



**Impact of Global Financial Crisis on Socially Innovative Microfinance Institutions in Pakistan**

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**Jel Classification**

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**Abstract**

The wave of global financial crises (2007 – 2008) caused a surge in the capital flows of developed countries particularly, between developed and developing countries. The crisis has hit all financial sectors with unexpected severity and speed. This paper determines the impact of global financial crisis (2007 – 2008) on socially innovative microfinance institutions operating in Pakistan by using descriptive ratio analysis and the Wilcoxon Signed Ranks Test. This paper analyzes performance of MFIs for 15 years i.e., from 2000 – 2014 in three waves: before, during and after the financial crisis. The results show that financial crisis affected performance of all selected MFIs but Thardeep Rural Development Programme (TRDP) showed major changes in three waves of crises. The output of the Wilcoxon Signed Ranks Test confirms that the financial crisis worsened the operations of MFIs in Pakistan. This study will assist microfinance practitioners, policy makers, rural financial institutions, and microfinance institutions in maintaining and developing more effective strategies to survive in such crisis in the future.

## **1. Introduction**

Microfinance (MF) is diffusing all over the world but at the same time it is rapidly changing with new innovative opportunities (Moro Visconti, 2012). In the present era technical or social innovation has a deep impact on microfinance institutions (MFIs) and it also contributes in reshaping their business model (Moro Visconti, 2014). For mitigating MF risk factors innovation works as an opportunity in view of its persistent impact on the risk factors (Holmes and Watts, 2009).

MFIs are considered as an effective and innovative measure of poverty alleviation as it provides various financial services to poor borrowers who require a small amount of money to finance their businesses (Kneiding, 2009). Therefore, microfinance can be recognized as an economic innovation with a goal to combat poverty (Jonker, 2009). At present thousands of microfinance institutions (MFIs) are operating with ranging from self-help groups to established commercial banks providing various financial services to millions of microbusinesses (Dokulilova, 2009). These MFIs are supported by not only the donor agencies, but also by many philanthropists, investors, network organizations, lenders, management consulting firms, and many other specialized businesses and all these organizations collectively form the flourishing global microfinance industry (Gonzalez, 2011).

Microfinance has developed as an essential tool for poverty alleviation from the past two decades and its idea was first launched in 1970 when Dr. Yunus of Grameen Bank (Nobel laureate) started interest free micro loans to poor people (Karanshawy, 2007). The beginning of microfinance sector in Pakistan can be drawn back to the early 1990s with two projects: The Aga Khan Rural Support Program (AKRSP) and the Orangi Pilot Project (OPP) (O'Donohoe, 2009). At present, a multitude of institutes are providing microfinance services in Pakistan including Non- Governmental Organizations (16) Microfinance Banks (10), Rural Support Programs (6), Non- Banking Financial Institutions (24) and others (16) (Pakistan Microfinance Network, 2014). According to Tahir and Che Tahrim (2014) microfinance institutions plays an important role in the financial sector of Pakistan by improving the living standards of poor households. Likewise, Chowdry (2011) explained that MFIs are a key sector being an operative and proven channel of credit delivery to the small and medium

households of economy but due to the global financial crisis not only the financial sector but also the MFIs of Pakistan went through a very harsh period.

The economy of Pakistan showed an impressive growth during the first half of 2000s (Khawaja & Ghani, 2012). But in 2008 the world economy confronted its most dangerous catastrophe since the Great Depression of the 1930s (Chowdry, 2011). The crisis began in 2007, when in the United States sky-high home prices finally turned resolutely downward, spread rapidly, initially it effected entire financial sector of U.S. and then it reached financial markets overseas (Havemann, 2009). Among developing countries, Pakistan faced greater inflationary pressure in the crisis period due to an increase in food prices, severe power shortage and slowdown in the services and manufacturing sector and its microfinance sector also faced a shock in its balance sheet as on the liability side, all types of donors were badly influenced due to a sudden drop in liquidity and on the assets side, due to the worsening of macroeconomic conditions the loan delinquency and write offs also began to increase (Badiola, 2009). The crisis and recession also affected the poverty reduction goals of developing countries in East Asia as the crisis lead to rising unemployment and collapsing of financial institutions made it more difficult to tackle as compare to the past recession of 1980s (Littlefield, 2009).

In the past many researches have been done on this issue but still it is far from clear that how much the crisis affected performance of MFIs. The objective of this study is to evaluate the performance of the socially innovative MFIs against the background of global financial crisis and for this purpose, the study has examined some key performance measuring ratios for assessing the scalability, sustainability and outreach of MFIs. The study has applied Wilcoxon Signed Ranks Test for ranking MFIs primarily based on their performance. This study will assist policy makers, microfinance practitioners, rural financial institutions and microfinance institutions for meaningful analysis and developing strategies for being sustainable institutions.

## **2. Literature Review**

In this part an overview of the literature on analysis of MFIs' performance is given and recommend that the thriving global industry of microfinance gives an opportunity to all

researchers to make a difference in understanding this complex phenomenon of microfinance through research. Though in the past several studies have been conducted to evaluate performance of MFIs but still, no standardized method for evaluation of a microfinance programs performance has yet been established. The researchers like Wagner and Charlotte (2013), Krauss (2011), Silva and Chavez (2015), Gonzalez (2011) applied panel regression testing with correlation analysis for measuring the performance of MFIs on secondary data.

