Future of Microfinance Institutions in Sri Lanka; Prediction of Financial Distress Using Altman's Z-Score

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Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

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ABSTRACT

Microfinance is a valuable developing tool for alleviating poverty. Poverty remains to be one of the biggest policy concerns in Sri Lanka. Amongst various measures to eradicate it, Microfinance has provided a ray of hope. This paper presents a framework to predict the financial distress of such micro finance institutions operating in Sri Lanka using the Altman's Z score model.

Quantitative research approach was used based on secondary data from 2015 to 2019 on the sample population which comprised ten listed and unlisted microfinance institutions operating in Sri Lanka. This study applied the Altman Z score model on measuring financial health of selected microfinance institutions, where financial health is adopted as the dependent variable. Secondary data for the study were obtained through e-mail surveys at firm level, annual reports, and audited financial statements.

The results of Z" Scores indicated that the mean financial health of the selected microfinance institutions has improved from 2015 to 2016, however there onwards it kept on deteriorating marginally. Thus, the microfinance institutions operating in Sri Lanka have a trend of downgrading their financial health moving closer to the Distress zone overtime.

The distress prediction models used in this research, may not provide information as to what is wrong within the organization, but rather it will only give signals to identify the potential for financial distress which would encourage the firm to identify problems and take effective actions to minimize the incidence of failure.

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1. INTRODUCTION

Microfinance is a new term that came into existence in the mid-1980s with the wide expansion of financial services. This concept, which was first introduced in Bangladesh, was later adopted by many developing countries around the world as an important institutional device for alleviating poverty of poor people. Microfinance is an approach which provides financial services to unemployed or low-income individuals and groups, who are excluded from the services of formal financial institutions as they are unable to fulfill the requirements of such formal financial institutions, to obtain their services [1-3]. The term Micro Finance is generally used to refer to such formal and informal agreements that offer financial services such as small loans, savings, insurance, remittances as well as other services including advisory and technical services to the poor.

The definition of microfinance institutions proposed by some authors and organizations are seemingly different from one another. However, the essence of the definition is usually the same in which microfinance refers to the provision of financial services primarily savings and credit to the poor and low-income households that don't have access to commercial banks [4].

Microfinance institutions are defined as an organization that offers financial and lending services to a low-income population that has no access to formal financial institutions such as licensed commercial banks or licensed specialized banks. According to [5] the microfinance sector in Asia has undergone a tremendous growth in terms of the number of firms, geographical area covered, and the number of customers served, since the implementations of the financial sector reforms which started in 1990's. [5] found that the importance of the microfinance sector in developing Asian countries has increased recently due to a number of reasons.

Collins, Dewing, & Russell [6] defined microfinance as a development tool that grants or provides financial services and products transfer to assist the poor in expanding or establishing their businesses. It is mostly used in developing economies where SMEs do not have access to other sources of financial assistance.

Microfinance is a powerful instrument for the poor in the form of financial services specifically focusing on poverty alleviation, enabling the poor to build assets, increase their income and reduce their vulnerability to economic stress [7,8].

1.1 Micro Finance Institutions in Sri Lanka

According to the CEIC Data at present Sri Lanka has been categorized as a lower middle- Income country with a GDP Per Capita of 3,852.000 USD in Dec 2019, compared with 4,079.000 USD in Dec 2018 which was considered as an all-time high. After passing a critical hurdle, ending the armed conflict in 2009, annual economic growth remained at 5.8 percent. The economy is now in transition from a rural economy to a more urbanized economy that revolves mostly around manufacturing and devices. It was a remaining key challenge for small and medium scale businessmen to restrict access to capital and the Sri Lankan Microfinance sector has gradually emerged within the last few decades to overcome this issue. In 1906 the Sri Lankan microfinance industry was started with the establishment of Credit Co-operative Societies under British administration and expanded exponentially as a powerful instrument for the rural community in Sri Lanka [9,10].

Micro-insurance also plays a key role in reducing their vulnerability to external shocks. Similarly, savings also reduces vulnerability to external shocks and becomes the source of capital for future investments [11]. Large number of microfinance services expanded exponentially which made a tremendous impact on the Sri Lankan rural community. There are a large variety of institutions providing microfinance services in Sri Lanka which includes licensed banks, rural banks, licensed finance companies, thrift and credit co-operatives and other community-based organizations and they provide a range of financial services through loans and deposit facilities including savings, credit, payment services, money transfer, and insurance.

As a result of this vast diversity of institutions providing microfinance services in Sri Lanka there has been a lack of a single source of information on the entire sector. There are trends that micro finance insurance and other micro financial services are gradually penetrating the local market, however it has a slow phase. At the global level, micro finance insurance services

also increasingly become popular among the low- income segments of the society.

