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MicroNOTE

EFFICIENCY, PRODUCTIVITY, RISK AND PROFITABILITY OF MICROFINANCE INDUSTRY IN PAKISTAN: A Statistical Analysis

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INTRODUCTION

The Pakistan microfinance sector currently stands at a gross loan portfolio (GLP) of PKR 52.1 billion with 2.8 million active borrowers. Since 2003, the sector has grown by tenfold when the GLP stood at only PKR 2.6 billion and active borrowers were estimated at 333,000. Over the span of ten years, many players (local and international) have established their operations in the Pakistan microfinance segment – this is evident by PMN's member organizations which grew from 13 microfinance providers (MFPs) in 2003 to 30 member MFPs by the end of 2013. Keeping this in view, PMN has gathered a wealth of data from its network of partners over the years and this publication reveals interesting insights into the various dimensions of the microfinance sector by performing a complex multivariate regression analysis.

In the paper, major issues facing the microfinance sector including efficiency, productivity, credit risk and profitability have been analyzed using the regression analysis. The idea is to study the key drivers of these indicators within a theoretical model using the available quantitative data PMN has gathered over the years in its annual financial performance benchmarking of the sector.

Globally, studies have been conducted to assess factors impacting the performance of MFPs, whereas, in Pakistan, this area of research is relatively new. Nevertheless, a research study was carried out in Pakistan (Mahmood, Tahir, & Shahnaz, 2009) which highlighted the impact of growth strategies adopted by MFPs on organizational performance. To measure performance, a combination of financial performance ratios, financial sustainability ratios, operational efficiency ratios and productivity ratios were selected. The findings of the study determined that organizations with an extensive growth strategy fall back in their performance indicators, and that microfinance banks (MFBs) are less efficient than non-bank microfinance institutions (MFIs).

In the same year, a research carried out in Netherlands (Esubalew Assefa, 2009) examined the impact of competition on the performance of MFIs across the globe. The results of the multivariate analysis indicated that MFPs have lower outreach when

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faced with more intense competition. It also showed that increased competition is associated with lower financial performance and lower efficiency. In another study, involving samples from ten countries (Woolley, 2008), it has been observed that GDP growth rate does not have any relation with the performance of microfinance institutions. Microfinance institutions can perform well in terms of profitability, operational self-sufficiency and portfolio quality despite an unfavorable GDP growth rate. The study also suggests that microfinance is financially resilient to downturns in the domestic marketplace.

The performance of an MFP can also be affected by the regulatory framework it has to follow. A part of this paper examines how regulated MFPs and non-regulated MFPs behave in terms of organizational performance. A study conducted by the World Bank (Cull, Demirgüç-Kunt, & Morduch, 2009) shows that regulated MFPs are negatively associated with profitability. Balance sheets and income statements of 245 leading MFPs from around the world were used to assess the relationship. It was discovered that the cost structures of regulated MFPs were higher as complying with regulation and supervision can be costly.

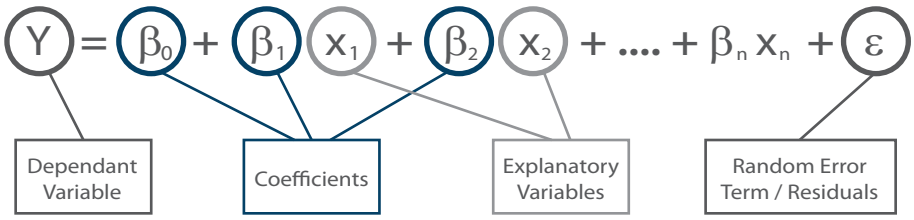
The review of international literature and local experiences helped develop the theoretical models tested in the paper.

