



THE PERSISTENCE OF EQUITY MUTUAL FUND PERFORMANCE: FURTHER EVIDENCE FROM AN EMERGING ECONOMY

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ABSTRACT: *This study evaluates the persistence of performance of actively managed, equity-based mutual funds in Nigeria using monthly net asset values (NAVs) of 30 funds obtained from the Securities and Exchange Commission over 10 years from 2012 to 2021. We employed a non-parametric technique based on the Contingency Table to test for performance persistence, using the Cross-Product Ratio (CPR) and the Rank Correlation statistics. Evidence shows that mutual funds do not exhibit performance persistence, and the performance of loser funds does not repeat, hence past performance does not predict future performance. Therefore, we recommend that retail investors (and their advisers) should not rely on historical performance to select mutual funds as an investment vehicle. This study provides valuable insight into the performance of actively managed funds in Nigeria and contributes to the ongoing debate about the efficiency of the financial markets and the role of active fund management. It suggests that investors might be better off with passive investment management strategies, given the lack of persistence in the performance of actively managed funds.*

KEYWORDS: Mutual Funds, Risk-Adjusted Returns, Performance Persistence, Nigeria Exchange Limited, Efficient Market Hypothesis.



INTRODUCTION

Mutual funds are a significant global investment option (Elton & Gruber, 2020), rapidly gaining popularity worldwide (Allied Market Research, 2020). They offer an affordable way for small investors to engage in the stock market, aggregating funds that contribute to economic development. These funds are crucial for long-term funding, supporting economic growth through equity and bond issuances by companies and governments (World Bank Group, 2015).

In addition to facilitating financial intermediation, mutual funds play a pivotal role in treasury management across numerous countries. In these contexts, corporate entities make investments in mutual funds to enhance their balance sheets. Furthermore, mutual funds can contribute to the functioning of the banking sector's financial intermediation activities by offering funding through investments in short-term financial instruments like certificates of deposits and repo transactions. Mutual funds serve as an appealing investment avenue for retail, corporate, and institutional investors alike, thanks to their provision of competitive interest rates. As a result, they offer an alternative to traditional fixed deposit investments typically offered by banks (World Bank Group, 2015).

Given their importance in the financial markets, researchers have beamed their searchlights on the performance of mutual funds. The first aspect of interest is the risk-adjusted returns of mutual funds, while the second is whether or not the performance of mutual funds repeats. In other words, do top (bottom) performing funds continue to maintain their relative performance in the future? This is the concept of performance persistence.

The persistence debate also addresses the controversy regarding whether the performance of mutual funds is attributable to skill or luck. If a group of fund managers had outperformed the market or a cohort of similar funds, and the driver of this outperformance is the presence of superior skill, then it should be expected that the outperformance will persist into the future (Cremers et al., 2019). Conversely, luck-driven performance will not endure.

Persistence of performance has attracted the attention of researchers over the last thirty years (for example, Malkiel, 1995, Carhart, 1997, Daniel et al., 1997, Wermers, 2000, Gruber, 2010; Elton et al., 2011; Rao et al., 2017; Rao et al., 2018; Jadevicius, 2019; Choi & Zhao, 2021; Silva et al, 2022; Hammouda et al 2023). However, across the world, there is no consensus among researchers on the subject in more recent studies. While some researchers report evidence of persistence (Ferreira et al., 2019; Chowdhury et al., 2020; Zhai & Wang, 2020; Vidal & Vidal-García, 2021; Lin, 2022; Cuthbertson et al., 2022; Vidal-García & Vidal, 2022a; Vidal-García and Vidal, 2022b; Silva et al, 2022; Hammouda et al 2023), others affirm that persistence does not exist in mutual fund performance (Rao et al., 2017; Rao et al., 2018; Jadevicius, 2019; Choi & Zhao, 2021; Ozkan & Ozturk, 2021; Azimova, 2021).

