RISK-ADJUSTED RETURNS AND PERFORMANCE OF MUTUAL FUNDS IN NIGERIA

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Abstract

RISK-ADJUSTED RETURNS AND PERFORMANCE OF MUTUAL FUNDS IN NIGERIA

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This study examines the performance of 30 actively managed equity-based mutual funds in Nigeria using monthly net asset values (NAVs) obtained from the Securities and Exchange Commission and covering a period of about ten years from January 2012 to September 2021. We evaluate the risk-adjusted returns of mutual funds, the extent to which selectivity skills and market timing ability affect risk-adjusted returns, and whether or not the performance of mutual funds persists. The study extends earlier efforts by using more robust multifactor performance appraisal models and investigating the phenomenon of performance persistence within the Nigerian context. Treynor ratio, Sharpe ratio, Jensen's Alpha, and Fama- French 3-factor multiple regression models are used to assess mutual funds' risk-adjusted performance, while Treynor-Mazuy (1966) and Henriksson-Merton (1981) multiple regression models are used to evaluate the selective and market timing ability of funds managers. A non-parametric technique based on the Contingency Table is used to test for performance persistence. Evidence shows that mutual funds do not deliver excess risk-adjusted returns, and mutual fund managers do not have selective skills and market timing ability. In addition, mutual funds do not exhibit performance persistence, implying that past performance does not predict future performance. Our result establishes the veracity of the Efficient Market Hypothesis in the Nigerian stock market.

Keywords: Mutual Funds, Risk-Adjusted Returns, Selective ability, Market-Timing Ability Performance Persistence, Nigeria Exchange Limited

Declaration

I declare that this thesis has been composed solely by myself and that it has not been submitted, in whole or in part, in any previous application for a degree. Except where stated otherwise by reference or acknowledgment, the work presented is entirely my own.

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CHAPTER 1: INTRODUCTION

A mutual fund is a form of collective investment scheme which pools funds from investors and aggregates them to invest in shares, bonds, treasury bills, and other financial instruments, under the management of a professional fund manager who acts on behalf of the contributors or subscribers, in line with the investment objectives of the fund (Reilly & Brown, 2015). On account of the professional management of their assets, mutual funds typically earn returns from various sources such as dividends from the underlying shares the fund invested in and/or interest on bonds and other fixed-income securities, as well as deposits the fund holds in financial institutions. In addition. mutual funds could generate either capital gains (or losses) on their investment when the securities it invests in are sold at a profit (or a loss). The resulting income or capital gains of a mutual fund can be distributed to fund holders periodically or in the alternative may the reinvested into the fund based on the preference of each investor. By reinvesting their distribution into the fund, an investor can compound his/her returns over time, but will effectively realize these returns in the future when they sell their units (World Bank Group, 2015).

Mutual funds are closely regulated because they are legally authorized to mobilize savings from the public and invest those savings on behalf of fund holders largely in a well-diversified portfolio of permissible and tradable securities. This level of scrutiny and regulation is required to protect the investment of members of the public. A collective investment scheme typically has a fund manager or investment manager who manages the investment decisions; there is also a fund administrator who oversees buying and selling of securities, account reconciliations, valuation, and pricing of units; there is also a Board of Trustees of a Board of Directors who are saddled with the responsibility of overall governance including safeguarding the assets of the fund, monitoring and enforcing compliance with rules and regulations; and a marketing or distribution company which has responsibility for marketing and selling units of the fund (World Bank Group, 2015).

In terms of their mode of operations, mutual funds are referred to as open-ended funds since they are allowed to make offers continuously to the general public and must buy back units of the fund from their holders on request and regularly at the current value

of those shares or units, also on an ongoing basis after the initial offering. Some mutual funds charge fees for the issuance and/or redemption of their units while others do not. Some funds are referred to as load fees, implying that the investor is charged a sales charge or commission for the purchase of units. Depending on the mutual fund manager, the charge could be a percentage of the amount invested or a flat fee (Elton, Gruber, Brown, & Goetzmann, 2014). There is another category of funds that does not charge a sales fee for purchasing units in the mutual funds or when they sell their shares. However, this does not mean that they do not charge fees at all. These are called no-load funds.

Although similar to mutual funds in several respects, closed-end funds are another category of managed investment companies. These are distinguished from open-ended funds in that they have a fixed number of shares available for trading and do not offer redemptions. That is, investors cannot redeem their shares from the fund manager. The only way for an investor to dispose of their shares is through trading in the stock market just like equities. The net asset value (NAV) of closed-end funds is calculated throughout the trading day based on the market values of the securities that make up the portfolio. However, the demand and supply of the shares or units determine the market price on the stock exchange. This leads to a situation where the market price of units of closed-end funds is higher or lower than the NAV of the units. One of the puzzles in finance is the observation that closed-end funds typically at prices lower than their NAV (Elton et al, 2014).

Mutual funds provide variety, as there are different types depending on their investment objectives and the type of securities they include in their portfolios. Hence, we have equity, fixed income, index, and money market funds, among others (Reilly & Brown, 2015). Equity mutual fund invests a large proportion of their funds in the stocks of various companies to generate returns. This category of funds tends to have a higher level of risk than other types of funds because of the inherent riskiness of equities. There are a variety of equity funds, and they can be classified based on their investment objective that needs to be mapped to the investor's risk profile. Equity mutual funds allocate a major proportion of their fund to equity shares of various companies in -varying

proportions. Funds could be allocated to small-cap, mid-cap, or large-cap companies depending on market conditions and the risk-return preferences of the fund. Usually, the remaining portion of the fund is allocated to other securities like bonds, Commercial Papers, Treasury Bills, and other money market instruments. This helps diversify the holdings, reducing the fund's liquidity needs.

Investors in equity mutual funds need to have a long-term investment horizon, and this must align with their investment objectives and risk tolerance. Equity funds generally aim to provide capital appreciation over a relatively long term and try to diversify by investing in shares with different risk-return profiles such as growth stocks, value stocks, cyclical stocks, and dividend stocks (Bodie, Kane & Marcus, 2014).

The first closed-end mutual fund was established in the Netherlands in 1774. Thereafter, in Britain and the U.S.A in 1868 and 1893 respectively, mutual funds were created as well. However, it was not until 1924 when the Massachusetts Investment Trust was created in the U.S.A that the first open-end fund was established to sell and redeem units continuously (World Bank Group, 2015). Since then, mutual funds have become a common feature of the capital markets in most countries and have undoubtedly turned out to be a successful investment vehicle globally, to the extent that they have become the main investment outlet for small investors (Rouwenhorst, 2004).

Mutual funds have been reported to hold potential benefits for investors including the provision of professional asset management services, low-cost diversification, transparency, liquidity, and making available to investors a variety of investment options and a range of risk-return alternatives (Reilly & Brown, 2015). From a broad macroeconomic point of view, mutual funds provide an avenue for small investors to save and invest in the stock market, thereby aggregating a large pool of funds that can be applied to develop the economy. The funds aggregated become an important source of long-term funding for catalyzing economic growth and development, which companies and governments (including their agencies) typically access through the issuance of equities and bonds. Moreover, funds that predominantly invest in short-term instruments, referred to as money market funds are a ready source of short-term financing for governments' domestic borrowing through their investment in short-dated securities such

as Commercial Papers and Treasury bills. From the investor's perspective, the steady returns generated from investing in mutual funds help build wealth over time, stabilize households' income, enhance their resilience, and reduce the financial burden on governments upon retirement.

As a versatile investment vehicle, mutual funds hold crucial economic benefits for their investors as they provide cost-efficient diversification benefits for retail and institutional investors and companies. This benefit is particularly important for individual investors who typically have a small amount of money to invest in installments and hence would find it costly, inefficient, and demanding to create a well-diversified portfolio of securities individually. Most also lack the expertise to achieve this. This is where mutual funds become very useful. In Nigeria, for instance, there are mutual funds with a minimum subscription of N5,000 (< $10), thereby providing an investment outlet for millions of small investors in the country. Similarly, institutional investors also take advantage of the opportunities provided by mutual funds to gain low-cost exposure to a specific asset class, sector, or geographical region.

Mutual funds also create an attractive investment outlet for operators of both defined benefit and defined contribution pension schemes, thereby playing a useful role in retirement planning and portfolio management. Although in Nigeria, pension funds invest predominantly in government securities, in other parts of the world, especially the developed economies, investing in mutual funds helps in enhancing the financial security of millions of investors, especially as they attain retirement age.

Moreover, mutual funds play a crucial role in financial intermediation in the economy by supporting the provision of short-term funding needs of users of funds such as governments, companies, and large financial institutions like banks. These economic agents usually issue short-term securities which some categories of mutual funds invest in predominantly, thereby supporting their short-term liquidity needs.

Apart from supporting financial intermediation, mutual funds are crucial in treasury management in many countries where corporate organizations invest in them to boost their balance sheet. They may also support the banking industry in their financial

intermediation function by financing them through investing in their short-term instruments such as certificates of deposits and repo transactions. Mutual funds provide an attractive investment outlet to retail, corporate, and institutional investors alike by providing competitive interest rates thereby serving as an alternative to investment in fixed deposits usually provided by banks.

A portfolio manager can approach the management of a portfolio of assets from the perspective of either active or passive management. The philosophy of active management is that capital markets are largely inefficient and provide opportunities for arbitrage to generate excess returns. Therefore, an active manager seeks to exploit market inefficiencies and views about the mispricing of an individual asset or group of assets to achieve positive, abnormal returns. He attempts to outperform an index by adopting either security selection or tactical adjustment strategy to generate alpha. On the other hand, passive management aligns with the assumption that the stock market is efficient, and difficult to beat (Reilly & Brown, 2015). A passive portfolio manager, therefore, constructs his portfolio to track the performance of a benchmark portfolio and does not attempt to generate alpha (Reilly & Brown, 2015).

Consequently, in order fairly assess the performance of an active fund manager, an appropriate benchmark should be set and the level of risk undertaken to achieve a given level of positive abnormal returns should be taken into account. For the passive manager, performance evaluation is based on an assessment of the extent to which the manager achieves full diversification. In other words, the relevant question is, how closely does the fund track the benchmark?

Over the years, researchers have beamed their searchlights on two key aspects of the performance of mutual funds. The first is whether or not mutual funds can outclass the market and deliver excess risk-adjusted returns. Early research efforts sought to answer this question, with most of the early studies done in the developed capital markets, especially the United States (U.S.), following the pioneering work of Treynor (1965), Sharpe (1966), and Jensen (1968). A related question regarding the source of excess returns has also attracted the attention of researchers. Do mutual fund managers possess superior skills? Are the excess returns generated by a mutual fund manager

attributable to their selectivity or market timing ability? More recently, attention has shifted towards exploring 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. This study seeks to reconcile the key strands of mutual fund performance studies. If mutual funds on average generate excess risk-adjusted returns, we would expect to find evidence that fund managers possess stock selection skills and/or market timing skills to beat the benchmark. Further, if some fund managers are found to possess superior skills to consistently beat the market, there should be evidence of persistence of performance within a group of funds as a result of their superior skills. Otherwise, any reported excess risk-adjusted returns would be attributable to luck and should not result in the persistence of performance. Our position, therefore, is that the different strands of the literature are mutually reinforcing.

Most studies in the developed markets report that mutual funds generally do not generate excess risk-adjusted returns, and early studies indicated that superior performance does not persist through time [Sharpe (1966) and Jensen (1968)]. However, studies in the early 1990s reported that some mutual funds exhibited persistent superior performance [Grinblatt & Titman (1992), Hendricks, Patel & Zeckhauser (1993), Goetzmann & Ibbotson (1994), Elton, Gruber & Blake (1996a), and Gruber (1996)], while more recent studies appear to cast doubt on the veracity of the claim of persistence.

In South Africa, and Kenya respectively, Tan (2015), and Mohamed, Ganesh, & Muroki (2014) reported that fund managers did not display selective skills, lacked market timing ability, and mutual funds performed poorly relative to the market index in the respective countries studied. In Nigeria, Oduwole (2015) studies mutual funds' performance and concluded that mutual funds managers lacked the selective ability to outperform a passive, buy-and-hold strategy. Further, Ilo, Yinusa, and Elumah (2018) evaluated the performance of 37 Nigerian mutual funds traded between January 2012 and December 2015, using Sharpe, Treynor, and Jensen's Alpha measures. They reported that mutual fund portfolios generated negative mean excess return thereby failing to compensate investors for investing in risky assets. They also concluded that fund managers did not demonstrate stock selection or portfolio diversification skills.

Earlier studies on mutual funds in Nigeria, including Oduwole (2015), Sambo (2016), Ilo, et al (2018), and Mahmuda & Abdullahi (2017) had used single-index models to evaluate the risk-adjusted performance of mutual funds. The single-index model simplifies the basic framework for portfolio analysis first developed by Markowitz, by reducing the number and complexity of the inputs by assuming that a single factor or index can be used to explain all the covariations of security returns. However, the single-index model is an oversimplification of reality. Its weakness is that it does not take into account simple but important relationships among securities, hence it is less accurate in modeling the factors that determine the cross-section of securities returns. Several researchers have reported that there are other factors apart from the market that causes securities to move together [Stephen Ross (1976a, 1976b); Basu (1977,1983); Banz (1981); Jegadeesh & Titman (1993)]. The multi-factor models attempt to address this deficiency by taking cognizance of the more granular details regarding these relationships while achieving substantial model simplicity. These models attempt to improve the explanatory power of the single-index model by incorporating additional independent variables that influence the co-movement of securities prices. This provides strong support for their use in portfolio evaluation and analysis.

The current study applied multiple-index performance evaluation models in appraising mutual funds, thereby contributing to the existing literature in the field, given that the Nigerian studies on the performance of mutual funds were based on the single-index models. This study should therefore provide a more robust analysis of the performance of mutual funds.

The debate regarding the different ramifications of the performance of mutual funds is still ongoing since there is no consensus among researchers on the performance of mutual funds (Elton et al, 2014). Some researchers have reported that discrepancies in results arose because of the different levels of market efficiency in various markets. Others postulate that they are a consequence of the the use of different types of data for the studies while others point to differences in research approaches and methodologies adopted by researchers. One thing is clear, however, there is much room for further research on the interesting subject.

1.1 Mutual Funds in Nigeria

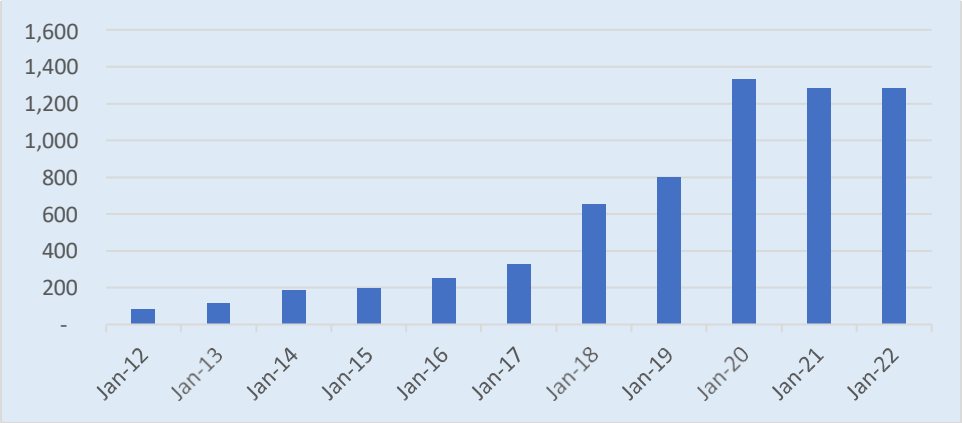
The establishment of the Paramount Equity fund in 1991, with a total net asset value (NAV) of N17.5 million as of December 31, 1991, signaled the birth of the Nigerian mutual fund industry (Nigeria Investment Promotion Commission, 2019). Subsequently, the global financial crisis of 2008 which adversely affected the Nigerian financial markets spurred the growth of the industry with the entrance of several financial institutions.

According to Arunma (2010), the global financial crisis, triggered massive portfolio outflows from the Nigerian stock market as foreign investors scampered for safety and exited the Nigerian market. The impact was an unprecedented stock market decline, prompting margin calls on margin facilities. This, in turn, created further declines and panic in the stock market, prompting a huge market crash and erosion of investors' confidence.

In the aftermath of the global economic meltdown and the attendant stock market downturn, the apex regulators of the capital market in Nigeria, the Securities and Exchange Commission (SEC) started a massive awareness campaign to encourage retail investors to explore the opportunities in the stock market while mitigating their investment risks by investing through mutual funds, thereby benefitting from the efficient diversification, professional management, asset liquidity, and transparency, among others, that mutual funds are reputed to provide.

Figure 1.1

Growth of Mutual Funds in Nigeria in Net Asset Values (N' millions) from 2012 to 2022



(Source: Securities and Exchange Commission)

These efforts appeared to have yielded the desired result as the Nigerian mutual fund industry took off impressively subsequently. According to the Nigeria Investment Promotion Commission (2019), the total net asset value (NAV) of mutual funds attained the N1 trillion mark in 2019 with over 100 funds in operation, from a situation on December 31, 1991, where only one fund existed with a total net asset value of N17.5 million. By February 25, 2022, the NAV of mutual funds in Nigeria had grown to N1.37 trillion Naira with 118 individual funds across 8 major categories of funds (Table 1 and Figure 1).

Another positive for the mutual fund industry in Nigeria is its resilience; before the coronavirus pandemic in early 2020, the total net asset value of the country's mutual funds stood at N1.042 trillion, but despite the devastating impact of the pandemic on financial markets globally, the industry recorded a grown in total net assets value of N270 billion or 26 percent increase as at May 2022, comprising of N260.5 billion increase in net flows and N9.5 billion of investments returns. The big question, therefore, is, what are the key growth drivers of the Nigerian mutual fund industry?

First, is the increase in awareness of the investing public on the opportunities and benefits that mutual funds provide as an investment vehicle. In addition, the search for higher yields, given the stock market's poor performance in recent years, motivated investors to explore opportunities in mutual funds. (NIPC, 2019). These factors are increasingly important in the investment environment given the persistently high rates of inflation and the poor performance of the Nigerian stock market in recent years, resulting in a flight to safety.

Until recently banks have been the default destination for savings, but savers today are increasingly turning to mutual funds as an alternative outlet. Between the years 2010 and 2019, the yield on government securities, especially the Nigerian Treasury Bill, was attractive at about 14.7 percent, which on average was 2.6 percentage points above the rate of inflation. This era presented an easy-money environment where the inflation rate was lower than the risk-free rate. From around 2019, however, the interest rate structure in the economy changed, with the Nigerian Treasury Bill yielding about 2.7% while the inflation rate was 13%. Investors have to be more discerning in identifying and

exploring attractive investment opportunities in the financial market. It is therefore not surprising that money markets funds in particular have attracted the lion's share of new funds inflow into the industry in recent years. For instance, in 2019, the industry as a whole attracted a new inflow of contributions estimated at N481.6 billion, out of which money market funds attracted N337 billion, representing about 70% of new inflows (Ndimele, 2019). In addition to this, mutual fund operators became more creative and nimbler to attract new investors.

Many of them created technology platforms that made it easier to participate in the industry, through stress-free and seamless subscriptions and redemption of their investments. The minimum subscription amount of about N5,000 for most of the funds is also very low, making it affordable to most intending investors.

Given the growing popularity and impressive growth of mutual funds in Nigeria, the SEC in 2019 stepped up its efforts to further consolidate the gains made so far by establishing new rules to improve the attractiveness of collective investment schemes. The SEC reviewed downwards the offer costs of open-ended and closed-ended funds from 3% to 1% and from 3% to 1.65% respectively. The operational costs for both open-ended and close-ended funds were also reviewed from 5% to 3.5%. The clear intention of the SEC in amending the rules was to make the schemes more attractive to the investing public by lowering transaction costs, thereby increasing the return on investment. The new rules are expected to benefit the fund managers as well in the long run by promoting investors' participation in collective investment schemes resulting in larger portfolios of managed funds. The key changes to the rules are the establishment of clear-cut differences between open-ended and close-ended schemes; the reduction of offer and ongoing maintenance costs of schemes; clear benchmarking of funds to an index, and the introduction of procedures to manage conflict of interest in related party transactions that involve fund managers. These new rules should engender greater transparency, enhance investors' confidence and further improve the performance of collective investment schemes. Adio (2019) established a link between transparency, disclosure and financial markets performance in Nigeria. He reported a positive and high correlation between the variables.

Table 1.1

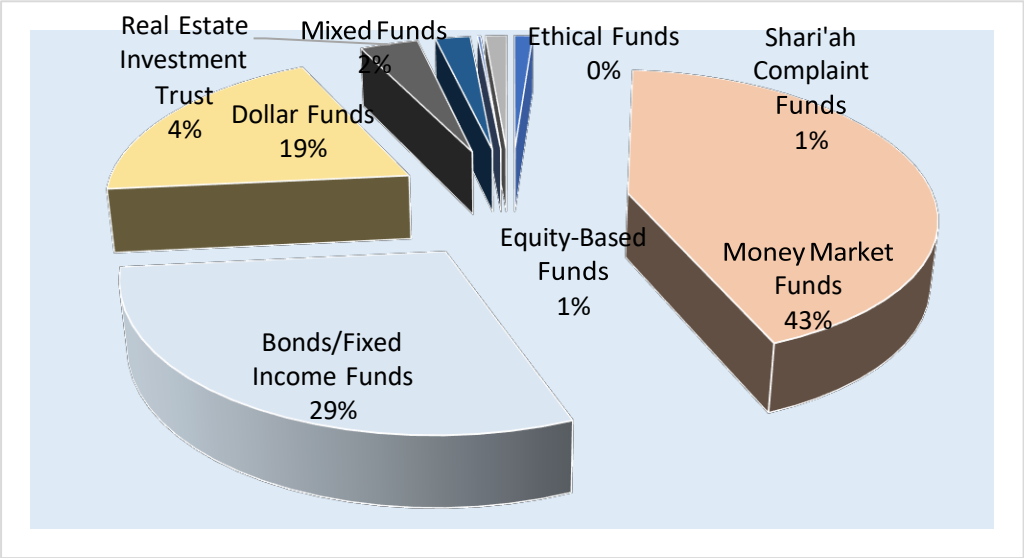
Categories of Mutual Funds And Net Asset Values In Nigeria As of February 2022

Fund Category	Number of Funds	Fund NAV as of 25-Feb-2022 (Naira)	Fund NAV as at 25-Feb-2022 (USD) @N422/$
Equity-Based Funds	15	15,625,860,722	37,028,106
Money Market Funds	30	588,741,407,380	1,395,121,818
Bonds/Fixed Income Funds	28	405,081,754,283	959,909,370
Dollar Funds	15	264,330,908,702	626,376,561
Real Estate Investment Trust	4	49,865,481,094	118,164,647
Mixed Funds	23	29,840,185,450	70,711,340
Ethical Funds	3	2,656,447,533	6,294,899
Shari'ah Complaint Funds	6	18,193,227,118	43,111,913
Total	**118**	**1,374,335,272,282**	**3,256,718,655**

Source: Securities and Exchange Commission

Figure 1.2

Categories of Mutual Funds and the Relative Proportion of their NAVs in Nigeria as of February 2022



(Source: Securities and Exchange Commission)

Currently, the total NAV of mutual funds in Nigeria is about 10% of the stock market capitalization and 11% of the size of the pension fund industry (Nwokoji, 2022) hence there is ample room to run. To further deepen the mutual fund industry in Nigeria and drive it to realize its full potential, a couple of steps need to be taken by the critical stakeholders. One of the key requirements is the enhancement of transparency. To increase investors' confidence, there is a need for fund managers to provide timely and useful information to the public on the investment performance, risks, and money flow of mutual funds. This information is useful to guide investors' decision-making. Fund managers also need to embrace internationally acceptable standards and procedures for reporting to be globally compliant and competitive. Specifically, the adoption of marking-to-market accounting in line with international financial reporting standards and Global Investment Performance Standards (GIPS) has been advocated. This would enhance fair and objective comparison of the performance of funds, and motivate the establishment of top-class fund analysis and evaluation services such as those provided by Morningstar, Financial Times, and Yodelar. These advances would attract more investors into the industry, enhance industry expansion and engender participation by foreign investors.

1.2 Regulatory Framework of Mutual Funds in Nigeria

The main regulation that governs the operations of securities and investments in Nigeria is the Investment and Securities Act (ISA) 2007. This Act provides a clear definition of Collective Investment Schemes (CIS) as any scheme that is permitted to invite members of the public to aggregate funds and invest them in securities and other assets, thereby granting them proprietary interest and sharing with them the risks and returns of investment in the proportion of their participatory interest. The ISA also classifies CIS into five categories: (1) Unit Trusts (2) Venture Capital Funds (3) Open-ended Investment Companies (4) Real Estate Investment Schemes (5) Specialized Funds.

According to the ISA, the Securities and Exchange Commission is the Apex regulator of the capital market saddled with the primary responsibility of registering all market participants in the capital market and all securities to be issued to the public. The SEC also maintains a safe investment environment by establishing various mechanisms for the protection of investors. SEC achieves these objectives by creating and enforcing rules that guide the activities of market operations in the capital in line with the provisions of the ISA. The SEC also establishes structures and processes to ensure transparency in the management of investors' funds. For instance, it requires all fund and portfolio managers to send in quarterly and annual reports on all products and portfolios of assets under their management in a prescribed form.

The Trustees are another pivotal player in the industry. The role of the Trustees in the mutual fund industry in Nigeria is similar to that of the Board of Directors of a company, as they are primarily responsible for the protection of the interest of the fund subscribers. Hence, the Trustees mainly ensure that the assets of the scheme are safeguarded on behalf of the investors and that the fund is run professionally, in line with laid down procedures and in compliance with relevant laws and regulations. Among others, the Trustees have direct responsibility for major decisions of the scheme, such as organizing the AGM, and approving the payment of dividends to subscribers. An important document that regulates the operations of a mutual fund is the Trust Deed. It is an agreement between the Trustees and the Fund Manager which serves as the key contract document between the two parties. It clearly lays down the rights and responsibilities of each party,

the investment objectives and policies of the fund, and all other relevant information. According to the ISA, any proposed amendments to the trust deed or custodial arrangement under any authorized scheme must be approved by the SEC before it can take effect.

A fund manager manages the day-to-day investment activities of the fund toward achieving its objectives. Hired by the Trustees of the fund, the fund manager is an incorporated company licensed and registered by the SEC. The ISA 2007 places a fiduciary responsibility on the fund manager and requires it to administer the funds of the scheme honestly, fairly, and transparently. It, therefore, requires the fund manager to exercise a duty of care in the interest of the subscribers and the public at large. Specifically, the fund manager is required to meet the commitments of the funds, manage the risk-return profile of the fund in line with the fund's objectives, ensure adequate coordination and control of the affairs of the scheme, keep proper records and documents, ensure the deployment of well-trained and motivated personnel to man key functions, put in place proper internal controls and compliance procedures, and promote investors education.

In Nigeria, the SEC requires full custody arrangement for all funds and portfolios being managed by investment companies. This means that a third party, referred to as a Custodian, holds all the assets of the scheme on behalf of subscribers. This protects the assets of the scheme in case the investment manager runs into financial crises. The custodian keeps the assets of the fund and maintains a proper record of all transactions on the assets. Clearly, the role of a custodian is critical for transparency and building investors' confidence in the scheme. Apart from safeguarding a fund's assets from misuse, misappropriation, theft, or loss, a custodian helps to maintain a clear distinction between the assets owned by mutual fund investors and other funds managed by the fund manager.

Another important player in the mutual fund industry in Nigeria is the Registrar. Specifically, in the mutual fund scheme, they maintain the register of all unit holders, as well as handle the processing of distributions, such as dividends unit holders. This function is in line with the usual role Registrars play in the capital market in connection

with the investment in securities such as equities and bonds. Registrars generally maintain up-to-date data about investors and disseminate relevant information to shareholders. Registrars also facilitate the dematerialization, transfer, transmission and consolidation of shares.

The ISA established the above regulatory structure under the direct regulatory oversight of the SEC to ensure that the overarching objective of investor protection in the capital market is achieved.

1.3 Statement of the Problem

In 2018, Nigeria was given the unenviable tag of the world's poverty capital. According to Homi, Kristofer, & Martin (2018) of the Brooklyn Institute, Nigeria during the year had overtaken India as the country with the highest number of extremely poor people about 87 million compared to 73 million in India. Further, projections from the report indicated that extreme poverty in Nigeria was rising at the rate of 6 people per minute. The report also noted that poverty was a great challenge in Africa as a whole with about two-thirds of extremely poor people worldwide from the continent.

In a new report, the World Bank (2022), highlighted the fact that Nigeria has not been able to substantially address the deplorable poverty situation in the country since 2019. Drawing on the 2018/19 Nigerian Living Standards Survey (NLSS), and the Nigeria COVID-19 National Longitudinal Phone Survey (NLPS) the World Bank (2022) estimated that 40% of the Nigerian population live below the poverty line, and does not have access to education and basic infrastructural facilities like electricity, portable water, and good sanitation. Further, although a majority of Nigerians are industrious and hard-working, their prosperity is being hampered by the unfavorable economic structure, and other environmental challenges. For instance, the majority of them are engaged in small-scale, subsistence agriculture and other enterprises, at which scale it is difficult to break the poverty cycle. Only about 17% of Nigerians hold jobs that are rewarding enough to lift them out of poverty (World Bank, 2022). Therefore, the government and other policymakers in Nigeria are faced with the onerous challenge of creating wealth and eradicating poverty in the country.

Among others, one of the channels through which economic growth and development can be achieved is a virile capital market. Experience from around the world has shown that the capital market is an effective medium for mobilizing capital for enterprises and creating wealth for individuals. A well-developed capital market is required to catalyze the mobilization of capital and enhance wealth creation. Specifically, through the issuance of equities and bonds, the capital market helps to mobilize savings for long-term investments required for economic growth and development, in addition to its role of promoting efficient allocation of resources to the most critical areas of need in the economy. Through this mechanism, broader ownership of productive assets is encouraged thereby supporting sustainable wealth creation (Ngerebo, 2006). This is where mutual funds as an investment vehicle can be a major catalyst for the development of the Nigeran capital market and the economy at large.

Mutual funds have attracted attention globally. The total net assets of regulated mutual funds grew exponentially to almost $49.3 trillion in 2017 from $21.7 trillion in 2008, a growth of 127% (Investment Company Institute, 2018). Perhaps, this is attributable to several benefits that have been attributed to mutual funds in the literature including low-cost diversification, professional management, transparency, and liquidity. In Nigeria, the growth of mutual funds has been even more impressive, with the total net asset value (NAV) of mutual funds rising to the N1 trillion mark in 2019, and over 100 funds in operation, from a situation in December 1991 where only one fund existed with a total net asset value of N17.5 million (Nigeria Investment Promotion Commission, 2019). The growth momentum in the industry is not slowing down as the NAV of mutual funds in Nigeria had grown to N1.37 trillion Naira with 118 individual funds across 8 major categories of funds by February 25, 2022.

However, different facets of the performance of mutual funds have been the subject of intense intellectual debate over the years. Since early researchers, notably Treynor (1965), Sharpe (1966), and Jensen (1968), pioneered research work on this subject, others have continued to investigate whether mutual funds can generate superior returns to outperform the market as a whole on a risk-adjusted basis. More recent studies have focussed on performance persistence [Miguel and Chen (2021); Choi and Zhao

(2021); Ozkan and Ozturk (2021); Reuter and Zitzewitz (2021); Dorfleitner et al (2021); Lin (2022); Cuthbertson et al (2022**);** Vidal-García, and Vidal (2022)].

Several studies report that portfolio managers do not have a superior ability to consistently beat the capital market (Elton et al, 2014; Mohamed et al, 2014; Tan, 2015). Other studies conclude that high administrative and management fees erode any excess returns that funds could have reported (Elton et al, 2014). Yet others report that the superior ability of fund managers produces excess returns from a fund which is difficult to predict, as the historical performance of a fund does not predict future performance (Elton et al, 2014). There is therefore no agreement among researchers on whether mutual funds successfully generate superior risk-adjusted returns over the market, and whether they exhibit performance persistence (Elton et al, 2014). As a result, it is doubtful that fund managers possess superior ability and skill to beat the market.

The problem is that the literature provides inconclusive results on whether or not mutual funds deliver excess risk-adjusted returns, the extent to which fund managers' selectivity and market timing ability impact risk-adjusted returns, and whether mutual' funds exhibit performance persistence. In addition, enough studies have not been done in Nigeria to gain insight into the ability of fund managers to successfully time the market and whether the performance of mutual funds repeats to aid investment decision-making by retail investors, and the provision of financial advice by investment professionals to their clients. This understanding will be of immense importance to investors, fund managers, and investment advisers. For instance, in Nigeria, huge and growing amounts of funds are invested in managed funds by a wide range of investors under the management of professional managers, yet a coupe of studies in Nigeria and other parts of Africa largely agree that fund managers do not display selective skills and lack market timing ability. In Nigeria, Oduwole (2015) and Ilo et al (2018) find evidence fund managers do not demonstrate stock selection skills. However other researchers [(Mahmuda & Abdullahi (2017) and Igbinosa (2020)] reported that mutual fund produced excess risk-adjusted returns.

The result of this work will help professional managers take better decisions on behalf of their clients. Moreover, investors who engage professional portfolio managers

and who continually seek to maximize their returns will have a better understanding of the different facets of the performance of mutual funds. Further, retail investors will gain insight into the sources of the reported performance of their funds. They will be able to determine whether or not the performance of mutual funds is attributable to successful market timing ability or superior skills of fund managers to select undervalued stock. In addition, a good understanding of the performance of mutual funds is required to guide policymakers to craft policies that will drive investment into the capital market through this strategic investment vehicle, to catalyze the growth of the Nigerian capital market and the economy at large.

1.4 Purpose of the Study, Research Aims, and Objectives

Mutual funds have grown in leaps and bound in recent years globally, and one of the reasons investors buy mutual funds is the expectation of superior investment benefits that portfolio managers would achieve. However, there is intense intellectual debate in the literature about whether or not professional managers have superior ability and skill to beat the market. This seeming contradiction has motivated the researcher to explore the subject and contribute to existing work in the field. The study, therefore, seeks to provide answers to the important question of whether or not actively managed equity mutual funds provide positive risk-adjusted returns; whether or not equity mutual fund managers possess selectivity and/or market timing skills; and whether or not actively managed equity funds display persistence.

The quantitative research method was used for the study. All available historical data on monthly net asset values (NAVs) of all actively managed equity mutual funds in Nigeria from January 2012 to September 2021 were collected from the Securities and Exchange Commission. In addition, relevant market statistics of listed companies on the Nigerian Exchange Limited (NGX) were obtained to execute the models adopted for the study. The data were subjected to analysis to obtain inferences and answer the research question.

The study aims to assess whether or not mutual funds in Nigeria generate excess risk-adjusted returns and exhibit performance persistence. The following specific objectives are therefore pursued:

i. To assess whether actively managed equity mutual funds in Nigeria generate excess risk-adjusted returns.

The first objective of the study above stems from the puzzle around the phenomenal growth of actively managed mutual funds in Nigeria despite the fact that evidence in the literature shows that active fund managers generally underperform index funds and do not deliver excess risk-adjusted returns. Gruber (1996) attempted to unravel this puzzle earlier, and his evidence corroborated available evidence in the literature. This study seeks to address this puzzle within the Nigerian market given that research work is sparse on the subject.

ii. To explore whether actively managed equity mutual fund managers in Nigeria have selective ability to earn excess-risk-adjusted returns.

The second objective seeks to explore the presence of selective ability as a source of alpha by mutual fund managers in Nigeria. This is another important debate in the mutual fund literature. This objective will help to shed more light on the ability of fund managers to deliver excess returns through expertise in selecting stocks that will outperform the market. Addressing this objective will help fund managers and investor alike to ascertain the source of alpha in a mutual fund portfolio, if any. This objective also relates to the concept of persistence of performance which is the subject of the fourth objective of this study. If mutual fund managers have superior selective ability, then we should expect some fund managers to demosntarte persistence of performance leveraging their superior selective ability. Again this subject has not been addressed adequately using empirical evidence in Nigeria

iii. To assess whether actively managed equity mutual fund managers in Nigeria have market timing ability to generate excess risk-adjusted returns.

The third objective seeks to investigate the presence of market timing skilss among fund managers in Nigeria. Market timing skill is another source of alpha that has been identifies in the literature. Similar to the argument of the second objective, this will provide evidence on the source of mutual fund portfolio alpha, if any. In addition, if some fund managers possess market timing ability, we expect to find evidence of persistence of performance

Again earlier studies in Nigeria did not explore the timing ability of mutual fund managers in Nigeria.

iv. To analyze whether actively managed equity mutual funds exhibit persistence of performance in Nigeria.

The fourth objective of this study seeks to explore a debate in the literature that the performance of the best funds does not repeat. At the same time, it addresses the controversy regarding whether the performance of mutual funds is attributable to skill or luck. The argument here is that 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 this outperformance will persist into the future (Cremers, Fulkerson, & Riley, 2019). However, if the performance is based on mere luck, then it will not persist. This information is useful to investors and investment advisers alike. For instance, if evidence points to the fact that all outperformance is a result of luck and not skill, then there is no justification to invest in even the best-performing funds since past performance cannot predict future performance. This study is the first to attempt a comprehensive evaluation of the performance persistence of mutual funds in Nigeria, and will therefore enrich the literature on the performance of mutual funds with empirical evidence from Nigeria.

1.5 Nature and Significance of the Study

This study seeks to contribute to a couple of important debates on mutual funds using empirical evidence from Nigeria. First, whether or not actively managed equity mutual funds generate superior risk-adjusted returns; second, whether or not equity mutual fund managers possess -selectivity and/or market timing skills; and third, whether or not actively managed equity mutual funds display persistence of performance,

The importance of mutual funds as a wealth-building vehicle and in enhancing national economic prosperity is well-reported in the literature. According to Ilo et al (2018), the development of the mutual fund market has the potential to bring enormous benefits to the public and enhance the development of the Nigerian economy. This will be achieved through deepening the capital market, promoting savings and investment at the

grassroots, encouraging small and medium enterprises to raise long-term capital, and granting retail investors access to professional management.

Unfortunately, mutual funds have not been studied extensively in Nigeria, and research works are sparse on the subject, even though huge amounts of investments are being managed in trust on behalf of clients by fund managers primarily through mutual funds and pension funds. It is important for investors who engage these managers to evaluate how well their funds are performing relative to the market and other funds. Not only that, it is useful to understand what drives performance. Do funds outperform the market due to the market timing skills or superior stock-picking skills of the managers? The proposed study will enrich the literature on mutual funds in Nigeria, and provide answers to several questions that have not been explored.

In addition, earlier studies on mutual funds in Nigeria including Oduwole (2015), Sambo (2016), Ilo et al (2018), and Mahmuda & Abdullahi (2017) had used single-factor risk-adjusted mutual funds appraisal methods. The current study contributes to earlier research efforts by evaluating the performance of a mutual fund using more robust multi-factor, risk-adjusted performance appraisal methods.

The result of the study will be reference material for investors, investment advisers, and fund managers who need relevant and up-to-date information to plan their investment actions and take investment decisions. The study will also contribute to the existing knowledge base on the subjects of finance, securities, and investment in the Nigerian capital market. Finally, findings from the study will contribute to bridging the knowledge gap in several relevant fields including capital markets, securities, investment, and finance.

The study was viewed from the positivist perspective which holds that the way to obtain reliable knowledge is through the scientific method involving measurement, observation, and logical analysis to arrive at findings and conclusions which are testable and replicable (O'Farrell & Wallace, 2012). The positivist philosophy holds that the same scientific approach applicable to the sciences and engineering can also be applied to research in the social sciences.

The quantitative research approach is consistent with the positivist philosophy. The researcher, therefore, obtained historical data on monthly net asset values (NAVs) and other relevant statistics of mutual funds in Nigeria from the Securities and Exchange Commission for the study. The study period is about ten years, from January 2012 to September 2021. Appropriate statistical tests and analyses were applied to process the data, and inferences were drawn as appropriate to address the research questions.

The use of the quantitative research approach for this study has several advantages. First, data were collected from a relatively larger sample size; therefore, the sample is representative of the population, making the result 'generalizable'. In addition, with proper design and execution of the methodology, the result of the study is statistically reliable and replicable (Shank and Brown, 2007). Moreover, since the quantitative approach aims to eliminate bias as much as possible, the researcher is detached from the sample being observed thereby generating results that have an objective meaning (O'Farrell & Wallace, 2012).

In addition, the time and efforts required to execute the analysis of data are significantly reduced, since the approach lends itself to the use of computers and statistical packages such as Excel and SPSS. Finally, with the generally high degree of reliability of quantitative research coupled with the use of statistical analysis to assess the degree of reliability, there is greater confidence in the validity and robustness of the study (O'Farrell & Wallace, 2012).

Across jurisdictions, most of the studies in the literature adopted the quantitative approach to evaluate the performance of mutual funds (Sharpe, 1966; Jensen, 1968; Lehman and Modest, 1987; Ippolito, 1989; Brown, Goetzmann, Ibbotson, and Ross, 1992; Brown & Goetzmann, 1995; Malkiel (1995); Daniel, Grinblatt, Titman, and Wermers, 1997; Wermers, 2000; Bollen and Busse, 2001; Kaplan and Sensoy, 2005; Jiang et al, 2007; Fama and French, 2010; Barras, Scaillet, and Wermers, 2010; Elton, Gruber, & Blake, 2012; Mibiola, 2013; Tan, 2015; Mohamed, Ganesh & Muroki, 2014; Oduwole, 2015; Ilo et al, 2018; Miguel and Chen, 2021; Choi and Zhao, 2021; Ozkan and Ozturk, 2021; Reuter and Zitzewitz, 2021; Lin, 2022; Vidal-García, and Vidal, 2022).

The performance of mutual funds was evaluated by determining whether they generate excess risk-adjusted returns. Treynor ratio, Sharpe ratio, Jensen's Alpha, and Fama-French 3-factor models were adopted, using relevant market statistics of listed companies on the Nigerian Stock Exchange, to provide a robust analysis (Fama, 2006).

Multiple regression analysis was applied to evaluate the stock selection and market timing ability of mutual funds managers. Specifically, the well-known regression models developed by Treynor and Mazuy (1966) (equation 1.1) and Henriksson and Merton (1981) (equation 1.2) respectively were used.

$$\text{□}pt - \text{□}ft = \text{□}p + \text{□}p\ (\text{□}mt - \text{□}ft) + \text{□}pt\ (\text{□}mt - \text{□}ft)^2 + \varepsilon pt \quad \text{(equation 1.1)}$$

$$\text{□}pt - \text{□}ft = \text{□}p + \text{□}p\ (\text{□}mt - \text{□}ft) + \text{□}pt\text{C}\ (\text{□}mt - \text{□}ft) + \varepsilon pt \quad \text{(equation 1.2)}$$

Another objective of the study was to evaluate the performance persistence of mutual funds in Nigeria. The study investigates whether or not actively managed equity mutual funds exhibit consistency in performance over time. Following the works of seasoned researchers in the field, including Blake and Timmermann (1998); Lunde, Timmerman, and Blake (1998); Allen and Tan (1999), and Rhodes (2000), the study adopted the well-tested, non-parametric methodology of the Contingency Table.

1.6 Research Questions and Research Hypotheses

The main research question is, 'To what extent do actively managed equity mutual funds in Nigeria generate excess risk-adjusted returns and exhibit performance persistence?''

To give clarity and focus to the study, the research question is broken down into the following sub-questions.

i. To what extent do actively managed equity mutual funds generate excess risk-adjusted returns in Nigeria?
ii. To what extent does the selective ability of actively managed equity mutual funds affect their risk-adjusted returns in Nigeria?
iii. To what extent does the market timing ability of actively managed equity mutual funds affect their risk-adjusted returns in Nigeria?

iv. To what extent do actively managed equity mutual funds exhibit persistence of performance in Nigeria?

Hypothesis 1

Null hypothesis (Ho): There is no significant difference between Nigeria's equity mutual funds' portfolio alpha (α_p) and zero.

Alternative hypothesis (HA): There is a significant difference between Nigeria's equity mutual funds' portfolio alpha (α_p) and zero.

Hypothesis 1 above addresses an important debate in the mutual funds' performance literature regarding whether or not actively managed equity mutual funds deliver excess risk-adjusted returns (alpha). It is this question that motivated Gruber's (1996) work to seek to unravel the puzzle around actively managed funds. He noted that actively managed mutual funds have continued to grow exponentially despite substantial evidence in the literature that, on average, they underperformed index funds. Yet actively managed mutual funds are professionally managed by well-trained experts who are expected to possess superior skills and privileged to access relevant information that ordinary investors do not have access to. One would therefore expect an active portfolio to be able to outperform the market as a whole leveraging on this advantage. However, the Efficient Market Hypothesis (EMH) holds that financial markets are informationally efficient such that information is rapidly incorporated into securities prices, making it impossible to generate alpha consistently. If the EMH holds, actively managed mutual funds cannot generate alpha consistently and hence, cannot beat the market. Hypothesis 1 focuses on these issues and will help to resolve the choice between active and passive fund management. If truly some professional managers have superior ability and skills to beat the market consistently, then there is a strong case for active management. Otherwise, investors would do well to simply invest in index funds. Evidence from the literature supports the hypothesis that mutual funds do not generate excess risk-adjusted returns [Oduwole (2015); Ilo et al (2018); Gilbertson & Vermaak (1982); Manjezi (2008); Mibiola (2013); Tan (2015); Mohamed, Ganesh, and Muroki (2014); Ippolito (1989); and Malkiel (1995)].

Hypothesis 2

Null hypothesis (Ho): There is no significant relationship between Nigeria's equity mutual fund managers' selective ability and risk-adjusted returns.
Alternative hypothesis (HA): There is a significant relationship between Nigeria's equity mutual fund managers' selective ability and risk-adjusted returns.

Hypothesis 2 seeks to determine whether or not actively managed equity mutual fund managers possess a selective ability to generate alpha. This is a logical extension of Hypothesis 1. According to Fama (1972), the ability of a fund manager can be segmented into selectivity and market timing ability. Selectivity describes the skill of a fund manager to correctly identify and buy undervalued securities to generate alpha. On the other hand, market timing is the ability to correctly forecast the future movement of the market and adjust the portfolio of assets appropriately in other to benefit from the dynamics. Hypothesis 2, seeks to determine whether selectivity is the source of alpha generated (if any) by the mutual funds. This information will be useful to both investors and fund managers alike in taking future decisions. A significant body of literature concludes that mutual funds managers do not have the selective ability [(Murhadi, 2010); (Musah et al, 2014); (Ünal and Tan, 2015); (Neto et al, 2017); (Lekovic et al, 2020); (Żebrowska-Suchodolska and Karpio, 2022); while other researcher found evidence of selective ability before fees but not after fees (Wermers, 2000; Fama and French, 2010; Barras, Scaillet, and Wermers, 2010).

Hypothesis 3

Null hypothesis (Ho): There is no significant relationship between Nigeria's equity mutual fund managers' market-timing ability and risk-adjusted returns.
Alternative hypothesis (HA): There is a significant relationship between Nigeria's equity mutual fund managers' market-timing ability and risk-adjusted returns.

Hypothesis 3 seeks to determine whether or not actively managed equity mutual fund managers possess market timing ability to generate alpha. Again, this is an extension of Hypothesis 1. Market timing is the ability to forecast the future direction of the market and adjust the portfolio accordingly to make a profit. If active portfolios can exhibit market timing skills, then they should be able to generate excess risk-adjusted

returns and add value to their investors. Evidence in the literature points to the fact that equity mutual funds do not demonstrate market timing ability (Gilbertson and Vermaak, 1982; Ferson & Qian, 2006; Manjezi, 2008; Elton, Gruber, and Blake, 2011b; Mibiola, 2013; and Tan, 2015; Mohamed et al, 2014, Musah et al, 2014).

