Risk and Return Comparison of MBS, REIT and Non-REIT Etfs

Hamid Falatoon
Ph.D Faculty at School of Business
University of Redlands
Redlands, CA 92373, USA

Mohammad R. Safarzadeh
Economics
California State PolytechnicUniversity
Pomona, CA, USA

Abstract

MBS has become an investment instrument ofchoice for retiring individuals and the ones who have preference for a secure stream of returns while taking lower risk relative to other vehicles of investment. As well, MBS has lately become a recommended investment strategy by financial advisers and investment bankers for safeguarding the retirement accounts of retirees from wild market fluctuations. The objective of this paper is to compare the risk and return of MBS with REIT and Non-REIT invetment opportunities. The paper uses finance ratios such as Sharpe, Sortino, and Traynor ratios as well as market risk and value at risk (VaR) analysis to compare and contrast the relative risk and return of a number equities in MBS, REIT and Non-REIT. The study extends the analysis to pre-recession of 2007-2009 to analyze the effect of the great recession on the relative risk and return of three diffrerent mediums of investment.

Keywords: Risk and Return, MBS, REIT, Sharpe, Sortino, Treynor, VaR, CAPM

I. Introduction

Mortgage-backed securities (MBS) are debt obligations that represent claims to the cash flows from a pool of commercial and residential mortgage loans. The mortgage loans, purchased from banks, mortgage companies, and other originators are securitized by a governmental, quasi-governmental, or private entity. The securities represent claims on the principal and interest payments made by borrowers on the loans in the pool. Most MBSs are issued by U.S. government-sponsored agencies, which directly or indirectly guarantee or back these securities. Some private institutions, such as brokerage firms, banks, and homebuilders, also securitize mortgages, known as "private-label" mortgage securities. The credit protection of MBS by government has lowered the credit risk of investment. However, the interest rate risk can exist and change based on spread between the short-term and long-term interest rates. An alternative to MBS is Real Estate Investment Trust (REIT) which allows an individual investor to collect income from the spread between the interest rates using short-term leverage to buy long-term mortgage-backed securities without real estate ownership. REIT does not carry credit risk but it does have interest rate risk. REIT has to maintain 75% of its portfolio with high quality MBS, which are implicitly or explicitly have government backing through Freddie Mac, Fannie Mae, and Ginnie Mae. REIT might be a good method for tax-deferred retirement contributions. For this study, we selected five largest MBS with market capitlization of over 1 billion dollar, four REIT ETFs, and four Non-REIT ETFs (Table 1). The risk to investment was measured using the systematic risk measure of CAPM model,the β coefficient (Tables 2, 3), as well asthe finance ratios were used to measure and compare the return per unit of risk for all the equities (Table 4). In additionl,1%, 2%, 5%, and 10% monthly and annually (Tables 5,6) value at risk (VaR). The test results lead us to believe that relative to their risk of investment, MBS equities are preferred investment medium during the periods of recession, where the other two mediums, REIT and Non-REIT ETFs under perform. During non-recession periods, Non-REIT ETFs had the highest return per units of risk and the REIT ETFs stood in between MBS and Non-REIT ETFs (Table 7).

Table1.Market Capitalization, Dividend and Beta as of December 2014

MBS	Market Cap	Dividend(Yield)	Published Market Beta
Brandywine Realty Trust (BDN)	2.51 B	.60(4.10%)	.84
Dule Realty Corp (DRE)	6.58 B	.68 (3.5%)	.84
Lexington Realty Trust (LXP)	2.13 B	.68(7.4%)	.63
Annaly Capital Management (NLY)	9.41 B	1.20 (11.7%)	.48
PS Business Parks (PSB)	1.97 B	2(2.70%)	.58
REIT ETFs			
ETF (VNQ) Vanguard REIT	50.17 B	3.76%	.36
ETF (RWR) SPDR Dow Jones REIT	3.03 B	3.12%	.34
ETF (IYR) ishare US Real Estate	4.57 B	3.59%	.43
ETF (ICF) ishare Cohen &Streers REIT	3.26 B	3.11%	.26
Non-REIT ETFs			
ETF (VV) Vanguard Large Cap	10.72 B	1.78%	.99
ETF (VIS) Vanguard Industrials	2.16 B	1.56%	.93
ETF (VFH) Vanguard Financials	3.23 B	1.77 %	.81
Utilities Selected SPDR ETF (XLU)	6.40 B	3.42%	.31

Table2. Estimated α and β coefficients of CAPM

MBS	α	β	R^2	D.W	Average Quarterly Return
BDN	-.006263 (-.5635)	2.034 (7.89)**	.35	2.63	-.0022
DRE	-.005076 (-.6374)	1.860155 (10.07)**	.46	2.52	-.0013
LXP	-.005407 (-.5931)	1.87 (8.84)**	.40	2.29	-.0016
NLY	.001103 (.1931)	.2914 (2.2)*	.04	1.94	.0017
PSB	.003658 (.75)	.924721 (8.19)**	.36	2.33	.0055
REIT ETFs					
VNQ	.002106 (.484)	1.385029 (13.72)**	.62	2.21	.004898
RWR	.001618 (.365)	1.407714 (13.68)**	.62	2.16	.004455
IYR	.000711 (.175)	1.359318 (14.42)**	.64	2.20	.003451
ICF	.001261 (.272)	1.444566 (13.43)**	.61	2.10	.004172
Non-REIT ET's					
VV	.001686 (4.21)**	1.005577 (108.28)**	.99	1.39	.003713
VIS	.00175 (1.006)	1.245249 (30.85)**	.89	2.04	.00426
VFH	-.003983 (-1.46)	1.369478 (21.56)**	.80	2.12	-.001223
XLU	.003729 (1.22)	.518067 (7.28)**	.31	2.06	.004773

* Significant at 95% level   ** significant at 99% level
Values in parenthesis are t-statistics.

