19%	0%	4%	2%	1%	163%
15	Buttala	36%	58%	7%	56%	28%	3%	17%	15%	20%	123%
16	Chilaw	NA	NA	4%	NA	27%	0%	4%	4%	5%	138%
17	Dalugama	NA	NA	0%	2%	108%	0%	4%	4%	7%	96%
18	Dambadeniya	NA	NA	1%	22%	30%	6%	18%	11%	5%	182%
19	Dankotuwa	NA	NA	2%	NA	27%	1%	14%	11%	5%	128%
20	Dehiwinipalatha	13%	18%	3%	27%	48%	1%	14%	15%	9%	111%
21	Dehiyaththakandiya	25%	39%	11%	NA	57%	5%	12%	7%	8%	188%
22	Dimbulagala	14%	18%	6%	4%	28%	2%	15%	13%	11%	118%
23	Divulapitiya	NA	NA	0%	14%	11%	0%	3%	3%	1%	109%
24	Dompe	NA	NA	0%	22%	42%	0%	2%	1%	1%	136%
25	Elehera	23%	33%	4%	63%	17%	2%	13%	14%	15%	119%
26	Galgamuwa	NA	NA	1%	7%	29%	4%	28%	16%	8%	181%
27	Galigamuwa	14%	33%	6%	0%	124%	4%	11%	8%	10%	149%

No	DMU NAME	Capital adequacy on equity	Capital adequacy on deposits	Liquidity of assets	Assets quality	Loan-deposit structure	Return on assets	Loan portfolio yield	Operational efficiency on loan	Operational efficiency on deposits	Operational self-sufficiency
28	Galnewa	29%	56%	6%	NA	126%	1%	11%	9%	12%	122%
29	Galoya Mitiyawatha	NA	NA	NA	NA	NA	NA	NA	NA	NA	88%
30	Gampaha	NA	NA	0%	7%	104%	0%	1%	1%	1%	112%
31	HaliEla	12%	15%	1%	89%	42%	-1%	14%	20%	11%	88%
32	Higurakgoda	11%	12%	2%	35%	28%	3%	14%	13%	13%	126%
33	Hiriyala	NA	NA	1%	0%	35%	2%	25%	20%	7%	132%
34	Horana	NA	NA	NA	NA	35%	0%	31%	31%	11%	104%
35	Horonbawa	NA	NA	2%	NA	66%	7%	16%	10%	8%	211%
36	Imbulpe	14%	17%	2%	48%	22%	1%	11%	20%	7%	110%
37	Ja-Ela	NA	NA	0%	19%	52%	0%	2%	1%	1%	131%
38	Jayanthipura	-6%	-6%	6%	85%	60%	-3%	12%	17%	12%	80%
39	Kabithigollawa	28%	41%	3%	NA	87%	2%	10%	7%	7%	148%
40	Kagama	7%	7%	4%	29%	98%	0%	9%	11%	11%	98%
41	Kakirawa	36%	59%	4%	29%	125%	2%	8%	7%	15%	138%
42	Kalawana	6%	7%	4%	41%	36%	3%	14%	18%	9%	133%
43	Kalpitiya	NA	NA	11%	3%	10%	10%	17%	8%	6%	220%