A few authors like Breza (2016) and Lavoie (2011) conducted qualitative research study based on primary data for measuring the performance of MFIs against the background of crisis. The researchers like Breza (2016), Aemiro and Mekonnen (2012) and Di Bella (2011) analyzed the ratios of gross loan portfolio (GLP), return on asset (ROA), return on equity (ROE) and portfolio at risk (PAR) for assessing performance of MFIs during and after the global financial crisis.

A number of authors like Lavoie (2011), Aemiro and Mekonnen (2012), Olson and Zoubi (2016) and Breza (2016) determined the impact of global financial crisis on the MFIs operating in the developing countries like Brazil, Ethiopia, Africa, Middle East and South East Asia (MENASA) and India. While Kollmann (2013) investigated the performance of MFIs using a two country model comprising of Europe and U.S. for assessing the impact of the global financial crisis. Whereas the study assessing MFIs' performance operating across the world was done by Beltratti (2012). Likewise, Schumacher (1973) encouraged "appropriate technology' i.e., the proper utilization of local resources for the benefit of poor.

Many researchers like Olson and Zoubi (2016), Breza (2016), Silva and Chavez (2015), Wagner and Charlotte (2013), Kollmann (2013), Bitrate (2012), Aemiro and Mekonnen (2012), Krauss (2011), Gonzalez (2011) and Lavoie (2011), assessed the performance of MFIs operating in the time period ranging from 1999 to 2011 and concluded that microfinance were efficiently providing different types of financial services including small deposits, micro-credit, payment services etc., to poor households but the global crises affected their operations badly.

Although in all previous researches the selected sample of MFIs was different but most of them like Olson and Zoubi (2016), Breza (2016), Silva and Chavez (2015), Aemiro and Mekonnen (2012), Kollmann (2013), Bitrate (2012) described a negative shift in the performance indicators of MFIs due to the global financial crisis mainly in year 2008 and also explained that MFIs were not stable enough to face the crisis without bearing some losses. While a few researchers like Mahinda and Wijesiri (2016), and Visconti and Roberto (2011) concluded that MFIs operating in developing countries were less affected by the crisis due to the flexibility in their organizational structure to global shocks.

### **3. Methodology**

The study employed quantitative approach on selected MFIs and the data is collected from Microfinance Information Exchange (MIX) database for the time period of 15 years that is, 2000-2014. The study analyzes the performance of those MFIs which offers wide range of socially innovative products/services and are more active in women empowerment programs. The study has applied two methodologies on the dataset which are descriptive ratio analysis and Wilcoxon Signed Ranks Test for assessing the performance before, during, and after the crisis of MFIs in Pakistan. The study comprises of all (non-profit) microfinance institutions providing services in Pakistan.

In this study 18 MFIs are sampled and the reason for selecting a small sample is to maintain the quality of results obtained from the Wilcoxon signed ranks test as this test requires small sample sizes for each phase of analysis. These MFIs are selected on the basis of provision of maximum socially innovative products/services to their clients and on their preference of providing maximum loans to female borrowers. As in the past researches, the promoters of microfinance has emphasized on providing more innovative services to the clients and considered women's empowerment as a social goal and an alternative way to evaluate the performance of MFIs (Badiola, 2009; Hermes et al., 2011)

**Table 1.** MFIs Selected on The Basis of their Socially Innovative Services and Average Loan Balance per Female Borrower

