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Impact of Monetary Policy Instruments on Profitability of Commercial Banks in Nigeria: Zenith Bank Experience

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Abstract

This paper examined the impact of monetary policy instruments on profitability of commercial banks in Nigeria using the Zenith Bank Plc experience. The paper used descriptive research design. It utilized time series data collected from published financial statements of Zenith Bank Plc as well as Central Bank of Nigeria Bulletin from 2005 to 2012. Four research questions and four hypotheses were raised for the study. Pearson Product moment correlation technique was used to analyze the data collected while t-test statistic was employed in testing the hypotheses. The study discovered that cash reserve ratio, liquidity ratio and interest rate did not have significant impact on the profit before tax of Zenith Bank Plc. However, minimum rediscount rate was found to have significant effect on the profit before tax of the bank. The paper concluded that a good number of monetary policy instruments do not impact significantly on profitability of commercial banks in Nigeria. The paper recommended that management of commercial banks in Nigeria should look beyond monetary policy instruments to enhance their profits.

1.0 Introduction:

Banks can hardly survive without a positive return on capital invested. Profitability is therefore the driven factor for activities of commercial banks. Consequently, banks engage in a variety of products and services for the achievement of this profit or to be profitable. The commonest and most important of these activities is the given out of loans to borrowers seeking financial accommodation. In doing this, it is expected that the borrower pays back the principal and interest. This interest in all bank services forms the bedrock of profitability in the banking sector.

Banks are the intermediaries through which the surplus and deficit units in any economy interact to exchange financial value indirectly. When the surplus units make deposits in the banks, they are given out to loan seeking customers or investors preparing to embark on viable projects with an interest charge on the loan. Consequent on the vital role of intermediation played by banks, the banking sector is highly regulated by the government.

To carry out this regulation effectively, government employs monetary policies as the primary tool to regulate the banking sector. Embedded in these monetary policies are the different types of instruments that are used to regulate the operations of banks in the economy. Being an external factor to the banks, the tools could act as a militating or mitigating factor in boosting banks profitability. The way and manner these factors are applied to banks vary from one country to the other and has traceable relationship to the state of the particular country's economy. In stable economies, these tools are spared of frequent manipulations and vice versa. Economic activities, to a large extent, depend on these tools especially in countries where the capital market is still in its primordial stages of development.

In Nigeria, monetary policy tools have been subjected to various forms of gyrations in keeping with the fluctuations in economic indices. Each time these policies change, bank operations are certainly affected. However, whether these changes in monetary policy instruments significantly affect profitability of banks remains a matter for investigation. The paper therefore, seeks to examine the impact of monetary policy instruments on profitability of Zenith Bank Plc between 2005 and 2012.

Zenith Bank within twenty-two years has demonstrated its resilience irrespective of the business/economic cycle and witnessed exponential growth in virtually all areas (Zenith Bank, 2012). In spite of the monetary policies, this growth seems to be persistent. Is it that the monetary policies do not actually influence their operations?

For the purpose of this study, the monetary policy instruments to be examined are; the Cash Reserve Rate (CRR), Liquidity Rate (LR), Interest Rate (IR), and Minimum Rediscount Rate (MRR).

1.1 Statement of the problem:

One of the most complex issues facing government is identifying the appropriate level and form of intervention in the banking sector. Its efficiency as a regulator is a significant determinant of the overall efficiency of the economy. The extent of regulatory intervention may also determine whether financial markets can develop to their full potential or not. Ultimately, any inefficiency must be funded by higher charges passed on to the community as cost arising from stringent regulation. The more sophisticated the monetary policy, the greater its vulnerability to failure of banks to deliver against its promises.

When these failures occur, investment which is an important factor in economic growth is kept low. Consequent upon this, trust and confidence in the financial system may go down and sourcing of funds from banks may face a downward trend due to increase in cost of loan.