DATA & METHODOLOGY

Over the last ten year PMN has been gathering data from it members on quarterly and annual basis. The annual data based on the audited financial statements of its members has mostly been used for benchmarking the sector's financial performance through the Pakistan Microfinance Review (PMR) whereas quarterly outreach data is used to monitor growth trends through the MicroWATCH[1]. Using this panel data set of approximately 30 microfinance providers spanning 2002-2012, this paper aims to study the relationship between key performance indicators of microfinance providers. We look at the questions of what drives *efficiency*, *productivity*, *profitability* and *risk* within the sector.

The regression models used are constructed using the Ordinary Least Square (OLS) method:

$$Y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + ... + \beta_n x_n + \varepsilon$$



The regression model on each of the above variables is a function of several independent or control variables. As a result of these multivariate regression analyses, the narrative builds up probabilistic statements regarding the factors influencing the independent variables related with the microfinance providers (MFPs), highlighting the extent and direction of their correlation (individually and collectively) with the variables of interest.

A detailed account of the findings of the regression models are described below, along with interpretation of the regression outcome indicating degrees and type of correlations, necessary underlying assumptions and conclusive probabilistic statements.

[1] PMN has been publishing PMR since 2003 and MicroWATCH since 2006.

EFFICIENCY

In the microfinance sector, efficiency can be defined by various ratios with operating expense ratio (calculated as total operating expense to average total gross loan portfolio) being one of the most common. The operating expense ratio includes all administrative and personnel expenses and allows a comparison between an MFI's portfolio yield with its administrative and personnel expenses – it measures the costs incurred to deliver loans. An MFP is considered to be efficient if it is successful in controlling its operating costs relative to net portfolio.

Factors that are considered to drive efficiency include size of organization, interest rate, growth rate, peer group and number of loans per staff.

In the model, the proxy used for size, is the total gross loan portfolio (GLP) of an organization which is considered a key determinant of an organization's operating costs and hence are indicative of the organization's size. The inclusion of this variable provides useful insights regarding the economies of scale and reveals whether larger institutions are associated with smaller operating expense ratios and therefore more efficiency.

The second independent variable used is interest rate, which is a proxy used for yield on gross loan portfolio. The premise of including this variable stems from the assumption that as MFPs' become more efficient and control their operating expenses, they will share the benefit with their clients and charge a lower interest rate.

Growth rate has also been used as an independent variable to determine the efficiency of an organization. It is defined as the percentage increase in the number of active borrowers each year. Growth rate has been used to test the hypothesis that as an organization grows and adds more clients, it can achieve economies of scale and become more efficient or vice versa i.e. growth rate adversely affects efficiency as the operating costs may go up by greater proportion.

It may also be argued that the type of institution may drive its efficiency. In Pakistan, microfinance banks (MFBs) and non-bank microfinance institutions (non-bank MFIs) differ significantly in terms of organizational structures and regulatory requirements as MFBs are regulated by the State Bank of Pakistan and have to abide by certain guidelines, whereas, non-bank MFIs do not fall under any regulatory framework. Keeping this in view, we expect the two peer groups to have a different impact on efficiency. To study this relationship, we tested the whether being a Microfinance Bank or Non-bank microfinance institutions (which consists of microfinance institutions, rural support programmes and other microfinance institutions) has any relationship with efficiency.

The last variable of the equation has been taken as loans per staff ratio which is essentially a proxy of an MFP's productivity, calculated by dividing the number of active loans of an organization by the total number of staff. Productive MFPs maximize services with optimal level of human resources, as this is a major contributor of an MFP's operating expenses. A comparatively high loan per staff ratio will mean that an MFP is utilizing more of its staff for the distribution of loans which in turn will increase its loan portfolio in a greater proportion than its HR related expenses. With this notion, we are assuming that an organization with a higher loan per staff ratio will be more efficient than an organization with lower loans per staff ratio.