Table3. Effect of Recession on Estimated α and β Coefficients of CAPM:$Y_t = \alpha + \beta X_t + \alpha_1 D + \beta_1 D X_t + \varepsilon_t$

MBS	α	β	α_1	β_1	R^2	DW
BDN	-.005837 (-.4756)	1.5525 (4.26)**	.03605 (1.13)	1.166 (2.18)*	.38	2.74
DRE	-.002462 (-.2816)	1.419519 (5.47)**	.016639 (.731)	.980697 (2.57)**	.49	2.59
LXP	.001674 (.166)	1.3922 (4.65)**	-.013098 (-.499)	.90086 (2.05)*	.43	2.34
NLY	-.001091 (-.1696)	.345811 (1.81)	.011673 (.697)	-.049175 (-.175)	.04	1.94
PSB	.000796 (.147)	.874656 (5.44)**	.025072 (1.78)	.232882 (.986)	.38	2.36
REIT ETFs						
VNQ	.004614 (.99)	1.061821 (7.64)**	.007872 (.64)	.696646 (3.41)**	.65	2.28
RWR	.004498 (.94)	1.068916 (7.55)**	.006407 (.52)	.720583 (3.47)**	.65	2.24
IYR	.003541 (.80)	1.035269 (7.86)**	.007215 (.63)	.682775 (3.55)**	.68	2.28
ICF	.004843 (.98)	1.065354 (7.24)**	.004538 (.35)	.792744 (3.67)**	.65	2.17
Non-REIT ETFs						
VV	.00145 (3.23)**	1.01192 (75.83)**	.001222 (1.04)	-.00646 (-.33)	.99	1.41
VIS	.001961 (1.00)	1.202055 (20.72)**	.001965 (.39)	.097885 (1.15)	.89	2.05
VFH	-.002388 (-.79)	1.20834 (13.53)**	.001394 (.18)	.334038 (2.55)**	.81	2.09
XLU	.00687 (2.02)*	.384393 (3.81)**	-.012189 (-1.38)	.207205 (1.4)	.34	2.14

Values in parentheses are t-statistics. α_1 is the coefficient of intercept dummy for recession.

* Significant at 95% level β_1 is the coefficient of slope dummy for recession

** Significant at 99% level

Table 4.Estimated Sharpe, Treynor, and Sortino Ratios

MBS	Sharpe Ratio	Treynor Ratio	Sortino Ratio
BDN	-.0179	-.00131	-.02472
DRE	-.0180	-.00114	-.02378
LXP	-.0154	-.00105	-.01890
NLY	.0260	.00563	.03399
PSB	.0738	.00529	.09647
REIT ETFs			
VNQ	.0640	.00350	.05900
RWR	.0574	.00316	.00716
IYR	.0360	.00195	.04483
ICF	.0414	.00231	.05530
Non-REIT ETFs			
VIS	.0692	.00316	.08820
VV	.0783	.00339	.09915
VFH	-.0227	-.00110	-.02826
XLU	.1220	.00942	.14878

Table5. Value at Risk, Monthly Estimates

MBS	1%	2%	5%	10%
BDN	-0.05135	-0.04532	-0.03628	-0.02825
DRE	-0.03166	-0.02788	-0.02220	-0.01716
LXP	-0.03677	-0.03236	-0.02574	-0.01986
NLY	-0.00456	-0.00348	-0.00186	-0.00042
PSB	-0.00208	-0.00088	0.00091	0.00251
REIT ETFs				
VNQ	-0.00530	-0.00372	-0.00134	0.00077
RWR	-.00625	-0.00461	-0.00215	0.00004
IYR	-.005907	-0.00443	-0.00223	-0.00027
ICF	-0.00749	-0.00574	-0.00311	-0.00078
Non-REIT ETFS				
VV	0.00231	0.00282	0.00360	0.00429
VIS	-0.00017	0.00072	0.00205	0.00323
VFH	-0.00857	-0.00738	-0.00559	-0.00400
XLU	0.00408	0.00451	0.00517	0.00575

Table6. Value at Risk, Annual Estimates

MBS	1%	2%	5%	10%
BDN	-0.6158572	-0.54352362	-0.43502407	-0.3386226
DRE	-.3779557	-.3325675	-.2644856	-.203995
LXP	-.4383501	-0.3853909	-0.3059528	-0.2353723
NLY	-.0465168	-0.033556	-0.014115	0.00315836
PSB	-.0100043	0.00437668	0.02594793	0.04511391
REIT ETFs	1%	2%	5%	
VNQ	-.0463776	-0.0273669	0.00114899	0.02648525
RWR	-.0584535	-0.0387673	-0.0092382	0.01699832
IYR	-.0573746	-0.0397307	-0.013265	0.01024971
ICF	-.0735396	-0.0525017	-0.020945	0.00709307
Non-REIT ETFs	1%	2%	5%	10%
VV	0.03599214	0.04222079	0.05156371	0.05986486
VIS	0.00982461	0.02046189	0.03641769	0.05059436
VFH	-.0999075	-0.0855779	-0.0640837	-0.0449863
XLU	0.0578135	0.06307108	0.0709574	0.07796436

