

## The impact of interest rate on savings behavior in Bangladesh

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### Abstract:

The purpose of this study is to determine the impact of interest rate on savings and deposits behavior in Bangladesh for the period of 2009 to 2018. The data is mainly collected from secondary sources such as World Bank and annual reports of Bangladesh bank. The explanatory variable is the interest rate; savings and deposits are considered as dependent variable in two different models. We use simple ordinary least square regression method to examine the relation between interest rate and savings behavior. The study finds that interest Rate positively affects customer's savings behavior in the banking sector of Bangladesh.

**Key Words:** Deposits; Interest Rate; Savings.

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### I. Introduction

Deposits are the heart of financial institutions like banks. Financial systems have been recognized to play an imperative role in economic development. One of such significant elements in financial systems that represent development in a country's economy is bank deposits. Financial institutions such as banks put to rights wishes of little savers for high liquidity and low risk with the needs of investors by taking deposits. Deposits are subject to numerous conditions; arguably, the most imperative and observable one is the rate the bank pays over the amount of savings. Deposit may be important for both developed and developing countries such that it helps depositors to earn on their funds which they have no immediate use for. It likewise makes a stage for banks to channel such assets to organizations and people who have who have urgent use of such funds. Eric Kofi Boadi and Yao Li (2015) analyzed that the total volumes of deposit distribution among individual banks and other monetary divisions, for example, insurance are normally determined by market forces. The dynamics between interest rate and customer savings behavior has not been excessively explored. No indisputable understanding has been reached regarding the idea of the nature of how interest rates is likely to affect customer savings behavior particularly in the Bangladesh context. A number of factors are likely to influence customer saving behavior in banks, such as the fixed saving interest rates, country specific wage, aggregate average annual bank losses, institutional and regulatory strength, average bank lending, and country specific monetary policy. Fixed savings account interest rates can also have strong consequences on overall average bank deposit and in most cases it is also affected by bank specific lending interest rates since it is customer deposits that are lent to private sector business with the expectations of returns on borrowed capital, making nominal interest rates to have a back-effect on fixed savings interest rates. Nominal interest rate therefore is likely to have an indirect causal effect on customer savings through fixed savings account interest rates. The study investigates the impact of interest rates on bank deposits in Bangladesh, using simple linear regression estimation a non parametric estimation method that is based on the premise that the sample median will tend to that of the distribution and produces consistent estimates in the presence of heteroscedastic errors and outliers in the response measurement. The purpose of the study is to provide empirical evidence of the factors that affect customer's savings behavior measured as aggregate bank deposit and savings in the study in Bangladesh during 2009 to 2018.

### II. Literature Review

Interest rate has huge implications in describing many economical phenomena and so many studies have been on it to show the connection with other monetary. Bank deposits are the consequence of propensity for individual saving and to expand saving behavior, the interest rate has been presented as a fundamental factor. Money saving habit will increase if the interest rate increases as on high interest rate individuals will forfeit their

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present consumptions. Keynes (1936) concentrated on consummation and characterized the interest rate as it is a return on spreading liquidity not or aggregation during a period though it is viewed as the opportunity cost of current utilization or value return in from the future viewpoint. Hadjimatheou (1987) depicted that increased rate of interest affects comprise of two partial for a net saver, which is expanded present consumption, due to income effect and decreased present consumption, due to substitution effect. Loayza and Shankar (2000) examined the relation in real interest rate, per capita income in Indian agricultural industry and its role in GDP. They found a positive connection among these factors, with respect to GDP and an adverse impact of savings on inflation, dependency rate and financial development.

Kwan (2002) analyze the impact of deposit rate deregulation in Hong Kong on the market value of commercial banks. The study locate that rules and deregulation reduces the deposit interest rate which is ultimately impact on market values. Athukorala and Tsai (2003) considered the household saving in their research with respect to inflation and interest rate in Taiwan. They found the unfavorable association between inflation and saving whereas a positive relation between interest rate and saving. Nabar (2011) considered targets, interest rates, and household saving in urban China for the term of 1996 to 2009 when there was a rising trend in saving rates. The result elaborated the inverse relationship between real interest rate and urban saving rates. It is proposed in the study that to expand domestic consumption it is needed to lower family saving which is possible when real deposit rate increases. Onwumere, Okore and Ibe (2012) investigated the impact of interest rate liberalization on savings and investment in Nigeria for the time of 1976-1999 by utilizing simple regression technique with the help of SPSS statistical software. The outcome showed saving was adversely and lightly affected by interest rate liberalization and strongly affected by investment.