The model thus tested was defined as:

$$\text{EFFICIENCY} = B0+B1(\text{Size})+B2(\text{Interest Rate})+B3(\text{Growth Rate})+B4(\text{Peer Group})+B5(\text{Loans per Staff})+\mu$$

where EFFICIENCY = (Total operating expense to Gross Loan Portfolio)

Findings

TABLE 1: Efficiency Analysis - Results

Efficiency	Coefficient	Std. Err.	t value	P value
Size	-4.09E-11	7.29E-11	-2.56	0.011
Interest Rate	-0.31767	0.186249	-1.71	0.090
Growth Rate	-6.99E-07	1.71E-07	-4.08	0.000
Peer Group – Microfinance Banks	0.23516	0.048754	4.82	0.000
Loans per Staff	-0.00109	0.000222	-4.88	0.000

To label a relationship between two variables as significant, it is important that the t value of the independent variable is greater than 2 and the P value is less than 0.05. As per the results in TABLE 1, we can see that four independent variables, *size, growth rate, peer group* and *loans per staff* are significantly related with efficiency whereas only interest rate does not have any significant relationship with efficiency.

Among the three significant variables, size, growth rate and loans per staff are negatively related with efficiency meaning that an increase in Size, Growth rate or Loans per staff will result in a decrease in operating expense ratio. It is important to note here that an organization is said be efficient if it has a low operating expense ratio whereas a high operating expense ratio will indicate an inefficient organization. Thus the results confirm the theoretical hypothesis that larger organizations or those that are growing tend to be more efficient than smaller organizations or those with stagnant growth. This could be due to the economies of scale that larger or growing institutions can realize.

Unlike the other variables, peer group is a qualitative variable and not a quantitative variable, meaning that it is not defined in any numerical form. In order to bring the peer group in a measurable form, It was constructed as a binary variable, with MFBs assigned the value of '1' and the non-bank MFI peer group assigned the value of '2', with the latter acting as the base category or benchmark with which the MFB peer group is compared. Hence, the results shown in TABLE 1 show the relationship of the MFB peer group in comparison with the non-bank MFI peer group.

Given the results, we can conclude that the MFB peer group, in comparison to non-bank MFI peer group, is more positively related to operating expense ratio, meaning that the non-bank MFI peer group is more efficient than the MFB peer group. One of the reasons for this outcome is that non-bank MFIs have lower operating expenses as compared to MFBs. Also, MFBs, unlike non-bank MFIs, not only focus on credit side but are also engaged actively in mobilizing deposits which has its own associated costs. This can also be one of the reasons for the higher operating expense ratio.

The loan per staff ratio is also significantly and inversely related with efficiency, meaning that MFPs which have higher loans per staff are more efficient. This relationship is quite evident – as an organization disburses more loans per staff, it will increase its loan portfolio at a greater proportion than its operating expenses, hence increasing efficiency.

PRODUCTIVITY

Productivity is an essential performance indicator that shows how well an organization is streamlining its operations by reflecting the amount of output per unit of input. In microfinance, this is measured in terms of work load of loan officers: the ratio, loans per loan officer, also known as *loan officer productivity* is calculated by dividing the number of active loans of an MFP by the total number of loan officers. Loan officers include field personnel or line officers that interact with the client, but not administrative staff or analysts who process loans without direct client contact. This

ratio captures the productivity of the MFP's loan officers – the higher the ratio the more productive the institution.

For the second model, five variables of interest were selected as determinants of productivity. The first variable, *size of an MFP*, was selected to determine if large organizations are more productive than comparatively smaller organizations. As discussed in model 1, size is defined as the total gross loan portfolio of an organization and this model aims to determine if organizations with large GLPs have been successful in disbursing more loans per loan officer. Similarly, the second independent variable of the model, *growth*, has also been selected on the premises that organizations that are growing in terms of active borrowers are adding more loans per loan officer and hence enhancing productivity.

Peer group has also been used as a variable in the second model to determine whether MFBs and Non-bank MFIs behave in regard to productivity. Considering the difference in organizational structures of both peer groups, we can assume that such differences can have an impact on the productivity - MFBs which have to follow strict regulatory requirements and generate value for shareholders are expected to be comparatively more productive than non-bank MFIs.