| Serial No. | Names of Sampled MFIs in Pakistan                          | Average Loan Balance per Female Borrowing (Rs.) | Socially Innovative Products / Services of MFIs  |
|------------|--|---|--|
| 1          | Accion Microfinance Bank (AMFB)                            | 27,827.87                                       | <ul style="list-style-type: none"> <li>• Small/ Larger Loans for Individuals</li> <li>• Fixed Asset Loan for Small Business Owners</li> <li>• Innovative Customized Overdraft</li> <li>• Group Loan</li> <li>• Support Programme for People Living with Impaired Disability</li> <li>• Education Based Loans for Schools</li> <li>• Savings Accounts, Brighta Socio-Investor Account</li> <li>• E-services (ATM Card)</li> </ul>   |
| 2          | Tameer Microfinance Bank (TMFB)                            | 26,781.81                                       | <ul style="list-style-type: none"> <li>• Innovative services for micro loans, micro-credit and insurance</li> <li>• E-services (ATM Card)</li> <li>• Group/ Individual Lending</li> <li>• Deposit Products, Product Brochures</li> <li>• Agriculture/ Enterprise Loan</li> <li>• Livestock Financing For</li> <li>• Milk Business Loan (MBL)</li> <li>• New Business Loan (NMBL)</li> <li>• Non-Formal Education/Health Services.</li> <li>• Livestock Extension Service Program.</li> <li>• Training Capacity Building and Skill</li> </ul> |
| 3          | Pak-Oman Microfinance Bank Ltd (POMFB)                     | 24,769.19                                       | <ul style="list-style-type: none"> <li>• Development of Community Action Groups</li> <li>• Loans, Deposits and Insurance Services</li> <li>• Financial Literacy Program</li> <li>• Innovative Renewable Energy Product</li> </ul>  |
| 4          | Development Action For Mobilization & Emancipation (DAMEN) | 23,843.10                                       | <ul style="list-style-type: none"> <li>• Innovative Agri Products &amp; Services</li> <li>• Sarsabz Karobar Services</li> <li>• Khushhali Qarza Services</li> <li>• Khushhali Livestock Services</li> <li>• Khushhali Cash Sahulat Services</li> <li>• Khushhali Assan Qarza Services</li> <li>• Trainings: Provide Capacity Building</li> </ul>   |
| 5          | The First Microfinance Bank (FMFB)                         | 19,764.29                                       | <ul style="list-style-type: none"> <li>• Opportunities and Trainings</li> <li>• Micro-Credit, Micro-Insurance</li> <li>• Capacity Building Programs</li> <li>• Pilots and Research Trainings</li> <li>• Micro Deposits</li> <li>• Astute savers invest in ORIX</li> <li>• Corporate Lease Service</li> <li>• Commercial Vehicle Leasing</li> <li>• Operating Lease Service</li> <li>• Islamic Finance Service</li> <li>• Innovative ORIX leasing Service</li> <li>• Micro Finance Service</li> <li>• Agri Finance Service</li> </ul>         |
| 6          | Khushali Bank  | 19,321.90                                       | <ul style="list-style-type: none"> <li>• Vocational Trainings</li> <li>• Provide Access to Justice Services</li> </ul>   |
| 7          | Community Support Concern (CSC)                            | 18,875.19                                       |  |
| 8          | Kashf Foundation   | 17,345.89                                       |  |
| 9          | Orix Leasing Pakistan Ltd.                                 | 15,338.23                                       |  |
| 10         | Rural Community Development Society                        | 13,704.40                                       |  |

| Serial No. | Names of Sampled MFIs in Pakistan               | Average Loan Balance per Female Borrowing (Rs.) | Socially Innovative Products / Services of MFIs   |
|------------|---|---|---|
| 11         | (RCDS)<br>Punjab Rural Support Programme (PRSP) | 12,882.81                                       | <ul style="list-style-type: none"> <li>• Women Training in Home Based Livestock Services</li> <li>• Network of water supply</li> <li>• Network of sanitation and conservancy services</li> <li>• Land use control services</li> <li>• Housing services</li> <li>• Urban or rural Infrastructure support services</li> <li>• Health insurance innovations for the poor in Pakistan</li> </ul>  |
| 12         | The National Rural Support Programme (NRSP)     | 12,650.37                                       | <ul style="list-style-type: none"> <li>• Livelihood improvement through agricultural and livestock innovations</li> <li>• Social sector services - education and health</li> <li>• Loan Product</li> <li>• Insurance Product</li> <li>• Special Project</li> <li>• PMIFL Loan</li> <li>• TUP Project (Innovative)</li> </ul>  |
| 13         | Safco Support Foundation (SSF)                  | 10,945.46                                       | <ul style="list-style-type: none"> <li>• Family Enterprise Loan, Liberation Loan, Education Loan, Health Loan, Emergency Loan, Housing Loan, Marriage Loan and a variety of innovative health services</li> </ul>   |
| 14         | Akhuwat   | 10,910.30                                       | <ul style="list-style-type: none"> <li>• Micro Loans, Micro Credit and Innovative Loan Schemes</li> <li>• Social Services</li> <li>• a. Health</li> <li>• b. Education</li> <li>• Innovation to cultivate crops during off-season</li> </ul>  |
| 15         | Orangi Pilot Project (OPP)                      | 10,860.44                                       | <ul style="list-style-type: none"> <li>• (Microfinance Programme (MFP) introduces a Branchless Banking service)</li> <li>• Micro Insurance, Loans for community infrastructure, Innovative services for sustainable livelihoods and disaster management.</li> <li>• PEACE Project</li> <li>• Access to Justice Services</li> <li>• Legal Empowerment Services</li> <li>• Dispute Resolution Services</li> <li>• Aitebaar Awareness Raising Services</li> <li>• Strengthening Rule of Law In Malakand</li> <li>• Community Based Conflict Resolution Services</li> </ul> |
| 16         | Thardeep Rural Development Programme (TRDP)     | 97,22.189                                       | <ul style="list-style-type: none"> <li>• Livelihood Enhancement &amp; Protection Project</li> <li>• Livelihood Enhancement &amp; Enterprise Development Project</li> <li>• Livelihood Support &amp; Promotion Of Small Community Infrastructure Projects</li> <li>• Innovative Green Project</li> <li>• Livelihood Strengthening Programme</li> </ul>   |
| 17         | Sungi   | 88,39.18  |   |
| 18         | Sarhad Rural Support Programme (SRSP)           | 79,37.56  |   |

\*Source: (Mix Market, 2016 and Annual Reports of MFIs)

#### 4. Ratio Analysis

In order to analyze performance of the selected 18 MFIs in Pakistan the following six key performance measuring ratios are used, in the past researches authors like Breza (2016), Aemiro and Mekonnen (2012), Di Bella (2011) and Llanto (2009) have also used some of the following ratios for measuring performance of MFIs.

