

Impact of Changes in Reserve Requirement on Banks Profitability: A Case of Commercial Banks in Pakistan

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Abstract

This study examines the relationship between Reserve Requirement Ratio and Banks Profitability in Pakistan. It emphasizes on the effect of changes in CRR on commercial banking profitability and how it affects the ROE and ROA. The data collected for the research was secondary and quantitative time series data for the ten year period 2005-2014. Using correlation analysis followed by Linear Regression carries the empirical analysis of the study. The finding of study reveal that CRR taken as measure for Reserve Requirement has significant inverse relationship on banks' financial performance, which is measured by ROA and ROE.

Keywords: Reserve Requirement Ratio (RRR), Cash Reserve Ratio (CRR), Return on Assets (ROA), Return on Equity (ROE).

1. Introduction

Banking industry in Pakistan has grown rapidly during the last decade and beyond becoming much more competitive, flexible and profitable. It is further expected to continue enjoying these trends and has promising future prospects. However, its sustainability of performance is dependent upon continued macroeconomic stability, stronger vigilance on the industry to make sure effective compliance of industry with the prudential regulatory and supervisory framework. Since 2008 after the rapid growth, the industry is facing issues like liquidity and solvency problems which have considerable effect on its performance. Today, the Banking sector of Pakistan is playing pivotal role in the growth of country's economy. Besides, State Bank of Pakistan (SBP) has been using cash reserve requirement (CRR) since its inception and often along with the changes in monetary policy stance to reinforce its transmission. The CRR has also been used to supplement or substitute open market operations (i.e. liquidity management function of RR).

Reserve requirement ratio is the minimal percentage of deposits to be kept up with central bank by the banks. It is one of the tools of monetary policy used to control money supply in the economy. Any changes made in CRR or SLR affects the availability of money with the bank for credit in the system thereby influencing the money supply in the economy. Whenever CRR is increased, it acts as a tax on bank deposits. As financial intermediation becomes more costly, spreads between lending and deposit rates rises. If the central bank stabilizes the interbank rate, we expect lending rates to increase and deposit rates to fall, as the stable interbank rate typically lies between deposit and lending rates (Glocker & Towbin, 2012). Changes in the lending and deposit rate affect the bank's spreads and therefore its profitability.

1.1. Problem Statement

To analyze the impact that changes in CRR can have on banking sector profitability in Pakistan. It is an attempt to explore the impact of state bank practices of using monetary policy tools especially CRR on the banks intermediation role and thereby its profitability. The effect of changes in CRR will be determined that how the increase or decrease in CRR affects bank's profitability i.e ROA and ROE for the commercial banks in Pakistan.

1.2. Objectives of the study

The objective of this study is

- To identify the relationship between reserve requirement ratio (CRR) and bank's profitability.
- To find the effects of changes in CRR on banks profitability.

1.3. Significance of the study

The study will provide a basic framework to readers, professionals and students in their academics. It will provide a guide for future research, general guidelines for policy makers in fast changing environment of the economy of Pakistan.

1.4. Scope and Limitation of the Study

The scope of this research includes the effects that changing CRR by the state bank can have on the profitability of commercial banks in Pakistan. This study covers the period of 2005-2014. The sample size of this study is 17 major commercial banks of Pakistan. To evaluate the impact of reserve requirement changes on the profitability of commercial banks operating in Pakistan, annual profit figures have been taken from the financial statements

of 17 commercial banks in Pakistan. But the study does not cover the whole banking sector of Pakistan. The study also does not cover the whole time period from the beginning of commercial banks in Pakistan to present.

2. Literature review

Extensive literatures have previously investigated the link between the changes in reserve requirements by central banks through CRR, SLR and bank profitability which is commonly expressed by either Return on Assets (ROA) or Return on Equity (ROE).

According to (UREMADU2012,) there is a positive relationship between CRR, SLR on banks profitability. They studied the variables CRR, SLR in Nigerian economy for the period 1980-2006 and found that they have a positive effect on banking profits while balances with the central bank, rate of inflation and foreign private investments have a negative effect on banks' profits. They observed that liquidity ratio leads banks' profits, closely followed by balances with the central bank and then gross national savings and foreign private investments.