Earlier studies on mutual funds in Nigeria studied the impact of fees on the performance of mutual funds (Abubakar & Maimako, 2014) and the risk-adjusted returns of mutual funds (Oduwole, 2015; Mahmuda & Abdullahi, 2017; Ilo et al., 2018; and Omokehinde, 2021). The current study comprehensively evaluates the performance persistence of mutual funds. In addition, the study uses the most extensive dataset so far in all the studies, thereby enhancing the robustness of the outcome. The output of the study will enrich the literature on the performance of mutual funds in emerging markets and will help investors to evaluate the skills



and expertise of fund managers thereby guiding them in making informed decisions about their investment choices.

The remaining part of the paper is arranged as follows. Section 2, reviews the theory and literature and situates the study within the context of the existing work in the field. This is followed by Section 3 which discusses the methodology adopted for the study, and thereafter Section 4 presents and discusses the results of our empirical analysis. Section 5 concludes the paper, highlights the key takeaways, and makes policy recommendations.

LITERATURE REVIEW

The Nigerian Mutual Fund Industry

The emergence of mutual funds in Nigeria is a relatively recent development, with the first mutual fund having been established in 1991. During the 1990s, the total assets managed by these funds remained below N20 billion. However, the global economic recession between 2008 and 2010 led to a renewed focus on mutual funds by Nigerian stock market regulators. Consequently, the importance of mutual funds gained traction.

Presently, the mutual fund industry in Nigeria has gained substantial momentum, with a reported Asset Under Management (AUM) exceeding 1.4 trillion Naira as of December 31, 2021, spread across 118 individual funds categorized into 8 major groups. According to the Securities and Exchange Commission of Nigeria (2021). Further, the Nigerian mutual fund market currently represents around 10% of the entire stock market capitalization and approximately 11% of the pension fund industry, indicating significant room for further growth. Recognizing this potential, steps are being taken by the apex regulator, the Securities and Exchange Commission, and other key stakeholders, to enhance and expand the mutual fund industry in Nigeria. These measures aim to facilitate sustained growth, attract international investments, and maximize the industry's potential.

Given the huge and growing amounts of funds invested by a wide range of investors under the management of professional managers, there is a need to fill a huge knowledge gap that exists in connection with the various segments of the performance of mutual funds. This understanding will be of immense importance to investors, fund managers, and investment advisers.

In conclusion, the evolution of the Nigerian mutual fund industry from its inception in 1991 to its current state showcases remarkable progress. The commitment of regulatory bodies and industry participants to foster its growth is crucial for its continued advancement within the broader financial landscape.



Empirical Evidence on the Persistence of Mutual Fund Performance

Over time, researchers have directed their attention toward various aspects of mutual fund performance. However, recent studies appear to concentrate on exploring the persistence of fund performance. This concept evaluates the degree of correlation between a fund's past performance and its future performance. Persistence in performance arises when a fund consistently achieves better (or worse) results compared to the average performance of similar funds or a specific benchmark (Australian Securities and Investment Commission, 2003).

Considerable research efforts have been dedicated to examining the persistence of mutual fund performance on a global scale. Although initial investigations (Sharpe, 1966; Jensen, 1968) did not uncover evidence of performance persistence, several studies by the early 1990s (Grinblatt & Titman, 1992; Hendricks et al., 1993; Goetzmann & Ibbotson, 1994; Elton et al., 1996; Gruber, 1996) reported indications of persistence. Subsequently, other researchers aimed to account for the observed performance persistence, but they encountered evidence that contradicted the notion of persistent mutual fund performance.

Firstly, several researchers identified survivorship bias in sampling as the reason behind the apparent persistence (Brown et al., 1992; Brown & Goetzmann, 1995; Malkiel, 1995). Conversely, other studies identified the presence of momentum and the utilization of momentum strategies not considered by the utilized risk model, offering plausible explanations for performance persistence (Carhart, 1997; Daniel et al., 1997; Wermers, 1997). Notably, Carhart's (1997) pivotal work demonstrated that the "hot hand" effects reported by Hendricks et al. (1993) could be explained by common factors influencing stock returns, particularly the Jegadeesh and Titman (1993) momentum factor, where stocks that historically performed well continue to outperform in the future.

Supporting the idea of persistence, there is substantial evidence that funds ranked based on positive alpha are likely to sustain positive alphas in subsequent periods (Carhart, 1997; Busse & Irvine, 2006; Gruber, 1996; Elton et al., 1996; Cohen et al., 2005). Generally, when persistence is observed among top-performing funds, it appears to be a short-term phenomenon (spanning one to two years).