**Table 2:** Variable Description

| Serial No. | Variable | Description                               | Formula  |
|------------|----------|---|--|
| 1.         | Dpsm     | Depositors per staff member               | Number of Depositors/Number of personnel                 |
| 2.         | Bpsm     | Borrowers per staff member                | Number of active borrowers/Number of personnel           |
| 3.         | Lpsm     | Loans per staff member                    | Adjusted number of loans outstanding/Number of personnel |
| 4.         | Wor      | Write-off ratio                           | Value of loans write off/Average gross loan portfolio    |
| 5.         | Alfbf    | Average loan balance per female borrowing | Average loan balance / Female borrowing                  |
| 6.         | Dasm     | Deposit account per staff member          | Number of deposit account/ Number of personnel           |

\*Source: Author's Own Calculations

#### 4.1 Wilcoxon Signed Ranks Test

The Wilcoxon Signed Ranks Test is applied on the secondary data with satisfying its four assumptions which are; use of two dependent samples for assessing differences in two time periods, independence of randomly selected paired observations, the inclusion of continuous dependent variable for ranking the differences according to their size and measurement of variables at ordinal level. Basically it is a non-parametric test used for examining significant differences between two scale/ordinal variables that can be matched, it also gives the descriptive statistics of the data and assign positive and negative ranks to the ratios of MFIs compared by using a standard normal distribution. In this study comparison and ranking of MFIs based on performance measuring ratios is done in three stages of time period; first comparison of ratios is done before and during the crisis period (2000-2006), second comparison is done between and during the crisis period (2007-2008) and third comparison is done before and after the crisis (2009-2014).



4.2 Results of Wilcoxon Signed Ranks Test

Table 3. Descriptive Statistics (before and during the crisis)

| Descriptive Statistics |    |         |                |         |          |
|------------------------|----|---------|----------------|---------|----------|
| Ratios                 | N  | Mean    | Std. Deviation | Minimum | Maximum  |
| dpsm_b                 | 18 | 1179.60 | 2662.44        | .0000   | 10441.77 |
| bpsm_b                 | 18 | 609.62  | 524.18         | 36.08   | 2151.36  |
| lpsm_b                 | 18 | 512.37  | 421.63         | 36.08   | 1607.49  |
| wor_b                  | 16 | .0652   | .0904          | .0000   | .2881    |
| dasm_b                 | 18 | 572.04  | 1413.60        | .00     | 5757.18  |
| dpsm_d                 | 14 | 80.40   | 88.88          | .0000   | 214.34   |
| bpsm_d                 | 17 | 241.20  | 144.35         | 33.51   | 625.04   |
| lpsm_d                 | 16 | 252.13  | 155.28         | 37.22   | 625.04   |
| wor_d                  | 17 | .0640   | .0906          | .0000   | .3448    |
| dasm_d                 | 13 | 54.71   | 81.53          | .00     | 214.34   |

The descriptive statistics obtained from the Wilcoxon Signed Ranks Test is depicted in above table which shows the value of mean and standard deviation along with maximum values attained by all ratios taken before the crisis is higher than during the crisis and the minimum values for all ratios taken before are comparatively lower then ratios during the crisis. The results of descriptive statistics showed that MFIs were performing well before the crisis as compare to the period of crisis that is, from 2007- 2008. The output obtained from Wilcoxon Signed Ranks Test is depicted below in Table 4.

Table 4. Wilcoxon Signed Ranks Test Results

|                 |                | Ranks           |           |              |
|-----------------|----------------|-----------------|-----------|--------------|
|                 |                | N               | Mean Rank | Sum of Ranks |
| dpsm_d - dpsm_b | Negative Ranks | 5 <sup>a</sup>  | 6.20      | 31.00        |
|                 | Positive Ranks | 4 <sup>b</sup>  | 3.50      | 14.00        |
|                 | Ties           | 5 <sup>c</sup>  |           |              |
|                 | Total          | 14              |           |              |
| bpsm_d - bpsm_b | Negative Ranks | 14 <sup>d</sup> | 10.50     | 147.00       |
|                 | Positive Ranks | 3 <sup>e</sup>  | 2.00      | 6.00         |
|                 | Ties           | 0 <sup>f</sup>  |           |              |
|                 | Total          | 17              |           |              |
| lpsm_d - lpsm_b | Negative Ranks | 13 <sup>g</sup> | 10.00     | 130.00       |
|                 | Positive Ranks | 3 <sup>h</sup>  | 2.00      | 6.00         |
|                 | Ties           | 0 <sup>i</sup>  |           |              |
|                 | Total          | 16              |           |              |
| wor_d - wor_b   | Negative Ranks | 7 <sup>j</sup>  | 7.57      | 53.00        |
|                 | Positive Ranks | 6 <sup>k</sup>  | 6.33      | 38.00        |

