

QUESTIONING SECONDARY MARKET OUTRIGHT TRANSACTION IN GOVERNMENT SECURITIES FOR MINIMUM & MAXIMUM YIELD TO MATURITY

S. Yadav*

PURPOSE

PURPOSE of the current research paper is to know whether investments for long term make higher returns also.

Design/Methodology/Approach: *The sample selected for the study is Secondary Market Outright Transaction in Government Securities. The affect of risk element which affects returns to a great extent has been eliminated by selecting Government Securities as a sample for the current study. The researcher has tested the difference in means of the Secondary Market Outright Transactions in Government Securities at Face Value which have been categorized on the basis of number of days of holding as following groups (i) Up to 14 days, (ii) 15-91 days, (iii) 92-182 days, and (iv) 183-364 days.*

Analysis of variance was done to know whether there is a significant difference between Yield to Maturity in case of Max. and Min. time periods of Secondary Market Outright Transactions of Government Securities.

Findings: *It was found out that time period in case of government securities does not lead to differences in yield to maturity.*

Research Limitations/Implications: *This research paper has been done only on government securities and can be further extended to cover other financial instruments like mutual funds, equity, bonds, etc.*

Practical Implications: *The findings have a practical implication for taking investment decisions of risk-averse investors.*

Originality/Value: *In the domain of financial research, time period consideration for investment decisions holds an important decision making criteria which adds value to the existing research.*

Key Words: *ANOVA, Government Securities, Investment, Secondary Market Outright Transaction, Yield To Maturity.*

Introduction

In the era of financial liberalization with banking sector reforms and allowances for inward and outward foreign equity investment, investors can, without restriction, purchase or sell any number of securities, Gelos and Werner (2001) and Beim and Calomiris (2001). Of course, before going for actual investment, they take into consideration a lot of factors in deciding where, when and how much to invest. While making the investment decision, not only conscious or explicit information plays a role, but also implicit or unconscious components like psychological, sociological, and economical, are considered to be important

* Associate Professor, Gitarattan International Business School, Delhi, India.

(Shiller, 1999). But generally people want to invest in those investment options with which they are familiar, Bergman and Jenter (2007). Investors are also vested with the dilemma when there is risk-return trade-off. The expected return and the riskiness of that return creates a lot of disturbance in the mind of investors, Markowitz (1952). Then what is the rescue? Where should a rational investor make investments? Common objective of financial investors is to achieve an optimal risk-return combination. It can be achieved either by maximising return with an accepted level of risk or by minimising risk with an acceptable rate of return (Gupta & Basu, 2008). The most common avenues of investment available today are either debt or equity which have their own pros and cons. Government, on the other hand, promotes the most risk free investments in the form of government securities. In India, these are popularly known as Treasury Bills which are issued for varying time periods like: Up to 14 days, 15-91 days, 92-182 days, and 183-364 days. Where would a rational investor make investment out of the four choices? As it is already stated that these treasury bills are risk free investments, then the only consideration left is the Yield to Maturity that an investor would expect depending upon the number of days of holding a treasury bill/ government security. It is said and believed that "Invest for long term and earn more". But does keeping the money blocked for long duration actually result into more yields to maturity? This paper makes an attempt to resolve this issue.

Literature Review

A few research studies were referred before the conceptualization of the current study. For this different investment options available to the investors were reviewed. A study by Goetzmann and Ibbotson (1994) analyzed monthly total returns of 728 mutual funds over 13-year period (1976-1988) using total returns and the Jensen alphas as performance measures. They examined the power of various lengths of selection periods to predict the performance measured from holding periods of the same length. The time horizons tested in that study was one year, two year, three year, and one month and the results were significant, i.e., past performance has some predictive power on future performance for all time horizons tested. Another important study was done by Gupta and Sehgal (1998) on the performance of 80 schemes managed by 25 mutual funds, 15 in private sector and 10 in public sector for the time period of June 1992-1996. The study examined the performance in terms of fund diversification and consistency of performance and concluded that mutual fund industry's portfolio diversification has performed well and it supported the consistency of performance. Gupta (2000) had examined the investment performance of Indian mutual funds using weekly NAV data and found that the schemes showed mixed performance during 1994-1999. Barbeirs, Shleifer, and Vishny (1997), did a study of equity share investment behavior and their findings were throwing light on why, when and how people buy or sell the stocks they do – and even why, when and how they do not buy stocks at all.