The fourth variable used is *lending methodology* – the approach an MFI adopts for the disbursement of its loans. It is important to note that in Pakistan three types of lending methodologies are implemented – individual, group and both (in which an MFP lends to individuals and in groups). Due to the difference in the lending methodologies, we assume that each methodology will have varied effect on productivity of an MFP. MFPs that lend to both, individuals and groups, are expected to disburse more loans per loan officer and hence are considered to be more productive.

The last variable of the equation is efficiency and as discussed in the previous model, it is defined as the operating expense ratio. This model aims to discover how much of an impact efficiency has on the productivity of an organization. It is assumed that efficient MFPs with low operating expense ratios should have high loans per loan officer ratio. The low operating expense ratio is an indicator that fewer loan officers are being utilized to generate a higher loan portfolio.

The model thus tested was defined as:

$$\text{PRODUCTIVITY} = B0+B1(\text{Size})+B2(\text{Growth})+B3(\text{Peer Group})+B4(\text{Lending Methodology})+B5(\text{Efficiency})$$

where PRODUCTIVITY = Loans per Loan Officer

In this second model, we will determine the relationship of productivity, which is defined as loans per loan officer, with size, peer group, growth rate, efficiency and lending methodology. The results of the model are as per TABLE 2.

Findings

TABLE 2: Efficiency Analysis - Results

Productivity	Coefficient	Std. Err.	t value	P value
Size	-2.73e-08	5.83E-08	-0.49	0.625
Peer Group - Microfinance Banks	-18.94783	55.23713	1.20	0.233
Growth Rate	0.073175	0.241544	0.21	0.833
Efficiency	78.38674	38.87863	-2.60	0.010
Lending Methodology - Individual	-282.6682	55.06039	-4.19	0.000
Lending Methodology – Group	-169.0137	45.71869	-2.36	0.020

From the results above, we can see that *lending methodology* and *efficiency* are the only two variables significantly related to productivity (t values are greater than 2 and P values less than 0.05). On the other hand, size, peer group and growth rate do not have any significant relationship with productivity and hence we can conclude that the productivity of an MFP is not being affected by the size, peer group or the growth rate of an organization.

As with the case of the variable *peer group*, *lending methodology* is also a quantitative measure and not a qualitative measure. Therefore, in this model, the third category (both) is taken as the base or the benchmark category with which group and individual lending methodologies are compared. The negative relationship implies that MFPs that offer individual or group lending are less productive (have lower loans per loan officer) in comparison to those MFPs that offer both lending methodologies. This implies that MFPs that lend to, individuals and groups, are disbursing more loans per loan officer than those MFP just lend to either one of the types. In the Pakistan microfinance sector, majority of the large MFPs are using both individual and group lending methodologies. TABLE 3 below shows that among the five largest MFPs in Pakistan (which account for more than 50% of the market share in terms of active borrowers), only NRSP is doing group based lending, while all the other four MFPs are lending to individuals and groups.

TABLE 3: Efficiency Analysis - Results

MFP	Market Share (% of active Borrowers)	Lending Methodology
Khushhali Bank	18.5	Individual & Group
NRSP	16.0	Group
Kashf Foundation	11.4	Individual & Group
NRSP Bank	6.1	Individual & Group
Tameer Microfinance Bank	7.0	Individual & Group

The other variable carrying a significant relationship with productivity is efficiency. The negative relationship implies that as the operating expense ratio decreases, the productivity increase. The link here is quite evident; the decrease in the operating expense ratio means that the GLP is increasing in comparison to the operating expenses which could imply that more loans are being disbursed per loan officer (increase in productivity).

CREDIT RISK

Credit risk is defined as the loss of principal or loss of a financial reward stemming from a borrower's failure to repay a loan or otherwise meet a contractual obligation. Credit risk arises whenever a borrower is expecting to use future cash flows to pay a current debt. Microfinance industry like other lenders carries significant credit risk and is usually seen as the most important risk facing them. Generally in banking, unsecured loans are considered most risky but the microfinance industry, which still largely makes clean loans, has an enviable record of repayments as compared to other participants of the financial industry.

