Capital Adequacy Ratio and Microfinance Banks: A Study of Pakistan

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Abstract

Critical requirement imposed by regulatory authorities on financial institutions and banks is sufficient and adequate capital. State Bank of Pakistan imposed capital adequacy ratio (associated risk to its assets) requirement on microfinance banks to ensure its stability. This study focuses on determinants that influence capital adequacy in Pakistani microfinance banks for the period 2011-2015. Analysis of observations considers 12 microfinance banks operating under State Bank of Pakistan. Five factors have been considered in current study that is Share of Deposit, Return on Equity, Portfolio Risk, GDP, and Total Assets. The results indicate that total assets to capital adequacy shows insignificant and negative relationship ($r=-.008$, $\text{sig}=.953$) while the other four factors indicate positive and significant relationship. The results of multiple regression indicate total assets ($\beta_{\text{Assets}}=-0.823$, $t=-17.200$, $p=0.000$) and growth rate ($\beta_{\text{growth}}=-0.766$, $t=-5.112$, $p=0.000$) having negative and significant impact, however, share of deposit shows insignificant and negative impact on capital adequacy ($\beta_{\text{SOD}}=-0.039$, $t=-2.446$, $p=0.01$), while the other factors have positive and significant impact on capital adequacy ratio.

Keywords: Capital Adequacy Ratio (CAR), Share of Deposit (SOD), Return on Equity (ROE), Portfolio Risk (PR), Growth Rate.

Introduction

Contemporary financial system does not provide any immunity to Microfinance Banks (MFBs) during any financial crisis and problems associated with banking sector around the globe (Tsai, 2015). As the crisis due to subprime mortgage was observed in early 2007, initial assessment revealed that there is no or insignificant impact on financial statements of microfinance institutions MFIs (Bruton, Khavul, Siegel, & Wright, 2015; Janda & Zetek, 2014; Vithessonthi & Tongurai, 2015). While some previous events such as, rise in food and oil prices adversely affected the households' total income and also affected borrowers' ability to pay installments, numerous anticipated that MFIs are not going to face any problem because subprime mortgage had concern only with commercial banks and MFIs had no financial integration at global level (Mehrotra & Yetman, 2015; Ngo, Mullineux, & Ly, 2014). In 2008 when financial crisis "trickled down" in an unwelcomed way and reached to its peak microfinance institutions/banks witnessed scarcity of funding and financial resource; finances also became more costly due to the shortage of liquidity internationally (Banerjee, Breza, Duflo, Kinnan, & Prathap, 2014; Mader, 2016; Sainz-Fernandez, Torre-Olmo, López-Gutiérrez, & Sanfilippo-Azofra, 2015).

In earlier 2009, commercial, microfinance banks and institutions experienced high cost of borrowing due to shortage of liquidity issue. National as well as international banks tightened their grip on scarce resources and due to high demand of financial resource cost of borrowing became higher and investors' behavior tilted towards the risk averseness (Haldar & Stiglitz, 2016). Steep increase in rate was observed in European and African countries; further, a few microfinance banks and microfinance institutions requested to borrowers for loan prepayments without any penalties and prepayment fees; international as well as national banks tried to pull themselves out together from this dramatic situation (Breza & Kinnan, 2016; Sainz-Fernandez et al., 2015).

This new experience and awareness towards the risk faced by microfinance banks and institutions are comparable or similar in nature and in most of the cases connected to the mainstream financial institutions (Linnerooth-Bayer & Hochrainer-Stigler, 2015). This draws an opportunity for microfinance banks and institutions to review capital planning and improve risk management to enhance their financial performance and to be in a position to absorb such future shocks. According to Basel Committee on Banking

Supervision (BCBS), banks should be in sustainable position to survive in adverse conditions, for example losses/high loan write-off ratio or financial crisis through capital management, which ultimately lead to drift in strategy (Mehrotra & Yetman, 2015; Serrano-Cinca, Gutiérrez-Nieto, & Reyes, 2016).

This paper reviews the micro determinants, which affect Capital Adequacy Ratio (CAR) of Microfinance Banks (MFBs). CAR is considered an important element of determination of capital necessary in order to survive in crisis and adverse conditions. CAR is an important indicator, which is an obligatory requirement imposed by State Bank of Pakistan (SBP) to absorb losses in adverse conditions. It measures the weight of portfolio risk to capital, under current political and economic conditions State Bank of Pakistan (SBP) imposes 15% minimum capital buffer for microfinance banks (SBP, 2015). CAR has positive correlation with risk level, riskier and volatile environment demands high CAR (Brown, Guin, & Kirschenmann, 2015; Nyambuti, 2016; Ogujiuba, Jumare, & Stiegler, 2013).

