




# “Mutual funds behavior and risk-adjusted performance in Nigeria”

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# MUTUAL FUNDS BEHAVIOR AND RISK-ADJUSTED PERFORMANCE IN NIGERIA

## Abstract

The paper investigates the behavior of mutual funds and their risk-adjusted performance in the financial markets of Nigeria between April 2016 and May 31, 2019, using descriptive statistics, as well as CAPM, Jensen's alpha, and other risk-adjusted portfolio performance measures such as Sharpe and Treynor ratios, as well as Fama decomposition of return. The descriptive tests revealed that 80.77% of the funds were superior to market returns, while 13.46% were riskier. The market and the fund returns behaved abnormally with asymptotic and leptokurtic characteristics as their skewness and kurtosis varied from the normal requirements. Diagnostically, the normality test by Jacque-Berra showed that the return was not normally distributed at a 1% significance level. The market was more aggressive relative to the funds. The average risk-free rate was 6.75% above the market's return. The risk-adjusted portfolio returns measured by Sharpe and Treynor ratios showed that 67.31% of the funds underperformed the market compared to 40.38% that outperformed the market using Jensen's alpha. Fama decomposition of return revealed that the fund managers are risk-averse with 48% superior selection ability and rationally invested over 85% of investors' funds in schemes with fixed income securities at a given risk-free return that cushioned the negative effects of the systematic and idiosyncratic risks and consequently threw the total returns into positive territories. Overall, the fund managers possessed 52% of inferior selection abilities that only earned 33% of superior risk-adjusted returns and hence, failed to achieve the desired diversification in the relevant period.

## Keywords

risk-adjusted, selection abilities, Fama decomposition of return, systematic risk, Jensen's alpha, asymmetric distribution, irrational investing

## JEL Classification

G11, G12, G14, G41

## INTRODUCTION

Mutual funds are pools of funds from a stratified set of investors, invested in diversified characteristic-based securities, and professionally managed by fund managers to satisfy the risk-return preference of the investors at a reduced cost. In the Nigerian financial market, there are 28 mutual fund managers licensed by the Securities and Exchange Commission (SEC) to manage 94 funds stratified into 9 different mutual schemes as of May 31, 2019. These schemes consist of equity-based funds; money market funds; bond funds; fixed-income funds; real estate funds; mixed funds; ethical funds; exchange-traded funds (ETF); and specialist funds. In Nigeria, the total net assets value (NAV) of the mutual funds stood at N782.64 billion (\$2.16billion) as of May 31, 2019. The mutual funds market is grossly underdeveloped in terms of the number of regulated funds, expense ratio, and the total net assets value in Nigeria in relation to the global developments. The total net assets value of the worldwide regulated open-ended funds fell from \$49.3 trillion in 2017 to \$46.7 trillion in 2018, while the number of funds marginally rose by 4.4.7% to 11,8978 in December 2018 (Investment Company Institute, 2019).

The funds started emerging after the 2008 global financial crisis in Nigeria. The growth in the market became noticed in 2013 due to the

aftermath effect of the global financial crisis. The NAV grew by 293.26% from N199.011 billion in May 2015 to N782.64 billion in May 2019 (SEC, 2019). The NAV is low given the Nigerian 200 million population coupled with the long existence of the Nigerian financial market. The investors' awareness of the trends in mutual funds investing and their importance to diversify risk to stimulate retail investors' participation in the market is low in Nigeria (Ugwoke & Onyeonu, 2013). This could be ascribed to no proven evidence of superior risk-adjusted returns, professionalism in funds management, superior selection and risk and returns prediction abilities, and non-transparency of expense ratio.

The performance of mutual funds in Nigeria is not transparent enough in pricing, average funds' expense ratios, redemption, subscription, and cancellation despite the launched mutual funds trading platform that tends to bring together market participants to facilitate electronic transactions that will have the benefit of a single view of their mutual fund investment and ease a variety of transactions that are expected to enhance visibility for the listed mutual funds and promote financial inclusion (Fama & French, 2015). The Nigerian equity market is not perfect but behaves abnormally as evident by the skewness and kurtosis values above the normal standard requirements (Omokehinde et al., 2017). Equity returns have been negative most of the years, post-global financial crisis, accounting for the greater divestment and lowest exposure by the fund managers. Fixed-income securities become more attractive to investors as they guarantee a better return compared to equities.

The local mutual funds market is overexposed to short-term or money market funds at 72.05% compared to the least exposure of 6.1% at the global open-ended fund market in 2018. The mutual fund sector in Nigeria, as an emerging market, has failed to mobilize savings for long-term instruments (Investment Company Institute, 2015). Thus, these market characteristics, coupled with the rationality of the fund managers and the investors, have accounted for the increased demand for fixed income, mixed and money market securities, which made up 87.49% of the total NAV of the mutual fund distribution, of which money market funds constituted 72.05% in Nigeria. Despite the low awareness and development of mutual funds in Nigeria, this study will be useful to investors to assess the professional management competence of their fund managers in possessing, selection and forecasting abilities; as well as reducing risk through diversification, providing alternative portfolio objectives, growth of assets, maintaining the safety of capital, the fair value of the investment, and lower transaction costs. In addition, the findings will guide regulators on how to regulate and protect the interest of all the stakeholders and the funds under management.

This paper examines the risk-adjusted behavior of mutual funds in Nigeria. Specifically, it evaluates if the actively fund management and selecting ability of the fund managers translate into a superior risk-adjusted returns that outperformed the market and adequately compensate for the level of risk-taking by investors.

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## 1. LITERATURE REVIEW

Research findings on the behavior of mutual funds and their risk-adjusted performance are mixed. Sharpe (1964), Treynor (1962), Treynor and Mazuy (1966), Jensen et al. (1972), and Fama (1972) pioneered the standard metrics for measuring mutual funds risk-adjusted returns and the selective and market timing abilities of the professional fund managers relative to their benchmarks. Treynor (1962) investigated reward-to-volatility, Treynor and Mazuy (1966) studied market timing

abilities of fund managers, Sharpe (1964) focused on CAPM and reward-to-variability. These measures, as well as Jensen's (1972) alpha and Fama (1972) decomposition of return, became the established standard of fund performance measurements. Some results rejected/supported the fund managers' abilities to increase the fund returns based on their professional management styles and picking skills. Several factors were found explaining the outperformance of the funds to market return rather than the personal skills of the fund managers.