The increase in cost of capital often deters prospective investors from engaging in new ventures as well as discourages customers of companies from optimal patronage of their products. It therefore, stands to reason that increase in cost of capital results in cyclical effects in the economy. In view of this, any review of monetary policy is often greeted with wide spread apprehension, that cuts across various sectors of the economy.

On the other hand, a decrease in the cost of capital tends to stimulate more aggressive investment in any economy. The higher the volume of investment, the greater the competition. Even though consumers of products from various companies stand to benefit from this situation in the short run, it may portend serious danger in the economy if it is allowed to stretch to the extreme. As companies engage in stiff competition, weak ones (especially those that are disadvantaged technologically) may be driven out of business. This may result in monopolies with their obvious consequences in the economy.

1.2 Objectives of the study:

The general objective of this study is to examine the impacts of monetary policy instruments on the profitability of commercial banks in Nigeria (2005-2012). However, the specific objectives are:

1. To ascertain if Cash Reserve Rate (CRR) has significant effect on the Profit Before Tax of Zenith Bank Plc from 2005 – 2012.

2. To determine if Liquidity Rate (LR) has significant effect on the Profit Before Tax of Zenith Bank Plc from 2005 – 2012.

3. To examine if Interest Rate (IR) has significant effect on the Profit Before Tax of Zenith Bank Plc from 2005 – 2012.

4. To ascertain if Minimum Rediscount Rate (MRR) has significant effect on the Profit Before Tax of Zenith Bank Plc from 2005 – 2012.

1.3 Research Questions:

1. Does Cash Reserve Ratio have significant effect on Profit Before Tax of Zenith Bank Plc.

2. Does Liquidity Ratio have significant effect on the Profit Before Tax of Zenith Bank Plc.

3. Does Interest Rate have significant effect on the Profit Before Tax of Zenith Bank Plc.

4. Does Minimum Rediscount Rate have significant effect on the Profit Before Tax of Zenith Bank Plc.

1.4 Research Hypotheses:

The following hypotheses were formulated to guide the study:

Ho_1: The Cash Reserve Ratio does not have significant effect on the Profit Before Tax of Zenith Bank Plc.

Ho_2: The Liquidity Ratio does not have significant effect on the Profit Before Tax of Zenith Bank Plc.

Ho_3: The Interest Rate does not have significant effect on the Profit Before Tax of Zenith Bank Plc.

Ho_4: The Minimum Rediscount Rate does not have significant effect on the Profit Before Tax of Zenith Bank Plc.

2.0 Review of Related Literature:

Related literature was reviewed under conceptual framework, theoretical framework and empirical review.

2.1 Conceptual Framework:

Monetary policy refers to the combination of measures designed to regulate the value, supply and cost of money in an economy. It can be described as the art of controlling the direction and movement of credit facilities in pursuance of stable price and economic growth in an economy (Chowdhury, Hoffman and Schabert, 2003). Put differently, monetary policy refers to the actions of the Central Bank to regulate the money supply whch could be through discretional monetary policy instruments such as the open market operation(OMO), discount rate, reserve requirements, moral suasion, direct control of banking system credit, and direct regulation of interest rate (Loayza, and Schmidt-hebbel, 2002).

Monetary policy comprises the formulation and execution of policies by the central bank to achieve the desired objective or set of objectives; the policies and decisions are aimed at guiding bank lending rates to levels where credit demand and money growth are at a level consistent with aggregate supply elasticity (Loayza and Schmidt, et al). The objectives and goals that the central bank seeks to achieve generally are low inflation (usually targeted), protection of value of currency, full employment and sustainable economic output (economic growth). Monetary policy covers the monetary aspect of the general economic policy which requires a high level of co-ordination between monetary policy and other instruments of economic policy of the country. The effectiveness of monetary policy and its relative importance as a tool of economic stabilization varies from one economy to another, due to differences among economic structures, divergence in degrees of development in money and capital markets resulting in differing degree of economic progress, and differences in prevailing economic conditions (Faure, 2007).

