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INTEREST RATE DETERMINANTS OF BANKS IN PAKISTAN

This study attempts to investigate determinant factors of interest rate differential on deposits and loan accounts of Pakistani banks. For this purpose 4-year data on 30 banks is included in this research paper. The empirical results based on the correlational analysis of the relationship between weighted average rate of interest and 10 independent variables which are credit risk, amount of deposit, administrative cost, profit margins, bank's liquidity, amount of loan, market share, inflation rate, macroeconomic conditions and bank specific factors. These variables will help to highlight customer reaction towards variation in interest rates which help banks to review their policies regarding interest rates, margins and risk premium. The results shows that credit risk, administrative costs, profit margins and deposit amounts are important factors for the interest rate determination and these are positively related with interest rate. Bank's liquidity and deposit amount have negative relationship with interest rate. Meanwhile, inflation and market share have no significant relationship with interest rate fluctuations.

Keywords: interest rate; banking sector; Pakistan; risk; deposits.

Міан Саїд Назір, Акса Батт, Мухаммад Музаррат Наваз ЧИННИКИ, ЩО ВИЗНАЧАЮТЬ ВІДСОТКОВІ СТАВКИ У БАНКАХ ПАКИСТАНУ

У статті зроблено спробу визначити чинники впливу на відсоткові ставки депозитів та кредитування у банках Пакистану. Для цього використано дані по 4 роках та 30 банках. Емпіричні результати спираються на дані кореляційного аналізу взаємозв'язку між середньозваженою відсотковою ставкою та 10 незалежними змінними – кредитний ризик, об'єм депозитів, адміністративні витрати, загальна рентабельність, ліквідність банку, об'єкт кредитування, частка ринку, рівень інфляції, макроекономічна ситуація та специфіка окремого банку. Дані зміни допоможуть визначити реакцію клієнтів на зміну відсоткової ставки при перегляді банками своїх політик щодо відсотків, маржі та премій за ризик. Результати показали, що кредитний ризик, адміністративні витрати, загальна рентабельність та об'єм депозитів є важливими чинниками при визначенні відсоткової ставки, і кореляція з ними є позитивною. Ліквідність банку та об'єм депозитів корелюються з відсотковою ставкою негативно. Водночас вплив інфляції та частки банку на ринку є незначним.

Ключові слова: відсоткова ставка; банківський сектор; Пакистан; ризик; депозити.

Рис. 1. Табл. 2. Літ. 12.

Миан Саид Назир, Акса Батт, Мухаммад Музаррам Наваз ФАКТОРЫ, ОПРЕДЕЛЯЮЩИЕ ПРОЦЕНТНЫЕ СТАВКИ В БАНКАХ ПАКИСТАНА

В статье сделана попытка определить факторы влияния на процентные ставки депозитов и кредитувания в банках Пакистана. Для этого использованы данные по 4 годам и

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30 банкам. Емпірические результаты основаны на данных корреляционного анализа взаимосвязи между средневзвешенной процентной ставкой и 10 независимыми переменными – кредитный риск, объем депозитов, административные расходы, общая рентабельность, ликвидность банка, объем кредитования, доля рынка, уровень инфляции, макроэкономическая ситуация и особенности отдельно взятого банка. Данные переменные помогут определить реакцию клиентов на смену процентной ставки при пересмотре банками своих политик по процентам, марже и премиям за риск. Результаты показали, что кредитный риск, административные расходы, общая рентабельность и объем депозитов являются важными факторами при определении процентной ставки, и корреляция с ними позитивна. Ликвидность банка и объем депозитов коррелируются с процентной ставкой негативно. Влияние же инфляции и доли банка на рынке незначительно.

Ключевые слова: процентная ставка; банковский сектор; Пакистан; риск; депозиты.

1. Introduction. Financial sector development and economic development are interrelated. No economy can grow and improve living standards of its population in the absence of a well-functioning and efficient financial sector. A sound and healthy banking system is directly related to economic growth and development of a country. Pakistan has a well-developed banking system, which consists of a wide variety of institutions ranging from a central bank to commercial banks and to specialized agencies to cater for special requirements of specific sectors. Banking industry in Pakistan is flourishing for the last decade. Banks are diverse in their scope and the course of activities as in developing countries where information asymmetry is found in banking industry is supposed to be the promising field for research.