No	DMU NAME	Capital adequacy on equity	Capital adequacy on deposits	Liquidity of assets	Assets quality	Loan-deposit structure	Return on assets	Loan portfolio yield	Operational efficiency on loan	Operational efficiency on deposits	Operational self-sufficiency
44	Kalutara	NA	NA	NA	NA	42%	2%	19%	16%	11%	119%
45	Karuwalagaswewa	-11%	-17%	4%	NA	29%	1%	11%	8%	6%	135%
46	Katana	NA	NA	0%	12%	26%	0%	3%	2%	1%	124%
47	Katuganpola	NA	NA	3%	NA	28%	2%	18%	15%	7%	123%
48	Kaudulla	-3%	-6%	4%	62%	57%	5%	13%	8%	13%	161%
49	Kegalle	7%	8%	2%	19%	38%	2%	31%	25%	10%	126%
50	Kehelwella	NA	NA	0%	8%	62%	0%	1%	1%	1%	143%
51	Kelaniya	NA	NA	0%	26%	37%	6%	14%	6%	6%	246%
52	Kiriella	7%	8%	3%	17%	19%	2%	12%	17%	8%	130%
53	Kirindiwela	NA	NA	4%	8%	54%	0%	1%	1%	1%	69%
54	Kobaigane	NA	NA	6%	33%	47%	2%	14%	13%	7%	121%
55	Kolonnakorale	9%	10%	2%	66%	32%	1%	8%	11%	7%	120%
56	Konaoathirawa	NA	NA	5%	NA	NA	NA	NA	NA	10%	156%
57	Kotadeniyawa	NA	NA	0%	8%	52%	0%	1%	1%	1%	115%
58	Kotapola	NA	NA	1%	3%	59%	0%	18%	18%	11%	105%
59	Kuliyapitiya	NA	NA	2%	NA	35%	3%	27%	19%	8%	144%

No	DMU NAME	Capital adequacy on equity	Capital adequacy on deposits	Liquidity of assets	Assets quality	Loan-deposit structure	Return on assets	Loan portfolio yield	Operational efficiency on loan	Operational efficiency on deposits	Operational self-sufficiency
60	Kurunegala	NA	NA	3%	0%	65%	2%	5%	3%	2%	174%
61	Madampe	NA	NA	2%	7%	76%	3%	10%	7%	6%	155%
62	Madawachchiya	32%	48%	1%	NA	62%	1%	26%	28%	25%	109%
63	Madirigiriya	10%	12%	2%	2%	107%	3%	14%	10%	11%	137%
64	Madurankuliya	NA	NA	4%	39%	7%	2%	9%	6%	6%	156%
65	Mahara	NA	NA	0%	12%	25%	0%	2%	2%	1%	131%
66	Maho	NA	NA	1%	2%	36%	2%	13%	12%	6%	147%
67	Maradankadawala	17%	64%	13%	NA	54%	2%	5%	13%	12%	130%
68	Mathugama	NA	NA	NA	NA	54%	3%	18%	16%	13%	126%
69	Mawanella	30%	50%	3%	0%	47%	3%	20%	15%	10%	144%
70	Mawathagama	NA	NA	2%	5%	42%	1%	10%	12%	7%	114%
71	Meerigama	NA	NA	0%	18%	29%	0%	2%	2%	1%	138%
72	Minuwangoda	NA	NA	0%	13%	42%	0%	2%	2%	1%	125%
73	Monaragala	-7%	-7%	3%	48%	24%	1%	18%	18%	14%	106%
74	Munwatta (East)	NA	NA	NA	NA	61%	4%	21%	16%	12%	135%
75	Munwatta (West)	NA	NA	NA	NA	24%	2%	26%	24%	11%	112%

No	DMU NAME	Capital adequacy on equity	Capital adequacy on deposits	Liquidity of assets	Assets quality	Loan-deposit structure	Return on assets	Loan portfolio yield	Operational efficiency on loan	Operational efficiency on deposits	Operational self-sufficiency
76	Naththandiya	NA	NA	2%	NA	50%	2%	11%	10%	8%	143%
77	Nawagaththegama	10%	11%	NA	54%	50%	1%	24%	22%	14%	107%
78	Negambo	NA	NA	0%	14%	29%	0%	2%	1%	1%	130%
79	Nikawaratiya	NA	NA	3%	2%	62%	0%	16%	16%	14%	101%
80	Nochchiyagama	-3%	-3%	NA	45%	47%	-2%	4%	8%	8%	64%
81	Palugasdamana	2%	3%	1%	2%	86%	2%	13%	12%	10%	119%
82	Panadura	NA	NA	NA	NA	33%	2%	31%	26%	13%	120%
83	Panama	18%	51%	8%	NA	131%	1%	6%	6%	12%	116%
84	Panduwasnuwara	NA	NA	4%	0%	60%	2%	11%	8%	5%	134%
85	Pannilpaththu	7%	8%	2%	17%	23%	2%	13%	18%	10%	128%
86	Pelmadulla	9%	11%	3%	13%	32%	2%	13%	17%	10%	123%
87	Polgahawela (MPCS)	NA	NA	1%	NA	28%	0%	9%	11%	6%	97%
88	Polgahawela (RBS)	12%	15%	2%	NA	54%	1%	10%	10%	8%	116%
89	Polonnaruwa	3%	5%	2%	62%	56%	1%	10%	10%	12%	116%
90	Polpithigama	NA	NA	1%	22%	26%	1%	22%	19%	7%	115%
91	Puttalam	NA	NA	NA	NA	NA	8%	NA	NA	2%	123%