Different types of institutions engage in Microfinance service provision in Sri Lanka. Few of the Micro Finance schemes initiated with the sponsorship of government institutions, banks and development programs included Samurdhi Scheme, Govijana Credit Scheme, HNB Grameen, Commercial Credit, LOLO Finance, Women's Society Based Credit Scheme and Bhagya Credit Scheme etc. While some Micro Finance institutions in Sri Lanka have been initiated with the sponsorship of non-governmental organizations.

According to the [12] by the Department of Development Finance, the outstanding loan portfolio of major Government microfinance institutions by end 2017 stood at Rs. 263 billion out of which 49 percent (Rs. 128 billion) is held by Regional Development Bank, 28 percent (Rs. 75 billion) is held by the Co-operative Rural Bank and 20 percent (Rs. 54 billion) is held by the Divineguma Community based Banks. The savings of the indigent reached Rs. 338 billion by the end of 2017, out of which Rs. 228 billion was placed on long term and short- term investment by these institutions.

According to the Central Bank of Sri Lanka, Microfinance has been a powerful instrument for the rural community of Sri Lankan by providing them with financial services, enabling them to build assets, reduce poverty, generate incomes, and reduce their financial vulnerability. As a result, these institutions have been able to improve the living conditions, while carrying out an active role in the economy.

Today this mechanism of micro financing is subjected to a large amount of controversy in Sri Lanka with regarding its sustainability mainly due to its nature of lending itself. There are a large number of institutions providing these services in Sri Lanka, most of these Microfinance institutions operate in small scale while being unable to achieve the required levels of operational and financial efficiencies due to their small nature. These institutions are unable to secure financial support from the commercial sector in Sri Lanka in order to fund growth. In the case of operating efficiency, it is identified that small loans are relatively more expensive than large loans. These loans are offered to low income clients who lack financial knowledge in dealing with money, as a result the risk of default from such clients is relatively high. Microfinance industry is struggling about potential tradeoffs between financial and social goals. These potential synergies between social performance and financial performance can cause for some off the trade –offs commonly associated with the double bottom line approach. It is believed that these potential trade-offs will determine the success or failure of that (MFIs) particular entity within the industry. Therefore, MFI need to explore the potential bankrupts in a corporate distress prediction context. In addition to that predicting financial distress is based on some of the identifiable patterns or symptoms of financial distress. Such symptoms might come in different forms which includes declining profit, liquidity, working capital, asset quality, arrears interest and loan repayment, delay in payment to suppliers, staff and other creditors. (It is the statement of the author. Any fact or previous study to proof the same). The purpose of this study is to assess the financial distress of microfinance institutions by using Altman Z-score model and investigate whether there are ways to utilize a widely accepted and used real world insolvency indicator, the Altman's z-Score.

The main objective of this research was to analyze the Micro Finance Institutions operation in Sri Lankan using a statistical model in order to predict financial distress.

2. LITERATURE REVIEW

2.1 Historical Background and Economic & Social Impact

[13] in their study of, the role of Micro finance they defined Microfinance as the provision of access to various financial services such as credit, savings, micro insurance, remittances, and leasing to low-income clients including consumers and the self-employed, who traditionally lack access to banking and related services. According to the author the main objective of micro finance is to provide a permanent access to appropriate financial services including insurance, savings, and fund transfer to those needed. In this study he claims that Micro finance is becoming more widely accepted, improving the efficiency and outreach while lowering the costs.

According to (Kansal, 2019) the concept of microfinance is rooted in a desire to help provide financial services to people who would otherwise not be able to access them, thereby empowering

them to get out of poverty, promoting better employment, along with economic development and growth. He further stated that even though elevation of poverty and economic growth is a noble cause, it must be achieved through a proper localized and flexible strategy through meaningful and tight regulations. Because there has been a debate over some micro finance institutions that are seeking to make an excessive or unfair profit from the ignorance of the poor. He also pointed out that Micro credit alone cannot solve the problem of poverty, as it creates a burden for the poor people, therefore a comprehensive package is needed with different types of products and services that need to be offered in order to provide people not merely with credit, but also to support them to inculcate the culture of finance in the mind of poor people, along with proper guidance to make them think of saving as an insurance to meet any future crises.

[14] pointed out that the face of poverty varies from country to country and poverty may mean a lack of some or all of the following:

  i.   Entitlement to food and other basic necessities.
  ii. Access to the public provision of economic, social, and human infrastructures.
  iii. Credit, opportunities for income generation, and consumption
  iv. Empowerment in both private and public resource allocations
  v.   Social protection for natural & other shocks

He further explained that   micro-finance is only an instrument among a large number of poverty reduction strategies that policymakers must pursue to reduce poverty.

[15] attempted to elaborate that Microfinance is not a panacea for poverty alleviation but with commitment & increased demand in both international & individual investment, microfinance can be proven to be the most effective & adaptable way of poverty alleviation. They pointed out that through innovations MFIs have been able to successfully lend to those traditionally ignored by commercial banks and microfinance remains a viable solution to economic development and poverty alleviation.

