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Kruskal Wallis Analysis Approach of Nigeria Treasury Bills

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Abstract
The study looked at treasury bill maturity using Kruskal wallis, non – parametric approach for the period 1990 to 2014. Some test methods for assessing the validity and reliability of the test include Normality Test, Homogeneity Test and Kruskal Wallis Test. The used data for this research was secondary. SPSS was used for the data analysis. It was found that there is no statistically significant difference in maturities of the treasuries over the years ($p > 0.05$). This implies that investors can go for any of the investment plans (3months, 6 months, one year or above) and earn commensurate returns. We recommend that deposit Money Banks and other investors can invest in any of the three type of treasury bills as there is no significant difference in their values or returns.

Key Word: ***Non – Parametric, Kruskal Wallis, Nemenyi Post Hoc Test, Homogeneity test.***

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I. INTRODUCTION

A good, efficient and effective financial system ensures that poverty is eliminated and economic growth is enhanced. This is done by stimulating investments and savings which are judiciously utilized for the good of all concerned. The impact of financial institutions on the private and public economies cannot be over – emphasised. Weak financial institutions portend weak economies (Mishkin, 2004).

According to Batini, (2004), banks play important roles in the financial system with regard to assets, deposits and loans.

There is gross underdevelopment in the financial institutions in Nigeria. Notwithstanding, all over the world, there has been speedy discoveries in financial institutions and governmental interventions. Treasury bills have been a major source of huge funds for the governments. These treasury bills have been instrumental to the asset of some financial institutions. Our financial markets are still at the teething, baby stage. Several innovations, changes have taken place over the years. These changes over time have been analysed to give update and assessment of the financial situations of nations. It has been proved that the asset of a financial institution shows the financial strength of the institution (Melnik,1999). Notwithstanding, the financial state of a financial institution sometimes might not be sufficient in assessing the financial strength of any financial institution. The Nigeria Treasury bills are designated periods that government give for depositors of money to leave their earnings with the Central Bank in form of fixed point so as to share in the proceeds obtained after the set period of time. These treasury bills are also primary market instruments for replacing money supply via Open Market Operations (OMO).

Statement of the Problem

The instability of money market has been a problem to investors. This has led to loss of value and worth of available money in circulations. This problem is compounded by the incessant inflations occasioned by fluctuating and modulating government policies. Several investors have lost valuable and quite a weight of money by this scenario. Also, when money is too much in circulation, this could trigger inflation thereby causing people to lose monetary values. The Nigeria bills provides a haven for investors at such times hence a study of this sort.

Objectives of the Study

These are the objectives of the study:

1. determine the trend of Treasury Bill Rates.
2. test for the normality of the distribution of treasury bill rates in Nigeria
3. compare money market Interest Rate of Treasury Bills.

Scope and Limitation of the Study

The study is confined only to use the best statistical tools for the amount of Treasury bill rates in Nigeria from 1990-2014. The limitations are inadequate time, resource scarcity and accessibility hiccups to some valuable information among others.

Significance of the Study

The study will provide insight on trend of Nigeria Treasury Bill maturities as a short term assets for Deposit Money Bank (DMBs}.

II. REVIEW OF LITERATURE

The essence of financial institutions is to evaluate and manipulate assets so as to circumvent the plunge of business transactions. The financial institutions should be the panacea for managing flow of cash, proceeds of investments yet making sure that our monies safe.

Kosmidous, Pasiouras & Floropoulos (2004) looked at assets on proceeds of eighty United Kingdom by the use of data between 1996 and 2002. The data used showcased the balance between assets and profits. They discovered that the banks that made high profits actually had low returns while those that made low profit also earn low returns. The liabilities, assets and the returns are intertwined to produce a balanced system. The investors make profits within a short time. The banks manipulate these factors to put smiles on people and partners.

Chu, Pittman and Chen (2007), examined the consumer price index and maturity rate of the United State treasury bill and discovered that inflation happens when these economic factors are compromised.

In the bid to find out the effect of inflation it was discovered that through irrational decisions of investors and operators of the economy. Fama (1981) showed the volatility of market forces can be linked to external forces influence the returns of investors. The efficiency of the system depends on the players in the financial institutions.

Mark and Aris (2002) used models to assess the influence of micro and macro factors on stocks, equities and returns. It was found that these had resulted to low returns excluding GNP which had improved the returns instead. Aydemir and Demirhanm, (2009) explained that bond brought in inflation and the attendant risks.

Mehra and Presscott (1985) asserted that these economic factors were not enough to bring succour to the treasuries of investors.

Akinbobola, (2012), postulated that the consumer price index indicates the living cost of individuals through changes mitigated by shares, bond and securities.

III. RESEARCH METHODOLOGY

Data Source

The results presented here were derived from data obtained from secondary sources. The data consists of the yearly time series of Nigeria's Treasury Bill Interest Rates. The data on three months, six months and twelve months Treasury bill maturities in Nigeria from CBN website

IV. METHOD OF DATA ANALYSIS

Kruskal Wallis Analysis of variance test was used and IBM SPSS version 20.