Portfolio at Risk (PAR) >30 days is usually the measure of the quality of the portfolio of a microfinance provider (MFP). PAR > 30days is defined as the value of all loans outstanding that have one or more installments of principal past due more than 30 days. This includes the entire unpaid principal balance, including both the past due and future installments, but not accrued interest. It measures the potential for future losses based on the current performance of the portfolio. It is a highly conservative measure as all the loans recorded in PAR are not expected to default. A value of less than 5 percent of the ratio is considered a good number for an MFP and reflective of a quality portfolio. This figure is much lower as compared to other financial institutions because microloans are generally unsecured.

PAR > 30 days for Pakistani microfinance industry has continually remained below 5 percent threshold despite having been affected by natural disasters like earthquake in 2005 and floods in 2010 & 2011, adverse security situation in the country is recent years and delinquency crisis in Punjab in 2008.

The first variable of interest *growth rate* has been calculated by measuring the year on year increase in active borrowers. It is anticipated that institutions that pursue aggressive growth would experience higher risk as maintaining portfolio quality would become a greater challenge and controls can slip. The second and third independent variables are the *individual and group lending methodologies*. Microfinance providers have traditionally lent in groups rather than to individuals in order to mitigate credit risk. However, lately it has been observed that the individual lending is gaining in popularity in Pakistan particularly in case of larger loan sizes. Both these indicators are represented by percentage of active borrowers being lent under the both the lending methodologies. In the model, we are trying to find out which lending methodology contributes more to credit risk of an organization, with theory suggesting individual lending being more risky.

Fourth variable of interest is the *peer group.* Microfinance providers in Pakistan have been divided into three peer groups based on their legal structures. This variable is used to study whether the type of an MFP has any bearing on its credit risk. The last variable is the *loan per staff ratio*. This ratio shows the number loan being looked after by a loan officer. It is an indicator of productivity of an MFP. However, excessive loans per staff can be counter-productive, causing the loan officer to compromise on due diligence and client appraisal processes as well as post disbursal monitoring.

The model thus looks at the impact of *growth rate*, *lending methodologies*, *peer groups* and *loan per staff ratio* on credit risk being faced by an MFP. The following model was thus tested:

$$RISK = B0+B1(Growth)+B2(Lending\ Methodology)+B3(Peer\ Group)+B4(Loan\ per\ Staff\ Ratio)+\mu$$

where RISK = PAR > 30 days

The results of the model are as per the following table:

TABLE 4: Credit Risk Analysis - Results

Credit Risk	Coef.	Std. Err.	t value	P value
Growth Rate	-0.0007257	0.000193	-3.76	0.000
Lending Methodology (Individual)	-0.0644811	0.0541824	-1.19	0.236
Lending Methodology (Group)	-0.0863009	0.0365122	-2.36	0.020
Peer Group	-0.0180043	0.0612728	-0.29	0.769
Loan Per Staff	0.0003337	0.0001607	2.08	0.040

The findings show that credit risk is affected by growth in outreach, lending under group methodology and loans per staff. Surprisingly, growth in outreach shows a negative relationship with risk: more growth leads to lower risk. This could imply that there is huge unmet demand in form of credit worthy clients which have not yet been tapped by the MFPs. In addition, less risk is associated with the group lending methodology as compared to individual and combined (both group and individual) methodology, as was expected. Though loan per staff is directly related with risk but its impact is marginal. This shows that close contact between borrowers and loan per staff is important in reducing defaults and if the number of loans per staff exceeds manageable levels there can be an increase in credit risk.

PROFITABILITY

Net income is the key indicator of profitability and can be called the accounting profit. Due to this it is often referred as the "bottom line". Over the last few years, the NI for the microfinance industry has been positive, driven largely by the increasing yields on the back of correction in asset mispricing.