[16] found that, **capital structure** of micro finance institutions had a significant impact on the sustainability of such institutions and if those were not managed properly it could lead to financial distress. Another similar study was done

by [17] where they found that sustainability and financial well-being was a vital factor that determined the ability of such institutions to pursue their objectives. Therefore, MFIs needs to be economically viable and sustainable in the long run since he believed that these initiatives have been able to make a difference in the rural community.

According to the [18] said that in 1980 time period the various aspects of the microfinance innovation were developed and the microfinance industry carries every sign of an innovation in its take-off phase. And he mentioned that the microfinance as an entrepreneurial activity in its own right, contributing to the development of small and medium-sized firms in developing countries.

Microfinance institutions target the poor with the prime objective of their social and economic uplift. Despite this many microfinance institutions are worried to become socially focused because development goals put pressure on financials and may deteriorate their efficiency or productivity. These potential synergies between social performance and financial performance can cause for some off the trade –offs commonly associated with the double bottom line approach.

Microfinance industry has potential tradeoffs between financial and social goals [19]. During their study they identified both tradeoffs and synergies between the social and financial performance goals of microfinance institutions.

The question has been long debated – whether MFIs face a trade-off between providing services to the poor and achieving financial sustainability. When MFIs commercialize, the debate becomes more focused around concerns of mission drift. In other words, as MFIs pursue financial sustainability, does this mean that they necessarily shift up-market – reducing their costs by providing larger products (loans/savings deposits) in more accessible areas, instead of the smaller, more flexible, products needed by poorer, maybe less accessible, clients? Are financially sustainable MFIs therefore less likely to target and serve poor clients?

Responses to this question are limited by the data available for outreach. Financial sustainability is clearly defined and the data to measure it is available and is maintained over time. On the other side of the question, however,

definitions and measures of poverty alleviation are not so clear.

Nevertheless, MFIs desire to know how well their programs are performing. To assess this success, Microfinance Institutions (MFIs) need to measure the impact of such programs on the borrowers.

[20] tried to identify the social impact assessment studies. In his working paper also pointed out that finding out a universally acceptable methodology for social impact assessment is almost impossible. [20] in his working paper also pointed out that finding out a universally acceptable methodology for social impact assessment is almost impossible; however, he suggested a generic model based on four variables which social impact takes place. The four proposed variables are livelihoods, literacy, community relations and health. He concluded that Social impact by means of micro financing activities and its evaluation can be best understood by this generic model.

And also, [21] focused on the Regulation of the Microfinance Sector in Sri Lanka. Various providers of microfinance, especially those, owned by or linked to the state are regulated by different entities such as Samurdhi Authority of Sri Lanka, etc. She emphasized that the absence of a regulatory and supervisory system for the microfinance sector has been one of the barriers to the growth of the sector.

From most of the research works, a large number of researches and literatures have been carried out about the importance and performance of micro finance institutions around the world but only few studies have been carried out on the financial sustainability of micro finance institutions. And no such study regarding Microfinance institution has been carried out in Sri Lankan context. Based on the findings of previous studies in the literature, the present study attempts to fill this gap in the literature by combining financial data with a widely accepted statistical formula (Altman z-score) to predict the financial distress of micro finance institutions in Sri Lanka.

2.2 Altman z-score

[22] indicate that with using accounting information it can pinpoint companies that will be about to face financial distress. The financial distress and finally bankruptcy can cause some great damages to shareholders, virtual investors, creditors, managers, employers, suppliers of early materials and clients. One of the inherent factors of financial distress and finally the bankruptcy of the organizations is lack of existing of control by different claimants.

[22] discussed the Z –Score model for assessing the distress of industrial corporations. This model is still being used by practitioners throughout the world. During his study first, those unique characteristics of business failures were examined in order to specify and quantify the variables which are effective indicators and predictors of corporate distress. He extended this model and findings to include application to firms not traded publicly to non- manufacturing entities. Altman's model is the best known of the early studies. Altman published what has become the best-known predictor of bankruptcy prediction model that combines five financial ratios to produce a product called a Z-score.

Here is his original Altman's Z score equation which was designed to predict the overall viability of publicly held manufacturing firms [23].

$$Z= 1.2(X1) + 1.4(X2) +3.3(X3) +0.6(X4) + .99(X5)$$

Where,

1. X1- working capital/ Total Assets
2. X2- Retained Earnings/ Total Assets
3. X3- Earnings before interest and tax/ Total Assets
4. X4- Market value equity / Total Assets
5. X5- Sales / Total Assets

Altman [22] applied the model to a sample of manufacturing companies in the US [24].