In Nigeria, the banking ordinance of 1952 is seen as the root of monetary policy guiding the financial institutions in the country. Banks offer demand on transaction deposits as well as provision on lending services and because of these degree of risks in the banking sector, their businesses are heavily regulated. This regulation of banks came into existence to combat bank failures of the 1940s and 1950s. Subsequently, other monetary policies came up in 1958, 1969, 1979 and it has been so till date.

Monetary policy could either be expansionary or contractionary depending on the overall policy objective of the monetary authorities. Monetary policy is expansionary when the policy thrust of the authorities increases the supply of money in the system; and contractionary when the action reduces the quantity of money supply available in the economy or constrains the growth or ability of the deposit money banks to grant further credits.

2.2 Theoretical Framework:

In the classical theory, the main function of money is to act as a medium of exchange. It is to determine the general level of prices at which goods and services will be exchanged. This relationship between money and the price level is explained in terms of the quantity theory of money. The classical theory of money states that the price level is a function of the supply of money.

The classicists believed that there was always full employment in the economy. At the same time, they recognized the existence of unemployment in the event of downward rigidity of money wages; a situation which could be corrected by an expansionary monetary policy.
Keynes did not agree with the classical view that the supply of money influenced the price level directly and that the economy always stayed at full employment level.

In the Keynesians theory, monetary policy plays a crucial role in affecting economic activity. It contends that a change in the supply of money can permanently change such variables as the rate of interest, the aggregate demand, and the level of employment, output and income. In a situation of unemployment, Keynes advocated a cheap monetary policy. So when the supply of money is increased, its first effect is on the rate of interest which tends to fall. Given the marginal efficiency of capital, a fall in the rate of interest will increase investment. The increase in investment will raise effective demand through multiplier effect thereby, increasing income, output and employment.

Keynes analysis contends that what causes the rate of interest to change is that the rate of interest is determined by the demand for and supply of money.

The modern monetary theory holds a completely different view. They believe that when the central bank purchases securities in open market, it sets in motion substitution and wealth effects, as the public portfolio consists of a wide variety of assets such as bonds, equities, savings, mortgage, etc. These effects will ultimately increase aggregate money demand and expand output. This theory is related to monetary economics which is essentially concerned with the role of money in an economy. It specializes on the development of monetary theory and policy, and it is used in influencing the level of economic activities and money in circulation. Monetary policy affects almost every facets of the economy like inflation, interest rate and employment etc. Monetary economics also studies the behaviour of financial institutions such as deposit money banks which are significant in determining the pace of growth and development in the economy.

2.3 Empirical Review

Gertler and Gilchrist (1994) conducted a study that specifically looked at how bank business lending responds to monetary policy tightening. They found that banks' lending does not decline when policy is tightened. They concluded that the entire decline in total lending comes from a reduction in consumer and real estate loans.

In contrast to Gertler and Gilchrist (1994) study, Kashyap and Stein (1995) found evidence that banks' lending may respond to a tightening of monetary policy. They found that when policy is tightened, both total loans and business loans at small banks fall, while loans at large banks are unaffected. The differential in the response of small banks may indicate they have less access to alternative funding sources than large banks and so are less able to avoid the loss of core deposits when policy is tightened.

Also, Punita and Somaiya (2006) carried out a study on the impact of monetary policy on the profitability of banks in India between 1995 and 2000. The monetary variables were banks rate, lending rates, cash reserve system and statutory ratio, and each was regressed on banks profitability independently. Lending rate was found to exact positive and significant influence on banks' profitability, which indicates a fall in lending rates will reduce the profitability of the banks. Also, bank rate, cash reserve system and statutory ratio were found to have negative and significant effect on the profitability of banks. Their findings were the same when lending rate, bank rate, cash reserve system and statutory ratio were pooled to explain the relationship between banks profitability and monetary policy instruments in the private sector.