Hypothesis 4

Null hypothesis (Ho): There is no significant relationship between Nigeria's equity mutual funds' past performance and future performance.

Alternative hypothesis (HA): There is a significant relationship between Nigeria's equity mutual funds' past performance and future performance.

Hypothesis 4 addresses the issue of persistence of performance which is one of the most controversial in the mutual funds' literature. It seeks to resolve the issue of whether or not the performance of actively managed equity mutual funds repeats. This also connects to the controversy regarding skill vs luck. It could be argued that if some fund managers in the past 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 this outperformance will persist into the future. However, if the performance is attributable to mere luck, then the outperformance should not repeat. Therefore, if all observed outperformance of mutual funds is attributable not to skill but luck, then the superior performance of top-performing funds will likely not repeat and there is no justification to use current performance as a yardstick for selecting mutual funds to invest in. Hypothesis 4 seeks to clarify this issue and guide investors in taking future investment decisions. Researchers from different jurisdictions have reported that mutual funds do not exhibit persistence of performance (Brown et al, 1992; Brown & Goetzmann, 1995; Malkiel, 1995; Carhart, 1997; Daniel et al, 1997; Wermers,1997; Musah et al, 2014; Bertolis and Hayes, 2015; Lekovic et al, 2020; and Azimova, 2021)

CHAPTER 2: LITERATURE REVIEW

The intellectual debate regarding mutual funds' performance has been intense and persistent since the 1960s, with the question of whether or not mutual funds can achieve excess risk-adjusted returns being on the front burner. Put differently, the contention is whether professional portfolio managers possess superior ability and skills to beat the market. This debate has naturally dovetailed to the choice between active or passive fund management. If truly some professional managers have superior ability and skills to beat the market consistently, then there is a strong case for active management. Otherwise, investors would do well to simply invest in index funds, as a body of literature has canvased over the years.

Despite this, it remains a puzzle that actively managed mutual funds have continued to grow in leaps and bounds when studies show that on average their performance has been inferior to that of index funds (Gruber, 1996). Hence, the question arises if the excess returns generated by professional managers are sufficient to justify and offset the cost incurred to actively manage their portfolios and whether there are managers with such superior capability that can consistently display outperformance. The argument is inconclusive; hence this study seeks to extend existing work in the field and contribute to the debate.

In this chapter, we explore a theoretical framework that serves as a foundation for the study. This includes the efficient market hypothesis, behavioral finance theory, risk-return concept, portfolio diversification, and asset pricing, models. In undertaking this literature review exercise, I make use of several academic databases including Google Scholar, EThOS (British Library), Heriot-Watt University Library, and Unicaf University Library. Some of the key search terms used include ‘‘mutual funds' performance'', ‘‘performance persistence'', ‘‘mutual funds risk-adjusted returns'', ‘‘mutual fund managers' skill vs luck''.

The literature on the performance of mutual funds is vast. It includes scores of scholarly peer-reviewed journal articles, academic books, policy working papers, and conference papers. Furthermore, several reputable business magazines, such as Forbes

magazine, the Economist, and the New Yorker, have contributed quality articles to the field over the years. I draw on this vast resource in undertaking the study.

2.1 Theoretical Framework and Field/Industry Description

This section presents a theoretical and conceptual framework that undergirds the study, and which is drawn upon throughout the work. This includes the efficient market hypothesis (EMH), behavioral finance theory, asset pricing models, the concept of active and passive portfolio management, portfolio optimization, and diversification, and portfolio performance evaluation. We apply the relevant finance theories and concepts because of the multifaceted nature of the study. The specific application of each theory or concept to the study is highlighted at the end of the sub-section where it is presented.

2.1.1 The Efficient Market Hypothesis

Following the development of the Efficient Market Hypothesis (EMH) in the 1960s by Eugene Fama, the theory has, over the years, significantly influenced our thoughts about how financial markets work. Essentially, the EMH states that all available information is fully reflected in the prices of securities in an efficient market (Fama, 1970). This suggests that market participants cannot take advantage of superior information to beat the market. Malkiel (2003) conveys the message about the implication of an efficient market in another way. He says the EMH implies that the performance of a portfolio constructed by the random selection of securities by a novice would match one constructed by a stock market expert. He captures it graphically by saying that a 'blindfolded chimpanzee throwing darts at the Wall Street Journal' would deliver similar portfolio performance as a professional.

Although not the same concept, the EMH is consistent with what is generally known as the 'random walk hypothesis', credited to Maurice Kendall in a 1953 paper on the behavior of stock and commodity prices (Brealey, Myers & Allen, 2014). He described a 'random walk' from the perspective that changes in the prices of securities are independent of one another. The random walk theory shares a similarity with the EMH in that it is based on the premise that new information is instantly reflected in securities

prices thereby eliminating the opportunity to profit from them. This implies that information-based trading should not yield any profit (Lo & MacKinlay, 1999).

The logic of random walk, according to Malkiel (2003) is that, if information flows freely in the stock market and available information is rapidly incorporated into securities prices, then price movement at any point in time will be influenced by new information only. In addition, since new information itself flows into the market unpredictably and randomly, then price movements must necessarily be unpredictable and random. The effect of this is that an uninformed investor who invests in a well-diversified portfolio of assets should achieve a level of returns similar to that of an 'expert'.

Fama (1970) characterized three levels of market efficiency as follows: strong-form, semi-strong form, and weak form; each with its implications and varying levels of data to back them up. In the strong form of EMH, it is assumed that all available information, both public and private (including insiders' information), are fully incorporated into the prices of securities. This rather strong assertion implies that even 'insiders' cannot exploit access to material, non-public information to trade and make a profit. Further, in a strong-form efficient market, since all relevant information has been incorporated into prices, the current market price is equal to the fair value of the security. However, empirical evidence does not support strong form efficiency in securities markets (Hillier, Ross, Waterfield Jaffe & Jordan, 2016). Indeed, it is unrealistic to say that an insider who has access to material, non-public information has no advantage over other market participants.

At the semi-strong efficiency level, it is assumed that prices of securities reflect information on historical prices and all publicly available information. The implication of this is that markets are informational efficient to the extent that prices will immediately adjust to public information as soon as they are released. A range of information such as past securities prices, earnings and dividend announcements, merger and takeover plans disclosure, and other macroeconomic expectations are public information in this context.

It can be inferred at the semi-strong level that the since current market price incorporates all available public information, then it is the best available estimate of the fair price of a security. The implication is that effort to study and make investment take decisions based on publicly available information is an effort in futility as it cannot consistently yield excess returns. Therefore, it is impossible to generate superior returns using fundamental analysis and investment research, which is the foundation of the growth and development of a major segment of the financial services industry. To assess whether or not a market is semi-strong efficient, researchers typically observe how quickly security prices incorporate new information such as dividend announcements, earnings announcements, news of mergers and takeovers, and other key macroeconomic information.

Studies have shown that markets are largely semi-strong efficient. According to Brealey et al (2014) in an investigation of semi-strong efficiency, researchers studied the abnormal returns generated by the stocks a sample of 17,000 firms that were targets of takeover attempts. They found that on average, prices of target stocks were significantly impacted on the day of public announcement but displayed normal movement. This shows that the impact of a takeovers attempt seems to be reflected in stock prices on the announcement day, thereby establishing semi-strong efficiency.

Finally, the weak form of EMH asserts that current securities price fully incorporates information contained in historical prices. In other words, analyzing past prices will not assist an analyst in identifying and exploiting mispriced securities in the market. When the market is weak-form efficient, prices follow a random walk, and all information in past prices is reflected in today's stock price. This is quite logical, as, in practice, it should truly be difficult for anyone to consistently exploit the market for profit based on information that is available to all market participants. One of the most common approaches to testing weak form efficiency is by measuring the profitability of a couple of trading strategies designed by investors to generate excess returns based on the belief that there are patterns in security prices. Another method is to test the degree of correlation of securities prices using statistical analysis. Empirical evidence has shown that markets, globally, are largely weak-form efficient (Brealey et al, 2014).

For several years after its development, the EMH was supported and validated by several follow-up studies. However, researchers soon started to observe happenings in financial markets that seemed to call to question the veracity of the EMH. Barberis and Thaler (2003), posited that subsequently, it became obvious that several observations in financial markets were not consistent with the EMH, including the behavior of the stock market in aggregate, the typical average returns, and the trading behavior of individuals.

In their quest to understand some of the anomalies, several researchers, including psychologists, Drs. Daniel Kahneman and Amos Tversky, and economist, Richard Thaler carried out several landmark studies that have helped us to understand better how psychology affects investment behavior. This led to the discovery that, emotion and psychology significantly influence human decisions, resulting in actions and behavior that are unpredictable or even irrational. There is enough evidence, for instance, that investors' decision-making process is influenced by herd instinct, churning, a tendency to under-react or over-react to news (Shleifer, 2000; Barber and Odean, 2000), and asymmetrical judgments about the causes of previous profits and losses. From this movement developed behavioral finance which investigates cognitive biases and other psychological and social factors that influence the economic decisions of individuals.

In addition, several unexpected trends have been detected in the pattern of historical share prices, including the 'small firm' effect, the January effect, and mean reversion. Banz (1981) documented that, shares of companies with small market capitalizations tended to deliver higher returns than shares of companies with large capitalizations. Several studies in different parts of the world have supported Banz's work. Further studies of the 'small firm' effect, provided empirical evidence that a significant amount of the excess returns generated by small-cap stocks was achieved in successive Januarys. This phenomenon is known as the ''January effect''. The contention is that if the EMH truly holds, this pattern should not persist.

Another market anomaly referred to as ''mean reversion'' was first reported by De Bondt and Thaler (1985). They observed that markets, sectors, or individual shares after experiencing a period of sustained under-or out-performance tend to revert to a long-term

average by recording in a corresponding period series of out- or under-performance. Again, this pattern violates the assumptions of EMH.

It is important therefore to interrogate the implications of an efficient capital market from the perspectives of market participants such as individual investors, investment analysts, portfolio managers, investment advisers as well as institutional investors. First, overall results from studies provide substantial evidence that capital markets are largely efficient, which means that publicly available, historical information is reflected in securities prices. However, at the same time there is enough evidence that suggests that on many occasions, security markets do not adjust rapidly to the available information. Not only that, even when market prices adjust to available information, there is ample evidence that shows that they do overreact or underreact to the available information.

Therefore, it is clear that using technical analysis as an approach to stock selection cannot add value as the fundamental assumption of technical analysis is directly opposite to the concept of EMH. Technical analysis holds that prices in the stock market move in identifiable and persistent trends. Technical analysts believe that new information in the market is not immediately available to all market participants at the same time, and that movement of stock prices to new levels is a gradual process. Proponents of this stock selection approach, therefore believe that knowledgeable and nimble traders can develop systems and strategies to identify market trends and position themselves appropriately to exploit such trends.

Proponents of EMH on the other hand believe that prices adjust rapidly, thereby making it difficult to exploit mispricing. They also hold that, although markets can over-adjust or under-adjust to information; since there is uncertainty regarding the direction of market adjustment, it is difficult to derive abnormal gains from adjustment errors. From the perspective of EMH therefore, if the market is weak-form efficient prices fully reflect all available historical information, and technical trading rules cannot add any value.

Similarly, the assumptions of EMH lead to the conclusion that fundamental analysis is an exercise in futility. The basic premise upon which fundamental analysis is based is that securities, various industries and sectors, and the aggregate market have

an intrinsic value that is determined by fundamental factors and the underlying economic realities. Fundamental analysts believe that intrinsic value can be estimated by analyzing key variables like cash flow, earnings, revenue, interest rate, and risk variables. Based on the estimate of intrinsic value, proponents take a buy, sell or hold decision on securities by comparing their intrinsic values to their market prices. Proponents of fundamental analysis, therefore, believe that an investor with superior skills and capabilities in estimating the intrinsic value of a security is well-positioned to exploit opportunities in the market since market value and intrinsic values are often out of sync in the capital market. On the other hand, EMH holds that all publicly available information is rapidly incorporated into securities prices. Since the information required for fundamental analysis is historical in nature, fundamental analysis will not provide an opportunity to gain an excess return from the stock market.

Malkiel (2003), explored the EMH and various criticism of the model and posited that it should be expected that collective judgment will sometimes be wrong in the stock market, hence pricing irregularities and predictable patterns will sometimes be observed. However, he submits that this should be the exception rather than the rule. Alluding to the obvious anomaly that manifested in the 1999 to early 2000 internet bubble as well as the stock market crash in the U.S. market in October 1987, the researcher concludes that markets are not expected to be perfectly efficient, hence the incentive still exists for stock market professionals to search for information which is rapidly incorporated into securities prices (Grossman and Stiglitz, 1980). Malkiel (2003), posits that despite the observed irregularities, most researchers and practitioners agree that overall, it is not possible to consistently extract higher returns from the stock market without assuming a corresponding level of risk, and to that extent, the stock market is efficient.

However, even in an efficient market, there are important roles for portfolio management in the financial market. First, portfolio managers help investors to realize their investment objectives. Investors have different investment objectives such as income generation, the safety of principal, or capital growth which are influenced by various factors including risk tolerance, personal tax situation, a need for control, ethical preferences, experience in investing, etc. Once the investment objectives and risk-return

preferences are decided, there is always an investment manager or mutual fund out there that will assist in achieving those objectives (Reilly & Brown, 2015). For instance, mutual funds provide a wide range of investment options to align with the preference of potential investors and clients. At one end, there are hedge funds that can take on much higher levels of risk, while at the other end, there are money market funds that undertake much lower levels of risk.

Another role that a fund manager plays in an efficient market is to help investors diversify their risk with the attendant benefit of overall portfolio risk reduction. Even if all assets are correctly priced in an efficient market, there is still the need to construct a portfolio of assets that will diversify away peculiar risks leaving only systematic risk which is not diversifiable. Evidence from studies around the world establishes that, for the most part, mutual funds are efficient at achieving diversification and risk reduction for their investors (Bodie et al, 2014).

In addition, rational portfolio management in an efficient market will take into cognizance the tax situation that confronts the investor. Investors in higher tax brackets will likely find tax-exempt securities like government bonds more attractive because of the related tax savings. Another strategy to minimize taxation on investment is to focus on long-term capital gains since, in most jurisdictions, income tax tends to be higher than capital gains tax (Bodie et al, 2014).

Another important role a portfolio manager plays in an efficient market is the day-to-day operations, management, and administration of the fund. This includes proper documentation, liaising with service providers such as legal counsel and accounting firms, monitoring and ensuring compliance with the regulatory requirements including anti-money laundering (AML) provision, adhering to the relevant know-your-customer (KYC) rules processing payment of fund expenses, providing dividend reinvestment services, and coordination of board meetings.

A portfolio manager also assists his clients in making appropriate portfolio choices taking cognizance of their peculiar risk profiles. For example, an employee of a company that enjoys generous stock options from his employer will likely end up having a lot of the

company's stock in his portfolio thereby holding a concentrated, undiversified portfolio with high unsystematic risk. The portfolio manager would help to diversify such a portfolio by adding other assets (Reilly & Brown, 2015).

One of the roles some portfolio managers seek to play on behalf of their clients is to generate excess returns above the benchmark through active management. Although proponents of the EMH think that chasing after alpha is an effort in futility, some analysts and portfolio managers believe that the stock market often provides opportunities to exploit the mispricing of assets. For instance, researchers in behavioral finance have found out that the stock market sometimes overreacts to news and at other times underreacts to news, and that these events present opportunities for discerning investors to exploit mispricing opportunities and generate alpha (Reilly & Brown, 2015).

In conclusion, even in an efficient market, there are crucial roles that rational portfolio management plays in adding value to investors. Several factors determine the optimal portfolio for each investor including risk aversion, financial status, age, tax exposure, employment status, and peculiar needs. Portfolio management assists in tailoring the portfolios of investors to their objectives and needs.

The efficient market hypothesis provides a framework for understanding how the financial markets work, and why it is difficult to consistently generate alpha from the securities market. To this end, it provides an important theoretical framework for ging an insight into the performance of mutual funds.

2.1.2 Behavioral Finance Theory

Behavioral finance is an alternative to the traditional finance theory which considers the impact of psychological factors on the investment behavior of individuals and groups in their role as investors, analysts, or portfolio managers (Reilly & Brown, 2015). This relatively new field of finance recognizes the fact that standard finance theory which assumes that people always act rationally and seek to maximize at all times, is plausible only within certain boundaries. However, this field holds that the assumption of traditional finance theory is flawed and incomplete since it does not factor individual behavior into its analysis. According to Olsen (1998), behavioral finance has a goal of

understanding how individuals could improve their decision-making based on their understanding of psychological and economic principles that influence their behavior.

Most people make suboptimal economic or financial decisions (Elton et al, 2014). To improve individual decision-making, therefore, an understanding of why this happens will be valuable since a repeated mistake could be corrected through education, training, and communication. In addition, since certain behavior tendencies have been observed to be prevalent in the market, it is important to evaluate whether these behaviors affect securities prices, and if so, to what extent.

A useful description of the key facets of behavioral finance is provided by the Editor in the preface for Wood (2010). The first is psychology, which directs its attention to the behavior of individuals. Next is social psychology which studies the impact of the presence of others and social norms and values on the thought, feelings, and actions of individuals. The third part is neuro-finance, and the way our brains function which helps to explain why we make the choices we make. Behavioral biases that affect investing behavior encompass both cognitive and emotional biases. On the one hand, cognitive biases stem from faulty information processing, or memory errors, while emotional biases, on the other hand, have their roots in impulses or intuition, resulting in us taking action based on our feelings instead of facts.

Researchers have done extensive work to help identify various biases that affect the investment behavior of investors when they have to make decisions under uncertainty. Although traditional finance theories seem to agree that investors are risk averse and are always rational when confronted with decision-making where risk is involved, more recent studies have reported that attitude to risk is a function of the way the risk is communicated, conceived, and interpreted by the investor.

For instance, the Prospect theory developed by psychologists Daniel and Tversky (1979) holds that individuals' investment decisions are determined by their perception of losses or gains. It explains that, when faced with a choice of equal probabilities, most people would choose to protect the wealth they already have, rather than take a risky chance to increase their current wealth. In other words, people tend to be averse to the

possibility of incurring a loss, hence they would rather take a position themselves to avoid a loss than take a risk to make an equivalent gain. In their study of the impact of behavioral finance on the stock market, the researchers study the behavior of propriety traders on the Chicago Board of Trade and find that traders demonstrate loss aversion and frequently take on above-average risk in the afternoon to recover from losses in the morning trades. They report that this behavior influences prices in afternoon trades at which time losing traders tend to buy contracts ‘high’ and sell ‘low’.

Prospect theory explains loss aversion, a tendency of individuals to take decisive steps to avoid losses compared to making gains. This is documented by Scott, Stumpp, and Xu (1999) who observe the tendency of investors to sell their winners too soon and hold on to their losers for too long. Investors feel the pain of losses much more than they savor the joy of making gains. Also, Hwang and Satchell (2010) studied the incidence of loss aversion as it affects participants in the financial markets from the perspective of a typical asset allocation decision. They show that investors in the stock market exhibit more loss aversion than assumed in the literature. They also report that loss aversion is a function of the prevailing market condition as investors are found to be more risk averse when the market is bullish compared to when it is bearish. The explanation for this is that a loss is particularly more painful when others market participants are recording gains. In addition, they find that investors tend to be more sensitive to a change in loss relative to a change in gain because the pain of a loss is greater than the pleasure of an equal amount of gain.

Investment analysis and decision-making of investors are also impacted by two related biases. The first is belief perseverance, also called conservatism bias, which is the inability of people to change their own beliefs in the presence of new information or facts that point to the fact that they are wrong. In other words, this is a tendency for individuals to hold on to their beliefs even when they logically should not. Related to this is another bias called anchoring, wherein people over-rely on prior information they had or something they are familiar with in forming an opinion that guides their decision-making. In the stock market, for instance, a stock may seem cheap or expensive to an analyst when compared to the anchor, and this may prevent the analyst from forming an objective, unbiased opinion about the intrinsic value of the stock.

Another common bias is overconfidence, which has been described as an unwarranted faith in one's intuitive reasoning, judgments, and cognitive abilities (Baker, Filbeck, & Ricciardi, 2017). This can manifest in the form of prediction overconfidence or certainty overconfidence. When professionals assign very narrow confidence intervals around their investment forecasts, they are exhibiting prediction overconfidence. On the other hand, certainty overconfidence occurs when professionals have too much confidence in the accuracy of their projections and are overly optimistic about the probability of their predictions. Overconfidence bias can lead to concentrated portfolios as it is tempting for a professional to believe that they have superior stock-picking ability, hence they can jettison the diversification principle and select fewer assets in constructing a portfolio of assets. Solt and Statman (1989) and Shefrin and Statman (1996) document valuation overestimation of growth companies by analysts due to overconfidence in forecasting both the rate and duration of growth of the firm and placing too much emphasis on good news around the companies while underplaying the bad news.

Many investors and analysts also exhibit representativeness bias which causes them to make a judgment based on how representative something is to the image they hold in their minds. For instance, under uncertainty, people are prone to believe that a history of good performance of a given firm is "representative" of the general level of performance that the firm will continue to deliver into the future (Boussaidi, 2013). Related to overconfidence is self-attribution bias wherein people discountenance the place of luck or external factors in their success and attribute it to their ability and talent while blaming luck for their failures. This bias causes people to overestimate their capabilities and talents (Gervais and Odean, 2001). Studies also show that overconfidence is driven by hindsight bias - a tendency for people to convince themselves that they accurately predicted an event before it occurred. This tends to make them believe that they can predict other future events more accurately than others. This makes them overconfident about their abilities.

Several studies have reported that traders who trade frequently in the stock market usually underperform the market as a whole. Barber and Odean (2001) studied the performance of investors utilizing the services of traditional brokers compared to online

traders who tend to trade and speculate more frequently. They reported that investors who traded less frequently achieved better results. In another study, they analyzed 78,000 U.S.-based household investors who operated brokerage accounts at the same firm. They discovered that, based on monthly turnover, active traders reported the lowest returns among the households, and that investors' overconfidence was an important motivation for active trading.

There is also persuasive bias, in which an investor displays an attachment to a particular type of company's stock with a good reputation such as Microsoft or Apple This can manifest in the form of the bandwagon effect, whereby people tend to adopt a certain action, behavior, style, or attitude simply because everyone else is doing it. As more people adopt a specific trend, even more people are driven to do the same thereby joining the bandwagon.

Confirmation bias is a tendency for an individual to look out for, select or interpret information to support or justify their preexisting beliefs, ideas, or judgment. This bias can motivate people to jettison and screen out ideas that are inconsistent with their points of view no matter how plausible they are. Confirmation bias can drive individuals to hold on tenaciously to their preexisting beliefs or opinions even when they are confronted with superior information that weakens their arguments.

There is also present bias which makes an individual more interested in the current gains or benefits rather than having a long-term perspective. Delaying gratification can be difficult and present bias causes some individuals to avoid investing, rather they engage in current spending and consumption. For example, it is more fun to take a vacation today than put several thousand dollars into a retirement account. This bias tends to make individuals spend too much while investing too little leading to significant sums of funds being lost to gratification. The long-term consequences of present bias are dire and understanding the power of compounding can help overcome this behavior.

Herding is another bias that has been identified in the stock market. It is the tendency for an average investor to copy the behaviour of others and mimic the crowd. Studies have shown that this is a very powerful behavioral bias. As people copy the trades and investment actions of others, the behavior is further reinforced, thereby creating a

market bubble driven by huge demand and conversely a market crash when the market discovers that assets are overpriced and a sell-off commences (Smith 1991, Smith, 2011). Herding is not only a feature among ordinary investors, it has been observed as well among investment analysts, portfolio managers, investment managers, and other professionals. The impact of herding is more pronounced on the stock market during extreme market conditions activities such as a bull or bear market.

Lakonishok, Shleifer & Vishny (1991) conducted one of the early studies on herding behavior. They used a data set of 769 equity-based pension funds between 1985 and 1989 to assess the potential impact of their trades on the stock market. They focussed on two types of trading habits of money managers. The first is herding whereby money managers mimic the buy (or sell) actions of others by trading on the same stocks at the same time. The second, called positive feedback, is the action of buying stocks that have outperformed in the past (winners) and selling stocks that have underperformed in the past (losers). However, the researchers found evidence that pension fund managers do not generally engage in herding or positive feedback behavior for the trading of individual stocks, except for small stocks. They also did not find a cross-sectional correlation between changes in pension funds' holdings of a stock and its abnormal return.

In their study, Christie and Huang (1995) reported herding behavior in the stock market, using the statistical method of cross-sectional standard deviation (CSSD) of individual asset returns. They reported that during periods of market extremes, herding tends to be pervasive. They noted that the returns of investors tend to move in line with the aggregate market when they engage in herding by following the aggregate market direction rather than using their judgment in trading, and this reduces the CSSD.

The tendency for people to mentally segment money or funds into different buckets or mental accounts based on different criteria such as the source of the funds, their intended use of the funds, and so on is referred to as mental accounting bias. This affects people’s investment behavior, as they tend to assign different functions to each portfolio of assets, which can result in sub-optimization and have detrimental effects on their investment behavior and actions. From Thaler’s (1999) perspective, mental accounting

is the way an individual mentally organizes, evaluates, and coordinates financial activities and decisions. Underlying mental accounting is the concept of fungibility of money; the fact that all money is interchangeable, and that money has the quality of equivalence and does not have labels. However, with mental accounting bias, people treat money and other assets as less fungible than they are. According to Thaler and Johnson (1990), even seasoned investors fall victim to mental accounting when they increase their risk-seeking behavior by investing in high-risk investments because of treating recent gains as disposable 'house money'. They, therefore, miss out on the portfolio's big picture. Barberis and Huang (2001), found in their study of mental accounting that this bias affects asset prices. They considered two scenarios regarding the disposition of investors to volatility and risk. In the first scenario, investors are risk-averse to the volatility of the overall portfolio, whereas, in the second scenario, they are risk-averse to the volatility of the individual stocks they own. They found evidence that investors tend to be more successful when they think in terms of the volatility of their individual securities in that, individual stocks returns have a high mean and excess volatility, with a large value premium. Overall, the issue in mental accounting is that rather than take a holistic view of their portfolio of investments people tend to separate their funds or investment into mental accounts and appraise the performance of the segments in parts; which might lead to suboptimization. Researchers have concluded that mental accounting can lead to a distortion in asset prices, although one benefit is that it could help people to break down and analyze complex information into more manageable segments.

Status quo bias has been defined as the tendency of individuals to stick to their decision irrespective of new information or changes in their environment which should make them reconsider their decision (Samuelson and Zeckhauser, 1988). In a study using a simplified stock market, Brown & Kagel (2009) investigate various behavioral tendencies that cause investors to take sub-optimal decisions, especially by ignoring new information and holding on to a security even when it is performing poorly. They establish the existence of quo bias and conclude that this disposition causes investors to lose a substantial part of their potential gains. According to Li, Ren, Ma & Liu (2009), status quo bias is affected by several variables, including prospect theory, framing effect, investor emotion, and information structure. In their study, the researchers evaluate the impact of

these variables on status quo bias. They report that emotions have an impact on the degree of status quo bias that individuals exhibit. They discovered that status quo bias is largely suppressed under positive emotions whereas its prevalence is more noticeable with negative emotions. They also find that in situations where people are faced with the challenge of choosing among alternatives, they tend to prefer alternatives that are certain rather than vague ones. Their study corroborates evidence that behavioral biases have an appreciable influence on the stock market and its participants.

Behavioral finance researchers have also shown that as a result of emotions in the stock market, the market regularly experiences overreaction and underreaction. It was De Bondt and Thaler (1985, 1987) that first documented evidence of market overreaction. They reported that by adopting a contrarian strategy which entails buying today's loser and selling today's winner superior investment returns can be generated. In their study, they analyzed the returns of stock on the New York Stock Exchange over three years. They then selected 36 best-performing stocks into a 'winner'' portfolio while the 35 worst-performing stocks were put in a 'loser' portfolio. They monitored the performance of each of the portfolios over the next three years comparing their returns to those of the benchmark portfolio. Their result shows that the losers' portfolio consistently outperforms the index, while the 'winner' portfolio consistently underperforms. Overall, they reported that the cumulative difference between the winner and loser portfolios was 25% over the three years. In summary, the original losers become winners while the original winners become losers. The explanation provided for this phenomenon was that concerning both the loser and winner portfolios, the market had overreacted. In the case of stocks in the loser portfolio, investors overreacted to bad news and drove the share price down disproportionately.

Subsequently, the market corrected itself and the stock prices rebounded driving the price back to its intrinsic value. The converse is true with the stocks in the winner portfolio whose prices were initially driven up disproportionately due to market exuberance but came crashing when the market corrected itself. This study highlights an important feature of the stock market; the fact that the market's reaction to big news and events tends to be exaggerated, inevitably resulting in abnormal price movements.

It is believed that behavioral biases are innate processes meant to aid our decision-making processes as humans, and they seem to be very helpful in everyday, routine, decision-making. On the other hand, they tend to be unhelpful when we have to take investment decisions with long-term consequences. Studies have shown that we may not succeed in finding a cure for the biases, however, if we are aware of their presence and the potential consequences of taking decisions under their influence, we can moderate their effects on our lives.

Although financial professionals cannot avoid all cognitive and emotional issues, they are well-positioned to guide clients during the financial planning process, on how to moderate the effects of behavioral biases in their investment decision-making. This would entail an understanding of the common biases that affect investors, how to ensure that investment decisions are not driven by the biases, and the creation of structured strategies and processes to guide decision-making. All of these will result in the client achieving better results with their investments as well as increase the likelihood of achieving their stated financial goals.

Further, a clear understanding of the basis for making an investment decision becomes very useful to an investor as a point of reference when the market gets volatile. It is useful to have formalized and documented investment objectives and requirements in an investment policy statement. This prevents snap judgments, rather, it motivates making a rational evaluation of an investment when the market moves and emotions try to take hold. Generally, investors may be able to use feedback to mitigate behavioral biases. For instance, a careful review of the outcomes of past decisions should help individuals learn to control biases that are detrimental to their investment decisions. Similarly, proper framing of investment decisions, action plans, and portfolio discussion in terms of long-term goals and the client's total wealth picture could be very helpful in addressing behavioral biases.

Investment professionals such as financial analysts and portfolio managers should leverage the benefit of greater awareness of various behavioral biases that affect investors in investment analysis and recommendations. Their professional training, experience in the field, and educational background may predispose them to

overconfidence bias. Therefore, they need to be careful to always maintain objectivity and reach independent conclusions and avoid being influenced by the actions of the crowd. According to Baker et al (2017), as the level of sophistication of investors increases, the influence of behavioral biases declines or even disappears. This is why institutional investors suffer from the influence of biases much less than individual investors; hence they help enhance the level of efficiency of the market.

One common bias in investment decision-making is for an individual to actively look out for information to confirm their belief while neglecting information that is against the planned course of action. To address this challenge, an investor should do a rational analysis of what could go wrong with their decisions or the risks inherent in the planned course of action. In addition, someone could be assigned the role of playing the devil's advocate by highlighting what could go wrong with an investment decision.

Another approach that can be used to moderate the effect of behavioral biases on our decision-making process is the use of checklists. In recent years there has been a growing interest in employing checklists to guide decision-making, especially when under pressure. A checklist distills and simplifies the knowledge of experts into a series of simplified and brief statements to guide decisions and actions. This is therefore a useful tool to help in financial planning and avoid behavioral pitfalls. The list can be designed to check for the presence of common behavioral biases.

Experience has shown that ignoring the potential impact of behavioral biases can have a devastating effect on the stock market as it can accentuate abnormal and unexpected behaviour. This is why an understanding of behavioral biases and their effects on the stock market is essential. A good grasp of the issues in this relatively new field will not only help finance practitioners recognize their own mistakes but also help them to identify the mistakes of their clients and help them to overcome their biases. This knowledge will also help practitioners understand the psychology of their clients and to develop behaviorally modified portfolios, designed to suit the way 'normal' people think and which best suits their predisposition. A good understanding of behavioral biases will help finance practitioners make better financial projections, conduct more realistic

securities analysis and make better recommendations of stocks to their clients. In addition, it will aid individual investors in making more pragmatic investment decisions.

Behavioral finance theory provides an alternative model to traditional finance theory for explaining the behavior of the financial markets by incorporating various psychological factors that influence human behavior It, therefore, presents a potentially useful framework for explaining the behaviour of securities prices which is useful in our quest to better understand the performance of mutual funds.

2.1.3 Mutual Funds Risk-Return Analysis

In finance, the two key elements of investment are risk and reward. Expected returns may vary depending on the return concept and assumptions applied, while risk is most commonly measured by the variability of returns. Statistically, risk is measured as the volatility of the distribution around the mean and the covariance of the assets within a portfolio. The process of quantifying risk and the need for optimization of securities is the landmark contribution of Markowitz (1952, 1959) which led to the development of Modern Portfolio Theory which emphasizes the trade-off between risk and returns. The idea is that for an investor to enjoy a higher return, he has to take on higher risk. This trade-off arises from the fact that the investor prefers a high return at low risk.

A portfolio is a combination of assets or securities. Each individual invests his wealth in a combination of assets taking due cognizance of his wealth, income, and preferences. The traditional portfolio theory suggests that an individual is a mean-variance maximizer. That is, he selects his assets in such a way as to minimize risk while seeking to maximize his returns. The variability of returns determines the level of risk. The higher the variability, the greater the portfolio's risk.

Therefore, to assess the risk of a mutual fund portfolio, it is necessary to analyze the pool of securities that make up the portfolio and their correlation. According to portfolio theory, by diversifying investments, the overall level of risk of a portfolio is reduced since it can be shown that as a result of the moderating effect of correlation, the risk of a portfolio of assets is lower that the mean of the risk of the individual assets that make up

the portfolio. However, there is a limit to this risk reduction effect, such that even in a 'fully diversified' portfolio risk is not completely eliminated. This is because there are two classes of risk. The first type is referred to as systematic risk which affects the market as a whole. Systematic risk cannot be moderated or removed by portfolio diversification. The other type of risk is the unsystematic risk or idiosyncratic risk which can be eliminated by effective portfolio diversification since it is the risk associated with individual entities and their securities. The aggregate of systematic risk and unsystematic risk is referred to as total risk.

Mathematically, it becomes more and more complex to quantify the risk of a portfolio with an increasing number of assets. This is because of the need to incorporate the co-variances between individual assets in the portfolio into the computation. To simplify this problem, Nobel Prize-winning economist, William Sharpe (1963) developed the classic Capital Asset Pricing Model (CAPM) which is a relatively simple measure of risk that accounts for an asset's correlation with other assets in a larger portfolio.

2.1.4 Asset Pricing Models

The CAPM assumes that investors hold fully diversified portfolios and that investors expect to be compensated for systematic risk alone, rather than total risk. According to this model, the expected return on a risky asset at a time (t) equals the risk-free rate at the time (t) plus the asset's risk premium.

$$E(Rt) = Rft + \beta E(Rmt - Rft) \quad \text{……(equation 2.1)}$$

The market risk premium expresses the expected excess return on the market portfolio, while β is a measure of the systematic risk of the risky asset. According to the CAPM, assets with higher betas are relatively riskier and can be expected to, on average, attract a higher rate of return. On the other hand, the asset will also likely experience more volatile returns so that, over any given investment horizon, they are more likely to lose more money.

Although the CAPM is theoretically appealing and simple to implement, the model has been criticized for various empirical inconsistencies that have been reported by several researchers, and for some unsatisfactory features which make it difficult to implement in practice. Based on empirical tests, Basu (1977) and Basu (1983) demonstrated the CAMP does not hold consistently. They compared the returns of stocks with low P/E ratios with those with high P/E ratios and noted that low P/E stocks earned much higher returns than high P/E stocks. This observation applies both to small capitalization and large capitalization stocks. Further, the findings of Basu (1977) were confirmed by Jaffe, Keim, and Westerfield (1989). They showed that this effect appeared not only in January but also in the remaining eleven months. The occurrence is inconsistent with the CAPM which postulates that only the beta should matter in determining returns.

Another inconsistency of the CAPM was reported by Banz (1981) who noted that low-capitalization stocks on average outperformed large-capitalization stocks consistently. Yet another observation that casts doubt on the veracity of the CAPM is the tendency for returns to reverse over long horizons. In their study, DeBondt and Thaler (1985) found that stocks that have had poor historical returns over three to five years ('losers') tended to outperform the 'winners' of the earlier period over the following three to five years. Chopra, Lakonishok, and Ritter (1992) found a statistically significant overreaction effect in stocks as portfolios of extreme losers in the prior 5 years outperformed portfolios of prior winners by as much as 5 -10% per annum during the following 5years. They showed that this effect cannot be explained by beta. In addition, Chan, Hamao, and Lakonishok (1991) found that BtM (book-to-market equity) and cash flow yield have a direct and significant relationship with the expected returns of securities.

This finding validates the earlier evidence of Rosenberg, Reid, and Lanstein (1985), who reported statistically significant abnormal returns with the book/price strategy. Further, another contradiction was reported by Bhandari (1988), who observed that the expected returns of common stocks were directly impacted by their debt-to-equity ratio after controlling for size and beta. This implies that beta provides an incomplete explanation of the risk-return profile of assets. Finally, the momentum effect is another

contradiction to the CAPM. Jegadeesh and Titman (1993) reported that by forming portfolios based on returns of the past 3 to 12 months, they found evidence that past winners on average continued to outperform past losers over the next 3 to 12 months.

Therefore, several researchers have attempted to provide alternative models. One of these alternatives is Stephen Ross's (1976a, 1976b) Arbitrage Pricing Theory (APT), which is based on the assumption that the return of each stock is dependent upon macroeconomic influences or factors and partly on "noise". While the APT does not specifically identify the factors, the following are commonly cited examples: oil price, interest rate, inflation, and the return on the market portfolio. According to the APT, the risk premium appropriate for a given security will be dependent upon the expected risk premium associated with the identified factor and the sensitivity of the stock under consideration to the factor ((b1, b2, b3, etc.). It should be noted that the degree of sensitivity of each stock to a given factor varies.

Further contributions to the development of robust asset pricing models led some researchers to suggest an alternative approach to the application of macroeconomic factors to capture systematic risk by adopting relevant firm characteristics (factors) which effectively model exposure to systematic risks. Fama and French's (1993) 3-factor model was developed to capture the variation of average return based on firm factors. As the name implies, this model is based on three factors, with the first being the usual market risk premium (Rm - Rf). The second factor is the size premium. This is effectively modeled as the difference between the returns of small-capitalization stocks and big-capitalization stocks (SMBs). The third factor is the book-to-market premium which is the difference between the returns on value stocks and growth stocks (HMLs).

SMB and HML are constructed using the following specifications: SMB = 1/3 (Small Value + Small Neutral + Small Growth) minus 1/3 (Big Value + Big Neutral + Big Growth); while HML = 1/2 (Small Value + Big Value) minus 1/2 (Small Growth + Big Growth). According to Fama and French (1996), SML and HML are included in the model as they appear to be predictive of average stock returns and hence risk premiums.

$$R_t = R_{Ft} + \beta_1 (R_{Mt} - R_{Ft}) + \beta_2 (SMB) + \beta_3 (HML) + e \quad \ldots\ldots\ldots \text{(equation 2.2)}$$

Carhart (1997) extended Fama and French's (1993) model by developing a four-factor model, which incorporates the momentum effect (Jegadeesh and Titman, 1993). Momentum measures the difference between the returns of past winners and past losers and thus the persistence of performance (UMD). The cross-sectional momentum factor has been found to enhance the fit of the multifactor model considerably (Elton, et al, 2014).

$$R_t = R_{Ft} + \beta_1 (R_{Mt} - R_{Ft}) + \beta_2 (SMB) + \beta_3 (HML) + \beta_4 (WML) + e \text{…….(equation 2.3)}$$

In furtherance of efforts to develop models to improve on existing ones, several researchers have attempted to develop new variants of the original Carhart or Fama–French model. To address the problem of mispricing in the peer group index, for instance, Hunter, Kandel, Kandel, and Wermers (2014) incorporated an active peer benchmark into the original Carhart model and demonstrated that they were able to achieve a performance improvement. Some researchers incorporated a new variable to improve the explanatory power of the existing models. An example is Jordan and Riley (2015) who incorporated a volatility factor model the differential in returns between funds comprising low-volatility securities versus funds with high-volatility securities.

Cremers, Petajisto, and Zitzewitz (2010) adopted another approach to achieve an improvement in the existing models. They maintained the general structure of the Fama–French and Carhart models, but made adjustments in the formation of the variables as necessary to better explain returns.

Overall, the factor models help to determine whether a security or a portfolio of assets delivers the so-called Jensen Alpha, which is a measure of abnormal returns. Abnormal return is defined as returns generated over and above a particular benchmark. It is obtained when we compare the actual returns generated by a portfolio of assets with the predicted (theoretical) return according to one of the returns-generating models. It is a measure of how well a fund manager performs. In its simplest form, it is the intercept obtained when a portfolio's excess return is regressed on the excess returns of an appropriate benchmark.

In conclusion, several models have been developed to define the risk-return relationship in the pricing of securities, and they are collectively referred to as asset prining model. These models and their variants are the backbone of the methodologies for pricing mutual funds, among other. Hence asset pricing models are a key theoretical and conceptual framework in this study.

2.1.5 Active vs passive portfolio management

Over the years, broadly two approaches have evolved for managing a portfolio of assets. The first approach is active management whereby the portfolio manager attempts to outperform the broad market index either by strategically selecting undervalued securities or segments of the stock market; or by correctly anticipating the direction of movement of the stock market and repositioning the portfolio accordingly. The second approach is passive management in which the portfolio manager seeks to track a market index, and does not attempt to beat the market. His objective is to track the index as closely as possible thereby minimizing tracking error. (Reilly and Brown, 2015). These approaches are driven by the portfolio manager's beliefs regarding the efficiency of the stock market. While the passive manager believes that securities prices rapidly incorporate all available information thereby making it impossible to generate alpha, an active manager holds a contrary view and believes there are opportunities to generate alpha in the stock market, since the market is not always efficient.

An active portfolio manager believes that he can beat the market. Broadly there are three strategies adopted by active managers. Market timers are active managers who adjust the beta of a portfolio based on a forecast of the direction of the market. Then we have securities selectors who search for undervalued securities. This category of active managers believes that they can exploit the sub-optimal market weights of securities. They, therefore, adjust their portfolios by overweighting undervalued securities and underweighting overvalued securities to generate alpha. Then we have a sector or industry selector whose strategy is similar to securities selection, but whose interest is in sector or industries. They tilt their portfolios based on their view of sectors that are undervalued or overvalued (Elton et al, 2014). On the other hand, passive management can be achieved through one of three approaches. The first is to maintain the market

weight of each security in the passive index; this is also called market capitalization matching. Another approach is the use of programming algorithms to mathematically construct a portfolio that best tracks the index with a limited number of securities. The third approach is to select a smaller number of stocks that matches the index in the proportion invested in a particular set of features, for instance, sector, industry, capitalization, quality etc.

While the case for active vs passive management has been on for quite some time and will likely continue for a long time, it should be noted that the big challenge for the success of active management is the cost involved in generating alpha. First, active managers incur costs to pay their well-trained staff who need to do quality research to identify mispricing in the market. This results in higher management fees charged to their investors. Moreover, active funds take on higher diversifiable risks than index funds for which investors must be compensated. Further, active funds incur higher transaction costs because of the higher frequency of trading and turnover. Finally, higher capital gains tax as a result of higher frequency of trading is an additional cost to active management compared to passive management (Elton et al, 2014).

Passive management on the other hand is less time-consuming and less costly. Consequently, passive funds are less costly to the investor in terms of management fees. It also enjoys the benefit of greater transparency in that the performance of the fund is unambiguous and can be evaluated against the performance of the market index which is easily verifiable. A passive manager generally has cost minimization as his objective while tracking the broad market. However, passive management has its drawbacks too; the most important being that based on its construction it is not designed to generate alpha.

Overall, while many fund managers believe they can outperform the market, a large body of work has concluded that the existence and persistence of positive alphas are largely elusive. In practice, however, active and passive management are not mutually exclusive. Many fund managers use a combination of active and passive management to enjoy some benefits of each of the approaches. On the one hand, they

want to benefit from the lower cost and greater transparency of passive management and on the other hand, the potential for generating alpha from an active approach.

2.1.6 Portfolio Optimization and Diversification

The theoretical underpinning of the models for the selection and management of a portfolio of assets is the optimization theory developed over the years by several researchers. However, the foundational theory of the optimization procedure which has been the backbone of most of the quantitative approaches to asset allocation is the optimization model developed by Markowitz (1959), which is commonly referred to as the mean-variance optimization (MVO) technique. This has been at the center of portfolio and fund management practice for a couple of decades. The basic idea of Markowitz's approach is to construct a portfolio of assets that will yield maximum returns for a given level of volatility; or which will, for a given level of volatility yield the maximum expected return. If we vary the level of volatility or expected returns, it is possible to generate a set of portfolios, known as the efficient set. Plotting the expected returns and volatilities of all the portfolios in the efficient set yields a parabola, known as the efficient frontier, which determines the combination of assets that generates the tangency portfolio or the maximum expected Sharpe ratio.

The main inputs required to compute the tangency portfolio that ensures the investor derives maximum utility are the asset returns and variance. The tangency portfolio is derived by combining a risk-free asset with one of the portfolios on the Markowitz efficient frontier. This yields the highest slope equivalent to the Sharpe Ratio, in the expected return and standard deviation space. The appropriate weights of the optimal tangency portfolio can be determined through a minimization technique.

However, as noted by Black & Litterman (1991), the tangency portfolio is unfortunately fraught with problems, one of which is that it is highly sensitive to the inputs of the model, making it susceptible to errors. Best & Grauer (1991) reported that the weight, mean, and variance of the mean-variance portfolio can be extremely sensitive to changes in the means of the securities that make up the portfolio. Added to this

weakness is the fact that asset means are noisy, and are therefore difficult to estimate (Markowitz, 1952). The combined effect of all these drawbacks is the challenge that the optimal portfolio tends to be impractical as it is composed of a concentration of a small number of assets. (Black & Litterman, 1991).

To address the problem of the Markowitz optimization model, the Black-Litterman approach to portfolio management was developed and the model is useful to construct portfolios with more realistic, intuitive weighting (Benninga, 2014). The Black-Litterman model starts with an assumption that a given portfolio is optimal. Typically, the market value-weighted passive portfolio is used as the starting point. The Black-Litterman approach comes in handy to help incorporate the opinions of an investor into the model once we can determine the optimal weights and the implied expected returns of assets. Benninga (2014) noted that portfolios constructed based on this approach tend to be better diversified and are more stable than those constructed from the mean-variance approach.

According to Benninga (2014), the following steps can be adopted in building an optimal active portfolio. Firstly, an estimate of the views of the market regarding the optimal weights of the benchmark portfolio assets, and their implied expected returns are obtained. From these weights, the expected returns consistent with the optimal portfolio weights, the estimated covariance matrix, and the risk-free rate can be computed. Next, the opinion of the fund manager can be incorporated. However, it is important to take into cognizance the fact that the expected returns of other assets in a portfolio will be affected once the views regarding the returns of some assets are taken into account because the returns of all the assets are correlated through the covariance matrix.