In 1983, Altman did another revision over original Z score model and this is developed for both manufacturing and non-manufacturing companies and private and public firms. In this formula X_5 variable has been removed in order to minimize the potential industry impact. If the same equation was used to predict financial distress of non-manufacturing firms it could lead to incorrect classification of such institutions since the original model would under predict the Z score due to their lower capital intensity. As a result of their lower capital intensity it is likely that non-manufacturing firms are likely to have significantly higher sales/Total assets sales/Total assets ratios as compared to manufacturing firms [25].

Altman's Z score equation for non-manufacturing companies is as follows.

$$Z = 6.56(X1) + 3.26(X2) + 6.72(X3) + 1.05(X4)$$

Where,

X1 **=** working capital/ Total Assets
X2 **=** Retained Earnings/ Total Assets
X3 **=** Earnings before interest and tax/ Total Assets
X4 **=** Market value equity / Total Assets

working capital/ Total Assets (WC/TA) measures the networking capital relative to the size of the assets using in the business. It is used as a measure of liquidity standardize the size of the firm. Having a solid working capital position enables firms grow and face challenges successfully. This ratio is a good test for corporate distress. If the business have negative working capital, it means they face problems in short term obligations and there are not enough current assets to cover them.

Retained Earnings/ Total Assets (RE/TA) measures total retain earnings of the firms to the total assets employed. It is able to capture the cumulative profitability. Furthermore, this ratio gives an indication of the firm's age, as a result relatively young organizations will probably have a lower RE/TA ratio than older organizations. Companies with low RE/TA are financing capital expenditure through borrowings rather than through retained earnings.

Earnings before interest and tax/ Total Assets (EBIT/TA) measures the productivity or the earning power of the assets. So that this ratio appears to be appropriate for studies dealing with financial distress or corporate failure.

Market value equity / Total Assets measures the extent to which total assets can decline before total liabilities exceed book value of equity. Most of the Micro finance institutions are more or similar to banks. Hence their financial structure will also be same where they use a significant level of leverage than other businesses.

2.3 Study Design

2.3.1 Population and sample selection

The financial system of Sri Lanka is composed of the Central Bank (CBSL), Licensed Commercial banks, Licensed Specialized banks, and Finance companies etc. There are 1628 corporate rural banks (CRBs) and 8440 thrift and credit co-operative societies (TCCs) operating in Sri Lanka. The target population of this study is such Microfinance institutions operating in Sri Lanka at present. Out of this large number of microfinance institutions, this study will be limited to a small sample of ten microfinance institutions operating in Sri Lanka. Table 1 shows the summary of the sample data.

2.3.2 Data collection

This study uses a Cross section of secondary data derived from financial statements. The various corporate financial data will be collected using secondary sources which includes, annual reports, respective websites, audited financial statements. The collection data were analyzed by applying the Altman model for measuring financial health of selected microfinance institutions.

2.4 Analysis

Data analysis of MFIs into zones based on their overall Z-score. For that Altman Z-Score will be used as the financial distress prediction model [26]. Individual discriminate scores for each of the firms in the sample from 2015 to 2019 are calculated and compared with critical cutting scores in order to classify them into the following zones. In line with the researcher's context we can use non-manufacturing firms' Z-score model because these selected sample institutions are Micro financial institutions under Sri Lanka. Therefore, researchers used this non-financial Altman's Z-score model to analyze the collected data.

Table 1. Summary of sample data

Sector	Microfinance
No. of Listed and Member institutions of LMFPA	55
No. of Companies Taken as Sample	10
% of Companies Taken as Samples	18%
No. of Years of Sample Company	05
No. of Firm Years of Sample Companies	50

For non-manufacturing firms, the safe zone is defined as Z > 2.6, the grey area is 1.10 < Z< 2.60 and financial distress is defined as 1.10 < Z.

- · "Safe" (Z > 2.6),
- · "Grey" (1.1< Z >2.6),
- · "Distress" (Z < 1.1).

Note: This revised measure has slightly different zones of interpretation.

3. FINDINGS

3.1 Liquidity Measured Working Capital to Total Assets Ratio

According to the table of descriptive statistics of working capital to total assets the mean and standard deviation values of the financial institutes were low, indicating that no major deviation existed in the data set.

3.2 Capital Structure Measured by Total Equity to Total Assets Ratio

According to the table of descriptive statistics of total equity to assets, the mean and standard deviation values of the financial institutes were low, indicating that no major deviation existed in the data set.

3.3 Cumulative Profitability Measured through the Retained earnings to Total Assets Ratio

According to the table of descriptive statistics of retained earnings to total assets ratio, it shows that the mean and standard deviation values of the financial institutes were low, indicating that no major deviation existed in the data set.

3.4 Financial Health Measure Using Altman's Z Score

This study adopted financial health as the dependent variable which is measured using the Altman's Z score.