Gambacorta and Lannoti (2005) investigated the velocity and asymmetry in response of bank interest rates (lending, deposit, and inter-bank) to monetary policy changes from 1985-2002 using an Auto-regressive Vector Correction Model (AVECM) that allows for different behaviours in both the short-run and long-run. The study shows that the speed of adjustment of bank interest rate to monetary policy changes increased significantly after the introduction of the 1993 Banking Law, interest rate adjustment in response to positive and negative shocks is asymmetric in the short run, with the idea that in the long- run the equilibrium is restored. They also found that banks adjust their loan (deposit) prices at a faster rate during period of monetary tightening in Italy.

Amidu and Wolfe (2008) examined the constrained implication of monetary policy on bank lending in Ghana between 1998 and 2004. Their study revealed that Ghanaian banks' lending behaviour is affected significantly by the country's economic support and change in money supply. Their findings also support the finding of previous studies that the Central Bank prime rate and inflation rate negatively affect bank lending. Prime rate was found statistically significant while inflation was insignificant. Based on the firm level characteristics, their study revealed that bank size and liquidity significantly influence bank's ability to extend credit when demanded.

Younus and Akhta (2009) examined the significance of Statutory Liquidity Requirement (SLR) as a monetary policy instrument in Bangladesh. Using descriptive analysis techniques, they found that statutory liquidity requirement has experienced infrequent changes and past evidence showed that reduction in SLR produced positive impact on bank credit and investment especially prior to the 1990s. SLR and Cash Reserve Requirement (CRR) were found to be significant tools of reducing inflation and both are used only in situation of drastic imbalance resulting from major shocks. They posited that Bangladesh Bank has used open market operations (OMO) more frequently rather than changes in the Bank Rate and SLR as instruments of monetary policy in line with its market oriented approach.

Okoye and Eze (2013), examined the impact of bank lending rate on the performance of Nigerian Deposit Money Banks between 2000 and 2010. It specifically determined the effects of lending rate and monetary policy rate on the performance of Nigerian Deposit Money Banks and analyzed how bank lending rate policy affects the performance of Nigerian deposit money banks. The result confirmed that the lending rate and monetary policy rate have significant and positive effects on the performance of Nigerian deposit money banks. The implication of this is that lending rate and monetary policy rate are true parameter of measuring bank performance.

Ajayi (2012) investigated the effect of monetary policy instruments on banks performance with a view to determining the existence of long-run relation for the period 1980-2008. The Engle-granger two step co-integration approaches were adopted. The empirical estimates indicated that bank rate, inflation rate and interest rate are credit enhancing, while liquidity ratio and cash reserves ratio exerted negative effect on banks total credit. Although, it was only cash reserve system and interest rate that were found to be significant at 5% critical value, main conclusion drawn was that monetary policy instruments are not effective to stimulate credit in the long-run, while banks total credit is more responsive to cash reserve system. Moreover, it was suggested that the monetary authorities should moderate the minimum policy rate as a tool for regulating commercial banks operations and facilitating investment in the economy.

3.0 Methodology:

The study employed descriptive research design. It utilized time series data obtained from the published financial statements of Zenith Bank Plc from 2005 – 2012. The Pearson Product Moment Correlation Coefficient was used to analyze the data collected. The results of the analysis were employed to answer the research questions while t-test statistic represented by

$$tc = \frac{r}{\sqrt{\frac{1-r^2}{n-2}}}$$

Where:
tc = calculated t
r = correlation coefficient
n = number of years

was used to test the hypotheses.

4.0 Results and Discussion

The profit figures of Zenith Bank Plc from 2005 to 2012 showed a continuous increase within the period under study except in 2009 when there was a significant drop from N52,004,000 in 2008 to N36,873,000 in 2009. The details are shown in Appendix 1.

Similarly, the rates of monetary policy instruments from Central Bank of Nigeria from 2005 to 2012 are displayed in Appendix 2.

Table 1 - Result of Data Analysis and test of Hypothesis:

The

	Factor	Correlation Coefficient (r)	t-cal	t-tab
Ho_1	Cash reserve rate	0.0997	0.243	±1.943
Ho_2	Liquidity rate	-0.77	-1.495	±1.943
Ho_3	Interest rate	-0.657	-2.118	±1.943
Ho_4	Minimum rediscount rate	0.831	3.61	±1.943

details of the results are shown in appendix 3.