However, there exists a divergence of opinions regarding the persistence of mutual fund performance in recent studies across different regions. While some researchers report evidence of persistence (Ferreira et al., 2019; Chowdhury et al., 2020; Zhai & Wang, 2020; Vidal & Vidal-García, 2021; Lin, 2022; Cuthbertson et al., 2022; Vidal-García & Vidal, 2022a; Vidal-García and Vidal, 2022b; Silva et al., 2022; Hammouda et al., 2023), others affirm its absence (Rao et al., 2017; Rao et al., 2018; Jadevicius, 2019; Choi & Zhao, 2021; Ozkan & Ozturk, 2021; Azimova, 2021). Following the evidence from the literature, we propose as follows:

Mutual funds do not exhibit persistence of performance.

Another prevailing theme in recent research is the observation that poor performance tends to predict continued poor performance. Ferreira et al. (2019) investigated the persistence of the performance of mutual funds using a global sample of equity mutual funds from 27 countries. They found evidence that net performance persistence was present in the majority of mutual fund industries, suggesting that fund managers possessed superior skills, contrary to a large body of reports in the literature. They found that competitiveness in the industry was



responsible for the cross-sectional variation in performance persistence, in line with the intuition that more intense competition makes persistence difficult among top-performing funds whereas it is much easier to keep poor-performing-performing funds at the bottom. Similarly, Pilbeam and Preston (2019) analyzed the performance of 355 actively managed Japanese equity mutual funds between April 2011 and April 2016. They found strong evidence that Japanese mutual funds outperformed the 4-factor CAPM benchmark adopted for the study and exhibited persistence in performance. This was particularly noticed among the poor-performing funds. Using a sample of 275 actively managed funds that operated between July 1989 and December 2020, Božović (2022) appraised the performance of emerging market funds based in the U.S. The study found evidence of significant negative alpha among the funds, driven by the performance of the bottom performers. It was also reported that the momentum factor accounted for the positive and significant alpha generated from the return spread between winners and losers in the short term. Several other studies validated the persistence of performance among poor-performing funds (Fortin & Michelson, 2010; Cuthbertson & Nitzsche, 2012; Miguel & Chen, 2021; Božović, 2022). One consistent factor among underperforming funds is high expense ratios. It seems that funds charging high fees are more likely to consistently perform poorly. Again, based on reported evidence in the literature this study proposes as follows:

Poor-performing funds do not display persistent performance.

In the context of Nigeria, research on mutual funds is limited. Earlier works primarily focused on the impact of fees (Abubakar & Maimako, 2014) and risk-adjusted returns (Oduwale, 2015; Mahmuda & Abdullahi, 2017; Ilo et al., 2018; and Omokehinde, 2021). None of the earlier studies addressed the persistence of mutual fund performance. Overall, the literature offers mixed evidence concerning the persistence of mutual fund performance. This necessitates further research into the subject.

METHODOLOGY

Mutual Fund Data

All available historical data on monthly net asset values (NAVs) of actively managed, equity-based mutual funds in Nigeria, useful for the study, were collected from the website of the Securities and Exchange Commission. This covers a period of ten years, from 2012 to 2021. The All-Share Index (ASI) of the Nigeria Exchange Limited was used as the benchmark portfolio while the 5-year government bond return was used as the risk-free rate.

The purposive sampling method (selective or subjective sampling) was used in sample selection, and all actively managed equity mutual funds during the study period were selected. This ensured that funds with similar characteristics were selected for the sample, thereby enhancing comparability which is fundamental to the study. In addition, to address the potential risk of survivorship bias the return data of all funds that operated during the study period were used.

Only actively managed equity funds were included, to avoid the risk of selecting funds into a sample with vastly different characteristics, as active portfolios are constructed and designed



to outperform the market by leveraging on the superior information available to fund managers and their stock selection and market timing ability.