This table shows the summary of the selected MFI'S Altman's Z-score annually based on the collected data. According to this representation except for two institutes in Sri Lanka, all other institutions are above the distress zone from 2016 onwards. Having said that, even though the majority of institutes are operating above the distress zone, only three institutes are operating in the safe zone as per Altman's Z score.

Table 2. Descriptive statistics of working capital

	2015	2016	2017	2018	2019
Mean	2.04	2.57	2.42	2.37	2.29
Standard Deviation	1.7074851	1.821434	1.243582	1.264543	1.0345014
Min	0.21	0.56	0.60	0.86	0.64
Max	6.00	6.66	5.08	5.06	4.12
Range	5.79	6.11	4.47	4.20	3.48

Table 3. Descriptive statistics of total equity to asset

	2015	2016	2017	2018	2019
Mean	0.19	0.19	0.16	0.17	0.16
Standard Deviation	0.1052393	0.112058	0.0510542	0.057397	0.061877
Min	0.08	0.08	0.09	0.08	0.07
Max	0.43	0.48	0.25	0.28	0.31
Range	0.35	0.39	0.16	0.20	0.24

Table 4. Descriptive statistic of retained earnings to total assets

	2015	2016	2017	2018	2019
Mean	0.12	0.13	0.10	0.10	0.09
Standard Deviation	0.124	0.128	0.066	0.069	0.065
Min	0.02	0.02	0.01	0.02	0.02
Max	0.43	0.48	0.21	0.21	0.21
Range	0.41	0.45	0.20	0.20	0.19

Table 5. Summary of the selected MFI'S Altman's Z-score

MFI'S	Altman's z score					Mean Z Score
	2015	2016	2017	2018	2019	
Bimputh Finance PLC	3.79	4.79	5.05	5.02	4.1	4.55
Commercial Credit and Finance PLC	1.59	2.09	2.55	2.57	2.26	2.21
Sarvodaya Development Finance Limited	0.73	0.47	0.54	0.95	0.62	0.66
HNB Grameen Finance Limited	0.19	1.27	1.68	1.78	1.98	1.38
LOLC Micro Credit PLC	1.5	1.19	2.38	1.1	2	1.63
SANASA Development Bank PLC	0.6	1.01	0.76	0.86	0.98	0.84
Berendina Micro Investments	1.6	2.15	2.11	2.16	1.5	1.9
Kanrich Finance limited (KFL)	1.09	2.57	2.38	1.97	2.31	2.06
Mercantile Investments and Finance PLC	3.18	3.33	3.55	3.61	3.36	3.41
Pragathisewa Foundation	5.67	6.21	2.98	3.25	3.29	4.28
SAFE ZONE	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**
DISTRESS ZONE	**1.1**	**1.1**	**1.1**	**1.1**	**1.1**	**1.1**

Table 6. Summary results of the sampled institutions on Altman's Z score

Type of Zone	2015		2016		2017		2018		2019	
	No.	%	No.	%	No.	%	No.	%	No.	%
Safe	3	30%	3	30%	3	30%	3	30%	3	30%
Grey	3	30%	5	50%	5	50%	5	50%	5	50%
Distress	4	40%	2	20%	2	20%	2	20%	2	20%
Total	10	100%	10	100%	10	100%	10	100%	10	100%

Table 7. Descriptive statistics of the Altman's Z score

	2015	2016	2017	2018	2019
Mean	1.99	2.51	2.40	2.33	2.24
Standard Deviation	1.622	1.719	1.243	1.257	1.035
Min	0.19	0.47	0.54	0.86	0.62
Max	5.67	6.21	5.05	5.02	4.10
Range	5.48	5.74	4.51	4.16	3.48

Above table shows the summary results of the sampled institutions on Altman's Z score basis. According to the table we find that only a few companies are in the "Safe zone", only 30% in all five years. Also, we can see that 40% of the institutions in 2015 are in the "distress zone", and 20% in the rest of the year. And the maximum of the Microfinance institutions belongs to the "Grey zone", 50% in 2016 to 2019.

Based on the above table of descriptive statistics of Altman's Z score, we can clearly see that the mean financial health of the selected microfinance institutions taken in this study has improved from 2015 to 2016.

According to the research findings Bimputh Finance PLC five -year mean Z-score which is 4.55 and greater than 2.6 and researcher can conclude that Bimputh Finance PLC under safe zone. It indicates this company maintains good

financial health based on Altman's Z score. Commercial Credit and Finance PLC mean Z score indicates 2.21, which are below the safe zone value of 2.6. Therefore, commercial Credit and fiancé PLC is in Grey zone according to Altman's Z score. This score provides insights for the company to develop financial wellbeing furthermore. Sarvodaya Development Finance Limited Mean Z score shows 0.66 and it's under the Distress zone in Altman's Z score model. This shows company is in financial distress and with a high probability of going bankrupt. Therefore, management must focus clearly on this issue and should invent the issues by considering new findings mechanisms based on the competitor's mechanisms.