Jensen et al. (1972), Elton et al. (2012), Kothari and Warner (2001), and Carhart (1997) showed supporting findings of the superiority of the benchmarks to mutual funds risk-adjusted returns or the professional picking skills of the fund managers. Jensen et al. (1972) estimated the impact of managers' forecasting ability on fund returns of 115 schemes from 1945 to 1964 and concluded that fund managers on average could not predict security. Friend et al. (1962) evaluated the performance of mutual funds against the randomly constructed portfolios and concluded that mutual fund performances were not superior to an indiscriminate portfolio. Kaura and Jayadev (1995) evaluated the performance of growth-oriented schemes by using Jensen, Treynor, and Sharpe measures and found that the schemes have not performed well. Tripathy (2006) examined the risk-adjusted performance of 31 mutual funds in India from 1995 to 2002 using six performance measures. It was found that the fund managers have not been successful in generating returns superior to market returns or in ensuring efficient diversification of portfolio. Babar et al. (2013) analyzed mutual fund performance from 2004 to 2011. Sharpe, Treynor, Jensen, and Sortino measures were used to evaluate the performance of 20 mutual funds. All the schemes underperformed the benchmark index and the fund managers showed inferior selection abilities and were unable to achieve the desired diversification in the relevant period. From February 1991 to August 1993, Jaideep and Sudipta (1994) examined the performance of five growth-oriented schemes, using CAPM and Jensen's measures, and concluded that the fund schemes' returns were inferior to the market return. Musah et al. (2014) used models of Treynor and Mazuy (1966), and Henriksson and Merton (1981) to evaluate mutual fund performance in Ghana from 2007 to 2012. It was found that those fund managers lacked the desired selective ability and timing skills to outperform the market on a risk-adjusted return basis. However, evidence from the Nigerian equity market is scanty and mixed. Oduwale (2015) examined mutual funds in Nigeria from December 2011 to November 2014 and found that the benchmark return was superior to mutual fund scheme returns. Using Sharpe and Treynor ratios and Jensen's alpha to evaluate the performance of 37 mutual funds spanning across six broad portfolio classes traded on the Nigerian Stock Exchange, Ilo et al. (2018)

found that the fund managers lacked the superior selecting ability and portfolio diversification skills as both the market and fund portfolios generally generated negative risk premia. Isiaka and Okoh (2019) analyzed the performance of collective investment schemes in Nigeria and concluded that the weekly performance of the funds was not significantly different among the six classes investigated.

On the other hand, Ippolito (1989), Lee and Rahman (1990), and Grinblatt and Titman (1992, 1994) concluded that the mutual fund schemes performance is superior to the returns of their benchmark. Rahman et al. (2012) measured the performance of 15 growth funds using Sharpe, Treynor, and Sortino ratios. The findings showed overall underperformance of the benchmark, with few funds able to earn superior risk-adjusted returns. Sharpe, Treynor, Jensen, and Fama metrics were employed by Bhosle and Adhikary (1994) to test the success of growth schemes. It was found that some of the sample schemes offered superior returns relative to the benchmark return. From April 2000 to March 2010, Prasad, and Prasad (2012) used data from 17 equity mutual funds and found that equity fund managers possess better timing skills and that 24 out of 25 equity funds have positive net selectivity reflecting the superior performance of the fund managers. Narayanasamy and Rathanamani (2013) used Sharpe ratio, alpha, beta, standard deviation, and R-Squared to evaluate the risk-adjusted performance of selected large-cap equity mutual funds. The sample data consisted of 5 mutual funds schemes from different private sectors and it spanned a three-year period from January 2010 to December 2012. It was found that all the funds performed admirably in the highly volatile market during this selected period.

On the other hand, Kong et al. (2019) examined the 80% of diversified mutual funds in Ghana. It was concluded that the money market funds performed better than the mixed and equity funds.

Overall, the majority of the findings did not ascribe the performance of the various mutual funds to the fund managers' selecting and timing abilities but can be largely attributed to the time frame, the state-of-the economy, and the effects of the different transmission mechanism channels on the various fund schemes.

## 2. METHODOLOGY

This paper used an ex-post-facto research of the 52 weekly NAV and prices data of the eight mutual schemes, and the NSE-ASI as the benchmark. The NAV and prices were obtained from SEC websites and FMAN respectively from January 4, 2016, to May 31, 2019. The 91-day average rate of the Nigerian Treasury Bills obtained on the website of CBN was considered to proxy the risk-free rate. The study also used descriptive statistics to test the statistical behavior of the historical weekly data sets such as mean, standard deviation, variance, covariance, beta, alpha or intercept, correlation coefficient, coefficient of determination, skewed and kurtosis considered for first, second, to fourth moments; including residual diagnostic tests for normality and heteroskedasticity. The study equally considered multiple regression research applying CAPM, Sharpe ratio, Jensen's alpha, and Fama decomposition of return measurements for the schemes' performance and selection abilities of fund managers. Sharpe and Treynor ratios

and Jensen's differential measures were employed to measure the scheme performance to the benchmark. However, it is important to attribute the risk associated with the portfolio returns to risk-free, systematic, unsystematic, and net selectivity of the securities using Fama decomposition of return.

### 2.1. Data

In the Nigerian capital market, there are 28 mutual fund managers licensed by the Securities and Exchange Commission (SEC) to manage 94 funds stratified into 9 different schemes as of May 31, 2019. These schemes consist of equity-based funds; money market funds; bond funds; fixed-income funds; real estate funds; mixed funds; ethical funds; exchange-traded funds; and specialist funds. This paper focuses on 18 fund managers, 52 mutual funds, and 8 schemes sans special funds from the second quarter in 2016 to May 2019 as shown in Table 1. The paper also used the NSE-ASI as benchmark and 167 observations.

**Table 1.** Fund managers, schemes, and net asset value as at May 31, 2019

Source: SEC (2019).

S/N	FUND MANAGERS	Schemes	Equity	MMF	Bond	Fixed	REIT	Mixed	Ethical	ETF	Sf
1	Afrinvest Asset Mgt Ltd	3		1	1			1			
2	AIICO Capital Ltd	2		1				1			
3	Alternative Capital Ltd	2				1		1			
4	Asset & Resources Mgt Co. Ltd	4	1	1				1	1		
5	AXA Mansard Investment Limited	2	1	1							
6	Capital Express Asset and Trust Limited	1				1					
7	Chapel Hill Denham Mgt. Limited	4	1	1				1			1
8	Cordros Asset Management Limited	3		1				2			
9	Coronation Asset Management Limited	3		1		1		1			
10	EDC Fund Management Limited	3		2		1					
11	FBN Capital Asset Mgt Limited	6	1	1	3			1			
12	First City Asset Management Ltd	4	1	1	1	1					
13	FSDH Asset Management Ltd	3				1	1	1			
14	Greenwich Asset Management Limited	2		1				1			
15	Growth & Development Asset Management Limited	1		1							

**Table 1 (cont.).** Fund managers, schemes, and net asset value as at May 31, 2019

S/N	FUND MANAGERS	Schemes	Equity	MMF	Bond	Fixed	REIT	Mixed	Ethical	ETF	Sf
16	Investment One Funds Management Limited	6	1	1		3		1			
17	Lead Asset Management Limited	1				1					
18	Lotus Capital Limited	3				1			1	1	
19	Meristem Wealth Management Limited	2	1	1							
20	New Gold Managers Limited	1								1	
21	PAC Asset Management Limited	3		1		1		1			
22	SCM Capital Limited	2	1					1			
23	SFS Capital Nigeria Ltd	3				1	2				
24	Stanbic IBTC Asset Mgt. Limited	13	2	1	1	4		1	2	2	
25	United Capital Asset Mgt. Ltd	6	1	1	2			2			
26	ValueAlliance Asset Management Limited	1						1			
27	Vetiva Fund Managers	6						1		5	
28	Zenith Asset Management Ltd	4		1		1		1	1		
TOTAL		94	11	19	8	18	3	20	5	9	1
NET ASSET VALUE (₦'BILLION) as at 31.05.2019		782.64	11.31	564	18.31	78.27	45.6	24.24	4.89	5.6	<b>31</b>
Percentage (%)		100.00	1.45	72.05	2.34	10.00	5.82	3.10	0.62	0.72	<b>3.90</b>

Note: SF = specialist fund; ETF = exchange-traded fund; REIT = real estate fund; MMF = money market fund; FIF = fixed-income fund; MIXF = mixed fund; ETHCAF = ethical fund; BDNF = bond fund; EQF = equity fund.