The strength of the Black & Litterman (1991) model is that it syndicates the views of the investor about the expected returns of one or more assets with the market equilibrium vector of expected returns to construct a new estimate of expected returns. This new vector of returns provides a more intuitive portfolio with reasonable and pragmatic portfolio weight. The model, therefore, produces better and more stable output that the classical mean-variance optimization model.

As an alternative to complex portfolio optimization models, the use of an equally weighted "1/N" portfolio has been widely acknowledged in practice and academic literature as one of the methods for addressing the weaknesses inherent in the construction of an optimal portfolio (Maillard, Roncalli & Teiletche, 2008). Studies have highlighted that equally-weighted portfolios are commonly used in practice (Benartzi & Thaler, 2001), that they have exhibited out-of-sample efficiency (DeMiguel, Garlappi & Uppal, 2009), and that they are a simple and rational strategy to adopt in portfolio decision-making processes, where, as is usually the case, there is ambiguity in the distribution of asset returns (Pflug, Pichler & Wozabal, 2012).

For instance, in their study, Malladi and Fabozzi (2017), through simulation and empirical data, show that from 1926 to 2014, an equal-weighted portfolio outperforms value-weighted strategies. They observe that portfolio rebalancing accounts for a significant part of the excess returns generated and that because of equal weighting, the excess returns outweigh the higher cost of transactions and portfolio turnover. They conclude that, even after taking cognizance of higher portfolio turnover costs, equal weightings make economic sense. However, the equally weighted portfolio has its challenge. Maillard et.al. (2008) reported the potential problem of limited diversification benefits if the risks of individual securities are significantly different.

Modern portfolio theory provides a framework for portfolio diversification and risk reduction which is the primary function of a portfolio manager. Hence it is an important framework for the evaluation of the performance of mutual funds.

2.1.7 Portfolio Performance Evaluation

Evaluating the performance of mutual funds using average raw returns alone can be misleading. It is necessary to adjust returns for the risks undertaken to give an objective relative performance between funds. Over the years, one of the simplest ways to appraise the performance of a fund is to compare its returns with those of its peers that exhibit similar risk characteristics. For example, growth stock equity funds are appraised under the same universe of funds. However, this approach has its shortcomings, as within

each universe there could be subdivisions with different risk characteristics; an example is a fund that focuses on high-beta, aggressive stocks versus another that invests in more conservative growth stocks (Bodie et al, 2014).

Several techniques have been developed to appraise the performance of a portfolio based on the mean-variance principle. These risk-adjusted evaluation techniques have gained much wider acceptance among researchers and practitioners as they are adjudged to give a more objective assessment of the performance of a portfolio. Treynor (1965) pioneered the development of this area when he introduced the 'Reward-to-Volatility ratio', more commonly referred to as the Treynor ratio, based on the concept of the security market line (SML). It is defined as follows:

$$\frac{R_p - R_f}{\beta_p} \quad \text{.....(equation 2.4)}$$

Where:

$$= \quad \beta_p \quad p$$

TR*p* - the Reward-to-Volatility ratio of portfolio p.

R_{pt} - Expected return of portfolio p.

R_{Ft} - Risk-free rate of return.

β_p - Portfolio's systematic risk.

The Treynor ratio is an important performance evaluation model when we wish to evaluate a portfolio against the benchmark portfolio and other actively managed portfolios. The Treynor measure is best suited to appraise a well-diversified portfolio. Quantitatively, it is the slope of the line that connects the risky asset to the risk-free asset. If the Treynor ratio of a portfolio is lower than the excess return of the market then the portfolio under consideration underperforms the market. On the other hand, if the Treynor ratio of a portfolio is higher that the excess returns of the market the portfolio outperforms the market benchmark and lies above the Securities Market Line.

Following the work of Treynor (1965), another version of the Reward-to-Variability ratio was proposed by Sharpe (1966) to appraise the performance of mutual funds. It is computed as follows:

$$\text{??}p = \frac{R_p - R_f}{\sigma_p} \quad \text{.....(equation 2.5)}$$

Where:

SRp - Reward-to-Variability ratio of portfolio p

R_p - Expected return of portfolio p.

R_F - Risk-free rate of return

δ_p - Portfolio's total risk.

The Sharpe ratio is a measure that assesses the performance of a portfolio, taking cognizance of the risk undertaken. It measures a portfolio's excess returns per unit of the portfolio's total risk as measured by the standard deviation. The Sharpe ratio has a benchmark in the slope of the Capital Market Line (CML) which is defined as the market risk premium divided by standard deviation. It, therefore, means that if the Sharpe ratio is greater than the CML, then the portfolio has exhibited superior performance relative to the benchmark and vice-versa.

Generally, the higher the Sharpe ratio, the better, since a higher figure implies that the portfolio delivers a higher excess return per unit of risk. This measure is most suitable for evaluating a portfolio that is not well diversified. The model has an important property in that it can be used as the objective function in mean-variance optimization, where the portfolio with the highest Sharpe ratio is the optimal portfolio of risky assets. According to Sharpe (1994), the ratio can be interpreted as a t-statistic to test the hypothesis that the portfolio returns and the risk-free rate are equal. Hence it can be inferred that the higher the Sharpe ratio, the higher the probability that the portfolio returns will exceed the risk-free rate.

Another commonly used portfolio appraisal model is a variant of the well-known Capital Asset Pricing Model (CAPM), by Jensen (1968). It is a single-factor regression model defined by the following regression specifications:

$$R_{pt} - R_{Ft} = \alpha_p + \beta_p (R_{Mt} - R_{Ft}) + e_{pt} \quad \text{.....} \ldots \text{(equation 2.6)}$$

Where:

α_p - Portfolio's excess risk-adjusted return

R_{pt} - Porfolio's returns at time t

R_{Ft} - Risk-free rate at time t

R_{Mt} - Return on the market portfolio at time t

β_p - Portfolio's systematic risk.

e_{pt} - Excess return of portfolio p at time t unexplained by the other terms in the equation

Using the Jensen model, the performance of a mutual fund is evaluated by regressing the excess returns of the portfolio on the excess return of the market. If the assumption holds that the market beta or slope co-efficient is constant, then the unconditional Alpha obtained from the analysis is a measure of average mutual fund performance. A positive Alpha implies that the portfolio's actual return is greater than the expected return as predicted by the portfolio's beta. On the other hand, a negative Alpha is an indication of underperformance; that is, the return of the portfolio is lower than expected given the beta value of the portfolio's returns. One of the weaknesses of the Jensen model is that it attributes the overall performance of the portfolio to the manager's selectivity ability as it assumes that the systematic risk is stationary over time. This is an incorrect assumption.

Information Ratio also known as Appraisal ratio, measures a portfolio's average excess return over the return of a benchmark portfolio, scaled by the standard deviation of this excess return. Specifically, the Information Ratio is excess return divided by tracking error; where the excess return is the return of a portfolio over or below a given benchmark index. Tracking error is defined as the standard deviation of the excess return. The Information Ratio is applied to evaluate whether an observed alpha is due to the skill of the portfolio manager or is a result of luck. It is derived by dividing alpha by the standard error of the regression. From this description, the Information Ratio can be viewed as a form of a benefit-to-cost ratio, hence is a very useful metric for evaluating the skill of an active manager (Goodwin, 1998). By this definition, the higher the Information Ratio, the higher the excess return of the portfolio given the amount of risk involved, and the better the performance of the fund manager.

Modigliani and Modigliani's (M^2) Risk-Adjusted measure is based on the concept that the risk level of a portfolio can be adjusted either upwards or downwards to match the risk of the market. Once the risk of the portfolio is adjusted to match the risk of the market portfolio, the appropriate return is calculated. The resulting return that the adjusted portfolio earns is referred to as M^2. Hence the intuition behind the model is that a direct comparison can be made between the return of a fund and the market once the risks as measured by the standard deviations have been equalized. If the portfolio under consideration records a higher M^2, then we can conclude that it has outperformed the

market portfolio and vice versa. Therefore, for a fund with any specified risk and return profile, the M^2 gives the equivalent of the return the fund would have achieved if the portfolio had the same level of risk as the market index. This model, therefore, allows us to directly compare the performance of the fund to that of the market. The higher the M^2 the more attractive a fund is. Thus, M^2 is of practical application in measuring the performance of a managed portfolio against a chosen market portfolio, and it is easier to understand and interpret.

Omega is another performance measure suggested by Shadwick and Keating (2002) which takes account of the entire return distribution of a portfolio. This helps to overcome the weakness of many traditional performance measures when applied to investments whose returns are not normally distributed. In addition, Omega defines a target return against which actual returns are classified as either a loss or a gain thereby providing additional useful information even for normally distributed returns. Put simply, omega classifies the losses and gains of a portfolio for a predetermined threshold and then computes the probability-weighted returns above and below the threshold. According to the authors, the measure is particularly useful in analyzing financial assets because it considers all the moments of an asset's return distribution rather than just the impact of any single one of them. The higher the omega value, the better the performance of a portfolio as this implies that the probability that a given return will be met or exceeded is higher.

The Sortino Ratio is an indicator that measures the risk of falling below a target return set by the investor. It is defined similarly to the Sharpe Ratio except that the minimum acceptable return is introduced into the equation to replace the risk-free rate. The minimum acceptable return is a target return below which the investor does not wish to drop. In addition, the standard deviation of the returns as defined in the Sharpe Ratio is replaced with the standard deviation of the returns that are below the minimum acceptable return. Hence, the Sortino Ratio is a variant of the Sharpe ratio, where the excess return over the target minimum return is divided by the downside deviation. The Sortino Ratio, therefore, addresses a problem with the Sharpe Ratio which does not give insight into whether the deviations from the mean arise largely above or below the mean.

The focus of this study is the evaluation of the performance of mutual funds, which is predicated on an objective performance assessment using relevant models and tools. Therefore, a theoretical framework for portfolio performance evaluation and assessment is required for the study.

2.2 Mutual Fund Performance Literature

2.2.1 Stock Selectivity

According to Fama (1972); and Treynor and Black (1973), the forecasting ability of mutual fund managers can be decomposed into selective and market timing ability. The first component, selective ability describes the mutual fund manager's ability to select and buy undervalued securities and on the other hand identify and sell overpriced securities. Market timing ability refers to the ability of the fund manager to correctly forecast the future movement of the stock market and adjust his portfolio in response to exploit this knowledge. Creating a clear distinction between these two sources of alpha, formalized by Fama (1972), and the role of several identified anomalies relating to size (Banz, 1981), value (Rosenberg, Reid and Lanstein, 1985), and others in the pricing of risk (Fama and French, 1996) have important implications for the evaluation of the performance of fund managers. First, it highlights the importance of segregating between timing and selective ability in analyzing the sources of alpha generation. In addition, it clarifies the fact that multiple factors must be taken cognizance of, to explain how average returns change across stocks and portfolios in a way that makes economic sense.

2.2.2 Performance Evaluation Models

Jensen (1968) built on the Capital Asset Pricing Model (CAPM) to develop a measure for measuring the performance of mutual funds by regressing the excess returns of a portfolio on the market factor. If the assumption holds that the market beta or slope co-efficient is constant, then the unconditional Alpha obtained from the analysis is a measure of average mutual fund performance. With the assumption that the systematic risk is stationary over time, the Jensen measure attributes the overall performance of the fund to the manager's selective skill. The model is depicted below:

$$R_{pt} - R_{Ft} = \alpha_p + \beta_p (R_{Mt} - R_{Ft}) + e_{pt} \quad \text{……(equation 2.7)}$$

Where:
α_p - Portfolio's excess risk-adjusted return
R_{pt} - Porfolio's returns at time t
R_{Ft} - Risk-free rate at time t
R_{Mt} - Return on the market portfolio at time t
β_p - Portfolio's systematic risk.
e_{pt} - Excess return of portfolio p at time t unexplained by the other terms in the equation

If Alpha (α) in the above equation is positive and significant, then we conclude that the portfolio has achieved an extra return, on average, over the benchmark.

Fama (1972) developed a selectivity model that decomposes a fund's performance into three components: (1) Excess returns, which is the level of return an investor should earn given the level of risk undertaken (2) Compensation for systematic risk, that represents an additional return for the risk chosen by the manager, and (3) Return from selectivity representing the returns from the manager's ability to select good securities.

Return from selectivity is further decomposed into compensation for diversification and net selectivity. Diversification measures the additional return that compensates the portfolio manager for bearing diversifiable risk. After accounting for diversification, the residual performance on selectivity is attributed to net selectivity. This implies that the greater the diversification of the fund, the lower would be the compensation for net selectivity and vice versa. For a well-diversified portfolio, the compensation for selectivity will be close to zero but will nevertheless take a non-negative value.

The components are expressed in the following equations: ……(equation 2.8)

- Risk-free return
- Compensation for systematic risk: [β (Rm – Rf)]
- Compensation for diversification: [Rm – Rf] [σp/σm –β], and
- Net selectivity: [Rp – Rf]) – [σp/σm] [(Rm – Rf]

Daniel, Grinblatt, Titman, and Wermers (1997) developed a new approach to assessing the performance of mutual funds to address concerns regarding benchmarks. They contended that for an objective evaluation, the performance of a portfolio manager

should be assessed based on the performance of the set of stocks in his portfolio relative to the average performance of similar stocks. They, therefore, introduced a characteristic-based benchmark designed to measure whether mutual funds select stocks that outperform simple mechanical rules. Based on this benchmark, they developed "Characteristic Timing" and "Characteristic Selectivity" measures designed to detect, respectively, whether a portfolio manager successfully times his portfolio weightings on these characteristics and whether he can select stocks that will outperform other stocks with similar characteristics.

Ferson and Schadt (1996) argued that mutual funds' performance measure based on unconditional risk and expected returns is fraught with bias as the approach assumes that the portfolio betas are fixed throughout the period of observation. They contended that this is inaccurate and therefore propose a conditional model that assumes that Fama's (1970) semi-strong form of market efficiency holds. They, therefore, modified the traditional Jensen alpha model to take cognizance of conditional information. The intuition behind the conditional model is that sensitivity to indexes should be dynamic over time since returns on public information are predictable to an extent, and the fund manager should not be given credit for performance derived from acting on publicly available information known to be predictive of returns. A semi-strong efficient market implies that all public information is incorporated into securities prices, therefore if a manager adjusts his portfolio on account of public information, he should not be given undue credit for superior performance. Hence, the model, therefore, takes cognizance of time-varying betas, the correlations between these betas, and public information variables such as dividend yield. Variation in betas over time arises because of three reasons. First, portfolio betas are not static and can change over time. Second, if the view of market dynamics relative to the values of securities changes, which in turn impacts the relative weight of a passive strategy. Third, a manager can actively tilt the portfolio weight as desired thereby deviation from a buy-and-hold strategy. The combined effect of these changes is captured by the conditional model. Several mutual fund performance studies have incorporated a conditional beta and alpha in performance evaluation and found evidence that the use of a conditional model makes the performance more neutral.

Several researchers have applied the Bayesian analysis to continuously adjust the alpha obtained from the multi-index models in evaluating the performance of mutual funds. Bayesian analysis is a statistical technique that allows one to incorporate prior information or belief about a population parameter into evidence derived from a sample to guide the process of making statistical influence. Specifically, a prior probability distribution of a parameter of interest is specified. This is followed by obtaining evidence from a sample. Information from both sources is combined, using Bayes's theorem to derive a posterior probability distribution for the parameter. Statistical inference on the parameter is based on the posterior distribution. Baks, Metrick, and Wachter (2001) apply this method in their study of mutual funds' performance. They incorporate an investor's belief regarding whether or not a manager has timing skills with the historical returns of the manager to compute the posterior alpha used to analyze the performance of the fund manager. Similarly, Pástor and Stambaugh (2000) use the Bayesian analysis in their performance study. They combined historical returns on funds with passive indexes with prior views about asset pricing and skill in constructing optimal portfolios of equity funds. They suggest that by including both benchmark and non-benchmark indexes, they isolate the inaccuracy of the pricing model from the managerial skill of fund managers.

The stochastic discount factor (SDF) model is an alternative model that has been proposed to appraise the performance of actively managed mutual funds given the variety of trading strategies mutugal funds employ to generate alpha. Traditional models of performance appraisal have their shortcomings, as they mostly do not account for the time-varying exposures to risk. The SDF model is based on the assumption that the financial markets do not allow arbitrage opportunities to persist; there is therefore an appropriate SDF to price all securities at any point in time. Therefore, the price of any asset is derived as the present value of the estimated series of the future payoffs of the asset, using the SDF as the discount factor. Theoretically, the SDF is a positive random variable that precludes arbitrage opportunities and takes cognizance of the time value of money and uncertainties in estimating the value of an asset or portfolio of assets. It has been applied by several researchers in evaluating the performance of mutual funds (see Chen and Knez, 1996; Farnsworth, Ferson, Jackson, and Todd, 2000; Dahlquist and Soderlind, 1999). The approach adopted is first to estimate the returns attributable to a

mutual fund if it earns the equilibrium return in the market when the SDF is applied as the applicable discount rate in the financial markets to all securities. Then, the actual return generated by the mutual fund is obtained. The excess risk-adjusted return on the mutual fund is then modeled as the difference between the estimated returns based on the SDF and the actual returns generated.

2.2.3 Evidence on Risk-Adjusted Return and Stock Selective Ability

Friend, Brown, Herman, and Vickers (1962) undertook one of the earliest studies on the impact of fees on the performance of mutual funds, covering the period from January 1953 to September 1958. The study concluded that management fees did not significantly impact mutual funds' performance. They also reported that mutual funds did not demonstrate superior performance over a random portfolio, implying that fund managers added no value through professional management.

Subsequent landmark studies by Treynor (1965), Sharpe (1966), and Jensen (1968) in the field of mutual funds' performance in the United States have remained a reference point for researchers.

Leveraging on the asset pricing theory developed by Sharpe (1964), Lintner (1965), and Treynor (1965), Sharpe (1966) analyzed the performance of 34 mutual funds in the period 1954-1963 in the U.S. market. He reported that 23 out of 34 funds underperformed the Dow Jones Industrial Average benchmark, while the other 11 funds in the sample beat the benchmark. He also observed that the lower the expense ratio, the better the performance of the funds. He concluded that the market was very efficient.

In his study of mutual funds, Jensen (1968) developed the Jensen Alpha and used the indicator to analyze the performance of 115 active mutual funds in the U.S. between 1945-1964. When the Jensen Alpha is significantly positive, there is evidence that the manager is successful in outperforming the market. However, it does not separate between stock selectivity and the market timing ability of the fund manager. Jensen reported that mutual funds, on average, underperformed the market and concluded that mutual fund managers cannot beat a passive buy-and-hold strategy. In addition, he concluded that no individual fund demonstrated exceptional performance which could be

attributed to superior skill. This landmark seminal work opened up the space for further studies in the field of risk-adjusted performance measurement of mutual funds.

For quite some time, these two studies by Sharpe (1966) and Jensen (1968) have been a reference point to the general notion that active management is not value-adding relative to passive investing.

Fama (1972) suggested that the forecasting skills of portfolio managers could be segmented into two components. The first relates to their ability to forecast the direction of the prices of individual securities, also referred to as securities analysis, thereby choosing securities that will yield positive returns. This is referred to as micro forecasting. The second component is the portfolio manager's ability to forecast the general direction of the stock market, referred to as macro forecasting or market timing. This proposed decomposition of excess returns in Fama's study has been pivotal to the development of several models for the analysis of the performance of portfolio managers.

Carlson (1970) provided another perspective on the performance of mutual funds in his research. He used a similar approach to Jensen's (1968), with S&P 500 as the benchmark, and analyzed the performance of 82 equity funds from 1948 to 1967 using annual returns. His results were inconsistent with the earlier studies by Jensen (1968) and Sharpe (1966) as he found evidence that mutual funds earned superior returns of about 60 basis points. He contended that the study period selected and market benchmarks used could have influenced the conclusion from earlier studies that reported a lack of selectivity of fund managers.

Concerns regarding the sensitivity of risk-adjusted measures of mutual fund performance to benchmarks motivated Lehman and Modest's (1987) study. They selected a sample of 130 mutual funds in the United States from January 1968 through December 1982 and evaluated their performance. They reported that mutual funds returned negative Jensen Alphas, and significantly underperformed the market, thereby corroborating several earlier studies.

Ippolito (1989) undertook a study of mutual funds using a similar approach to Jensen (1968). Selecting a sample of 143 U.S. mutual funds, he evaluated them over the period 1965-1984. He employed the CAPM model and the Wiesenberger database, making the results directly comparable to those of Jensen (1968). He reported that after taking cognizance of all fees and expenses (except load charges) mutual funds outperformed index funds on a risk-adjusted basis. Available evidence from the study shows that mutual funds, on average, exhibit selectivity. The researcher concluded that mutual funds alpha, although significant does not offset the load charges of the funds. These results contradicted several early mutual funds studies that reported negative alphas in mutual funds while corroborating Carlson's (1970) conclusion.

Grinblatt and Titman's (1989a) study validated Ippolito's (1989) evidence. They analyzed mutual funds' performance from 1974 to 1984 in the U.S. using Jensen's (1968) single-index measure, selecting both monthly and quarterly return data to compute excess returns. Their results indicated that mutual funds earned positive excess returns after taking into account fees and expenses. Specifically, funds classified as having 'aggressive growth' and 'small net asset value' features recorded abnormal performance at statistically significant levels.

Lee and Rahman (1990) adopted a regression technique developed by Bhattacharya and Pfleiderer (1983), which is a variant of the Treynor-Mazuy model to analyze the ability of mutual funds to time the market and select superior stocks. They studied 93 mutual funds between January 1977 and March 1984 using monthly returns for 87 months. As a proxy for the risk-free rate, they used the monthly returns of 91-day Treasury bills. They found some evidence that fund managers indeed possessed superior selectivity and market timing skills, and recommended that funds that do not exhibit forecasting skills should consider a passive portfolio management strategy and focus on providing a diversification service to their shareholders. This suggests that the low-cost diversification benefit provided by mutual funds is enough justification for investors to utilize mutual funds as an investment vehicle.

However, Brown, Goetzman, Ibbotson, and Ross (1992) argued that the reported superior performance of mutual funds in some studies such as Ippolito (1989) and Grinblatt & Titman (1989a) arose due to survivorship bias. In a similar effort, Elton (2001) studied mutual funds' performance using Morningstar's database which was not free of survivorship bias. He documented that overall performance was inflated by between 0.4-1% depending on the sample period selected and studied. This implies that if the survivorship bias is not eliminated in evaluating mutual funds' performance, the existence of positive alpha could be wrongly inferred when in fact the true average performance of the population is negative.

Elton et al (1993) investigated the extent to which mutual fund performance was consistent with informational efficiency in the United States for the period 1965 to 1984. They sought to test the veracity of the theory of Grossman (1976) and Grossman and Stiglitz (1980), who developed a hypothesis about a form of market efficiency whereby informed investors are able to trade at prices that effectively compensate them for the cost incurred to obtain information. Their result was consistent with prior results that active mutual fund managers underperformed passive portfolios. They observed that after adjusting for the impact of assets not included in the S&P index on mutual fund returns, the returns earned by mutual funds did not compensate for the cost incurred in acquiring information. Importantly also, the study found contradictions in Ippolito's (1989) results after adjusting for benchmark bias and concluded that Ippolito's (1989) findings were not rigorous enough.

However, Ippolito (1993) attempted to revalidate the conclusion from his original data. He reported that mutual funds recorded positive excess returns, thereby reconfirming his earlier assertion in Ippolito (1989). During the same period, Grinblatt and Titman (1993) approached the measurement of the performance of mutual funds by introducing a new measure that does not require the use of a benchmark, thereby eliminating the benchmark problems identified by Roll and others. Using the new approach, they evaluated the 155 mutual funds from December 31, 1974, to December 31, 1984, based on their quarterly stock holdings. Their results indicated that the average performance of fund portfolios was positive from January 1, 1976, to March 31. They concluded that their result validates Grinblatt and Titman's (1989a) study which provides

evidence that mutual funds, on average, record positive excess returns, especially in the aggressive growth category of funds.

Gruber (1996) attempted to unravel a puzzle regarding the phenomenal growth of actively managed funds even though studies have shown that active fund managers underperform index funds on average. In order to understand why an investor buys mutual funds, he examined their average performance. He selected a sample of 270 mutual funds that consisted largely of common stock funds listed in Wiesenberger's Mutual Funds Panorama, which accounted for 77.2 percent of the assets held by all common stock funds at the end of 1984. Based on the result obtained, Gruber (1996) concludes that mutual funds generally underperform the benchmark. With unadjusted returns, mutual funds underperformed the market by 1.94 percent per year; while, using the single-index model and the four-index model, the risk-adjusted return was estimated to be -1.56 percent and 65 basis points per year respectively.

Malkiel (1995), studied mutual funds' returns during the 1971 to 1991 period utilizing a survivorship bias-free dataset and concluded that mutual funds underperformed the market when the average return of all the funds was analyzed both before and after management fees have been deducted. He reported that he could not validate the risk-return relationship as laid down by the CAPM model. This highlights the controversy surrounding the appropriateness of benchmarks chosen to model the risk-return relationship as noted earlier by a couple of researchers, including Lehman and Modest (1987), and Fama and French (1992).

Elton et al (1996a) investigated the performance of a sample of 188 survivor bias-free common stock mutual funds from 1977 to 1993 in the United States. Although the study's primary objective was to investigate performance predictability, it also examined the average performance of the sample of mutual funds studied and found it to be negative. He reported that the average under-performance of the full sample of mutual funds was statistically significant for both 3 years and 1-year periods.

Ferson and Schadt (1996) made a major departure from the traditional approach to analyzing funds' performance by adopting what is now commonly known as conditional performance evaluation. Their focus was to improve performance evaluation benchmarks given their conviction that there is time variation in risks and risk premiums, and hence objective evaluation should take account of these dynamics. Their approach, therefore, incorporates lagged information variables in performance models. They used monthly data for 67 mutual funds over the 1968-1990 period and found out that using both CAPM and a four-factor model, mutual funds on average underperformed the market in line with prior results. However, using conditional models, the extent of the under-performance was moderated, and the distribution of alphas shifted to almost zero. It could therefore be argued that the conditional performance evaluation approach appears to model the risk-return profile of mutual funds more correctly.

Cahart (1997) used survivorship-bias-free data to study equity funds from January 1962 to December 1993 adopting the Capital Asset Pricing Model (CAPM) and his newly proposed 4-factor model. Regarding the average performance of mutual funds, he reported that his evidence overall was consistent with market efficiency. He noted that the top decile mutual funds earned enough excess returns to cover their costs, but most funds underperformed and were not able to cover their costs. Moreover, bottom-decile funds underperformed more significantly by about twice their investment costs. In addition, the study sought to explain the driver of the performance persistence reported by some researchers, like Chen, Jegadeesh, and Wermers (2000) also attempted to offer explanations. They concluded that the momentum phenomenon earlier reported by Jegadeesh and Titman (1993) was responsible for the observed performance persistence, since the portfolios of past winning funds likely consisted of a relatively large proportion of stocks with high past returns, thereby perpetrating the performance. Therefore, he reasoned that the superior performance of fund managers may simply be a reflection of the benefit of momentum in the component stocks of the portfolio and not a product of persistent superior selection skills.

Daniel et al (1997) attempted to address concerns regarding benchmarks used to assess the performance of mutual fund portfolios. They argued that the performance of

a portfolio manager should be evaluated based on the performance of the set of stocks selected by the fund manager relative to the average performance of stocks with the same features. They, therefore, introduced a so-called characteristic-based benchmark designed to assess whether mutual funds exhibit skills that enable them to outperform the returns on simple mechanical trading rules. They obtained evidence from their study that on average, mutual funds do succeed in achieving this, but marginally (under 100 basis points), and just enough to cover the management fees. They noted that aggressive growth and growth funds, which performed best in this regard also incurred the highest costs. This result seems to validate a kind of market efficiency and equilibrium described by Grossman and Stiglitz (1980) whereby informed traders succeed in beating the market just sufficiently to allow them to cover the cost of information.

Indro, Jiang, Hu, and Lee (1999) found in their study that fund size impacts mutual fund performance. Using a sample of 683 active U.S. equity funds over the 1993-95 period, they reported that there was an optimum fund size that guaranteed that a mutual fund would generate sufficient returns to cover the cost of procuring trading information. Conversely, mutual funds whose size exceeded the optimum size exhibited diminishing marginal returns. They also reported that 20% of the mutual funds in their sample had sub-optimal small sizes, while 10% of the larger funds spent too much to acquire information for trading. Finally, they obtained evidence that active management did not enhance the performance of growth funds significantly whereas it impacted more positively on value and blended funds.

Wermers (2000) undertook a comprehensive study of mutual funds' performance using a new database to evaluate performance. The database combined data from the CDA and CRSP data set over several years to provide a robust database that has information on turnover ratios, expense ratios, net returns, investment objectives, and total net assets. With this database, the researcher empirically decomposed mutual funds' performance into granular details to analyze the value-addition from active management. They reported an outperformance of the mutual fund portfolios over the benchmark index by 1.3% per year over the 1975 to 1994 period. In addition, further analysis showed that about 60 basis points of the out-performance were traceable to the features of the component stocks, while the balance of 70 basis points was explained by

the superior stock-picking skills of fund managers. However, mutual funds underperformed the benchmark market indexes by 1% per year based on a net return implying a 2.3% difference between the gross returns and the net returns of funds. The breakdown of this figure is 0.7% resulting from the lower average returns generated by non-stock securities held by the funds, with the remaining 1.6% attributable to expense ratios and transaction costs almost evenly. Therefore, evidence from the study corroborates the equilibrium model proposed by Grossman and Stiglitz (1980) that fund managers successfully select and hold securities that generated excess returns large enough to cover their expenses and transaction costs. In conclusion, the study shows that it is mutual funds' holding of cash and bonds that account for their lower net returns compared to the market.

Coggin and Trzcinka (2000) studied equity-based pension funds in the U.S., using a sample of 292 mutual fund composites which comprised 138 large-value funds, 110 large-growth funds, and 44 small-cap funds, The results provided evidence that the magnitude of the alpha recorded by mutual funds is influenced by the choice of benchmark. In addition, they did not find evidence that performance repeats since investment managers in the study sample did not consistently generate excess returns relative to the S&P 500 benchmark, or any other appropriate style benchmark. They concluded that equity mutual funds do not beat the benchmark and past performance does not predict future performance. They advised investors not to use historical performance to select mutual funds to invest in.

Dellva, DeMaskey, and Smith (2001) evaluated mutual funds in the Fidelity sector during the period 1989-98, using several benchmarks including the S&P 500, the Dow Jones Industry Group Total Return Index, and the Dow Jones Subgroup Total Return Index. They found evidence that the fund managers in their sample had positive selectivity (when the Dow Jones Industry Group or Subgroup Index is used), but negative timing ability. In addition, their results support the work of earlier researchers who reported that the benchmarks selected for appraising the performance of mutual funds influenced the outcome (see Lehmann and Modest (1987), Grinblatt and Titman (1988), and Rennie and Cowhey (1990).

Kothari and Warner (2001) studied mutual fund performance measures using simulated funds that have features similar to actual funds. Their results showed that the performance measures used in past mutual fund research were not able to detect large amounts of abnormal fund performance (up to three percent per year) especially if the fund's style was different from those of the value-weighted market portfolio. They suggested that the explanatory power of models could be improved if the funds' stock trades are analyzed using the event-study approach.

Baks, Metrick, and Wachter (2001) pioneered the use of the Bayesian model to evaluate mutual funds' with a sample of 1,437 funds. Their key contribution was the development of a new approach that analyzed the performance of funds from the perspective of an investor thereby solving some of the challenges of the traditional mean-variance approach. They achieved this by incorporating a set of prior beliefs about the managerial skills of mutual fund managers. They found that despite quite skeptical prior beliefs, their model still recommended significant allocation to active managers.

Pastor and Stambaugh (2002) estimated the alpha of mutual funds using the CAPM and the Fama- French-3-Factor Model. They applied the Bayesian analysis technique by combining historical return on mutual funds and passive indexes with prior views about asset pricing and skill to form optimal portfolios of equity funds. They suggested that they succeeded in isolating the inaccuracy of asset pricing models from the managerial skill of fund managers by including both benchmark and non-benchmark indexes. Their result showed that modest confidence in a pricing model helps construct portfolios with high Sharpe ratios. They concluded that the majority of the equity funds in their sample recorded negative alpha, thereby showing underperformance. Likewise, Elton, Gruber, and Blake (2003) using a sample of 108 funds from 1990-1999 in the U.S. market and multi-index model benchmarks, observed underperformance. The conclusion of both Pastor and Stambaugh (2002) and Elton et al (2003) validates the earlier work of Shukla and Trzcinka (1992), who used data from 1979 to 1989 to study 257 mutual funds and reported that mutual funds recorded an average ex-post alpha value of negative (-0.74 percent per annum) and that only 45% of the sample of 115 funds generated positive alphas.

Baker, Litov, Wachter, and Wurgler (2004) undertook a study to better understand the nature of reported stock-picking ability following the result of studies by some researchers, including Chen, Jegadeesh, and Wermers (2000) that provided evidence that the stocks that mutual fund managers buy outperform the stocks that they sell. They designed a measure of trading skill that analyses the performance of the stocks held by mutual funds compared with those sold at subsequent earnings announcements. They provided evidence that corroborates earlier studies that the average mutual fund manager has some ability to pick winners and losers. In addition, they investigated the source of the alpha generated by mutual fund managers. Their evidence points to the fact that alpha is largely attributable to fund managers' ability to forecast the earnings of firms.

Shuklav (2004) appraised the value of interim portfolio revision, which is an integral part of active management. He compared the net effect of interim portfolio revision to the result obtained if there was no portfolio revision to determine whether or not this activity was value-adding. He finds out that the net value added by interim portfolio revision is negative as the excess returns generated do not cover transaction costs. He also reports that there is a positive relationship between the excess return generated by mutual funds and the expense ratio, implying that the managers who generate higher returns also charge higher fees.

Otten and Bams (2004), adopted a process that involved a series of steps to evaluate mutual funds' performance. They assessed the incremental value added by relevant variables such as momentum, book-to-market ratio, size, bond index and a vector of information variables. They analyzed performance at both style and aggregate levels using a richer set of data and reported that conditional factor models are better at evaluating the performance of mutual funds than the traditional unconditional models. Moreover, they found that Carhart's four-factor model was the best at explaining the returns of mutual funds.

Chen, Comerton-Forde, Walter & Gallagher (2005) studied the investment management skills in small-cap equities in Australia using a sample of monthly portfolio

holdings and daily trades. They found evidence that small-cap equity fund managers exhibited significant stock selection skills based on reported risk-adjusted returns. The study is particularly noteworthy because of the scale of cumulative abnormal returns generated by mutual funds in the sample over one month with the holdings-based metric outperforming by 59.7 basis points, and the transactions-based metrics by 64.1 basis points respectively. In addition, the researchers reported that the result remains robust even after accounting for transaction costs. They opined that their study provides evidence outside of the U.S. that supports active management in a market segment that does not enjoy the level of liquidity and analyst coverage as the U.S. mutual fund market.

Huij and Verbeek (2007) demonstrated that using multifactor performance models for assessing mutual funds' performance systematically introduces biases due to a misestimation of the factor premiums. They suggested that factor premiums are either underestimated or overestimated since the factor proxies used are based on hypothetical stock portfolios which do not account for some variables like transaction costs, trade restrictions, and trade impacts. They proposed that factor proxies should be based on the returns of portfolios of funds rather than stock portfolios for a more objective assessment.

Stotz (2007) evaluated various aspects of the performance of German equity funds' performance including selectivity, style timing, and market timing, using Jensen Alpha and Carhart's 4-factor model. He concluded that active management did not help fund managers to generate excess returns, with mutual funds returning, on average, negative risk-adjusted returns of between 1.3% and 1.9% per annum for the period 1989 to 2005. In addition, he noted that the investment style of the mutual funds influenced the degree of underperformance recorded. Generally, funds that adopted a small-cap growth strategy with high momentum were able to outperform the benchmark, on average. Finally, evidence from the study, using the Treynor-Mazuy and Henriksson-Merton models, highlights that mutual funds managers are poor at timing the market.

Fama and French (2009) examined 1,374 equity mutual funds in the U.S. for the period 1984 to 2006 and obtained evidence that only a few funds succeeded in generating excess risk-adjusted returns sufficient to cover their expenses. They concluded that

actively managed funds in the portfolio performed at just about the same level as the market portfolio. They noted, however, that fund expenses resulted in overall lower returns to investors. They analyzed the excess return of the aggregate wealth invested in actively managed funds and reported that it was negative 0.81%, at 2.50 standard errors below zero, which provided robust evidence that mutual funds as a whole delivered returns below an equivalent portfolio of the three passive benchmarks of the Fama-French model. Evidence from the study shows that using bootstrap simulations, most of the mutual funds did not produce risk-adjusted returns adequate to cover their expenses. They highlighted that there was evidence of both inferior and superior performance as depicted by the alpha of the funds. However, they observed that results appeared better when gross returns (the returns without the expense ratio included) were considered. From the investor's perspective, though, gross returns are irrelevant since an active manager would normally charge fees to cover expenses.

Ammann and Steiner (2009) studied the performance of actively managed and passively managed Swiss mutual funds from 1989 to 2007, using a Carhart (1997) model specifically developed for Switzerland. Regarding methodology, they compared actively managed mutual funds to passively managed funds instead of comparing each of them to a theoretical benchmark. Using 160 funds in their sample and 13,672 monthly observations they reported that both active and passive funds on aggregate significantly underperformed the index. However, when categorized in terms of investment styles, active large-cap funds significantly underperformed the index while active small-cap and mid-cap funds significantly outperformed the index. When compared directly, active funds significantly underperformed passive funds by -1.1% p.a. on average. They observed that it was active retail funds that substantially drove the underperformance as the performance of active institutional funds was almost at par with the passively managed funds. Finally, they found evidence that active funds performed better before the year 2000 than thereafter. They, therefore inferred that the Swiss capital market may be showing signs of higher levels of efficiency in recent years.

Bessler, Drobetz & Zimmermann (2009) appraised the performance of German mutual funds using the conditional model, over the period from 1994 to 2003. They adopted the beta-pricing approach and the SDF methodology for their analysis. Their evidence corroborates the result of several studies that, on average, mutual funds do not generate superior returns to beat their benchmark and cover their cost. They also compared the conditional and unconditional alphas obtained from the study and observed that performance worsened considerably with conditional alphas. This is not unexpected since the logic of the conditional models is that credit should not be given to mutual fund managers based on any action taken on information available to the public. This scales up the performance benchmark for active fund managers as it does not recognize performance driven by the use of publicly available information. The study also concludes that underperformance is more pronounced in the SDF framework than in beta-pricing models.

Barras, Scaillet, & Wermers (2010) developed and applied a new approach for evaluating mutual funds' performance by categorizing them into three groups based on the claim that the new approach effectively distinguishes between luck and true performance. They separated funds into unskilled, zero-alpha, and skilled funds. Skilled funds are defined as those that deliver positive alphas after trading costs and expenses, while zero-alpha funds and unskilled funds are those that generate negative alpha. They reported that 75% of funds generated zero alpha, consistent with the theoretical argument of Berk and Green (2004) that past performance does not repeat. In addition, they found that a relatively large proportion of funds were categorized as skilled funds before 1996, but by 2006 the proportion had dwindled to almost nil. They concluded that it is easier to identify mutual funds with the persistence of performance by using a model that segregates between luck and true performance.

Cremers et al (2010) suggested that standard multi-factor models, specifically Fama-French and Carhart, yielded statistically significant alphas even for passive benchmarks like the S&P 500 and Russell 2000. They reported that these alphas arose as a result of the disproportionate weights attached to small-value stocks that have performed well in the Fama-French model and the CRSP value-weighted market index

which generally biased U.S stocks downwards. They proposed using common and easily traded benchmark indices as an alternative model. Their evidence shows that the index-based approaches outperform the standard models in evaluating the performance of mutual funds. This study reinforces the importance of using appropriate benchmarks in mutual fund performance measurement.

Azer and Al Hourani (2010) studied the performance of equity mutual funds in the U.S., using a sample of 200 funds with four different market indexes as benchmarks and Jensen Alpha as the risk-adjusted performance model. Performance was evaluated using Jensen's alpha and returns net of expenses. They reported that when either the S&P 500 or the DJIA was used as a benchmark, the average fund Alpha was positive and significant, while the use of Russell 3,000 or NASDAQ produced either positive or negative, but statistically insignificant average Alpha. Overall, they concluded that on average, U.S. equity-based mutual funds delivered statistically significant alpha net of fees.

Glode (2010) argues that the economic state of the market should be taken into cognizance when assessing the performance of the fund manager, otherwise the skill of a fund manager can be wrongly estimated. He holds the view that investing in an actively managed fund that is expected to underperform the market in a normal market could make sense if the active fund usually outperforms in a down market. He, therefore, proposes a model which captures the unconditional negative risk-adjusted returns expected of mutual funds and the high excess returns expected in a bad market.

Dyck, Lins, and Pomorski (2011) waded into the active vs passive management debate with a focus on emerging markets. They found evidence that active management beat passive over the 1993 to 2008 period, with the impact more in the emerging market at over 180 bps per year, while in the EAFE by about 50 bps. However, this did not apply in the U.S. markets where active management underperformed. They observed that institutional investors used active management more frequently in emerging markets compared to the US market, and that constraint on fund flows to non-US markets was responsible for the outperformance of active management. Overall, they concluded that the level of stock market efficiency and investors' sophistication in a market are major determinants of the value of active management.

Elton, Gruber, and Blake (2011a) explored the use of several techniques to measure mutual fund performance to identify funds that will beat the average actively managed mutual fund and passive index fund in subsequent periods. They employed Fama and French's (1992) 3-factor and 4-factor models and obtained evidence that the use of holding data to compute betas and alphas resulted in a superior selection of funds when compared with a selection based on the alphas from a time-series regression on fund returns. They reported that this result held true both when the performance of funds was evaluated in subsequent periods using alphas computed from holdings data or using alphas obtained from a regression of fund returns.

Linnainmaa (2011), addressed the concept of reverse survivorship bias. He suggested that the estimated alphas of poor-performing funds that failed usually understated their true alphas when the underperformance was a result of negative, unique risks. He, therefore, developed a model to address this bias. He reported that on average, about 12% of mutual funds had a net alpha greater than 2% per annum, based on the four-factor model and that fund-by-fund regression understated the alphas of mutual funds, which in turn underestimated the skill of fund managers. He observed that most funds still recorded negative alphas, anyway.

Angelidis, Giamouridis, and Tessaromatis (2012) proposed a new approach to evaluating the performance of active managers. They posited that a fund manager's performance should be evaluated with reference to the benchmark they chose and reported in the fund's prospectus rather than a traditional passive benchmark with the same risk characteristic as is usually the practice. The researchers argued that using the implied benchmark like the S&P 500, S&P Value Index, or S&P Growth Index to assess a fund manager will present a biased result because the fund manager's investment decisions are not influenced by these benchmarks rather, they are influenced by the benchmarks adopted and reported by the funds. They concluded that the traditional approach will not correctly capture the ability of fund managers to select superior stocks and successfully time the market. They, therefore, suggested incorporating the benchmark adopted by the fund manager in the appraisal process.

Pástor, Stambaugh & Taylor (2014) studied over 3,000 mutual funds over the period 1979 to 2011 and provided some insight into the reasons why funds found it so challenging to generate alpha. They reported that fund managers have over time become more skilled, but that the higher skill level attained has not resulted in better performance. The reason they adduced to this observation is the growing industry size. According to the researchers, the active management industry has become much bigger and more competitive in recent years, hence it takes more skills to just maintain current performance levels. They also reported an interesting observation: that the rising skill levels observed were not a function of increasing skill within all the funds, rather it was connected to the new funds entering the industry which were more skilled on average than the existing funds. Their hypothesis on this was that newer funds tended to better-educated and more technology-savvy managers.

Doshi, Elkamhi, and Simutin (2014) proposed a new and convenient approach to measuring active portfolio management and predicting mutual fund performance by making use of the fund's holdings and their market capitalizations. They referred to this method as active weight. The sum across holdings of the differential between the value weights and actual weights of securities held in the portfolio of a mutual fund is called the active weight. The study reported evidence that active weight provides new insight into active management not covered by earlier studies. According to the researchers, the active weight captures managerial skills, and actively managed funds outperformed passive ones by 2.5% annually. Their evidence shows that the active fund approach robustly predicts several indicators of performance including fund flows, asset growth, factor-adjusted performance, and value-added.

Bhootra, Drezner, Schwarz, and Stohs (2015) explored the skill vs luck debate, and whether there was any justification for investors to include actively managed mutual funds in their investment portfolios. They contended that if active management could demonstrate superior performance due to skill, then it was justified. They suggested the use of a model that had not been commonly used in the literature to detect skills – the generalized binomial distribution model sequence of n Bernoulli events in which the result of each event is either success or failure. They reported that a statistically significant

proportion of mutual funds, though small in number, outperformed their peers on a risk-adjusted basis, driven by skill and not luck. They concluded that it was rational for investors to entrust the management of their wealth to successful and skillful mutual fund managers, and argued that a well–structured portfolio that combined active management and passive management may outperform a passive index fund strategy.

Pace, Hili, and Grima (2016) also explored the active vs passive debate following the argument of Gruber (1996) regarding a seeming contradiction of the increasing popularity and growth of actively managed mutual funds despite the overwhelming academic research evidence that actively managed funds consistently underperformed passive funds (index funds) on average. The researchers sought to provide advice for investors on the right choice between active or passive funds as an investment vehicle. They used a data set free from survivorship bias consisting of 776 equity-based funds domiciled either in America or Europe. They applied both single-factor and multi-factor asset pricing models– Capital Assets Pricing Model, Arbitrage Pricing Model (1968), Fama-French Three-Factor (1993), and Carhart Four-Factor (1997) for their analysis. The result of the analysis of the Net Asset Value (NAV) of mutual funds over 10 years showed that the risk-adjusted returns generated by active management were equivalent to the returns from index replication (gross of fees). However, their evidence shows that when fees and other expenses related to active management were incorporated into the analysis, actively managed funds underperformed passive, low-cost funds. The researchers advise investors to gain exposure to the market through low-cost index replication structures while focusing on expense ratios and other transaction costs, rather than past returns in choosing their investment vehicles.

Mateus, Mateus, and Todorovic (2016) revisited the analysis of the performance of 887 actively managed U.K equity mutual funds deploying a new performance measurement approach suggested by Angelidis et al (2012), which proposes adjustments to a fund's alpha by the benchmark's alpha to present a more objective performance assessment. Their result shows that when this approach was adopted, the Fama–French and Carhart's alphas of UK equity mutual funds were overall positive and

higher than those implied by the standard models. The researchers noted that the result was consistent irrespective of the funds' investment styles and the benchmark used.

Saha and Rinaudo (2017) explored the active vs passive management debate. They concluded in their study that a strategy that invested in a portfolio consisting of the five largest actively managed funds consisting of US equities, fixed income, and international securities outperformed a passive index fund both in terms of average returns and risk-adjusted returns. In addition, the active strategy suggested provides greater downside risk protection than the passive approach. This study challenges the wisdom of passive investing which has been canvassed by several researchers.

Blake, Caulfield, Ioannidis, and Tonks (2017) applied two bootstrap methods for assessing the performance of mutual funds. The first method produced narrow confidence intervals due to pooling over time, while the second produced wider confidence intervals because it preserved the cross-correlation of fund returns. From their results, they showed that on average UK mutual funds underperformed the benchmark net of fees. They also found evidence that based on gross fees, 95% of fund managers and 100% of fund managers did not beat a random passive portfolio using the first bootstrap method and the second bootstrap method respectively.