HNB Finance Limited shows 1.38 mean score of five years according to Table 1. Currently the company operates under Grey zone and needs to take required action to ensure and develop to

the financial strength of the HNB Finance Limited. LOLC Finance PLC Z- score indicates 1.63 and it's also below the safe zone under Altman's Z score model and currently operates LOLC Finance PLC under the Grey zone. LOLC Finance must focus their attention on improving their financial wellbeing up to Safe zone by taking needed mechanisms based on the company management decisions. Sanasa Development Bank PLC means Z score 0.84 and it's under the Distress zone according to Altman's Z score model. This shows the company is in financial distress and with a high probability of going bankrupt and management must focus clearly on this issue and should invent the issues by considering new findings mechanisms based on the competitor's mechanisms. This is highly impactful to the company's survival.

Berendina Micro Investments mean Z score show 1.90 and in Grey zone based on the Altman's Z score model and company need to take required action to ensure and develop the financial strength of the Berendina Micro Investments Company up to Safe zone by getting little strategic options. Kanrich Finance Limited's mean Z score indicates 2.06, which is below the safe zone value of 2.6. Therefore, commercial Credit and fiancé PLC is in Grey zone according to Altman's Z score. This score provides insights for the company to develop financial wellbeing furthermore up to Safe zone.

Mercantile Investments and Finance PLC indicate mean Z value is 3.41 which shows Safe zone according to Altman's Z score model. Furthermore, it indicates this company maintains good financial health based on Altman's Z score. Pragathi Sewa Foundation also maintains good financial wealth under the company due to a mean Z score above the 2.6 of our calculation in table. Pragathi Sewa Foundation runs under the safe zone and companies need to maintain this level by using different financial strategies.

4. DISCUSSION

One common bankruptcy prediction model is the Altman Z score formula. As an objective of this study Altman Z score was applied in an analysis of financial data regarding microfinance institutions operating in Sri Lanka. Altman's Z score model uses five common business ratios and weighs them statistically to arrive at one single value. His original model was focused on manufacturing firms which was later revised to

be applicable for non-manufacturers including financial institutions such as Micro Finance institutions. This revised Altman's Z-score equation is presented as: $Z = 6.56(X1) + 3.26(X2) + 6.72(X3) + 1.05(X4)$.

Results of this newest revised Z-score model exhibit a 90.9% success rate in predicting bankruptcy prior to firm's demise and a 97% accuracy rate for identifying non bankrupt firms with continuing economic solvency (Anjum, 2012).

Some researchers have also shown that this model presents an accurate prediction of bankruptcy one to two years in advance. However, this accuracy rate depends largely on the accuracy of the secondary financial information used in calculating the Altman's Z score along with industry and other factors relevant to the study.

In this study, Altman Z score was used to analyze the financial distress of ten selected micro finance institutions from Sri Lanka. The study basically categorized the institutions according to the overall Z score compared with the cut off values of Altman Z score. Altman described that organizations (non-Manufacturing) with the score less than 1.1 are likely to experience bankruptcy. In other words, there is a high probability that institutions will face financial distress in the near future (Distress Zone) if Z < 1.1. Organizations with a Z score between 1.1 and 2.6 are in a zone of ignorance or a grey zone in which the level of financial distress is unclear. Rest of the organizations with a Z score of greater than are likely to be financially sound. In other words, such institutions are financially sound and there is least probability that the firm will face financial distress (Safe Zone). Basically, the safe zone describes the firms which carry out their actions at a fast rate while the distress zone indicates the firms which carry out few total actions and respond slowly.

In line with the results generated through the Z score analysis of this study, except for two institutes in Sri Lanka, all other institutions are above the distress zone from 2016 onwards. Having said that, even though the majority of institutes are operating above the distress zone, only three institutes are operating in the safe zone as per Altman's Z score.

Even though we categorized micro finance institutions into different zones based on the

overall Z score, it is not a clear-cut decision rule at all times. Because in previous studies as well as in this research paper it is obvious that the individual contributions of each of the four ratios are important to look at in coming to a conclusion rather than just basing it on the overall Z score.

As discussed in chapter 04, Sri Lankan micro finance institutions are operating at a lower Z score figure. This situation is further highlighted by the ratio calculations of the ten microfinance institutions under the study.

Based on the findings of this study, the financial health status of most selected Sri Lankan micro finance institutions has not been entirely healthy for the entire study period. As per the study only two micro finance institutions managed to stay in the safe zone throughout the five years of the study. Furthermore, this study carried out a trend analysis on the result of Z-Score from 2015 to 2019. Since Altman's Z score itself is just only a snapshot in time, the users of Z score should look at the trend over a period of time. Based on the trend analysis of Z score values, the improvement of financial health of the selected microfinance institutions operating in Sri Lanka has been poor from year to year, where the financial health of most selected micro finance institutions has gradually decreased from 2016 onwards.