The basic aim of our paper is to learn about the "mysteries" behind interest rate being offered by banks in Pakistan. As compared to low-interest rate, the banks offer high return to attract more customers and deposits. Differences in interest rate affect the choices of customers to choose bank for their investments. Normally customers prefer to deposit their investments in banks that offer high rate of return. Banks have to keep balance between deposit amount and loan amount credited. Banks have multiple tools to control deposit and loan requests, the most basic and popular tool is interest rate. They can decrease the trend of people depositing amount by decreasing interest rate on saving and at the same time increasing charges of credit amount. Control of excess liquidity is done by using interest rate tool. We consider these two factors as determining factors of interest rate for banks. There are some internal costs in banks which they take from the customers under the name of service charges. We can notice that in days when banks increase their branch networks or spend high amounts as administrative costs they increase interest rates and charges for their services. Local or domestic banks bear more administrative costs than foreign or specialized banks because their area of business is limited, this is why their interest rates are not very high or too low. Instead of domestic banks foreign or specialized banks interest rates have seen greater spread. Return on asset variable is used to check how effectively banks use their resources. It is a common thought that foreign and specialized banks effectively utilize their resources. As they have limited amounts of resources, they use ultimate efforts to get high profits from small investments. This is why small banks have larger spread in their interest rates on deposit and loan accounts. Saira et al. (2011) elaborate in their study the determinant factors of banks profitability, and their result is that equity and deposits are determinants factors of banks profitability in Pakistan.

There are multiple other factors which have strong impact on interest rate on banks accounts. Some of the important aims and objectives of this study are:

- To prove that there is negative relationship between interest rate and deposit amount in banks;
- To prove that there is positive relationship between administrative costs and interest rate of bank accounts;
- To prove that there is positive relationship between profitability and interest rate on deposit and loan accounts of a bank;
- To prove that there is negative relationship between market share and interest rate on deposit and loan accounts of a bank;
- To prove that there is positive relationship between inflation rate and interest rate on deposit and loan accounts of a bank;
- To prove that there is positive relationship between credit risk and interest rate on deposit and loan accounts of a bank;
- To prove that there is negative relationship between GDP growth rate and interest rate on deposit and loan accounts of a bank;
- To prove that there is positive relationship between bank specific factors and interest rate on deposit and loan accounts of a bank;
- To prove that there is negative relationship between bank's liquidity and interest rate on deposit and loan accounts of a bank;
- To prove that there is positive relationship between amount of loan and interest rate on deposit and loan accounts of a bank.

2. Review of literature. Ezeoha (2011) studies the factors which impact the banks' asset quality in Nigeria and how consolidation of banks affects their profitability, operating efficiency, level of asset liquidity, size of bank capital and nonperforming loans. He concludes there is significant negative relationship between nonperforming loans and profitability of a bank. High profitable assets are significantly important for improving quality of a banks' asset. Khemraj (2010) suggests that high liquid assets can give impression that bank's management is not utilizing assets effectively in different products or services which are normally non-remunerated in less developed economies. There is significant negative relationship between loan to deposit ratio and non-performing loans. It is suggested that in the time of financial distress, banks should increase the number of credit loans to control their access liquidity. Dia et al. (2009) in their paper propose a model that predicts loan and deposit accounts interest rates and conclude that interest rate profits on loan accounts and cost bearing by a bank for these loan products are very persistent and strongly influence each other. They also conclude that there is no segregation of long-term and short-term loans on the basis of interest rates margins. Interest rate margins would be the same for all types of loan accounts. Dabla and Floerkemeier (2007) in their paper examine the determinants of past and future interest rate margins and spread in the specific area of Armenia in 2002–2006. They support the statement that market structure and bank specific factor are important causes for variations in interest rate margins and create spreads. They find that interest rate margins are negatively associated with deposit amount (market share). Moreover, margins are negatively related with profitability (ROA). Macroeconomic variables have minimal impact on interest rate margins.