Cash Reserve Rate:

The correlation coefficient of 0.0997 shows that a very low positive relationship exists between Profit Before Tax of Zenith Bank plc and the cash reserve rate. The result of the test of hypothesis showed t- calculated value of 0.243 while the tabulated value was ±1.943. Since the t calculated value is less than the tabulated value, hypothesis one is not rejected. This implies that cash reserve rate has no significant effect on the Profit Before Tax of Zenith Bank of Nigeria. This finding negates the results of the study conducted by Punita and Somaiya (2006) that Bank rate, cash reserve system and statutory ratio have negative and significant effect on the profitability of banks in India.

Liquidity Rate:

Table 1 shows a correlation coefficient of -0.77 for liquidity rate. This indicates existence of a high negative relationship between liquidity rate of Central Bank of Nigeria and the profit before tax of Zenith Bank Plc. Furthermore, test of hypothesis reveals t- calculated of -1.495 as against the tabulated value of ±1.943. In view of the fact that the t-tabulated, is greater than the t – calculated, the tested hypothesis is accepted. The implication of this is that liquidity rate has no significant effect on the profit before tax of Zenith Bank Plc. This finding is however inconsistent with the submissions of Younus and Akhta (2009) that reduction in statutory liquidity requirement (SLR) produced positive impact on bank credit and investments prior to1990s in Bangladesh. Suffice it to say that from 1990s and above, results of the two studies charted a similar trend. This result agrees with the finding of Ajayi (2012) that liquidity rate and cash and reserves exert negative effects on banks total credit.

Interest Rate:

In table 1, interest rate has a correlation coefficient of -0.657. This shows a moderately high negative relationship between Profit Before Tax of Zenith Bank Plc and the interest rate as declared by the Central Bank of Nigeria. In addition, the table reveals t- calculated and t- tabulated values of -2.118 and ±1.943 respectively. Since the t calculated is less than the t tabulated, the hypothesis as tested is not rejected. This implies that interest rate has no significant impact on the profit before tax of Zenith Bank Plc. The result is in disagreement with the findings of Okoye and Eze (2013) in which they state that lending rate and monetary policy rate have significant and positive effects on the performance of Nigerian deposit money banks.

Minimum Rediscount Rate:

The correlation coefficient for minimum rediscount rate as shown in table 1 is 0.831. The value indicates a very high positive relationship between the profit before tax of Zenith Bank Plc and the minimum rediscount rate from Central Bank of Nigeria. Furthermore, table 1 displays 3.61 and ±1.943 as the values of t calculated and t tabulated respectively. As the value of t calculated is greater than the value of t tabulated, the tested hypothesis is rejected. This implies that minimum rediscount rate has significant positive impact on the profit before tax of Zenith Bank Plc. This result lends credence to the findings of Okoye and Eze (2013) that monetary policies have significant and positive effects on the performance of Nigerian deposit money banks.

5.0 Conclusion

The study examined the impact of cash reserve rate, liquidity rate, interest rate and minimum rediscount rate on the profit before tax of zenith Bank Plc. It was found that minimum rediscount rate had a very high relationship with the profit of Zenith Bank Plc. It also had a significant and positive impact on the profit of the bank. The other factors did not have significant impact on the profit of the bank. It therefore means that a good number of monetary policy instruments do not impact significantly on profitability of commercial banks in Nigeria.

6.0 Recommendations

The following recommendations were made:

i. Having established that many of the instruments of monetary policy do not significantly impact on the profitability of banks in Nigeria, management of banks should look beyond monetary policies to enhance their profits.

ii. The Central Bank of Nigeria should redefine these monetary policy instruments to make them more attractive to the banks. This will make banks to embrace them beyond mere coercion.

iii. Banks in Nigeria should avail themselves of the additional benefit of profit enhancement component of minimum rediscount rate for better implementation.