|                     |                |                |      |       |
|---------------------|----------------|----------------|------|-------|
|                     | Ties           | 1 <sup>l</sup> |      |       |
|                     | Total          | 14             |      |       |
| dasm_d - dasm_b     | Negative Ranks | 2 <sup>m</sup> | 5.00 | 10.00 |
|                     | Positive Ranks | 4 <sup>n</sup> | 2.75 | 11.00 |
|                     | Ties           | 6 <sup>o</sup> |      |       |
|                     | Total          | 12             |      |       |
| albf_b_d - albf_b_b | Negative Ranks | 5 <sup>p</sup> | 3.00 | 15.00 |
|                     | Positive Ranks | 0 <sup>q</sup> | .00  | .00   |
|                     | Ties           | 0 <sup>r</sup> |      |       |
|                     | Total          | 5              |      |       |

Table 4 depicts ranks obtained from Wilcoxon Signed Ranks Test Results which showed a greater number of positive ranks (representing ratios taken before crisis) as compare to negative ranks (representing ratios taken during crisis) with a significant difference between mean ranks for ratios measured before and during the crisis, with significant z-values for three ratios 'bpsm', 'lpsm' and 'albf\_b'. Thus, the output gives sufficient evidence to reject our null hypothesis and it is inferred from the results that performance of MFIs was badly affected by the global financial crisis in Pakistan.

#### 4.3 Comparison between Ratios (during and after the crisis)

**Table 5.** Descriptive Statistics (during and after the crisis)

| Descriptive Statistics |    |          |                |         |          |
|------------------------|----|----------|----------------|---------|----------|
|                        | N  | Mean     | Std. Deviation | Minimum | Maximum  |
| dpsm_d                 | 14 | 80.40    | 88.88          | .0000   | 214.34   |
| bpsm_d                 | 17 | 241.20   | 144.35         | 33.51   | 625.04   |
| lpsm_d                 | 16 | 252.13   | 155.28         | 37.22   | 625.04   |
| wor_d                  | 17 | .064     | .0906          | .0000   | .3448    |
| dasm_d                 | 13 | 54.71    | 81.53          | .00     | 214.34   |
| albf_b_d               | 8  | 441.30   | 395.30         | .0000   | 1149.75  |
| dpsm_a                 | 19 | 396.39   | 949.22         | .0000   | 3996.64  |
| bpsm_a                 | 19 | 717.73   | 394.18         | 42.55   | 1600.41  |
| lpsm_a                 | 18 | 750.55   | 368.94         | 238.80  | 1600.41  |
| wor_a                  | 18 | .1036    | .13524         | .0000   | .5242    |
| dasm_a                 | 18 | 425.14   | 1056.62        | .00     | 4365.17  |
| albf_b_a               | 18 | 28143.54 | 13333.06       | 7007.57 | 53563.63 |

The descriptive statistics shows higher value of mean and standard deviation for the ratios taken after the crisis showing that data is more dispersed after the crisis. The maximum

values attained by all ratios taken during the crisis is higher than after the crisis and the minimum values for all ratios taken during are comparatively lower than ratios taken after the crisis. The output provide an evidence to state that the crises worsened the operations of microfinance institutions during the crises period.

**Table 6.** Wilcoxon Signed Ranks Test Results

|                   |                | Ranks           |           |              |
|-------------------|----------------|-----------------|-----------|--------------|
|                   |                | N               | Mean Rank | Sum of Ranks |
| dpsm_a - dpsm_d   | Negative Ranks | 2 <sup>a</sup>  | 3.00      | 6.00         |
|                   | Positive Ranks | 6 <sup>b</sup>  | 5.00      | 30.00        |
|                   | Ties           | 6 <sup>c</sup>  |           |              |
|                   | Total          | 14              |           |              |
| bpsm_a - bpsm_d   | Negative Ranks | 1 <sup>d</sup>  | 1.00      | 1.00         |
|                   | Positive Ranks | 16 <sup>e</sup> | 9.50      | 152.00       |
|                   | Ties           | 0 <sup>f</sup>  |           |              |
|                   | Total          | 17              |           |              |
| lpsm_a - lpsm_d   | Negative Ranks | 0 <sup>g</sup>  | .00       | .00          |
|                   | Positive Ranks | 15 <sup>h</sup> | 8.00      | 120.00       |
|                   | Ties           | 0 <sup>i</sup>  |           |              |
|                   | Total          | 15              |           |              |
| wor_a - wor_d     | Negative Ranks | 5 <sup>j</sup>  | 8.60      | 43.00        |
|                   | Positive Ranks | 11 <sup>k</sup> | 8.45      | 93.00        |
|                   | Ties           | 0 <sup>l</sup>  |           |              |
|                   | Total          | 16              |           |              |
| dasm_a - dasm_d   | Negative Ranks | 1 <sup>m</sup>  | 1.00      | 1.00         |
|                   | Positive Ranks | 4 <sup>n</sup>  | 3.50      | 14.00        |
|                   | Ties           | 7 <sup>o</sup>  |           |              |
|                   | Total          | 12              |           |              |
| albfb_a - albfb_d | Negative Ranks | 0 <sup>p</sup>  | .00       | .00          |
|                   | Positive Ranks | 8 <sup>q</sup>  | 4.50      | 36.00        |
|                   | Ties           | 0 <sup>r</sup>  |           |              |
|                   | Total          | 8               |           |              |

According to the Table 6 higher number of positive ranks (representing ratios taken after crisis) as compare to negative ranks (representing ratios taken during crisis) with a significant difference between mean ranks for ratios measured during and after the crisis and significant z value for four ratios which are 'dpsm', 'bpsm', 'lpsm' and 'albfb' provides sufficient proof to reject null hypothesis and proves that performance of MFIs was badly affected due to the crisis.