Table7.Average Monthly Return

MBS and S&P500	Pre-recession	Recession	Post- Recession
BDN	-.00567 (.0768)	-.043 (.33105)	.015527 (.0790)
DRE	-.00282 (.0629)	-.050 (.2504)	.01693 (.070)
LXP	-.000821 (.0480)	-.0727 (.26730)	.0228 (.0811)
NLY	.000662 (.0650)	.0051 (.09458)	.0061 (.05957)
PSB	.00697 (.0638)	-.0022436 (.10395)	.010838 (.05375)
S&P500	.006654 (.007930)	-.025101 (.013244)	.012374 (.004580)
REIT ETFs	Pre-recession	Recession	Post- Recession
VNQ	.011165 (.0474)	-.33846 (.150)	.01776 (.05071)
RWR	.011187 (.0485)	-.0363 (.01525)	.01765 (.0513)
IYR	.00959 (.04823)	-.0348 (.143)	.01625 (.04835)
ICF	.012082 (.0511)	-.0397 .1574	.01768 (.05216)
Non-REIT ETFs	Pre-recession	Recession	Post-Recession
VV	.0088 (.0226)	-.0226 (.0722)	.0136 (.0381)
VIS	.01046 (.0280)	-.0296 (.09692)	.01575 (.049289)
VFH	.00381 (.0310)	-.0413 (.12544)	.012759 (.0494)
XLU	.01465 (.0307)	-.0190 (.06096)	.011568 (.0341)

*Values in the prentices are standard deviations

II. Literature Review

A large body of literature on REIT and MBS deals with different methods of collaterizing mortgage securities, methods of pricing MBS, and estimating mortgage payments (Kariya and Kobayashi, 2000, Kariya,etal., 2002, Curley and Guttentag, 1977, Schwartz and Torous,1989 Pellerin,etal., 2013, peyton,etal., 2014). Others deal with risk and return to REIT and MBStaking theoretical approach without conducting a systematic empirical analysis of risk and return to REIT and MBS and how they compare with risk and return to equity portfoliotos (Glawischnig and Seidl, 2009,Sizemore, 2014, Jacobius, 2011). A large number of empirical studies in support of REIT and MBS,conducted by financial analysits, can be found in financial media. The common statement found in these studies is how PEITs are "perfectly tailor-made" for retirement portfolio (Sizemore,2014). In general, these analysts compare the risks and returns of REIT and MBS to real estate incomecollected from the rent or mortgage interest. They argue that REIT and MBS offer diversification and a level of stability and enjoy the growth potentials. They claim that REIT and MBS generate relatively steady income, capital gain and tax benefits and they are a hedge against inflation (Keke and Emoh, 2015). Financial analysis (Peyton, Park, and Lotito, 2014)associated with TIA-CREF compare portfolios with different combination of stocks and MBSconclude that portfolios inclusive of REITs lower the volatility and increse risk adjusted return ratio which is higher than a standard 60% stock and 40% bond allocation. Other studies support this conclusion. Walmsley (2007) and Adereti (2007) indicate that" MBS is charecterized by attractive yields, credit quality and pool of funds, tradable capital market instrument, and aids diversification of financing sources".There are very few empirical studies that directly compare the relative risk and return of REIT, MBS and equity portfolios.

These studies, generally, use historical measures of risk and return to compare relative performance of different investment mediums. Using the historical measures of risk and return have been criticised on the grounds that dividing time-series data to arbitrarily selected sample periods and measuring the historical risk and return result in biased estimates of the measures (Enders, 2003 and Brooks, 2014).

This study compares the performance of the three types of investment instruments using time series anlysis. As well, the study incorporate the market risk and the business cycle effects on the performance of the three different investment instruments.

III. Methodology

This paper uses three different quantitative measures of risk and return to compare relative performance ofthe investment mediums, MBS, REIT ETFs and Non-REIT ETFs over the recent business cycle. The study employs finance ratios, CAPM model, and the value at risk (VaR) analysis. The study uses monthly data for the time period 2005M1 – 2014M12. <u>Finance Ratios:</u> The finance ratios measured are the Sharpe ratio (Sharpe, 1966), Treynor Ratio (Treynor, 1965), and Sortino ratio (Sortino, 1980).All three ratios try to measure the risk-adjusted return of an investment as the ratio of risk premium per unit of risk. They differ from each other in the measurement of the risk. Sharpe ratio is defined as:

$$S_p = \frac{E[R_a - R_b]}{\sigma_p} = \frac{E[R_a - R_b]}{\sqrt{\text{var}[R_a - R_b]}},$$

where, R_a is the asset return, R_b is the return on a risk free asset, $E[R_a - R_b]$ is the expected excess return of the asset over the risk free return or the risk premium.Sharpe ratio is obtained by dividing the risk premium of an asset to standard deviation of the asset's risk premium. The higher the Sharpe ratio for a portfolio or an asset indicates a better risk-adjusted performance. Also a negative Sharpe ratio reveals that a risk free security perform better than the asset being analyzed (Sharpe, 1994). Sharpe ratio is a good indicator of how well the return of a security compensate an investor for the amount of risk taken. For theoretical discussions the focus is on expected value of risk premium. However, for practical implementations the ex post results are used, assuming that the historical results have some predictive ability.