7.0 Suggestions for further study

The following areas are suggested for further study:
A similar study should be conducted to involve more banks in Nigeria. Similarly, a study of this nature involving more instruments of monetary policy in advocated.

8.0 Limitation of the study:

The major limitation of the study was delay in the release of audited financial statements of the bank. This was largely why the study ended with 2012 data.

APPENDIX 1

Profit Before Tax of Zenith Bank Nigeria Plc from 2005 – 2012

Year	Profit in ₦m
2005	9,165
2006	15,154
2007	23,289
2008	52,004
2009	36,873
2010	41,469
2011	57,144
2012	94,048

Source: Zenith Bank Plc. Annual Financial Statement 2010 & 2012.

APPENDIX 2

Rates of Monetary Policy Instruments in percentage (%) from

2005-2012

YEAR	CRR %	LR %	I R%	MRR %
2005	10.0	40.0	18.0	13.0
2006	5.0	40.0	17.0	14.0
2007	3.0	40.0	17.0	14.0
2008	2.0	30.0	16.0	14.0
2009	2.0	30.0	15.0	14.0
2010	2.0	30.0	17.0	14.0
2011	8.0	30.0	19.0	14.0
2012	8.0	30.0	12.0	15.0

Source: CBN Statistical Bulletin

APPENDIX 3

Result of Data Analysis

Using a co-efficient of correlation as a test technique formula

$$r = \frac{n\Sigma XY - (\Sigma X)(\Sigma Y)}{\sqrt{n\Sigma X^2 - (\Sigma X)^2 \, x \, n\Sigma y^2 - (\Sigma y)^2}}$$

Where:
r = correlation coefficient
n = no of years under study
Σ = summation
X = profit of selected banks stated in billions
Y = cash reserve rate

Test for Cash Reserve Rate on Zenith Bank Profitability Before Tax
Let x and y represents cash reserve rate and profit of Zenith Bank

X	**Y**	**XY**	**X^2**	**Y^2**
.10	9	90	0.01	81
.05	15	75	0.0025	225
.03	23	69	0.0009	529
.02	52	104	0.0004	2704
.02	37	74	0.0004	1369
.02	41	82	0.0004	1681
.08	57	456	0.0064	3249
.08	94	752	0.0064	8836
.40	**328**	**1702**	**0.0274**	**18674**

$$r = \frac{n\Sigma XY-(\Sigma X)(\Sigma Y)}{\sqrt{n\Sigma X^2-(\Sigma X)^2 \text{ x } n\Sigma y^2-(\Sigma y)^2}}$$

$$r = \frac{8(1702)-(.40)(328)}{\sqrt{8(0.0274)-(.40)^2 \text{ x } 8(18674)-(328)^2}}$$

$$r = \frac{13616-131.2}{\sqrt{0.2192-0.16 \text{ x } 149{,}392-107{,}584}}$$

$$= 0.099699$$

Test for Liquidity Rate on Zenith Bank Profitability Before Tax
Let x and y represents liquidity rate and profit of Zenith Bank

X	**Y**	**XY**	**X^2**	**Y^2**
.40	9	4	.16	81
.40	15	6	.16	225
.40	23	9	.16	529
.30	52	15	.09	2704
.30	37	11	.09	1369
.30	41	12	.09	1681
.30	57	17	.09	3249
.30	94	28	.09	8836
2.7	**328**	**102**	**.93**	**18674**

$$r = \frac{n\Sigma XY - (\Sigma X)(\Sigma Y)}{\sqrt{n\Sigma X^2 - (\Sigma X)^2 \times n\Sigma y^2 - (\Sigma y)^2}}$$

$$= \frac{8(102) - (2.7)(328)}{\sqrt{8(.93) - (2.7)^2 \times 8(18674) - (328)^2}}$$

$$= \frac{816 - 886}{\sqrt{6{,}271}}$$

$$= -0.77$$

Test for Interest rate on Profitability

Let x and y represents Interest rate and profit of Zenith Bank.