## 2.2. Model specification

The paper used listed prices of the mutual funds from FMAN Daily Official List and the market index to calculate the returns. The daily price of each fund is calculated by dividing the total NAV per fund by the number of funds outstanding. The natural log differences (LN) of the daily price/index were taken to obtain the market and the fund/scheme returns. The returns were used for other calculations by applying econometric packages, using EViews 10.0 and advance excel to estimate the mean, standard deviation, kurtosis, skewness, and other statistics in a descriptive manner.

*Estimating weekly market and portfolio returns.* The weekly ex-post returns on the market and the schemes are calculated by taking their natural log differences as given in equations (1) and (2), respectively:

$$R_{mt} = \ln \left( \frac{Index_{mt}}{Index_{mt-1}} \right) \cdot 100, \quad (1)$$

$$R_{it} = \ln \left( \frac{P_{it}}{P_{it-1}} \right) \cdot 100, \quad (2)$$

where  $R_{mt}$  and  $R_{it}$  are the natural log of weekly returns on the market  $m$ , and the funds  $i$ , at time  $t$ , respectively. The  $Index_{mt-1}$ ,  $Index_{mt}$ ,  $P_{it-1}$  and  $P_{it}$  represent the historical beginning and end weekly of NSE-ASI Index, and prices of the mutual funds respectively, and  $t = 1, \dots, N$ ; in which  $N$  is the sample size (176 weeks) from January 22, 2016, to May 31, 2019. Average Returns per annum on the Market ( $\underline{R}_{mt}$ ), and Funds ( $\underline{R}_{it}$ ) are shown in equations (3) and (4), respectively:

$$\underline{R}_{mt} = \sum_{t=1}^n \frac{R_{mt}}{n} \cdot 52, \quad (3)$$

$$\underline{R}_{it} = \sum_{t=1}^n \frac{R_{it}}{n} \cdot 52. \quad (4)$$

*Estimating weekly market and portfolio variances.* The variance of each company return is the



squared differences of the actual and average returns as given by equations (5) and (6):

$$\sigma_{mt}^2 = \sum_{i=1}^N (R_{mt} - \underline{R}_{mt})^2, \quad (5)$$

$$\sigma_{it}^2 = \sum_{i=1}^N (R_{it} - \underline{R}_{it})^2, \quad (6)$$

where  $\sigma_{mt}^2$  and  $\sigma_{it}^2$  are the variances of the benchmark  $m$ , and fund portfolio  $i$  at time  $t$ , while  $\sigma_{pt}^2$  represents portfolio variance of the funds. However, the market risk is measured by beta ( $\beta_{mt}$ ). Beta sensitizes the mutual fund portfolios' returns to the market return as indicated in equations (7), and (8). Beta as the market variance is obtained by dividing the covariance of the funds and the market return ( $COVR_i R_m$ ) per market variance ( $\sigma_m^2$ ):

$$\beta_{mt} = \frac{COVR_m R_m}{\sigma_m^2}, \quad (7)$$

$$\beta_{it} = \frac{COVR_i R_m}{\sigma_m^2}. \quad (8)$$

The beta of the market as represented by equation (7) is (10). Thus, any portfolio with beta greater than 1.0 is an aggressive portfolio, and defensive if the portfolio beta is below 1.0 the covariance of the market and portfolios were derived from equations (7) and (8) by multiplying the portfolio betas by the market variance as indicated in equations (9) and (10):

$$COVR_m R_m = \sigma_m^2 \beta_{mt}, \quad (9)$$

$$COVR_i R_m = \sigma_m^2 \beta_{it}. \quad (10)$$

Equation (10) is equally written as:

$$COV_{im} = \frac{1}{N} \sum_{i=1}^N [R_{mt} - \underline{R}_{mt}] [R_{it} - \underline{R}_{it}]. \quad (11)$$

*Performance evaluation measures.* Apart from the above measures of risk and return on market and schemes, other performance evaluation measures are as stated below:

1. Sharpe CAPM.
2. Jensen's alpha.
3. Fama decomposition of return.

4. Treynor ratio.
5. Sharpe ratio.

*Sharpe CAPM.* However, Sharpe CAPM model of ex-post return is formally specified as:

$$R_{it} = R_f + \beta_i ((R_{mt}) - R_f). \quad (12)$$

*Jensen's alpha.* Mathematically speaking, alpha is the rate at which portfolio return exceeds CAPM as given by equations (13):

$$\alpha_{pt} = R_{pt} - [R_f] + \beta_i ((R_{mt}) - R_f), \quad (13)$$

where  $\alpha_{pt}$  - alpha return on fund portfolios at time  $t$ ,  $R_{pt}$  - return on fund portfolios at time  $t$ ,  $\beta_i$ ,  $R_{mt}$ , and  $R_f$  as previously defined.

*Fama decomposition of return.* Fama (1972) extended Sharpe CAPM in the course of explaining factors accounting for total returns of the portfolios by including residual risk and net selectivity risk factors. In other words, the residual risk of the portfolios or compensation for inadequate diversification and net selectivity in the Nigerian stock market is too important to be ignored, hence, Fama return is decomposed into four:

$$\left[ \begin{array}{l} i. Risk - free Return = (R_f) \\ ii. Compensation for systematic risk = \\ = \beta_i ((R_{mt}) - R_f) \\ iii. Compensation for inadequate \\ diversification = [R_m - R_f] \left[ \frac{\sigma_p}{\sigma_m - \beta} \right] \\ iv. Net selectivity = (R_p - R_f) - \\ - (\sigma_p - \sigma_m)(R_m - R_f) \end{array} \right]. \quad (14)$$

*Treynor ratio.* Treynor measure, also known as the reward-to-volatility ratio, is defined as:

$$T = \frac{[R_p - R_f]}{\beta_v}. \quad (15)$$

*Sharpe ratio.* Sharpe measure is known as a reward to variability ratio measure of the risk-ad-

justed performance per standard deviation of the portfolio is stated as:

$$S = \frac{[R_p - R_f]}{\sigma_v}. \quad (16)$$

Portfolio risk-adjusted return:

$$[R_p - R_f]. \quad (17)$$

### 3. RESULTS

Table 2 shows the annualized returns of the schemes and the benchmark. The benchmark trailed behind 6 schemes with an average return of 6.42%. The equity-based fund recorded an average return of 9.75% to take 5<sup>th</sup> position out of the eight schemes. The best performing fund was the MMF with a 17.17% return, as well as the most mobilized investable and attractive scheme to the investors with a total NAV of N563.9 billion or 72.05% of the N782.64 billion aggregate NAV (Table 1). Other fixed income-related schemes such as FIF, MIXF, and BNDF followed with average returns of 12.80%, 11.41%, and 10.71% respectively. Relating to the benchmark, six schemes (EF, MMF, BNDF, FIF, MIXF, and ETF) outperformed the market; while two of the funds (REITF and ETF) performed below the market. On average, all the schemes recorded an average of 8.51%, which is above market returns.