Treynor ratiois defined as: $TR = E[R_a - R_f]/\beta$ Where, R_a is return to an asset,R_f is the return on a risk free asset.The Treynor ratiomeasures the reward $E[R_a - R_f]$ per unit of market risk. The market risk, β is measured using a CAPM model, $Y_t = \alpha + \beta X_t + \varepsilon_t$, where Y = $R_a - R_f$ is the risk premium to an asset under study and X = $(R_m - R_f)$,is the risk premium to a well-diversified portfolio, here S&P500, and ε is stochastic error term.Beta (β) measures the volatility of an investment compared to a benchmark (S&P 500).As a measure of volatility, β represents only market (systematic) risk, not overall risks. An investment may have a very low β but still be highly volatile in price. In such situation, the investment simply does not correlate with the underlying benchmark. Since Treynor ratio takes its risk measure from theCAPM model, the model has been estimated for the securities under study. Sortino ratio is defined as: $SR = E[R_a - T]/DR$ Where, R_a is return to an investment an asset, T is the target return (risk free rate of return in this study), and DR is the downside risk or standard deviation of negative asset returns. It is defined as DR= square root of Sum[Min($R_a - R_T$), 0)^2]/t. Here, R_T is the average rate of return on asset. Downside risks are popular in portfolio management. They focus only on returns that fall short of a target return. <u>Value at Risk (VaR):</u> VaR is a loss that we are fairly sure will not exceed if current portfolio is held over some period of time. VaR has two parameters: Significance level (α) and risk horizon. The significance level is set by a regulatory agency or by the researcher. The risk horizonis the period of time over which VaR is measured.The risk horizon differs for different cases. VaR should refer to the time period over which we expect to be exposed to a certain position. In general, the more liquid the risk, the shorter the time period over which the risk needs to be assessed. VaR assumes that the current position will remain static over the chosen risk horizon. Therefore, there will be a difference between the theoretical return (based on a static portfolio) and realized or actual return.

## IV. Analysis and Interpretation

Table 1 represents the market capitalizations, dividends and yields for five MBS corporations in the REIT industry, four REIT ETFs, and four Non-REIT ETFs, with diverse pool of investments. The selection criteria for the companies to be included in this study were based on a minimum market capitalization requirement of one billion dollar for all the companies or ETFs. Table 2 represents the estimated CAPM for thirteen equities under study. All the Jensen αs of the CAPM models were statistically not different from zero, except for Vanguard ETF, which the Jensen α was statistically significant at the 99% level of confidence. All the systematic risk coefficients, βs, were statistically significant at the 99% level of significance, except for NLY, where β was significant at the 95% level of significance. Compared to market risk (β = 1), all the estimated β coefficients of MBSs, REITs and Non-REITs were statistically no different from market risk, except for NLY, where the null hypothesis of β = 1 could not be rejected at the 95% level of significance.