These studies reveal that different schemes perform in different manner depending upon several conditions. With this view in mind, the current study tested the differences in Yield to Maturity of Secondary Market Outright Transactions in Government Securities at Face Value with the premise that with the difference in number of days to maturity, yield to maturity also differs.

Objectives of the study

- (i) To find out whether there exist a difference in Minimum 'Yield to Maturity' due to different holding periods of secondary market outright transactions in government securities at face value.
- (ii) To find out whether there exist a difference in Maximum 'Yield to Maturity' due to different holding periods of secondary market outright transactions in government securities at face value.

Research Methodology

As the current research problem poses a comparison between randomly selected population means, the statistical tool used for analyzing the data was ANOVA (Analysis of variance). The researcher has tested the difference in means of the Secondary Market Outright Transactions in Government Securities at Face Value which have been categorized on the basis of number of days of holding as following groups (i) Up to 14 days, (ii) 15-91 days, (iii) 92-182 days, and (iv) 183-364 days.

YTM was analyzed under two heads as Min. YTM and Max. YTM. The data has been extracted on a weekly basis. Period covered for current study was 42 weeks from 7 October 2011 to 20 July 2012 restricted as per availability of data. The data pertaining to the above 42 weeks period was extracted from the RBI website.

First of all, ANOVA conditions were checked using the data collected from each of the 4 groups i.e., Up to 14 days, 15-91 days, 92-182, days, and 183-364 days. The following three conditions were checked before running ANOVA:

- (i) The 4 samples of both Min. YTM and Max. YTM were found to be independent (in other words, their outcomes didn't affect each other) as each individual in the population had an equal chance of being selected. This condition was satisfied in case of Min. YTM as well as Max. YTM.
- (ii) The 4 samples of both Min. YTM and Max. YTM had a normal distribution: To check the condition of normality, separate histograms of the data from each group were made and observed to see if they resembled a normal distribution. From Figure 1 and Figure 2, it is clear that if we split the histogram down the middle, it looks the same on each side and has a bell-shape. This applied in case of both Min. YTM and Max. YTM.
- (iii) To be more sure of the normality condition, two well-known tests of normality, namely the Kolmogorov-Smirnov Test and the Shapiro-Wilk Test were applied on Min. YTM and Max. YTM. Shapiro-Wilk Test was used as it is more appropriate for small sample sizes (< 50 samples), but can also handle sample sizes as large as 2000. It can be seen from the Table No. 3 and Table No. 4 that both Min. YTM and Max. TYM were normally distributed as the significance value of the Shapiro-Wilk Test is greater than YTM 0.05, the data is normal.
- (iv) The variances of the 4 normal distributions were found to be close (Table No. 1 and Table No. 2): After comparing all the variances as a group and looking for any glaring differences, it was found out that the standard deviation was not more than 10 percent which justified the fact that the problem of variance did not exist.

Table No. 1: Descriptive Statistics: Up to 14, 15-91, 92-182, 183-364 for Min. YTM

Variable	N	N*	Mean	SE Mean	St. Dev.	Minimum	Q1	Median	Q3	Maximum
Up to 14	42	0	8.125	0.137	0.888	3.006	8.139	8.200	8.486	8.852
15-91	42	0	8.2446	0.0317	0.2052	7.6517	8.1697	8.2500	8.3500	8.6801
92-182	42	0	8.3995	0.0322	0.2085	8.0000	8.2450	8.3833	8.5615	8.7899
183-364	42	0	8.2293	0.0349	0.2260	7.8500	8.0636	8.2350	8.3750	8.7158

Table No. 2: Descriptive Statistics: up to 14, 15-91, 92-182, 183-364 for Max. YTM