The risk of the schemes was measured by the variance. The market was 6.78% riskier than other schemes sans REITF and ETF with 7.72% and 14.41% variance. The scheme returns were highly

volatile and characterized by skewness and kurtosis that behaved out of the normal standards of zero and 3.0; signifying that the behavior of the schemes and the market returns is asymmetric, leptokurtic, and asymptotic. Using beta, it is concluded that the schemes are less aggressive to the market. The beta of the schemes with fixed income securities is zero or near zero (Table 2). All the schemes were positively correlated with the market except FIF and REITF with -0.02 each. Equally, Table 3 presents the behavior of the 52 funds led by AIICO MMF fund with a 19.09% return. The non-fixed income securities funds such as REITF, EQF, EF, and ETF are less attractive because their returns are volatile and far below the risk-free rate of 13.17%. It also revealed that only 17 funds recorded returns above the 13.17% of risk-free rate. Relating to the benchmark by returns, 81% or 42 of the 52 funds outperformed the market while 13% were riskier (both RIETF and ETF respectively). All the funds were less risky relative to the market with substantial under-diversification characterized by their correlation coefficient, R-Squared, and beta.

*Does fund managers' risk preference result in rational investing?* Figure 1 shows the risk preference of the fund managers with over 87.49% of the total NAV invested in fixed-income securities consisting of MMF (72.05%), Bond (2.34%), Fixed (10.0%), and Mixed (3.10%) respectively. Overall, for every one-naira investment in the total funds, investment in the four schemes of fixed income securities constituted NGN87.49. This is an indication that the fund managers were risk-averse during the period. The high exposure to MMF in Nigeria may suffer investment in the long-term

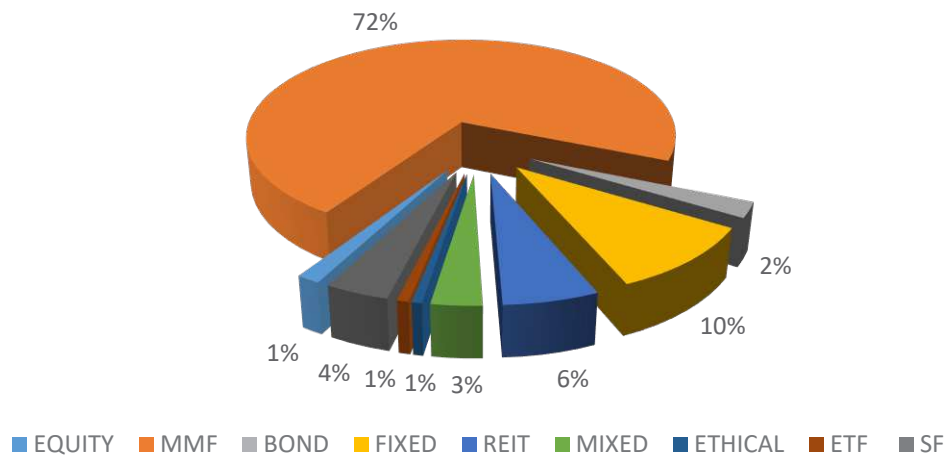
**Table 2.** Descriptive statistics of the mutual funds in Nigeria (April 2016 – May 2019)

Source: Author's elaboration.

Indicators	NSE-ASI	EQF	MMF	BNDF	FIF	REITF	MIXF	EF	ETF	AVE
SUM	21.74	32.28	57.73	36.15	46.66	-18.92	38.57	24.69	11.94	28.64
Mean (weekly))	0.12	0.19	0.33	0.21	0.27	-0.11	0.22	0.14	0.07	0.16
Annual Return	6.42	9.75	17.17	10.71	13.80	-5.59	11.41	7.30	3.53	8.51
Std. Dev.	2.60	2.08	2.12	1.17	0.96	2.34	1.41	1.54	3.76	1.92
Variance	6.78	4.40	4.60	1.47	1.34	7.72	2.18	2.54	14.41	4.83
Skewness	0.83	0.22	6.93	-0.38	0.48	-1.48	-0.10	-0.09	0.24	0.73
Kurtosis	1.74	2.13	48.25	8.73	32.79	80.71	5.79	5.55	9.48	24.18
COVAR	6.74	2.27	0.08	0.12	0.01	0.24	1.46	1.81	2.93	1.11
CORREL	1.00	0.42	0.02	0.04	-0.02	-0.02	0.36	0.43	0.30	0.19
BETA	0.99	0.33	0.01	0.02	0.00	0.03	0.22	0.27	0.43	0.16
R^2	1.00	0.19	0.00	0.00	0.00	0.01	0.17	0.20	0.11	0.09
RF	13.17	13.17	13.17	13.17	13.17	13.17	13.17	13.17	13.17	13.17



Distribution of investment in mutual funds in Nigeria in 2016-2019 (%)

**Figure 1.** Distribution of investment in mutual funds in Nigeria

instruments. It portends a greater danger for economic development. However, the risk-averse fund managers behaved rationally and this resulted in higher returns from MMF (17.17%), BNDF (10.71%), and FIF (13.80%) relative to returns on other schemes (Table 2).

*Do the risk premia have a positive effect on the mutual fund returns?* The risk premium is otherwise known as the systematic risk and it is a product of beta and the market risk-adjusted return. The market beta as shown in Table 2 is 1.0 and the market risk premium is negative at  $-6.7\%$  (Table 3). For the fixed income schemes with zero to near-zero betas, their market risk premia are zero or near zero in the likes of MMF, BNDF, FIF, and MIXF. The negative impact of the market risk premia for the market and other schemes is a disincentive to investors especially for risky schemes such as EQF, ETF, and ETHICAF. Ordinarily, investing in risky assets is expected to generate a return that is adequate to compensate for the level of risk-taking. The returns should be above the risk-free rate. The VETBANK ETF return of 18.51% was boosted by the 69.64% return recorded in 2017. However, Table A1 (Appendix A) shows UPDC REITF, VIET, and ZENITH ETHICAF with returns of  $-17.52\%$ ,  $-12.70\%$ , and  $0.77\%$  respectively. Thus, one of the major reasons for the high exposure of investors to fixed income securities funds could be ascribed to the negative impact of the market risk premia or systematic risk on the fund

performance. Since this risk is not diversifiable according to Sharpe (1964), what the fund managers did was to systematically avoid investing in risky or non-fixed income securities funds. If this trend persists, it could lead to mass divestment from the Nigerian equity market to fixed-income securities funds.

*Risk-adjusted portfolio performance.* With an average risk-free rate of 13.7%, the market grossly performed below the risk-free return during the period at  $-6.75\%$ . Sharpe, Treynor, and Jensen measures were used to evaluate the risk-adjusted portfolio returns (Table 3). These measures behaved similarly. On risk-adjusted portfolio, only MMF and FIF reported positive returns of 4.0% and 0.92% at a risk-free rate of 13.17%. However, the best scheme on managers' selection ability is MMF with the highest positive effect of 9.49% and the worse is REIT ( $-12.7\%$ ). Thus, the managers' decision to concentrate their investment in MMF (72.05%) is the best and the worst is in the REIT scheme. On fund managers' selection ability, 30 of the 52 funds had a positive impact on the total return (Table B1, Appendix B). The fund managers for REITF ( $-12.70\%$ ), and ETHICAF ( $-2.64\%$ ) possessed the poorest selection ability. In fact, investing in REITF is completely irrational during the period. On a fund-by-fund risk-adjusted returns basis, 17 of the 52 funds recorded positive excess returns over risk-free rate using Sharpe and Treynor ratios, while 40% or 21 of 52 funds using Jensen's

alpha with 90% of the securities in fixed-income (Table B1, Appendix B). Top on the risk-adjusted returns are AIICOMMF (5.92%), VETBANKETF (5.34%), ARMMMF (4.90%), AXAMMF (4.63%), and SanbicMMF (4.4%) while funds at the bottom level are UPDCRIET (-30.69%), VETETF (-25.87%), ZENITHETHICAF (-12.40%), VCHETF (11.95%), and StanbicETF 30 (-9.75%) (Table B1, Appendix B).