No	DMU NAME	Capital adequacy on equity	Capital adequacy on deposits	Liquidity of assets	Assets quality	Loan-deposit structure	Return on assets	Loan portfolio yield	Operational efficiency on loan	Operational efficiency on deposits	Operational self-sufficiency
92	Rajangana-Giribawa	NA	NA	7%	1%	80%	3%	10%	7%	8%	153%
93	Rathnapura	9%	10%	2%	24%	8%	2%	37%	29%	8%	131%
94	Redeegama	NA	NA	2%	1%	44%	3%	12%	8%	5%	150%
95	Saliyapura	31%	32%	2%	70%	36%	-1%	11%	17%	14%	94%
96	Sandalankawa	NA	NA	3%	3%	36%	2%	10%	4%	2%	230%
97	Senapura-Katiyawa	14%	27%	4%	78%	108%	0%	7%	7%	17%	105%
98	Shwawasthipura	4%	5%	7%	5%	92%	2%	12%	11%	11%	117%
99	Udapalatha	25%	33%	0%	98%	34%	1%	17%	17%	7%	112%
100	Ududdawa	NA	NA	1%	6%	58%	2%	16%	14%	10%	119%
101	Uvaparanagama-North	-1%	-1%	13%	39%	33%	-3%	14%	21%	10%	73%
102	Uvaparanagama-South	3%	4%	4%	62%	37%	2%	17%	18%	9%	116%
103	Vijitha	21%	31%	5%	19%	12%	3%	15%	15%	15%	129%
104	Wariyapola	NA	NA	3%	NA	72%	2%	8%	5%	4%	159%
105	Wattala	NA	NA	0%	24%	32%	0%	2%	2%	1%	123%
106	Welimada	22%	32%	-4%	44%	45%	1%	14%	12%	11%	112%
107	Wellawaya	18%	23%	4%	19%	24%	4%	15%	13%	13%	133%

No	DMU NAME	Capital adequacy on equity	Capital adequacy on deposits	Liquidity of assets	Assets quality	Loan-deposit structure	Return on assets	Loan portfolio yield	Operational efficiency on loan	Operational efficiency on deposits	Operational self-sufficiency
108	Wennappuwa	NA	NA	1%	11%	24%	2%	12%	8%	4%	148%

Maximum	36.0%	64.5%	13.3%	98.2%	131.3%	9.6%	36.8%	31.1%	25.1%	245.5%
Minimum	-11.3%	-16.5%	-3.5%	0.0%	4.1%	-2.9%	0.7%	0.6%	0.8%	63.5%
Average	12.2%	19.3%	3.0%	26.2%	47.2%	1.8%	13.3%	11.9%	8.0%	129.1%
Median	10.2%	12.4%	2.3%	18.5%	39.8%	1.7%	12.9%	11.5%	7.6%	123.8%
Standard deviation	11.8%	20.3%	2.9%	25.4%	28.1%	1.9%	8.0%	7.2%	4.6%	30.0%
Number of CRBs	48	48	96	76	102	104	102	102	105	108

NA= Not available data.