Variable	St. Dev.
Up to 14	18.85
15-91	0.712
92-182	0.2370
183-364	0.1980

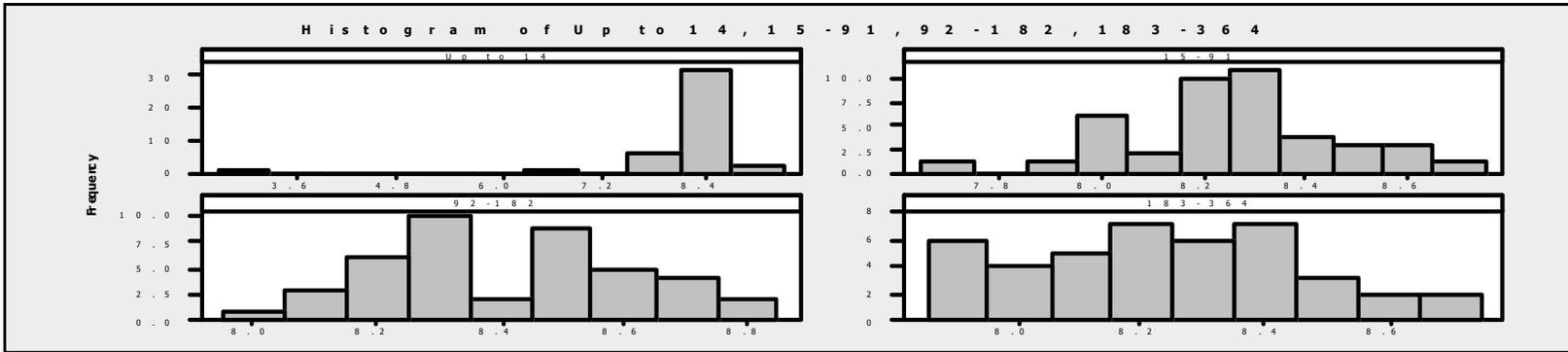


Figure 1: Check of normality for Min. YTM

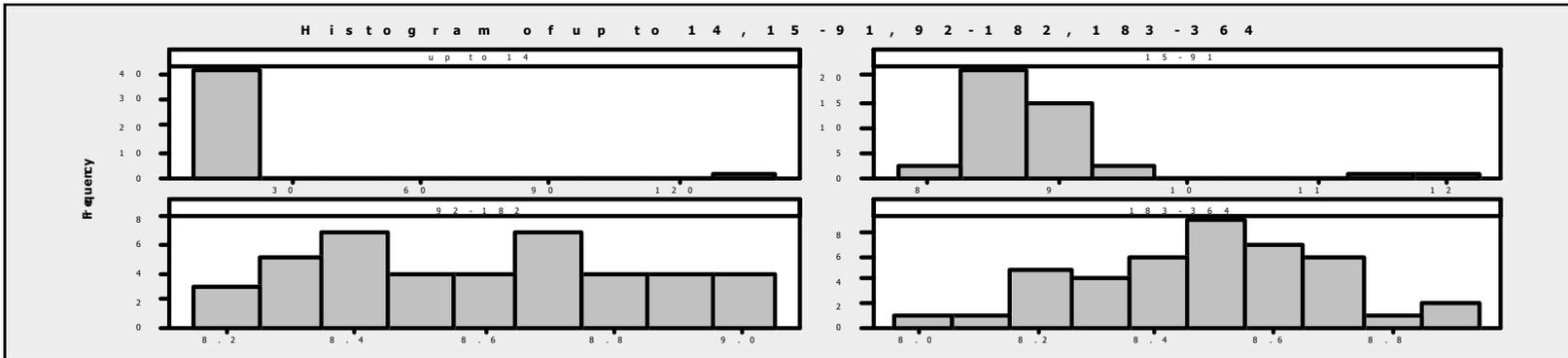


Figure 2: Check of normality for Max. YTM

Table No. 3: Tests of Normality for Min. YTM

	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
UP14	0.394	42	0.000	0.419	42	0.000
UP91	0.132	42	0.065	0.967	42	0.255
UP182	0.136	42	0.050	0.965	42	0.225
UP364	0.059	42	0.200*	0.979	42	0.615

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Table No. 4: Tests of Normality for Max YTM

	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
UP14	0.105	42	0.200*	0.987	42	0.902
UP91	0.255	42	0.000	0.587	42	0.000
UP182	0.116	42	0.178	0.959	42	0.141
UP364	0.078	42	0.200*	0.986	42	0.888

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

After the initial check of conditions of ANOVA, the following hypothesis was set up:

H_0 : $\mu_1 = \mu_2 = \mu_3 = \mu_4$

H_a : At least two of the population means are different.