*Superiority of portfolio returns over the CAPM.*

The superiority of portfolio returns to the CAPM is measured by Jensen’s alpha as shown in Table 3. Jensen’s alpha indicated that 21 funds returns were superior to the CAPM return. An evaluation of the superiority of the portfolio (funds) returns to the market indicated that 42 of the 52 funds recorded above-the-market returns. Most of the funds with excess returns over CAPM returns are fixed income securities funds; especially, the MMF, FIF, MIXF, and BNDF. The three worst funds at the nadir of Table B1 (Appendix B) are Zenith ETHCAF (-11.36%), VIETF (-22.88%), and UPDC REITF (-30.0%). A curious look at the 8 schemes in Table B1 (Appendix B) shows that only two of the schemes (MMF and FIF) recorded

excess portfolio returns over the CAPM returns at 4.08% and 0.93% respectively. The funds exhibited some less than perfect diversification in the allocation of funds among the schemes. The covariance and the correlation coefficient of the market and scheme returns, the beta, and coefficient of determination of the schemes were below the market, hence, indicating that the schemes were not efficiently diversified and that the market was riskier and more aggressive than the funds.

*Fama decomposition of returns for fund managers’ selecting abilities.*

The decomposition of the total returns of the market, schemes, and funds into four are shown in Table 3. The market return was influenced negatively by the systematic risk at -6.71% and brought the risk-free rate to -6.42%. The residual risk and net selectivity risk effect on the market return are zero. According to Sharpe CAPM, these risks have been eliminated. The market portfolio is perfect and efficient. The systematic risk had a negative effect on all the 52 funds at an average of -1.24% (Table C1, Appendix C). The highest impact of systematic risk on the market return stood at -6.71%. The market return was volatile and asymmetric and coupled with the fact that

**Table 3.** Risk-adjusted performance of the schemes in Nigeria (January 2016 – May 2019)

Source: Author’s elaboration.

Indicators		NSE-ASI	EQF	MMF	BNDF	FIF	REITF	MIXF	ETHCAFF	ETF	AVE
Total risk	VAR	6.42	4.40	4.60	1.47	1.54	7.72	2.21	2.62	14.41	4.87
Risk premium	$B_i(R_m - R_f)$	-6.71	-2.25	-0.08	-0.12	-0.04	-0.23	-1.41	-1.87	-2.92	-1.12
CAPM	$R_f + B_i(R_m - R_f)$	6.46	10.92	13.09	13.05	13.13	12.94	11.76	11.30	10.25	12.05
Sharpe ratio	$(R_p - R_f)/\delta_p$	-2.59	-1.32	1.54	-0.95	0.36	-7.21	-1.34	-2.57	-3.70	-1.90
Treynor ratio	$(R_p - R_f)/\beta_p$	-6.78	-3.44	4.02	-2.48	0.93	-18.53	-3.50	-6.74	-9.70	-4.93
Jensen’s alpha	$R_p - \{R_f + B_i(R_m - R_f)\}$	-0.04	-1.17	4.08	-2.35	0.96	-18.53	-2.07	-4.83	-6.72	-3.83
Mkt risk-adjusted	$(R_m - R_f)$	-6.75	-6.75	-6.75	-6.75	-6.75	-6.75	-6.75	-6.75	-6.75	-6.75
Portfolio risk-adjusted	$(R_p - R_f)$	0.00	-3.42	4.00	-2.46	0.92	-18.76	-3.48	-6.70	-9.64	-4.94
Superiority of mkt rtn	$(R_m - R_p)$	0.00	-3.32	-10.74	-4.28	-7.67	12.02	-3.27	-0.05	2.90	-1.80
Superiority of portfolio rtn	$(R_p - R_m)$	0.00	3.32	10.74	4.28	7.67	-12.02	3.27	0.05	-2.90	1.80
<b>Fama decomposition of return</b>											
Risk-free	$R_f$	13.17	13.17	13.17	13.17	13.17	13.17	13.17	13.17	13.17	13.17
Rtn for systematic risk	$B_i(R_m - R_f)$	-6.71	-2.25	-0.08	-0.12	-0.04	-0.23	-1.41	-1.87	-2.92	-1.12
Rtn for residual risk	$(\delta_p/\delta_m - \beta_i) * (R_m - R_f)$	0.00	-3.13	-5.41	-2.92	-2.64	-5.82	-2.26	-2.19	-6.84	-3.90
Net selectivity	$R_p - (R_f + \delta_p/\delta_m) * (R_m - R_f)$	0.00	1.96	9.49	0.57	3.60	-12.70	0.19	-2.64	0.11	0.07
Total returns		6.42	9.75	17.17	10.71	14.09	-5.59	9.69	6.47	3.53	<b>8.23</b>

the market was more aggressive than the funds with the highest beta 1.0. The effect of systematic risk on the returns of the 8 schemes in Table 3 signifies that EQF (-2.25%), and ETF (-2.92%) recorded the highest. The average stochastic risk effect (-3.67%) on the schemes' total returns was more devastating than the systematic risk effect (-1.24%). The effect of the residual risk on the schemes was most felt on ETF (-6.84%), and RIET (-5.82%). The worst funds with a negative impact of residual risk on returns are HALA ETF and UPDC REITF at -9.33% and -9.26% respectively (Table C1, Appendix C).

## 4. DISCUSSION

The mutual fund sector is underdeveloped in Nigeria in terms of NAV of \$2 billion relative to \$46.78 trillion global development. The distribution of the NAV among the schemes in Nigeria is concentrated in the MMF, controlling over 72.0% of the total NAV of N783.64 billion in September 2019. By extension, the fixed income securities funds controlled over 80% of the total NAV. The high exposure to money market funds could be ascribed to a phobia for risk, preference for short-term funds to other long-term funds, and returns maximization. The money market funds recorded the highest returns of 17.17%. The market average return stood at 6.42% lagged behind the risk-free return by -6.75%. The aggregate return for all the 52 funds stood at 9.71%. The market, schemes, and the 52 fund returns behaved abnormally but were characterized as asymmetric and leptokurtic because their skewness and kurtosis varied from the standard zero and 3.0 respectively. The 52 funds and the 8 schemes were defensive in the course of the sensitivity of the schemes and the fund returns

to the market return. Furthermore, 45 funds and 2 schemes (REITF and ETF) were riskier than the market risk at 6.78%. Five of the 8 schemes' returns outperformed the market return while three of the fund returns performed below the market. The paper was able to diagnose the factors influencing the total returns of the market and the mutual funds using Fama decomposition of return, which revealed the fund returns distribution. The market was influenced negatively by systematic and residual risks. The effect of market risk on scheme returns was minimal compared to the magnitude of the effect of idiosyncratic factors. The negative effect of the systematic risk was strongly disincen- tive to investors in the non-fixed income securi- ties funds, especially in EQF and ETF. The MMF demonstrated superior selection ability with the highest positive total return. The fund managers slightly possessed superior selection abilities in respect of MMF, FIF, and EQF but were unable to achieve the desired diversification in the relevant period to earn enough returns to beat the market for ETF, ETHICAF, and REITF. Overall, the fund managers were able to possess superior selection abilities that resulted in higher-than-market re- turns at 8.23%. There was homogeneity in fund managers' risk preference and demand for mutu- al funds in Nigeria. The investors in the mutual funds market are risk-averse and prefer fixed in- come securities funds such as MMF, FIF, BNDF, and MIXF to other variable schemes. Investors behave rationally in the mutual funds market in Nigeria as NGN 87.94 invested in all the funds was in the fixed income securities that also generated the highest returns. Only 32.69% of the 52 funds recorded excess returns above risk-free rate using Sharpe and Treynor ratios. Using Jensen's alpha, only 40.38% of the 52 funds returns were superior to the CAPM return.