Orji Anthony (2012) contemplated the Bank savings and bank credits in Nigeria with the reference of determinants and impact on financial development. The examination determined that size of private domestic saving is essentially favorable instigated by GDP per capita, financial deepening and interest rate and adversely influenced by inflation rate and real interest rate. The study suggested that government could play role to decrease unemployment rate and to improve saving, for the advancement of economic growth in Nigeria. Younus et al. (2014) attempted to identify the determinant of lending rate in Bangladesh. They found that deposit rates, inflation, non-performing loans and both 3 and 5 year NSD certificate rates are significantly effect the lending rate whereas private sector credit and policy rate does not have any impact on the lending rate in Bangladesh.

### III. Empirical Design and Methodology

The study is based on secondary data, which has been taken from annual reports of Bangladesh Bank, website of Bangladesh bank, World Bank national accounts data and www.countryeconomy.com. Deposit of Banks is the dependent variables of the study, which has been extracted from the annual report of Bangladesh Bank. Interest rate and savings are the independent variables of our study, whereas GDP and Inflation have also been included as independent variable as country control variables.

#### 3.1 Data Description

Identified data are based on time series, to evaluate the deposit series of indicators during the study. They are presented in the form of yearly from 2009 - 2018. Using yearly time series helps improve the study of the effect of independent variables in the performance level of deposits in the entire banking system. The report model is built based on secondary data. The choice of variables must have a strong theoretical base, which can be achieved through the identification of empirical studies. In this way, the results generated will be reasoned and statistically significant.

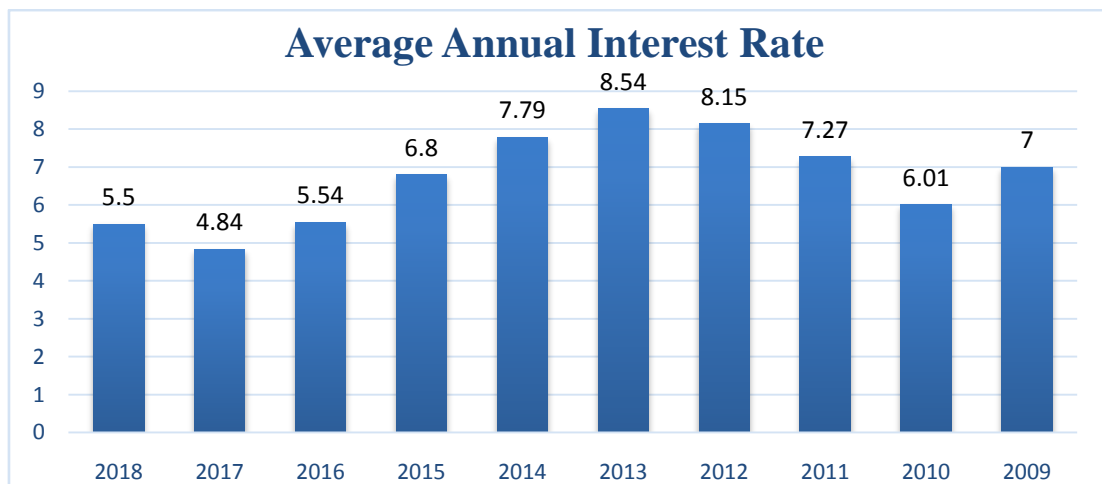


Figure 01: Average Annual Interest Rate of 10 Years

Source: Annual report of Bangladesh Bank

Average annual interest rate of 10 years in Bangladesh perspective, here we found that interest rate is following any upper trend or lower trend where in 2013 the interest rate was 8.54 which is maximum and lowest interest rate in 2017 was 4.84. Data are collected from the annual report of Bangladesh Bank.