Models for Persistence Test

To evaluate performance persistence, the Contingency Table methodology which has been adopted by several researchers, including Blake and Timmermann (1998); Lunde et al (1998); Allen and Tan (1999), and Rhodes (2000) was used. In applying the Contingency Table methodology, we first determine the excess return (alpha) of each mutual fund portfolio for a given period, say P_t using the Jensen Alpha methodology defined by the following regression specifications:

$$R_{pt} - R_{Ft} = \alpha_p + \beta_p (R_{Mt} - R_{Ft}) + e_{pt} \dots\dots\dots(\text{equation 1})$$

Next, we categorize the mutual funds into two categories: Winner (W) and Loser (L) based on the relative Jensen Alpha of each fund compared to the mean Alpha of the cohort of mutual funds. Mutual funds whose Jensen Alphas are higher (or lower) than the mean Jensen Alpha of the cohort of mutual funds are classified as Winner (or Loser) respectively. Following this, we repeated the steps above in the subsequent period P2 and categorized the mutual funds into the Winner (W) or Loser (L) category as usual. A contingency table is then prepared with 4 categories: WW, LL, WL, and LW. With this information, relevant statistical analyses are conducted to test for the persistence of performance.

The first statistical model used is a non-parametric method called cross-product ratio (CPR) or odd ratio, first used by Brown (1995) and subsequently by several other researchers including Teo and Woo (2001). The approach is to compute the CPR or odd ratio as follows:

$$CPR = (WW \times LL) / (WL \times LW) \dots\dots\dots(\text{equation 2})$$

A CPR figure greater than one implies the existence of apparent persistence while a CPR figure lower than one is indicative of a negative relationship between the performance in the two periods, and hence no persistence of performance. The statistical significance of the CPR is tested using a Z-statistic calculated as follows:

$$Z = \frac{CPR}{\sigma_{in}(CPR)} \dots\dots\dots(\text{equation 3})$$

Where $\sigma_{in}(CPR)$ is calculated as follows:

$$\sigma_{in}(CPR) = (1/ N_{WW} + 1/ N_{LL} + 1/ N_{WL} + 1/ N_{LW})^{1/2} \dots\dots\dots(\text{equation 4})$$

The Z-statistics assumes a normal distribution. At a 5% level of significance, a Z-statistic larger than 1.96 implies that the CPR is significantly larger than 1, indicating the existence of performance persistence for the given period (s).

We also applied Spearman’s Rank Correlation statistic to test for the statistical significance of persistence. To implement this, a table is created from the data sets generated from two consecutive periods. The mutual funds are ranked based on their relative alphas as presented in the two datasets, with the ranking of 1 allocated to the biggest number in a column followed



by 2, 3and so on. The smallest value in the column will get the lowest ranking. Mean rankings are allocated to tied scores. This procedure is applied to the two sets of data. Then the difference in ranks between the two sets of data (d) on each row of the table is computed. Applying the appropriate formulae, the rank correlation coefficient is computed.

Next, we test the statistical significance of the relationship. This is achieved by determining the p-value of the rank correlation score at the 5% level of significance and comparing this with the actual rank correlation score to determine whether or not there is evidence of persistence of performance.

DATA ANALYSIS AND RESULT

Table 1: Contingency Table Showing the Cross Product Ratios Over Nine Overlapping Periods

Period	Repeat Winners (WW)	Reversal Performers (WL)	Reversal Performers (LW)	Repeat Losers (LL)	Total	Cross Product Ratio (CPR)
2012/2013	3	7	3	5	18	0.7143
2013/2014	2	3	6	6	17	0.6667
2014/2015	3	2	1	5	11	7.5000
2015/2016	0	2	2	0	4	0.0000
2016/2017	3	1	2	1	7	1.5000
2017/2018	3	5	1	1	10	0.6000
2018/2019	2	3	2	3	10	1.0000
2019/2020	0	4	5	1	10	0.0000
2020/2021	4	4	1	4	13	4.0000
All Periods	20	31	23	26	100	0.7293

** indicates statistical significance at the 95% level

Source: *Author*

Table 1 presents the computation of the Cross Product Ratio (CPR) for the performance persistence tests using the Contingency Table methodology. It can be observed that 9 periods of 2 years each from 2012/2013 to 2020/2021 are used for the performance persistence test. To measure 'persistence' or 'reversal', we computed the Cross Product Ratio (CPR) and checked whether it was greater than or lower than 1. If CPR is above one, there is prima facie evidence of persistence, implying that winners tend to keep winning and losers tend to keep losing.