With the introduction of liberalization and improved credit schemes and services the financial sector grows faster than ever before. The improved practices create more accuracy in operations, accountability of actions minimizes the risk of credit loss and increases the efficiency. New and improved services have numerous advantages which are explained by Gjedrem (2005):

1. Different credit products provide flexibility to customers to fulfill their diversified needs in credit.

2. Refinancing options and introduction of new financing products for existing customers can help to achieve customer loyalty.

3. New financial institutions with introduction of new financing products increase competition and improve credit services and schemes.

Oldfield and Santomero (1997) study the management perspective toward risk and they give 3 solutions which are widely practiced to avoid risk in various financial institutions: (i) Simple business practices; (ii) Transferred to other participants, (iii) Actively managed at the firm level. Ho and Saunders (1981) examine banks as dealers', demanders of deposits and suppliers of loans. According to this study, bank interest margin depends on 4 factors: (i) The degree of bank's management risk aversion; (ii) Market structure of the industry; (iii) Average size of bank transactions and (iv) The variance of interest rates. They conclude that a number of inconsistencies and regulatory limitations have impact upon interest rate difference. Rekha (2005) evaluates the nonperforming assets of banks in India and proposes 2 approaches to credit risk management as considered below.

2.1. Preventive measures:

- i. Assessment of risk amount.
- ii. Continuous measurement of the market internal credit risk associated with types of credit customers in the portfolio of creditors.
- iii. Timely warning and alerts regarding current and future credit risks to specific category of customers in the portfolio of creditors.

2.2. Curative measures:

In these types of measures the authors suggest possible solutions if credit risk comes in the warning position for a bank. Some of these are securitization, derivative market trading, risk sharing program with other creditors and legal actions enforcement against people who do not pay back. There is a lot of literature on interest rate spread and effect of macroeconomic variables on interest rates of banks but still there is no generally accepted model relating macroeconomic variables to changes between borrowing and lending rates. However, most of the studies are based on Ho and Saunders (1981), they say macroeconomic instability raises the risk of default and bank spreads. They conclude that interest margins rise with the variance of interest rates as a result of the intermediation risk faced by banks. This is supported empirically by Saunders and Schumacher (2000). Quaden (2004) argues that a more efficient banking system benefits the real economy by allowing "higher expected returns for savers with a financial surplus, and lower borrowing costs for investing in new projects that need external finance". Low interest rate spread encourages both borrowers and creditors of banks. In addition, Cardoso and Eliana (2003) state if inflation shocks are not passed through to both borrowing and lending rates equally rapidly, bank spreads may be correlated with inflation rates, and indeed various studies find positive correlation

between spreads and inflation. Meanwhile, theory predicts that level of risk for borrowers is likely to rise with the level of interest rates, probably in a nonlinear way. Banks charge high rates to compensate higher risks at the market, causing a positive relationship between the level of interest rates and spreads. In this research we consider inflation rate and GDP growth rate as macroeconomic variables for determination of interest rate.

All the studies mentioned above are using some specific variables related to bank, market or economic conditions. The specificity of our research from all of the discussed above is that we cover all areas like market, bank specific and economic. We discuss the individual factors and the results in detail. We use hypothesis and statistical modeling approach to show empirically positive or negative relationship of independent variables with weighted average interest rate. This study covers the broad area of financial institutions in Pakistan and gives suggestion to bankers, individuals and researchers. According to our literature review we choose methodology for the article which consists of introduction, methodological framework, sample information and statistical model with its evaluation.

3. Research Methodology. Literature indicates that there are numerous factors that can affect interest rate on deposits and loan accounts of different banks. This research is focused only on 10 important factors (independent variables) that are inflation, amount of deposits, amount of loan, profitability, administrative cost, market share, credit risk, liquidity, economic conditions and bank specific factors. We use interest rate as a dependent variable, this interest rate value is the weighted average rate of interest on all loan and deposit accounts of each bank in the sample.