Appendix XI: Spearman correlation coefficients between accounting practices and efficiency

		DEA-TE(I)	DEA-TE(A)	RRPL	RRNPL	INTEX	PLL	WLL	CFL	Branches	Members	Income	Deposit	Employees	Loans
DEA-TE(A)		.279**													
	n	105													
RRPL		.436**	-0.033												
	n	108	105												
RRNPL		.301**	-0.007	.771**											
	n	108	105	108											
INTEX		.312**	0.01	.763**	.911**										
	n	108	105	108	108										
PLL		.317**	0.012	.757**	.866**	.930**									
	n	108	105	108	108	108									
WLL		.349**	0.034	.787**	.905**	.921**	.946**								
	n	108	105	108	108	108	108								
CFL		.359**	0.014	.793**	.900**	.923**	.942**	.985**							
	n	108	105	108	108	108	108	108							
Branches		.240*	0.037	.309**	.373**	.313**	.370**	.367**	.392**						
	n	108	105	108	108	108	108	108	108						
Members		0.165	0.09	.492**	.522**	.453**	.445**	.475**	.502**	.644**					
	n	108	105	108	108	108	108	108	108	108					
Income		-0.012	0.131	.378**	.444**	.398**	.357**	.401**	.386**	.397**	.484**				
	n	108	105	108	108	108	108	108	108	108	108				
Deposit		.325**	.217*	.332**	.406**	.374**	.410**	.438**	.456**	.634**	.609**	.635**			
	n	105	105	105	105	105	105	105	105	105	105	105			
Employees		.317**	0.038	.358**	.344**	.325**	.405**	.403**	.439**	.486**	.458**	.326**	.676**		
	n	108	105	108	108	108	108	108	108	108	108	108	105		
Loans		.283**	0.179	.392**	.436**	.387**	.368**	.413**	.421**	.633**	.634**	.667**	.804**	.502**	
	n	102	102	102	102	102	102	102	102	102	102	102	102	102	
Investments		.400**	.271**	.287**	.314**	.287**	.357**	.381**	.408**	.585**	.456**	.454**	.799**	.627**	.602**

**Correlation is significant at the 0.01 level *Correlation is significant at the 0.05 level. c = Correlation coefficients n= Number of observations.

Appendix XII: Spearman correlation coefficients between financial practices and efficiency

		DEA-TE(I)	DEA-TE(A)	Branches	Members	Income	Deposit	Employees	Loans	Investments	CA-ASET	CA-DEPO	LQI-ASET	ASET-QUIL	LON-DEPO	ROA	LON-PORT	OE-LON	OE-DEPO
CA-ASET		0.199	0.263	-0.202	0.057	-0.115	-0.237	-0.181	-0.17	-0.188									
	n	48	48	48	48	48	48	48	48	47									
CA-DEPO		0.265	.310*	-0.193	0.017	-0.082	-0.216	-0.213	-0.127	-0.192	.970**								
	n	48	48	48	48	48	48	48	48	47	48								
LQI-ASET		-0.147	-0.174	-.416**	-.461**	-0.166	-.532**	-.450**	-.453**	-.527**	0.077	0.177							
	n	96	96	96	96	96	96	96	94	95	46	46							
ASET-QUIL		-.347**	-0.141	-.226*	-.427**	-.444**	-.443**	-.355**	-.509**	-.392**	0.089	0.055	0.111						
	n	78	78	78	78	78	78	78	78	77	39	39	76						
LON-DEPO		0.006	0.108	0.007	0.115	0.082	-0.138	-.285**	.207*	-.229*	0.205	0.283	0.148	-0.218					
	n	102	102	102	102	102	102	102	102	101	48	48	94	78					
ROA		0.18	-0.052	-0.158	-0.154	.263**	-0.079	-0.052	-0.048	-0.117	0.122	0.146	.320**	-.250*	-0.049				
	n	104	104	104	104	104	104	104	102	103	48	48	95	78	102				
LON-PORT		-.517**	-.272**	-0.163	-0.066	.320**	-0.085	-0.018	-0.166	-0.07	-0.129	-0.211	0.125	0.041	-.230*	.473**			
	n	102	102	102	102	102	102	102	102	101	48	48	94	78	102	102			
OE-LON		-.641**	-.393**	-.246*	-.200*	0.146	-0.176	-0.085	-.286**	-0.128	-0.211	-0.278	0.169	.231*	-.248*	0.188	.862**		
	n	102	102	102	102	102	102	102	102	101	48	48	94	78	102	102	102		
OE-DEPO		-.590**	-0.042	-.461**	-.382**	-0.078	-.588**	-.478**	-.473**	-.584**	.347*	.335*	.504**	.328**	.235*	0.179	.484**	.587**	
	n	105	105	105	105	105	105	105	102	104	48	48	96	78	102	104	102	102	
OP-SELF		.672**	0.169	0.086	0.078	.202*	0.19	0.15	0.17	.224*	0.111	0.16	0.03	-.346**	-0.102	.656**	-0.023	-.337**	-.341**
	n	108	105	108	108	108	105	108	102	104	48	48	96	78	102	104	102	102	105