Findings of many researchers indicate that microfinance banks should focus on incorporation and implementation of comprehensive system for risk identification, monitoring and management by level capital accordingly (Ali & Khan, 2015; Ibtissem & Bouri, 2013; Mwangi, 2014; Sánchez & Lechuga, 2016). However, the question is still there that what are the micro components of CAR in case of microfinance banks? The recent literature shows evidences that there are other factors, which determine the value of CAR in banking sector of Pakistan (Abusharba, Triyuwono, Ismail, & Rahman, 2013).

Basel-II, and Pillar 1

Social Economic Engagement Program (SEEP), a practitioners' organizations dedicated to combating poverty, promotes markets and provides financial systems. Framework of SEEP is currently under discussion and development phase. However, key components considered in upgraded framework is CAR to test the ability of microfinance banks to fulfill their obligations during unexpected losses (Allet, 2014; Amelec & Carmen, 2015). CAR measures the level of capital required by microfinance banks associated with risk-weighted assets under the guidelines of Basel II.

$$\text{Capital Adequacy Ratio (CAR)} = \frac{\text{Total Capital}}{\text{Risk Weighted Assets}}$$

Comprehensive framework for risk mitigation in banking system was issued in 2004 by Basel Committee to determine the level of capital adequacy associated with risk weighted to assets. First part of Basel II known as "Pillar 1", defines the different level capital structure consist on:

- Core equity or Tier 1; and
- General reserves/ supplementary capital and subordinated term debt or Tier 2; (provisioning against *unknown* losses or crises)

Framework Basel II of Basel committee set minimum capital ratio that should not be less than 8%. However; regulatory authority of banking sector in Pakistan, is State Bank of Pakistan (SBP), which sets 15% of minimum capital adequacy Ratio for microfinance banks (Hassan, Ilyas, & Rehman, 2015; Tchuigoua, 2015).

Capital Adequacy Level for Microfinance Banks

Literature documented that most of the microfinance banks determine their Capital Adequacy Ratio based on Tier-I, which is well above the required level of 8% capital Adequacy Ratio recommended by Basel-II (Tchuigoua, 2015, 2016). Analysts and researchers suggested that it is appropriate to set minimum level of capital adequacy at least 50% above the recommendations of Basel-II, in other words microfinance banks should set capital adequacy at least at 12% or higher (Tchuigoua, 2016). Usually microfinance banks have higher level of capital adequacy due to following reasons: first, high volatility in delinquency rates; operating expenses for microfinance institutions are quite high as compared to commercial banks; and third, access to recapitalization on emergency basis is quite difficult and limited. Policy makers recommend that in the light of greater risk exposure to sudden macroeconomic changes faced by a microfinance bank loan portfolio, in most cases banks should maintain capital levels greater

than the minimum required capital required by law for their particular legal entity (Omondi, 2015; Usha, 2015).

Capital Adequacy Needs More than Ratios

There are several questions related to CAR, which need to be addressed such as, if a Capital Adequacy Ratio is not sufficient to facilitate banking sector about adequate capitalization, then how banking sector will judge about adequate capital requirement? Does number of banks shuttered by financial crisis around the globe had the "Right" capital adequacy ratio? They did not have adequate tools, plans and resources for assessment and management of risk when they erupted (Ahmed & Malik, 2015; Flannery, 2016).

The unpinning reason of banks' failure during financial crisis was inadequate liquidity and capitalization, which ultimately led to collapse due to banks inability to absorb adverse effects and shocks. As a result, Basel Committee revised its framework and standards for risk assessment and management through liquidity coverage and capitalization to ensure the survival of banks from adverse events in future (Aktas, Acikalin, Bakin, & Celik, 2015; Alkadamani, 2015; Curcio & Hasan, 2015; Shingjergji & Hyseni, 2015).

The question of capital adequacy and its composition is therefore, integrally connected with level of risk and economic components. It cannot be answered by a simple formula.

Literature Review

The underpinning concept of capital structure was documented by Miller and Modigliani (M&M) in early 1958, and later theory of corporate finance was also documented by them. Theory of corporate finance was documented and discussed by many empirical and theoretical studies conducted on financial and non-financial sectors. Mainstream studies of capital structure considered non-financial sector only, although a number of studies also considered financial sector under observation but limited studies considered determinants of Capital Adequacy Ratio of conventional banking sector with respect to developing nations like India, Malaysia, Singapore, Thailand, Pakistan and others. Macey and Miller (1995) studied the significant factors to be considered while investing financial sector or specifically banking sector. However, theory of capital structure concludes that investors' decisions do not impact earnings and values of organizations, based on assumptions that market is frictionless and efficient.