Chen and Scholtens (2018) studied active and passive socially responsible ETFs in the United States. They investigated various aspects of mutual fund performance including financial performance, the extent of active management, and the cost of investing. They reported that there was no persuasive evidence that active funds outperformed passive funds. In addition, they concluded that it was highly probable that passively managed socially responsible funds would contribute to the enhancement of sustainability by increasing the variety of investment options.

Cai, Cheng, and Yan (2018) proposed a new non-parametric methodology for estimating and testing time-varying fund alphas and betas both in the short and long run. This new methodology proposed, according to the researchers was robust in finite samples based on Monte Carlo simulation evidence. When they applied the methodology

to mutual funds and hedge funds in the U.S., they found evidence that the alpha of most funds progressively declined over time. In addition, they combined their methodology with the bootstrap method to control for the incidence of luck in performance and found that positive long-run alphas of mutual funds disappeared, while negative long-run alphas of both mutual and hedge funds remained. This result further corroborates available evidence that mutual funds do not generate positive risk-adjusted returns.

Mingo-López, Sáez, Domínguez, and Tortosa-Ausina (2018), investigated how applying different criteria of sustainability in constructing the portfolio of mutual funds impacted the risk-adjusted returns generated by the fund. They compared the performance of mutual funds based on the social responsibility criteria of environmental, governance, social, and sustainability features. They employed Carhart's (1997) model to evaluate persistence and proposed a variant of the multifactor models with a benchmark that takes cognizance of the fund's objective for their analysis. Data from a sample of 3,920 equity funds from across the world was analyzed. They found that mutual funds underperformed the benchmark, with the average alpha being negative and close to zero. In addition, they observed that the overall performance of mutual funds worsened as the level of socially responsible (SR) attributes in the funds' portfolios increased. They posited that the performance of the worst-performing funds was the main driver of the overall results obtained. In addition, their evidence shows that using the historical performance of SR funds as a basis for investing could help an investor achieve a greater overall return. They concluded that if an investor chooses the right SR funds, they can achieve greater portfolio returns even while pursuing higher ethical (and sustainable) values.

Pilbeam and Preston (2019) appraised the performance of 355 actively managed Japanese equity mutual funds that operated between April 2011 and April 2016. They reported that there was strong evidence that mutual funds underperformed the benchmark four-factor model adopted. In addition, mutual funds did not succeed in timing the market successfully. However, there was evidence of significant persistence of performance among poor-performing funds compared to top-performing funds.

Fahling, Steurer, and Sauer (2019) investigated whether or not active management added value to the German fund market. They selected a sample of 194 actively managed mutual funds whose performance was compared to that of a passive benchmark created by deriving the arithmetic mean of four passively managed exchange-traded funds, which they considered represented the market as a whole better than the S&P 500 or the DAX. They obtained evidence that although actively managed funds did create excess risk-adjusted returns before expenses, the abnormal returns disappeared when expenses were accounted for. They concluded that active funds do not generate alpha.

Warren (2019) investigated the notion that active management was a zero-sum game before cost and a negative-sum game after cost as opined by Sharpe. He argued that there were some gaps in Sharpe's arguments that an active manager could exploit to outperform a passive fund. He also contended that the circumstances of the investor and the market in which he operated were more important factors in the choice of an active or passive strategy. He specifically identified fees paid, investor objectives, and the asset category to invest in as the key determinants.

Kooli and Stetsyuk (2020), attempted to estimate the amount of added value hedge fund managers extracted from the capital market. They applied the bootstrap methodology to control for luck, and found evidence that hedge fund managers exhibited skills; however, the magnitude of the value added was a function of the benchmark used. When the Vanguard S&P 500 Index Fund and a set of eight Vanguard index funds, were used as benchmarks respectively, hedge fund managers generated, on average, $3.24 million per year and $2.88 million per year, respectively, although they observed that the values were lower during the period of study than before the financial crisis of 2007–2008. Finally, they concluded that from available evidence, hedge fund managers do not share this value-added with their investors. This study, again, validates earlier works that reported that active fund managers do not add value net of cost.

Berk, van Binsbergen, and Miller (2020) reviewed and summarized the recent literature on managers' skills and the performance of mutual funds. They appraised recent works in the field and interpreted them in the context of the Efficient Market Hypothesis. They reached the following conclusions. Firstly, that net alpha is not an appropriate measure of the skill of fund managers, rather, value-added, which is the product of assets under management, and gross alpha is a more appropriate measure. Secondly, in assessing the skill and performance of fund managers, the set of real-time available index funds is the relevant alternative investment opportunity set against which the skill and performance of investment managers should be assessed. Thirdly, the authors suggested that all relevant, high-quality data should be included when making inferences regarding skill and performance as there was no good reason to exclude any.

Vidal-García, and Vidal (2021) investigated the relationship between the short-term performance of mutual funds and fund size. They found evidence of diseconomies of scale in the industry globally, as small funds outperformed large funds. Evidence of diminishing returns to scale was provided by the significantly negative coefficient of net returns and Carhart alphas of funds. In addition, their results showed that smaller funds exhibited superior selective ability over larger funds. However, they found a correlation between fund size and market-timing ability, as the larger the fund was, the better they seemed to anticipate future market directions.

In another study, Vidal-García and Vidal (2022) evaluated the stock selective ability of French mutual funds managers from 1990 to 2020. They employed traditional performance appraisal models incorporating time-varying probabilities and risk to improve the performance of the model. They found evidence that the selective ability of fund managers was poor. However, they reported that the use of the conditional model improved explanatory power.

Armour, Jackson, and Boyadzhiev (2003) presented a report of the Morningstar Active vs Passive Barometer which evaluates the relative performance of active funds compared to their passive funds' peers in the U.S.A. The 2022 report which included a sample of almost 3,500 funds, showed that 49% of actively managed funds beat their

passive counterparts during the study period. However, over a longer-term period, the result was much different. For instance, when the performance was evaluated over a 10-year period, ending December 31, 2020, the percentage of active funds that outperformed their passive counterparts dropped significantly to 23%. This result corroborates the evidence that active funds generally underperform passive funds and their benchmark.

2.2.4 Market Timing

An active mutual funds manager can employ either the strategy of security selection (micro-forecasting) or market timing (macro-forecasting) in his effort to generate alpha and add value to a mutual fund portfolio (Fama, 1972; Treynor & Black, 1973). According to Treynor and Mazuy (1966), if the fund manager possesses market timing ability, he adjusts his portfolio such that he holds a larger fraction of volatile,high-beta securities during a bull market and does the opposite during a bear market. This way, his portfolio would always outperform the market irrespective of the market condition, whether bullish or bearish.

According to Elton et al (2014), a fund manager can alter the beta of his portfolio, thereby achieving market timing, in three ways. Firstly, the manager can sell stocks and buy fixed-income instruments, if he forecasts a downturn in the stock market. Secondly, he can sell high-beta stocks and buy low-beta stocks if he projects that the stock market will underperform. Thirdly, he can write stock index futures if he thinks the stock market will underperform; with the added benefit of lower transaction costs.

Elton & Gruber (2020) take a broader view of timing as an alpha-generating strategy. They posit that timing involves adjusting a portfolio's sensitivity to a factor in response to changing beliefs about the future returns of the factor. The factor could be the market or any other factor. They argue that if the factor is the market, for instance, the manager increases the sensitivity of his portfolio to the market by increasing beta, in anticipation of expected higher return, thereby generating alpha. The concept of timing therefore need not be limited to market timing, but it can be extended to other factors which determine the cross-section of asset returns such as size, value, and momentum.

There are two approaches in the literature to measuring timing. One is using return data and the other uses holdings data.

Most of the returns-based models are a development of the timing models of Treynor and Mazuy (1966) or Henriksson and Merton (1981). Treynor and Mazuy (1966) suggest that if a fund manager has timing ability then he would adjust his portfolio's beta in anticipation of the future direction of the market; specifically, he will increase portfolio beta when market returns are rising and decrease beta when market returns are falling. With this approach, a graph depicting the relationship between beta and market returns will be a curvature rather than linear. Mathematically, there are two terms of interest for each factor for which the timing ability of the fund manager is being tested, in the model. These are the return on the factor and the squared return on the factor (see equation 2 below). Both of these terms could be expressed in terms of excess returns. According to Elton and Gruber (2020), a positive coefficient on the squared term is an indication of the presence of timing ability. Both Treynor and Mazuy's (1966) and Henriksson and Merton's (1981) models are derived from the Jensen (1966) model in equation 1 below.

$$R_{pt} - R_{Ft} = \alpha_p + \beta_p (R_{Mt} - R_{Ft}) + e_{pt} \quad \text{.....(equation 2.9)}$$

$$R_{pt} - R_{Ft} = \alpha_p + \beta_p (R_{Mt} - R_{Ft}) + \beta p_T (R_{Mt} - R_{Ft})^2 + e_{pt} \quad \text{.....(equation 2.10)}$$

Equation 2 (above) depicts the Treynor and Mazuy (1966) model which simply introduces a squared return on the factor in consideration. Alpha (α_p) in the equation describes the stock selection ability of the fund manager. When Alpha (α_p) is positive, it is indicative of value added by the fund manager over and above the market return. The coefficient of the squared term in the equation is βp_T which measures timing ability. A positive βp_T value indicates that the fund manager has market timing ability.

Henriksson and Merton's (1981) model is based on the argument that market conditions could be classified broadly as ''good'' or ''bad''. A good market is defined as where the market returns exceed the risk-free rate, while a bad market is a market condition where the returns on the market are below the risk-free rate. The researchers argued that to prove the existence of timing ability, a manager should have a high beta

on the relevant factor in a good market while showing a low beta on the factor in a bad market. Two terms are used by the researchers for the variable market returns. The first is the standard term for the market risk premium, while the other is an identical term but with its coefficient multiplied by a dummy variable which is set at 1 in good markets and 0 in bad markets. The coefficient on this term represents the net difference in the beta of good and bad markets. The researchers concluded that if the coefficient is positive at a statistically significant level, the manager has timing ability (equation 3).

$$R_{pt} - R_{Ft} = \alpha_p + \beta p\,(R_{Mt} - R_{Ft}) + \beta_{PT}C\,(R_{Mt} - R_{Ft}) + e_{pt} \quad \text{……(equation 2.11)}$$

The main difference between the two models is that while Treynor and Mazuy's (1966) model assumes a continuous change in response to changing expectations about a factor's return, Henriksson and Merton's (1981) model conceives of the change as discrete, thereby assigning two distinct values of 1 and 0, using a dummy variable C.

Several researchers have used models that measure timing from holdings data (Daniel et al, 1997; Jiang, Yao, and Yu, 2007; and Elton, Gruber, and Blake, 2012).

Holding-based data include detailed information on individual stocks that make up a portfolio. With this information, it is possible to estimate the fund's beta. This is based on the knowledge that the portfolio beta on any factor is a weighted average of the betas of the factor on all the securities that constitute the portfolio, where the attached weight is the proportion of the portfolio that each security represents. It is then possible to directly test market timing ability by examining the relationship between the (time-varying) fund beta and the market return. The covariance between fund beta at the beginning of a holding period and the holding period market returns will be assessed to determine whether or not there is timing ability. A significant covariance between the betas and holding period returns demonstrates timing ability.

One of the advantages of this approach is that it allows for a more accurate estimation of the betas on a fund in a situation where management changes the composition of a portfolio over time while trying to exploit market timing strategy. The use of time-series regression in a situation like this will lead to a wrong estimation of the betas, whereas using holdings data at specific points makes it possible to directly estimate the

betas on each factor of interest in the fund. Another benefit of the holdings-based approach is the flexibility of allowing for various assumptions regarding the behavior of beta. For instance, Henriksson and Merton (1981) argued that the market had two distinct betas, one in good markets and another in bad markets. Treynor and Mazuy (1966) on the other hand assumed a relatively continuous change in beta as factor returns varied. Using the approach of estimating betas from holdings data, different patterns of beta change with factor returns can be modeled successfully (Elton, Gruber and Blake, 2020).

2.2.5 Evidence on Market Timing Ability

The work of Treynor and Mazuy (1966) was the first attempt in the literature at developing and applying a model to test specifically for the market timing ability of mutual fund managers. The argument presented in support of their approach was that if a fund manager can successfully forecast the direction of the market, he will increase the volatility (or beta) of his portfolio in a bullish market and the fund will perform better that the market as a whole. Conversely, when the market declines, he will adjust the volatility (or beta) of his portfolio downwards, and the decline of his portfolio would be less than the market in general. Thus, the portfolio of the fund manager who succeeds in timing the market would perform better than a benchmark portfolio that has a constant beta.

Using the model they developed, Treynor and Mazuy (1966) found out that, among the 57 funds that operated between 1953–1962 in their sample, only one fund demonstrated market timing ability. Their conclusion was that fund managers, on average, lacked the market-timing ability to outperform the market.

Another model, which has become a reference point in testing for timing ability was developed by Henriksson and Merton (1981), thereby extending the frontier of knowledge in the field. This is a parametric test that uses a different interpretation of market timing ability. Apart from the idea of TM that a portfolio manager with timing ability could alter portfolio composition in anticipation of market movement, it also incorporates the concept that a fund manager could alter the level of market risk based on the up-market and down-market beta in the model. The Henriksson and Merton model (1981) was applied by Henriksson (1984) in analyzing the performance of 116 mutual funds in the United States

between 1968 and 1980. They found that only 3 out of 116 mutual funds exhibited significant positive market timing ability, and therefore concluded that on average fund managers did not have timing ability.

Following the seminar work of Treynor and Mazuy (1966) and Henriksson and Merton (1981), several researchers including Chang and Lewellen (1984), Grinblatt and Titman (1989), and Goetzmann et al. (2000) undertook studies to test market timing ability of fund managers. Evidence from these studies indicated the absence of market timing ability.

Kane and Marks (1988) contributed to the development of a more robust approach for assessing the market timing ability of mutual fund managers by exploring the submission of some earlier researchers that the use of the Sharpe measure for evaluating the performance of fund managers that possessed market timing ability may be misleading, as the model does not correctly rank market timers according to their ability. Based on their findings, they recommended that, rather than using quarterly portfolio return data, more frequent sampling of managed portfolio returns will address the observed deficiency.

A modification to the traditional model of assessing the timing was proposed by Ferson and Schadt (1996) who developed a conditional version of the Treynor and Mazuy (1966) model, which assumes that the market is semi-strong efficient. Their goal was to distinguish between market timing that leverages public information and market timing that was driven by the availability of superior information. In this model, market timing ability is not deemed to exist if excess returns are obtained based on the use of publicly available information. The researchers analyzed a sample of 67 mutual funds from 1968 to 1990 and reported that fund managers adjusted the risk levels of their portfolios based on publicly available information. They concluded that mutual funds do not generate abnormal returns based on the availability of public information.

Graham and Harvey (1996), investigated how investment recommendations sent to clients through investment letters impacted timing ability and volatility in the U.S. market. Selecting a sample of 237 investment letters over the 1980-1992 period, they analyzed the recommendations contained in the investment letters which suggested various allocations

between equities and cash. As opposed to the traditional approach of estimating portfolio betas in mutual fund studies, they directly observed the asset weights and bypassed the risk estimation. Based on the recommendations, they constructed portfolios and found that only a few of the newsletters contained recommendations that beat a buy-and-hold strategy with the same variance. Their result showed that generally, the newsletters did not demonstrate impressive timing ability. In addition, they controlled for time-varying expected returns and found evidence that the newsletters do not contain information superior to publicly available information regarding the market direction.

A version of a holdings-based measure termed the characteristics-based measure was developed by Daniel et al (1997). The researchers' approach is based on their argument that most of the cross-sectional variations in stock returns are explained by size, book-to-market value (BM), and momentum. They used these characteristics to create portfolios of stocks and computed characteristics-based performance measures on this basis. They applied the measures to a database of mutual funds that had over 2,500 equity funds from 1975 to 1994 and reported that mutual funds, in particular aggressive growth funds, exhibited no characteristic timing ability, although they displayed some selective ability.

Zakri & Janjigian (1997) studied the market timing ability and selectivity of funds in the U.S. market. They proposed an amendment to the traditional Treynor-Mazuy (TM) model for their study and applied the model to domestic equity mutual funds. The key feature of the extended model used is that it takes cognizance of the fact that assets not listed in the S&P 500 index were components of mutual fund portfolios. They selected a sample of 633 mutual funds during the 1984 to 1994 period and reported positive and significant market-timing ability in mutual funds. This result was in contrast with the evidence from the original TM model. Their evidence also shows a positive and significant selectivity ability of mutual funds. In addition, they reported that there was a negative correlation between market timing ability and selectivity.

In a departure from the approach of earlier studies, Busse (1999) investigated the market timing ability of fund managers using daily mutual fund returns for the first time. Specifically, he studied mutual funds' ability to time market volatility. From the study,

evidence shows that volatility timing is key in the return of mutual funds. When volatility is high, fund managers tend to decrease their exposure to the market thus enhancing performance and effectively demonstrating market timing ability. The study demonstrates that volatility timing is beneficial as it results in higher Sharpe ratios while moderating interest rate risk. This suggests that actively managed funds can hedge against volatility in the market, thereby demonstrating timing ability.

Becker, Ferson, Myers, and Schill (1999) studied the market timing ability of mutual fund managers using a conditional market-timing model that estimates funds managers' risk aversion for tracking error and a precise market timing signal. They studied mutual funds in the U.S. from 1976 to 1994, using a sample of over 400 funds, and found evidence that U.S. equity mutual funds behaved as highly risk-averse benchmark investors with little conditional market-timing ability.

Using Henriksson and Merton's (1981); and Treynor & Mazuy's (1966) models, Bollen & Busse (2001) studied the performance of 230 mutual funds using monthly and daily data. They found evidence that fund managers possessed market timing ability, which was more pronounced in the shorter horizon.

Bauer & Dahlquist (2001) from their study in the U.S. obtained evidence to validate the conclusion of Nobel laureate William F. Sharpe and other researchers that market timing is generally a challenging undertaking. They reported that the difficulty to time the market successfully varies over time. Using a new measure of performance referred to as the "roulette wheel" measure, they undertook a comprehensive evaluation of market-timing strategies on a monthly, quarterly, and annual basis from 1926 to 1999 for six major U.S. asset classes. Their result shows that in the period between 1995 and 1999 period, a buy-and-hold strategy on large-capitalization stocks would have outperformed about 99.8 percent of over one million possible quarterly switching options between large-cap stocks and U.S. T-bills. The researchers posit that the situation would have been much different in an earlier period of 1994. They showed that during that period if 1,000 portfolio managers had made monthly random choices between large-cap stocks and T-bills, about 591 of them would have outperformed a buy-and-hold strategy. This shows clearly that it had

become progressively more difficult to time the market successfully in more recent years than in earlier periods.

Chance and Hemler (2001), analyzed the performance of 30 professional market timers during the period 1986 to 1994. Their approach was to analyze explicit recommendations executed in clients' accounts in a departure from the approach in earlier studies. When they used daily data, they found significant unconditional and conditional timing ability among fund managers; however, when they observed the recommendations of market timers every month, they found that significant timing ability disappeared. They concluded that the frequency with which recommendations are observed can impact the conclusions reached on timing ability.

Jiang (2001), proposed a nonparametric test for market timing ability and applied the model to a large sample of mutual funds that had different benchmark indices. He selected a sample of actively managed domestic equity funds for the period 1980-1999 for the study and found evidence that, on average, there was no superior timing ability among the mutual funds. In addition, he concluded that the observable features of mutual funds cannot be used to predict their timing performance.

Drew, Veeraraghavan, and Wilson (2002) attempted to address two questions in their study of Australian equity superannuation funds. Firstly, they sought to explore whether or not active fund managers possessed selectivity and market timing ability to deliver alpha. Secondly, they investigated the nature of the trade-off between stock selectivity and the market timing ability of fund managers. Their findings showed that fund managers delivered inferior returns from 1991 through 2000 and did not exhibit stock selectivity and market timing abilities to generate excess returns. Evidence from the study does not corroborate the claim in some studies that poor market timing ability is compensated for by superior selective ability.

Subsequently, Bollen & Busse (2004) studied the performance of mutual funds in a shorter horizon and reported significant abnormal performance which tended to dwindle in longer periods. They suggested that when funds generate high returns, they have larger cash inflows; this possibly creates a challenge of having enough investment opportunities

to exploit to maintain the rates of return achieved; implying that cash flow dynamics have an impact on performance.

Ferson and Qian (2004) modified the conditional timing approach earlier developed by Ferson and Schadt (1996). They argued that changes in the sensitivity to the market could arise as a result of changes in sensitivity to some other factors. Therefore, they incorporated these dynamics into their model. Specifically, they varied the beta and timing coefficient of funds over time and in different states of the economy. Their result indicated that U.S equity funds do not deliver alpha, and that fund managers deliver excess returns just enough to cover trading costs and expenses. They also reported evidence of conditional timing ability which was concentrated in certain fund types and during specific stages of the economic cycle. The funds exhibited some evidence of conditional timing performance under conditions of steep term structure interest rates. Further, evidence from their study shows that fund managers exhibit timing ability when dividend yields are high, which they attributed to the positive relationship between returns and dividend yields.

Kaplan and Sensoy (2005) investigated the timing ability of fund managers using the indexes chosen by the funds as benchmarks. They tested their timing ability in varying the level of their cash holdings and adjusting the benchmark portfolio beta to exploit the future direction of the market. Their result shows that mutual funds exhibit market timing ability in adjusting portfolio beta to generate alpha but not by varying cash holdings. The researchers attempted to provide possible explanations for this result. First, they argued that perhaps fund managers do not have enough discretionary control over cash holdings for this to be predictive of their timing ability. The second possibility is that fund managers adjust their benchmark stockholdings in anticipation of market movements. Thirdly, perhaps changes in the portfolio benchmark beta are simply a result of active management and not deliberate market timing, as active managers normally tend to buy stocks that are sensitive to the benchmark in up markets and vice versa.

Comer (2006) investigated the market timing ability of mutual funds using a sample of two hybrid funds. He developed a variant of the traditional Treynor-Mazuy model by incorporating a bond index and a bond timing variable. He observed that the conclusion reached regarding the timing performance of the funds using the traditional model and the

new multifactor model was different. Evidence from the multifactor Treynor-Mazuy model shows weak stock timing ability over the 1981–91 time period; however, for the 1992 to 2000 period, significant stock timing ability was demonstrated in one of the samples.

Chen and Liang (2007) investigated the market timing ability of so-called market timing hedge funds in the U.S., using the well-known models of Treynor-Mazuy, Henriksson-Merton, and Busse (1999). They also developed a new model which simultaneously assessed the market timing ability and volatility of mutual funds. They used a sample of 221 market timing funds during the period 1994–2005 and reported that hedge fund managers demonstrated timing ability both at the aggregate and individual fund levels. They also reported differences in the degree of timing ability based on the market condition, with timing ability being stronger during a bear market and in volatile market conditions.

Jiang et al (2007) proposed a new model for measuring timing based on mutual fund portfolio holdings. They argued that the model was free from artificial timing bias which conventional models were susceptible to and that it was more powerful statistically. They reported from their study that, on average, active, domestic equity funds in the U.S. possessed positive timing ability. They noted that funds that successfully timed the market tended to have relatively larger fund sizes and held a larger proportion of small-cap stocks in their portfolios. They also reported that successful market timers frequently used industry rotation investment strategy. Their evidence established that mutual funds used both public and non-public information to predict market returns.

Chen, Adams, & Taffler (2009) attempted to further explore the work done by Kosowski, Timmermann, Wermers, and White (2006) who reported evidence that a category of growth-oriented fund managers possessed superior skills to deliver excess returns, but did not identify the type of skills attributable to them. The researchers, therefore, sought to fill existing gaps by using new factor timing models to analyze the timing skills of 3,181 U.S. equity fund managers categorized as growth funds from 1993 to 2006. They employed the bootstrap method adopted by Kosowski et al (2006) to appraise the existence of excess returns and timing ability; they also used the method of Busse (1999) to appraise whether or not the timing ability was due to luck. They reported that growth-oriented managers who were able to deliver excess returns demonstrated superior growth timing skills which

significantly contributed to the abnormal returns recorded (at least 45%) and exhibited persistence of performance. Specifically, the top 10% of funds that showed evidence of growth timing ability over the look-back period of three years continued to display the strongest growth timing ability in the following year. They also reported that only fund managers who adopted the growth-oriented strategy of investing primarily in growth stocks were able to exhibit successful growth timing ability.

Saez (2009) proposed an approach to analyzing market timing over non-simultaneous periods using a sample of Spanish mutual funds. His result shows that mutual funds, on average, do not exhibit market timing ability, although a greater proportion of funds, particularly larger funds, demonstrate negative timing. The study validates evidence that negative timing is robust and persistent in the longer term. The researcher concludes that negative timing in mutual funds is the result of poor timing skills and not due to a buy-and-hold strategy.

Cuthbertson, Nitzsche, and O'Sullivan (2010) undertook a study to investigate the timing skills of U.K. mutual funds. They argued that a new non-parametric methodology adopted for the study was more robust than the well-known regression-based market timing models of Treynor-Mazuy (1966) and Henriksson-Merton (1981). They reported that mutual funds, on average, did not have timing ability, with just about 1% of funds exhibiting positive market timing ability, while 19% of funds recorded negative timing skills. They also found that the small fraction of funds that successfully timed the market were in the categories of equity income and all company funds, while mutual funds in the small stock funds and balanced fund categories did not show timing ability. However, timing ability was evident in some small-stock funds when a small-stock index rather than a broad market index was used as a benchmark.

Alda, Agudo, and Muñoz (2010) appraised the stock selection and market timing abilities of pension fund managers in the U.K. and Spanish markets. They analyzed the funds' access to, and use of, privileged information to implement management strategies and considered the possible effects of portfolio size. They reported that they corrected benchmark omission bias in the study. Evidence shows that fund managers possessed some degree of selective ability but exhibited perverse market timing ability and wrong use

of privileged information in timing strategies. The researchers concluded that the findings were consistent with the portfolio size effect, though influenced by benchmark omission bias. Similar results were obtained both for Spanish and UK pension fund managers.

Philippas (2011), studied the market timing ability and selectivity of fund managers in Greece, using the Treynor and Mazuy (1966) and Henriksson and Merton (1981) framework, with a sample of nineteen Greek fund managers, over sixty months. He finds that the fund managers lack correct timing ability; neither do they demonstrate the skills for selectivity.

Elton, Gruber, and Blake (2011b) used monthly holdings to study timing ability. Their holdings data differ from those used in previous studies in that they have a higher frequency and the database includes a full range of securities held, not just traded equities. The main benchmark used is the Fama–French three-factor model with the addition of a bond factor. Using a one-index and two-index model, they found evidence of positive and statistically significant timing ability among fund managers. However, with the multi-index model, the authors show that timing decisions, irrespective of whether the timing is measured using conditional or unconditional sensitivities, result in decreased fund performance. The study also shows that one of the key contributors to the negative timing performance of the funds is sector rotation decisions made in connection with high-tech stocks.

Sougné, Bodson, and Cavenaile (2012) studied the market timing performance of mutual fund managers globally from the perspectives of market return, market-wide volatility, and market aggregate liquidity. They suggested a different approach for analyzing market timing by allowing the betas of funds to follow a random walk in the absence of market timing, thereby isolating and capturing market exposure dynamics and fund performance attributable to market timing. Their result shows that only a fraction of mutual funds exhibit market timing on returns (6%) while 13% and 14% respectively demonstrate volatility and liquidity market timing.

Christensen (2013) studied the timing ability of Danish mutual funds, using a sample of 71 mutual funds that operated in the market between 2001 and 2010. He adopted the single index model and multiple index performance appraisal regression models based on

the Jensen measure. For the timing ability, the quadratic regression models of Treynor & Mazuy (1966) and the options approach of Henriksson & Merton (1981) were used. He also analyzed the impact of management fees and other expenses on the performance of mutual funds. He reported that mutual funds do not deliver excess returns, do not exhibit timing ability, and do not demonstrate selectivity. A similar result was obtained by Škrinjarić (2013) who investigated the market timing skills of mutual fund managers in Croatia, using Treynor-Mazuy and Henriksson-Merton models to analyze a sample of 10 mutual funds. A lack of market timing abilities of mutual funds was reported.

Qian, Sun, Yu, and Chen (2014) sought to contribute to the debate over the possession or otherwise of superior skills by mutual fund managers and whether or not those skills persisted. They selected and analyzed all US domestic equity mutual funds from 1980 to 2012 using the so-called manipulation-proof performance measure (Goetzmann et al., 2007). They reported that there was ample evidence that some managers possessed superior stock-picking skills although high transaction costs due to frequent trading and higher expenses eroded the excess returns generated.

Rao (2014) studied the market timing and selective ability of Socially Responsible Funds (SRFs) and explored the impact of fund characteristics on market timing and selective ability, using the Treynor and Mazuy (1966) and Henriksson and Merton (1981) models from July 2002 to June 2012. He reported that managers of SRFs exhibited some selectivity but lacked market timing ability. He also reported that there was a trade-off between selective ability and market timing ability.

Borri and Cagnazzo (2017) compared the performance of a simple buy-and-hold strategy to market-timing strategies used by Italian investors. They collected data and estimated the returns generated through market timing strategies employed in Europe, the United States, and emerging markets. Their results show, across markets, the buy-and-hold strategy generally beat market timing. This outperformance varies depending on the region with an extra return of 0.24 percent per quarter in the Europe and Euro area, and 0.87 percent per quarter in the U.S. They posited that the differences in returns were not due to different levels of risk exposure in the different markets. They advised investors to choose low-cost passive strategies to optimize their gains in mutual funds.

Bazgour, Bodson, and Sougné (2017) investigated the liquidity timing ability of fund managers on four factors: market, size, value, and momentum. They did not find evidence that fund managers successfully adjusted their market exposure in anticipation of market liquidity changes; however, they reported strong evidence that fund managers successfully overweighted small stocks in anticipation of higher levels of market liquidity.

Oliveira, Salen, Curto, and Ferreira (2018) used the well-known Treynor & Mazuy and Henriksson & Merton, models to analyze the performance of 163 actively-managed European equity mutual funds that operated between January 2000 and December 2016. They found that the performance of mutual funds was poor and that mutual funds did not demonstrate possession of timing ability. However, they reported that evidence pointed to the existence of some selective ability.

Pilbeam and Preston (2019) analyzed the performance of Japanese mutual funds using a sample of 355 actively managed equity funds that operated between April 2011 and April 2016. They used an equal-weight portfolio of the funds and adopted Jensen's alpha measure to evaluate the performance. They reported strong evidence that Japanese mutual funds underperformed the benchmark four-factor capital asset pricing model. In respect of market timing ability, they reported that, on average, mutual funds did not display timing ability. The positive and significant timing ability demonstrated by about 50% of the funds in their sample was offset by the negative and significant timing ability of the other half. The researchers also sought to establish the robustness of the statistical inference by using Fama and French's cross-sectional bootstrap. Their evidence shows that most of the funds did not outperform a random portfolio with no skill, implying that fund managers were unable to exhibit superior ability. Finally, they found stronger performance persistence in poor-performing funds than in top-performing ones.

Cagnazzo (2019) empirically investigated mutual funds' performance in emerging markets, specifically with respect to the market-timing strategies used by investors. They used a model called 'performance gap' to verify the ability of investors to time the market, and reported that, on average, the performance gap was negative and statistically significant at -0.05% per month for equity and -0.06% for fixed income funds. They also reported that, overall, the worst performance was traceable to corporate and growth funds.

Nikolaos, Alexandros, Stephanos & Christina (2020) evaluated the selectivity and market timing skills of equity mutual funds in Greece using a sample of seventeen Greek equity mutual funds and the Treynor-Mazuy model. They reported that equity mutual funds managers did not exhibit selectivity and market timing ability, and concluded that the Efficient Markets Hypothesis (EMH) was validated.

Bozovic (2021) explored the performance of actively managed, European equity-based mutual funds that operated in the US between July 1990 and November 2020, using a sample of 16 funds and employing a standard risk-adjusted factor model. They found that mutual funds underperformed a simple passive strategy of the European benchmark portfolio and did not generate positive and significant alpha. They concluded that the funds did not exploit any of the asset pricing anomalies.

Żebrowska-Suchodolska and Karpio (2022) explored the market timing ability of mutual fund managers on the Polish stock market. They used the returns of 9 balanced mutual funds from 2003 to 2019 and employed the Henriksson-Merton and Treynor-Mazuy methodologies for the study. They reported that mutual funds underperformed the benchmark and fund managers did not exhibit market timing ability and selectivity.

Tosun, Jin, Taffler, and Eshraghi (2022) analyzed whether mutual fund managers had the ability with respect to their buy and sell transactions. In particular, they investigated whether managers possessed factor-timing skills. That is, were they able to appropriately tilt portfolio exposure to the risk factors of size, book-to-market, and momentum effects? They found that their results were consistent with the earlier works of Daniel et al. (1997), Elton et al. (2012), and others, who reported that fund managers do not exhibit evidence of significant characteristic-timing skills. However, they showed that fund managers exhibited differential abilities in their buying and selling transactions. Fund managers with superior selling ability were significantly better at buying stocks and, as a result, earned higher aggregate returns. On the other hand, possession of superior buying ability did not necessarily translate to successful selling skills, resulting in lower overall returns to such managers. They concluded that the overall timing performance of mutual funds is a function of the selling skills of fund managers.

Busse, Ding, Jiang, Lei, and Tang (2022) in their study reported a strong correlation between the returns of mutual funds driven by feedback trading and mutual fund betas. They also reported the incidence of artificial market timing when the traditional market timing regression models are applied over periods when the systematic risk levels in the market are variable. According to the researchers, a plausible explanation for the inverse relationship that has been widely reported between selectivity and market timing ability of mutual fund managers is the existence of artificial timing. They found evidence that fund feedback trading was prevalent in the market and that investors considered it valuable given the prevailing fund flow patterns.

2.2.6 Performance Persistence

Performance persistence can be defined as the level of correlation between the past performance of a fund and its future performance. Performance persistence occurs if a fund consistently outperforms (or underperforms) the average performance of a cohort of similar funds or a specific benchmark.

From the above definition, we could distinguish between absolute and relative performance persistence. Absolute performance persistence is the ability of a fund to consistently beat a specific benchmark. According to the Australian Securities and Investment Commission (2003), this has implications for the Efficient Market Hypothesis, that is, the rate at which security prices incorporate available information. It also raises questions regarding the merits or otherwise of managing mutual funds actively versus managing funds passively, such as in an index fund.

Relative performance persistence on the other hand compares the relative performance of a cohort of funds. Clearly, this has implications for the choice an investor makes regarding competing funds. If a fund can demonstrate relative persistence of performance, then it is easier for investors in mutual funds to make a choice between alternative funds. This means that consumers can make use of their knowledge of the historical performance of funds to take decisions about future investments.

In the academic literature, broadly two approaches have evolved for measuring performance persistence. The first approach is the use of regression analysis, whereby the risk-adjusted returns of a fund over time are regressed, using a benchmark. Thereafter, the correlation between alphas in the earlier period and the later period is assessed to determine the existence or otherwise of performance persistence.

The second approach is the Contingency Table methodology. This involved comparing the returns between funds in similar asset categories or a cohort. The researcher then uses the medians or quartiles of the funds returns to compare rankings of the funds in two different periods to obtain evidence of persistence of performance (Funds Management Research Centre, 2002).

2.2.7 Evidence on Persistence of Performance

Grinblatt and Titman (1992) investigated whether mutual funds exhibited persistence of performance or not. They designed several benchmark portfolios based on the features of the securities that the portfolios were made up including size, dividend yields, and historical returns. They selected a sample of 279 funds that operated from 1975 to 1984 in the United States and computed excess returns of the funds using time-series regression analysis. In order to obtain the required evidence, they divided the study period into two sub-period, with 1975 to 1979 as the earlier and 1980-1984 as the latter. The aim was to assess the performance of each fund in both sub-periods and determine whether funds that performed above average in the earlier period were able to replicate the performance in the latter period. They concluded that funds with above-average performance in the earlier period were able to maintain the performance in the future period. Hence, they found evidence of persistence of performance.

Shukla and Trzcinka (1992) studied the persistence of performance of 1,387 mutual funds grouped by 243 advisers from 1979 to 1989. They reported that there was no evidence of superior performance. However, their results show that poor performance was persistent. In addition, they found evidence that supports the conclusion from a number of previous studies that the benchmarks chosen markedly impact the results

obtained, as the use of some benchmarks increase the extent of inferior performance reported.

A similar result was obtained by Bogle (1992), who appraised the subsequent performance of the top twenty funds every year between 1982 and 1992. The result of his study shows that on average the twenty top-performing funds are ranked just above the median fund at 284th the following year out of 681 funds. This clearly implies that there is no evidence of repeat performance among the top-performing funds.

Brown et al (1992) contributed to the performance persistence debate. They argued that the use of a sample of funds consisting of only surviving funds will likely introduce a bias into the result. They contended that funds that adopted aggressive, high-risk strategies were likely to record above-average performance. If such funds survived, they were likely to continue to adopt and use high-risk strategies which would ensure repeat performances. They, therefore concluded that taking cognizance of only surviving funds in a sample will probably result in a wrong conclusion regarding the persistence of performance.

Hendricks et al (1993) investigated the performance of no-load, growth-oriented mutual funds from 1974-1988, using a sample of 165 funds. Using Jensen Alpha as performance metrics, they analyzed the performance of mutual funds and reached the conclusion that mutual funds exhibited short-term performance persistence. They reported that the top-performing 1/8th of mutual funds over a two-year period recorded superior returns on average over the worst-performing 1/8th of funds over the next two years. They concluded that funds that do well in the past relative to other similar funds continue to do well in the future in the short term. A similar observation was made regarding underperformance, which also persisted into the future. In addition, the researchers found that it was possible to generate profits by adopting a trading strategy that bought top performers and sold weak performers. They referred to the observed phenomenon as the possession of ‘‘hot hands’’.

Khan and Rudd (1995) analyzed the performance of equity and fixed-income funds, covering the period 1983-1987 and 1986-1990 respectively using a combined sample of 300 mutual funds. They assessed the performance of the selected funds during

the initial study period stated above and subsequently evaluated their performance a future period, 1988 to 1993 for equity funds and 1990 to 1993 for fixed income funds to determine whether their performance repeated. They made use of risk-adjusted returns and Contingency Table analysis and came to the conclusion that past performance did not predict future performance for equity funds, whereas fixed-income funds exhibited performance persistence even after taking cognizance of the investment style of the funds as well as management fees.

An important perspective regarding the influence of sample selection in studying mutual fund performance was provided by Malkiel (1995), who used a sample of mutual funds consisting of both surviving and non-surviving funds between 1971 and 1991 in the United States. He obtained evidence that during the 1970s sub-period, the persistence of performance was observable, but the phenomenon seemed to fade off in the 1980s. This study suggests that selecting a sample that consists only of surviving funds may lead to the wrong conclusion that mutual funds perform much better than they actually do.

Brown and Goetzmann (1995), selected a large sample of survivorship-bias-free, equity-based funds from 1976 to 1988 to investigate fund performance and disappearance during the period of study. They reported that the major reason for the failure and disappearance of mutual funds was weak historical performance over several years. In addition, their study clearly highlighted that losing funds appeared to persist as losers over time. They, therefore, suggested that investors can use past performance as a basis for making successful future decisions.

Elton et al (1996a) used a performance benchmark that takes account of four factors that have been found to influence the cross-section of returns, that is, market factor, size factor, growth factor, and bond index factor. The sample selected was free of survivorship bias and consisted of 188 equity funds with net assets of $15 million and above, from 1997 to 1993. The researchers computed the excess returns of each fund, ranked, and allocated them to 10 portfolios based on performance. They then evaluated and ranked the performance of each portfolio subsequently. They reported evidence of performance persistence both in the short and long run. In addition, they suggested that

the observed persistence of performance could not be adequately explained by the 'hot hands' phenomenon and that high expenses were strongly linked to the poor performance of the lowest decile portfolio of funds.

In his study, Carhart (1997) rejected the "hot hand" phenomenon reported by Hendricks et al. (1993). He selected a survivorship-bias-free sample of all equity-based funds between 1962-1993. He reported that the so-called hand' reported can be explained by the one-year momentum strategy. He argued that funds that by pure chance held a large proportion of the previous period's winning securities in their portfolios will likely maintain a relatively good performance in the future period based on the momentum effect. Further, he contended that such a performance could not be attributed to superior ability since anyone could adopt the momentum strategy which is based on historical information about past returns. Moreover, when the researcher adjusted for the momentum effect in his risk-adjusted measure, no evidence of performance persistence was found in top-performing funds, but rather it was observed in strongly under-performing funds. Based on the result of his study, the researcher suggested that mutual fund investors should avoid investing in funds with persistent poor performance. In addition, he suggested that funds with high returns in a previous year were likely to record above-average performance in the subsequent year, but not in the long term. Finally, he noted that there was an inverse relationship between funds' performance and their expense ratio, as funds with high alphas tended to have low expense ratios.

Daniel, et al (1997) developed and applied a portfolio-based performance measurement model with a view to analyzing the performance persistence of mutual funds. Their approach was to use benchmarks that took account of the features of securities that made up the portfolios being evaluated. Their results corroborated the evidence that the main drivers of performance persistence in mutual funds are the momentum effect and the adoption of momentum strategies by fund managers.

Phelps and Detzel (1997) validated earlier reports in the literature regarding the evidence that mutual funds exhibited performance persistence, using similar methodologies and time periods for the study. However, they noticed that evidence of performance persistence disappeared when risk measures that captured relevant risk

factors more robustly were applied. They also reported that the results were not replicated when performance in more recent periods was analyzed. They advised that the strategy of investing in past winners with the expectation that they will continue to win in the future is not reliable.

Christopherson, Person and Glassman (1998) used time-varying, 'conditional' alphas and betas to study the performance of pension funds. They justified the use of conditional analysis because it models more closely the real feature of alphas and betas rather than the usual constant averages used traditionally. Their sample consisted of 273 pension funds studied over the period 1979 to 1990. They obtained evidence in support of performance persistence of pension managers over time. The evidence appeared to be particularly strong with pension fund managers who recorded low conditional alpha in an earlier period. In addition, they reported that persistence became stronger farther into the future from three years and above.

Blake and Timmermann (1998) analyzed the performance and performance persistence of mutual funds in the U.K. They selected a sample of 2375 mutual funds from 1972 to 1995, and used monthly returns for their analysis. They obtained evidence that, on average, the risk-adjusted returns of U.K. mutual funds underperformed the benchmark by about 1.8% annually. In addition, they tested for the persistence of performance and reported that there was strong evidence of the existence of the phenomenon among U.K. funds, as top-performing funds maintained that status throughout the study period while those with poor performance continued to produce negative abnormal returns, on average.

Porter and Trifts (1998) studied the persistence of performance of mutual fund managers by evaluating the impact of experience on their performance. They compared the performance of relatively more experienced managers with less experienced managers using a sample of 93 mutual fund managers over a period of 10 years from 1986 through 1995. They employed relative percentile ranking to evaluate the performance of mutual funds with similar investment objectives and reported that the performance of the relatively more experienced managers was similar to the performance of the less experienced managers, on average. Specifically, managers with 10-year track

records at the same fund did not outperform managers with shorter track records. They also found that the superior performance of experienced managers did not persist over 5-year periods; however, repeat performance was observed among inferior performers, particularly for funds with above-average expense ratios.

Zheng (1999), analyzed the performance of mutual funds by tracking the flow of funds from investors to mutual funds to assess whether investors can identify top-performing funds. He selected a survivorship-bias-free sample of open-end mutual funds from 1961-1993 including both load and no-load funds, with an average of 478 funds each month. He found evidence that on aggregate, the flow of new funds into mutual funds was predictive of short-term future performance, as funds that attracted an inflow of new funds outperformed those that lost money. However, from the study, there was no evidence that adopting a strategy that followed the flow of funds would outperform the market. In addition, he observed a reversal in the performance ranking of portfolios with positive and negative returns respectively after 30 months, which suggests that performance persistence is a short-term phenomenon.

Allen and Tan (1999) tested the performance persistence of U.K. mutual funds using weekly returns of a sample of 131 funds from 1989 to 1995. The benchmark used was the U.K. fund managers' return, and they adopted the relative performance of funds to determine whether or not good past performance was predictive of future performance. They employed the two-way Contingency Tables earlier used by Goetzman and Ibbotson (1994) to test long-run persistence. They found that when raw returns of funds were used for assessment, 56% of the funds showed persistence of performance. Also, when risk-adjusted returns were used, 59% of winners repeated their performance. Overall, they concluded that U.K. mutual funds displayed evidence of persistence of performance in the long run, both when raw returns and risk-adjusted returns were used. However, their evidence does not validate persistence in the very short run.

Fletcher (1999), analyzed the performance of U.K. unit trusts from 1985 to 1996 using a sample of 85 trusts with an investment focus on the U.S. He used both Jensen's (1968) and Ferson and Schadt's (1996) models of performance analysis. The study presents evidence that funds do not demonstrate the persistence of performance. The

researcher concludes that the results are consistent with market efficiency in that evidence does not show that unit trust can consistently beat the market, and past performance of unit trust is not predictive of future returns.

Jain and Wu (2000) examined a sample of 294 mutual funds to test whether mutual funds that promoted their services through advertisement persisted in outperforming their peers in the U.S. market. They purposively selected a sample of equity mutual funds that advertised their services in either Barron's or Money magazines over the years 1994 to 1996. Moreover, they selected funds whose performance before the advertisement was significantly higher than that of the benchmarks. They appraised performance persistence by comparing the returns of advertised mutual funds before and after the advertisements. They obtained evidence that the funds in their sample delivered inferior performance on average in the period (s) after the advertisement and there was no persistence of performance. They concluded therefore that the results did not validate the signaling hypothesis. However, the authors reported that advertised funds attracted more money than others that did not advertise.

Quigley and Sinquefield (2000) studied the performance of U.K. equity-based mutual funds from January to December 1997, using a three-factor model that models funds' exposure to the market, value, and size risks. They reported that mutual fund returns, net of expenses, generally underperformed the market, and that poor performance was worse for small-cap style mutual funds. In addition, they found evidence that, based on net returns, good performance does not repeat, whereas bad performance persists.

Wermers (2001), undertook an analysis of the performance of mutual funds using a comprehensive database of quarterly portfolio holdings of almost all publicly traded mutual funds with equity holdings from 1974 to 1994. The data was survivorship-bias-free. He arrives at a couple of conclusions. First, evidence shows that the best performers during a given year consistently repeat the performance in the following year except for a few years. This observation is consistent with the momentum effect. However, he notes that the persistence of performance disappears after controlling for the momentum effect in stock returns. Further, he reports the persistent use of active momentum strategies by

mutual fund managers, which appears to be the major factor driving the persistence of performance. Finally, he validates the conclusion of other researchers that survivorship bias is not a major concern in the measurement of mutual fund performance. He reports that once the momentum effect is removed, the best performers during one year are the worst performers during the following year. This shows that non-surviving funds as a pool are quite representative of the cross-section of funds contrary to earlier belief.

Fletcher and Forbes (2002) studied 724 equity-based U.K. unit trusts using monthly returns to assess performance persistence. Unit trusts' performance was measured using several models including Jensen (1968) and Carhart (1997), with the chosen benchmark being Financial Times All 26 Shares (FTA) index. In addition, for the performance persistence test, they used Brown and Goetzmann's (1995) two-way Contingency Tables. They found evidence of significant performance persistence of unit trusts when the Capital Asset Pricing Model (CAPM) or Arbitrage Pricing Model (APT) were used as risk models. However, when the Carhart (1997) 4-factor model was applied, the evidence disappeared. The authors, therefore, contended that the apparent performance persistence of unit trust cannot be attributed to superior skill, rather it is due to factors that influence the cross-sectional differences in stock returns not captured by risk models.