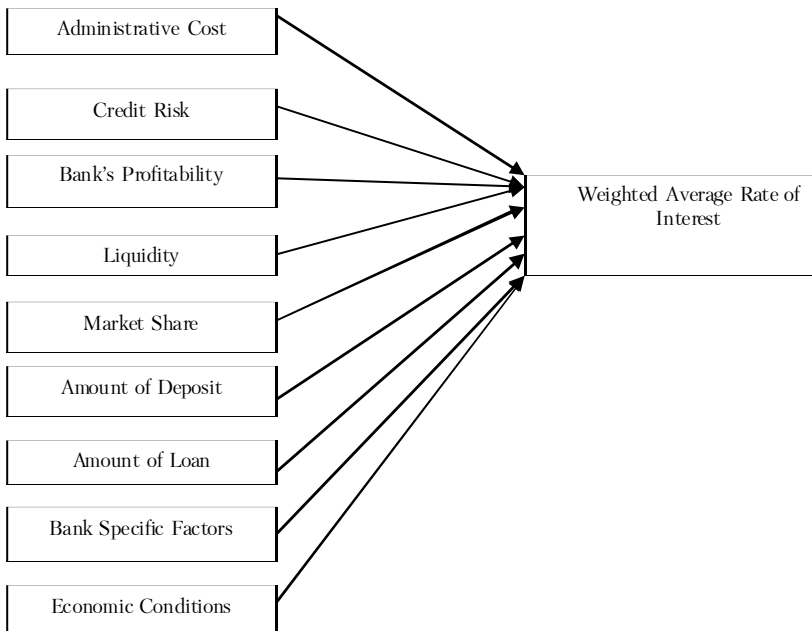


Fig. 3.1. Theoretical framework

3.1. Data Collection. The data is taken from all the banks registered by State Bank of Pakistan. We take sample of 30 banks. Sources of the data are secondary and all information about internal financial variables is taken from the banks financial statements, macroeconomic variables data is taken from Federal Bureau of Statistics websites (inflation and GDP growth rate). List of banks with their specification as Islamic or foreign category and short names used in the statistical analysis are provided. Time period for the study is 2006-2009. For the banks which were established after 2006 the expected values of the particular year from the remaining years data is used.

3.2. Statistical Model. Statistical modeling is used to prove empirically the importance of the study. α is set at 0.05 or 0.01 (5% and 1% error rates respectively), the selection of α often dictates the level of β for a given hypothesis test. We use 10 different proxies to determine interest rate on deposit and loans accounts of banks.

$$W_{it} = \alpha + \beta_1(RISK_{it}) + \beta_2(INF) + \beta_3(DEP_{it}) + \beta_4(AC_{it}) + \beta_5(PRO_{it}) + \beta_6(MS_{it}) + \beta_7(EC) + \beta_8(LIQ_{it}) + \beta_9(BS_{it}) + \beta_{10}(LN_{it}) + \varepsilon$$

The details of calculations and abbreviations of the proxies are:

α = intercept,

$\beta_{1,2...10}$ = coefficients of predictors,

W_{it} = weighted average rate of interest, calculated as interest income by advances of i^{th} bank and t time period,

$RISK_{it}$ = credit risk is measured as provision against non-performing loan by advances of i^{th} bank and t time period,

DEP_{it} = amount of deposit of i^{th} bank in t time period,

AC_{it} = administrative cost of i^{th} bank in t time period,

PRO_{it} = average profitability is measured as earnings before interest and taxes by total assets of i^{th} bank in t time period. In other words, known as return on asset ratio.

MS_{it} = average market share is measured as loan of i^{th} bank by loan of all banks of i^{th} bank and t time period,

LIQ_{it} = average liquidity is measured as total loan / total deposit of i^{th} bank and t time period. In other words, known as loan to deposit ratio,

BS_{it} = bank specific factors are measured as total number of branches of i^{th} bank in t time period,

LN_{it} = amount of loan of i^{th} bank in t time period,

INF = inflation rate is measured as real inflation rate in Pakistan,

EC = macroeconomic conditions is measured as GDP growth rate of Pakistan,

ε – Error Term

4. Results of Empirical Research

4.1. Descriptive Analysis. Descriptive statistics is used to show the characteristics of the data. The data and sample overview, authentication and concentration of the data analysis are the main objective of the descriptive statistics analysis. Total number of observations is 120, all of them are used for all 10 variables. The average value of interest rate (INT) is 18% for all the banks in the sample. There is also very little dispersion found in the data on interest rate. The variance of the disturbances reported conveys information on the fluctuations in the model components. The results suggest there is no evidence of an unobserved stochastic trend in the model, implying

that the variables used in the model are sufficient and other exogenous variables that cannot be explicitly measured are not required, for example, number of branches is having very prominent standard deviation value. Profitability (ORA) of the most of the banks in the sample is negative because banks have net loss in their P/L accounts that why the value of mean is negative. Other measures of the profitability variable make the data normal and useful for calculation of the model.