Number of studies documented factors that affect markets efficiency; asymmetric information, transaction cost, taxes and cost of financial distress (Berger, Herring, & Szego, 1995). Impact of these factors has been observed across the world but significant impact has been observed in under-developing & developing nations, significance of capital adequacy ratio in banking sector

These components are considered valid across the world but indicates more significant impact in case of developing or underdeveloped as compare to developed economies because markets are not efficient or weak, a number of studies was reported the significance/ importance these factor those effect the capital adequacy in case of commercial banks (Curcio & Hasan, 2015). The structure of non-financial and financial organization or especially banking institutions are quite different due to high regulated environment; this can be due to the facts that embedded structure, regulations, objectives, and functions performed by banking institutions are significantly different from other financial and non-financial organizations. However, literature categorized level of policies through, which determinants of Capital Adequacy Ratio can be inferred; market forces, regulatory requirements and internal policies are the important factors (Alfon, Argimon, & Bascuñana-Ambrós, 2004; Bokhari, Ali, & Sultan, 2012; Fikri, 2012).

Components of Capital Adequacy (CA) Ratio

Capital Adequacy Ratio imposed by the regulatory authority that is, State Bank of Pakistan in case of Pakistan, claims that this ratio facilitates in testing the health of banking sector of Pakistan. This is a mandatory requirement imposed by most of the central banks of the world on financial institutions including microfinance banks, because a certain level of capital ensures the ability of microfinance banks to absorb losses in adverse conditions and to protect the interest of

depositors and other stakeholders. Capital adequacy level ensures microfinance banks' capacity to meet market risk, credit risk, operational risk and other risks (Al-Sabbagh, 2004; Bokhari et al., 2012; Moyer, 1990).

Role of Portfolio Risk in Capital Adequacy

Generally, it is considered that the level of capital adequacy maintained by microfinance banks is a shock absorber, due to unanticipated losses incurred, it also reduces the probability of insolvency and bankruptcy. However, ratio set by State Bank of Pakistan (SBP) is not actually reflecting the level of risk faced by banks nevertheless, it affects the level of capital ratio maintained by individual banks in Pakistan. Although, risk level faced by banking sector can be gauged through Risk Weighted Assets/Total Assets (RWA), the risk of financial distress caused by the loss of franchise value. So far, negative and significant relationship between Capital Ratio and portfolio risk has been observed, therefore, capital ratio of each bank may differ from the capital ratio set by the State Bank of Pakistan (SBP) due to size and level of risk of individual banks. Assessment of risk is now conducted at individual level under methods defined by SBP and Basel-II regulations for financial institutions (Aktas et al., 2015; Dreca, 2014; Shingjergji & Hyseni, 2015).

Cost of the Capital to Microfinance Banks

Cost of capital from alternative sources is considered as one of the major components of capital ratio in financial sector and especially in banking industry. Return on Equity (ROE) is a more appropriate tool to consider the cost of capital, whenever alternative cost of capital is low holding of access capital does not affect banks' profitability, as higher cost of alternative capital holding less capital is more suitable for banks profitability (Rahman & Banna, 2016; Shingjergji & Hyseni, 2015; Soyemi, Ogunleye, & Ashogbon, 2014).

Share of Deposits with Central Bank

Share of deposits is also considered as key factor in determinants of Capital Adequacy Ratio for financial institutions especially banks. Share of deposits represents the percentage of total funds deposited to central bank. Deposits are considered as cheap source of funds as compared to any external source, such as loans, bonds from syndicates and business angels (Kleff & Weber, 2003). Decrease in

deposits leads to high borrowing cost from external sources and ultimately leads to higher cost of external source, ultimately affecting banks' profit margin. To test the effect of deposits on capital ratio generally share of deposits is considered as proxy in panel regression analysis (Karim, Hassan, Hassan, & Mohamad, 2014; Paudel & Khanal, 2015).

Regulatory Pressure

Regulatory pressure is also considered as key factor, which affect capital ratio significantly in banking industry of Pakistan. In Pakistan State Bank of Pakistan is the ultimate regulatory authority to set obligatory minimum ratio for banking industry, although in a few countries minimum capital ratio is set by supervisory committees and agencies (Adeusi, Kolapo, & Aluko, 2014; Chalermchatvichien, Jumreornvong, Jiraporn, & Singh, 2014; Polat & Al-khalaf, 2014).