Another study conducted by (Rao, 2006) in which he investigated the impact of monetary policy on the banks profitability mainly in the financial sector of India by studying various instruments of monetary policy. The lending rates have been found to have positive relationship with banks' profits which indicates a rise in lending rates will increase the profitability of the banks. When the Bank Rate, SLR and CRR is included the regression coefficient is insignificant to explain the relationship between bank profitability and the monetary policy instrument in the case of public sector banks. It can be concluded that banking is still regulated and controlled in terms of a strict credit policy followed by the Reserve Bank of India to combat inflationary pressures.

Cash Reserve Ratio (CRR) have significant effect impact on the interest rates and the liquidity of banks (K. Ravi Teja, 2013). Also changes in CRR have inverse relationship with domestic investor institution while direct relationship with foreign institution. Any fluctuations in cash reserve ratio will have direct effects on stock market and on overall economy. It has been observed that whenever inflation is moving upside due to the excess liquidity, increase of CRR is fueling the repo-rate and reverse repo-rates to go up side: which is affecting the borrowing cost for the industries.

(Haiying Pan, 2012) studied the effects of regular increases in reserve requirement ratio (RRR) in china and found out that changing reserve ratio does not have any direct effect on controlling surplus liquidity, preventing inflation or controlling the lending activity. Further, RRR has a long-term but very weak and negative influence on money supply and loan scale and no effect on CPI.

Another research (Sehrish Gul, 2011) investigated the impact of bank-specific characteristics and macroeconomic indicators on bank's profitability in the Pakistan's banks for the period 2005-2009. It investigated the impact on major profitability indicators i.e. return on assets (ROA), return on equity (ROE), return on capital employed (ROCE) and net interest margin (NIM) of assets, loans, equity, deposits, inflation, economic growth and market capitalization and has found strong evidence that both internal and external factors have a strong influence on the profitability of the banks. Banks with higher margins of equity capital, deposits, loans and Total Assets are prone to earning higher profits. Accordingly the macro factors also show a significant positive relationship with the bank profits.

(Zarafat, 2014) studied the macroeconomics factors that generates banks' profits and found that for the banks' profitability the growth of GDP must be in place in order to stimulate lending and borrowing activities, also real interest rate has no direct relationship with banks' profitability. It experimented the relationship and dynamic linkage between profitability of Malaysian commercial banks, expressed through return on assets (ROA) and macroeconomic variables which include real GDP growth, inflation (expressed through CPI) and real interest rates. It therefore justifies the economic theory, that economic growth increases bank profits through enhanced demand for business loans. These loans generate good returns to commercial banks, resulting in higher profits.

The study (ALMAZARI, 2013) focuses on the relationship between two determinants (capital adequacy and cost-income ratio) and the profitability of the commercial banks of Saudi Arabia. Bank profitability is affected by internal and external factors. The internal factors include: capital adequacy, bank size, liquidity, and the level of provisioning whereas external factors are lack of capital, the money supply, competition, government regulation, ownership, and inflation. Efficiency is measured by capital adequacy ratios (CARs) and cost income ratio (CIR), and bank's profitability is measured by ROA and ROE. It found that both have negative relationships with the profitability of the banks.

(Guonan Ma, 2011) examines the evolving role of reserve requirements as a policy tool in China. Since 2007, the Chinese central bank (PBC) has increasingly relied on this tool for withdrawing domestic liquidity surpluses, it being a cheaper substitute for open-market operations in this period of rapid FX accumulation. Depending on the policy mix, higher reserve requirements tend to signal a tightening bias, to squeeze excess reserves of banks, to push market interest rates higher, and to help widen net interest spreads, thus tightening

domestic monetary conditions. There are, however, costs in using this policy tool, as it imposes a tax burden on Chinese banks, albeit banks seem to have passed through a significant portion of these costs to their customers, mostly depositors and SMEs. However, the pass-through to bank customers appears to be partial.