4.4 Comparison between Ratios (before and after the crisis)

Table 7. Descriptive Statistics (before and after the crisis)

| Descriptive Statistics |    |          |                |         |          |
|------------------------|----|----------|----------------|---------|----------|
|                        | N  | Mean     | Std. Deviation | Minimum | Maximum  |
| dpsm_b                 | 18 | 1179.60  | 2662.44        | .0000   | 10441.77 |
| bpsm_b                 | 18 | 609.62   | 524.18         | 36.08   | 2151.36  |
| lpsm_b                 | 18 | 512.37   | 421.63         | 36.08   | 1607.49  |
| wor_b                  | 16 | .0652    | .0904          | .0000   | .288     |
| dasm_b                 | 18 | 572.04   | 1413.60        | .00     | 5757.18  |
| albf_b                 | 11 | 3173.86  | 4837.71        | 647.76  | 17247.73 |
| dpsm_a                 | 19 | 396.39   | 949.22         | .0000   | 3996.64  |
| bpsm_a                 | 19 | 717.73   | 394.18         | 42.55   | 1600.41  |
| lpsm_a                 | 18 | 750.55   | 368.94         | 238.80  | 1600.41  |
| wor_a                  | 18 | .1036    | .13524         | .0000   | .524     |
| dasm_a                 | 18 | 425.14   | 1056.62        | .00     | 4365.17  |
| albf_a                 | 18 | 28143.54 | 13333.06       | 7007.57 | 53563.63 |

According to table 7 the mean values for ratios ‘dpsm’, ‘dasm’ and ‘albf’ taken before the crisis is higher than the mean values of ratios taken after the crisis. While the mean value of ‘bpsm’, ‘lpsm’ and ‘wor’ taken after the crisis is greater than mean values of these ratios taken before the crisis. In case of standard deviation the ratios depicts more dispersion of data before the crisis as compare to after the crisis. The maximum values depicted by all ratios taken before the crisis is higher than values taken after the crisis and the minimum values for all ratios taken before crisis are comparatively lower then ratios taken after the crisis.

Table 8. Wilcoxon Signed Ranks Test Results

|                 |                | Ranks           |           |              |
|-----------------|----------------|-----------------|-----------|--------------|
|                 |                | N               | Mean Rank | Sum of Ranks |
| dpsm_a - dpsm_b | Negative Ranks | 8 <sup>a</sup>  | 7.25      | 58.00        |
|                 | Positive Ranks | 5 <sup>b</sup>  | 6.60      | 33.00        |
|                 | Ties           | 5 <sup>c</sup>  |           |              |
|                 | Total          | 18              |           |              |
| bpsm_a - bpsm_b | Negative Ranks | 6 <sup>d</sup>  | 7.17      | 43.00        |
|                 | Positive Ranks | 12 <sup>e</sup> | 10.67     | 128.00       |
|                 | Ties           | 0 <sup>f</sup>  |           |              |
|                 | Total          | 18              |           |              |
| lpsm_a - lpsm_b | Negative Ranks | 3 <sup>g</sup>  | 7.33      | 22.00        |
|                 | Positive Ranks | 14 <sup>h</sup> | 9.36      | 131.00       |
|                 | Ties           | 0 <sup>i</sup>  |           |              |
|                 | Total          | 18              |           |              |

|                   |                |                 |       |       |
|-------------------|----------------|-----------------|-------|-------|
|                   | Total          | 17              |       |       |
| wor_a - wor_b     | Negative Ranks | 5 <sup>j</sup>  | 10.00 | 50.00 |
|                   | Positive Ranks | 11 <sup>k</sup> | 7.82  | 86.00 |
|                   | Ties           | 0 <sup>l</sup>  |       |       |
|                   | Total          | 16              |       |       |
| dasm_a - dasm_b   | Negative Ranks | 6 <sup>m</sup>  | 6.17  | 37.00 |
|                   | Positive Ranks | 5 <sup>n</sup>  | 5.80  | 29.00 |
|                   | Ties           | 6 <sup>o</sup>  |       |       |
|                   | Total          | 17              |       |       |
| albf_b_a - albf_b | Negative Ranks | 1 <sup>p</sup>  | 1.00  | 1.00  |
|                   | Positive Ranks | 10 <sup>q</sup> | 6.50  | 65.00 |
|                   | Ties           | 0 <sup>r</sup>  |       |       |
|                   | Total          | 11              |       |       |

The results depicted in table 8 shows difference between mean ranks for ratios measured before and after the crisis is significant with higher number of positive ranks (representing ratios taken before crisis) than negative ranks (representing ratios taken after the crisis) and significant test z values for three ratios which are 'bpsm', 'lpsm' and 'albf'. Overall, the results gives sufficient evidence to reject null hypothesis and therefore, it is inferred that performance of MFIs is affected due to crisis.