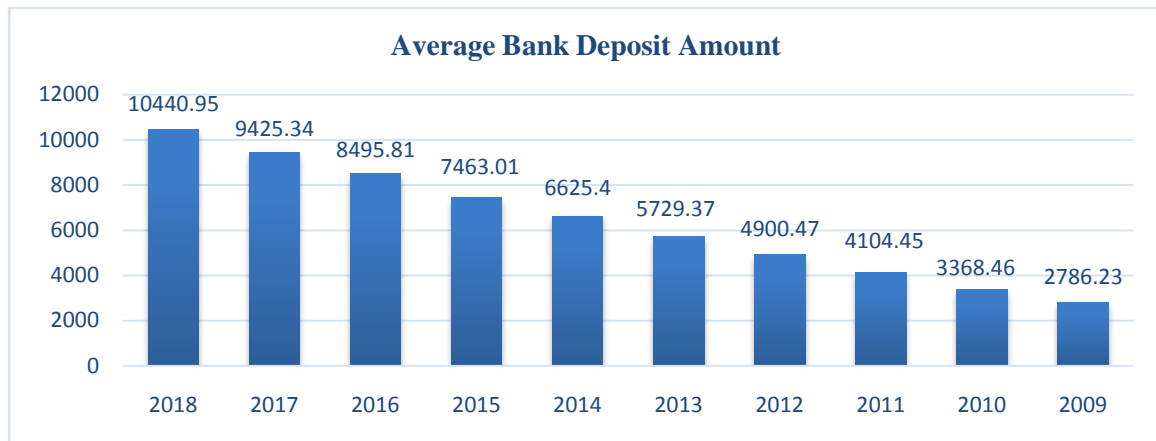
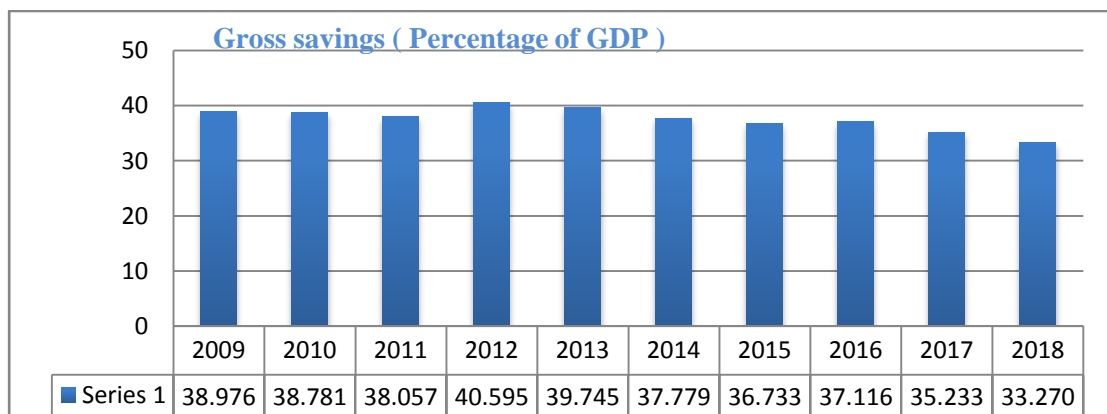


Figure 02: Average Bank deposit amount 10 years (Billion TK)

Source: Annual report of Bangladesh Bank

Average Bank deposit amount in Billion TK. The maximum amount 10440.95 billion TK in 2018 and the lowest amount in 2009 was 2786.23 billion TK.



Source: World Bank national accounts data, and OECD National Accounts data files.

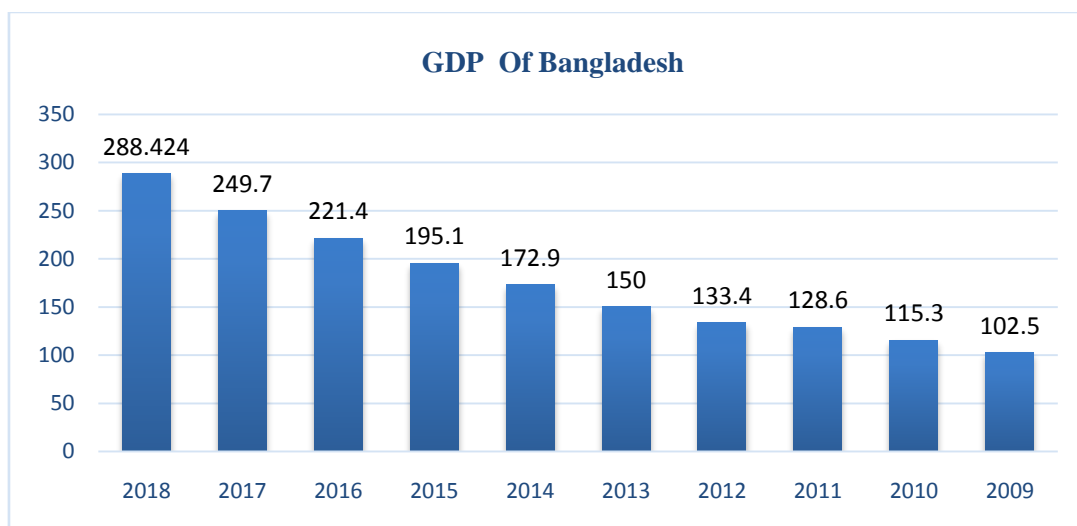


Figure 03: GDP of Bangladesh (Billion TK)