Wermers, Smith, Bollen, Daniel, Ferson, Grinblatt, Oldfield, Stoll, Titman, Wallace, Zhenng, and Zhao, (2003) investigated the phenomenon of 'smart' money. That is, whether or not investors have the ability to select funds that will outperform the benchmark. They found out that there was persistence of performance in mutual funds over several years. They attributed this result to the behavior of both investors and fund managers. On the one hand, investors invested more heavily in funds that performed better in the previous year. On the other hand, managers of these top-performing funds invested in momentum stocks which helped them to continue the outperformance for several years. However, managers of losing funds tended to hold on to their losers, perhaps due to the disposition effect, hence they continued to underperform as they did not benefit from the momentum effect being enjoyed by the winning funds. The researchers also reported that the outperformance recorded by the top fund managers was not completely explained by the momentum effect. Rather, there was a flow-related

buying effect as well, in that stocks that winning funds purchased as a result of a persistent inflow of funds from investors tended to record excess returns of up to 2 to 3% per annum over a period of four years. They concluded that money was smart in the sense that investors identified and invested in funds that had a superior past performance. They were of the opinion, however, that a smarter strategy was to invest in the stocks that top-performing funds were buying in order to benefit from the attendant momentum effect resulting from flow-related purchases.

Berk and Green (2004) developed a novel model to assess the performance of active portfolio managers by developing a benchmark to measure the relationship between performance and fund flow into mutual funds. They identified two reasons why active managers did not outperform passive portfolios. First, was competition for capital; and second, was the decreasing return to scale that arose with active management. These factors, they argued, combined to dictate that past performance could not be used to predict future performance. That is, performance does not repeat. However, the researchers found evidence of a strong relationship between past performance and the flow of funds. They contend that it is this relationship that ensures that there is no persistence of performance in mutual funds. Finally, they conclude that the majority of active managers (about 80%) have superior skills to cover their fees.

Kenourgios & Petropoulos (2004) examined the arguments around the persistence of performance of mutual funds and whether past performance can be used as a basis for selecting mutual funds. Specifically, they examined whether UK mutual funds that had recorded top performance over a period of one or two years were able to replicate their performance in the future. They used Jensen alpha and two-way Contingency Table methodologies to evaluate persistence. Evidence from their study points to weak persistence in the 1990s; they concluded that there was no strong evidence to support the use of past returns performance to guide future investment decisions. However, since they excluded funds that had ceased to exist or merged or started operation after 1990, there is a possibility of survivorship bias in the sample.

In another U.K. study, Tonks (2005) investigated persistence in the performance of pension funds. His data consisted of quarterly returns from the Combined Actuarial

Performance Services Ltd for 2,175 pension funds from 1983 to 1997. Although he controlled for survivorship bias, he identified look-ahead bias as a potential drawback. Using a 3-factor model to adjust for risk and Contingency Table analysis to assess the persistence of performance, he reported significant performance persistence over one-year horizons and a lesser degree of persistence over other time intervals.

Cohen, Coval, and Pastor (2005) developed a new approach for assessing the skill of mutual fund managers by analyzing their security holdings and comparing them with the holdings of top-performing managers as well as poor-performing managers. They used the historical holdings of several funds to evaluate the performance of each fund. According to the researchers, the new measure applied was particularly useful for empirical applications where the ranking of managers was required. They reported evidence of weak performance persistence in the performance of U.S. equity mutual funds using gross returns and after taking cognizance of the impact of momentum in stock returns.

Timmermann, White, Kosowski, and Wermers (2006) investigated the performance of U.S. mutual funds that invested in the domestic equities market from 1975 to 2002 using a bootstrap statistical methodology, which they justified on account of the complex non-normal distribution of the alpha of mutual funds due to the diverse patterns of risk-taking ventures undertaken by funds. They found that quite a number of fund managers displayed stock selection skills that more than covered their costs and that the superior performance of these top managers was persistent. These results are inconsistent with the conclusions of many past studies.

Busse and Irvine (2006) analyzed the performance of 230 mutual funds in the U.S. from 1985 to 1995. They categorized mutual funds into deciles of portfolios after ranking them based on their quarterly alphas. They then estimated the performance of each decile portfolio in subsequent periods. To compute risk-adjusted alphas, they used several models including Carhart's (1997) four-factor model and a modified Treynor and Mazuy's (1966) and Henriksson and Merton's (1981) market timing models. The authors found evidence of short-term performance persistence but noted that persistence disappears after controlling for momentum.

Kosowski, Timmermann, Wermers & Hal (2006), evaluated the performance of the U.S. equity mutual fund industry from 1975 to 2002. They used the bootstrap approach, giving justification that mutual funds' alphas exhibited complex, non-normal statistical distribution due to the variety and complexity of trading activities undertaken by mutual funds to generate alpha. They reported strong evidence that the performance of both winning and losing managers could not be attributed solely to luck or mere sampling variability. They found that growth-oriented funds displayed superior and persistent performance while income-oriented funds did not.

Bauer, Otten, and Tourani-Rad (2006) assessed the performance of New Zealand mutual funds for the period 1990 to 2003, using a survivorship-bias-free sample of 143 funds. They obtained evidence that mutual funds in New Zealand were unable to outperform the benchmark as the alphas for equity funds were statistically not different from zero, while balanced funds recorded marginal underperformance. In addition, they did not find any evidence to support the timing ability of fund managers but reported that there was evidence of persistence of performance among poor-performing funds. Finally, they reported that fund size and expense ratio positively impacted risk-adjusted returns of mutual funds while load charges were negatively related to risk-adjusted returns.

Cuthbertson, Nitzsche, and O'Sullivan (2008) deployed the bootstrap method to study the performance of U.K. unit trusts with the aim of determining whether their performance was driven by skill or mere luck. Their sample consisted of 675 equity-based, actively managed funds designed to be free from survivorship bias, and that operated from 1975 to 2002. Their result indicated the presence of a small number of top-performing funds with genuine stock-picking ability, and clear evidence that their performance was not attributable just to good luck. In addition, they concluded that available evidence showed that the worst performing displayed persistence of performance, which suggested 'bad' skills.

Wang (2008) adapted the methodology of Berk and Green (2004) to evaluate the performance of mutual funds in relation to funds flow. He found evidence similar to the earlier work of Berks and Green as follows: (1) High-skilled managers do not consistently beat low-skilled managers as new fund flows into top-performing funds tend to equalize

the excess returns across the field. (2) Evidence from the study is consistent with the fact that some managers possess superior skills. (3) Investors tend to chase the abnormal returns generated by the high-skilled managers by increasing fund flow to top-performing funds (4) Performance does not persist in the long run as funds flow and diseconomies of scale in the portfolio cancel each other out.

Fortin and Michelson (2010) studied the persistence of performance of mutual funds using a large sample of equities and bond funds over a period of 10 years. They created nine categories of mutual funds: Aggressive Growth and Growth (AGG), Balanced Funds (AAB), International Stock (IS), Corporate Bond (CB), Government Bond (GB), Municipal bond (MB), Growth/Income and Equity/Income (GIEI), Small Company Equity (SCE), and Specialty Equity (SP). They reported evidence of persistence of performance in all the categories except for Government Bonds (GB) and Corporate Bonds (CB). They found that performance repeated for both top-performing and poor-performing funds but did not apply to funds in the middle of the performance ranking.

Gruber (2010) explored the rationale for active management in the face of overwhelming evidence from research that active funds generally underperformed passive funds. He contends that, to some extent, past performance data can be used to predict future performance since mutual funds are traded at net asset value which does not factor in the value of superior management. He posits that a category of sophisticated investors is aware of this fact, hence fund flows into mutual funds are predictable. He observes that investors who put new money into mutual funds benefit from this knowledge as new cashflows generate positive risk-adjusted returns which outperform both active and passive funds on average.

Hereil, Mitaine, Moussavi, and Roncalli (2010) investigated the performance of mutual funds using a Markov modeling of the fund rating system. They found evidence that within the time horizon of investors, performance does not persist. They suggested that possible explanations for this result include the fact that rating systems are not time-homogeneous, and that fund style is important for comparing funds ratings. They concluded that both quantitative analysis and qualitative factors are important and should be combined in mutual funds' selection.

Elton, Gruber, and Blake (2011a) explored several alternative approaches for assessing the performance of mutual funds to ascertain which method was most effective in identifying top performers with persistent, above-average performance. The researchers showed that using alphas computed from fund holdings and securities betas as a basis of ranking mutual funds had better predictive value in identifying funds that will produce better future alphas than the alternative approach of selecting funds using alpha estimated from a time series regression on historical fund returns. In addition, they noted that the more frequent the holdings data provided, the greater the benefit. They adopted Ferson and Schadt's (1996) model of conditioning beta to identify winning mutual funds and reported strong evidence that access to more frequent holdings data about mutual fund portfolios could enhance the evaluation of mutual funds by investors. Their argument supports performance persistence.

Elton, Gruber, and Blake (2012) studied the relationship between fund size and performance. They sought to test the argument of Berk and Green (2004) regarding the possible reasons why past performance should not predict future performance. Berk and Green (2004) had given two economic arguments to support the non-persistence of persistence. First, is the effect of increasing expenses as a fund records good performance, while the other is the impact of increasing size following good performance with its attendant diseconomies of scale. Evidence from the study shows that expense ratios and management fees decline with size, and with success. Further, evidence shows that top-performing funds reduce fees while poor-performing funds increase fees. In addition, the study shows that size is not significantly related to future alpha, and that there is a strong relationship between past and future performance, even though the relationship tends to weaken over longer periods.

Cuthbertson and Nitzsche (2012) studied the performance of German mutual funds between 1990 and 2009 for persistence of performance using empirical statistics. They found no evidence that performance repeated when gross returns and Fama-French 3-factor methodologies were used. Similar results were obtained when a 'total performance' measure was used. They concluded that the performance of mutual funds does not persist and that poorly performing funds exhibit lack of superior skill rather than being unlucky.

Cuthbertson, Nitzsche, and O'Sullivan (2012) analyzed U.K. mutual funds using statistical hypothesis testing methodologies to estimate the false discovery rate (FDR) amongst them. False discoveries simply refer to mutual funds whose significant alphas can be attributable to luck only. They reported that FDR was quite high among top-performing funds with the implication that only about 2% of all funds truly outperformed their benchmarks. On the other hand, among the worst-performing funds, the FDR was quite low at 15.9%. They concluded that very few top-performing funds repeat their performance across all categories including small companies and equity income funds.

Vidal (2012) found persistence of performance in European equity mutual funds, using a large survivorship-bias-free sample of six European countries between 1988 and 2010. He obtained evidence of performance persistence in benchmark-adjusted returns over a 1-year period and longer periods. In line with several other studies, this phenomenon was stronger among the top and bottom performers. He concluded that past performance was a predictor of future performance and that investors could find useful information for investment decision-making from historical performance data.

Rao (2014) in his study focused on socially responsible (SR) funds and investigated their performance over a ten-year period using monthly and annual return data, and a sample of 238 funds. To investigate persistence of performance, he adopted several approaches including relative percentile ranking, annual returns, and reward-to-variability ratios methodologies. Evidence from the study does not validate the existence of performance persistence among SR funds, and he concludes that past performance cannot guarantee superior future performance.

Flam and Vestman (2014) studied various aspects of mutual fund performance in Sweden including the skill of fund managers, risk-adjusted returns, and persistence of performance between 1999 and 2009. They found that Swedish mutual funds generated a negative alpha of -0.5% after expenses, although they recorded positive alpha of 0.9% before expenses. They found no evidence of persistence of performance or management skills of fund managers They reached the conclusion that the 4-factor alpha of mutual funds, on average, both before and after expenses, was statistically nil.

Sáez, Domínguez, and Tortosa-Ausina (2016) appraised the performance persistence of U.S. mutual funds, applying the traditional measures of persistence including Contingency Tables and transition matrixes on a set of simulated passive funds. Results showed that there was evidence of persistence of performance in mutual funds which was pronounced among top-performing funds. However, the researchers noted that the result was subject to the period of study as they did not find persistence in the recent period covering 2008 to 2015. They suggested that the inconclusive results in the literature regarding the phenomenon of performance persistence may be due to its being conditioned by the sample period.

Rao, Tauni, Iqbal, and Umar (2017) undertook a study to determine whether Chinese equity funds outperformed the market; whether fund managers demonstrated positive market timing ability; and whether there was persistence of performance among poor-performing mutual funds. A sample of 520 equity mutual funds was studied over the period 2004 to 2014, which covered the 2008 global financial crisis. They used the Capital Asset Pricing Model, and Carhart's four-factor model to evaluate risk-adjusted returns of mutual funds, while Treynor & Mazuy (1966) and Henriksson & Merton's (1981) models were used to assess market-timing ability. They found evidence that Chinese equity funds outperformed the benchmark, and that fund managers demonstrated the ability to successfully time the market. However, there was no evidence of the persistence of performance.

Mateus, Mateus, and Todorovic (2019) studied 817 U.K. equity mutual funds during the period 1992 to 2016. They proposed the use of style-specific peer group benchmarks, as opposed to the established style-specific indices. Using this approach, they found evidence that top performing funds as measured by significant positive alphas showed performance persistence for the following year, both when parametric and non-parametric models were used. They also reported that both winner and loser funds exhibited persistence.

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.

Zhai and Wang (2020) appraised the performance of mutual funds as well as hedge funds, using data covering the period from 2010 to 2019 in China. A non-parametric methodology was used to evaluate the persistence of performance using net returns and the Sharpe ratio. They reported evidence of persistence of performance for both mutual funds and hedge funds for some periods. Using lagged one-year returns to evaluate persistence, they found evidence that the performance of top-performing portfolios of hedge funds repeats while portfolios of mutual funds showed no evidence of persistence of performance.

Jadevicius (2019) studied persistence among Baltic equity funds using daily returns of ten open-ended mutual funds listed on the NASDAQ Baltic stock exchange. He used the Contingency Table methodology and applied Malkiel's Z-statistic, the Cross-Product Ratio (CPR) as well as Chi-square statistic to make a statistical inference. Overall, he did not find evidence of persistence of performance among the Baltic mutual funds.

Ferreira, Keswani, Miguel, and Ramos (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.

Miguel and Chen (2021) undertook a study of the persistence of performance of quantitative actively managed US equity funds. They found evidence that both for quantitative and non-quantitative funds, the performance of poor-performing funds repeats, while there is strong evidence of reversals among top-performing funds. They inferred from the study that the observed differences in the persistence of performance

were not due to flow-induced incentives to generate alpha. Finally, they concluded that, in terms of superior fund management capacity, machines were less skillful than humans.

Choi and Zhao (2021) conducted a follow-up study to the seminal work of Carhart (1997) on the persistence of mutual funds' performance, which reported that U.S. equity mutual funds' exhibited persistence of performance, as the one-year historical return was found to be a positive predictor of raw excess return and one-factor alpha over the next year. The implication of this is that an investor could believe that they can profit from a strategy of buying mutual funds with high past-year returns. Choi and Zhao, therefore, replicated Carhart's analysis of the performance of mutual funds from 1963 through 1993 and then extended the same analysis up to 2018. They found that from 1994 to 2018, a fund's performance was completely unpredictive of its future returns. They also reported that, over the period studied by Carhart, a statistically significant correlation between past and future returns was only observed in the years before 1980. They suggested that performance persistence may have disappeared as a result of lower returns to the phenomenon of momentum which was responsible for the persistence of performance in the earlier years. At the same time, high-performing funds now held fewer high-momentum stocks in their portfolio. The result lends credence to the recommendation that investors should invest in passive mutual funds rather than trying to beat the market through active management. It also highlights the importance of constantly re-evaluating and critiquing classical studies in finance and financial markets because of the dynamism of their environment.

Ozkan and Ozturk (2021) evaluated the persistence of performance of Turkish mutual and pension funds, studying a sample of 310 mutual funds and 259 pension funds that operated between 2010–2019. They employed several models including the Sharpe ratio, Treynor ratio, Information ratio, Jensen's alpha, Sortino ratio, and Omega ratio. They found that only 2% of funds demonstrated some degree of persistence while 15 out of 20 fund categories did not have any funds that showed persistence in 10 years. They concluded that, overall, Turkish funds neither exhibit persistence of performance nor outperform the benchmark.

Reuter and Zitzewitz (2021) interrogated the impact of size on the performance of mutual funds. They posited that the level of diseconomies of scale in mutual funds management should be a pointer to the skills of the portfolio manager and the performance persistence of the portfolio. Their evidence showed that, although Morningstar ratings resulted in increased fund size, the regression discontinuity estimates did not give strong evidence that fund size eroded returns. They concluded that the impact of any downward bias in estimates of performance persistence due to diseconomies of scale is likely to be negligible.

Vidal and Vidal-García (2021) evaluated the persistence of performance of Korean equity mutual funds that operated between 1990 and 2020, using daily return data. They used the Contingency Table methodology for their analysis and found evidence that Korean mutual funds exhibited performance persistence at a statistical significance level of 1%.

Dorfleitner, Kreuzer, and Laschinger (2021) using a large dataset of over 400 fund compositions over the period 2003-2018, studied the performance of socially responsible U.S. mutual funds. Specifically, they analyzed the persistence of environmental, social, and governance (ESG) scores and controversies scores of the funds. They found evidence that, both in the short and long run, U.S. mutual funds exhibit ESG score persistence. In addition, results show that, compared to lower-paid managers, higher-paid managers achieve better controversies scores but worse ESG scores.

Lin (2022) also investigated whether the performance of U.S. open-end mutual funds repeats or not. He analyzed the monthly returns of mutual funds categorized under nine investment styles from January 1993 to December 2008. He finds some evidence to support the existence of performance persistence in mutual funds. He also reports that a zero-investment best-minus-worst strategy consistently outperforms the market as a whole.

Cuthbertson, Nitzsche and O'Sullivan (2022**)** re-evaluated the persistence of performance in the U.S. market. They used both the factor models and index models approaches for their analysis and constructed a range of portfolios with various sizes. They estimated gross alphas and net alphas of mutual funds using nonparametric

bootstrap *p*-values and statistical *t*-tests. They obtained evidence that mutual funds demonstrated performance persistence using both models adopted when a combination of small portfolios of funds and a relatively short holding period of 6 months or less are used.

Vidal-García, and Vidal (2022) investigated the short-term persistence of mutual funds in the Scandinavian countries between 1990 and 2020. Their sample consisted of equity mutual funds investing locally across the Scandinavian countries. As a performance measure, they adopted the four-factor Carhart's model and the Sharpe ratio, while the Contingency Table methodology and multiple regression analysis were used to analyze performance persistence. They reported that in the short term, Scandinavian mutual funds exhibited performance persistence and hence concluded that only short-term information on mutual funds is useful to guide investors' decision-making.

2.2.8 Mutual Fund Performance: Evidence from Nigeria

Research on mutual funds in Nigeria is quite scanty, and evidence from the few studies done is largely consistent with earlier findings from other parts of the world that mutual funds generally underperform the market.

Oduwole (2015) studied the performance of equity-based and mixed mutual funds from 2011 to 2014 using a sample of 31 funds and performance measures of Jensen Alpha, Sharpe ratio, and Treynor ratio. Evidence from the study led to the conclusion that on average, mutual funds underperform the market index as only 32% of the funds recorded positive Sharpe ratios, none had a positive Treynor ratio and only one fund had a positive but statistically insignificant Jensen's Alpha. He concludes that mutual funds managers in Nigeria lack selectivity to beat the market index and a passive strategy.

Sambo (2016) evaluated the overall efficiency of the aggregate pension funds investment portfolio in Nigeria from 2013 to 2015. His primary objective was to determine whether pension funds on average delivered returns above the risk-free rate and the stock market index using the Sharpe ratio. His evidence shows that the aggregate pension fund portfolio underperforms the market.

Mahmuda & Abdullahi (2017) studied the performance of mutual funds in Nigeria between 2015 to 2017. They categorized funds into nine groups and used the Sharpe ratio, Treynor ratio, and Jensen's alpha as performance appraisal models. They reported that mutual funds showed positive Treynor ratio and Sharpe ratio, but negative Jensen's Alpha. They inferred that mutual funds in Nigeria generally delivered excess risk-adjusted returns, but that fund managers lacked good stock selection skills or portfolio diversification ability. However, apart from the small sample period used, there is the likelihood of survivorship bias in this study, as mutual funds with less than one-year returns history were excluded from the sample.

Ilo et al (2018), analyzed the performance of 37 mutual funds that operated in Nigeria from 2012 to 2015. They used the traditional appraisal methods of Sharpe ratio, Treynor ratio, and Jensen's Alpha. Their result validates the earlier conclusion of Oduwole (2015) that, on average, mutual fund portfolios generate negative excess returns, and hence cannot adequately compensate investors for the risk undertaken. In addition, evidence points to the fact that fund managers lack stock selectivity and portfolio diversification skills.

Igbinosa (2020) used a sample of 95 mutual funds in his study of mutual fund performance in Nigeria for the 12 months of 2019. Seven categories of mutual funds were studies using a range of risk-adjusted models including Sharpe, Treynor, Jensen, and Information Ratios as well as Treynor-Mazuy's model. He found that, only managers of mixed funds exhibited market timing ability while managers of bond and fixed income funds exhibited selectivity. While managers of real estate funds, bond funds, and fixed-income funds displayed performance persistence over the period of study. However, it should be noted that the 12-month sample period used for this study is too small for a convincing conclusion on the performance of mutual funds.

Osaretin (2020) appraised the performance of mutual funds in Nigeria in 2019 employing the traditional risk-adjusted appraisal methodologies of Sharpe ratio, Treynor ratio, Jensen Alpha, Information Ratio, and Treynor-Mazuy ratio. He used the monthly net asset value of seven classes of mutual fund portfolios. He reported that mutual funds

outperformed the market, but that only real estate funds, bond funds, and fixed-income funds demonstrated superior selective ability. Again, it could be argued that the sample period in this study was simply too narrow for a meaningful conclusion.

Omokehinde (2021) in his study of the risk-adjusted performance of mutual funds in Nigeria analyzed the performance of mutual funds between April 2016 and May 31, 2019. He used a range of performance measures including Jensen's alpha, Sharpe, and Treynor ratios, as well as Fama decomposition of return. His result showed that 67% of mutual funds underperformed the market. In addition, he reported that fund managers did not exhibit superior stock selective ability.

2.2.9 Mutual Fund Performance: Evidence from other African and Developing Markets

Some considerable research work has been done in South Africa on the performance of mutual funds, relative to most countries on the African continent which have much fewer studies on the subject. Gilbertson's (1976) work was one of the earliest studies in South Africa, which assessed the performance of eleven funds from 1970 to 1976. He reported that on a risk-adjusted basis mutual funds underperformed the market by 1.10% on average. The result shows that only two mutual funds outperformed the market, and at a statistically insignificant level.

A similar study was by Taylor (1977) with a sample of 10 funds, covering the same period and using Sharpe, Treynor, and Jensen measures. The result is consistent with the earlier work by Gilbertson, as it shows that mutual funds on average underperform the market by 2.40% on a risk-adjusted basis. However, the reported underperformance is statistically equal to zero at 5% level of significance.

Furthermore, Gilbertson and Vermaak (1982) analyzed the performance of eleven South African mutual funds from 1974 to 1981. Their result shows that the funds recorded returns in the range of 15.9% per annum to 22.5% per annum (compounded monthly) which was lower than the returns of the market. They found no performance persistence in mutual funds, although, on a risk-adjusted basis, mutual funds outperformed the market.

In another study of South African mutual funds, Knight and Firer (1989) revisited the earlier work of Gilbertson and Vermaak (1982), by assessing the performance of 10 mutual funds from 1977 to 1986. They found that using raw returns as the basis of measurement, the unit trusts on average underperformed the market by about 2% p.a, although some of the funds beat the market individually. In addition, they reported that 50% of the mutual funds significantly outperformed the market on a risk-adjusted basis.

Biger and Page (1993) appraised the performance of 25 unit trusts from 1988 to 1992 using the Arbitrage Pricing Model. Evidence from their work shows that using a single-factor model, the sampled funds outperformed the market. However, a different result was obtained when a multi-factor model was used. This reinforces the importance of using an appropriate benchmark performance appraisal.

Meyer (1998) investigated whether or not performance repeated among mutual funds in South Africa, using a sample of 84 unit trusts that operated between July 1985 to June 1995. She finds evidence that performance repeats, but that the phenomenon is observable among only weak performers and not top performers.

Bradfield (1998) investigated the performance of mutual funds to determine whether they possessed superior ability to pick stocks and time the market. Using a variant of Lee and Rahman's (1990) model developed further by Bhattacharya and Pfleiderer (1983), he finds evidence that unit trusts do not exhibit positive stock selection or timing ability. Also, von Wielligh and Smit (2000) conducted a study on the persistence of the performance of mutual funds in South Africa. They found evidence that poor performance repeats among equity mutual funds.

In another study, Firer, Beale, Edwards, Hendrie, and Scheppening (2001) analyzed the persistence of performance of equity and fixed-income unit trusts between January 1989 and December 1999. They found evidence of strong persistence, based on risk-adjusted returns, for most combinations of formation and holding periods for equity unit trusts. They suggested that selecting equity unit trusts winners over the previous 2 years and holding them for the next two years was the most profitable long-

term strategy to adopt. They found that fixed-income funds do not demonstrate the same level of persistence.

Using an appraisal model earlier used by Zheng (1999), Oosthuizen and Smit (2002) investigated the selective ability of South African unit trust to successfully pick funds that would deliver superior returns to them. They reported that unit trust investors, on average, possessed a weak but statistically significant ability to select superior funds.

Another study was done by Collinet and Firer (2003) to appraise the performance of equity unit trusts in South Africa. They found weak evidence of persistence of performance among the equity unit trust as there was a positive correlation between past and future rankings to some extent. This relationship however did not persist for a considerable length of time.

Oldham and Kroeger (2005) investigated the performance of unit trusts using a sample of 20 funds that operated between 1998 and 2002. They adopted the Johannesburg Stock Exchange All Share Index as the market proxy and used the Capital Assets Pricing Model and Arbitrage Pricing Theory as asset pricing models. Evidence from their results indicated that only 4 funds out of the 20 in the sample generated superior performance over the benchmark at some point during the period of study. Overall, there was no convincing evidence that unit trust fund managers succeeded in generating excess risk-adjusted returns for their investors consistently.

On the contrary, however, Meyer- Pretorius, and Wolmarans (2006) reported that equity-based funds successfully outperformed the broad market index over the period, 1988 to 2005. They posited that by displaying superior timing and stock selective ability, unit trusts were able to outperform the benchmark on a risk-adjusted basis. Unit trusts earned 19.5% per annum while the market earned 18% on average. However, after costs, the average returns dropped to 12.4%.

Manjezi (2008) analyzed the performance of mutual funds based on their risk-adjusted returns, using a sample of 15 funds that operated between 2001 and 2006. He used the Treynor and Mazuy (1966) model for evaluating the timing and selective ability

of fund managers. Evidence from the study shows that, on average, mutual funds beat the market, with 9 out of 15 funds generating positive and statistically significant alpha. However, there was no evidence of superior timing and selective ability of fund managers from the Treynor-Mazuy regression analysis. The researcher concludes that the result presents evidence that the South African market was largely efficient.

Mibiola (2013) uses three measures to assess the performance of mutual funds. He selected a sample of 64 equity-based, South African funds and studies them over a period of 20 years (1992 to 2011). He subdivided the period into seven sub-periods to avoid survivorship bias. Evidence shows that mutual funds did not demonstrate superior performance over the market as a whole.

Tan (2015) appraised the performance of mutual funds between January 2009 and November 2014, a period that covers an era of quantitative easing in South Africa as a result of the challenges faced by developing economies. He used a sample of 10 equity funds and various performance appraisal models including Sharpe ratio, Treynor ratio, and Jensen's alpha to evaluate the risk-adjusted returns of mutual funds, and assessed market timing ability using Treynor-Mazuy and Henriksson-Merton models. Evidence from this study shows that South African fund managers neither display selectivity nor market timing abilities.

In their own study, Bertolis and Hayes (2015) evaluated the performance of equity-based funds from January 1994 to December 2012, using the FTSE and JSE All Share Indexes as market proxies. They further split the period into 6 sub-periods to reflect differences in the economic cycle classified as, downturn, average growth, or robust growth periods. The result shows that mutual funds underperform the benchmark during periods of economic downturn while they outperform in periods of robust growth. Overall, unit trusts displayed marginal outperformance, but no persistence of performance.

Keywood (2015), used a survivorship-bias-free dataset and Sharpe Ratio as a risk-adjusted measure. He tested the persistence of performance of mutual funds using the 'Recursive Portfolio Approach' and found evidence of short-term persistence of

performance among only balanced, equity, and fixed-income funds. He noted, however, that persistence diminished over longer investment horizons.

Thobejane, Simo-Kengne, Muteba, and John (2017) evaluated the performance of 191 equity unit trusts in South Africa, from February 2006 to January 2016, covering three business cycles: the pre-global financial crisis, during the global financial crisis, and the recovery period from the crisis. The study investigated the presence of superior managerial ability as well as the persistence of the performance of funds. They reported that fund managers demonstrated weak evidence of selectivity and ability of successfully time the market. On the persistence of performance, they reported weak evidence that performance repeats, both among the top and bottom performers.

Chekenya and Klingelhöfer (2021) investigated mutual funds using a survivorship-bias-free sample of 6,000 funds between 1990-2015. They reported that some managers succeeded in beating the market either in the short run or long run.

In Ghana, Musah, Senyo, and Eliasu (2014) used the Treynor- Mazuy (1966), and Henriksson-Merton (1981) models to evaluate mutual fund performance from 2007 to 2012. They obtained evidence that largely validated earlier studies in Africa that fund managers lacked superior selectivity and timing skills to beat the market. In addition, evidence of performance persistence was not noticeable in the sample of mutual funds studied. They concluded that replicating the Ghana Stock Exchange composite index. In other words, passive investing is a better strategy than active fund management.

Mohamed et al (2014) assessed the performance persistence of equity and mixed mutual funds in Kenya from 2006 to 2009 using a sample of seven mutual funds. They used the Grinblatt and Titman (1993) regression model for their analysis and found evidence of significant performance persistence. They concluded that investors could use historical performance data to predict future performance, and hence make better investment decisions.

Muthomi and Muturi (2019) also contributed to the mutual fund literature by investigating the performance of mutual funds in Kenya. They assessed the impact of four key fund characteristics, viz stock selective ability, market timing ability, fund size,

and expense ratio on performance. The evidence obtained shows that only stock selective skills and market timing ability affect the performance of mutual funds in Kenya.

In India, Jaideep and Sudipta (1994) appraised the performance of five growth-oriented mutual fund schemes between February 1991 and August 1993, using the Capital Assets Pricing Model and Jensen Alpha models. They reported that mutual funds generally underperformed the market using the Sharpe ratio, Treynor ratio, Jensen Measure, and Fama-French metrics. In Greece, Artikis (2003) obtained a similar result. He evaluated the performance of ten 10 domestic balanced funds from 1995 to 1998, and reported that mutual funds generally underperformed the market as a whole using the General Index of the Athens Stock Exchange as the market index. Yet another study in India corroborated these conclusions when Tripathy (2006) evaluated the risk-adjusted returns of mutual funds using a sample of 31 funds from 1995 to 2002 and applying six performance measures. Evidence shows that fund managers were neither able to generate superior returns to beat the market nor were they able to efficiently diversify their portfolios.

Guha Deb, Banerjee, and Chakrabarti (2007) evaluated the selectivity and market timing skills of fund managers in India by applying both the unconditional and conditional models. The unconditional model is the traditional model used for assessing the skills of managers using Treynor- Mazuy (1966) and Henriksson - Merton (1981). The conditional model was developed by Person and Scadt (1996) who modified the traditional model by incorporating the effect of public information variables like interest rate, market dividend yield, etc., to control for biases in the traditional market timing and stock selection models. Using a sample of 96 mutual fund schemes, they obtained evidence that mutual funds lacked both market timing and stock selection ability using both unconditional as well as conditional approaches.

Abdel-Kader and Kuang (2007) investigated the performance of thirty Hong Kong actively managed mutual funds from August 1995 to July 2005, with the specific objective of exploring their risk-adjusted performance, selective skills, timing ability, and performance persistence. They made use of several models including the single-factor model, three-factor models, Jensen’s alpha, and Treynor ratio to evaluate the weekly

returns of funds selected in the sample, using the Hong Kong market as a benchmark. Treynor-Mazuy's (1966) model was used to evaluate the selectivity and timing ability of fund managers while performance persistence was assessed using both Jensen's and Treynor's measures. The result shows that Hong Kong mutual funds underperform the market and that mutual fund managers do not demonstrate selectivity and timing ability. However, evidence shows that performance repeats in the short run among winners and losers alike.

Rompotis (2007) studied the performance of Greek equity funds from August 2005 to August 2007. He obtained evidence that mutual funds do not outperform the benchmark. He also infers that fund managers do not possess stock-picking ability since mutual funds do not produce significant excess risk-adjusted returns. In addition, his evidence shows that fund managers have negative market timing ability which clearly explains why mutual funds do not achieve an excess return to compensate for expenses. However, the existence of persistence of performance in the short run was reported.

Razek and Ebeid (2007) studied the market timing ability of mutual funds using a sample of 30 stocks in the Egyptian stock market, collectively listed on the CASE 30 index. They used the Treynor-Mazuy and Henriksson-Merton Models for their study and concluded that there was no evidence that mutual funds in Egypt possessed market timing ability. They, therefore, recommended a buy-and-hold strategy to investors. In addition, they held the view that a carefully constructed index portfolio designed to track a broad market index will serve the purpose of replicating the returns of the market.

In Poland, Swinkels and Rzezniczak (2009) carried out a study on the performance of mutual funds using monthly mutual fund returns over the years 2000 to 2007. Specifically, they assessed the managers' selectivity and market timing skills across equity funds, balanced funds, and bond funds, with a total sample of 38 mutual funds. They reported evidence of positive but insignificant selective skills of managers across the three categories of funds in the sample. With respect to market timing, they found no evidence of superior ability.

Murhadi (2010) studied the market timing and selective ability of mutual fund managers in Indonesia using the Treynor-Mazuy (1966) and Henriksson-Merton (1981) models. He used the return data of 55 mutual funds over a period of 17 months from February 2008 to June 2009. He reported that, on average, mutual funds do not demonstrate superior market timing and stock selection skills, although four mutual funds each demonstrated market timing ability and stock selection ability respectively.

In a similar study in India, Bodla (2012) explored whether or not mutual funds possessed superior ability using traditional models. He used a sample of 27 equity mutual funds and data covering January 2002 to June 2010. His evidence suggests that mutual fund managers lack market timing ability but demonstrate some measure of selectivity. He also found a negative association between market timing ability and selectivity.

Rahman, Qiang, and Barua (2012) evaluated the performance of mutual funds that invested primarily in growth stocks on the Dhaka Stock Exchange in Bangladesh, using the traditional models of Sharpe, Treynor, and Sortino Ratios. Evidence from the study shows that most of the funds outperformed the benchmark based on the Jensen measure and Treynor ratio, but underperformed the benchmark when the Sharpe ratio was used. In addition, most of the funds did not exhibit evidence of proper diversification. They concluded that growth-stock-oriented mutual funds do not sufficiently reduce total risk through efficient diversification, do not deliver excess risk-adjusted return, and do not demonstrate evidence of superior skills sometimes attributed to mutual funds.

Zhou and Wong (2012) studied 250 funds over the fourth quarter of 2001 and the second quarter of 2009 in China. They obtained evidence that mutual funds do not possess market timing skills. They also found that the worst-performing funds tended to have larger sizes, higher subscription fees, better ratings, and higher geometric average returns. They opined that perhaps funds with the listed features were more attractive to investors and uninformed investors were quick to invest in them, pushing them to buy high and sell low.

In Pakistan, Babar, Nawaz, and Ashraf (2013) evaluated the performance of mutual funds from 2004 to 2011. They deployed the traditional risk-adjusted return measures of Sharpe ratio, Treynor ratio, Jensen Alpha, Sortino Ratio, Information/Appraisal ratio, and Fama decomposition model to evaluate the performance of 20 schemes. They reported that mutual funds underperformed the benchmark as they were not able to deliver excess risk-adjusted returns. In addition, mutual funds were neither well-diversified nor did fund managers demonstrate superior selective ability.

Narayanasamy and Rathanamani (2013) deployed several performance measures including Sharpe ratio, alpha, beta, standard deviation, and R-Squared to evaluate the risk-adjusted performance of five mutual fund schemes over three years from 2010 to 2012. They found that four out of the five funds in the sample studied recorded positive alpha, implying that they were able to outperform the benchmark.

Muruganandan (2013) assessed the market timing skills of mutual fund managers using both the Treynor-Mazuy (1966) model and the Jaganathan -Korjaczyk (1986) model of cubic regression. He reported that fund-of-funds managers lacked market timing skills and exhibited negative stock selection ability.

From a study of fourteen mutual funds in Poland, Ünal, and Tan (2015) found evidence that equity mutual funds lack both selectivity and market timing skills. The researchers analyzed the performance of fund managers using Jensen's (1968) alpha measure and Treynor-Mazuy's (1966) regression analysis methods. They found that two funds had positive but statistically insignificant Jensen alphas, while two other funds reported positive but insignificant market timing ability. This result suggests that, on average, mutual funds do not exhibit selective skills and market timing ability.

Panda, Mahapatra, and Moharana (2015) selected 41 equity funds for their study aimed at analyzing the risk and return performance, stock selection skills, and market timing ability of fund managers in India from January 2008 to December 2013. Their result showed that, overall, mutual funds did not deliver superior returns over the benchmark. However, mutual funds were found to exhibit average stock selection skills but no market timing ability.

The result of a test of the persistence of performance of mutual funds obtained by Rahmani and Hekmat (2015) is inconsistent with most other studies. Selecting a sample of 31 active mutual funds from the 21st of June, 2011 to the 21st of June, 2013, they evaluated whether or not the performance of mutual funds repeated. Using alphas as a measure of performance, panel regression analysis showed that mutual funds exhibited short-term persistence of performance, which was stronger among winners than losers. This is a departure from the results of most studies which show a greater incidence of performance among losers, where persistence is evident.

Bhatti, Ariff, and Mansor (2015) investigated the impact of fees on the performance of mutual funds using two types of funds in their sample. The first was the regular category of mutual funds while the other was ethical funds, based on Islamic principles, which had restrictions on the permissible investment opportunities. They computed the average returns of the two categories of mutual funds over a 20-year period and compared them to a market benchmark of equities-only mutual funds, and found that fees charged led to a significant reduction in returns for both types of funds. In addition, they find evidence that the earlier reported market timing ability in previous studies arose largely because of econometric issues, and that once a panel regression method is used, the supposed market timing ability disappears.

Hussain (2016) explored the performance of mutual funds in Pakistan from July 2005 to June 2013 using a sample of 20 open-ended funds and 7 closed-ended funds, employing several performance measures including Sharpe, Treynor, Sortino, Information, Jensen Alpha, M2/RAP, and Fama decomposition measure. Evidence shows that mutual funds do exhibit selective ability but underperform against the benchmark. In addition, the funds are not well-diversified. In addition, it was reported that, overall, closed-ended funds performed better than open-ended funds.

Dhanraj (2016) investigated the market timing and stock selection ability of Indian Asset Management Companies from April 2000 to March 2014. He selected a sample of 62 mutual fund schemes and used the Treynor-Mazuy (1966) and Henriksson-Merton (1981) performance appraisal models to analyze the performance of mutual funds. His

result shows that mutual funds possess stock selection ability but lack market timing ability.

Pandow (2016) studied mutual funds in India across the public, private, and foreign sector funds from the perspective of their selectivity and timing performance over a period of five years from April 2007 to 31st March 2011. Evidence from the study shows that 85 percent of mutual fund managers possess superior timing ability.

Neto, Lobão, and Vieira (2017) assessed the selective skills and market timing ability of Portuguese mutual funds, using a sample of 51 funds covering June 2002 to March 2012. They employed the unconditional models of Treynor-Mazuy (1966) and Henriksson-Merton (1981) as well as the conditional models. The result indicates that Portuguese mutual funds on average do not possess selectivity or timing skills. However, domestic equity funds in the sample exhibited a statistically significant market timing ability, while domestic and North American equity funds displayed selective ability during bull markets and timing skills during bear markets.

In China, Liao, Zhang, and Zhang (2017) investigated the performance of mutual funds and their ability to time the market. Employing both the cross-sectional and bootstrap analysis methodologies, they found evidence that mutual fund managers in China possessed the ability to successfully anticipate market volatility, market liquidity, and market returns, and positioned their portfolios appropriately to exploit those dynamics. They also obtained evidence that the best market timers beat poor performers by about 6–7% annually.

Rao, Ahsan, Tauni, and Umar (2017) analyzed the performance of mutual funds in China, selecting a sample of 707 equity mutual funds that operated from 2004 to 2015. They deployed the Capital Asset Pricing Model, Fama–French's three-factor model, and Carhart's four-factor model for their analysis. Their result showed that, overall, mutual funds in China delivered excess risk-adjusted returns. They, therefore, recommended that investors should adopt the active management approach to investors. In addition, they investigated the phenomenon of performance persistence and obtained evidence that performance does not repeat among mutual funds in China, as top-performing funds in an earlier period do no maintain their performance status in the following year, and

loser funds in an earlier period reverse their position, giving better relative returns in the following year. Overall, there was no evidence of the existence of performance persistence in Chinese mutual funds.

Biplob (2017) evaluated the performance of 15 close-ended mutual funds traded on the DSE (Dhaka stock exchange), Bangladesh, based on monthly net asset value, deploying the risk-adjusted performance measures - Jensen alpha, Treynor ratio, and Sharpe ratio., and using DSEX index as a proxy for the benchmark index. He reported that 12 out of 15 funds achieved superior returns compared to the benchmark index return. He concluded that mutual funds do not exhibit statistically significant timing skills, but show a moderate level of selectivity.

Nandrajog (2018) studied 68 equity mutual funds in India from January 2007 to June 2016; using the NSE-Nifty as a proxy for the market portfolio. His evidence shows that overall, mutual funds do provide positive returns over the market. The focus of Damani's (2018) study on mutual funds was to empirically investigate the market timing ability of fund managers. He made use of the Treynor-Mazuy (1966) and Henriksson-Merton (1981) models for his analysis and the BSE Sensex as a proxy for the market. The study used a sample of 41 large-cap equity funds and diversified equity funds that operated between April 2003 and July 2016. The researcher's findings provide evidence that fund managers adjust their betas while predicting market cycles.

Omri, Soussou, and Ben Sendrine Goucha (2018) compared the performance and investment styles of Islamic mutual funds with conventional funds during the 2009 to 2014 global financial crises, using the Riyad Capital mutual funds as a proxy for Saudi Arabian mutual funds. They employed the absolute and relative performance measures for their analysis and found that Islamic funds outperformed conventional mutual funds given similar risk exposure in the domestic market, but the two categories of mutual funds delivered comparable results when global market risk was lower. In addition, in terms of style, Islamic funds were more value-oriented and favored a contrarian strategy compared to conventional funds.

Maroof, Attiya, Javid, and Mian (2019), also explored the performance and market timing ability of mutual funds in Pakistan using a sample of 84 mutual funds over the years 2007 to 2014 which comprised of both bull and bear markets. Evidence from the study shows that mutual funds perform well during bear markets. Moreover, they tend to exhibit selective ability in bull markets, but the market timing and volatility timing abilities in bear markets. However, the result does not show evidence of style timing ability. Overall, the researchers reached the conclusion that mutual funds generally perform better in a bear market and fund managers demonstrate timing ability by adjusting their portfolio to exploit market movements.

Cagnazzo (2019) carried out an empirical assessment of the performance of market-timing strategies employed by investors in Emerging Markets. Their approach was to identify short-term determinants of mutual fund flows into emerging market equity and fixed-income funds. They then established a connection between fund flows and the performance of the funds. They employed a statistic called performance gap to evaluate whether investors made good timing decisions. They obtained evidence that, on average, the performance gap was negative and statistically significant to the tune of -0.05% per month for equity funds and -0.06% for fixed-income funds.

Gao, O'Sullivan, and Sherman (2019) conducted a study on the performance of Chinese mutual funds using a dataset of 419 funds from May 2002 to May 2014. Several risk-adjusted performance evaluation models were used, with the first being the unconditional models including Jensen Alpha, Fama and French model, and Carhart's model. Next are the conditional-beta models, which take into cognizance factor loadings based on publicly available information. The third group is the conditional alpha-beta models in which case alphas are assumed to be time-varying, and conditional on economic information, following Christopherson et al. (1998). Results from all the performance measures show that, on average, fund managers neither exhibit superior selection, nor timing skills.

In Greece, Koutsokostas, Papathanasioum, and Balios (2019) investigated the performance and persistence of performance of equity mutual funds from 2008 to 2017 using several performance models. They used daily data on all mutual funds in operation

and employed both single-index (Jensen Alpha) and multi-factor models (Fama and French, 1993; Carhart, 1997). To appraise the persistence of performance they made use of both parametric (Bollen and Busse, 2005) and nonparametric tests (Malkiel, 1995; Brown and Goetzmann, 1995; Kahn and Rudd, 1995). They obtained evidence that, on average, Greek equity mutual funds underperformed the market index. Their result does not validate the existence of persistence of performance among equity mutual funds.

Hacini and Dahou (2019) sought to evaluate the skills of mutual funds in Jordan to successfully select stocks that will deliver superior returns and time the market. The study adopted the Treynor & Mazuy model to analyze stock selectivity and market timing skills. Also, monthly data of the NAVs of mutual funds and monthly returns of the general index of the Jordanian Stock Exchange from October 2010 to Jun 2019 were analyzed. They obtained evidence that mutual funds exhibit superior stock selection ability, but do not demonstrate market timing ability.

The study undertaken by Upadhyaya and Chhetri (2019) in Nepal was aimed at evaluating the risk-adjusted returns of mutual funds and the ability of fund managers to diversify risk, select securities, and time the market. They obtained data from eight mutual funds from 2015 to 2018 for analysis. The risk-adjusted performance measures used included Jensen alpha, Treynor ratio, and Sharpe ratio. The Treynor-Mazuy and Fama decomposition models were applied to evaluate diversification, market timing, and selective ability of fund managers. Evidence from this study shows that mutual funds do not successfully time the market, they display a low amount of diversification and exhibit a moderate selective ability.

Guha Deb (2019) examined the performance persistence of actively managed equity mutual funds after controlling for market risk, size, value, momentum, and expenses. They also investigated whether performance persistence was a function of the investor’s holding period, fund size, age, style, or expense ratio. Evidence from the study showed that there was persistence over a shorter time horizon and that larger and older funds and funds with high expense ratios were more persistent. However, they reported that some of that persistence was due to the relatively poor performers in the group.

Mansor, Al Rahahleh, and Bhatti (2019) investigated the return performance and persistence of ethical and conventional mutual funds in Malaysia during financial crises, with specific reference to the Asian financial crises and the global financial crises. They selected a total sample of 479 funds consisting of 129 Islamic mutual funds (IMFs) and 350 conventional mutual funds (CMFs) respectively. Using the Contingency Table methodology to test for persistence, they got evidence that, on average, IMFs and the CMFs outperformed the market during the study period; while overall, the IMFs outperformed the CMFs. It was observed however that the IMFs and CMFs recorded similar performance during crisis periods.

Using sixty-five mutual funds that operated between 2018 an 2019, Boudiono and Azis (2020) studied the effect of market timing ability and fund size on the performance of equity funds. They found that market timing ability has a significant, positive effect on the performance of mutual funds, while fund size negatively impacted the performance of mutual funds also at a statistically significant level.