Economic Growth

Growth rate of economy is another factor, which explains the level of capital ratio, as the financial sector is considered as pulse of any economy, so in case of positive and significant economic growth rate lower the risk and low capital ratio is required or in case of lower growth rate higher the risk and higher the capital ratio required by banks. To minimize the risk factor financial institutions especially banks manage higher level of capital ratio (Bateni, Vakilifard, & Asghari, 2014; Saunders & Cornett, 2014).

Data and Analysis

In this study sample of 12 out of 13 microfinance banks registered with the State Bank of Pakistan are taken and their annual data from 2011-15 is used for analysis; data is collected from financial statements of respective selected banks and from annual data published by SBP (SBP, 2015). Proposed level of Capital Adequacy Ratio in Banking Institutes is taken as;

$$CAR = \alpha + \beta_1 Assets + \beta_2 GDP + \beta_3 ROE + \beta_4 SOD + \beta_5 PR + \epsilon_t$$

The required level of Capital Adequacy Ratio for microfinance banks set by State Bank of Pakistan was 15% in 2010, till then there is no change in this ratio (SBP, 2015). Although, it was frequently changed for commercial banks on annual basis, so regulatory requirement of for the level of CAR in Pakistan is not taken as independent variable in the model. Table 1 displays the summary statistics of variables used in this study of capital adequacy ratio.

Table 1
Summary Statistics

	LNSOD	LNROE	LNCAR	LNPR	LNGDP	LNASSETS
Mean	20.40620	2.836206	3.534437	20.91155	19.14258	22.02066
Median	21.14546	2.780410	4.101933	20.81408	18.72021	22.27829
Maximum	23.54445	4.190262	4.555774	23.92623	22.19668	24.00779
Minimum	15.01925	1.734870	1.395247	16.36102	14.43455	18.52155
Std. Dev.	2.518264	0.609623	0.982174	1.589011	1.750281	1.283305
Skewness	-0.712704	0.254394	-0.617646	-0.223292	-0.225320	-0.468664
Kurtosis	2.288612	2.346413	1.680003	2.895944	2.638421	2.377542
Jarque-Bera	6.344648	1.715102	8.170850	0.525664	0.834539	3.165092
Probability	0.041906	0.424200	0.016816	0.768871	0.658843	0.205451
Observations	60	60	60	60	60	60

LNSOD_t representing the natural log share of deposit

LNROE_t is representing the Returns on Equity at the time period *t*

LNCAR_t is capital adequacy Ratio at the time period *t*

LNPR_t is representing Portfolio Risk at the time period *t*

LNGDP_t is representing the Gross Domestic Product at the time period *t*

LNAssets_t is representing the Total Assets at the time period *t*

Assumptions of multiple regressions has been tested carefully and as our data set is panel so to test presence of stationarity ADF

(augmented dickey fuller) and PP (Phillip Person) tools has been employed. Table 2 shows the results of Unit root of each variables considered under study.

Table 2
Results of unit root test
Share of Deposit

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-8.82569	0.0000	12	48
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-2.78010	0.0027	12	48
ADF - Fisher Chi-square	34.2388	0.0805	12	48
PP - Fisher Chi-square	38.4516	0.0312	12	48

** Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.

Return on Equity

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-2.70460	0.0441	12	48
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	0.41092	0.6594	12	48
ADF - Fisher Chi-square	23.8768	0.4687	12	48
PP - Fisher Chi-square	28.3174	0.2469	12	48

** Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality

Assets

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process) -				
Levin, Lin & Chu t*	-4.32740	0.0000	12	48
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	8.1E-05	0.5000	12	48
ADF - Fisher Chi-square	23.8394	0.4708	12	48
PP - Fisher Chi-square	33.4319	0.0953	12	48

** Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.

Capital Adequacy Ratio

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-16.1400	0.0000	12	48
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-10.0051	0.0000	12	48
ADF - Fisher Chi-square	74.6009	0.0000	12	48
PP - Fisher Chi-square	90.0173	0.0000	12	48

** Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.

Portfolio Risk

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-6.17702	0.0000	12	48
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-6.40993	0.0000	12	48
ADF - Fisher Chi-square	57.9597	0.0001	12	48
PP - Fisher Chi-square	80.9931	0.0000	12	48

** Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.

GDP

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-12.0786	0.0000	12	48
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-4.68985	0.0000	12	48
ADF - Fisher Chi-square	33.2846	0.0068	12	48
PP - Fisher Chi-square	36.7693	0.0023	12	48

** Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution.

All other tests assume asymptotic normality.