In England (Jonathan Bridges, 2014) calculated the effect of changes in capital requirements on bank capital ratios and bank disposition. Regulatory capital requirements affect the capital ratios possessed by banks – following an increase in capital requirements, banks usually re-erect the cushions that they initially held over the regulatory minimum. Following an increase in capital requirements, banks, on average, cut (in descending order based on point estimates) loan growth for real estate, other corporates and household secured lending. Loan growth principally recovers in three years' time. If calculated over a different policy regime and at the individual bank level, these results may contain some insights into how dynamic capital requirements might affect lending in a macroprudential regime.

As per (Sattar, 2014) there is strong and positive correlation between rate of interest and commercial banks' profitability. It means if the value of interest rate is increases/decreases then as result value of banks' profitability will also increases/decreases. Gradually, interest spread of banking sector of Pakistan is rising. As a result changes in the interest rate depress the savings and investment and on the other hand it increases the efficiency of banks' lending. Similarly, when interest rate is high, the rise in lending rate is higher than the deposit rates which as a result increases the bank operating income. But on the other side when interest rates are low then rise in deposit rate is higher than the lending rates.

The analysis conducted by (Shipho, 2011) showed that all the bank specific factors had a statistically significant impact on profitability, while none of the market factors had a significant impact. Based on the findings the study recommends policies that would encourage revenue diversification, reduce operational costs, minimize credit risk and encourage banks to minimize their liquidity holdings. Further research on factors influencing the liquidity of commercial banks in the country could add value to the profitability of banks and academic literature.

Many countries use reserve requirements as an additional policy instrument (TOWBIN, 2011). It provides evidenced based data on their macroeconomic effects by using a vector autoregressive (VAR) model for the Brazilian economy and identify interest rate and reserve requirement shocks. For both instruments a discretionary adjustments results in a decline in domestic credit. It found however, very different effects for other macroeconomic aggregates. In contrast to interest rate policy, a positive reserve requirement shock leads to exchange rate depreciation and an improvement in the trade balance, but also to an increase in inflation. The results suggest that reserve requirement policy can complement interest rate policy in pursuing a financial stability objective, but cannot be its substitute with regards to a price stability objective.

Changes in reserve requirements are used to measure 'credit shocks' (Rush, 2014). Reserve requirement changes are usually done for regulatory reasons and thus, offer a more external measure of credit shocks. To distinguish between the 'money' and 'credit' channels, the importance of reserve requirement variable is studied in an empirical model that includes other monetary aggregates and found that an increase in reserve requirements lowers aggregate investment, real GNP and commercial and industrial loans made by banks.

Banking sector plays an important role in financial stability of an economy (Dr. Imran Naseem, 2012). He investigated the factors affecting profitability of banking sector in Pakistan and examined the relationship between macroeconomics and bank specific characteristics. The study found both internal and external factors have strong impact on profitability of overall banking sector. Total Assets, Loans, Deposits and macro factors i.e., economic growth, inflation and stock market capitalization are perceived to have more safety and such an advantage can be translated into higher profitability, it also shows that not all external factors have direct relation only GDP is negatively related to bank's profitability.

The role of reserve requirement has changed predominantly over time (Gray, 2011). Three main purposes for reserve requirements – prudential, monetary control and liquidity management are described and it suggests the best practice for the structure of a reserves regime. Finally, the current practices using a 2010 IMF survey of 121 central banks are being illustrated.

(Camilo E. Tovar, 2012) attempts to detect the relationship between RR and banks capital structure. RRs can help improve the funding structure of the banking system, lessening the exposure of banks. For these reasons, in seams of surplus global liquidity and large capital inflows to emerging market economies, RRs appear to be a valuable policy tool to "lean against the wind."

3. Methodology

As the literature suggests reserve requirement as a monetary policy tool affects banks performance, the quantitative data is collected to test their relationship, CRR is used as a monetary policy variable and ROE & ROA for banks profitability. The data collected for this research is mainly secondary data from various websites like state bank of Pakistan's website and annual financial statements of 17 commercial banks present in Pakistan. It included the time series data for the ten year period i.e. 2005-2014.