5. CONCLUSION

In this research paper sample was limited to 10 micro finance companies from Sri Lanka because of the lack of data relating to MFIs. The study accurately predicts the financial distress of selected MFIs and specify the variables which are efficient indicators and predictors of financial distress.

According to output of this research a significant number of institutions were fallen under the distress zone including Sarvodaya Development Finance Limited, SANASA Development Bank, HNB Grameen Finance Limited in 2015, LOLC Micro Credit PLC in 2016 and Kanrich Finance limited (KFL) in 2015. Therefore, this research can be concluded by saying that micro finance institutions operating in Sri Lanka are not in a good financial position and likely to be potentially bankruptcy in near future based on the ten-microfinance institution used in the study and based on this paper it is clear that the current structure of microfinance institutions operating in

Sri Lanka are not financially sustainable as they are operating below the safe zone of the Altman's Z score.

Even though this research attempted to classified micro finance institutions in to three types of zones based on the Altman Z score model, results should not be generalized to the universe of MFIs operating in Sri Lanka, given the limited sample size. As an immediate action, the firms operating below the distress zone and safe zone needs to measure and re-evaluate their financial performance and health and make necessary steps to reach the safe zone before it's too late.

Furthermore, it is not recommended to take decisions or come to the conclusion only based on the Z score value. It is recommended that users of Z score should use that measure only as the screening method rather than taking decisions only based on Z score.

For the supplementary understanding this research calculated the t statistics using SPSS and come to the conclusion that the mean value of Z score is lower than the Lower bound of the safe zone of Z score throughout all 5 years of the study. This also confirmed the above discussed results which said five out of ten institutions fell below the distress zone while eight out of ten institutes in the sample were not in the safe zone. In the long run, steps need to be taken at a national level in order to address this issue. Where the government along with relevant authorities needs to identify the root causes for the problem and address them directly.

The micro finance institutions operating in Sri Lanka needs to give importance to both social performance as well as financial performance. However, based on the relatively small sample size of the research it is more difficult to find out statistically significant results. Also due to the small sample size, generalizing of the results of the study to a larger population of Microfinance institutions operating around the country is made difficult. Furthermore, five out of ten institutions used in the study are listed institutions that carry out other services along with micro financing at a larger scale. Therefore, it is arguable that their results can be generalized to a larger population of small microfinance institution around the country.

Another challenge faced when analyzing the financial data during this study deals was with

regard to the validity of financial information reported. It bares nothing that the findings of this study are valid only if the financial data reported and used in the study was a true reflection of the financial performance of respective institutions. In addition to that deeper knowledge is required to better understand the tradeoff between social and financial goals, since the micro finance industry has long term speculated about potential tradeoff between social and financial goals while operating sustainably and struggling to achieve the expected growth. Often, such social and development goals put pressure on the financials of these institutions, causing many microfinance institutions concerned about being too social-focused. Given the nature of microfinance institutions and its dual social and financial goals, more information is required to measure the tradeoff and impact on the financial health due to social initiatives. The lack of adequate data for measuring social performance is a general limitation, even though this paper, had made full use of the limited available financial data.

In Sri Lankan context, all of the listed microfinance institutions come under the preview of the Securities and Exchange Commission in Sri Lanka, while four institution have been registered as licensed microfinance institutions under the Central Bank of Sri Lanka. Furthermore, another 49 microfinance institutions are registered as member institutions of the Lanka Microfinance Practitioners Association.

As a result of these different types of microfinance providers being under the purview of different authorities there has been no comprehensive picture of the sector been available so far. This has been the main reason behind the unregulated nature of microfinance institutions which has led to exploitation of customers. The Sri Lankan government and the CBSL needs to address this issue and enact legislation to regulate all such institutions before it's too late.

The Central Bank of Sri Lanka has been the primary regulating authority for banking and financial services in the country. As a result of the large variety of institutions providing microfinance services in Sri Lanka, such institutions have been registered under various laws, but are not regulated under a common regulatory umbrella. Therefor unless the CBSL enact regulations to take all such unregulated microfinance institutions under its supervision the

government of Sri Lanka would have establish a separate regulatory authority for microfinance institutions operating in Sri Lanka. Establishment of a regulatory authority to oversee and regulate all microfinance institutions will be a huge milestone for the future of microfinance sector in the country.

As observed in other countries, the microfinance sector of Sri Lanka has been a victim of weak corporate governance and unethical operations. Such unethical behavior has led these institutions to high transaction costs, poor repayment rates, recurring losses, and leading the organizations to financial distress. Such incidents have resulted in the exploitation of the rural community in Sri Lanka.