**Correlation is significant at the 0.01 level. *Correlation is significant at the 0.05 level. c = Correlation coefficients n= Numbers of observations

DEATE(A)	Technical efficiency in intermediation
DEA (I)	Technical efficiency in asset transformation
RRPL	Revenue recognition on performing loan
RRNPL	Revenue recognition for non-performing loans
INTEX	Interest expenses
PLL	Provision for Loan Losses
WLL	Write-off loan losses
CFL	Cash flow information
Branches	Number of branches
Members	Number of members
Income	Income
Deposit	Deposit
Employees	Number of employees
Loans	Loans
Investments	Investments

CA-ASET	Capital adequacy on assets
CA-DEPO	capital adequacy on deposits
LQI-ASET	Liquidity asset
ASET-QUIL	Assets quality
LON-DEPO	loan to deposit
ROA	Return on assets
LON-PORT	Loan portfolio yield
OE-LON	Operational efficiency on loan
OE-DEPO	Operational efficiency on deposits
OP-SELF	Operational self-sufficiency

Appendix XIII: Mean efficiency and Kruskal-Wallis test scores in CRBs size metric

Kruskal-Wallis test scores	Size metric	TE (I)	PTE (I)	SE (I)	TE (A)	PTE (A)	SE (A)
	Branches						
Kruskal-Wallis Chi-Square		6.709	7.366	.966	1.081	0.147	2.593
p-value		0.035	0.025	0.617	0.582	0.929	0.273
	Employees						
Kruskal-Wallis Chi-Square		10.906	8.266	0.346	1.633	7.305	20.695
p-value		0.004	0.016	0.841	0.442	0.026	0.000
	Loan						
Kruskal-Wallis Chi-Square		8.848	17.379	1.425	4.839	5.915	9.408
p-value		0.012	0.000	0.490	0.089	0.052	0.009
	Members						
Kruskal-Wallis Chi-Square		2.940	3.556	3.142	0.855	0.284	2.229
p-value		0.230	0.169	0.208	0.652	0.868	0.328
	Income						
Kruskal-Wallis Chi-Square		.248	11.623	19.724	2.215	2.309	1.270
p-value		0.883	.003	.000	0.330	0.315	0.530
	Deposits						
Kruskal-Wallis Chi-Square		4.317	3.675	0.973	5.104	4.326	16.600
p-value		0.038	0.055	0.324	0.078	0.115	0.000
Kruskal-Wallis Chi-Square	Investments	16.716	22.458	.598	9.457	6.073	10.371
p-value		0.000	0.000	0.742	0.009	0.048	0.006

TE (I) = Technical efficiency in intermediation. PTE (I) = Pure technical efficiency in intermediation. SE (I) = Scale efficiency in intermediation. TE (A) = Technical efficiency in asset transformation. PTE (A) = Pure technical efficiency in assets transformation. SE (A) = Scale efficiency in assets transformation.