3.1. Research Hypothesis

- a. H₀: There is a negative relationship between CRR and banks' ROE.
 H_A: There is a positive relationship between CRR and banks' ROE.

- b. H₀: There is a negative relationship between CRR and banks' ROA.
 H_A: There is a positive relationship between CRR and banks' ROA.

3.2. Data Source and Collection Technique

Data collected for the research is secondary mainly extracted from the official websites of the state bank and commercial banks present in Pakistan annual financial statements published by the banks annually are used for extracting the data. Data type is quantitative which is collected and then worked on to find the correlation and regression between the variables.

4. Data analysis

Descriptive Statistics							
	N	Minimum	Maximum	Mean	Std. Deviation	Skewness	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error
ROE	10	-9.74	17.23	6.1880	8.73431	-.433	.687
ROA	10	-.53	.94	.4710	.46962	-1.298	.687
CRR	10	5.00	7.20	5.5200	.89044	1.399	.687
Valid N (listwise)	10						

According to the above table, skewness for ROE is within the range of -1 to 1, therefore Pearson correlation will be applied to find the relationship, while for ROA skewness is beyond the range of -1 to 1 so Spearman correlation will be used to test its relationship. Overall, two tests are applied in this study i.e. correlation and regression to test the hypothesis developed.

Correlation Analysis			
		ROE	CRR
ROE	Pearson Correlation	1	-.022
	Sig. (1-tailed)		.476
	N	10	10

In the table we can see that the correlation between the variables that is ROE and CRR is -0.022 so we can say that there is a weak linear relationship between the two. The sign is negative, which shows that as CRR increases ROE for the banks decreases. The significance level is 0.476 which means the relationship is significant. The test results failed to reject the null hypothesis.

Correlation Analysis			
		ROA	CRR
Spearman rho	ROA	Correlation Coefficient	1.000
		Sig. (1-tailed)	.160
		N	10

Here, the correlation coefficient is -0.350 between ROA and CRR therefore negative relationship exists between the two. This relationship between the two variables is significant as the significance level is 0.16. therefore here we fail to reject the null hypothesis that there is a negative relationship between CRR and ROA.

Regression Analysis

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.22 ^a	.000	-.124	9.26189

a. Predictors: (Constant), CRR

ANOVA ^b						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.332	1	.332	.004	.952 ^a
	Residual	686.262	8	85.783		
	Total	686.594	9			

a. Predictors: (Constant), CRR
 b. Dependent Variable: ROE

Coefficients						
Model		Un-standardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	7.379	19.361		.381	.713
	CRR	-.216	3.467	-.022	-.062	.952

a. Dependent Variable: ROE

In the above tables relationship of ROE is tested with the CRR, ROE being the dependent variable. As the significance value is > 0.05 but the t value of -0.062 suggests inverse relationship between ROE and cash reserve ratio (CRR). In model summary the value of R² is equals to 0.000 that indicates zero variation between ROE and CRR. According to this it can also be concluded that the model fit is weak. The value of beta shows:

$$ROE = 7.379 - 0.216 \text{ CRR}$$

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.364 ^a	.132	.024	.46397

a. Predictors: (Constant), CRR

ANOVA ^b						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.263	1	.263	1.220	.301 ^a
	Residual	1.722	8	.215		
	Total	1.985	9			

a. Predictors: (Constant), CRR
 b. Dependent Variable: ROA

Coefficients						
Model		Un-standardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.530	0.970		1.578	.153
	CRR	-.192	0.174	-.364	-1.105	.301

a. Dependent Variable: ROA

The model fit for this hypothesis is very low because the R² is 0.132 which denote approximately 13% variation. The significance level is >0.05 and t statistics of -1.105 shows negative relationship between the variables that are ROA and CRR. The equation will be like this:

$$ROA = 1.530 - 0.192 \text{ CRR}$$

5. Conclusion

The relationship between reserve requirement and banks profitability has been examined over the last 10 years for Pakistan. However the limited studied focused on the commercial banking industry of Pakistan. The study will provide literature on the monetary aspects of banks profitability in the contextual setting of Pakistan. This paper extend and contributes to impact of monetary policy by taking its dimension of reserve requirement ratio particularly CRR over the banks return on asset (ROA) and return on equity (ROE) by offering the empirical evidence on its effect on banks profitability. The result of this study shows that the CRR is negatively associated with bank profitability. And therefore it can be concluded that changes in CRR will have an inverse impact banks profitability. As the CRR will be increased by SBP, ROE and ROA will fall for banks and vice versa according to the above findings. This empirical finding are similar to literature as studies by (Maddaloni & Peydro, 2011) and (Yourougou, 1990). The study also posits some limitation regarding the sample size as it uses the only 17 banks for the period of 10 year for analysis. This sample can be extended to the other sector of economy for generalization of results and second limitation that it only uses the Cash Reserve Ratio (CRR) as measure of monetary policy, its other measure can be incorporated for further investigation.

6. Bibliography

- i. Al Mazari, A. A. (2013). Capital Adequacy, Cost Income Ratio and the Performance of Saudi Banks. *International Journal of Academic Research in Accounting, Finance and Management Sciences*, 284–293.
- ii. Camilo E. Tovar, M. G.-E. (2012). Credit Growth and the Effectiveness of Reserve Requirements and Other Macprudential Instruments in Latin America . *IMF Working Paper* .

- iii. Dr. Imran Naseem, M. A. (2012). The Profitability of Banking Sector in Pakistan. *Science Series Data Report*, 42-53.
- iv. Gray, S. (2011). Central Bank Balances and Reserve Requirements . *IMF Working Paper*.
- v. Guonan Ma, Y. X. (2011). China's evolving reserve requirements. *BOFIT Discussion Papers 30/2011* .
- vi. Haiying Pan, H. S. (2012). Analysis of the Effects of Frequent Increases of the Reserve Requirement Ratio by the People's Bank of China. *Modern Economy*, 229-236.
- vii. Jonathan Bridges, D. G. (2014, january). The Impact of Capital Requirements on Bank Lending . *Working Paper No. 486, bank of England*, pp. 21-28.
- viii. K.Ravi Teja, M. T. (2013). Cash Reserve Ratio Impact on Stock Market (INDIA) in Longrun. *International Journal of Marketing, Financial Services & Management Research*, 85-93.
- ix. Rao, P. (2006). Monetary Policy: Its Impact On The Profitability Of Banks In India . *International Business & Economics Research Journal*, 15-22.
- x. Rush, P. L. (2014). The Effect of Changes in Reserve Requirements on Investment and GNP. *International Finance Discussion Papers, number 471*.
- xi. Sattar, W. A. (2014). Impact of Interest Rate Changes on the Profitability of four Major Commercial Banks in Pakistan. *International Journal of Accounting and Financial Reporting* , 142-154.
- xii. Sehrish Gul, F. I. (2011). Factors Affecting Bank Profitability in Pakistan . *The Romanian Economic Journal* , 61-87.
- xiii. Shipho, T. O. (2011). Effects of Banking Sectoral Factors on the Profitability of Commercial Banks in Kenya . *Economics and Finance Review* , 1-30.
- xiv. Towbin, C. G. (2011). The Macroeconomic Effects of Reserve Requirement.
- xv. Uremadu, S. O. (2012). Bank Capital Structure, Liquidity and Profitability Evidence from the Nigerian Banking System. *International Journal of Academic Research in Accounting, Finance and Management Sciences*, 98-113.
- xvi. Zarafat, M. V. (2014). An Analysis of Macroeconomic Determinants of Commercial Banks Profitability in Malaysia for the period 1995-2011 . *Asian Economic and Financial Review* , 41-57.

7. Appendix

Table 1: Yearly Average Profit figures of 17 banks, CRR rates

YEAR	ROE (%)	ROA(%)	CRR
2005	17.23	0.88	5.00
2006	13.09	0.80	6.00
2007	4.00	0.25	7.00
2008	4.34	-0.10	7.20
2009	-9.74	-0.53	5.00
2010	15.33	0.53	5.00
2011	4.45	0.66	5.00
2012	2.56	0.73	5.00
2013	-3.46	0.55	5.00
2014	14.08	0.94	5.00