Source: www.countryeconomy.com

Annual 10 years GDP of Bangladesh. GDP of Bangladesh is increasing day by day. Maximum amount 288.424 billion TK in 201

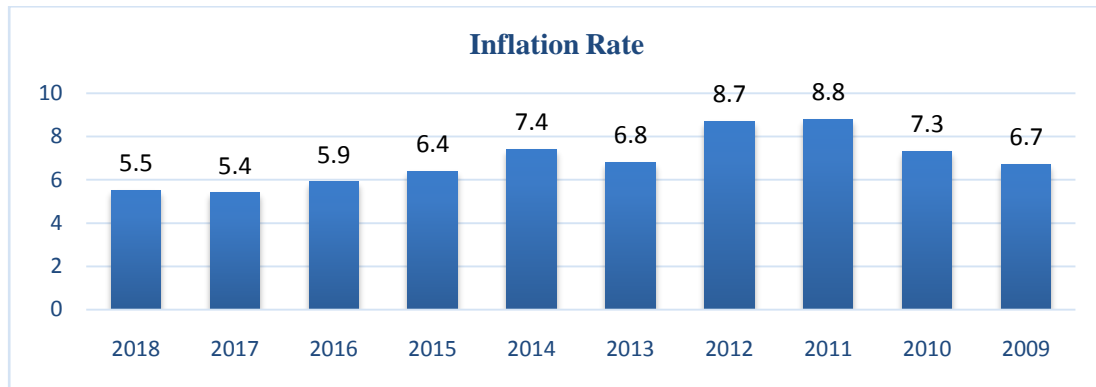


Figure 04: Inflation Rate on Bangladesh

Source: - Annual report of Bangladesh Bank

Inflation rate of 10 years are collected from the annual report of Bangladesh bank annual report. Maximum inflation rate was 8.8 in 2011.

3.2 Hypothesis of the study

**Hypothesis 1:**

**Ho:** There is no significant relation between Interest rate and bank deposit.

**HA:** There is significant relation between Interest rate and Bank deposit.

**Hypothesis 2:**

**Ho:** There is no significant relation between Interest rate and savings.

**HA:** There is significant relation between Interest rate and savings.

3.2 Empirical Model

Deposit interest rate is considered significant, for the bank deposit therefore, in the study we are analyzing the effect of deposit interest rate on bank deposit of Bangladesh, by the following model:

$$D = \beta_0 + \beta_1 IR + \epsilon \dots \dots \dots (1)$$

Where D is the bank deposit, which consists on deposits of schedule banks & other financial institutions,  $\beta_0$  is the constant term in the model, IR is the deposit interest rate and  $\epsilon$  is the error term in the prescribed model.

Further, in this model we use some other country level control variables, such as GDP and Inflation:

$$D = \beta_0 + \beta_1 IR + \beta_2 X_t + \epsilon \dots \dots \dots (2)$$

Where D is the Bank Deposit,  $\beta_0$  is the constant term in the model, IR is the Interest Rate,  $X_t$  is the Country Control variables GDP, Inflation and  $\epsilon$  is the error.

In addition, for analyzing the impact of interest rate on savings we estimate the following model:

$$S = \beta_0 + \beta_1 IR + \beta_2 X_t + \epsilon \dots \dots \dots (3)$$

Here, S is the savings.

**IV. Empirical Results and discussion**

Identified data are processed by the statistical program SPSS-22. Initially, the relevant tests have been developed for evaluation of variables and construction of the final model of linear equation. Relevant tests identified are: the test of autocorrelation and multicollinearity test. Multicollinearity test serves to evaluate the linear relationship between the variables. Simple ordinary Least Square Regression method has been applied, with the help of SPSS-22 statistics software, to find the relation between Interest Rate and Bank Deposit of Bangladesh for two separate models where we use two country levels variables also. We have used 10 years annual data for this analysis.

