International Journal of Business and Management
www.ccsenet.org/journal.html
Vol. 3, No. 12
December 2008

# Income Elasticity of Time Deposit in the Context of Bangladesh

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**Abstract**

In the start of this paper we investigated the roles played by components real per capita income and deposit rate in the determination of time deposit and subsequently we tried to show that time deposit is income elastic. Hausman Specification Test is used to check for simultaneity in the endogenous variables. VIF is used to see the presence of multicollinearity and stepwise regression is used to determine the model to estimate the time deposit efficiently.

**Keywords:** Hausman specification test, VIF, Stepwise regression, Time deposit

## 1. Introduction

Banks and financial institutes are always making efforts to increase their money deposits. They are making different policies time to time to do it. Because the more the deposits they have the more the investment they can make in different sectors and possibly earn more profit leading to contribution in economy. That is why we were interested to determine the factors on which the deposit depends and finally measures the elasticity (Ball, L., 2001, pp.31-44) considered the problem of money demand in the long run (Markus Knell and Helmut Stix 2005, pp.513-533) considered the problem of income elasticity of money demand. In our study we focused on time deposit instead the total deposit. There is no doubt that total deposit plays an important role in economy. But since the savings accounts have more flexibility to allow the account holder to withdraw the deposit, if money needed people by nature do not hesitate to withdraw it. But if they deposit their money for a fixed time period with the hope of more return, they look for alternative means to cope the situation instead of withdrawing fixed or time deposits. Another logic to use time deposit is that it is fixed for certain time period that accounts better for the ability of the banks to generate investment. From these points we concentrated on time deposit.

For the analysis we collected data on time deposit, deposit rate (weighted), per capita GDP, GDP deflector over the time period 1980-2006 (see ECONSTATS). We used per capita GDP and GDP deflector to estimate the per capita real income and used per capita real income for the estimation purpose. In our paper we will be using the term ‘income’ to refer per capita real income and ‘deposit’ to refer time deposit.

## 2. Selection and estimation of Model

According to economic models used in previous studies, time deposit is theoretically dependent on deposit rate and real income. In our study we have shown the effect to theses two variables in the determination of time deposit and subsequently the income elasticity of time deposit in the context of Bangladesh.

We had strong belief that simultaneity exist between the variables deposit rate and time deposit. We took these two variables as endogenous and per capita real income as exogenous variable and set the following simultaneous equation system.

$$Y_1 = \beta_1 + \beta_2 Y_2 + \beta_3 X_1 + e_1 \quad (1)$$

$$Y_2 = \phi_1 + \phi_2 Y_1 + e_2 \quad (2)$$

Where, $Y_1$ = Time deposit, $Y_2$ = Deposit rate, $X_1$ = Per capita real income.

Surprisingly Hausman Specification Test to check for simultaneity led us to not to reject the null hypothesis of no simultaneity present in the endogenous variables with the p-value 0.196 (*see* Appendix A.1).

This absence of simultaneity helps us to set the model in the following way.

$$Y = \gamma_0 + \gamma_1 X_1 + \gamma_2 X_2 + e \quad (3)$$

Where, $Y$ = Time deposit, $X_1$ = Per capita Real income, and $X_2$ = Deposit rate.

To postulate the model we used collinearity diagnostic to check the presence of multicollinearity. The value of VIF is 1.338 (*see* App. A.2) which strongly recommend the absence of multicollinearity problem.

In the next step we run the stepwise regression method to fit the model (*see* App. A.3) which excludes deposit rate. Deposit rate indeed is insignificant in explaining the variation of time deposit in the context of Bangladesh. The reason for deposit rate to be insignificant might be the lack of alternative available to customers who have surplus income. The lack of substitute to savings has made the long-term deposit unresponsive to deposit rate. Since the availability of investment opportunity is not sufficient people with surplus income has no other alternative to time deposit. Whatever the deposit rate might be is certainly better than holding hard cash. So as the income of people is going up so does the time deposit.

Based on the above findings we finally set the following model for our desired estimate.

$$Y = \gamma_0 + \gamma_1 X_1 + e \quad (4)$$

Where, $Y$ and $X_1$ represent the same as it is in model (3).

**3. Findings**

The value of $R^2$ for this model is 0.963 (*see* App. A.3) large enough to take the decision that model (4) is an efficient model to estimate time deposit. The intercept $\gamma_0$ = -177596.45 (p-value = 0.00). The negative intercept may be interpreted as de-saving which signifies that when income goes down a certain level they start withdrawing their deposit. This result is consistent with the economic theories and absolutely logical. That says people maintain a smooth consumption path.

The estimated value of $\gamma_1$ = 1655.09 (p-value= 0.00) which indicates that with the increase of income time deposit increase significantly. Again, the elasticity coefficient for this model is 5.20 which is greater than 1. The approximation of the coefficient of independent variable income is greater than one reflects the fact that, time deposit is a luxury good. That means after a certain level of real income the percentage increase in long-term savings is greater then the percentage change in income.

So the demand for deposit is going up with increase in income but the deposit rate changes little and the increase in time deposit is mainly due to increase in income.

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**Appendix A.1**

**Coefficients** [a]

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | 7.822 | .272 | | 28.751 | .000 |
| | Unstandardized Predicted Value | -1.440E-05 | .000 | -.529 | -3.164 | .004 |
| | Unstandardized Residual | 3.087E-05 | .000 | .223 | 1.332 | .196 |

a. Dependent Variable: Deposit Rate

**Appendix A.2**

**Coefficients** [a]

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. | Collinearity Statistics | |
|---|---|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | | Tolerance | VIF |
| 1 | (Constant) | -200732.736 | 19414.528 | | -10.339 | .000 | | |
| | Per Capita Real Income | 1708.230 | 75.452 | 1.013 | 22.640 | .000 | .720 | 1.388 |
| | Deposit Rate | 2228.892 | 1673.877 | .060 | 1.332 | .196 | .720 | 1.388 |

a. Dependent Variable: Time Deposit

**Apeendix A.3**

**Regression**

**Variables Entered/Removed** [a]

| Model | Variables Entered | Variables Removed | Method |
|---|---|---|---|
| 1 | Per Capita Real Income | . | Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100). |

a. Dependent Variable: Time Deposit

**Model Summary**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | .981 [a] | .963 | .961 | 8623.1937 |

a. Predictors: (Constant), Per Capita Real Income

**ANOVA[b]**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 48184829346.650 | 1 | 48184829346.650 | 647.999 | .000 [a] |
| | Residual | 1858986731.511 | 25 | 74359469.260 | | |
| | Total | 50043816078.161 | 26 | | | |

a. Predictors: (Constant), Per Capita Real Income

b. Dependent Variable: Time Deposit

**Coefficients [a]**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | -177596.458 | 8794.826 | | -20.193 | .000 |
| | Per Capita Real Income | 1655.093 | 65.018 | .981 | 25.456 | .000 |

a. Dependent Variable: Time Deposit

## Appendix A.4 (Continuation)

**Excluded Variables [b]**

| Model | | Beta In | t | Sig. | Partial Correlation | Collinearity Statistics |
|---|---|---|---|---|---|---|
| | | | | | | Tolerance |
| 1 | Deposit Rate | .060 [a] | 1.332 | .196 | .262 | .720 |

a. Predictors in the Model: (Constant), Per Capita Real Income

b. Dependent Variable: Time Deposit