Data Analysis Techniques

Procedure: Kruskal Wallis test is given as:

$$H = \left(\frac{12\sum R^2 i}{N(N+1)n}\right) - (3(N+1))$$

$$Where\ N = n_1 + n_2 + \cdots \ldots + nk,\ \ \Sigma\, Ri = rank\ sum$$

Decision Rule: If the H0 is true and each sample is at least 5 observations. Consequently we reject H_0 against the alternative that these μ's are not all equal at the level of significant α.

Nemenyi*post hoc* test:

$$S.E = \sqrt{\frac{k(n_{total}+1)}{12}}$$

V. RESULTS

Table 1: Money Market Interest Rate (per cent) of treasury bills

Years	3 months	6 months	12 months
1990	19.60	20.50	22.10
1991	15.71	17.09	20.10
1992	20.80	22.30	22.10
1993	23.60	23.26	23.99
1994	15.00	15.00	15.00
1995	13.62	13.65	13.96
1996	12.94	13.21	13.43
1997	7.04	7.49	7.46
1998	10.20	10.50	9.98
1999	12.68	12.75	12.59
2000	10.60	10.27	10.67
2001	10.20	10.50	9.98
2002	16.31	16.99	16.50
2003	14.31	13.07	13.04
2004	13.69	12.47	13.32
2005	10.53	10.38	10.82
2006	9.75	9.33	8.35
2007	10.29	9.74	8.10
2008	11.95	11.85	11.84
2009	12.96	13.03	12.85
2010	6.52	6.28	5.67
2011	5.69	4.90	4.70
2012	8.40	7.85	7.18
2013	7.94	7.47	5.54
2014	20.80	28.29	92.80

Source: CBN Statistical Bulleting

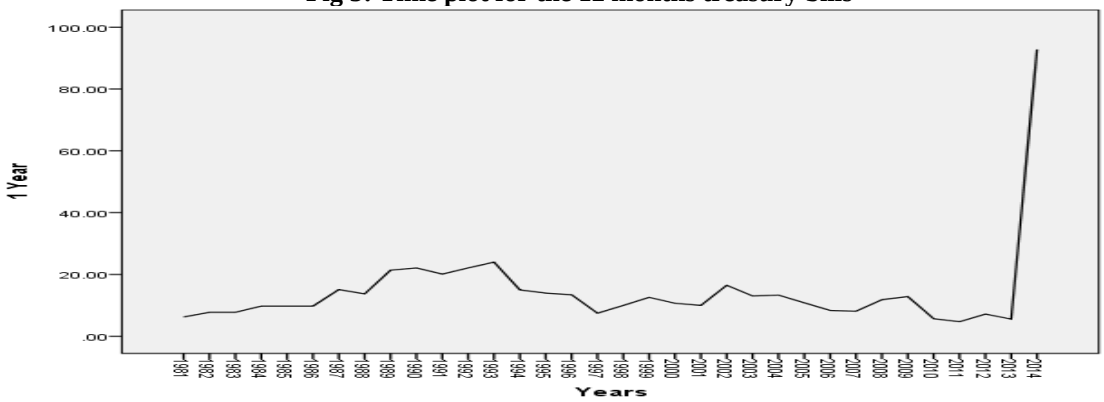
Fig 1: Time Plot for the 3 months treasury bills

The graph for the 3 months were in their lowest position in 1981, 1997 and 2011 though it was declining since 1994 to 1997.

Fig 2: Time plot for the 6 months treasury bills

The 6 months graph were in their lowest position in 1981, 1997 and 2011 though it was declining since 1994 to 1997.

Fig 3: Time plot for the 12 months treasury bills



The 12 months graph were in their lowest position in 1981, 1997 and 2011 though it was declining since 1994 to 1997.

Kruskal Wallis test for the mean difference in the Treasury bill maturity rates

	Groups	N	Mean Rank
Treasury bill maturity rates	3 months	34	51.56
	6 months	34	51.29
	12 months	34	51.65
	Total	102	

Table 5: Test Statistics[a,b]

	Treasury bill maturity rates
Chi-Square	.022
df	2
Asymp. Sig.	.989

The output above shows the calculated is less than the X^2 tab (i.e 0.022 < 5.991), we accept H_0.

VI. FINDINGS, CONCLUSION AND RECOMMENDATION

Findings:

The following findings emanate directly from the study

i The graphs of the Nigeria treasury bills show lowest positions of treasury bills in 1981, 1997 and 2011 and in their highest position in 2014.

ii. From the Kruskal Wallis test, it was found out that there is no difference among maturity rates.

Conclusion

The following are the conclusion:

i. The lowest positions of investment were in 1981, 1997 and 2011 and in their highest position in 2014

ii. There was no difference among maturity rates for the period studied.

Recommendation

Consequent upon the findings of this study, as follows are the requisite recommendations.

i. The banks should ensure a more effective management of their loan portfolio.

ii Deposit Money Banks and other investors can invest in any of the three type of treasury bills as there is no significant difference in their values or returns.

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