Table 3 represents the effect of the great recession of December 2007 – June 2009 on the α andβ coefficients of the CAPM models. The effects of the recession on the estimated Jensen α_s, measured by the inclusion of intercept dummies in the CAPM models, were statistically no different from zero for all the equities. The effect of the great recession on the systematic risk of the equities (β_s), measured by inclusion of slope dummies in the CAPM models, were all positive and statistically significant for four REIT ETFs. The slope dummies were statically not significant for all Non-REIT ETSs, except for the Vanguard Financials (VFH), where the β of the slope dummy was positive and statistically significant. For REIT MBS all the β coefficients of the recession dummies were positive and statistically significant, except for the Annaly Capital Management (NLY) and PS Business Parks (PSB), where the coefficients of the recession slope dummies were not statistically different from zero. The statistical analysis of the effect of the recession on slope and intercept dummies, as presented in table 3, shows that the great recession did increase the systematic risk of all the REIT ETFs. Three out of the five REIT MBSs had increase in the systematic risk due to the great recession. However, for the Non-REIT ETFs the great recession increased the systematic riskof only one (VFH) out of the four Non-REIT ETFs. Table 4 andgraphs 1 - 3 represent the financial ratios, Sharpe, Treynor, andSortino for REIT MBS, REIT, and Non-REIT ETFs. All the ratios for the REIT ETFs and Non-REIT ETFs are positive, except for Vanguard Financials (VFH). However, these ratios are negative for three out of the five REIT MBS. Among the REIT MBS, the ratios are positive only for NLY and PSB. The financial ratios of Table 4 clearly support the conclusions of the CAPM models in tales 2 and 3 that with respect to risk and return, in general, investing in REIT and Non-REIT ETFs provide better investment opportunities than REIT MBS. Tables 5 and 6 represent the Value at Risk (VaR) of the equities at 1%, 2%, 5%, and 10% levels, calculated annually and monthly. The estimated VaRs for all levels of risk clearly show that VaRs for MBS are, in general, lower than the REIT and Non-REIT ETFs. As well, the REIT ETFs have lower VaRs than Non-REIT ETFs. Graphs4 –7 for the 1% and 10%, monthly and annually estimated VaRs clearly show these results. These results are consistent with general public perception that returns to MBS enjoy implicit or explicit government backing and have lower credit risk than the other two groups of equities. With respect to returns, table 7 and graph9 show that, during the great recession of December 2007 – June 2009 the return for MBS was higher than the return to REIT and Non-RETI ETFs. However, during the periods of no-recession, the Non-REIT ETFs had the highest return and MBS had the lowest return, with REIT ETFs standing in the middle of the two as shown in graphs 8 and 10.
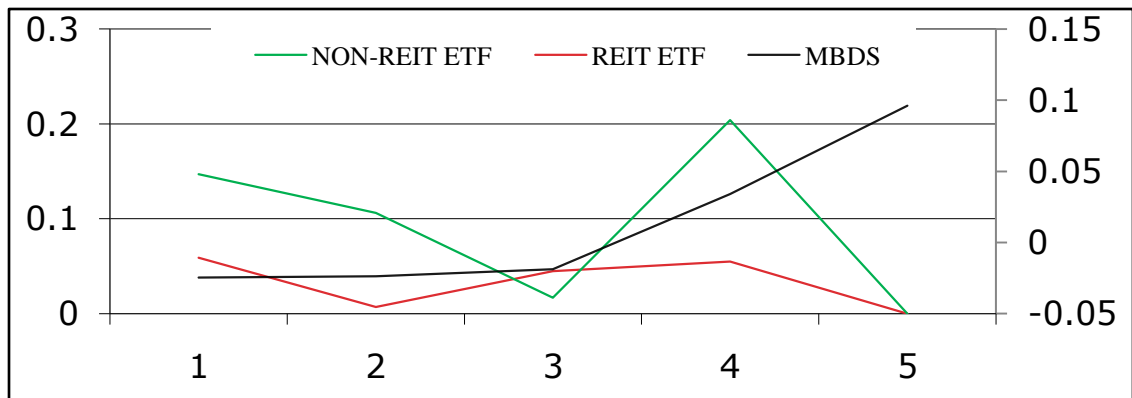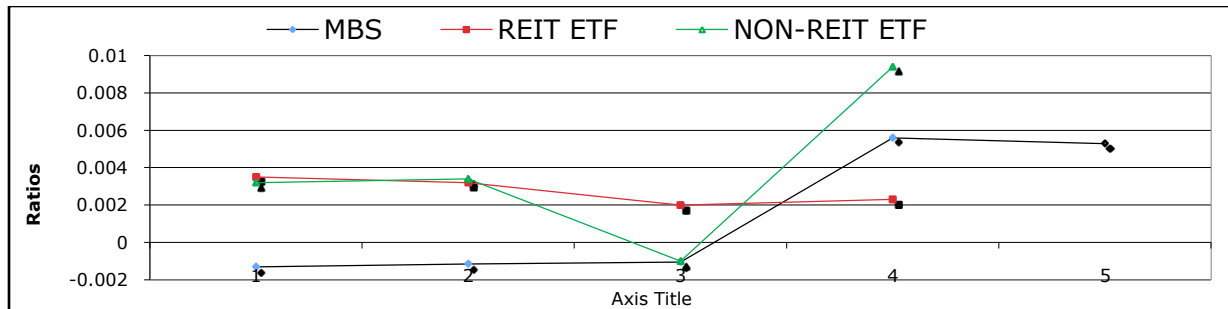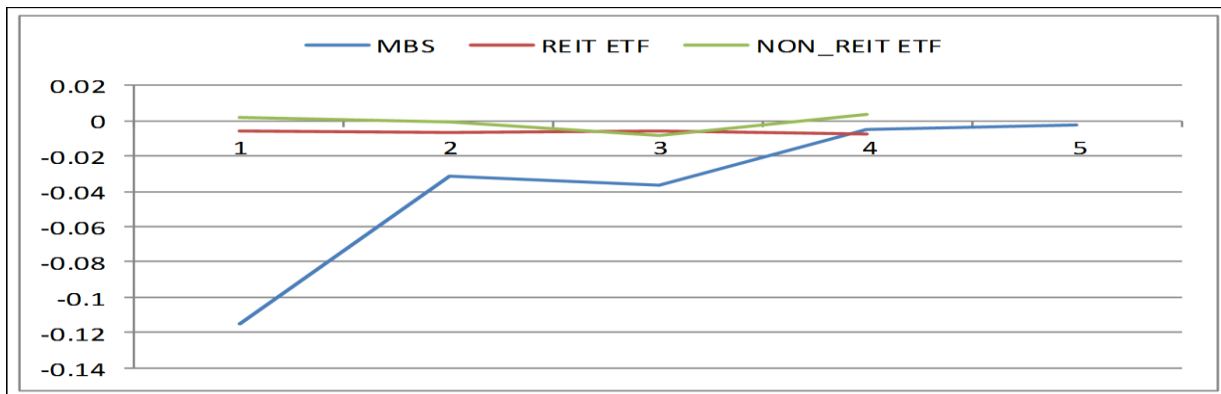