Minimum YTM and maximum YTM were analyzed against the above two hypotheses.

Data from 4 groups of random samples (Up to 14 days, 15-91 days, 92-182 days, and 183-364 days) were collected and tabulated from each population (Annexure 1). After tabulation, *F*-test was conducted one by one on the data from four groups and *p* values were worked out. The results of *F*-test for Min. YTM are shown in Table No. 5 and for Max. YTM in Table No. 6.

Hypothesis was tested and conclusions were drawn on the basis of *p* values.

Interpretations and Conclusions

It can be inferred from ANOVA Table No. 5 and Table No. 6 that in case of Min. YTM, *p* value came out to be 0.076 and in case of Max. YTM it came out to be 0.369 respectively, so in both the cases the result are not significant (being *p* value greater than the alpha value of 0.05). It can thus be concluded there is not enough evidence to reject H_0 . Hence, the means of the four samples are not different for min. YTM and Max. YTM. Whether one makes an investment for short period or long period in case of Government Securities, there is no difference in yields. So, time period has nothing to do with the yield to maturity. The results of the above analysis show that in case of four different time periods, there is

Table No. 5: One-way ANOVA: Up to 14, 15-91, 92-182, 183-364 for Min. YTM

Source	DF	SS	MS	F	P
Factor	3	1.618	0.539	2.33	0.076
Error	164	37.922	0.231		
Total	167	39.540			
S = 0.4809 R-Sq. = 4.09% R-Sq.(adj.) = 2.34%					
Individual 95% CIs For Mean Based on Individual 95% CIs For Mean Based on Pooled St. Dev					
Level	N	Mean	St. Dev.	+-----+-----+-----+-----+-----+	
Up to 14	42	8.1247	0.8878	(-----*-----)	
15-91	42	8.2446	0.2052	(-----*-----)	
92-182	42	8.3995	0.2085	(-----*-----)	
183-364	42	8.2293	0.2260	(-----*-----)	
				+-----+-----+-----+-----+-----+	
				8.10	8.25
Pooled St. Dev. = 0.4809					

Table No. 6: One-way ANOVA: Up to 14, 15-91, 92-182, 183-364 for Max. YTM

Source	DF	SS	MS	F	P
Factor	3	282.6	94.2	1.06	0.369
Error	164	14600.3	89.0		
Total	167	14882.8			
S = 9.435 R-Sq. = 1.90% R-Sq.(adj.) = 0.10%					
Individual 90% CIs For Mean Based on Pooled St. Dev.					
Level	N	Mean	St. Dev.	+-----+-----+-----+-----+-----+	
Up to 14	42	11.604	18.855	(-----*-----)	
15-91	42	8.825	0.712	(-----*-----)	
92-182	42	8.588	0.237	(-----*-----)	
183-364	42	8.461	0.198	(-----*-----)	
				+-----+-----+-----+-----+-----+	
				6.0	8.0
Pooled St. Dev. = 9.435					

no significant difference in Minimum as well as Maximum Yield to maturity of Secondary market outright transaction in government securities at face value. It shows that whether an investor invests for 14 days or 364 days, the returns are the same. So, duration of holding treasury bills cannot be taken as an important consideration for making investments.

References

- Barberis, N., Shleifer A., & Vishny, R. (1997). A model of investor sentiment, reproduced, University of Chicago, presented at NBER-sage workshop on behavioral economics, Cambridge, MA.
- Bergman, N.K., & Jenter, D. (2007). Employee sentiment and stock option compensation. *Journal of Financial Economics*, 84(3), 667-712.