In our last model, we look at how some key variables are related to profitability. The first independent variable is the growth rate of active borrowers of an MFP. Higher growth results in increased revenues and brings MFP closer to reaching scale resultantly higher profits. The second independent variable is the size of the organization represented by its total asset base. This variable has been added to find out whether larger organizations enjoy economies of scale. The third independent variable is the peer group while the fourth and fifth independent variables are the two lending methodologies; individual and group. Traditionally, microfinance providers have extended credit under group methodology to reduce credit risk. However, lately individual lending has been increasing in popularity especially for larger loan sizes in Pakistan. Through these two variables we aim to find which of the two lending methodologies contribute more to profitability.

The sixth and the last independent variable is the asset *utilization ratio*. This is the percentage of GLP as of the total asset base. Higher the asset *utilization ratio*, higher the income. Therefore a higher utilization ratio showed lead to a higher net income.

The model thus tested was:

PROFITABILITY = B0+B1(Growth Rate)+B2(Size)+B3(Peer Group)+B4(Lending Methodology)+B5(Asset Utilization)+μ

where PROFITABILITY = Financial Revenue to Total Assets

The model here looks at the impact of growth in active borrowers, size of the MFP, lending methodologies and asset utilization on net income which is the dependant variable. Results are shown in the table below:

Findings

TABLE 5: Profitability Analysis - Results

Profitability	Coef.	Std. Err.	t value	P value
Growth Rate	0.0002847	0.000134	2.13	0.035
Size	-3.88E-11	3.42E-11	-1.14	0.258
Peer Group	-0.022461	0.026338	-0.85	0.395
Lending Methodology (Individual)	-0.082773	0.026521	-3.12	0.002
Lending Methodology (Group)	-0.098558	0.023767	-4.15	0.000
Asset Utilization	0.0276268	0.042298	0.65	0.515

According to the results, the NI tends to increase with an increase in the growth in outreach. Being in a particular peer group has no contribution to profitability of an entity. This is important as only MFB peer group have been established as for profit entities whereas as RSPs and NGO-MFI are non-profit entities. However, the tests show that legal structures do not have any impact on profitability. Surprisingly, asset utilization ratio has little or no impact on the net income. One of the reasons for this can be lower asset utilization ratio of the microfinance industry in Pakistan as compared globally[2]. Use of both lending methods i.e. individual and group, increases the profits rather than using one of the two. This shows that lending methodology has no impact on the profitability.

[2] Pakistan Microfinance Review (PMR) 2012, PMN, 2013.

CONCLUSION

This study is the first attempt to evaluate performance of the microfinance industry in Pakistan using statistical analysis. Key indicators analyzed included efficiency, credit risk, productivity and profitability. The findings of the report were generally in line with theoretical expectations but there were some exceptions. They key finding are summarized as follow:

- The study pointed out that MFPs can lower their expense ratio and become efficient by realizing economies of scale.

- Productivity of MFPs is affected by lending methodologies and efficiency. Using a combination of both group and individual lending methodologies results in higher productivity for MFPs. In addition, organizations that have lower expense ratio are also more productive.

- Analysis of credit risk presented some surprising findings. Credit risk appeared to decrease with increase in outreach which is opposite to the prevailing view that higher growth leads to increase in credit risk. Also, the study found that group lending methodology lowers credit risk showing the continued importance of social collateral in microfinance industry.

- Profitability of MFPs was found to increase with the growth in outreach and surprisingly asset utilization has no impact on profitability.

We can conclude based on these findings that microfinance industry can lowers costs by realizing economies of scale. Productivity of MFIs can be approved by using both group and individual lending methodologies. Credit risk is lower for group lending methodology and it decreases with increasing outreach pointing toward untapped creditworthy clientage. Profitability increases with growth and improvements in asset utilization can also lead to higher profits.

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Note:
For complete calculations you may contact **Ammar Arshad** at **aarshad@pmn.org.pk**

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