Graph1. Sharpe Ratios
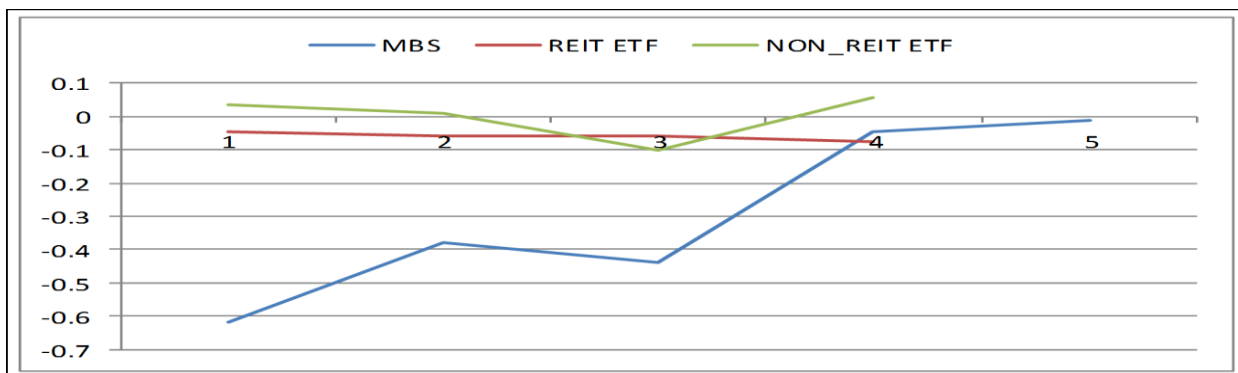
Graph 2.Treynor Ratios
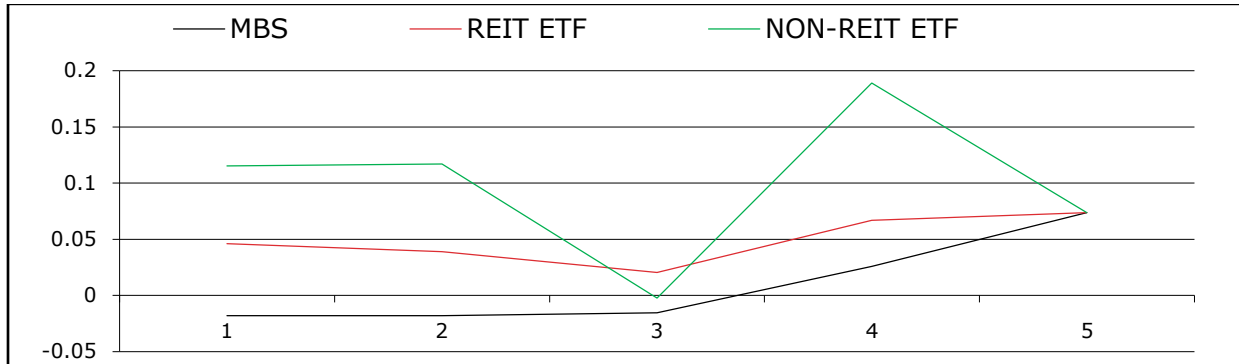
Graph3. Sortino Ratio
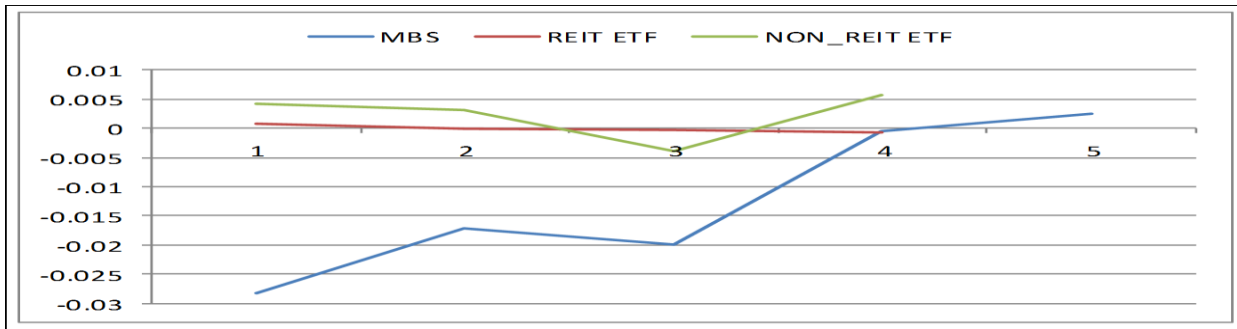