Agarwal, Bansal & Dhillon (2020) appraised the market timing and selective skills of mutual fund managers. Using both Treynor-Mazuy's (1966) and Henriksson-Merton's (1981) models, they found evidence that mutual funds lack market timing and selectivity. Similarly, Alam and Ansari (2020) explored the timing ability of mutual funds in India, but from the perspective of liquidity and volatility timing, using a sample of 183 equity funds from April 2000 to March 2018. Their result shows that mutual funds possess liquidity timing ability at both individual and portfolio levels. However, they reported that mutual funds do not possess market timing and volatility timing ability.

Another study in China was by Li and You (2020) which examined Chinese mutual fund managers' ability to time the market, liquidity, and volatility. They used daily data of equity mutual funds from 2015 to 2019 and found evidence that mutual fund managers do possess market timing ability. They reported that passive funds demonstrated better volatility timing skills, while active funds displayed a superior ability to time the market and liquidity.

Lekovic, Jaksic, and Gnjatovic (2020) evaluated the performance of mutual funds in the Republic of Serbia from 2011-2015. They found evidence that active portfolio managers are not able to beat the market. In addition, the result shows that fund managers lack both selectivity and market-timing skills.

In Bangladesh, Chowdhury, Ali, Usman, and Ullah (2020) investigated the performance of mutual funds. They obtained data from the Dhaka Stock Exchange on all open-ended funds from 2010 to 2015 for their analysis. Their results presented evidence that managers of equity mutual funds possess selective ability, and that past performance correlates with future performance in the short run; hence performance persists.

Zhang, Wang, and Yan (2020) analysed foreign equity funds in China, from 2004 to 2017, using a sample of 308 Chinese Qualified Foreign Institutional Investors (QFIIs) in China's A-share market. Their study focussed on stocks actively traded by QFIIs, and stocks that deviated from the benchmarks (DFB). Adopting a holdings-based approach for QFIIs, they obtained fund managers' views and forecasts of the future value of stocks. They reported evidence of short term persistence based on the observation that stocks traded by QFIIs, and stocks with higher DFB outperformed their benchmarks over the next one to three quarters. They suggest that the reported superior performance was driven by the use of historical rather than new information in asset pricing by the foreign institutions. They affirm that their results highlight the critical role of foreign equity funds in driving market efficiency in the emerging markets.

In another study in China, Cornell, Hsu, Kiefer, and Wool (2020) investigated the performance of mutual funds within the context of the prevailing speculative retail trading environment and the expectation that professional fund managers should demonstrate superior performance. Using data on the Chinese mutual fund industry, they proposed a new method to evaluate the skills of fund managers with persistent performance. Their result shows that mutual funds in the top 1% of their ranking in a current 6-month period, have a probability of 22% to be among the top 10% in terms of returns in the following period. However, for a fund in the top 1% in the previous 6 months, the probability of being in the top 10% in the next 6 months is only modestly better than noise at 12%. This is evidence of weak persistence if any. In addition, the researchers observed declining

skills and performance persistence at the industry level, probably as a result of mutual funds transforming to hedge funds. The study also shows that most of the top-performing Chinese mutual funds delivered excess performance relative to peers through market timing rather than stock selection, perhaps due to the emphasis placed on the management of portfolios' downside risks over relative returns.

Azimova (2021) studied the risk-adjusted performance of mutual funds with a focus on the performance of Turkish mutual funds that operated on the Borsa Istanbul from 2009 to 2020, deploying the Sharpe ratio and Information Ratio metrics. They did not find evidence that the performance of mutual funds repeats. In addition, they studied the impact of benchmarks on performance measurement and reported that most Turkish funds were not statistically related to the broad capitalization index or to the alternative index. They inferred that popular indices may not be appropriate proxies for the broad market for the purposes of performance benchmarking. They recommended that in mutual fund performance studies, appropriate benchmarks that reflect the risk-return features of mutual funds should be adopted.

Atta and Marzuki (2021) investigated the market timing and selective skills of mutual fund managers in four emerging markets of Saudi Arabia, Malaysia, Indonesia, and Pakistan from 2007 to 2018, using several performance models. They reported that mutual fund managers demonstrated good selective skills but poor market timing ability.

Ariswati, Iskandar, and Azis, (2021), investigated the impact of market timing ability and stock selection skills on the performance of equity mutual funds in Indonesia within the context of the Covid-19 pandemic. The study used both Treynor-Mazuy conditional model along with unconditional models to assess the market timing ability and selective skills of mutual funds, using return data from 55 equity mutual funds. They obtained evidence that, using the unconditional model, mutual funds did not demonstrate market timing ability but exhibited stock selection skills. However, with the conditional models which incorporate macroeconomic variables, mutual funds showed positive market timing ability but negative selectivity.

Another study by Gao, O'Sullivan, and Sherman (2021) investigated the performance of Chinese equity mutual funds from May 2003 to September 2020. They implemented a non-parametric bootstrap methodology which helps to evaluate the role of skill versus luck in the performance of mutual funds. Evidence from the study suggests that fund managers do not possess superior skills to beat the market and that the poor performance of mutual funds is driven by poor stock selection ability. In addition, they reported that luck, and not skill, is the reason for the performance of top-ranked funds that generated positive abnormal returns; while the negative abnormal performance of bottom performers is largely accounted for by bad skill. In other words, while it is evident that the performance of poor-performing funds repeats, the same cannot be said about top-performing funds.

Surinder and Miglani (2022) selected a sample of 98 mutual funds from both the public and private sectors to analyze the market timing ability of mutual fund managers in India for the period 1999-2004 using the traditional models of Jensen Alpha, Treynor-Mazuy, and Henriksson-Merton model. They reported that Indian mutual fund managers lacked market timing ability but exhibited stock selection skills.

Suvarna (2022) also evaluated the market timing and selective ability of mutual funds in India using 52 equity-diversified mutual funds and deploying conditional performance assessment models. The researcher reported that less than 25% of sampled funds showed selectivity and market timing coefficients that were positive and significant, indicating that, on average, mutual funds do not exhibit either skill. However, he noted that while there was no significant negative stock selector in the sample, there was stronger evidence of perverse market timing among the funds. They also inferred a negative correlation between stock picking and market timing coefficients, indicating that mutual funds were unable to demonstrate both selectivity and market timing skills at the same time.

Żebrowska-Suchodolska and Karpio (2022) analyzed the market timing ability of mutual funds operating on the Polish market, using a sample of nine balanced funds between 2003-2019. The Henriksson-Merton and Treynor-Mazuy were used along with their variants expanded to include factors related to the bond market. Their result shows that the models with additional factors are more appropriate for the evaluation of balanced mutual funds. Overall, regardless of the model used, evidence shows that mutual fund

managers lack market timing skills; rather, they tend to follow the trend rather than successfully anticipate it. In most cases, there was also no ability to select superior securities.

Veeravel and Balakrishnan (2022), investigated the persistence of performance, market timing ability, and selective skills in large-cap equity mutual funds in India. They used monthly data of net assets values (NAV), market capitalization, and price-to-book ratio covering the period January 2000 to December 2019 for their study. The traditional performance appraisal model of Jensen (1968) was used along with the more recently developed models of Fama-French (1993), and Carhart (1997) to form and mimic portfolios. They reported that the benchmark market index outperformed mutual funds. In addition, evidence was weak that Indian fund managers who adopted the large-cap equity style could generate abnormal returns.

Azis, Iskandar, Ariswati, Sudirman, and Caisar (2022) studied the market timing ability and selectivity of investment managers during Covid-19 in Indonesia. They purposively selected 55 equity mutual funds for their study and found that the Treynor-Mazuy conditional inflation and exchange rate model showed that market timing and stock selection by fund managers could impact the performance of equity fund portfolios during the pandemic in Indonesia. Their result shows that only 9% of equity mutual funds demonstrated market timing ability, while 81% showed evidence of possessing selectivity.

2.2.10 Research Gaps Identified

After a comprehensive review of several studies in the literature by researchers worldwide on the performance of mutual funds, this study focuses on risk-adjusted returns, performance persistence, and the selectivity and market-timing ability of equity mutual funds in Nigeria. It seeks to contribute to a couple of important debates on the performance of equity mutual funds, using empirical evidence from Nigeria. Firstly, it investigates whether or not active equity mutual funds generate superior risk-adjusted returns. Secondly, the study explores whether active equity mutual fund managers possess superior selectivity and market-timing skills to generate alpha. Finally, it

evaluates the persistence of performance of active equity mutual funds. In other words, it provides insights into the question, ‘does the performance of active equity mutual funds repeat’?

The importance of mutual funds as a wealth-building vehicle and in enhancing national economic prosperity is well-reported in the literature. Unfortunately, mutual funds have not been studied extensively in Nigeria, and research works are sparse on the subject. This may not be unconnected to the relative infancy of the mutual fund industry in Nigeria as it is in most developing markets. According to the Nigeria Investment Promotion Commission (2019) as of December 31, 1991, only one mutual fund existed in Nigeria with a total net asset value of N17.5 million ($46,052 @ N380/$).

Earlier studies on mutual funds in Nigeria including the work of Oduwole (2015), Sambo (2016), Ilo et al (2018), and Mahmuda & Abdullahi (2017) used single-factor risk-adjusted models. The current study extends the earlier studies by evaluating the risk-adjusted performance of mutual funds using more robust, multi-factor, risk-adjusted models. While the single-index model simplifies the basic framework for portfolio analysis by significantly reducing the number and complexity of the inputs by assuming that a single factor or index can be used to explain all the covariations of security returns, it is an oversimplification of reality. It does not take into account simple but important relationships among securities with the effect that it is less accurate in modeling the factors that determine the cross-section of securities returns. The multi-factor models seek to cure this defect by taking cognizance of the more granular details regarding the risk-return relationship, while at the same time achieving substantial model simplicity. The multi-index model tries to improve the explanatory power of the single-index model by incorporating additional independent variables that influence the co-movement of securities prices. This provides strong support for its use in portfolio evaluation and analysis.

In addition, earlier studies largely used the Jensen Alpha model to investigate the selective ability of mutual funds. However, this model has been found to have a weakness as it does not distinguish between the selectivity and market-timing ability of fund managers. This study addresses that gap by using time-tested multiple regression

models developed by Treynor-Mazuy (1966) and Henriksson-Merton (1981) to investigate the selectivity and market-timing ability of mutual fund managers in Nigeria. This allows us to explore the question of whether or not mutual fund managers possess superior skills to beat the market and add value to investors' portfolios.

Further, we explore the debate regarding whether or not the past performance of mutual funds predicts future performance. This is the most significant and glaring gap in the Nigerian mutual funds' performance literature. This study is the first attempt to comprehensively investigate the phenomenon of performance persistence in the Nigerian context. We address this gap by evaluating the persistence of performance of mutual funds in Nigeria using the well-established Contingency Table methodology in conjunction with Odd Ratio and Rank Correlation methodologies for statistical inference.

Overall, this study investigates broader facets of the performance of mutual funds in Nigeria using more sophisticated performance evaluation models and the most comprehensive datasets compared to earlier studies. The output of the study will be reference material for investors, investment advisers, and fund managers. The study also contributes to the existing knowledge base on the subjects of finance, securities, and investment in the Nigerian capital market. The result will be published in relevant finance, investment, and wealth management journals.

2.3 Summary

In this chapter, a comprehensive review of past studies on the performance of mutual funds is done. This covers evidence regarding whether or not mutual funds generate excess returns, the stock selection skills and timing ability of fund managers, and the phenomenon of persistence of performance of mutual funds.

Most of the studies on mutual funds were done in the U.S. This perhaps, is due to the availability of large and robust databases on mutual funds, since the industry was established in the U.S. as far back as 1824. In addition, the availability of the requisite research skills and technology may have motivated more studies in the U.S. Therefore, a significant proportion of the studies reviewed are from the U.S. and to a lesser extent

the United Kingdom. The literature from other jurisdictions was also reviewed and cited based on availability.

Studies on the performance of actively managed equity mutual funds have mostly reached the conclusion that active management does not deliver superior value to investors, on average. This conclusion is based on findings broadly summarized as follows: Firstly, mutual funds, on average underperform the market as a whole after fees. Secondly, the performance of top-performing funds does not repeat; in other words, mutual funds do not exhibit persistence of performance. Thirdly, some fund managers demonstrate superior skills, however, few funds generate alpha after expenses. Highlighted below are some of the most frequently referenced studies to support the above conclusions.

A large body of literature reports that mutual funds generally do not generate excess risk-adjusted returns after fees and that actively managed funds, on average, do not beat comparable passively managed funds. From the theoretical standpoint, this result should not be surprising as several researchers have described active management as a zero-sum game before fees, implying that the gain of one manager is the loss of another. By implication, active management is a negative-sum game after costs are incorporated.

Following this argument, Warren Buffett concluded in one of his popular shareholders' letters, that active fund managers on Wall Street who managed Trillions of Dollars on behalf of their clients and charged high fees would usually benefit the most by reaping outsized profits while their clients haveittle to show for it (The Guardian, 2017, February 25), In addition, Buffett made a bet against several hedge funds, affirming that employing a simple strategy of buying a passive S&P 500 index fund will beat the hedge funds that charge huge fees. He was proven right when by 2017, the index fund was outperforming all the hedge funds that made a bet against Buffett (Gelles, February 28, 2015).

Early studies, especially by Sharpe (1966) Jensen (1968), Ippolito (1989), and later Malkiel (1995) are unanimous in their conclusion that mutual funds underperform after fees. Gruber (1996) evaluates the performance of mutual funds from 1945 through 1994 in the U.S., and reports that on average, after deducting fees mutual funds generate negative alpha. In a similar study, Davis (2001) corroborated the findings of Gruber (1996), as he reported that between 1965 to 1998 all equity strategies failed to successfully generate a positive alpha net of fees. Studies done in Africa largely validate these results from other parts of the world. Studies by [Gilbertson and Vermaak, 1982; Manjezi, 2008; Mibiola, 2013 and Tan, 2015] and Mohamed et al (2014) in South Africa, and Kenya respectively, conclude that mutual funds underperform the relevant market index.

The second finding from the literature is that the performance of the best funds does not persist which also directly addresses the controversy regarding skill vs luck. The contention here is that if a fund manager in the past 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 this outperformance will persist into the future (Cremers, Fulkerson, & Riley, 2019). However, if the performance is attributable to mere luck, then the converse should be the case; the outperformance should not repeat. We can therefore conclude logically that if all outperformance is a result of luck and not skill, then there is no justification to invest in even the best-performing funds since past performance cannot predict future performance.

Regarding the persistence of performance of mutual funds, substantial research efforts have been devoted by researchers. Again, early studies do not find evidence of the persistence of performance [Sharpe (1966) and Jensen (1968)]. In the early 1990s however, several studies reported evidence of persistence [Grinblatt &Titman (1992), Hendricks et al (1993), Goetzmann & Ibbotson (1994), Elton et al (1996a), and Gruber (1996)].

Following this, other researchers sought to provide explanations for the observed performance persistence, but they find evidence that seems to contradict the claim of persistence of performance of mutual funds. First, [Brown et al (1992), Brown &

Goetzmann (1995), and Malkiel (1995)] identify survivorship bias in sampling as the reason for the apparent persistence. Yet other studies find that the existence of momentum and use of momentum strategies not taken into account by the risk model used provide plausible explanations for the persistence in performance [Carhart (1997), Daniel et al (1997) and Wermers (1997)]. Specifically, the seminal work by Carhart (1997) demonstrates that the so-called 'hot hand' effects reported by Hendricks et al (1993) can be explained by common factors that have been found to influence the cross-section of stock returns, particularly the Jegadeesh and Titman (1993) momentum factor, whereby stocks that have delivered superior returns in the past continue to outperform in the future.

Carhart finds evidence that the performance of only bottom-ranked funds repeats and concludes that his result does not validate the existence of superior skills among fund managers. Elton et al (1996a) address the issue of survivorship bias in performance studies. They show that studies that select only surviving funds are inherently survivorship biased, and would likely present false evidence of persistence since the likelihood that surviving funds have recorded superior performance over time was much higher. In addition, Brown et al (1992) demonstrate that survivorship bias will likely give a false appearance of performance persistence in analyzing the relationship between volatility and returns of mutual funds. Other researchers corroborate Carhart's conclusion. For instance, Malkiel (1995) highlights the impact of survivorship bias and also does not find evidence that performance repeats after the 1970s. Also, Phelps and Detzel (1997) report that by using more recent data, and better models for risk measurement, any evidence of persistence of performance disappears. In addition, Carhart's (1997) study which dismisses the 'hot hand' phenomenon uses survivorship-bias-free data.

More recent studies provide strong evidence that poor performance predicts poor performance. One feature that appears to be undisputed among poor-performing funds is high expense ratios. It does appear that if a fund charges high enough fees, it could be guaranteed to consistently perform poorly. But perhaps more relevant to mutual fund investors is evidence of performance persistence among top-performing funds. In this regard, there is ample evidence that if funds are ranked based on positive alpha there is a high likelihood that top-ranking funds will deliver positive alphas in subsequent periods

[Carhart (1997); Busse and Irvine (2006); Gruber (1996); Elton, Gruber, and Blake (1996c), and Cohen et al (2005)]. Overall, where persistence is found among top-performing funds, the evidence seems to point to the fact that this is a short-term phenomenon (one to two years). It should be noted that evidence is inconclusive, and there is no consensus among researchers on several issues. This provides a rationale for further research on the performance of mutual funds.

The issue of whether or not mutual fund managers possess superior skills has been debated in the literature extensively. Some researchers have argued that the existence or otherwise of persistence of performance addresses the issues of luck versus skill. This argument is plausible because if a fund manager indeed possesses superior skills, then past outperformance should persist into the future for the manager. On the other hand, if any observed outperformance in the past is a result of luck and not skill, then the outperformance should not persist. It can be concluded therefore that if all outperformance is simply a result of luck, not skill, then it does not make sense to invest in even the best-performing actively managed funds.

Although there is ample evidence that some fund managers demonstrate enough skill to beat the market at the gross returns levels, very few are able to outperform the market net of fees. Several studies support this position. Wermers (2000) finds that after costs and fees the average fund underperforms by about 1% per year, although before costs and fees actively managed mutual funds outperform by 1.3% per year. Similarly, Fama and French (2010) validate the position that most funds do not generate enough superior retuns to offset the cost of active management. In addition, Barras et al (2010) argue that just a fraction of funds (0.6%) have skill in excess of fees and that an overwhelming majority of funds (75.4%) siphon the excess returns through fees. They also observe a drastic reduction in the proportion of funds that exhibit superior skills from 14.4% in 1990 to almost nil in late 2006.

Recent studies have reported that many active managers not only have superior skills that add value to investors but also that these skills persist over time. A common feature of these studies is that they have employed new approaches or methodologies to

obtain these results. For instance, Berk and van Binsbergen (2015) employed a so-called ‘value added’ measure; Barras et al (2010) developed the ‘false discoveries’ technique while Daniel et al (1997) adopted individual fund holdings data for their analysis.

In measuring the skill of mutual fund managers, most academic papers adopt the net alpha of funds, which is the risk-adjusted return (alpha) after fees. For this analysis, either a single passive index or one of the recently developed multi-factor models (e.g Carhart and Fama-French) are adopted as the benchmark. However, more recent works have proposed further developments in respect of the benchmark to be used, an example being the holdings-based benchmark model developed by Daniel et al (1997), which is fast gaining acceptance in the field. Recent studies have shown that the quality of data used for analysis and the benchmarks selected are critical factors that influence the results and conclusions made from a mutual funds performance study, and by extension on the skill of active managers.

Several researchers have attempted to analyze how selected benchmarks affect the conclusion reached in performance studies. Kothari and Warner (2001) and Glode (2011) are of the opinion that the traditional benchmark models have limitations and can underestimate the skill of active managers. In addition, Glode (2011) argues that a wrong conclusion could be made that an active fund underperforms a passive fund if the performance evaluation model adopted does not factor the economic state of the market into its analysis. A couple of researchers have also argued that the multi-factor models which are now very popular with academic researchers have inherent biases and are not an appropriate benchmark for performance evaluation [(Huij & Verbeerk (2009); and Cremers et al (2010)].

Data used for a mutual fund performance study can also have an impact on the conclusion. According to Linnainmaa (2013), while on the one hand, data with survivorship bias can overestimate the skills of active managers, on the other hand, data that eliminate survivorship bias can understate the skill of active managers because of what is referred to as ‘reverse survivorship bias’, which is a situation where poor performing funds, whose poor performance is frequently due to luck rather than poor

skill discontinue operations. The skills of the managers of these funds are likely underestimated overall because the unlucky funds would, on average, have performed better if they had continued operations. The implication of reverse survivorship bias, therefore is that any methodology that simply uses average alphas across funds to assess the skills of fund managers would likely underestimate the true average skill. This study finds evidence that the true alpha of mutual funds was underestimated by 43 basis points per year compared to the average alpha with reverse survivorship bias.

Evidence regarding the ability of fund managers to time the market appears more diverse. While early studies do not find convincing evidence of timing, later researchers including Bollen and Busse (2001), Kaplan and Sensoy (2005), and Jiang et al (2007) find positive timing when they assessed sensitivity based on a single index. Some researchers argue that changes in the sensitivity to some other factors not captured by the single index model could affect changes in the sensitivity to the market and that this should be incorporated into the timing model. Based on this position Elton, Gruber, and Blake (2011b) and Ferson & Qian (2006) used different models that address this concern, and did not find evidence of timing even though when they used a single-index model, they find timing ability.

Studies in Nigeria and other parts of Africa largely agree that fund managers do not display selective skills and lack market timing ability. In Nigeria, Oduwole (2015) and Ilo et al (2018) find evidence fund managers do not demonstrate stock selection skills. Although Mahmuda & Abdullahi (2017) and Igbinosa (2020) report that mutual fund shows excess risk-adjusted returns, their conclusions are objectionable because it appears that they have used gross returns for their analysis. It is highly probable that once expenses and fees are applied, the apparent risk-adjusted returns reported will vanish. This is consistent with findings from other jurisdictions.

An important observation from the literature is the downward trend in the phenomenon of persistence of performance. Jack and Bernstein (1999) posit that the situation is explained by the growing efficiency of equity markets since as markets become more efficient over time there will be fewer opportunities to generate excess

returns which will allow mutual funds to cover their fees. Other researchers obtain evidence that validates the increasing efficiency of the equity market (Chordia, Roll, and Subrahmanyam 2008, 2011; Conrad, Wahal, and Xiang, 2015).

Grossman and Stiglitz (1980) propounded a theory of market efficiency to the effect that active managers who gather information to obtain superior returns will continue to do so as long as they are able to cover their costs. Some studies have reported that increasing competition among active managers may have resulted in limited available investment opportunities to generate excess returns. Pastor, Stambaugh, and Taylor (2015) reported that although active managers have demonstrated higher levels of skill over time, this has not translated into greater returns as a result of intense competition which has hindered their performance. This explanation is supported by the work of Dyck, Lins, and Pomorski (2013) who show that there is a direct correlation between the level of competition in a market and the value of active management; hence active management delivers greater value in the emerging markets with less competition. To further corroborate this view Hoberg, Kumar, and Prabhala (2018) provide evidence that even within the U.S. markets, active funds appear to perform better in periods when competition is less fierce.

Generally, a couple of weaknesses have been identified in connection with studies done in Nigeria. First, almost all the studies used one-factor models to determine risk-adjusted return, such as Jensen Alpha, Sharpe ratio, and Treynor ratio. However, one-factor models have been criticized for not capturing all relevant factors that determine the cross-section of stock returns including size, value, and momentum.

Further, there are issues regarding the appropriate benchmarks to use in assessing the performance of the funds. Using the same benchmark to assess the performance of different categories of funds, as most of the studies did, will likely result in wrong conclusions as several studies in other jurisdictions have shown.

Moreover, the sample period selected for most of the studies was too small. Perhaps this is due to the relatively short history of operations of the mutual fund industry in Nigeria. For a robust analysis of the performance of mutual funds in Nigeria, an ample amount of data covering a longer sample period is required. This study improves on this weakness by using a comprehensive, survivorship-bias-free dataset, covering almost ten years.

We also explore the phenomenon of performance persistence in the Nigerian context. We address this yawning gap in the mutual funds' performance literature in Nigeria by doing a detailed evaluation of the persistence of the performance of mutual funds in Nigeria using the well-established Contingency Table methodology.

Overall, we investigate broader facets of the performance of mutual funds in Nigeria using more sophisticated performance evaluation models and the most comprehensive datasets compared to earlier studies. The output of the study will be reference material for investors, investment advisers, and fund managers. The study will be a rich addition to the subjects of finance, securities, and investment in the Nigerian capital market. The result will be published in relevant finance, investment, and wealth management journals.

CHAPTER 3: RESEARCH METHODS AND DATA COLLECTION

Mutual funds in recent years have attracted attention globally. Statistics from Investment Company Institute (2018) indicate that total net assets of worldwide regulated open-end funds grew by about 127% to almost $49.3 trillion in 2017, from $21.7 trillion in 2008. Perhaps, this is attributable to several benefits, including low-cost diversification, professional management, transparency, and liquidity.

However, the performance of mutual funds has been a subject of intense intellectual debate over the years. Since early researchers, notably Treynor (1965), Sharpe (1966), and Jensen (1968), pioneered studies on this subject, others have continued to seek answers to whether mutual funds can outclass the performance of the market as a whole on a risk-adjusted basis. More recent studies have focussed on performance persistence (Funds Management Research Centre, 2002).

Several studies report that portfolio managers do not have a superior ability to consistently beat the capital market (Elton et al, 2014; Mohamed et al, 2014; Tan, 2015). Other studies conclude that high administrative and management fees erode any excess returns funds that could have been reported (Elton et al, 2014). Yet others report that the returns from a fund are a function of the superior ability of the fund manager which is difficult to predict as past performance cannot be used to predict future performance (Elton et al, 2014). There is therefore no agreement among researchers on whether mutual funds perform better than the market on a risk-adjusted basis, and whether mutual funds exhibit performance persistence (Elton et al, 2014). As a result, it is doubtful that professional managers have superior ability and skill to beat the market.

The problem, therefore, is that the literature provides inconclusive results on whether or not mutual funds deliver excess risk-adjusted returns, the extent to which selective ability and market timing ability of fund managers affect risk-adjusted returns, and whether mutual funds exhibit performance persistence. This understanding will be of immense importance to investors, fund managers, and investment advisers. For instance, in Nigeria, huge and growing amounts of funds are invested and managed by professional managers on behalf of clients through mutual funds and pension funds. The result of this

work will help these professional managers take better decisions on behalf of their clients. Moreover, investors who engage professional portfolio managers and who continually seek to maximize their returns will be able to evaluate the performance of their funds relative to the market and competing funds. Finally, users of the result of this study will understand better whether the reported performance of their funds is a result of market timing skills or superior stock picking skills of their fund manager.

The quantitative research method was used for the study. All available historical data were collected on the monthly net asset values (NAVs) of all actively managed equity mutual funds in Nigeria from January 2012 to September 2021, from the website of the Securities and Exchange Commission. In addition, relevant market statistics of listed companies on the Nigerian Stock Exchange were obtained to execute the models adopted for the study. The data were subjected to analysis to obtain statistical inferences and answer the research question.

3.1 Research Approach and Design

This study adopts the positivist research philosophy and the quantitative research approach. All available historical data on monthly net asset values (NAVs) of all actively managed mutual funds in Nigeria from January 2012 to September 2021 were collected from the Securities and Exchange Commission (SEC) and the Nigeria Exchange Limited (NGX) The data were subjected to statistical analysis to test the performance and performance persistence of mutual funds.

According to Creswell (2013), the starting point in designing research is to make a clear decision regarding a couple of important choices. First is the epistemology that guides the research (e.g., objectivism, subjectivism). This is followed by a decision on the philosophical stance that drives the methodology. Next, is the methodology that governs the choice of methods (e.g., experimental research, survey research, ethnography) and, finally the methods that will be used for data collection (e.g., questionnaire, interview. focus group). These choices must be clear, consistent with one another, and coherent.

This study is approached from the positivist research paradigm. A research paradigm is simply the underlying philosophical basis and set of central beliefs that influence and direct a school of thought or a particular discipline. In business and management, two major research paradigms have evolved. These are positivism and interpretivism (phenomenology). These are two distinct beliefs about how to conduct research and they are mutually exclusive. That is, a researcher adopts either a positivist or a phenomenological approach, not both.

The key features of positivism are that the researcher assumes that the same analytical approach applicable to the sciences and engineering is equally applicable to the social sciences. He assumes there is an underlying reality that the researcher can find out by observation or logical reasoning. Positivism explains what is happening, not necessarily why it is happening. The researcher believes that he can conduct research, collect data, analyze data, generate results, and reach conclusions while being entirely detached and neutral.

Phenomenology is an alternative approach to positivism and evolved because of the complexities and incompatibilities of the real world. While a positivist approach is appropriate in engineering and pure sciences since these fields are largely predictable, it has major limitations where human behavior is concerned because human behavior is dynamic and largely unpredictable. The phenomenologist approaches research from a different perspective. He seeks to involve himself or herself with the sample directly rather than being completely detached. He considers both objective and subjective aspects of research and rejects the idea that there is an underlying reality that has to be discovered. Phenomenology is holistic, as it considers a wider range of factors and variables and it seeks to understand the complex linkages that exist in them.

The quantitative research approach was used in this study because it is consistent with the positivist research paradigm that underpins the research. The positivist paradigm posits that to gain reliable and trustworthy knowledge, we need to use the scientific method which involves measurement, observation, and logical analysis (O'Farrell & Wallace, 2012). It also assumes that we can identify a dependent variable and one or more independent variable(s) (Wisdom & Creswell, 2013), and establish a mathematical

relationship between them. Appraising the performance of mutual funds, and its persistence is a phenomenon that is observable, quantifiable, and is assumed to exist 'out there'. To gain insight into the topic we need to measure, observe and analyze a relatively large amount of data. These features are consistent with the positivist framework.

Another justification for adopting quantitative research for the study is that the approach typically makes it possible to 'generalize' the findings of research since it uses hypothesis-based research involving the collection of large samples. According to the Centre for Innovation in Research and Teaching (n.d), this quality of generalizability is very critical as it makes research more meaningful, relevant, and useful, allowing the researcher to interpret, extend and apply the research result to a broader context. In studying the performance of mutual funds, we tested several hypotheses based on existing theories in the literature such that findings from the study of the sample can be applied to the population as a whole. This is possible because of the relatively large sample size usually associated with quantitative research which, in conjunction with an appropriate sampling method, increases the likelihood that the result is not only reflective of the sample but is also representative of the population as a whole.

In addition, the quantitative approach assumes that the researcher seeks to be detached from what is being observed and that results have an objective meaning (O'Farrell & Wallace, 2012). Quantitative research has been described as a "researcher detachment" approach in view of this (Denscombe, 1998). The idea here is that the researcher is not likely to be biased either while gathering data or while analyzing data since he does not have to be in direct contact with the participants. Typically, he collects his data through questionnaires, by telephone, through the internet, or by using secondary data. This implies that the researcher remains objective and protects the respondents' anonymity. One of the potential weaknesses of data collection methods such as interviews and focus groups used in qualitative research is the likelihood of interaction with the subject which can compromise the objectivity of information, and impact the reliability of results.

Also, with the quantitative research approach, provided the research has been properly designed and executed, results are replicable. Replication is the reproducibility of the study (Centre for Innovation in Research and Teaching, n.d). In other words, if other researchers adopt the same methodology in studying similar samples, they will obtain similar results. According to Lichtman (2013), a researcher using the quantitative approach follows clear guidelines and objectives and does not need to resort to guesswork since the research approach basically relies on hypotheses testing. Replication is enhanced by the fact the researcher approaches the study using clear guidelines and objectives, following a general procedure. Hence the research can be repeated at any other time or place, reproducing the same results (Shank and Brown, 2007). Replication is important in research because it ensures that findings are valid, reliable, and generalizable.

Further, quantitative research tests objective theories by analyzing the relationship among quantifiable variables, and the research designs are very often descriptive or experimental. Moreover, the relationship between two events or variables can be established definitively and theories that establish the causal relationship between events or variables can be developed. In some cases, models that mirror and/or predict observed interdependencies can be developed (O'Farrell & Wallace, 2012). Qualitative research on the other hand primarily is exploratory in nature and seeks to explore research questions or investigate human interaction in connection with a social or human problem or issue that is being observed.

The quantitative research approach fits this study because it often helps to develop a 'macro' view of a situation. Quantitative data focuses on the feature or quantity of things. It seeks to answer the question of how many are there and what statistical patterns can we observe. The data generally takes the form of numbers and involves counting or quantifying to draw conclusions. Also, relatively larger sets of data are collected and processed using statistical techniques (Creswell, 2013). This approach significantly reduces the time and effort that the researcher would have invested in data processing and communication of his result. Data can be processed using computers and statistical

packages, for example, Excel Spreadsheets and SPSS, which save a lot of energy, time, and resources.

On the other hand, qualitative research focuses on the quality of things, that is, it seeks to answer the question, what is their nature? What are they like? How can they be described? Often it involves obtaining the views and perceptions of participants and its data are generated through the use of interviews, focus groups, and observation. The sample size for data gathering in qualitative research is often relatively small, and hence it usually provides a 'micro' view of the issues under consideration. With these features, the qualitative approach will not do justice to the requirements of the proposed research.

Clearly, the quantitative research approach suits the proposed research better than the qualitative approach since it tends to be associated with the development of general theories and aims to objectively measure the phenomenon at hand using quantitative techniques. A researcher using the quantitative research approach will most likely be analyzing raw data using a statistical software package, and data gathering need to be well structured to facilitate analysis. Quantitative research is often conducted using research methods like surveys and experiments, which are best at collecting structured data (O'Farrell & Wallace, 2012).

The use of quantitative research approach makes it possible to collect and analyze secondary data for the study with several attendant benefits. First, the use of secondary data will result in time savings (Ghauri, 2005). In particular with the advent of new technology and wide-scale internet access, it will be fast to access the required data. Most of the data required for the study are available in digitized libraries for easier access. Again, the data collection approach adopted is most appropriate for this study in view of the requirement for a relatively large amount of data, covering a longer period in order for the result to meet the statistical requirements of reliability, replicable and generalizable. The data is readily available and inexpensive to obtain as it is collected routinely and administratively. It will be impracticable and very costly to seek to collect primary data under this scenario (Institute of Work and Health, 2015).

Further, this study requires highly structured data to enhance data processing and analysis using appropriate statistical software packages or spreadsheet packages. The administrative secondary data adopted here is highly structured as required by the study design (O'Farrell & Wallace, 2012). Specifically, historical data on net asset values of mutual funds (at specific intervals such as daily, weekly, or monthly as the case may), the standard deviation of returns, the beta of returns, etc are required. The quantitative approach is best for this type of analysis.

Overall, quantitative research has the advantage that the results are statistically reliable (provided the research has been properly designed and executed); the degree of reliability of the result can be assessed fairly easily through the use of appropriate statistical analysis (O'Farrell & Wallace, 2012); and using quantitative research approach makes it possible to 'generalize' the results, meaning that findings from the sample can be applied to the population as a whole. In addition, results are replicable and the researcher can be detached from what is being observed, thereby enhancing objectivity. It also results in significant cost and time savings.

To provide further support for the use of a quantitative approach for this study evidence from the literature shows that most research efforts across the world have adopted this approach [(Sharpe (1966); Jensen (1968); Lehman and Modest (1987); Grinblatt and Titman (1989b); Ippolito (1989); Brown, Goetzmann, Ibbotson, and Ross (1992) ; Brown & Goetzmann (1995) and Malkiel (1995); Daniel, Grinblatt, Titman, and Wermers (1997); Wermers (2000); Bollen and Busse (2001), Kaplan and Sensoy (2005), Jiang et al (2007); Fama and French (2010), Barras, Scaillet, and Wermers (2010); Elton, Gruber, & Blake (2012); Mibiola (2013); Elton, Gruber, Brown & Goetzmann (2014);Tan (2015); Mohamed, Ganesh & Muroki (2014); Oduwole (2015); Ilo et al (2018); Miguel and Chen (2021); Choi and Zhao (2021); Ozkan and Ozturk (2021); Reuter and Zitzewitz (2021); Dorfleitner et al (2021); Lin (2022); Cuthbertson et al (2022**);** Vidal-García, and Vidal (2022)].

The above considerations provide strong justification for adopting the quantitative research approach for this study.

3.2 Population and Sample of Research Study

For this study, the purposive sampling method (selective or subjective sampling) was adopted. With this approach, the researcher uses his discretion to select suitable elements for the sample that will aid in addressing the research question and achieving the research objective (Saunders, Lewis & Thornhill, 2009). Purposive sampling might constitute a potential source of selection bias since the sampling method does not give equal chance to all elements in the population to be selected. This could raise doubts about the validity of the result and hinder its generalizability. To address this potential drawback, all actively managed equity mutual funds, during the study period were selected for the sample.

In addition, there is the risk of survivorship bias in a study of this nature where performance is measured over a relatively long period of time. Survivorship bias is the tendency that high-performing funds are over-represented in a sample. Since being a survivor is a function of good past performance, the use of the statistics of only surviving funds (and ignoring closed or merged funds since they did not survive) will bias upwards the true mean performance of the managed fund market (Australian Securities and Investment Commission, 2003; Vanguard, 2015).

Several studies have investigated how survivorship bias affects the result of performance studies by comparing the result of analysis using a survivor-only sample with that of a survivorship-bias-free sample. Both Hendricks et al. (1993) and Carhart (1997) report an incidence of weaker persistence of performance in the sample of survivors. Elton et al (1996a) demonstrate that studies that use a sample of surviving funds only will likely reach an incorrect conclusion that the performance of mutual funds repeats since the sample selected is biased in favour of funds that are more likely to have outperformed over time. Brown et al (1992) validated this position by showing that a survivorship-biased sample can give the false appearance of persistent performance. In addition, Malkiel (1995) justified making adjustments for survivorship bias in performance studies. He found that evidence of persistence disappeared after the 1970s, though he used the same sample that Carhart (1997) used in his study.

Consequently, to guide against survivorship bias, available returns data of all actively managed equity mutual funds that operated from 2012 to 2021 were included and analyzed. The above represents all available data that meets the requirements of the study in terms of robustness and proper classification of mutual funds into appropriate categories. This study, therefore, uses the most comprehensive dataset so far in the mutual funds performance literature in Nigeria. Data processing entails painstaking data aggregation and analysis in view of the dynamic changes that have taken place in the Nigerian Mutual funds' space over the years. For instance, as of January 27, 2012, there were 44 active mutual funds in Nigeria with a total NAV of N81.304 billion, out of which 20 were actively managed equity-based funds. By December 24, 2020, this number had risen to 105 active funds with a NAV of N1.479 trillion, of which 14 were actively managed equity-based funds as some funds ceased operations while several new funds commenced operations during the period of study. In addition, several funds reclassified their operations from one category to another.

There is the risk of selecting funds into the sample with vastly different characteristics, making it practically impossible to compare their performance objectively since mutual funds use a wide range of investment strategies, hence exhibiting different risk-return profiles requiring different benchmarks for performance measures. To address this issue, only actively-managed equity funds are selected, as this category of funds is designed to outperform the market by leveraging on superior information, stock selection skills, and the market timing ability of their managers. Further, it is relatively easy to adopt a common benchmark upon which the performance of equity-based funds will be assessed. Consequently, passively managed funds and ETFs were excluded from the sample.

The import of carefully designing the sampling process and making painstaking efforts to ensure that sampling bias is eliminated or at least reduced in research is to allow for extrapolation of the results of the study. Extrapolation is the process of drawing conclusions about the wider population based on statistical inferences made from a study of the sample (Good and Hardin, 2006). It is obvious therefore that drawing conclusions from a biased sample will result in making a wrong inference about the population of

interest. The consequence of bias in sample selection is biased parameter estimates (Frederick, Daniel, and Megan, 2006). Therefore, sampling bias occurs in the process of sample selection and not in the sample itself. Our objective in this study was to minimize sampling error so that valid generalizations could be made from the results of the study.

Data gathering entails obtaining all available historical data on monthly net asset values (NAVs) of all the funds in the sample, covering January 2012 to September 2021, from the website of the Securities and Exchange Commission. The data is freely accessible at https://sec.gov.ng/net-asset-value-data-for-collective-investment-schemes/. All available data that were properly classified and robust enough for the purpose of the study were selected for our sample.

3.3 Operational Definition of Variables

In this section, brief operational definitions of variables and concepts are provided to give clarity to readers. The specific way in which a variable is measured or applied in a particular study is called the operational definition. It is important to operationally define key variables in order to lend credibility to the methodology and to enhance the reproducibility of the results of the study. An operational definition clearly communicates the meaning of a concept by specifying how the idea is measured and applied within a particular context or in a study. This is important because the same concept can be given different operational definitions by different researchers or even by the same researcher under different circumstances.

The performance of mutual funds can be assessed in terms of the absolute or relative returns generated over a given period of time. In this study, we use a relative performance measure that takes cognizance of the risk undertaken in generating the returns. In other words, we use the risk-adjusted returns of funds.

It would be misleading to use raw returns as a basis of evaluating the performance of mutual funds since these do not take cognizance of the level of risk undertaken to achieve the returns. Based on finance theory, there is a direct correlation between risk and return, hence it is likely that a higher return is associated with a higher level of risk.

Therefore, for an objective assessment of the performance of a fund, a risk-adjusted return is required. Several models have been developed to evaluate the risk-adjusted return of mutual funds. In order to do this, we need data on the fund returns, risk, and appropriate benchmark.

The geometrical mean of historical or ex-post returns is used for the performance evaluation of mutual funds in this study. Although returns can be computed either as geometric mean or internal rate of return, theoretically, the geometrical rate of return is a more accurate measure of the realized rate of return on a portfolio. The Geometric Mean (GM) gives a summary of the rate of return over a historical period and is a more appropriate estimate of the return of a portfolio when evaluation is done over a relatively long period. In this study, the rate of return is compounded monthly, therefore to compute an average rate of return, we first de-compound the stream of returns by taking the Nth root of all the historical returns. Hence, in this study, we compute the GM of the monthly returns of all the mutual funds in our sample and the index.

In evaluating the performance of mutual funds, the realized returns of portfolios of assets should be adjusted for risk in order to objectively compare them. To achieve this, two measures of risk are commonly used. The first one is beta, a measure of systematic risk, which is the more appropriate metric when a portfolio of assets is well-diversified since in this scenario only systematic risk which cannot be diversified away is relevant. The alternative measure of risk is standard deviation which measures volatility or total risk. This measure is most appropriate when a portfolio is not well-diversified. In this case, both systematic and unsystematic risks (total risk) are relevant and should be taken into account.

A benchmark is a point of reference against which the performance of a mutual fund portfolio is measured. The benchmark itself is composed of an unmanaged group of securities. Typically, broad market indexes like the S&P 500, NASDAQ, FTSE, and NGX All Share Index are used as benchmarks. In appraising the performance of a fund manager, we need an appropriate benchmark. The performance of the mutual fund portfolio can then be compared with the selected benchmark. Clearly, different

benchmarks are appropriate for different funds based on several factors such as the type of securities in the portfolio and investment style.

In this study, the capitalization-weighted portfolio is chosen as an appropriate benchmark since this is the most commonly used in the equity markets (Philips, Cole & Kinniry, 2010). In addition, a benchmark should reflect the market or market segment that it is intended to measure. Moreover, a benchmark should be unambiguous with clearly identifiable components and their weights; it should be investible with the option to invest passively in it through an index fund; it should be measurable such that it should be possible to compute the returns on it on a regular basis; it should reflect currently available investment options; and it should be appropriate by being consistent with the managers' investment biases and style (Reilly and Brown, 2015). Another important feature of a benchmark is that it should possess features that make it possible to readily use it to implement a buy-and-hold strategy. This is important so as to enable its use in appraising the performance of an active portfolio which is designed to outperform a passive, capitalization-weighted portfolio. Several studies have found evidence that the performance of mutual funds can be influenced by the benchmark selected; hence there can be benchmark errors (Grinblatt and Titman 1989b). Similarly, Grinblatt and Titman (1989b) and Elton et al (1996a) highlighted the importance of selecting the appropriate benchmarks in mutual fund performance studies.

Theoretically, the risk-free rate is the rate of return that is attributable to a risk-free investment. Government instruments like Treasury bills are typically used as a proxy for a risk-free investment. In a rational world, therefore, it would be expected that the absolute minimum return that should be attributable to a risky asset is the risk-free rate. In fact, a risky asset should attract a risk-free rate plus a premium to account for the level of risk undertaken by the investment under consideration. We use the rate of return on a 5-year government bond to proxy the risk-free rate in this study. This was obtained on the website of the Central Bank of Nigeria. Our argument in making this choice is that the study is on equity mutual funds, and equity investments are meant to be long-term in nature.

In this study, we compute the beta of each portfolio by regressing the streams of returns of the benchmark portfolio against that of the mutual fund portfolio under consideration using the slope function in excel. Beta is a measure of the volatility of the returns of a portfolio compared with the overall market's volatility. Since the market as a whole is the benchmark, it has a beta of 1. A portfolio with a beta value greater than 1 is more volatile than the market (meaning it will generally appreciate more than the market and drop more than the market drops). A portfolio with a beta of less than 1 has a smoother ride as its returns are less volatile than the market returns. In computing beta, we first generated a stream of returns for each portfolio, including the benchmark (The All-Share Index).

In this study, the average return on the All-Share Index obtained directly from the Nigeria Exchange Limited (NGX), is used as a proxy for the return on the stock market. In finance, a market proxy is generally used as a broad representation of the entire stock market or a market segment of interest. Researchers and analysts typically select a group of stocks in a segment or other categories and combine their performance to form an index. The proxy provides a quick measure of the day-to-day performance of the underlying stocks in the index. This offers a useful basis for comparing the performance of an individual stock or a portfolio of assets with the general market trends. The need to choose an appropriate market proxy that reflects the market as a whole or a relevant segment to give a reliable benchmark of performance cannot be over-emphasized.

There are several measures of portfolio risks used in this study depending on the context. First, we recognize total risk which is measured by the standard deviation of each portfolio. Volatility is derived directly from the stream of simple returns for each portfolio, over the relevant period. Then we have undiversifiable risk which can be derived from Total Risk and Diversifiable risk as below: Undiversifiable Risk = Total Risk - Diversifiable Risk.

Finally, undiversifiable risk is a type of risk that cannot be diversified away through the selection of a large number of uncorrelated securities. It can be computed using the following relationship:

Total Risk = Diversifiable Risk + Undiversifiable Risk (systematic risk);

That is, $\sigma_p^2 = \sigma_e^2 + \beta^{2,}\sigma_m^2$ ……(equation 3.1)

We compute the Sharpe ratio as follows:

$$\frac{\diamondsuit_p - \diamondsuit_f}{\diamondsuit\diamondsuit \quad \sigma_p} \quad \text{……..(equation 3.2)}$$

=

Where:

SR*p* - Reward-to-Variability ratio of portfolio p

R_p - Expected return of portfolio p.

R_F - Risk-free rate of return

$\boldsymbol{\delta_p}$ - Portfolio's total risk.

The Sharpe ratio is a measure that assesses the performance of a portfolio, taking cognisance of the risk undertaken. It measures a portfolio's excess returns per unit of the portfolio's total risk as measured by the standard deviation. The Sharpe ratio has a benchmark in the slope of the Capital Market Line (CML) which is defined as the market risk premium divided by standard deviation. It therefore means that if the Sharpe ratio is greater than the CML, then the portfolio has exhibited superior performance relative to the benchmark and vice-versa.