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## CONCLUSION

The negative risk premium for all the funds and the market can be corrected with the government in- troducing macroeconomic policies that can enhance economic development and boosting operations in the Nigerian financial market. Government should reverse the uptrend in interest payments on fixed-in- come securities to reverse the negative risk premium on equities. Investors are more informed and ra- tional; hence, the persistence of volatility in the non-fixed income securities funds will influence them to continue divesting from the non-fixed income securities funds to fixed income securities funds if the interest on fixed-income securities persists. The fund managers should be transparent in their charging fees and other applicable charges to comply with the SEC rules and remain open to the investors, other-

wise, as investors become more informed with time, the high residual risk effect on funds may influence investors to prefer index investing. 32.69% of the 52 funds with positive risk-adjusted returns should be considered a good option to invest in because they are less risk-tolerant. However, using Jensen's alpha, 21 of the 52 funds with positive alpha are recommended to be considered good options for investing. The negative impact of the unsystematic risk should be reduced to comply with Sharpe CAPM on efficiently diversified portfolios. Investors should demand fixed income securities funds when their beta is zero or near zero; when the market return is inferior to risk-free return or when the risk premium is negative. In addition, investors should invest in funds with zero coefficient of determination when the market R-Squared is one. In a volatile market, a zero strength and direction of the linear relationship between the market risk and the funds are recommended. Finally, due to the asymmetries in the equity market and other non-fixed income securities, the investors should de-risk their potential loss by concentrating on fixed income securities funds until when positive changes begin to manifest in the equity market. In conclusion, the mutual funds' behavior in Nigeria is principally determined by the monetary policy transmission channel of interest rate on risk-free securities and risk-premium on equities.

## AUTHOR CONTRIBUTIONS

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## APPENDIX A

Table A1. Descriptive statistics of mutual funds in Nigeria (January 2016–May 2019)

Source: Author's elaboration.

FUND MGRS	FUNDS	Annual return	Variance	COVAR	CORREL	BETA	R <sup>2</sup>	RANK
AIICO	AIICO MMF	19.09	6.03	0.10	0.02	0.01	0.00	1
VETIVA	VETBANK ETF	18.51	19.72	4.02	0.35	0.59	0.12	2
ARM	ARM MMF	18.07	5.34	0.09	0.02	0.01	0.00	3
AXAMI	AXA MMF	17.80	4.93	0.09	0.02	0.01	0.00	4
STANBIC	Stanbic MM	17.58	5.06	0.10	0.02	0.01	0.00	5
FBN	FBN MMF	17.52	4.99	0.08	0.01	0.01	0.00	6
UCAM	UCAM BF BDNF	16.96	1.09	0.03	0.01	0.00	0.00	7
Meristem	Meristem MMF	16.55	4.47	0.08	0.01	0.01	0.00	8
UCAM	UCAM MMF	16.49	4.42	0.07	0.01	0.01	0.00	9
FBN Cap	FBN Beta EQF	15.61	5.25	2.82	0.47	0.42	0.23	10
INVSTNT One	VGIF FIF	14.94	4.78	0.08	0.01	0.01	0.00	11
PAC	PAC MIXF	14.71	0.70	-0.12	-0.06	-0.02	0.00	12
FCAM	Legacy MMF	14.24	1.58	0.06	0.02	0.01	0.00	13
FSDH	Coral FIF	14.21	2.08	0.28	0.07	0.04	0.01	14
ZENITH	Zenith FIF	14.01	0.37	-0.08	-0.05	-0.01	0.00	15
SKYE	SFS FIF	13.70	0.41	-0.08	-0.05	-0.01	0.00	16
Stanbic	Stanbic GIF FIF	13.25	0.09	0.00	0.00	0.00	0.00	17
ARM	ARMAG EQF	12.58	6.09	2.92	0.46	0.43	0.21	18
Afrinvest	Afrinvest MIXF	12.22	4.54	2.87	0.52	0.42	0.27	19
FCAM	Legacy EQF	12.12	4.20	2.52	0.47	0.37	0.23	20
AXAMI	AXAM EQF	11.79	3.76	1.64	0.35	0.24	0.12	21
Stanbic	Stanbic MIXF	11.42	2.00	1.39	0.46	0.20	0.21	22
FBN	FBNFIF BDNF	11.16	1.68	0.25	0.07	0.04	0.01	23
Alternative	ACAP MIXF	11.12	1.53	1.06	0.33	0.16	0.11	24
FSDH	Coral MIXF	10.78	1.73	1.96	0.57	0.29	0.33	25
Stanbic	Stanbic BDNF	10.31	0.39	0.02	0.01	0.00	0.00	26
Afrinvest	NIDF BDNF	10.22	1.12	0.30	0.11	0.04	0.01	27
FBN	FBN MIXF	9.94	3.19	2.04	0.44	0.30	0.19	28
ARM	ARM ETHCAF	9.90	2.45	1.83	0.45	0.27	0.20	29
Investmt one	vantage MIXF	9.70	1.36	0.98	0.32	0.14	0.11	30
ARM	ARM MIXF	8.18	2.88	2.39	0.54	0.35	0.30	31
ChapelHill	Paramount EQF	8.12	2.40	1.78	0.44	0.26	0.20	32
Meristem	Meristem EQF	7.92	5.97	2.47	0.39	0.36	0.15	33
FBN	FBN BDNF Retail	7.87	2.47	-0.02	0.00	0.00	0.00	34
FBN	FBN BDNF Instnal	7.73	2.06	0.12	0.03	0.02	0.00	35
STANBIC	Stanbic ETHCAF	7.70	4.84	3.08	0.54	0.45	0.29	36
UCAM	United cap EQF	7.52	4.31	1.89	0.35	0.28	0.12	37
UCAM	UCAM MIXF	7.39	2.00	0.40	0.11	0.06	0.01	38
LOTUS	Halal ETHCAF	7.27	1.27	1.02	0.35	0.15	0.12	39
Sterling	Frontier EQF	6.87	4.08	1.42	0.27	0.21	0.07	40
STANBIC	IMMAM ETHCAF	6.72	3.28	2.40	0.51	0.35	0.26	41
VETIVA	VG30ETF	6.52	12.87	4.00	0.43	0.59	0.19	42
NSE	ASI	6.42	6.78	6.74	1.00	1.0	1.00	43
SKYE	SKYE REITF	6.33	0.70	-0.22	-0.10	-0.03	0.01	44
ChapelHill	Women MIXF	6.24	1.01	0.44	0.17	0.07	0.03	45
Stanbic	Stanbic EQF	5.19	3.51	2.93	0.60	0.43	0.37	46
ZENITH	Zenith MIXF	4.88	3.34	2.17	0.46	0.32	0.21	47
LOTUS	HALAL ETF	4.18	13.19	0.08	0.01	0.01	0.00	48
STANBIC	Stbic ETF 30	3.42	8.35	3.27	0.44	0.48	0.19	49
VETIVA	VCG ETF	1.22	15.95	3.22	0.31	0.48	0.10	50
ZENITH	ZENITH ETHCAF	0.77	1.25	1.05	0.36	0.15	0.13	51
VETIVA	VIETF	-12.70	16.36	3.01	0.29	0.44	0.08	52
FSDH	UPDC REITF	-17.52	14.73	0.69	0.07	0.10	0.00	53
AVERAGE		9.78	4.47	1.25	0.23	0.18	0.10	

# APPENDIX B

**Table B1.** Risk-adjusted returns of mutual funds in Nigeria (January 2016–May 2019)

Source: Author's elaboration.