X	**Y**	**XY**	**X^2**	**Y^2**
18.0	9	162	324	81
17.0	15	255	289	225
17.0	23	391	289	529
16.0	52	832	256	2704
15.0	37	555	225	1369
17.0	41	697	289	1681
19.0	57	1083	361	3249
12.0	94	1128	144	8836
131.0	**328**	**5103**	**2177**	**18674**

$$r = \frac{n\Sigma XY - (\Sigma X)(\Sigma Y)}{\sqrt{n\Sigma X^2 - (\Sigma X)^2 \times n\Sigma y^2 - (\Sigma y)^2}}$$

$$r = \frac{8(5103) - (131)(328)}{\sqrt{8(2177) - (131)^2 \times 8(18674) - (328)^2}}$$

$$= \frac{-2144}{\sqrt{10661040}}$$

$$r = -0.6566$$

Test for Minimum Rediscount rate on Profitability
Let x and y represents Interest rate and profit of Zenith bank.

X	**Y**	**XY**	**X^2**	**Y^2**
.13	9	1.17	.0169	81
.14	15	2.1	.0196	225
.14	23	3.22	.0196	529
.14	52	7.28	.0196	2704
.14	37	5.18	.0196	1369
.14	41	5.74	.0196	1681
.14	57	7.98	.0196	3249
.15	94	14.1	.0225	8836
1.12	**328**	**46.8**	**.157**	**18674**

$$r = \frac{n\Sigma XY - (\Sigma X)(\Sigma Y)}{\sqrt{n\Sigma X^2 - (\Sigma X)^2 \times n\Sigma y^2 - (\Sigma y)^2}}$$

$$r = \frac{8(46.8) - (1.12)(328)}{\sqrt{8(.157) - (1.12)^2 \times 8(18674) - (328)^2}}$$

$$r = \frac{374.4 - 367.4}{\sqrt{66.9}}$$

$$= 0.831$$

Test of Hypothesis

Hypothesis 1

Ho: The cash reserve rate does not have any significant effect on the profitability of Zenith Bank Plc.

$$tc = \frac{r}{\sqrt{\frac{1 - r^2}{n - 2}}}$$

Where:
tc = calculated t
r = coefficient of correlation
n = no. of years

$$tc = \frac{0.099699}{\sqrt{\frac{1 - (0.099699)^2}{8 - 2}}}$$

$$= \frac{0.099699}{\sqrt{\frac{0.99}{6}}}$$

$$= \frac{0.099699}{\sqrt{0.165}}$$

$$= \frac{0,099699}{0.41}$$

= 0.2432

Hypothesis 2

Ho: The liquidity rate does not have any significant effect on the profitability of Zenith Bank Plc.

$$tc = \frac{r}{\sqrt{\frac{1 - r^2}{n - 2}}}$$

Where:
tc = calculated t
r = coefficient of correlation
n = no. of years

$$= \frac{-0.77}{\sqrt{\frac{1-(-0.77)^2}{8-2}}}$$

= - 1.495

Hypothesis 3

Ho: The interest rate does not have any significant effect on the profitability of Zenith Bank Plc.

$$tc = \frac{r}{\sqrt{\frac{1-r^2}{n-2}}}$$

Where:
tc = calculated t
r = coefficient of correlation
n = no. of years

$$= \frac{-0.6566}{\sqrt{\frac{1-(-0.6566)^2}{8-2}}}$$

= - 2.118

Hypothesis 4

Ho: The minimum rediscount rate does not have any significant effect on the profitability of Zenith Bank Plc.

$$tc = \frac{r}{\sqrt{\frac{1 - r^2}{n - 2}}}$$

Where:
tc = calculated t
r = coefficient of correlation
n = no. of years

$$tc = \frac{0.831}{\sqrt{\frac{1 - (0.831)^2}{8 - 2}}}$$

$$= 3.61$$

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