Graph4. 1% VaR, Monthly
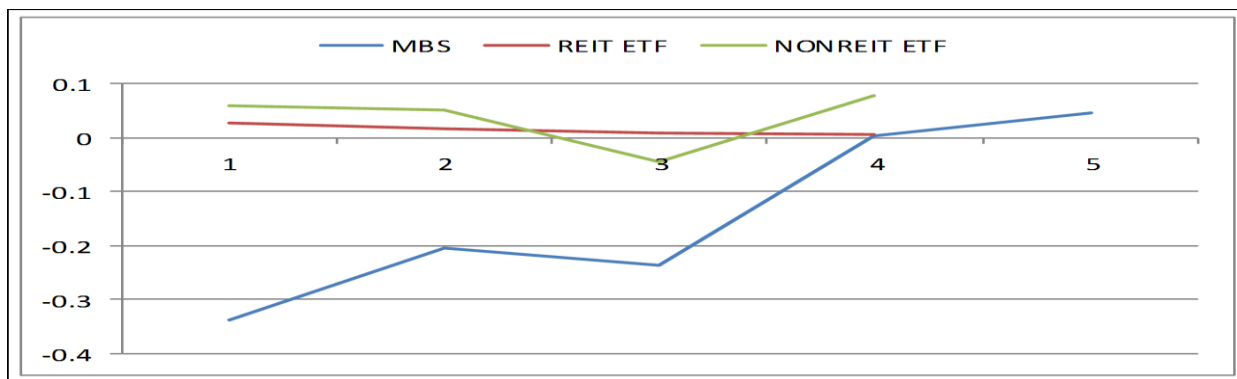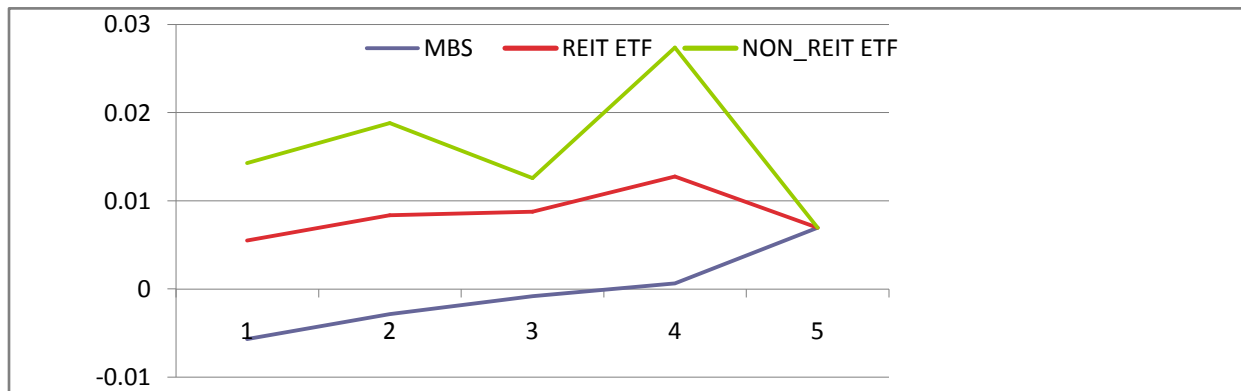

Graph5. 1% VaR, Annual
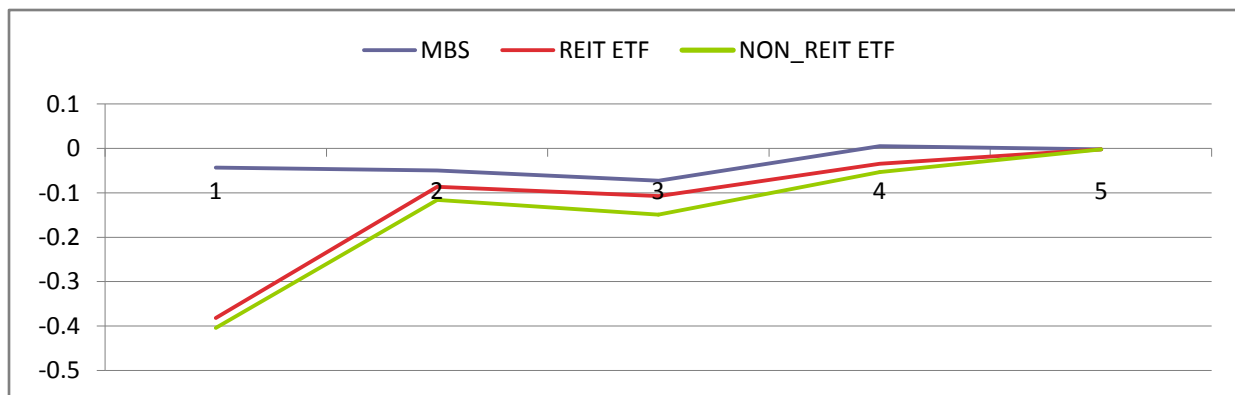
Graph6.10% VaR, Monthly
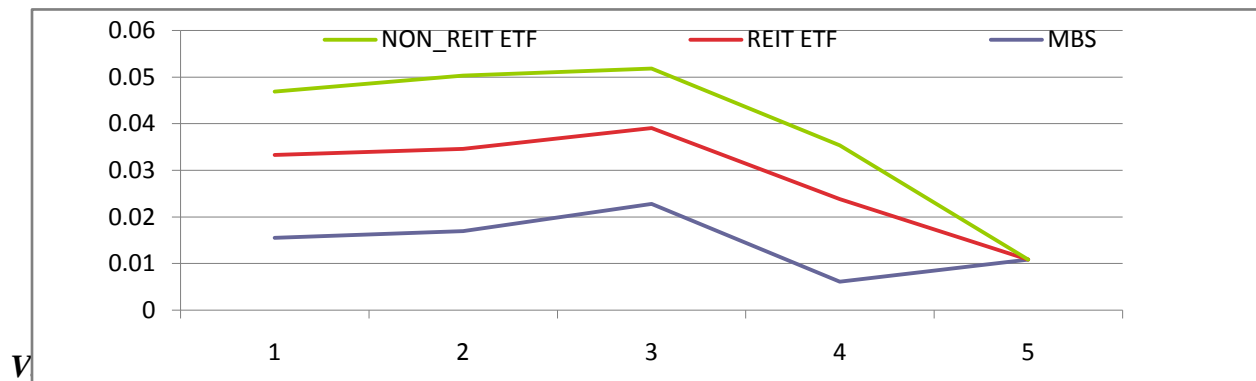