On the other hand, a CPR of less than one is indicative of 'reversal'; that is, winners reverse to losers and/or losers reverse to winners. It should be noted that the CPR ratio tests the persistence of both repeat winners (WW) and repeat losers (LL) jointly. Table 1 shows that 5 test periods out of 9 (56%) showed CPR less than 1, while the remaining 4 periods (44%) recorded CPR of 1 or above, giving an apparent indication of persistence. However, when the CPRs were subjected to statistical tests of significance using the Z-statistic, the result showed that the CPRs for all nine periods were statistically insignificant as highlighted in Table 2.

**Table 2**

Statistical Significance of the Cross-Product Ratios for Nine Overlapping Periods and the Aggregate of all the Periods

Period	In (CPR)	SE (In CPR)	Z	P-value
2012/2013	-0.3365	1.0048	-0.3349	0.3707
2013/2014	-0.4055	1.0801	-0.3754	0.3557
2014/2015	2.0149	1.4259	1.4130	0.9207
2015/2016	0	0	0	0
2016/2017	0.4055	1.6833	0.2409	0.5948
2017/2018	-0.5108	1.5916	-0.3209	0.3745
2018/2019	0.0000	1.2910	0.0000	0.5000
2019/2020	0	0	0	0
2020/2021	1.3863	1.3229	1.0479	0.8508
All Periods	-0.3157	0.4052	-0.7790	0.7794

** indicates statistical significance at the 95% level

Source: *Author*

For further robustness tests, we applied the rank correlation analysis to validate the persistence test. The computed correlation coefficients are shown in Table 3 which highlights that only one period (2015/2016) indicates a strong correlation, with a negative correlation coefficient of -0.8000. However, when subjected to a statistical significance test, the correlation coefficients of all nine periods were statistically insignificant (Table 3 and Figure 2). In addition to the test done for each period, we also conducted a performance persistence test for all the periods taken together as a whole. The result shows a CPR of 0.729 (p-value 0.779), which is statistically insignificant, again reconfirming that the performance of equity mutual funds does persist. Based on our findings, we do not reject the first null hypothesis of this study which states that the performance of mutual funds, in general, does not repeat.



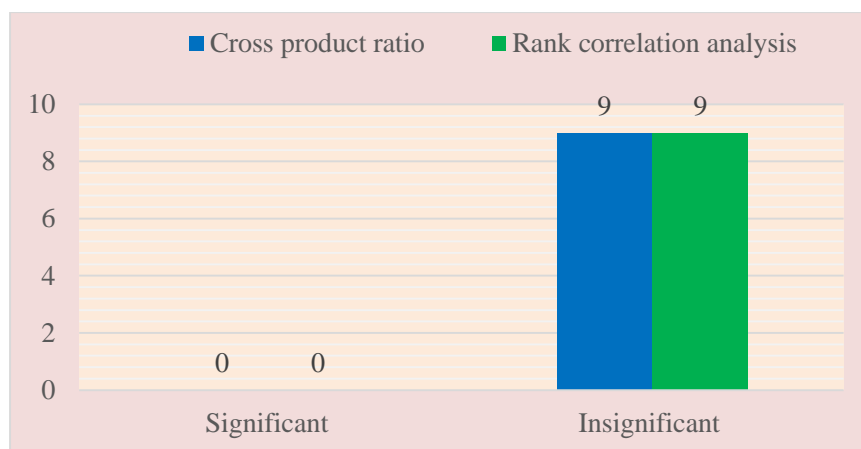
Table 3: Rank Correlation Coefficients with their Statistical Significance to Test the Persistence of Performance of Nigerian Equity Mutual Funds

Period	Rank Correlation Coefficient (r)	P-value
2012/2013	-0.0691	0.3926
2013/2014	0.0882	0.6318
2014/2015	-0.1227	0.3596
2015/2016	-0.8000	0.1000
2016/2017	0.0714	0.5605
2017/2018	-0.0667	0.4274
2018/2019	0.0182	0.5199
2019/2020	-0.4909	0.0748
2020/2021	0.4835	0.9529