Generally, the higher the Sharpe ratio, the better, since a higher figure implies that the portfolio delivers a higher excess return per unit of risk. This measure is most suitable for evaluating a portfolio that is not well-diversified. The model has an important property in that it can be used as the objective function in mean-variance optimization, where the portfolio with the highest Sharpe ratio is the optimal portfolio of risky assets. According to Sharpe (1994), the ratio can be interpreted as a t-statistic to test the hypothesis that the portfolio returns and the risk-free rate are equal. Hence it can be inferred that the higher

the Sharpe ratio, the higher the probability that the portfolio returns will exceed the risk-free rate.

Following Treynor (1965), we define the Treynor Ratio thus:

$$TR = \frac{r_p - r_f}{\beta_p} \quad \text{.....(equation 3.3)}$$

Where:

TRp - the Reward-to-Volatility ratio of portfolio p.

R_{pt} - Expected return of portfolio p.

R_{Ft} - Risk-free rate of return.

β_p – Portfolio's systematic risk.

Treynor ratio is an important performance evaluation model when we wish to evaluate a portfolio against the benchmark portfolio and other actively managed portfolios. The Treynor measure is best suited to appraise a well-diversified portfolio. Quantitatively, it is the slope of the line that connects the risky asset to the risk-free asset. If the Treynor ratio of a portfolio is lower than the excess return of the market then the portfolio under consideration underperforms the market. On the other hand, if the Treynor ratio of a portfolio is higher that the excess returns of the market the portfolio outperforms the market benchmark and lies above the Securities Market Line. Treynor ratio is an important performance evaluation model when we wish to evaluate a portfolio against the benchmark portfolio and other actively managed portfolios. The Treynor measure is best suited to appraise a well-diversified portfolio.

Another commonly used portfolio appraisal model is a development of the well-known Capital Asset Pricing Model (CAPM) by Jensen (1968). It is a single-factor regression model defined by the following specifications:

$$R_{pt} – R_{Ft} = \alpha_p + \beta_p (R_{Mt} – R_{Ft}) + e_{pt} \quad \text{......................……(equation 3.4)}$$

<u>Where:</u>

α_p - Portfolio's excess risk-adjusted return

R_{pt} - Porfolio's returns at time t

R_{Ft} - Risk-free rate at time t

R_{Mt} - Return on the market portfolio at time t

β_p - Portfolio's systematic risk.

e_{pt} - Excess return of portfolio p at time t unexplained by the other terms in the equation

Using the Jensen model, the performance of a mutual fund is evaluated by regressing the excess returns of the portfolio on the excess return of the market. If the assumption holds that the market beta or slope co-efficient is constant, then the unconditional Alpha obtained from the analysis is a measure of average mutual fund performance. The implication of a positive Alpha is that the portfolio's actual return is greater than the expected return as predicted by the portfolio's beta. On the other hand, a negative Alpha is an indication of underperformance; that is, the return of the portfolio is lower than expected given the beta value of the portfolio's returns. One of the weaknesses of the Jensen model is that it attributes the overall performance of the portfolio to the manager's selectivity ability as it assumes that the systematic risk is stationary over time. This has been found to be an incorrect assumption.

Treynor- Mazuy (1966) develop a model used to decompose the total return of a fund in order to identify the sources of performance. This is the model adopted in this study to separate the selectivity and market-timing ability of fund managers. The Treynor and Mazuy (1966) model is expressed as follows: $R_{pt} - R_{Ft} = \alpha_p + \beta_p (R_{Mt} - R_{Ft}) + \beta p_T (R_{Mt} - R_{Ft})^2 + e_{pt}$ ……(equation 3.5)

Where:
α_p = excess risk-adjusted return of the portfolio
R_{pt} = return on portfolio p, at time t
R_{Ft} = return on a riskless asset at time t
R_{Mt} = return on the market portfolio at time t
β_p = sensitivity of the excess return on the portfolio t with the excess return on the market
e_{pt} = excess return of portfolio p, at time t not explained by the other terms in the equation

Alpha (α_p) in the equation describes the stock selection ability of the fund manager. A positive Alpha (α_p) value indicates that the fund manager generates returns greater than the market return. The coefficient of the squared term in the equation is βp_T, which measures timing ability. A positive βp_T value indicates that the fund manager has market timing ability.

Fama (1972) develop the concept further by developing another model by which the performance of a portfolio can be decomposed in order to better evaluate the managers' contribution to overall portfolio returns. This approach seeks to assess the performance of a managed portfolio against that of a naively selected portfolio with a similar risk level. Fama's model suggests the following breakdown:

- ✓ Selectivity (R1)
- ✓ Diversification (R2)
- ✓ Risk Management and Market Timing (R3)

This is illustrated by the following mathematical equation:

$$Rp = Rf + R1 + R2 + R3 \quad \text{(equation 3.6)}$$

Where:

Rp is the total return on the portfolio,

Rf is the risk-free rate of return

In the mutual fund literature, performance persistence can be defined as the level of correlation between the past performance of a fund and its future performance. Performance persistence occurs if a fund consistently outperforms (or underperforms) the average performance of a cohort of similar funds or a specific benchmark.

Further, we could distinguish between absolute and relative performance persistence. Absolute performance persistence relates to the ability of a fund to consistently beat a specific benchmark. According to the Australian Securities and Investment Commission (2003), this has implications for the Efficient Market Hypothesis. Relative performance persistence on the other hand compares the relative performance of a cohort of funds. Clearly, this has implications for the choice an investor makes regarding competing funds. In this study, we employed the relative approach in evaluating persistence.

Table 3.1

Summary of variables, their operational definitions, and measurement approach

	Variable	Operational Definition	Measurement
1	Excess risk-adjusted return	**(1) Sharpe ratio** $\frac{\bar{r}_p - r_f}{\sigma_p}$ **(2) Treynor ratio** $\frac{\bar{r}_p - r_f}{\beta_p}$ **(3) Jensen** $R_{pt} - R_{Ft} = \alpha_p + \beta_p (R_{Mt} - R_{Ft}) + e_{pt}$ **(4) Fama French 3-Factors model** $R_t = R_{Ft} + \beta_1 (R_{Mt} - R_{Ft}) + \beta_2$ (SMB) + β_3 (HML) + e	• Positive Sharpe and Treynor ratios • Positive and statistically significant alpha (α_p)
2	Selective ability	**(1) Treynor – Mazuy** $r_{pt} - r_{ft} = \alpha_p + \beta_p (r_{mt} - r_{ft}) + \gamma_{pt} (r_{mt} - r_{ft})^2 + \varepsilon_{pt}$ **(2) Henriksson - Merton**	• Positive and significant Alpha (α_p)
3	Timing Ability	**(1) Treynor & Mazuy** $r_{pt} - r_{ft} = \alpha_p + \beta_p (r_{mt} - r_{ft}) + \gamma_{pt} (r_{mt} - r_{ft})^2 + \varepsilon_{pt}$ **(2) Henriksson - Merton** $r_{pt} - r_{ft} = \alpha_p + \beta_p (r_{mt} -$ $r_{ft}) +$	• Positive and significant Beta (βp_T)
4	Persistence of performance	**(1) Odd ratio (Cross product ratio)** CPR = (WW x LL) / (WL x LW) (2) **Rank Correlation Coefficient**	• Statistically significant Odd ratio • Statistically significant R^2

3.4 Study Procedure and Ethical Assurances

Ethics can be defined as, ‘‘norms for conduct that distinguish between acceptable and unacceptable behavior.’’ (Resnik, 2011). They are the moral principles an individual should follow. Behaving ethically means doing what is right at the right time. Research ethics, therefore, addresses the application of ethical principles to the various issues and fields of research. This covers a wide range of issues including ethical matters relating to the design and conduct of research, the treatment of human participants or animals within research projects, the use or misuse of research results, and issues relating to scientific misconduct.

A classic example of the consequences of violating research ethics is the case of Paolo Macchiarini, a thoracic surgeon and former researcher of regenerative medicine. He was a rising star and a leading expert in his field. He developed innovations in trachea transplant, which he claimed yielded superior results in the treatment of patients. It was discovered later that he was engaged in research misconduct and unethically performing experimental surgeries. He gave his “regenerating” windpipes to at least seventeen patients, most of whom were dead by the time his deception was discovered. (Rasco & Power, 2017). The aftermath of this scandal is the dismissal of Macchiarini and the resignation of several top officials of the Karolinska Institute in Stockholm, Sweden where Macchiarini was an employee (Enago Academy, 2019).

The world over, people are now more conscious of the need for researchers to adopt and comply with ethical codes of conduct and practices in the process of conducting research. Evidence of this trend is the increasing rate of non-response to surveys in spite of the fact that respondents’ privacy is more or less guaranteed in such cases of large-scale data collection. The importance of research ethics cannot, therefore, be overemphasized. First, it supports the achievement of the goals of research which includes gaining knowledge, discovering the truth, and avoiding error. For instance, research ethics forbid the use of false or fabricated research data and results. The effect of observing this ethical code is that research works are reliable and dependable (Resnik, 2011).

Further, research ethics enhances collaboration and cooperation among researchers by promoting trust, accountability, fairness, and mutual respect. It is a fact that, increasingly, most research works require interdisciplinary collaboration. Many research ethical codes are designed to promote deeper cooperation and engagement, and protection of propriety rights and information (Resnik, 2011).

In addition, research ethics promotes accountability and responsibility to the public in a world where research is largely funded with public funds and requires active engagement with the community. For example, adhering to the policies of government and universities on how to treat human subjects with dignity and protect animal rights ensures that the researcher is accountable to the public. Indeed, to gain public confidence, attract goodwill, and greater funding, researchers are required to be accountable and display ethical conduct (Resnik, 2011).

Finally, many norms and ethics of research promote other moral values which are for the good of society. This includes social responsibility, maintenance of public health and safety, protection of the rights of humans and the welfare of animals, and promoting compliance with regulations and laws. Unethical conduct in research can cause harm to people, animals, and society as a whole. For instance, if a researcher fabricates results in medical research, he can potentially cause serious harm to society if others rely on the falsified data and research output (Resnik, 2011).

According to Halej (2017), by ensuring that research adheres to ethical principles, researchers and participants alike will know the difference between acceptable and unacceptable behavior. They will be able to assess and mitigate risks and preserve the integrity of research data by ensuring they are not fabricated or falsified. In addition, participants will be encouraged to be open and forthright in sharing their experiences views, and opinions and thereby generating more reliable data.

There are a couple of fundamental principles of ethics in research. First, Informed Consent is fundamental to research ethics. It means that research participants should be fully aware that they are participating in research and know what is required of them.

Armiger (1997) posits that it means 'that a person knowingly, voluntarily and intelligently, and in a clear and manifest way, gives his consent.'

To satisfy the requirements of this ethical principle, it would be expected that participants would have adequate information about the aim of the study, the approach to the research, the possible results and outcomes of the research, research requirements, possible inconveniences, discomfort, risks and other challenges that the participants may encounter (Laerd Dissertation, n.d). It has to be admitted that it may be impossible to anticipate exactly the information a participant would require from the onset. However, the researcher should endeavor to provide all material information that would likely determine whether consent is given or not.

The concept of informed consent also extends to the requirement that participants should willingly volunteer to take part in a study without being forced, deceived, or coerced to do so. If the researcher cannot obtain informed consent, he should provide explanations for this (Laerd Dissertation, n.d). It should be noted however that informed consent is not always needed or it may become expedient to relax the requirement. This applies in some peculiar educational, organizational and natural research settings; for instance, where a researcher has no direct contact with participants or where no participant's personal details are obtained (University of Oxford, n.d).

Avoidance of Harm is another important ethical principle in research which provides that research should not harm participants (Bell, Bryman & Harley, 2019). Research that is likely to cause harm to participants is considered unacceptable. In the well-known Haney, Bank, and Zimbardo's (1973) prison experiment, it was reported that several participants in the study experienced severe emotional distress including mental breakdown during and after the study (Bell et al, 2019). Today, it is unlikely that such a study will be approved by any university's ethics committee. The researcher should provide strong justifications to proceed with the research if the possibility exists that participants will suffer harm, injury or exposure to discomfort. In such circumstances, the researcher needs to go the extra mile to put in place mechanisms that will ensure that

any discomfort is minimized, that the principle of informed consent is observed, and that detailed debriefing is done after the research (Laerd Dissertation, n.d).

It is important to identify ahead the various types of harm or discomfort that participants can experience in the course of conducting research so as to minimize the likelihood of it occurring. Harm could be physical, for instance, if the research relates to physical activity. It could also be in the form of psychological trauma, distress, or discomfort. For instance, if, as a result of research, the HIV status of participants in a study is disclosed without their consent this could cause unimaginable trauma. In some cases, participants are exposed to social disadvantage or stigma resulting from involvement in the research. It could also be in the form of loss of privacy and anonymity (Laerd Dissertation, n.d).

The principle of Confidentiality and Anonymity requires that information volunteered by participants remain private. This is very essential because a participant will only be willing to volunteer private and sensitive information if the researcher agrees to uphold confidentiality. This research ethics principle is important not only at the data collection stages of research but perhaps, even more so when data has been collected, there is a greater danger of hurting research participants. To reduce this risk, data should be treated confidentially both during storage and when data and results are published. This does not imply that data collected in the course of the research should always remain private, and never be shared with anyone. In reality, the views and identities of participants at various stages of the research process can be disclosed, but with permission from research participants (Smith, 2003).

One way to address the challenge of maintaining confidentiality is to remove identifiers. For example, exclude names, locations e.t.c of participants, or use proxies when documenting results. It must be acknowledged however that it is not always easy or even possible to completely hide information that could point to the identity of participants. For example, imagine that in a study you obtain responses from employees in an organization, and classify them based on age groups. Assuming there is only one respondent in a particular age group (e.g., over 60 years old), which could make it

relatively easy to identify the responses of this individual. Under this scenario, the researcher will have to devise other means of protecting the confidentiality of the participant (Laerd Dissertation, n.d).

Another important dimension to the principle of confidentiality is the fact that, depending on the jurisdiction, it is a legal responsibility to keep certain information confidential. These legal protections can define the type of research that can be conducted and how to handle research data from participants. For example, the Goals 2000 Educational Act of 1994 set by the U.S. Congress requires parental consent before children could be asked questions about religion, sex, and family life (Smith, 2003).

Avoidance of Deception is another fundamental principle. Deception in research is a scenario where research participants are not fully informed of the purpose of the study. Generally, deception is not acceptable when conducting research involving humans as it jeopardizes the integrity of the informed consent principle, could harm participants, and erode trust between the public and researchers. However, in some instances, deception is necessary to conduct research as it can provide valuable insight into issues and factors which would probably never be discovered if the participants are fully abreast of all the factors and issues (Skavlid, 2015).

A striking case of the use of deception in research is the controversial Milgram's obedience experiments and conformity studies which gave insight into human behavior under the command of an authority figure. In the experiments, the study participants were not informed about what the researchers were actually studying. Participants were given the impression that they were giving electric shocks to a learner when they answered a question wrong. The truth however was that no shocks were given and the learners were confederates of Milgram (McLeod. 2015). It was a horrifying realization when, after the experiment, the participants came to terms with the reality of what they might be capable of doing. The research revealed that ordinary people are likely to obey orders given by an authority figure, even to the extreme extent of killing an innocent human being, and that obedience to authority is deep-seated in us all on account of our upbringing (McLeod, 2017).

Another example of deception in research is the approval given by the National Committee for Research Ethics in the Social Sciences and the Humanities (NESH) in the spring of 2009 to researchers to send out fake job applications with a view to determining whether or not applicants with a non-Norwegian background were being discriminated against. The results of the study generated intense controversy when they were published (Skavlid, 2015). This example shows clearly that the use of deception is sometimes necessary and justifiable in some covert research in the pursuit of knowledge or truth.

Debriefing involves the researcher discussing the procedure and findings of the study with the participant after the research is over. This process should give the participant an idea of what was being investigated and why, and the part they played in the study (McLeod. 2015). The participants must be told if they were deceived and why. They should be given the opportunity to ask questions and their questions should be answered honestly and fully. It is important for the participants to be debriefed as soon as possible and in detail. The researcher should also endeavor to make participants understand debriefing.

According to Harris (1998), the purpose of debriefing is to reassure the participants about the purpose of the research, clarify any misconceptions and anxieties that the participants may have about the research, and leave them with a sense of dignity, knowledge, and justify the time committed to the research. Debriefing also provides an opportunity to repair the breach of informed consent or trust that has occurred not only between the investigator and the subject, but (potentially) between all researchers and all subjects entailed by the deception, to remove any confusion or defuse any tensions that might have been generated by the deception, to make it clear to participants that deception is permissible only in exceptional circumstances.

Finally, participants in a research reserve the right to withdraw from participation in an investigation at any stage. This principle would obviously not be applicable in studies that involve covert observation where it is not feasible to inform everyone being observed what the researcher is doing. However, if and when a participant decides to withdraw

from the research process, their choice should be respected and they should not be forced, harassed, or coerced in any way to change their mind.

This study is quantitative research that does not involve the collection of private and sensitive data from human subjects, hence some research ethics issues such as the need for informed consent, debriefing, and the requirement not to cause harm to human/animal subjects, will not apply. Nevertheless, several important ethical issues relating in particular to quantitative studies still need to be taken into consideration.

To start with, right from the outset, ethical precautions were embedded into the project design phase to enhance the validity and robustness of the study. Research design includes the overall strategy and structure of the study which determines the nature of the study, sampling method, sample size, statistical test to be used, and procedure for quantifying. This stage is fundamental to the success of a research study (Jones, 2000).

Sample selection was carefully done to ensure the sample is representative of the population being studied and to achieve the research objective. With respect to sampling procedures, Jones (2000) identified a couple of ethical precautions that should be observed. First, the sample should not be too large to avoid incurring unnecessary costs thereby wasting time and resources. On the other hand, the sample should not be too small so as to give adequate room to detect useful patterns/results. Finally, quantitative research works should take cognizance of the statistical power of the test being used, and reflect this in the sample size as appropriate.

At the data collection stage, the first major consideration was to ensure that there was no breach of informed consent as the data used in the study were publicly available data of the returns of mutual funds.

In processing data, it was ensured that credible and reliable data on the net asset values of mutual funds and other performance indicators required were collected for analysis. In addition, the reasonableness of the numerical data obtained was checked. Close attention was given to the treatment of outliers and missing values. As it is unethical to use data selectively in order to embellish the result, the researcher ensured careful

review and justification of the basis for removing any records from the data collected for analysis (Jones, 2000).

Data analysis was done using appropriate statistical processes and techniques. Otherwise, an inappropriate analysis could result in wrong conclusions and lead to reputational damage to the research process. The researcher avoided common unethical behaviors in research such as the selective use of data to achieve a preconceived result, making erroneous generalizations, data dredging or fishing, using statistical tests wrongly, disregarding results that do not fit into the desired pattern, and the wrong use of graphs, labels, and the like, to distort information.

The ultimate objective of research is the search for truth and unbiased reporting. Therefore, the reporting of research data should be objective. However, in practice, the process is fraught with numerous statistical and ethical pitfalls. To avoid these pitfalls, the researcher was honest and forthright in data reporting. Proper referencing and acknowledgment of the ideas and works of others were ensured to avoid plagiarism and protect intellectual property. Further, the researcher respected the privacy of participants in the presentation of data, while also sustaining the right of society to be informed. Conscious that the reporting of the study can have an impact on other people, the study presented detailed reporting of the methods used, what was done, with whom, and how. This is to promote accountability to sponsors and others interested in the research. With respect to data storage and management, adequate procedures were put in place in compliance with applicable data protection laws.

Moreover, adequate procedures were put in place to store and manage data efficiently so that relevant data protection regulations were not breached and that sensitive data were protected and secured. Particularly, non-public information volunteered by supporting organizations was kept confidential.

3.5 Data Collection and Analysis

All available historical data on monthly net asset values (NAVs) of all the actively managed, equity-based mutual funds in Nigeria, covering January 2012 to September 2021 were collected from the Securities and Exchange Commission. Additional historical

data were collected from the Fund Management Association of Nigeria and the Nigeria Exchange Limited as needed. Passively managed funds were excluded from the sample because of comparability issues.

Ideally, the performance of passive funds should be assessed against the reference benchmark they are tracking and not the market since they are not designed to beat the market. To avoid survivorship bias which can result in an overestimation of the performance of active funds (Vanguard, 2015), all funds that operated during the study period were included in the sample.

The historical secondary data on monthly net asset values (NAVs) of mutual funds in the sample were subjected to statistical analysis to test their performance and the persistence of their performance. In assessing whether or not mutual funds generate excess risk-adjusted returns, the study adopted the most popular performance measures, widely used in practice, that is Treynhor ratio, Sharpe ratio, and Jensen's Alpha (Elton et al, 2014).

A market benchmark is required for the computation of several of the performance appraisal models. The study adopted the All-Share Index (ASI) of the Nigeria Exchange Limited as the benchmark portfolio. The ASI data for the study period from January 2012 to September 2021 were obtained from the Nigeria Exchange Limited. Also required is an appropriate risk-free rate. In this study, we adopt the monthly return on a 5-year Nigerian government bond as a proxy for the risk-free rate. The monthly rates were obtained from the website of the Central Bank of Nigeria (CBN).

Three single-factor models that express portfolio returns as a ratio of risk are used in this study: (1) Treynor ratio, (2) Sharpe ratio and (3) Jensen Alpha. In addition to the single index models, the Fama- French 3-factor model was used to appraise the performance of mutual funds in order to provide a more robust and comprehensive analysis. It has been reported that, after extensive tests using a large number of random portfolios, the Fama and French model was found to explain as much as 95% of the return generated in a diversified stock portfolio (Fama, 2006).

Fama-French's (1993) 3-factor model comprises additional variables besides the return on the market portfolio which has been shown to influence the cross-section of average returns in the market. The first one relates to firm size, which captures the size effect, and is based on empirical evidence that smaller firms tend to generate higher returns than larger firms. The second is the book-to-market ratio which captures the value effect, the observation that value stocks on average outperform growth stocks (Fama and French, 1992). As a result, fund managers who employ this strategy to generate returns should not qualify as informed or skilled managers.

This model is based on three factors, the first being the market risk premium (Rm - Rf). The second factor is the size premium. This is effectively modeled as the difference between the return of small-capitalization stocks and big-capitalization stocks (SMB). The third factor is the book-to-market premium which is the difference between the return of value stocks and growth stocks. SMB (Small minus Big) is the average return on three small portfolios minus the average return on three big portfolios, SMB equals 1/3 (Small Value + Small Neutral + Small Growth) minus 1/3 (Big Value + Big Neutral + Big Growth). HML (High minus Low) is the average return on two value portfolios minus the average return on two growth portfolios, HML equals 1/2 (Small Value + Big Value) minus 1/2 (Small Growth + Big Growth).

$$R_t = R_{Ft} + \beta_1 (R_{Mt} - R_{Ft}) + \beta_2 (SMB) + \beta_3 (HML) + e \quad \text{……(equation 3.7)}$$

To evaluate stock selection and market timing ability of mutual funds managers, multiple regression analysis was employed. Specifically, the widely used Treynor-Mazuy (1966) and Henriksson- Merton (1981) models were adopted.

$$\text{□}pt - \text{□}ft = \text{□}p + \text{□}p\ (\text{□}mt - \text{□}ft) + \text{□}pt\ (\text{□}mt - \text{□}ft)^2 + \varepsilon pt \quad \text{……(equation 3.8)}$$

$$\text{□}pt - \text{□}ft = \text{□}p + \text{□}p\ (\text{□}mt - \text{□}ft) + \text{□}pt\text{C}\ (\text{□}mt - \text{□}ft) + \varepsilon pt \quad \text{……(equation 3.9)}$$

The models are derived from the Jensen (1966) model in the equation below.

$$R_{pt} - R_{Ft} = \alpha_p + \beta_p (R_{Mt} - R_{Ft}) + e_{pt} \quad \text{……(equation 3.10)}$$

Where:

$\alpha_{p=}$ excess risk-adjusted return of the portfolio

R_{pt} = return on portfolio p at time t

R_{Ft} = return on a riskless asset at time t

R_{Mt} = return on the market portfolio at time t

$\beta_{p=}$ sensitivity of the excess return on the portfolio t with the excess return on the market

e_{pt} = excess return of portfolio p, at time t not explained by the other terms in the equation

The Treynor and Mazuy (1966) model simply introduces an additional independent variable by squaring the standard term for the market risk premium ($(\text{\textcircled{?}}mt - \text{\textcircled{?}}ft)^2$). Alpha ($\alpha_p$) in the equation describes the stock selection ability of the fund manager. A positive Alpha (α_p) value indicates that the fund manager generates returns greater than the market return. The coefficient of the squared term in the equation (βp_T) measures timing ability. A positive βp_T value indicates that the fund manager has market timing ability.

Henriksson and Merton's (1981) model on the other hand is based on characterizing market conditions into either a ''good'' or a ''bad market. A good market is where the market returns exceed the risk-free rate, while a bad market has the returns on the market being lower than the risk-free rate. To prove the existence of timing ability, it is argued that the portfolio would have a high beta on the relevant factor in a good market while having a low beta on the factor in a bad market. Two independent variables are incorporated into the model. The first is the standard term for market risk premium ($(R_{Mt} - R_{Ft})$), and the other is an identical term but with its coefficient multiplied by a dummy variable which is set at 1 in a good market and 0 in a bad market (C). The coefficient on this term (β_{PT}) represents the net difference in the beta of good and bad markets. If the coefficient is positive at a statistically significant level, it is inferred that the manager has timing ability.

The key distinction between the timing models is that while Treynor and Mazuy's (1966) model assumes a continuous change in response to changing expectations about a factor's return, Henriksson and Merton's (1981) model assumes discrete change, this is why two distinct values of 1 or 0 are assigned to a given market conditions.

To evaluate performance persistence, we test whether the past performance of individual funds can be used to predict their future performance and hence provide a basis for fund selection. That is, the study seeks to answer the question of whether or not funds that perform well in a prior period continue to replicate their performance in future periods. 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.

The Contingency Table methodology is an approach used to analyze the frequency at which funds are categorized as Winner and Loser over successive time periods. In applying the Contingency Table methodology, we first determine the excess return (alpha) of each mutual fund portfolio for a given period, say P_0 using the Jensen Alpha methodology. 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 means 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 repeat the steps above in the subsequent period P_1 and categorize the mutual funds into Winner or Loser category as usual.

Based on this procedure funds that are classified as Winner in two consecutive periods are repeat winners; those that are classified as Losers in two consecutive periods are repeat Losers, LL; while funds that are winners in a period and Losers in the next or vice versa are reversal performers, WL and LW respectively. The 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). Basically, the approach is to compute the CPR or odd ratio as follows: CPR = (WW x LL) / (WL x LW). ……..…(equation 3.11).

As highlighted above, this is basically the ratio of repeat performers (WW & LL) to reversal performers (WL & LW). The CPR can be interpreted as follow: If the number of funds in the classified WW or LL is equal to the number classified as WL or LW then, there is no evidence of persistence and the CPR will be equal to one. However, a CPR figure greater than one implies that there is apparent persistence since the number of repeat performers is obviously greater than the number of reversal performers. Finally, a CPR figure lower than one is indicative of a negative relationship between the performance in the two periods. The statistical significance of the CPR is tested using a Z-statistic calculated as follows:

$$Z = \frac{CPR}{\sigma^{*}in(CPR)}$$

Where σin(CPR) is calculated as follows:

$$\sigma^{*}in(CPR) = (1/ N_{WW} + 1/ N_{LL} + 1/ N_{WL} + 1/ N_{LW})^{1/2} \quad \text{……(equation 3.12)}$$

The Z-statistics assumes a normal distribution. At 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 used 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, 3 ……and so on. The smallest value in the column will get the lowest ranking. Mean ranking is 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. The difference is then squared (d^2) to remove negative numbers. Finally, the differences are summed up ($\sum d^2$). 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% (or any other desired) level of significance and comparing this with the actual rank correlation score to determine whether or not there is evidence of persistence of performance.

Microsoft Excel and SPSS with their wide array of functions are used to process data. This significantly simplifies the computation and ranking of mutual fund returns, computation of variances, standard deviations, betas, and other risk measures. They are also used the for preparation of charts, graphs, and tables. Excel package/SPSS is used for multiple regression analysis.

3.6 Summary

Mutual funds have grown in leaps and bounds globally in recent years but in spite of their impressive growth, it has remained a puzzle whether or not mutual funds can outperform the market consistently. Several researchers have attempted to provide empirical evidence of the performance and performance persistence of mutual funds, but empirical evidence on these subjects is inconclusive. Therefore, it is apparent that does appear that a lot more effort is needed to further shed light on the important subject of performance and performance persistence of mutual funds (Elton et al, 2014).

The study was approached from the positivist perspective which holds that the way to obtain reliable knowledge is through the scientific method involving measurement, observation, and logical analysis to arrive at findings and conclusions which are testable and replicable (O'Farrell & Wallace, 2012). In addition, this study adopts a quantitative approach, in consistency with the positivist philosophy.

All available historical data on monthly net asset values (NAVs) of actively managed, equity-based mutual funds in Nigeria were collected from the website of the Securities and Exchange Commission. The All-Share Index (ASI) of the Nigeria Exchange Limited was used as the benchmark portfolio while the 91-day Treasury Bills was used as the risk-free rate. The proposed study period is about ten years, from January 2012 to September 2021.

Using the quantitative research approach for this study has several advantages. First, data were collected from a relatively larger sample size; therefore, the sample is representative of the population, making the result 'generalizable'. In addition, with proper design and execution of the methodology, the result of quantitative studies is statistically reliable and replicable (Shank and Brown, 2007). Moreover, since the quantitative approach aims to eliminate bias as much as possible, the researcher is detached from the sample being observed thereby generating results that have an objective meaning (O'Farrell & Wallace, 2012).

In addition, the time and efforts required to execute the analysis of data in quantitative studies are significantly reduced, since the approach lends itself to the use of computers and statistical packages such as SPSS. Finally, not only are quantitative research results generally more reliable, but they also lend themselves to the use of statistical analysis to assess the degree of their reliability which gives the researcher greater confidence about the validity and robustness of the study (O'Farrell & Wallace, 2012).

The performance of mutual funds was evaluated by determining whether or not they generate excess risk-adjusted returns. In doing this, Sharpe ratio, Treynor ratio, and Jensen's Alpha (Elton et al, 2014) analysis were used. In addition to these single index models, the Fama- French's 3-factor model was applied for a more robust analysis. Multiple regression analysis was adopted to evaluate the stock selection and market timing ability of mutual funds managers. Specifically, the Treynor-Mazuy (1966) and Henriksson-Merton (1981) models were implemented. To evaluate the performance persistence of mutual funds, the study adopted the methodology of the Contingency Table, following the work of researchers including Blake and Timmermann (1998); Lunde et al (1998); Allen and Tan (1999), and Rhodes (2000).

The purposive sampling method (selective or subjective sampling) was used in sample selection. It has been reported that this approach could potentially result in selection bias since the sampling method does not give equal chance to all elements in the population to be selected, hence raising doubts about the validity of the result and

hindering generalizability. To address this, all equity mutual funds, actively managed 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 actively operating funds during the study period were used.

There is also the risk of selecting funds into a sample with vastly different characteristics. To address this issue, only actively-managed equity funds were included, 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.

As a quantitative, desktop study, this study does not involve the collection of private and sensitive data from human subjects, hence some research ethics issues such as the need for informed consent, debriefing, and the requirement not to cause harm to human/animal subjects, do not apply. Nevertheless, several important ethical issues relating in particular to quantitative studies were taken into consideration.

From the outset, ethical precautions were embedded into the project design phase to enhance the validity and robustness of the study. Sample selection was carefully done to ensure the sample was representative of the population being studied and to achieve the research objective. Further, the sample was neither too large to avoid incurring unnecessary costs thereby wasting time and resources nor too small so as to give adequate room to detect useful patterns/results.

In processing data, it was ensured that credible and reliable data on the net asset values of mutual funds and other performance indicators required were collected for analysis. In addition, the researcher assessed the reasonableness of the numerical data obtained. Close attention was given to the treatment of outliers and missing values. It was ensured that data was not used selectively in order to embellish the result. There was clear justification for removing any records from the data collected for analysis.

Moreover, data analysis was done using appropriate statistical processes and techniques. Reporting of results was done professionally, and the ideas and works of other researchers and writers were duly referenced and acknowledged to avoid plagiarism and protect intellectual property. To support future research and contribute to the body of knowledge in the relevant fields it was ensured that detailed reporting of the methods used, the procedures adopted, and analysis techniques applied was done. Finally, adequate procedures were put in place to store and manage data efficiently so that relevant data protection regulations were not be breached, and that sensitive data were protected and secured.

CHAPTER 4: DISCUSSION OF RESEARCH FINDINGS

The aim of this study is to assess the risk-adjusted performance of mutual funds in Nigeria, evaluate the stock selection and market timing skills of fund managers, and determine whether or not mutual funds exhibit persistence in performance.

The subject of mutual fund performance has been hotly debated in the literature, with several grey areas left unresolved after several years of intense research across the globe. This study addresses more comprehensively the performance of mutual funds in Nigeria than any of the earlier studies, both in terms of the length of the period covered, the robustness of the methodologies used, and the scope the of study.

The main research question is, ‘to what extent do mutual funds in Nigeria generate excess risk-adjusted returns and exhibit performance persistence?’’

To give clarity and focus to the study, the research question is broken down into the following sub-questions.

i. To what extent do active equity mutual funds generate excess risk-adjusted returns in Nigeria?
ii. To what extent does the selective ability of active equity mutual funds affect their risk-adjusted returns in Nigeria?
iii. To what extent does the market timing ability of active equity mutual funds affect their risk-adjusted returns in Nigeria?
iv. To what extent does the past performance of active equity mutual funds affect their future performance in Nigeria?

In order to address the research questions, four hypotheses were formulated in the form of null and alternative hypotheses.

All available historical data on monthly net asset values (NAVs) of all the actively managed equity mutual funds in Nigeria covering January 2012 to September 2021 was collected from the Securities and Exchange Commission. Additional historical data was collected from the Nigeria Exchange Limited as needed. Passively managed funds were excluded from the sample. Ideally, the performance of passive funds should be assessed against the reference benchmark they are tracking and not the market since they are not designed to beat the market. To avoid survivorship bias which can result in an

overestimation of the performance of active funds (Vanguard, 2015), all funds that operated during the study period were included even if they were closed or merged along the line.

The historical secondary data on monthly net asset values (NAVs) was subjected to statistical analysis to test the performance and performance persistence of mutual funds in Nigeria. In assessing whether or not mutual funds generate excess risk-adjusted returns, the study adopted the most popular performance measures that are widely used in practice, that is Sharpe ratio, Treynor ratio, and Jensen's Alpha (Elton et al, 2014). These measures express portfolio returns as a ratio of risk and share the commonality of using a single factor to measure risk.

In addition to the single index models, the Fama- French 3-factor model is used to assess the performance of mutual funds to provide a more robust analysis. It has been reported that after extensive tests using a large number of random portfolios, the Fama and French model was found to explain as much as 95% of the return generated in a diversified stock portfolio (Fama, 2006).

To evaluate the stock selection and market timing ability of mutual funds managers, multiple regression analysis is employed. Specifically, the widely used Treynor-Mazuy (1966) and Henriksson-Merton (1981) models are implemented.

$$\text{[illegible]}pt - \text{[illegible]}ft = \text{[illegible]}p + \text{[illegible]}p\ (\text{[illegible]}mt - \text{[illegible]}ft) + \text{[illegible]}pt\ (\text{[illegible]}mt - \text{[illegible]}ft)^2 + \varepsilon pt \quad \text{.....(equation 4.1)}$$

$$\text{[illegible]}pt - \text{[illegible]}ft = \text{[illegible]}p + \text{[illegible]}p\ (\text{[illegible]}mt - \text{[illegible]}ft) + \text{[illegible]}pt\text{C}\ (\text{[illegible]}mt - \text{[illegible]}ft) + \varepsilon pt \quad \text{.....(equation 4.2)}$$

Alpha (αp) in the equation describes the stock selection ability of investment managers. A positive Alpha (αp) value implies that the mutual funds can generate returns greater than the market return. $\text{[illegible]}pt$ and $\text{[illegible]}pt\text{C}$ in the equations, respectively describe market-timing ability. A positive $\text{[illegible]}pt$ or $\text{[illegible]}pt\text{C}$ value indicates that an investment manager has a market-timing ability (Cuthbertson, Nitzsche, & O'Sullivan, 2006). Market timing is the ability of the fund manager to adjust his portfolio appropriately in anticipation of changes in the asset portfolio or the market price movement in general.

To evaluate performance persistence, we tested whether the past performance of

individual funds could be used to predict their future performance and hence provide a

basis for fund selection. That is, an attempt was made to answer the question of whether or not funds that performed well (or poorly) in a prior period continue to replicate the performance in future periods. The Contingency Table methodology that has been used and refined by several researchers, including Blake and Timmermann (1998); Lunde et al (1998); Allen and Tan (1999), and Rhodes (2000) was adopted.

The Contingency Table methodology follows the following procedure: The raw or risk-adjusted returns of mutual funds in the sample are ranked over two consecutive periods. The funds are allocated to different groups. Although various approaches could be used in determining these groupings, we opted in this study for the option of creating two groups to form 'winner' and 'loser' portfolios. We determined the proportion of mutual funds that continued to maintain their positions in the ranking. Appropriate statistical tests were applied to check whether or not the funds consistently maintained their relative rankings at a statistically significant level.

Microsoft Excel and SPSS with their wide array of functions were used to process data. This significantly simplified the computation and ranking of mutual fund returns, computation of variances, standard deviations, betas, and other risk measures. They were also used for preparing charts, graphs, and tables. SPSS was used for multiple regression analysis. After subjecting the results obtained to appropriate statistical analysis and tests of significance, the null hypotheses were either accepted or rejected.

The remaining part of this chapter is organized into five sub-sections. The first sub-section addresses the issue of data trustworthiness, reliability, and validity which is critical to research outcomes and is the foundation of useful research. If data used in research are not trustworthy, reliable, or valid, in turn, the results, inferences, and conclusions drawn from such work are not dependable. Next is the presentation of the results/ findings of the study, which is structured to address each research question and related hypothesis in a logical order. This is followed by a brief evaluation of the findings before a summary of the key takeaways of the chapter is presented.

4.1 Trustworthiness of Data

Quantitative research involves the collection of numerical data and is based on the scientific approach holds that the relationship between theory and research is deductive, and reflects the view that social reality is objective. Data is usually generated through the use of surveys and experiments and analyzed through various statistical techniques (Bryman and Bell, 2005). For quantitative research to be considered trustworthy requires that several qualities are present. These are internal validity; external validity; reliability and objectivity (Lincoln & Guba, 1985).

Generally, validity assesses the extent to which the instrument measures what it is designed to measure. It is the degree to which the results are truthful. We have two dimensions of validity: internal and external. A study is considered internally valid if it is able to determine correctly the existence of a causal relationship between one or more independent variables; and one or more dependent variables (Heffner, 2017). In other words, it provides a correct explanation of the relationship between variables. In addition to this, it must identify and isolate confounding variables as much as possible. A confounding variable causes the result of a study to be incorrect by showing a false correlation as the researcher fails to control for or eliminate the variable (Shuttleworth, 2008).

Therefore, internal validity focuses on two key issues. First is how well the study is designed and executed, including research design, operational definition of variables, sample selection, methodology, and selection of variables (Huitt, Hummel & Kaeck, 1999). Secondly, internal validity assesses the degree of confidence we can have in concluding that changes in the dependent variable were a function of the change in the independent variable and not by extraneous variables.

According to Campbell and Stanley (1966), the following are threats to internal validity:

History – The researchers report that the unique experiences of participants over time affect their responses, which behave like independent variables, especially where data is collected over a long period.

Maturation –This is another challenge that comes with the passage of time where the research subjects become less motivated over time in their participation, thereby impacting the internal validity of the study.

Testing – Pre-tests are frequently used in research design, and this can influence the outcome of a study thereby distorting the results.

Instrumentation –Research Instruments are the tools used to collect, measure, and analyze data related to a given research. It has been found that changing the method of measurement and instruments of research can affect the variables being measured.

Statistical Regression – This is also called regression to the mean. It has been noted that if research participants originally chosen are re-tested as a result of extremely high or low scores or characteristics, the resulting distribution is expected to be closer to the entire population's distribution.

Selection – Bias can be introduced into a study if the research subjects in the control and experimental groups are changed in the course of the study thereby affecting internal validity.

Experimental Mortality – When the comparison groups in a research study experience differential or higher levels of withdrawal of participants (mortality) then it will be difficult to ascertain whether the observed differences between the groups are produced by the independent variable or are a result of the different or high drop-out rates.

Selection Interactions – It is possible that the selection method of research subjects interacts with one or more of the above-mentioned threats to internal validity, thereby biasing the results. For instance, participants selected into treatment groups have different maturation rates. Selection interactions can also happen with history and instrumentation.

External validity describes the ability to generalize a study to other situations, people, settings and measures. (Trochim, 2006). It assesses whether the finding of a study can be applied to a broader context. which is particularly threatened if people, places, or times are poorly chosen.

The aim of scientific research is to produce generalizable knowledge about the real world. Without high external validity, it is impossible to apply results from the laboratory or a survey to other people or the real world. Since in most situations it is difficult, if not impossible to measure the population as a whole, a sample is usually drawn from the population and studies. Sample selection is done in a way to ensure that the larger population is fairly represented so that statistical inferences drawn from the sample can be generalizable to the larger population (Landreneau, 2009). Therefore, a good research design and sampling model first identifies the target population of the study, draws a representative sample for the population, conducts the study with the selected sample, and finally generalizes the results to the original population (Trochim, 2006). Moreover, researchers use statistical confidence limits to make statements about their findings as an expression of external validity. Several factors could affect external validity and generalization, including subjects, situation, time, intervention, and measures. The more a study is replicated the greater the external validity will be.

Data reliability is very important in research. This refers to the maintenance of consistency or repeatability throughout a series of measurements. For example, a survey respondent is expected to provide the same response each time he is faced with the same question. If this does not happen and he changes his response to the same question, then the consistency or reliability of the survey instrument can be called to question. This quality of “repeatability” or “consistency”. is achieved if a measure consistently produces the same result (Trochim, 2006). Reliability issues often come up when researchers adopt a subjective approach to research (Wilson, 2010), which is associated largely with qualitative research. However, in quantitative research, researchers assess reliability by examining the consistency of a group of measurements or measuring instruments used in a study. They also adopt the test-retest method (also known as stability) to prove reliability. They do this by administering a set of measures to a group of individuals, allowing some time to elapse, and then readministering the same instrument to the same group. Equivalence is a measure that tests whether two forms of the same test will produce the same result. This is achieved by administering two forms of the same test to the same group of individuals and then analyzing the correlation between the two administrations. Equivalence and stability estimate is another way to

examine reliability by administering one form of an instrument and then a second form of the instrument after a certain amount of time to the same group of individuals. Another way to measure reliability is by Agreement. Using this approach raters observe the same behavior and examine whether or not they obtain similar and consistent results from one another. Reliability is critical in quantitative research as it is a basis for validity and measures whether or not a study obtains the same results consistently.

Another measure of trustworthiness of research is objectivity, which demands that researchers should remain distanced from what they study so that their findings depend only on the true nature of what was being studied rather than on the personality, beliefs, and values of the researcher (Payne & Payne, 2004). Objectivity is ensured through the methodology of measurements, data collection, and data analysis through which reliability and validity are established. Methodological procedures such as instrumentation and randomization helps to ensure objectivity is achieved. Quantitative researchers focus on the facts; hence another important dimension of objectivity is creating an appropriate distance between a researcher and participants to reduce or eliminate bias. The objective researcher is distant so that the researcher is not influenced by the participants, and does not influence the study. Clearly the four criteria of research trustworthiness overlap; for example, validity and reliability: if a study's results can be generalized, implying that it is externally valid, then it should be repeatable.

Finally, the use of a reflexive journal can enhance the trustworthiness of a study. A reflexive journal is a detailed documentation of the researcher's experiences from his/her own perspective, reactions to situations, reflections on the research process, and ideas about data collection and other aspects of the study (Barry & O'Callaghan, 2008; Smith & Noblit, 1989). This method can be useful to both qualitative and quantitative researchers. Specifically, in quantitative research, a reflexive journal can provide information about decisions regarding choice of methodological decisions made and reasons for choosing certain methods, instruments, and data analyses of the study.

This study on the risk-adjusted performance of mutual funds is a quantitative, desk research involving the collection and analysis of publicly available economic and market data about mutual funds. The required data were collected directly from the website of government/regulatory agencies with the responsibility to collate and warehouse such data and make them available to users.

Specifically, data regarding the prices and Net Asset Values (NAVs) of mutual funds in Nigeria were collected from the website of the Securities and Exchange Commission. Similarly, we obtained information on treasury bills and treasury bonds from the website of the Central Bank of Nigeria. Finally, close prices and other relevant parameters of listed Nigerian equities were obtained directly from the data center of Nigeria Exchange Limited. In addition, we cross-checked some of the data collected with similar data on the website of the Debt Management Office for consistency. This gives reasonable assurances that the data were trustworthy.

Given that this is a quantitative study, we have approached it from the positivist research paradigm which seeks to obtain knowledge through the scientific method involving measurement, observation, and logical analysis to arrive at findings and conclusions which are testable and replicable (O'Farrell & Wallace, 2012).

Data needed for the study included economic and statistical data already warehoused in the databases of relevant regulatory agencies and securities trading platforms. This gives a reasonable level of confidence regarding data reliability and validity since the sources are largely dependable and have in place robust structures to ensure data integrity.

In addition, the data collected and analyzed were pooled from a larger sample. This was carefully done to ensure that the sample is representative of the population being studied, to achieve the research objective. This process should make the result of the study 'generalizable' to the larger population. Further, we made painstaking efforts to ensure proper design and execution of the methodology of the study, leveraging on the large body of literature that exists on the performance of mutual funds. This provides reasonable confidence that the results of the study are statistically reliable and replicable

(Shank and Brown, 2007). In addition, the results obtained from the study have objective meaning and are without bias, since the researcher was completely detached from the sample during the process of data collection (O'Farrell & Wallace, 2012).

Finally, the study lends itself to the use of statistical analysis to assess the degree of reliability and statistical significance of the results obtained. This further boosts our confidence in the validity and robustness of the study (O'Farrell & Wallace, 2012).

4.2 Result / Findings

4.2.1 Descriptive Statistics

Table 4.1 below provides some descriptive statistics of the performance of equities mutual funds in Nigeria. It indicates that 26 mutual funds (87%) out of the 30 funds in the sample recorded positive raw returns (i.e not adjusted for risk). Further, 13 funds (43%) performed better than the All-Shares Index (the market benchmark) which attained an annualized return of 7.083% during the period; while 6 funds (20%) achieved raw returns above the risk-free rate of 13.344%. The above statistics show that from the perspective of absolute returns, mutual funds would be adjudged to have performed quite well, given that majority delivered positive returns, and close to half of them actually beat the benchmark portfolio. However, for an objective assessment and comparison of the performance of mutual funds, we need to factor into our analysis the amount of risk undertaken to achieve a given level of returns. Therefore, our analysis in this study takes cognizance of the risk taken to deliver the reported returns.

The 3rd column in Table 4.1 shows the standard deviation of returns (representing total risk) of the funds, which ranges from 4.688% to 38.208%. It highlights that 25 of the mutual funds in our sample (83%) recorded a lower standard deviation of returns than the benchmark All shares Index of the Nigeria Exchange Limited (NGX). This is an indication that most of the mutual funds have succeeded in effectively reducing total risks through diversifying their systematic risks.