Graph7. 10% VaR Annual

Graph8. Average Rate of Return Pre-Recession

Graph9. Average Rate of Return during Recession

Graph10. Average Monthly Returns post- Recession

REIT MBS has become an investment instrument of choice for retiring individuals and the ones who have preference for a relatively secure stream of returns while taking lower risks. Also, financial planners and investment bankers have, lately, been recommending MBS asa desired investment strategy for safeguarding the retirement accounts of retirees from wild market fluctuations. The objective of this paper is to compare the risk and return of REIT MBS with REIT and Non-REIT ETF invetment opportunities.The main question addressed in this paper is whether REIT is a right investment for retirement. The study uses finance ratios, Sharpe, Treynor, and Sortino to compare the return to risk ratios of nine firms within REIT with the return to risk ratios of a number of Non-REIT ETFs. As well, the annual and monthly measures of Value at Risk (VaR) at diffenet levels are emplyed to compare and contrast the value at risk of investment in three different investment instruments. To compare the performance of the investment mediums over the business cycles, the time period of the study was selected to be 2005M1 – 2014M12, which includes the great recession of 2007M12 –2009M6. CAPM models were estimated to measure the systematic risks for the periods of recession, non-recession and overall. The statistical analysis of the data shows that, during the great recession the average rate of return for Non-REIT ETFs were the lowest among the three mediums of investment and was the highest for the MBS, with REIT ETFs having an average return in between NON-REIT ETFs and MBS. During the non-recession periods, Non-REIT ETFs had the highest average rate of return and MBS had the lowest average rate of return. The financial ratios, Sharpe, Treynor, and Sortino, showed that that with respect to return to risk ratios, in general, investingin Non-REIT ETFs provided better investment opportunities than investing in REIT ETFs and MBS.The MBS had the lowest return to risk ratios among the three investment mediums. The estimated VaRs for all levels of risk clearly showed that the VaRs for Non-REIT ETFs were in general, higher than the other two mediums of investment and werethe lowest for MBS. These results are consistent with general public perception that returns to MBS enjoy implicit or explicit government backing and have lower credit risk than the other two groups of equities. The CAPM models were used to test the effect of the great recession on the market risk of the three mediums of investment. The statistical analyses of the effect of the recession showed that the great recession did increase the systematic risk of all the REIT ETFs and three out of the five MBS. However, for the Non-REIT ETFs the great recession increased the systematic risk of only one (VFH) out of the four Non-REIT ETFs. In conclusion, MBS may be an advisable instrument of investment for retirees with a short investment horizonbecause of health concerns or dependency on additional funds for living expenses. However, retirees with high life expectancy or adequate income from other sources may not need to sacrifice the potential of higher returns in Non-REIT ETFs, and REIT ETFs by investing in MBS.

VI. References

Adereti, S. A. (2007). Financial Real Estate Investment Through the Capital Market, (unpublished B.Sc Project). University of Lagos, Lagos, Nigeria.

Brooks, C. (2014).Introductory Econometrics for Finance, 2e, Cambridge University Press.

Curley, A. J.&Guttentag, J. M. (1977). Value and Yield Risk on Outstanding Insured Residential Mortgages,*Journal of Finance*, 32(2), 403-412.

Enders, W. (2003). Applied Econometric Time Series, 4e, John Wiley & Sons, Inc., New York.

Jacobius, A.(2011) REIT Returns Beat Real Estate Funds, Other Alts-Pensions & Investments. Retrieved from http://www.pionline.com/article/20111115/online/111119987.

Kariya, T.& Kobayashi, M. (2000). Pricing Mortgage – Backed Securities (MBS).*Asia-Pacific Financial Markets*, 7(2), 189-204.

Kariya, T.Ushiyama, F.&Pliska, S. R.(2002). A 3-factor Valuation Model for Mortgage-Backed Securities (MBS).*Managerial Finance*, 37(11), 1068-1087.

Keke, O.V.&Emoh, F.I. (2015). Real Estate Investment Trusts (REITs) and Mortgage Backed Securities (MBS) as Emerging Trends for Financing Real Estate Development in the Nigerian Capital Market.*International Journal of Civil Engineering, Construction and Estate Management*,3(2), 1-7.

Glawischnig, M.& Seidl, I. (2009). Portfolio Optimization with Serially Correlated, Skewed and Fat Tailed Index Returns. *Central European Journal of Operations Research*, 21(1), 153-176.

Pellerin, S. R., Sabol S.J, and Walter, J.R. (2013). MBS Real Estate Investment Trusts: Primer.*Economic Quarterly*, 99(3),193-227.

Peyton M., Park, T. &Lotito, F. (2014). RITTs and Real Estate: Complementary Through Good times and Bad.*TIA-CRAF Asset Management*, 1-8.

Schwartz, E. S.&Torous, W. N.(1989). Prepayment and the Valuation of Mortgage-Backed Securities.*The Journal of Finance*, 44(2), 375-392.

Sharpe, W. F. (1966). Mutual Fund Performance. *Journal of Business*, 39(1),119–138.

Sizemore, C. (2014). Five Essential Retirement REITs. *Forbes/Personal Finance*, 1-6.

Sortino, F. A. &Hopelain, D. (1980). The Pension Fund: Investment or Capital Budgeting Decision.*Financial Executive Magazine,* 48, 21-3.

Treynor, J. (1965). How to Rate Management of Investment Fuds.*Harvard Business Review*, 63-75.

Walmsley, A. (2007). How Pension Funds Could Finance Housing.Retrieved from: http://allafrica.com/stories/200710310632.htm1.