** indicates statistical significance at the 95% level

Source: Author

Figure 2: The Number of Periods with Statistically Significant and Insignificant Cross Product Ratio and Spearman’s Rank Correlation Coefficients



The figure indicates the statistical significance of coefficients at the 95% level

Source: Author

Table 4 shows the persistence test conducted among ‘losers’ (poor-performing funds) funds. We identified losers in the first period under consideration and tracked their performance through their relative rankings over time. We found that there was no persistence of performance among losers contrary to the findings of several studies (Fortin & Michelson, 2010; Cuthbertson & Nitzsche, 2012; Pilbeam & Preston, 2019; Miguel & Chen, 2021; Božović, 2022). Based on this result, we do not reject the second null hypothesis 2 of this study which states that performance of poor-performing funds does not repeat.



Table 4: Rank Correlation Coefficients with their Statistical Significance to Test the Persistence of Performance Among Loser Funds

Period	Rank Correlation Coefficient (r)	P-value
2018/2019	0.0000	1
2019/2020	-0.600	0.2848
2020/2021	0.8000	0.1041
All Periods	0.0667	0.8134

** indicates statistical significance at the 95% level

Source: *Author*

DISCUSSION AND RECOMMENDATIONS

Using the monthly net asset values of 30 actively managed, equity mutual funds that operated between 2012 and 2022 in Nigeria, we evaluated the performance of mutual funds in Nigeria and present evidence that mutual funds do not exhibit persistence in performance. We conclude therefore that past performance does not predict future performance. In addition, we argue that the performance of mutual fund managers is largely attributable to luck and not skill.

This study presents evidence that generally, the performance of mutual funds does not predict future performance. In other words, mutual funds do not exhibit performance persistence. This result is supported by evidence from the earliest mutual fund studies (Sharpe, 1966; Jensen, 1968). Several studies in Africa and other developing countries also reported no evidence of performance persistence including in Ghana (Musah et al, 2014); South Africa (Bertolis and Hayes, 2015); Turkey (Ozkan and Ozturk, 2021; and Azimova, 2021).

In addition, we tested whether there was persistence of performance among losers as reported by a couple of researchers (Cohen et al., 2005; Busse & Irvine, 2006; Fortin & Michelson, 2010; Cuthbertson & Nitzsche, 2012; Pilbeam & Preston, 2019; Miguel & Chen, 2021; Božović, 2022). However, our result does not validate that proposition in the Nigerian market.

Overall, this study validates the Efficient Market Hypothesis on the Nigerian stock market. The EMH provides that in an efficient market, prices fully reflect available information (Fama, 1970). This suggests that market participants (including fund managers) cannot take advantage of superior information to consistently beat the market. It also implies that no trading strategy can consistently beat the market, and neither can fundamental analysis, technical analysis, or any other stock selection strategy be used to generate alpha.

Based on our findings, it is recommended that retail customers (and their advisers) should invest in low-cost, passively managed mutual funds tracking broad market indexes and exchange-traded funds (ETFs). Since evidence shows that the performance of mutual funds does not repeat, historical performance does not provide useful information to guide investment decision-making. Retail investors (and their advisers) should, therefore, not rely on the history of past performance to select mutual funds as an investment vehicle.



Furthermore, it is imperative to channel future research endeavors towards scrutinizing the performance of mutual funds in Nigeria through the utilization of more contemporary models. For instance, the model devised by Ferson and Schadt (1996) could be employed, which integrates publicly available information concerning economic conditions. This model offers a more robust framework for evaluating the aptitude of fund managers to time the market effectively. Additionally, exploring the portfolio holding model utilized by Daniel et al. (1997), Jiang et al. (2007), and Elton et al. (2012) would be valuable. By delving into these models, researchers can derive insights into the performance of mutual funds from an alternative perspective. The outcomes generated by these newer models can then be juxtaposed with the findings derived from the present study, resulting in a more comprehensive understanding of mutual fund performance dynamics in Nigeria.

In summary, the study provides valuable insight into the performance of actively managed funds in Nigeria and contributes to the ongoing debate about the efficiency of the financial markets and the role of active fund management. It suggests that investors might be better off with passive investment management strategies, given the lack of persistence of performance by actively managed funds.

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