FUND MGRS	FUNDS	RISK PREMIUM	CAPM	SHARPE RATIO	TREYNOR RATIO	JENSEN ALPHA	Portfolio risk adjusted	Superiority of portfolio rtn	RANK
		$B_i(R_m - R_f)$	$R_f + B_i(R_m - R_f)$	$(R_p - R_f)/\delta_p$	$(R_p - R_f)/\beta_p$	$R_p - \{R_f + B_i(R_m - R_f)\}$	$(R_p - R_f)$	$(R_p - R_m)$	
AIICO	AIICO MMF	-0.10	13.07	2.27	5.95	6.02	5.92	12.67	1
VETIVA	VETBANK ETF	-4.00	9.17	2.05	5.37	9.34	5.34	12.09	2
ARM	ARM MMF	-0.09	13.08	1.88	4.93	4.99	4.90	11.65	3
AXAMI	AXA MMF	-0.09	13.08	1.78	4.65	4.72	4.63	11.37	4
STANBIC	Stanbic MM	-0.10	13.07	1.69	4.44	4.51	4.41	11.16	5
FBN	FBN MMF	-0.08	13.09	1.67	4.38	4.43	4.35	11.10	6
UCAM	UCAM BF BNDF	-0.03	13.14	1.45	3.81	3.81	3.79	10.53	7
Meristem	M eristem MMF	-0.08	13.09	1.30	3.40	3.46	3.38	10.12	8
UCAM	UCAM MMF	-0.07	13.10	1.28	3.34	3.39	3.32	10.07	9
FBN Cap	FBN Beta EQF	-2.80	10.37	0.94	2.45	5.24	2.44	9.18	10
INVSTNT One	VGIF FIF	-0.08	13.09	0.82	2.15	1.85	1.77	8.52	11
PAC	PAC MIXF	0.12	13.29	0.59	1.55	1.42	1.54	8.29	12
FCAM	Legacy MMF	-0.06	13.11	0.41	1.07	1.12	1.07	7.81	13
FSDH	Coral FIF	-0.28	12.89	0.40	1.05	1.32	1.04	7.79	14
ZENITH	Zenith FIF	0.08	13.25	0.32	0.84	0.76	0.84	7.58	15
SKYE	SFS FIF	0.08	13.25	0.20	0.53	0.45	0.53	7.27	16
Stanbic	Stanbic GIF FIF	0.00	13.17	0.03	0.08	0.08	0.08	6.82	17
ARM	ARMAG EQF	-2.91	10.26	-0.23	-0.60	2.31	-0.59	6.15	18
Afrinvest	Afrinvest MIXF	-2.85	10.32	-0.36	-0.95	1.90	-0.95	5.80	19
FCAM	Legacy EQF	-2.51	10.66	-0.40	-1.06	1.45	-1.05	5.69	20
AXAMI	AXAM EQF	-1.63	11.54	-0.53	-1.39	0.25	-1.38	5.36	21
Stanbic	Stanbic MIXF	-1.38	11.79	-0.67	-1.76	-0.37	-1.75	5.00	22
FBN	FBNFIF BNDF	-0.25	12.92	-0.77	-2.02	-1.76	-2.01	4.74	23
Alternative	ACAP MIXF	-1.06	12.11	-0.79	-2.06	-1.00	-2.05	4.69	24
FSDH	Coral MIXF	-1.95	11.22	-0.92	-2.41	-0.45	-2.39	4.35	25
Stanbic	Stanbic BNDF	-0.02	13.15	-1.10	-2.88	-2.84	-2.86	3.89	26
Afrinvest	NIDF BNDF	-0.30	12.87	-1.13	-2.97	-2.65	-2.95	3.79	27
FBN	FBN MIXF	-2.03	11.14	-1.24	-3.25	-1.20	-3.23	3.51	28
ARM	ARM ETHCAF	-1.82	11.35	-1.25	-3.28	-1.45	-3.27	3.48	29
Investmt one	vantage MIXF	-0.97	12.20	-1.33	-3.49	-2.50	-3.47	3.27	30
ARM	ARM MIXF	-2.38	10.79	-1.92	-5.01	-2.61	-4.99	1.76	31

**Table B1 (cont.).** Risk-adjusted returns of mutual funds in Nigeria (January 2016–May 2019)

FUND MGRS	FUNDS	RISK PREMIUM	CAPM	SHARPE RATIO	TREYNOR RATIO	JENSEN ALPHA	Portfolio risk adjusted	Superiority of portfolio rtn	RANK
		$B_i(R_m - R_f)$	$R_f + B_i(R_m - R_f)$	$(R_p - R_f)/\delta_p$	$(R_p - R_f)/\beta_p$	$R_p - (R_f + B_i(R_m - R_f))$	$(R_p - R_f)$	$(R_p - R_m)$	
ChapelHill	Paramount EQF	-1.77	11.40	-1.94	-5.08	-3.28	-5.05	1.70	32
Meristem	Meristem EQF	-2.46	10.71	-2.02	-5.28	-2.79	-5.25	1.50	33
FBN	FBN BDNF Retail	0.02	13.19	-2.04	-5.33	-5.32	-5.30	1.45	34
FBN	FBN BDNF Instnal	-0.12	13.05	-2.09	-5.48	-5.33	-5.44	1.30	35
STANBIC	Stanbic ETHCAF	-3.07	10.10	-2.10	-5.50	-2.40	-5.47	1.28	36
UCAM	United cap EQF	-1.88	11.29	-2.17	-5.68	-3.76	-5.65	1.10	37
UCAM	UCAM MIXF	-0.40	12.77	-2.22	-5.81	-5.38	-5.78	0.97	38
LOTUS	Halal ETHCAF	-1.01	12.16	-2.27	-5.94	-4.89	-5.90	0.84	39
Sterling	Frontier EQF	-1.42	11.75	-2.42	-6.34	-4.88	-6.30	0.45	40
STANBIC	IMMAM ETHCAF	-2.39	10.78	-2.48	-6.49	-4.06	-6.45	0.29	41
VETIVA	VG30ETF	-3.98	9.19	-2.55	-6.68	-2.67	-6.65	0.10	42
NSE	ASI	-6.75	6.46	-2.59	-6.78	-0.04	-6.75	0.00	43
SKYE	SKYE REITF	0.21	13.38	-2.63	-6.87	-7.05	-6.84	-0.09	44
ChapelHill	Women MIXF	-0.44	12.73	-2.66	-6.97	-6.49	-6.93	-0.18	45
Stanbic	Stanbic EQF	-2.92	10.25	-3.07	-8.03	-5.06	-7.98	-1.23	46
ZENITH	Zenith MIXF	-2.16	11.01	-3.18	-8.34	-6.13	-8.29	-1.54	47
LOTUS	HALAL ETF	-0.08	13.09	-3.45	-9.04	-8.90	-8.99	-2.24	48
STANBIC	Stanbic ETF 30	-3.26	9.91	-3.74	-9.80	-6.49	-9.75	-3.00	49
VETIVA	VCG ETF	-3.21	9.96	-4.59	-12.02	-8.74	-11.95	-5.20	50
ZENITH	ZENITH ETHCAF	-1.04	12.13	-4.76	-12.47	-11.36	-12.40	-5.65	51
VETIVA	VIETF	-2.99	10.18	-9.94	-26.02	-22.88	-25.87	-19.13	52
FSDH	UPDC REITF	-0.68	12.49	-11.79	-30.86	-30.00	-30.69	-23.94	53
AVERAGE		-1.24	11.93	-1.30	-3.41	-2.15	-3.39	3.35	