Market share (MS) and credit risk (RISK) are normal distribution variables, no significant change is found in their variance. Amount of loan (LOAN), deposit (DEP), administrative cost (ADM) and liquidity (LIQ) variable data move in the negative direction and are negatively skewed. The answer of their kurtosis statistics makes them part of normal distribution because all of their answers are close to zero. The data on these variable moves in negative direction supporting our prediction that these variables have negative relationship with interest rates of banks. For example, high liquidity position of bank has negative impact and interest rates. The inflation rate (INF) of Pakistan for this time period has seen fluctuations causing high value of standard deviation or dispersion. This does not weaken the importance of the variable as we can see the positive skewness and closeness to the peak of normality of the data. Meanwhile, the values of the mean and median of inflation rate are also very close which authenticate the normality of the variable. Almost all the data is concentrated in the normal region of the descriptive statistics.

Table 4.1. Descriptive statistics

Variables	Mean		Median	Mode	SD	Variance	Skewness	Kurtosis
INT	.18193	.18192	.157677	.0770 ^a	.087912	.008	2.024	5.387
RISK	.02813	.02813	.0154	.00000	.03484	.001	2.307	5.813
MS	3.3895	3.3895	1.0755	.0686 ^a	4.4938	20.195	1.599	1.641
LIQ	.67889	.67888	.6943	.5638 ^a	.20919	.044	-.205	2.538
DEP	10.623	10.6239	10.5411	9.4025 ^a	.7372	.544	-.219	-.935
ADM	9.2295	9.2295	9.230	7.9564 ^a	.65916	.435	-.905	3.560
INF	156.08	156.085	150.4	131.6400 ^a	22.9508	526.742	.604	-1.125
GDP	4.3800	4.380	4.75	1.2100 ^a	2.16061	4.668	-.378	-1.369
BRANCH	298.90	298.90	105	40.0000	429.45494	184431.553	1.873	2.053
ROA	-.00019	-.00019	-.0047	-.0316 ^a	.024476	.001	-4.786	34.287
LOAN	10.40925	10.4092	10.450	9.1536 ^a	.84034	.706	-.848	1.601

Note: Log of amount of deposit, loan and administrative cost values is used because of the size of the value. Rest of the values are shown in %.

4.2. Regression Analysis. Regression analysis is used to check the values of parameters for a function that cause the function to best fit a set of data observations provided. The model summary is quite well, all the variables are well enough to determine the interest rate on deposit and loan accounts of the banks. Coefficient of determination is 62% which is above average which means the model is perfect for interest rate determination. R is the correlation between the observer values of the dependent variable. All independent variables are 78% correlated meaning strong correlation

exists between the variables. These variables are best fit for the model "determination of the interest rate" for deposit and loan account of the banks.

The result of Table 4.2 shows that interest rate would be 4.4 when rest of the independent variables will be constant. Risk, administrative cost and profitability have positive effect on dependent variable (INT). Risk and administrative cost come out as very prominent factors for change in interest rate, almost 6 units positive increase in interest rate due to these two variables. Whenever the cost of bad debts and administrative cost increases it imposes banks to increase interest rate on their products. Meanwhile, interest rate has positive and strong relation with profitability of a bank. Each unit of increase in ROA will increase interest rate by 2 units. After risk and administrative cost profitability is the second most influencing variable on interest rates. Macroeconomic variables have no significant impact on interest rate. They have negative impact on interest rate. Changes in economic conditions have negative impact on people spending and savings, likewise price and interest rate also change and move in the opposite direction of economic changes. The increase in GDP growth rate decreases interest rate by 2.12 which is natural as economic activity in the country increases and financial institutions would help public in investments by lowering interest rates. But still these two variables are not found to be important for determining interest rate of banks.