- Beim, D.O., & Calomiris, C.W. (2001). *Emerging financial markets*. New York, NY: McGraw Hill Irwin.
- Gelos, R.G., & Werner, A.M. (2001). Financial liberalization, credit constraints, and collateral: Investment in Mexican manufacturing sector. *Journal of Development Economics*, 67(1), 1-27.
- Gupta, A. (2000). Market timing abilities of indian mutual fund managers: An empirical study. *The ICFAI Journal of Applied Finance*, 6(2), 47-60.
- Gupta, O.P., & Sehgal, S. (1998). Investment performance of mutual funds: The indian experience. *ICFAI Journal of Applied Finance*. (2), 25-36.
- Gupta, R. & Basu, P.K. (2008). Portfolio optimisation in the indian stock market industry sector analysis. *Delhi Business Review*, 9(1), 21-30.
- Goetzmann, W.N., & Ibbotson, R.G. (1994). Do winners repeat?. Pattern in mutual fund performance, *Journal of Portfolio Management*, 20(2), 9-18.
- Markowitz, H. M. (1952). Portfolio selection. *The Journal of Finance*, 7(1), 77-91.
- RBI Statistics. Retrieved from <http://dbie.rbi.org.in/DBIE/dbie.rbi?site=statistics>, Accessed on August 24, 2014.
- Shiller, R. (1999), Human behavior and the efficiency of the financial system. In J.B. Taylor, & M. Woodford (Eds.), *Handbook of Economics* (pp.1305-1340). Elsevier.

Annexure 1: Data pertaining to 'YTM' of secondary market outright transactions in government securities at face value downloaded from the website of RBI:

Maximum YTM %					
Max.	9.0003	8.26	8.4498	8.4001	8.5067
Max.	8.9761	8.4008	8.4783	8.58	8.63
Max.	9.09	8.4287	8.7504	8.6001	8.684
Max	9.0586	8.495	8.66	8.705	8.65
Max	9.0581	8.6526	8.6503	8.6801	8.7314
Max	9.2312	8.6	8.8672	8.8798	8.85
Max	9.234	8.8921	8.855	8.86	8.85
Max	9.2406	8.8686	8.8696	8.8361	8.7
Max	9.278	8.9498	8.9501	8.8799	8.75
Max	9.2135	8.8007	8.85	8.7001	8.4701
Max	9.0568	8.7	8.7504	8.5003	8.4505
Max	8.9058	8.8009	9	8.4002	8.3001
Max	8.8752	8.6178	8.6002	8.4601	8.4
Max	8.9871	8.8999	8.7004	8.55	8.5
Max	8.9868	8.8998	8.6	8.34	8.2
Max	8.8145	9.2537	8.7479	8.65	8.4501
Max	8.73	8.7541	8.7293	8.5306	8.3888
Max	8.7332	8.8516	8.8131	8.75	8.57
Max	8.6959	9.0017	8.9	8.8699	8.65
Max	8.689	9.0953	8.9388	8.6998	8.5067
Max	8.7983	9.2659	9.0227	8.8001	8.55
Max	8.7937	9.0991	11.6352	8.9999	8.55
Max	8.99	9.4767	11.8238	8.9801	8.55
Max	8.99	8.9978	9.0646	8.72	8.5
Max	9.02	8.8516	9.2996	8.97	8.55
Max	9.379	130.8718	9.1	8.97	8.6728
Max	9.4488	8.75	9.2501	8.68	8.58
Max	9.8496	8.9008	8.8131	8.78	8.4999
Max	9.8511	8.7517	8.6504	8.505	8.225
Max	9.31	8.5	8.43	8.378	8.35
Max	9.2594	8.7459	8.4364	8.38	8.35
Max	9.2206	8.4975	8.4364	8.4215	8.3
Max	9.2012	8.4002	8.4007	8.4151	8.35
Max	9.2107	8.4983	8.4006	8.4215	8.45
Max	9.1974	8.4484	8.4006	8.5885	8.37
Max	9.0938	8.4	8.4	8.21	8.2829
Max	9.0141	8.3022	8.3037	8.29	8.0999
Max	9.0613	8.5065	8.4997	8.3127	8.1799
Max	9.1083	8.32	8.311	8.3268	8.3085
Max	9.19	8.25	8.3999	8.2692	8.16
Max	9.061	8.1797	8.2275	8.2225	8.2
Max	8.8993	8.1518	8.2	8.1802	8.04

Source: RBI Statistics, <http://dbie.rbi.org.in/DBIE/dbie.rbi?site=statistics>.