Table 1: Descriptive Statistics of Variables

	Mean	Median	Maximum	Minimum	Std. Dev.	Observations
Interest Rate	6.7440	6.9000	8.54	4.84	1.23841	10
Bank Deposit	6333.949	6177.3850	10440.95	2786.23	2608.298	10
Gross savings	37.6290	35.098	40.595	33.270	2.17128	10

<b>GDP</b>	175.732	161.450	288.424	102.500	61.7611	10
<b>Inflation</b>	6.890	6.750	8.8	5.4	1.1911	10

Source: SPSS regression results

Descriptive statistics shows that, 10 observations are analyzed and found positive mean of all variables, which are interest rate 6.7440, Bank deposit 6333.9490, gross savings 37.6290, GDP6333.9490 and Inflation 6.890. We also found positive Median of all variables, which are interest rate6.9000, Bank deposit 6177.3850, GDP 288.424 and Inflation 6.750.Bank deposit has the highest maximum value 10440.95& interest rate has lowest maximum value 8.54also Bank deposit has the highest minimum value 2786.23& interest rate has lowest minimum value 4.84. The highest standard deviation is of Bank deposit 2608.29871and Inflation has lowest standard deviation that is 1.1911. All variables have Kurtosis less than 3, whereas Interest rates -1.229, Bank deposit-1.208, GDP -.643, Inflation -.672.Sum of the all variables, where Interest rate 67.44, Bank deposit 63339.49, GDP 1757.324, Inflation 6.890.

**REGRESSION ANALYSIS FOR MODEL 1**

**Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.558 <sup>a</sup>	.312	.226	2294.89764	.312	3.626	1	8	.093

a. Predictors: (Constant), Interest rate

Source: SPSS regression results

From the model summary we have found that R Square .312, on the other hand Adjusted R Square .226. That means 22.6% of the variance in bank deposit can be explain by one level increase or decrease in interest rate and the P value is .093 that means this model is significant at the level of 10% significant error.

**ANOVA<sup>a</sup>**

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	19096558.168	1	19096558.168	3.626	.093 <sup>b</sup>
Residual	42132441.485	8	5266555.186		
Total	61228999.653	9			

a. Dependent Variable: Deposit Amount

b. Predictors: (Constant), Interest rate

Source: SPSS regression results

Here the P value is less than 10% that means this model is highly significant.

**Coefficients<sup>a</sup>**

Model	Unstandardized Coefficients		Standardized Coefficients		t	Sig.	95.0% Confidence Interval for B	
	B	Std. Error	Beta				Lower Bound	Upper Bound
1 (Constant)	14266.406	4228.493			3.374	.010	4515.484	24017.329
Interest rate	-1176.224	617.698	-.558		-1.904	.093	-2600.638	248.189

a. Dependent Variable: Deposit Amount

Source: SPSS regression results

The results generated from the linear regression Model 1 shows that interest rate has a negative impact in level of deposits and it is statistically significant. It is noted that the variable "interest rates for deposits in domestic currency" has a negative impact. Such behavior can be explained by the fact that the level of deposits in domestic currency had declined in this period.

**REGRESSION ANALYSIS FOR MODEL 02**

**Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.993 <sup>a</sup>	.985	.978	388.34729	.985	133.330	3	6	.000

a. Predictors: (Constant), Inflation Rate, Interest rate , GDP

Source: SPSS regression results

Here, From the Model Summary we have found the value of R Square is .985 and the adjusted R Square value is .978, that is more than the previous model. The P value is .000 that means this model is significant.

**ANOVA<sup>a</sup>**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	60324117.929	3	20108039.310	133.330	.000 <sup>b</sup>
	Residual	904881.724	6	150813.621		
	Total	61228999.653	9			

a. Dependent Variable: Deposit Amount

b. Predictors: (Constant), Inflation Rate, Interest rate , GDP

Source: SPSS regression results

From the ANOVA table we have found this model is significant because the Table value of P is less than 5%, also we found all positive mean square value.

**Coefficients<sup>a</sup>**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	-3176.788	1721.298		-1.846	.114	-7388.653	1035.077
	Interest rate	292.703	151.189	.139	1.936	.101	-77.242	662.648
	GDP	44.777	3.284	1.060	13.635	.000	36.742	52.813
	Inflation Rate	-48.192	182.729	-.022	-.264	.801	-495.314	398.930

a. Dependent Variable: Deposit Amount

Source:SPSS regression results

The results generated from the linear regression Model 2 shows that interest rate has positive impact in level of deposits and it is statistically significant. It is noted that the variable "interest rates for bank deposits" has a positive impact. Also we found that GDP has a positive impact on the bank deposit. But the inflation rate has a negative impact on deposit. So it can be explained by the fact that the level of deposits in banking sector in Bangladesh had increased in this period.