Table 4.2. Coefficient

Model	B	t-value	Expected	Observed
(Constant	833	.428		
RISK	1.081	.053***	+ive	+ive
MS	.001	-.117	-ive	+ive
LIQ	-.049	-.805	-ive	-ive
DEP	-.096	.807**	-ive	-ive
ADM	.108	-.299***	+ive	+ive
INF	-.001	-.431*	+ive	-ive
GDP	-.018	.028**	-ive	-ive
BRANCH	5.716E-6	.170	+ive	+ive
ROA	.611	-.345**	+ive	+ive
LOAN	-.036	.053	+ive	-ive

Dependent Variable: INT

Adjusted R² = 0.588

F-Value = 17.864***

***, **, * are significance levels at 1%, 5%, 10% respectively.

Bank specific factors (BRANCH) support our hypothesis that it has positive impact on interest rate determination. This variable is not very important for interest rate. Amount of deposit has significant negative relationship with interest rate. Each value change determination decreases interest rate. Positive liquidity position of a bank means bank having liquid assets in form of deposits, cash etc. Our results on liquidity with interest rate are negative because if a bank has positive liquid assets it really doesn't need any more deposits from general public. So, it decreases the interest rates to stabilize the liquidity position. Customers change their bank for deposits because they prefer banks which not only offer them good service but healthy returns too.

5. Conclusion. In this study, the determinants of interest are found for 30 banks in Pakistan for the period 2006-2009. There are 10 factors defined which help in

determination of the interest rate for deposit and loan accounts of banks in Pakistan. These variables are determined with the help of previous studies in the field of interest rate determination. These variables cover not only specifically each separate bank in sample but also cover the situation of risk at the market and condition of the macroeconomic variables. There are 3 types of analysis done on the data set: descriptive, correlation and regression. Descriptive analysis shows that the sample data is normally distributed. Correlation analysis shows strong correlation between dependent and independent variables. Regression analysis is applied in the procedure of hypothesis testing. It proves the positive and negative relationship of variables with interest rate. The results show that interest rate has inverse relation with deposits volume. It means that if deposits of a bank increase, than interest rate on deposits will decrease. Logic behind this is that if a bank is having more deposits in its books, then it will have much money for further investments and as deposits are liability for a bank, so it cannot exceed its liability more than a limit, so a bank will decrease its interest rate. By the decrease in interest rate on deposits people will switch off depositing their savings and they may invest it in some other economic activity.

According to our results, inflation rate and GDP growth rate are directly related with interest rate. This result also shows that banks in Pakistan are financially sound that economic fluctuations does not directly affect their profitability. Profitability of banks has positive relationship with interest rate. It means that a bank earns profit and the it can announce better interest rate on deposits. All these factors result in the interest rates increase. People want to place more money in banks in the form of deposits. While entering data we have seen many small banks having net loss in their profit and loss account but they stiu have sound position in the deposits and loan accounts. This situation shows poor risk management practices. Risk management plays a very important role in the success of any lending institution, banks especially, because the major liability in their accounts is public deposits. Credit risk and profitability of a bank both show strong positive relationship with interest rate on accounts. This kind of fluctuations does not give good impression on bank customers for saving their amounts. The branch network of some banks is much larger than of foreign and specialized banks. There is also a vast difference in administrative costs and maintenance cost of the banks. Banks should spend on management and branches which they can handle and afford easily. That is why number of branches variable has variation in the data but this variable is an important factor for determining the interest rate. Increase in braches quantity increases bank's expenses which they have to cover from their customers accounts.

Risk management team of a bank plays an important role in minimizing bank losses from bad debts. If this department is not working properly, the interest rate would fluctuate more often. Banks should limit the amount of deposit and loan because these two amounts are directly affecting the interest rates of banks. The proper policy-making on deposit and loan amount can save bank from many future losses. Banks should hold the number branches which they can manage easily. Large number of branches with average management can affect the profitability of a bank. Affective management of resources can prevent bank management from interest rate fluctuations and decreases their administrative costs. For customers before selecting a bank for savings or a loan they should watch bank's profitability and market value of

a bank and, most importantly, the list of the past offered interest rates. By checking the previously offered interest rates they can predict future fluctuations in interest rate. There are some limitations of the study like all the data is taken from secondary sources because it is not possible to do such kind of research in the short period of time.

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