6. RECOMMENDATIONS FOR FURTHER RESEARCH

The limitation of this study is that it only uses one model while predicting financial distress. To reach more concrete prediction other prediction models can also be used in parallel to the Altman's Z score model. Z score model is not the only model to measure the financial health of microfinance institutions and therefore the researcher recommends other model like CAMEL and Black Scholes Mercton Option pricing Model along with well-known financial distress prediction to determine the financial health of microfinance institutions operating in Sri Lanka.

Future studies could also incorporate non-financial factors such as rural outreach, women's empowerment alongside the financial models to identify any potential tradeoffs between financial and social goals.

Furthermore, similar study can also be done to compare the financial health of microfinance institutions country wise, identifying counties with strong microfinance sectors and using them as benchmarks can help Sri Lankan policy makers to develop the Sri Lankan microfinance industry.

DISCLAIMER

The products used for this research are commonly and predominantly use products in our area of research and country. There is absolutely no conflict of interest between the authors and producers of the products because we do not intend to use these products as an avenue for

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Khandker SR. Microfinance and poverty: Evidence using panel data from Bangladesh. The World Bank Economic Review. 2005;19(2):263-286.
2. Badugu D, Tripathi V. Micro-finance research structure studies: The microfinance structures, microfinance systems, and microfinance institutions, such as the social, economic empowerment of the poor. International Journal of Business and Applied Social Science. 2016;02(02).
3. Hulme D. Impact assessment methodlogies for microfinance: Theory, experience and better practice. World Development, 2000;28(1):79-98.
4. Wale LE. Performance analysis of a sample microfinance institutions of Ethiopia. International NGO Journal. 2009; 4(5):287-289.
5. Shawen, Guptha. Financial Performance of Microfinance Institutions. The 7; 2019.
6. Collins D, Dewing I, Russell P. Postcards from the Front: Changing narratives in UK financial services. Critical Perspectives on Accounting. 2009;20(08):884-895.
7. Salehi M, Abedini B. Financial distress prediction in emerging market empirical evidences from Iran. Business Intelligence Journal. 2009;02(02).
8. Samarkoon, Tanweer. Altman's Z-Score models of predicting corporqate distress: Evidence from the Emerging Sri Lankan Stock Market. Journal of the Academy of Finance; 2003.
9. Karunanayake R. Fiscal Management Report 2017; 2017.
10. Rhyne E, Otero M. Microfinance matures opportunities, risks, and obstacles for an emerging global industry. Innovations: Technology, Governance, Globalization. 2007;2(1):91-114.
11. Hon. Ravi Karunanayake M. The Fiscal Management Report Issued under the Fiscal Management (RESPONSIBILITY) ACT, NO. 03 OF 2003. Colombo 01, Sri Lanka.: Ministry of Finance; 2017.
12. PERFORMANCE REPORT. Department Of Development Finance; 2017.
13. Badugu D, Thripathi VK. Role of microfinance institutions in the development of entrepreneurs. International Journal of Accounting Research. 2016; 02(09).
14. Kandker SR. Microfinance and poverty: Evidence using panel data from Bangladesh. The World Bank Economic Review. 2005;19(02):263-286.
15. Sengupta R, Aubuchon CP. The microfinance revolution: An overview. The Federal Reserve Bank of St. Louis. 2008; 90(1):9-30.
16. Kinde B. Financial sustainability of microfinance institutions (MFIs) in Ethiopia. European Journal of Business and Management. 2012;4(15):1-11.
17. Agarwal PK, Sinha S. Financial performance of microfinance institutions of India a cross-sectional study. Delhi Business Review. 2010;11(02).
18. Mersland R, Strom R. The past and future of innovations in microfinance. The Oxford Handbook of Entrepreneurial Finance. 2010;859-891.
19. Rosenberg R, Gonzalez A, Narain S. The new moneylenders: Are the poor being exploited by high microcredit interest rates? Washington: CGAP. 2009;15.
20. Ghalib A. Measuring the impact of microfinance intervention: A conceptual framework of social impact assessment. 2007;24.
21. Fernando S, Madurapperuma M. The levels of financial sustainability and depth of outreach: a case of microfinance institutions in Sri Lanka; 2009.
22. Altman IE. Financial ratios, discriminant analysis and the prediction of corporate Bankruptcy. The Journal of Finance. 1968; 23(04):589-609.
23. Meressa AH. Evaluating financial distress condition of micro finance institutions in Ethiopia Using Altman's Revised Z- Score Model. International Journal of Accounting Research. 2018;3(4).
24. Lubawa G, Louangrath P. Using Altman Z-score to assess the financial effects of multiple loans on SMEs. International Journal of Research & Methodology in Social Science. 2016;2(1):63.

25. Meressa HA. Evaluating financial distress condition of micro finance institutions in Ethiopia using Altman's Revised Z-Score. International Journal of Accounting Research; 2018.

26. Meressa HA. Evaluating financial distress condition of micro finance institutions in Ethiopia using Altman's Revised Z-Score model. International Journal of Accounting Research. 2018;03(04).

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