## 5. Conclusion

The results of ratio analysis and the Wilcoxon Signed Ranks Test show that performance of all MFIs operating in Pakistan was badly affected by global financial crisis as a clear difference in the performance measuring ratios before, during, and after the crisis is observed by the analyses. The results of ratio analyses showed major changes in performance measuring ratios is depicted by TRDP as it showed highest ratio of Depositor per Staff Member 'dpsm' and Loan per Staff Member 'lpsm' among 18 selected MFIs before the crisis and depicted a major decrease in both the ratios 'dpsm' and 'bpsm' during the crisis. In case of Write-off Ratio 'wor', TRDP showed significant rise during the period of crisis, which shows performance of loan processing and collection departments working in TRDP was badly affected by the global financial crisis. After the crisis, TRDP showed a decrease in write off ratio, representing an improvement in its performance by stabilizing its loan disbursement process. But TMFB outperforms after the crisis in two ratios which are "bpsm' and 'albf' as compare to TRDP by showing significant increase in opening of deposit

accounts and allotment of average loan to their female borrowers. The results of Wilcoxon Signed Ranks Test showed significant z values and difference in mean ranks for most of the ratios compared. Thus, the results gives evidence to reject null hypothesis and the study concludes that performance of MFIs is badly affected due to crisis.

To our knowledge this study is the first attempt of its kind to analyze the impact of financial crunch on the performance of MFIs in Pakistan by using Wilcoxon Signed Ranks test as most of the previous researches have used fixed panel effects models or ratio analysis method. The findings of our study supports the results' findings of previous researches as Breza. K (2016) examined the performance of MFIs operating in the rural areas of India by using financial ratios (gross loan portfolio, average borrowers ratio) and found significant reduction in aggregate demand of MFIs during the crisis period. Similarly, Silva and Chavez (2015) examined the performance of MFIs by using fixed-panel regression model and revealed that performance of MFIs was severely affected by the financial crunch, they further exposed that efficient government polies for supporting MFIs can help them to survive in crisis period. On the similar lines, Wagner (2013) used key financial ratios like credit growth and portfolio quality and highlighted that MFIs are highly vulnerable to economic shocks. Likewise, Kollmann (2013) also confirmed the worst influence of (2007-2009) crunch on microfinance performance by conducting a research on two-country model and revealed 15% fall in the GDP of US and EA (euro area).

From the findings it is recommended that the methods of evaluating performance of MFIs should not be mere cost focusing rather it should consider the number of services provided by MFIs. This study shall help microfinance practitioners in evaluating performance MFIs more precisely and shall also assist them in maintaining financial and operational sustainability of MFIs by adopting appropriate strategies from TRDP as it survived efficiently after the crisis. Consequently, MFIs will be able to improve poor clients' welfare by maintain their sustainability and ensuring maximum outreach in terms of both directions i.e., outwards and downwards. In order to further enhance the understanding about ways of measuring performance of MFIs, future research is recommended to inspect on how MFIs can maintain their efficiencies during such crisis in the future.