# APPENDIX C

**Table C1.** Fama decomposition of mutual funds returns (January 2016–May 2019)

Source: Author's elaboration.

FUND MGRS	FUNDS	Risk free	Rtn for systematic risk	Rtn for residual risk	Net selectivity	Total returns	RANK
		$R_f$	$B_i(R_m - R_f)$	$(\delta_p/\delta_m - \beta_i) * (R_m - R_f)$	$R_p - (R_f + \delta_p/\delta_m) * (R_m - R_f)$		
AIICO	AIICO MMF	13.17	-0.10	-6.27	12.28	19.09	1
VETIVA	VETBANK ETF	13.17	-4.00	-7.51	16.85	18.51	2
ARM	ARM MMF	13.17	-0.09	-5.89	10.89	18.07	3
AXAMI	AXA MMF	13.17	-0.09	-5.66	10.38	17.80	4
STANBIC	Stanbic MM	13.17	-0.10	-5.73	10.24	17.58	5
FBN	FBN MMF	13.17	-0.08	-5.71	10.14	17.52	6
UCAM	UCAM BF BNDF	13.17	-0.03	-2.67	6.49	16.96	7
Meristem	M eristem MMF	13.17	-0.08	-5.40	8.86	16.55	8
UCAM	UCAM MMF	13.17	-0.07	-5.38	8.77	16.49	9
FBN Cap	FBN Beta EQF	13.17	-2.80	-3.13	8.37	15.61	10
INVSTNT One	VGIF FIF	13.17	-0.08	-5.59	7.44	14.94	11
PAC	PAC MIXF	13.17	0.12	-2.29	3.72	14.71	12
FCAM	Legacy MMF	13.17	-0.06	-3.20	4.32	14.24	13
FSDH	Coral FIF	13.17	-0.28	-3.46	4.78	14.21	14
ZENITH	Zenith FIF	13.17	0.08	-1.66	2.42	14.01	15
SKYE	SFS FIF	13.17	0.08	-1.73	2.18	13.70	16
Stanbic	Stanbic GIF FIF	13.17	0.00	-0.77	0.86	13.25	17
ARM	ARMAG EQF	13.17	-2.91	-3.49	5.80	12.58	18
Afrinvest	Afrinvest MIXF	13.17	-2.85	-2.67	4.57	12.22	19
FCAM	Legacy EQF	13.17	-2.51	-2.80	4.26	12.12	20
AXAMI	AXAM EQF	13.17	-1.63	-3.39	3.64	11.79	21
Stanbic	Stanbic MIXF	13.17	-1.38	-1.63	1.26	11.42	22
FBN	FBNFIF BNDF	13.17	-0.25	-3.11	1.35	11.16	23
Alternative	ACAP MIXF	13.17	-1.06	-2.15	1.15	11.12	24
FSDH	Coral MIXF	13.17	-1.95	-1.46	1.01	10.78	25
Stanbic	Stanbic BNDF	13.17	-0.02	-1.60	-1.23	10.31	26
Afrinvest	NIDF BNDF	13.17	-0.30	-2.44	-0.21	10.22	27
FBN	FBN MIXF	13.17	-2.03	-2.60	1.39	9.94	28
ARM	ARM ETHCAF	13.17	-1.82	-2.24	0.79	9.90	29
Investmt one	vantage MIXF	13.17	-0.97	-2.05	-0.45	9.70	30
ARM	ARM MIXF	13.17	-2.38	-2.02	-0.59	8.18	31



Table C1 (cont.). Fama decomposition of mutual funds returns (January 2016–May 2019)

FUND MGRS	FUNDS	Risk free	Rtn for systematic risk	Rtn for residual risk	Net selectivity	Total returns	RANK
		$R_f$	$B_i(R_m - R_f)$	$(\delta_p/\delta_m - \beta_i)*(R_m - R_f)$	$R_p - (R_f + \delta_p/\delta_m)*(R_m - R_f)$		
ChapelHill	Paramount EQF	13.17	-1.77	-2.25	-1.03	8.12	32
Meristem	Meristem EQF	13.17	-2.46	-3.87	1.08	7.92	33
FBN	FBN BDNF Retail	13.17	0.02	-4.09	-1.23	7.87	34
FBN	FBN BDNF Instnal	13.17	-0.12	-3.60	-1.73	7.73	35
STANBIC	Stanbic ETHCAF	13.17	-3.07	-2.63	0.24	7.70	36
UCAM	United cap EQF	13.17	-1.88	-3.50	-0.26	7.52	37
UCAM	UCAM MIXF	13.17	-0.40	-3.26	-2.12	7.39	38
LOTUS	Halal ETHCAF	13.17	-1.01	-1.91	-2.98	7.27	39
Sterling	Frontier EQF	13.17	-1.42	-3.82	-1.06	6.87	40
STANBIC	IMMAM ETHCAF	13.17	-2.39	-2.30	-1.76	6.72	41
VETIVA	VG30ETF	13.17	-3.98	-5.32	2.65	6.52	42
NSE	ASI	13.17	-6.75	-0.04	0.00	6.42	43
SKYE	SKYE REITF	13.17	0.21	-2.39	-4.66	6.33	44
ChapelHill	Women MIXF	13.17	-0.44	-2.16	-4.32	6.24	45
Stanbic	Stanbic EQF	13.17	-2.92	-1.93	-3.13	5.19	46
ZENITH	Zenith MIXF	13.17	-2.16	-2.58	-3.55	4.88	47
LOTUS	HALAL ETF	13.17	-0.08	-9.33	0.43	4.18	48
STANBIC	Stbic ETF 30	13.17	-3.26	-4.23	-2.26	3.42	49
VETIVA	VCG ETF	13.17	-3.21	-7.14	-1.60	1.22	50
ZENITH	ZENITH ETHCAF	13.17	-1.04	-1.86	-9.50	0.77	51
VETIVA	VIETF	13.17	-2.99	-7.49	-15.39	-12.70	52
FSDH	UPDC REITF	13.17	-0.68	-9.26	-20.74	-17.52	53
AVERAGE		13.17	-1.24	-3.67	1.52		