**REGRESSION ANALYSIS FOR MODEL 3**

**Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.828 <sup>a</sup>	.686	.529	1.48945521190

a. Predictors: (Constant), Inflation Rate of Bangladesh , Average Annual Interest Rate , GDP of Bangladesh

Source: SPSS regression results

Here, From the Model Summary we have found the value of R Square is .686 and the adjusted R Square value is .529.

ANOVA <sup>a</sup>						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	29.120	3	9.707	4.375	.059 <sup>b</sup>
	Residual	13.311	6	2.218		
	Total	42.430	9			
a. Dependent Variable: Gross savings (% of GDP)						
b. Predictors: (Constant), Inflation Rate of Bangladesh , Average Annual Interest Rate , GDP of Bangladesh						

Source: SPSS regression results

From the ANOVA table we have found this model is significant because the Table value of P is less than 10%, also we found all positive mean square value.

Coefficients <sup>a</sup>						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	21.563	6.602		3.266	.017
	Average Annual Interest Rate	.840	.580	.479	1.450	.197
	GDP of Bangladesh	.042	.013	1.182	3.300	.016
	Inflation Rate of Bangladesh	.449	.701	.246	.641	.545
a. Dependent Variable: Gross savings (% of GDP)						

Source: SPSS regression results

The results generated from the linear regression Model 3 shows that interest rate has positive impact in level of gross savings and it is statistically significant. Here the constant value is 21.563 and if the interest rate of deposit is increased or decreased 1 % then the value of gross savings will change .840. So it can be explained by the fact that the level of gross savings in Bangladesh will increase if the interest rate of bank deposit will increase.

### V. Discussion and Findings

The overall results generated from the linear regression shows that all of three independent variables have impact in level of bank deposits and they are statistically significant. It is noted that the variable interest rates for bank deposits in domestic currency has a positive impact when we use the country level variable, GDP has a positive impact in dependent variable and on the other hand Inflation rate has negative impact on dependent variable. Such behavior can be explained by the fact that the level of deposits in domestic currency had increased in this period, as a result of the continuous increase of the bank deposits in the banking sector of Bangladesh. So, the analysis confirms that interest rates on domestic currency deposits have had a higher impact on the behavior of depositors to save their own funds. The interest rate has an impact on the level of deposits and the alternative hypothesis is accepted and interest rate has a positive impact on the customer's savings behavior. Based on statistical analysis, our findings of both models reveal the following relationship between variables:

- ❖ Interest Rate positively affects customer's savings behavior in the banking sector of Bangladesh.
- ❖ GDP growth has also positive impact on bank deposit and we find that, bank deposit amount is increasing day by day with the increasing of GDP of Bangladesh.
- ❖ Inflation has a negative impact on bank deposit. So when the inflation rate will increase the savings behavior of customer's will decrease.

### VI. Conclusion

In this report it is discussed the impact of interest rates on the progress of the deposits in the banking system in Bangladesh in the period 2009-2018. Our analysis suggests that interest rates are not determined randomly, but they express the level of risk undertaken by the bank management. In this way, the study of changes in interest rates is important to assess the future behavior of economic agents. One of the important issues to be discussed is the impact of interest rates is not easy to be analyzed in developing countries. A number of factors, such as: the characteristics of the banking system in developing countries, the characteristics of depositors, expectations for the future of the economy etc., make it difficult to understanding the relationship between interest rates and changes in the level of deposits (Iyer and Puri, 2007). Also, the banking system in

developing countries is characterized by a high degree of concentration of deposits in some major banks. This situation affects the behaviors of depositors. Meanwhile, the cost of changing banks is high in developing countries, affecting the performance of the deposits structure (Kemplerer, 1987). Global developments have affected the banking system of each country, whether belonging to the developed countries or developing countries. This situation has led to an increased role of the authorities responsible for maintaining stability, resulting in taking appropriate policies for the management of negative situations. Thus, an important issue is based on increasing the level of transparency of information on activities and banking products. Such a policy will help in analyzing situations and making reasonable decisions (BIS, 2003). In the end, the relationship between depositors and the bank is a mutually important and profitable relationship. In this way, the banking system needs to appear as credible at economic agents. In such situations, the management of financial stability is easier in a country. According to our study, we suggest that, interest rate would be a motivator for bank deposit and people tend to deposit more, when there is a high interest rate. Therefore, policies should be made accordingly to increase the national savings. An effective monetary policy could be helpful for it and government needs to educate and attract people, towards overall savings. However, further studies could be done by taking other influential variables and study their behavior, and a long-time series may change the results.

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