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Appendix

Table 9. Data of Ratios (average) of 18 MFIs

| MFI Name      | Years     | dpsm   | bpsm    | lpsm   | wor      | dasm    | albf    |
|---------------|-----------|--------|---------|--------|----------|---------|---------|
| AMFB          | 2000-2006 | 175.25 | 7.42    | 36.08  | 0        | 74.31   | 112.54  |
|               | 2007-2008 | 214.34 | 85.20   | 75.09  | 0.06     | 214.34  | 232.65  |
|               | 2009-2014 | 258.97 | 42.55   | 0      | 0        | 0       | 0       |
| Akhawat       | 2000-2006 | 0      | 323.87  | 303.87 | 0.007    | 0       | 147.76  |
|               | 2007-2008 | 164.97 | 164.97  | 0      | 0        | 0       | 0       |
|               | 2009-2014 | 0      | 470.59  | 170.59 | 0.0062   | 0       | 117.27  |
| Asasah        | 2000-2006 | 296.09 | 324.36  | 320.19 | 0        | 296.1   | 126.75  |
|               | 2007-2008 | 157.47 | 150.42  | 150.42 | 0        | 0       | 0       |
|               | 2009-2014 | 185.07 | 302.18  | 302.18 | 0.055    | 185.08  | 207.57  |
| CSC           | 2000-2006 | 151.02 | 231.69  | 151.02 | 0        | 151.03  | 184.78  |
|               | 2007-2008 | 112.41 | 86.107  | 86.10  | 0.19     | 0       | 172.40  |
|               | 2009-2014 | 132.01 | 473.29  | 473.29 | 0.05     | 152.42  | 188.19  |
| FMFB          | 2000-2006 | 122.52 | 294.88  | 287.45 | 0.01     | 383.31  | 137.18  |
|               | 2007-2008 | 168.38 | 203.81  | 203.81 | 0.014    | 76.39   | 652.42  |
|               | 2009-2014 | 221.67 | 710.85  | 711.60 | 0.25     | 121.67  | 328.58  |
| KASFH         | 2000-2006 | 223.58 | 951.89  | 748.43 | 0.0074   | 126.27  | 871.19  |
|               | 2007-2008 | 170.32 | 352.05  | 157.04 | 0.010    | 170.32  | 698.75  |
|               | 2009-2014 | 131.18 | 935.75  | 200.89 | 0.163    | 131.19  | 391.78  |
| Khushali Bank | 2007-2008 | 0      | 535.70  | 219.98 | 0.149    | 0       | 155.83  |
|               | 2009-2014 | 0      | 308.06  | 208.06 | 0.047    | 0       | 0       |
|               | 2000-2006 | 110.95 | 106.31  | 107.97 | 0.257    | 1102.96 | 183.81  |
| NRSP          | 2000-2006 | 46.23  | 674.68  | 528.98 | 0.050    | 13.28   | 0       |
|               | 2007-2008 | 0      | 318.31  | 318.31 | 8.00E-04 | 114.23  | 0       |
|               | 2009-2014 | 0      | 794.94  | 794.94 | 0.0698   | 125.62  | 253.74  |
| ORANGI        | 2000-2006 | 0      | 133.48  | 125.70 | 0.1321   | 175.82  | 261.32  |
|               | 2007-2008 | 124.52 | 300.63  | 300.63 | 0.0019   | 283.65  |         |
|               | 2009-2014 | 361.25 | 575.41  | 600.41 | 0.002    | 442.51  | 202.8   |
| ORIX          | 2000-2006 | 124.24 | 984.06  | 104.60 | 0        | 332.14  |         |
|               | 2007-2008 | 147.85 | 625.04  | 225.04 | 0.018    | 114.25  |         |
|               | 2009-2014 | 125.68 | 1492.18 | 149.18 | 0.104    | 258.14  | 306.472 |
| POMFB         | 2000-2006 | 0      | 90.59   | 90.59  |          | 332.14  |         |
|               | 2007-2008 | 182.54 | 143.02  | 143.02 | 0.049    | 182.54  |         |
|               | 2009-2014 | 134.94 | 238.80  | 238.80 | 0.524    | 646.45  | 495.38  |

**Journal of Accounting, Finance and Auditing Studies 4/3 (2018) 67-86**

| MFI Name | Years     | dpsm   | bpsm   | lpsm     | wor   | dasm    | albfb  |
|----------|-----------|--------|--------|----------|-------|---------|--------|
| PRSP     | 2000-2006 | 120.34 | 719.29 | 127.34   | 0.236 | 1207.34 |        |
|          | 2007-2008 |        |        |          | 0     | 225.36  | 0      |
|          | 2009-2014 | 0      | 441.76 | 141.76   | 0.005 | 265.89  | 257.62 |
| RCDS     | 2000-2006 |        |        |          | 0.008 | 336.54  |        |
|          | 2007-2008 | 111.85 |        |          | 0.018 | 0       | 0.018  |
|          | 2009-2014 | 0      | 526.84 | 226.8456 | 0.017 | 0       | 274.81 |
| SRSP     | 2000-2006 | 104.77 | 578.39 | 170.1042 | 0.32  | 560.18  | 172.73 |
|          | 2007-2008 |        | 333.52 | 133.52   | 0.149 |         |        |
|          | 2009-2014 | 0      | 553.74 | 253.74   | 0.001 | 0       | 175.13 |
| SSF      | 2000-2006 | 114.75 | 730.78 | 161.86   | 0.017 | 127.45  | 129.66 |
|          | 2007-2008 | 132.65 | 263.19 | 263.19   | 0.046 | 0       | 226.43 |
|          | 2009-2014 | 165.24 | 690.34 | 190.34   | 0.083 | 0       | 210.93 |
| Sungi    | 2000-2006 | 220.62 | 279.12 | 279.12   | 0     | 220.62  | 64.49  |
|          | 2007-2008 |        | 33.51  | 37.22    |       | 215.98  |        |
|          | 2009-2014 | 0      | 692.19 | 192.19   | 0.032 | 0       | 178.35 |
| TMFB     | 2000-2006 | 57.35  | 47.03  | 47.03    |       | 57.36   |        |
|          | 2007-2008 | 67.63  | 97.75  | 97.75    | 0.102 | 67.64   | 330.89 |
|          | 2009-2014 | 399.64 | 713.05 | 113.05   | 0.012 | 436.17  | 535.62 |
| TRDP     | 2000-2006 | 539.08 | 500.36 | 307.49   | 0.075 | 302.25  |        |
|          | 2007-2008 | 0      | 285.58 | 285.58   | 0.34  | 0       |        |
|          | 2009-2014 | 0      | 849.92 | 149.92   | 0.00  | 0       | 194.37 |