Results of unit root test infer that all the variables under consideration are stationarity at level, so panel regression can be applied. Table 3 shows the results of Correlation matrix where, all variables considered show positive and significant association. Although the results of Assets indicate insignificant association with capital ratio (-.008), Return of Equity indicates insignificant association with Assets and Portfolio Risk respectively (-.179 and 0.86). Economic Growth (GDP) and Share of Deposits also revealed insignificant association (-.036). Results of correlation indicate that banks with risk averse strategies require higher level of capital ratio much above as compared to regulatory minimum level of capital adequacy ratio (Argimón & Ambrós, 2015).

Table 3

Correlation Matrix

		Assets	SOD	PR	CAR	GDP	ROE
Assets	Pearson	1					
	Correlation						
	Sig. (2-tailed)						
SOD	Pearson	.358**	1				
	Correlation						
	Sig. (2-tailed)	.005					
PR	Pearson	.777**	.140	1			
	Correlation						
	Sig. (2-tailed)	.000	.287				
CAR	Pearson	-.008	-.322*	.596**	1		
	Correlation						
	Sig. (2-tailed)	.953	.012	.000			
GDP	Pearson	.643**	-.036	.938**	.694**	1	
	Correlation						
	Sig. (2-tailed)	.000	.784	.000	.000		
ROE	Pearson	-.179	-.468**	.086	.439**	.427**	1
	Correlation						
	Sig. (2-tailed)	.172	.000	.513	.000	.001	
N		60	60	60	60	60	60

** . Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Results of panel regression were presented in Table 4, which shows explanatory power of the model, at first coefficients, standard errors, t-statistics and p-values of individual explanatory variables are shown. P-values and t-statistics indicate that all the explanatory variables (Return on Equity, Share of Deposits, Portfolio Risk, Economic Growth, Total Assets) under consideration show significant explanatory relationship with capital ratio. The coefficient of determination (R^2) indicates strong explanatory power of explanatory variables towards the dependent variables capital ratio, which is ($R^2 = 0.932620$) 93.26% variation is explained by explanatory variables.

Table 4

Regression Summary Output Matrix

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNROE	0.887444	0.129586	6.848287	0.0000
LNSOD	-0.039991	0.016343	-2.446986	0.0176
LNPR	0.655861	0.159269	10.39665	0.0000
LNGDP	-0.766163	0.149850	-5.112874	0.0000
LNASSETS	-0.823170	0.047857	-17.20046	0.0000
R-squared	0.932620	Mean dependent var	3.534437	
Adjusted R-squared	0.927720	S.D. dependent var	0.982174	
S.E. of regression	0.264058	Akaike info criterion	0.254356	
Sum squared resid	3.834951	Schwarz criterion	0.428884	
Log likelihood	-2.630671	Hannan-Quinn criter.	0.322623	
Durbin-Watson stat	1.195280			

Conclusion

State Bank of Pakistan (SBP) imposed regulatory requirement of financial sector especially banks (Commercial and Microfinance) to maintain a minimum level of capital ratio. Commercial and microfinance banks are bound to test and perform individual capacities regarding credit risk to ensure depositors' protection and to ensure that their level of confidence should remain intact in financial sector. Determining the behavioral trends of capital ratio for commercial banks has been tested and explained by numerous studies in literature however, the current study is one of the few that are conducted on determinants of capital ratio of microfinance banks except the regulatory requirement. The underpinning objective of current study is to examine various factors or determinants that affect capital adequacy ratio of microfinance banks of Pakistan. Study employed panel regression on a dataset from 12 out of 13 microfinance banks registered with State Bank of Pakistan for the period of 5 years from 2011-15 on annual basis.

Results show that factors considered in this study are significant and important in determining the capital adequacy ratio of microfinance banks of Pakistan. These factors are Return on Equity (LNROE=0.88, S.E=.129, t-value=6.848, p-value=0.000), Share of Deposits (LNSOD=-0.039, S.E=.0163, t-value=-2.446, p-value=0.0176), Portfolio Risk (LNPR=0.655, S.E=.159, t-value=10.396, p-value=0.000), Economic Growth (LNGDP=-0.766, S.E=.149, t-value=-5.112, p-value=0.000) and Total Assets (LNASSETS=-0.823, S.E=.047, t-value=-17.200, p-value=0.000) and the results of these factors are significant in determination of capital adequacy ratio for microfinance banks of Pakistan. Future research can performed on primary data about how managers take

decision in determining capital ratio of particular microfinance bank, secondly a comparative study can be performed between commercial and microfinance banks on the basis factors that influence capital adequacy ratio.

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