Table 4.1

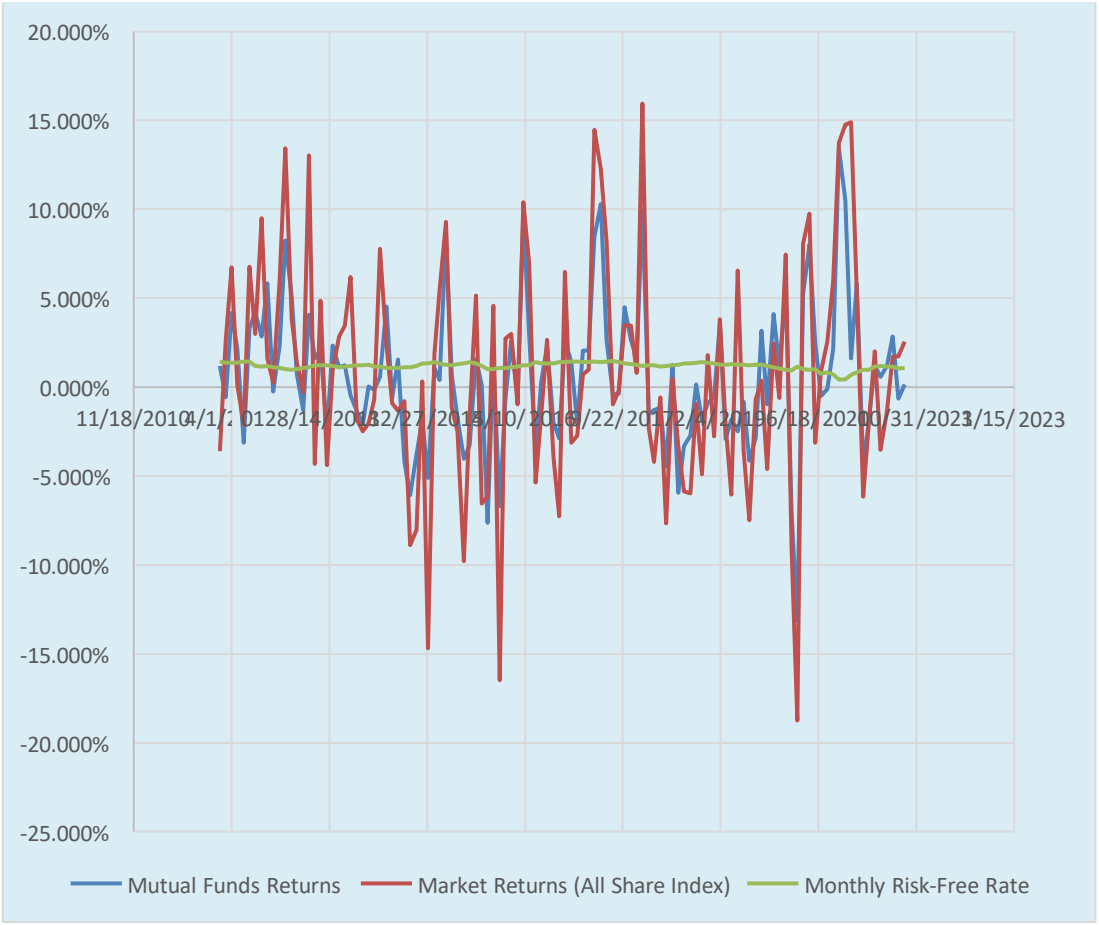
Descriptive Statistics, Sharpe Ratio, and Treynor Ratio Performance Measures for 30 Nigerian Equity Mutual Funds

FUND	Average Annual Returns (Raw)	Standard Deviation	Beta	Sharpe Ratio	Sharpe Ranking	Treynor ratio	Treynor Ranking
Fund 1	-2.389%	16.401%	0.60225	-0.98341	26	-0.26781	24
Fund 2	14.134%	25.237%	0.60340	0.10237	6	0.04282	6
Fund 3	4.403%	21.464%	0.68371	-0.41974	16	-0.13177	15
Fund 4	-3.703%	18.151%	0.58743	-1.07125	27	-0.33101	26
Fund 5	12.652%	18.676%	0.60009	-0.15000	10	-0.04668	9
Fund 6	3.951%	18.406%	0.69495	-0.62481	20	-0.16548	18
Fund 7	-0.483%	8.474%	0.10331	-1.91346	29	-1.56959	29
Fund 8	8.207%	20.189%	0.67339	-0.35883	13	-0.10758	11
Fund 9	27.124%	24.464%	0.80829	0.57870	2	0.17515	4
Fund 10	9.799%	14.976%	0.24673	-0.37201	14	-0.22581	20
Fund 11	18.638%	10.503%	0.36339	-0.05264	8	-0.01521	7
Fund 12	4.173%	23.744%	0.84995	-0.47511	17	-0.13273	16
Fund 13	12.004%	18.026%	0.70925	-0.21285	12	-0.05410	10
Fund 14	6.303%	18.285%	0.57822	-0.500 93	19	-0.15841	17
Fund 15	-15.071%	4.688%	0.17935	-6.60582	30	-1.72656	30
Fund 16	21.400%	15.343%	0.14523	0.35943	4	0.37973	2
Fund 17	2.864%	17.034%	0.48099	-0.73815	23	-0.26141	22
Fund 18	8.918%	38.208%	0.58357	-0.17046	11	-0.11161	13
Fund 19	28.086%	5.921%	0.14434	2.05840	1	0.84447	1
Fund 20	15.553%	25.109%	0.14277	-0.01601	7	-0.02816	8
Fund 21	6.239%	10.436%	0.37753	-0.95331	25	-0.26351	23
Fund 22	4.206%	16.697%	0.31145	-0.70270	22	-0.37672	27
Fund 23	14.246%	16.662%	0.15541	-0.10503	9	-0.11261	14
Fund 24	5.942%	19.114%	0.55752	-0.49499	18	-0.16970	19
Fund 25	4.669%	12.454%	0.45658	-0.89325	24	-0.24364	21
Fund 26	7.647%	19.806%	0.71593	-0.39403	15	-0.10901	12
Fund 27	20.055%	23.439%	0.66352	0.33304	5	0.11765	5
Fund 28	26.371%	19.291%	0.36783	0.53782	3	0.28206	3
Fund 29	0.550%	12.553%	0.27096	-1.18712	28	-0.54997	28
Fund 30	4.792%	16.688%	0.33825	-0.65921	21	-0.32524	25
All Funds	**7.250%**	**14.081%**	**0.53840**	**-0.5814**		**-0.15206**	
All Share Index	6.958%	21.959%	1.00000				
Risk-Free Rate	15.437%						

The 4th column shows the betas of the funds, which is a measure of systematic risks. Systematic risk is also referred to as inherent risk or market risk which affects all securities and cannot be diversified away. We found that all the mutual funds in our sample exhibited systematic risk levels lower than the market benchmark since all their betas were lower than 1, while the beta of the benchmark All Share Index was 1. Figure 4.1 clearly highlights the volatility of the returns of mutual funds compared with the volatility of the market, using the All-Share Index as a proxy. Again, this is a confirmation that portfolio managers were able to achieve appreciable diversification and risk reduction for their clients.

Figure 4.1

Comparison of Monthly Raw Returns of Mutual Funds with Returns of the Market (All Share Index) and the Risk-Free Rate from 2012 to 2021



4.2.2 To what extent do mutual funds generate excess risk-adjusted returns in Nigeria?

The result of the Sharpe and Treynor ratios computed to assess the risk-adjusted returns of mutual funds are highlighted in Table 4.1. In addition to the computed ratios, the 30 funds in the sample are ranked based on both their Sharpe and Treynor ratios. The result shows that 24 funds out of 30 funds (80%) recorded negative Sharpe ratios. Similarly, 24 funds (80%) recorded negative Treynor ratios. An equally weighted portfolio of all the mutual funds generated negative Sharpe and Treynor ratios of -0.5814 and -0.15206 respectively. This implies emphatically that mutual funds, on a risk-adjusted basis do not yield positive risk-adjusted returns. Moreover, the All-Share Index out-performed mutual funds on a risk-adjusted basis; although the benchmark portfolio also recorded negative Sharpe and Treynor ratios of -0.28511 and -0.06261 respectively. From the evidence in Table 4.1, it is clear that not only are mutual funds unable to generate positive risk-adjusted returns, they also do not beat the market on a risk-adjusted basis.

Figure 4.2

Pie Charts Showing the Proportion of Mutual Funds that Recorded Positive and Negative Alphas Respectively Based on Sharpe and Treynor Ratios.

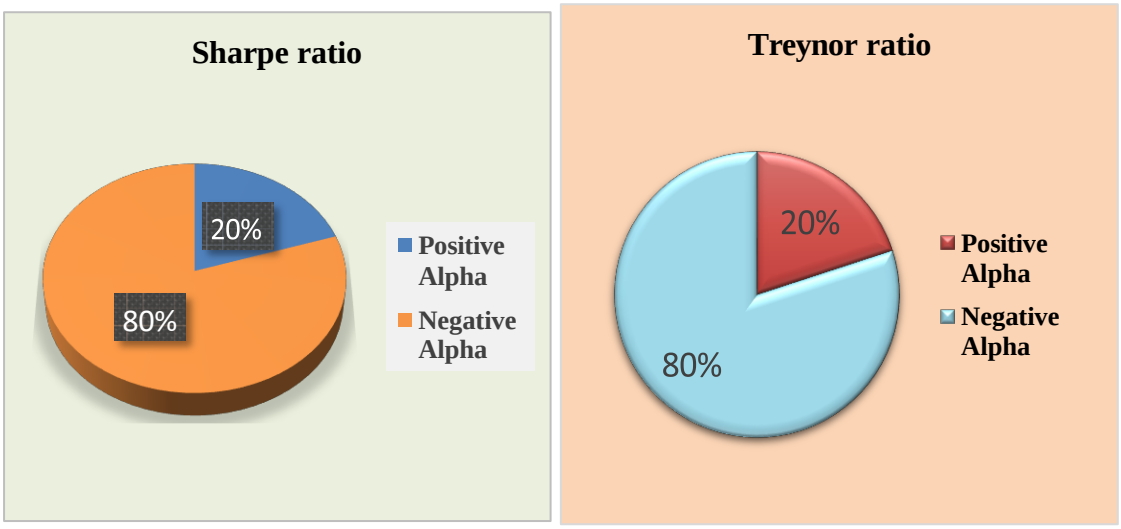


Table 4.2

Jensen 1-Factor Alphas and Fama-French 3-Factor Alphas for
30 Nigerian Equity-based Mutual Funds

Fund	Jensen 1-factor alpha			ctor
	Alpha (α_p)	**P-value**	**Alpha (α_p)**	**P-value**
Fund 1	-0.00819	0.06280	-0.00942	0.03831**
Fund 2	0.00294	0.78582	0.00309	0.78840
Fund 3	-0.00257	0.63736	-0.00099	0.85982
Fund 4	-0.01164	0.00012**	-0.01027	0.06934
Fund 5	0.00176	0.70055	0.00243	0.60305
Fund 6	-0.00418	0.13230	-0.00414	0.14339
Fund 7	-0.00865	0.14986	-0.00062	0.97966
Fund 8	-0.00048	0.89566	-0.00120	0.74868
Fund 9	0.00923	0.17166	0.00736	0.29628
Fund 10	-0.00219	0.75330	-0.00296	0.68167
Fund 11	0.00543	0.46639	0.02035	0.08741
Fund 12	-0.00418	0.39430	-0.00459	0.37068
Fund 13	-0.00067	0.90565	-0.00221	0.69666
Fund 14	-0.00117	0.77374	-0.00135	0.74789
Fund 15	-0.02598	0.00434**	-0.02631	0.06744
Fund 16	-0.00451	0.07549	0.00535	0.47464
Fund 17	-0.00559	0.12255	-0.00661	0.07128
Fund 18	0.00233	0.85371	0.00342	0.79636
Fund 19	0.00428	0.44302	-0.00184	0.71290
Fund 20	0.00229	0.89346	0.00536	0.68173
Fund 21	-0.00314	0.26750	-0.00514	0.08052
Fund 22	-0.00609	0.38830	-0.01102	0.12271
Fund 23	-0.00585	0.03578**	-0.00195	0.79107
Fund 24	-0.00270	0.31138	-0.00294	0.58686
Fund 25	-0.00375	0.25705	-0.00515	0.13113
Fund 26	-0.00095	0.76914	-0.00173	0.59366
Fund 27	-0.00216	0.81382	-0.00183	0.85042
Fund 28	0.01031	0.20353	0.00944	0.20244
Fund 29	-0.00836	0.00577	-0.00995	0.00138**
Fund 30	0.00381	0.54752	-0.00666	0.31761
All Funds	**-0.00300**	**0.14886**	**-0.00283**	**0.17878**

Note: ** indicates an Alpha that is statistically significant at 5%

Furthermore, Table 4.1 shows the rankings of the 30 mutual funds based on their Sharpe and Treynor ratios. We tested the degree of correlation of the Sharpe and Treynor ratio rankings using Spearman's Rank Correlation methodology and found evidence that there was a strong, statistically significant correlation between the rankings generated by the Sharpe and Treynor ratios, with a correlation coefficient of 0.963515017, which is statistically significant at both 5% and 1% levels. There is therefore no question that the Sharpe and Treynor ratios provided rankings of mutual fund portfolios with a high degree of similarity. This further reinforces our earlier result that the mutual funds in our sample are well-diversified. It has been observed that when portfolios are completely diversified, their rankings based on Sharpe and Treynor measures are very similar.

The result of the Jensen one-factor regression analysis and Fama-French 3-factor multiple regression analysis are presented in Table 4.2. The Table highlights the Alphas generated by the 30 mutual funds individually and collectively. It also shows the statistical significance of the results as determined by their P-values.

It can be observed that 9 mutual funds out of 30 in the sample (30%) recorded positive Jensen Alphas while the remaining 21 funds recorded negative Jensen Alphas. Further, all the positive Alphas recorded were statistically insignificant at 5% while 3 of the 21 negative Alphas (14%) were statistically significant at 5%. An equally weighted portfolio of all the mutual funds recorded a statistically insignificant, negative Alpha of -0.00300 (p-value 0.14886). This implies that statistically, Alpha is equal to zero (see Appendix A).

We applied the Fama French 3- factor model to further analyze Alpha and explore whether the model would provide a better fit to explain the cross-section of mutual fund returns. The result in Table 4.2 shows that 8 fund out of the 30 funds in the sample (27%) recorded positive but insignificant Alphas while the remaining 22 mutual funds (78%) generated negative Alphas, with only 2 beign statistically significant at 5% (representing 9% of the negative Alphas). Similar to the result from the Jensen model, an equally weighted portfolio of all the funds recorded a negative, insignificant Alpha of -0.00283 (p-value 0.17878). In terms of model fit, both the Jensen model and Fama French 3-Factor

model provide a similar model fit with an R^2 of 0.7110 and 0.7123 respectively (see Appendix B).

Figure 4.3

The Number of Positive vs Negative Alphas with Jensen 1-Factor Model and Fama French 3-Factor Model

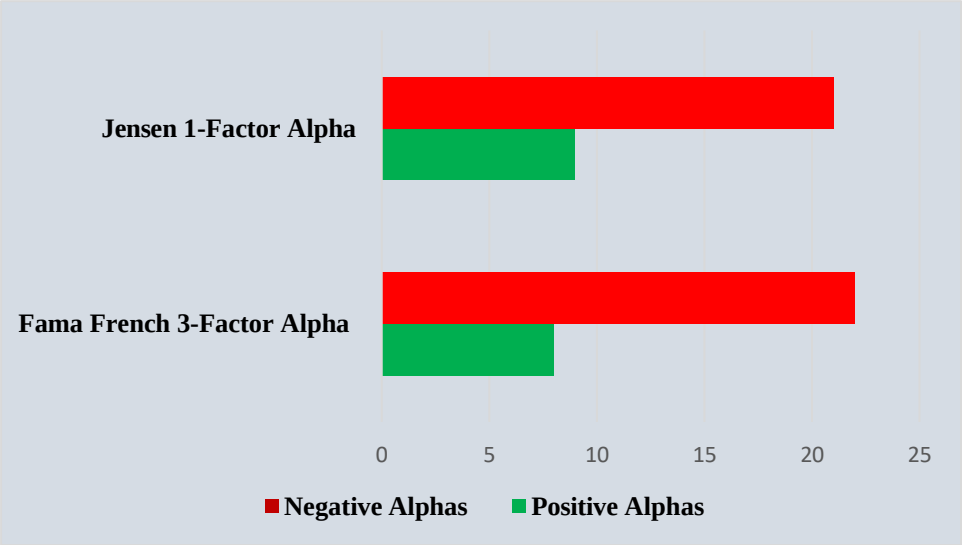
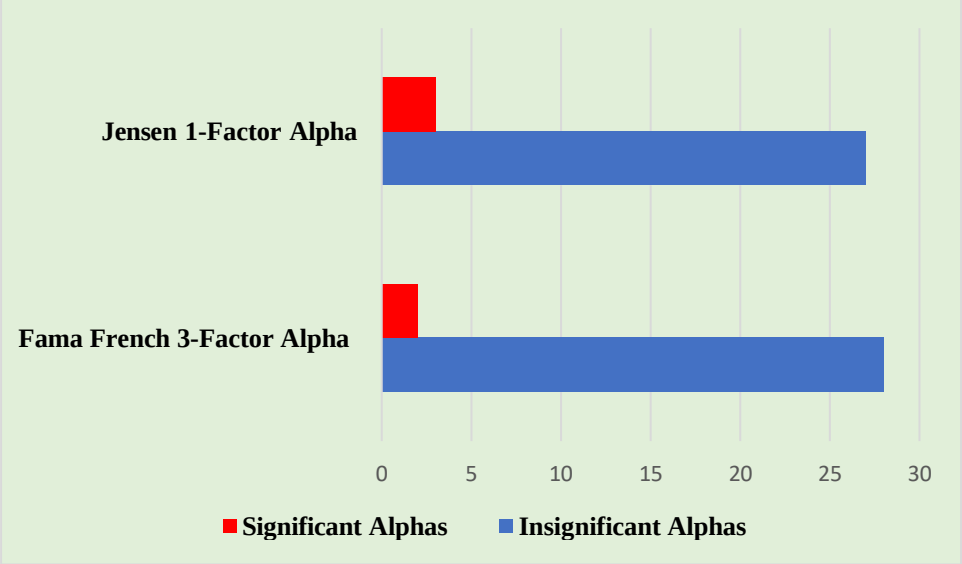


Figure 4.4

The Number of Significant vs Insignificant Alphas with Jensen 1-Factor Model and Fama French 3-Factor Model



It is worthy of note that the coefficients of Small minus Big (SML) and High minus Low (HML) of the Fama French 3-Factor model were both negative and statistically insignificant at -0.049960702 (p-value 0.718270506) and -0.059740345 (p-value 0.559236595) respectively. This indicates that, with respect to the performance of mutual funds in Nigeria during the period of study, the coefficients were not different from zero in explaining the risk-adjusted returns of mutual funds. This explains why the Jensen model and the Fama-French 3-Factor model equally presented strong R^2, indicating a good model fit (see Appendix B).

Following the results obtained from the four models presented above, we refer to Hypothesis 1, which states as follows:

Null hypothesis (Ho): There is no significant difference between mutual funds portfolio alpha ($\alpha_{p)}$ and zero in Nigeria.
Alternative hypothesis (HA): There is a significant difference between mutual funds portfolio alpha ($\alpha_{p)}$ and zero in Nigeria.

On the basis of available evidence in this section, we reject the alternative hypothesis and uphold the null hypothesis that states that 'there is no significant difference between mutual funds portfolio alpha ($\alpha_{p)}$ and zero in Nigeria.'

Table 4.3

Alpha (α_p) and βp_T {coefficient of the squared term $(R_{Mt} - R_{Ft})^2$} of Treynor-Mazuy Model for Evaluating Selective and Market Timing Ability of 30 Nigerian Equity-based Mutual Funds

Fund	Alpha (α_p)	P-value	βp_T	P-value
Fund 1	-0.00678	0.18677	-0.39677	0.59607
Fund 2	0.00557	0.67027	-0.48214	0.70955
Fund 3	-0.00113	0.86191	-0.32567	0.68311
Fund 4	-0.01006	0.00404**	-0.38900	0.38170
Fund 5	0.00139	0.80022	0.08400	0.90070
Fund 6	-0.00375	0.24793	-0.05401	0.89751
Fund 7	-0.00829	0.24054	-0.08717	0.92383
Fund 8	0.00297	0.49130	-0.85281	0.12769
Fund 9	0.01074	0.18708	-0.26635	0.72438
Fund 10	-0.00661	0.41881	1.37795	0.29710
Fund 11	-0.01133	0.24831	5.27803	0.04406**
Fund 12	-0.00215	0.71282	-0.47108	0.52006
Fund 13	0.00310	0.63414	-1.20696	0.26023
Fund 14	-0.00357	0.46079	0.53012	0.35614
Fund 15	-0.02738	0.00530	-3.21991	0.24457
Fund 16	-0.00336	0.25768	-0.28345	0.46018
Fund 17	-0.00510	0.19642	-0.02128	0.96912
Fund 18	0.00418	0.78126	-0.43658	0.81817
Fund 19	0.00524	0.39165	-0.97779	0.60827
Fund 20	-0.00153	0.93642	2.80441	0.62921
Fund 21	-0.00592	0.07208	0.78647	0.10264
Fund 22	-0.00305	0.71632	-0.99055	0.49869
Fund 23	-0.00711	0.03025**	0.31044	0.46047
Fund 24	-0.00337	0.59601	0.15103	0.84502
Fund 25	-0.00308	0.42932	-0.19039	0.73829
Fund 26	0.00010	0.97975	-0.25812	0.59988
Fund 27	-0.00020	0.98609	-0.28164	0.76330
Fund 28	0.00519	0.58430	1.59681	0.31178
Fund 29	-0.00780	0.02785**	-0.13841	0.76047
Fund 30	-0.00755	0.31033	1.05940	0.33237
All Funds	**-0.00342**	**0.16315**	**0.10188**	**0.74648**

Note: ** indicates a coefficient that is statistically significant at 5%

Table 4.4

Alpha (α_p) and $\beta p_T C$ of the Henriksson-Merton Model for Evaluating Selective and Market Timing Ability of 30 Nigerian Equity-based Mutual Funds

Fund	Alpha (α_p)	P-value	$\beta p_T c$	P-value
Fund 1	-0.002811	0.674952	-0.236024	0.297315
Fund 2	0.006367	0.708041	-0.12211	0.791219
Fund 3	0.000319	0.970674	-0.1134	0.666514
Fund 4	-0.00883	0.055179	-0.1148	0.423127
Fund 5	0.001832	0.802935	-0.00286	0.989725
Fund 6	-0.00334	0.436608	-0.02575	0.848474
Fund 7	0.004761	0.904156	-0.49042	0.808216
Fund 8	0.005462	0.340227	-0.24374	0.176152
Fund 9	0.008773	0.388848	0.016292	0.951695
Fund 10	-0.00921	0.38972	0.329403	0.384567
Fund 11	-0.02009	0.205455	1.006181	0.088636
Fund 12	0.002938	0.70451	-0.28139	0.239482
Fund 13	0.009073	0.276014	-0.46813	0.120414
Fund 14	-0.00479	0.461445	0.138038	0.473716
Fund 15	-0.02228	0.042124**	-0.86314	0.511765
Fund 16	0.008973	0.41261	-0.15518	0.692098
Fund 17	-0.00537	0.34139	-0.0093	0.958040
Fund 18	0.002627	0.89592	-0.01208	0.984494
Fund 19	0.01183	0.16198	-0.55231	0.225231
Fund 20	-0.01188	0.656217	0.943596	0.486023
Fund 21	-0.00705	0.110494	0.171607	0.244593
Fund 22	0.000796	0.941887	-0.31576	0.410343
Fund 23	-0.00778	0.07295	0.078892	0.55980
Fund 24	-0.00639	0.446673	0.145608	0.56811
Fund 25	-0.0014	0.785896	-0.10335	0.550079
Fund 26	0.001536	0.760305	-0.10178	0.519842
Fund 27	-0.00100	0.944183	-0.0375	0.91306
Fund 28	0.002192	0.860542	0.375492	0.395824
Fund 29	-0.00462	0.535117	-0.10666	0.653687
Fund 30	-0.01165	0.239083	0.344058	0.299869
All Funds	-0.003546	0.275023	0.022178	0.827118

Note: ** indicates a coefficient that is statistically significant at 5%

4.2.3 To what extent does the selective ability of mutual funds affect risk-adjusted returns in Nigeria?

Presented in Table 4.3 are the multiple regression Alphas and the βp_T (market-timing coefficient) of 30 equity-based mutual funds derived from the Treynor-Mazuy multiple regression model for evaluating the selective and market-timing ability of mutual funds. A positive Alpha (α_p) value indicates that the fund manager generates returns greater than the benchmark return, implying the presence of selective ability, while a positive βp_T value indicates that the fund manager possesses market timing ability.

Table 4.3 shows that 9 out of the 30 funds in the sample, representing 30% recorded positive but statistically insignificant Alphas; 3 funds (10%) recorded negative and statistically significant Alphas, while the remaining 18 funds (60%) recorded negative, statistically insignificant Alphas. Overall, 27 funds (90%) recorded insignificant Alphas. An equally weighted portfolio of all the mutual funds recorded negative but insignificant Alphas of -0.00342 with p-value of 0.16315 (Appendix C).

The result of the Henrikson-Merton model for measuring the stock selective ability of mutual fund managers is consistent with the conclusion reached using the Treynor-Mazuy model. The measure of selective ability in the Henriksson-Merton model is Alpha (α_p). From Table 4.4, we can observe that only 14 out of 30 funds in our sample (46.66%) recorded positive alphas. while others were negative. In addition, the coefficients of all 30 funds (except Fund 15) are statistically insignificant. When the return data of all the funds were pooled together, an equally weighted portfolio of the 30 mutual funds in our sample recorded a negative alpha of -0.003546 with an insignificant alpha of 0.275023 (Appendix D)

Consequently, we refer to Hypothesis 2 stated below:

Null hypothesis (Ho): There is no significant relationship between mutual funds' selective ability and risk-adjusted returns in Nigeria.

Alternative hypothesis (HA): There is a significant relationship between mutual funds' selective ability and risk-adjusted returns in Nigeria.

Following the results presented in this section, we reject Alternative Hypothesis 2 above and do not reject Null Hypothesis 2 which states that there is no significant relationship between mutual funds' selective ability and risk-adjusted returns in Nigeria.

4.2.4 To what extent does the timing ability of mutual funds affect risk-adjusted returns in Nigeria?

Regarding market timing ability, Table 4.3, earlier referred to, highlights the multiple regression Alphas (α_p) and the βp_T (market-timing coefficient) of 30 equity-based mutual funds derived from the Treynor-Mazuy model for evaluating the selective and market-timing ability of mutual funds. In the case of market timing, a positive and statistically significant βp_T value indicates that the fund manager possesses the market timing ability to generate returns higher than benchmark return.

Table 4.3 shows that 11 funds out of 30 (37%) recorded a positive βp_T value. However, the coefficient of only one fund (Fund 11) is statistically significant. The remaining 21 funds (63%) exhibited negative and statistically insignificant βp_T values. Taken together as a whole, an equally weighted portfolio of the funds in our sample recorded a positive but statistically insignificant βp_T value of 0.10188, with a p-value of 0.74648 (Appendix C)

In addition to the Treynor-Mazuy model, we applied the Henriksson-Merton Model market timing model which assumes a non-stationary beta that takes a value of 1 in an upmarket but a value of zero in a down market. Similar to the interpretation of the Treynor-Mazuy model, a positive and significant βp_T**C** is evidence of the presence of market timing ability. Table 4.4, which presents the result of this model highlights that 10 out of 30 funds (33.33%) recorded positive βp_Tc while the remaining 20 funds (67.66%) delivered a negative coefficient. Overall, for all the funds taken together, an equally weighted portfolio of all the funds recorded a positive but statistically insignificant βp_Tc of 0.022178 (Appendix D). Therefore, both Treynor-Mazuy and Henriksson-Merton models produced evidence that mutual fund managers do not possess market timing ability.

Consequently, we refer to Hypothesis 3 stated below:

Null hypothesis (Ho): There is no significant relationship between mutual funds' market-timing ability and risk-adjusted returns in Nigeria.

Alternative hypothesis (HA): There is a significant relationship between mutual funds' market-timing ability and risk-adjusted returns in Nigeria.

Following the results presented in this section, we reject Alternative Hypothesis 3 above and have no empirical evidence to nullify Null Hypothesis 3 which states that there is no significant relationship between mutual funds' market-timing ability and risk-adjusted returns in Nigeria.

Figure 4.5

The Proportion of Mutual Funds that Recorded Significant and Insignificant Alphas and βp_T, in Measuring the Selectivity and Market Timing Ability Respectively Using the Treynor-Mazuy Model

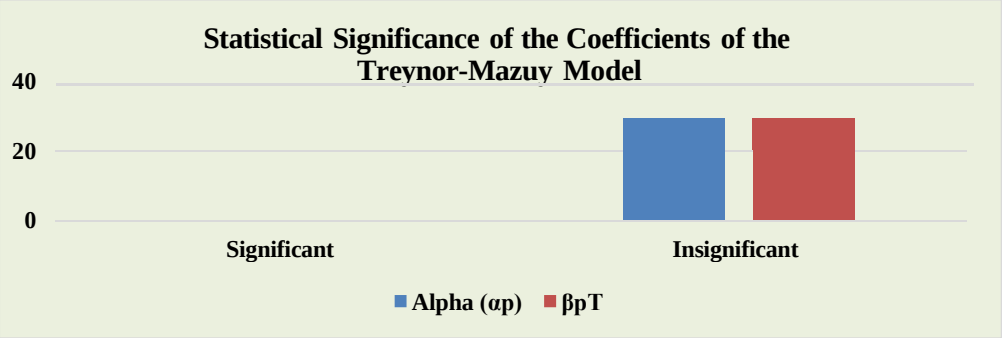
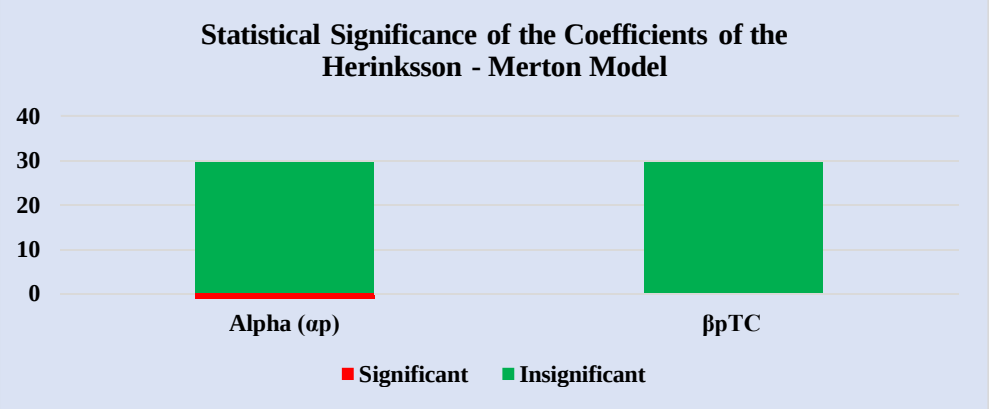


Figure 4.6

The Proportion of Mutual Funds that Recorded Significant and Insignificant Alphas and $\beta p_T C$ in Measuring the Selective and Market Timing Ability Respectively Using the Henriksson-Merton Model



4.2.5 To what extent do mutual funds exhibit persistence of performance in Nigeria?

Table 4.5 (Panel A) below presents the results of the performance persistence tests using the Contingency Table methodology. The procedure adopted was to first rank the risk-adjusted returns of the mutual funds in our sample based on their Jensen Alpha, over two consecutive periods. On this basis, the funds are categorized into two groups tagged ‘winner’ and ‘loser’ portfolios. A fund is classified as a ‘winner’ if its risk-adjusted return exceeds the mean return of all the funds in the sample for the given period. Conversely, a fund is a ‘loser’ if its risk-adjusted return falls below the mean return of all the funds in the sample. The process is repeated in two consecutive periods to construct a contingency table. Statistical tests of significance, including Z-statistics of the Cross Product Ratio (CPR), and rank correlation analysis were applied to test for the significance of persistence.

From Panel A, it can be observed that 9 periods of 2 years each from 2012/2013 to 2020/2021 are used for the performance persistence test. ‘Repeat winners’ (WW) represents the number of funds categorized as winners in two consecutive sample periods. ‘Repeat losers’ (LL) represents the number of funds that are losers in two consecutive sample periods. ‘Loser-winners’ (LW) refers to the number of funds that are losers in the first period and subsequently reverses to winners in the second; while ‘Winner-losers’ (WL) defines the number of funds that are winners in the first period but subsequently reverses to losers in the second sample period. WL and LW are jointly referred to as reversal performers.

Table 4.5

Contingency Table Methodology Showing the Cross Product Ratios and Rank Correlation Coefficients with their Statistical Significance Using a Sample of 30 Nigerian Equity-Based Mutual Funds

PANEL A						
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
PANEL B						
Period	In (CPR)	SE (In CPR)	Z	P-value	Rank Correlation Coefficient (r)	P-value
2012/2013	-0.3365	1.0048	-0.3349	0.3707	-0.0691	0.3926
2013/2014	-0.4055	1.0801	-0.3754	0.3557	0.0882	0.6318
2014/2015	2.0149	1.4259	1.4130	0.9207	-0.1227	0.3596
2015/2016	n/a	n/a	n/a	n/a	-0.8000	0.1000
2016/2017	0.4055	1.6833	0.2409	0.5948	0.0714	0.5605
2017/2018	-0.5108	1.5916	-0.3209	0.3745	-0.0667	0.4274
2018/2019	0.0000	1.2910	0.0000	0.5000	0.0182	0.5199
2019/2020	n/a	n/a	n/a	n/a	-0.4909	0.0748
2020/2021	1.3863	1.3229	1.0479	0.8508	0.4835	0.9529
All Periods	-0.3157	0.4052	-0.7790	0.7794		

To measure ‘persistence’ or ‘reversal’, we computed the 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 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.

Panel A 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, the result showed that the CPRs for all nine periods were statistically insignificant based on the Z-statistics.

For further robustness tests, we applied the rank correlation analysis to validate the persistence test. The computed correlation coefficients are shown in Panel B of Table 4.4, which shows that only one period (2015/2016) gives an indication of an apparently strong correlation, with a correlation coefficient of -0.8000. However, when subjected to a statistical test of significance, the correlation coefficients of all nine periods were found to be statistically insignificant. 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), indicating that the CPR is statistically insignificant and that there is no evidence of performance persistence.

Following the results above, we give consideration to Hypothesis 4, which states as follows:

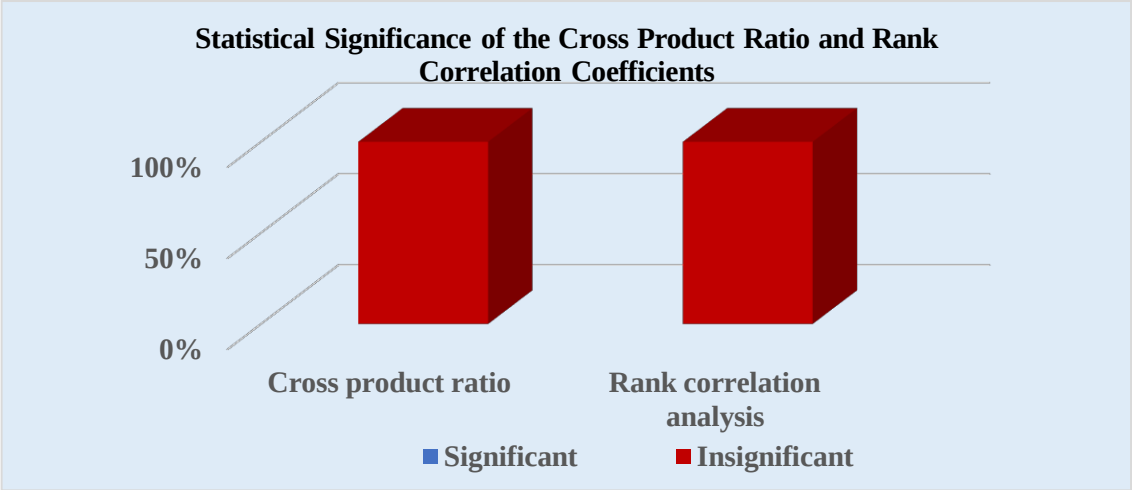
Null hypothesis (Ho): There is no significant relationship between mutual funds’ past performance and current performance in Nigeria.

Alternative hypothesis (HA): There is a significant relationship between mutual funds’ past performance and current performance in Nigeria.

Based on our evidence, we reject the alternative hypothesis and uphold the null hypothesis that states that there is no significant relationship between mutual funds' past performance and future performance in Nigeria.

Figure 4.7

The Proportion of Periods with Statistically Significant and Insignificant Cross Product Ratio and Spearman's Rank Correlation Coefficients Respectively, Using the Contingency Table Methodology to Evaluate the Persistence of Performance of Mutual Funds.



4.3 Evaluation of Findings

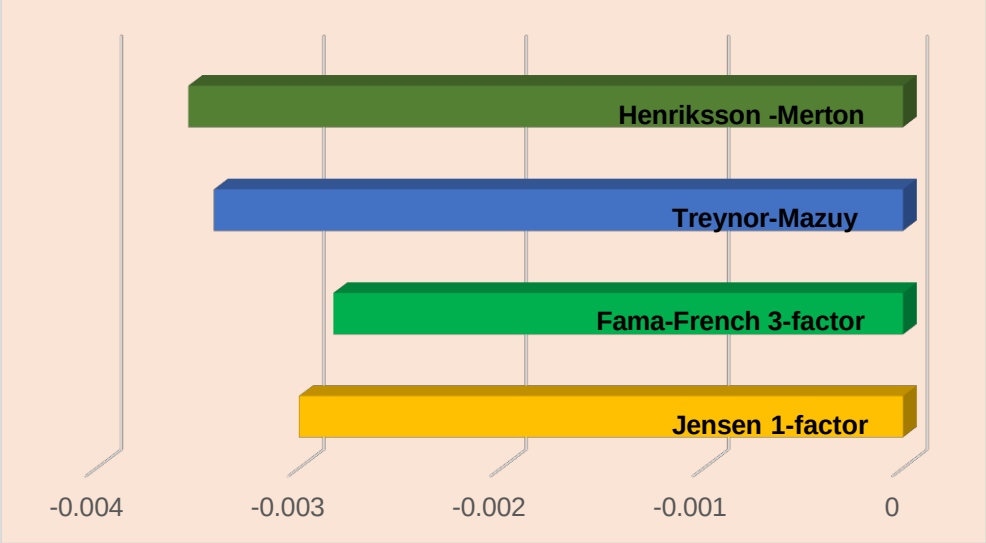
This section provides a critical evaluation of the result obtained in this study in the context of existing theories and findings in the literature.

Evidence from this study points convincingly to the conclusion that mutual funds do not generate excess risk-adjusted returns. As reported in detail in an earlier section, the results of the Sharpe ratio, Treynor ratio, Jensen Alpha, and the Fama-French 3-factor model are consistent in supporting the evidence that mutual funds' alpha is not significantly different from zero. This is largely in line with existing literature on mutual funds in Nigeria and most other parts of the world. Oduwole (2015) and Ilo et al (2018) studied Nigerian mutual funds and concluded that fund managers do not generate positive alpha. Similar results were obtained from other parts of Africa by Gilbertson & Vermaak, 1982; Oldham and Kroeger, 2005; Manjezi, 2008; Mibiola, 2013; Tan, 2015 in

South Africa; and Mohamed et al, 2014 in Kenya. In addition, the results of several studies in a numbers of developing market also corroborate our result, including India (Jaideep and Sudipta, 1994; Tripathy, 2006); Greece (Artikis, 2003); and Nepal (Upadhyaya and Chhetri, 2019). In addition, Sharpe (1966) Jensen (1968), Ippolito (1989), and later Malkiel (1995) were in agreement that mutual funds underperform after fees.

Figure 4.8

Estimates of the Average Alphas of 30 Equity Mutual Funds from Jensen factor, Fama-French 3-factor, Treynor-Mazuy, and Henriksson-Merton models.



It is also noteworthy that in using the Fama-French 3-factor model to evaluate the risk-adjusted performance of mutual funds in this study the coefficients of Small minus Big (SML) and High minus Low (HML) were both negative and statistically insignificant, This implies that the well documented size effect and value effect did not significantly influence the cross section of returns of securities in the Nigerian stock market during the study period and were insignificant in explaining the risk-adjusted returns of mutual funds.

The literature distinguished clearly between stock selection and market timing strategies, both of which a portfolio manager could explore to generate alpha. While stock selection strategy involves buying stocks and including them in a portfolio based on the perceived strengths of the individual stocks, market timing strategy involves adjusting the

portfolio towards holding a larger proportion of volatile securities during a bull market and vice versa during a bear market.

The result of the Treynor-Mazuy and Henriksson-Merton models adopted for this study points clearly to a lack of selectivity among mutual fund managers. An overwhelming majority (90% and 97% respectively) of the mutual funds studied have statistically insignificant alphas, implying a lack of selective ability. In agreement with our result, several studies provide evidence that active managers do not possess selective ability in Indonesia (Murhadi, 2010); Ghana (Musah et al, 2014); Poland (Ünal and Tan, 2015); Portugal (Neto et al, 2017); Republic of Serbia (Lekovic et al, 2020); Poland (Żebrowska-Suchodolska and Karpio, 2022). Some other studies reported that there was evidence of selective ability but that this was not impactful enough to cover fees and expenses. Wermers (2000), for instance, found that after costs and fees, the average fund underperformed by about 1% per year, although before costs and fees actively managed mutual funds outperformed by 1.3% per year. However, it is worthy of note that a couple of studies reported the presence of some selective ability in Banglasesh (Biplob, 2017); Nepal (Upadhyaya and Chhetri, 2019) and Jordan (Hacini and Dahou, 2019).

With respect to market timing ability, the result shows that the market timing coefficients of the Treynor-Mazuy and Henriksson-Merton models are statistically insignificant for 97% and 100% respectively of the mutual funds. This provides strong evidence of a lack of market timing skills. It implies that fund managers are not able to adjust their portfolio as appropriate in anticipation of a bull or bear market and take advantage.

Earlier studies on mutual funds in Nigeria did not investigate the market timing ability of mutual funds. However, our results are consistent with results from other parts of Africa. Studies by Gilbertson and Vermaak (1982), Manjezi (2008), Mibiola (2013), and Tan (2015) in South Africa, Mohamed et al (2014) in Kenya, Musah et al in Ghana (2014), respectively concluded that fund managers lacked market timing ability. Similar results were reported in other developing markets such as Poland (Ünal and Tan, 2015; Żebrowska-Suchodolska and Karpio, 2022); Indonesia (Murhadi, 2010); Bangladesh

(Biplob, 2017); Portugal (Neto et al, 2017); Nepal (Upadhyaya and Chhetri, 2019); Jordan (Hacini and Dahou, 2019); Emerging Markets (Cagnazzo, 2019); Republic of Serbia Lekovic et al, 2020); and Saudi Arabia, Malaysia, Indonesia, and Pakistan (Atta and Marzuki, 2021).

Evidence regarding the timing ability of fund managers is more diverse, though. While early studies in the developed markets do not find convincing evidence of timing, later researchers including Bollen and Busse (2001), Kaplan and Sensoy (2005), and Jiang et al (2007) find positive timing when they assessed sensitivity based on a single index. However, some researchers contend that a more robust model that will capture the dynamics of the changes in the sensitivity of the market and changes in the sensitivity of other factors should be used to measure timing. Elton, Gruber, and Blake (2011b) and Ferson & Qian (2006) therefore used models that address this concern and found no evidence of timing; whereas they found timing ability when a singe-index model was applied.

This study presents evidence that the past 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). However, in the early 1990s, several new studies reported evidence of persistence of performance [Grinblatt &Titman (1992), Hendricks et al (1993), Goetzmann & Ibbotson (1994), Elton et al (1996a), and Gruber (1996)]. Following the new findings, several other researchers sought to provide an explanation for the phenomenon of persistence of performance reported in the literature. Some found evidence that seems to contradict the claim of persistence of performance of mutual funds. A couple of studies identified survivorship bias as the explanation for the apparent performance persistence (Brown et al, 1992; Brown & Goetzmann, 1995; and Malkiel, 1995), while others identified momentum and the use of momentum strategies as the reason (Carhart, 1997; Daniel et al, 1997; and Wermers, 1997).

Several studies in Africa and other developing countries also reported no evidence of performance persistence including Ghana (Musah et al, 2014); South Africa (Bertolis and Hayes, 2015); the Republic of Serbia (Lekovic et al, 2020); and Turkey (Azimova, 2021)

More recently, new studies provide evidence that past performance is correlated with future performance. Specifically, several studies present evidence that poor performance predicts poor performance, and that top-performing funds maintain their performance in future periods [(Gruber (1996); Elton et al (1996c), Carhart (1997); Cohen, Coval, and Pastor (2005); and Busse and Irvine (2006)]. It is also reported in the literature that persistence of performance is a short-term phenomenon among top-performing funds that exhibit it (one to two years) e.g South Africa (Keywood, 2015); and China (Zhang et al, 2020)

However, evidence from this study does not validate the existence of persistence of performance.

4.4 Summary

In this chapter, we present the result of our data analysis with the aim of addressing the broad research question, 'what is the risk-adjusted performance of mutual funds in Nigeria?'This is a quantitative, desk research involving the collection and analysis of publicly available economic and market data about mutual funds. Data was collected directly from the website of regulatory agencies that are responsible to obtain them and making them available to the public. This gives a high degree of confidence that the data were reliable. To give further assurance of the reliability and validity of the result of the study, we have adopted tried and tested research methods from the literature. In addition, data were purposively collected from all actively managed equity mutual funds that operated in Nigeria during the period of study. We can therefore generalize the result of the study with a high level of confidence.

A review of the descriptive statistics of the funds shows that the majority of the funds (87%) recorded positive raw returns, 43% outperformed the market based on raw returns, and 20% of the funds delivered raw returns in excess of the risk-free rate. An important observation is that all the funds achieved a systematic risk level of less than 1

as measured by beta. This implies that mutual funds are able to achieve significant risk reduction through diversification,

Evidence from the result of this study is that mutual funds do not achieve positive risk-adjusted returns. The result of the Sharpe model, Treynor model, Jensen Alpha, and Fama-French 3-factor model all reach the same conclusion. This result corroborates the conclusion from several studies on mutual funds. In addition, this study explores the selective skill and market timing ability of mutual funds. From the literature, the alpha generated by a mutual fund can be decomposed and attributed to either or both of these skills. Results from this study show that mutual funds in Nigeria lack both selectivity and market timing ability. This outcome is consistent with the conclusion from a large body of works in the literature.

Finally, we explore the subject matter of performance persistence, which has grown in importance in mutual funds research recently. We find that mutual funds in Nigeria do not exhibit performance persistence. In other words, past performance does not predict future performance. It is worthy of note that there is no agreement in the literature regarding the phenomenon of the persistence of mutual funds' performance. Our results are consistent with the results of earlier studies on performance persistence, but contradict some recent works which report evidence that poor performance predicts poor performance, and that top-performing funds exhibit persistence of performance in the short term [(Carhart (1997); Busse and Irvine (2006); Gruber (1996); Elton et al (1996c), and Cohen et al (2005)].

A major takeaway from all the results obtained is that they consistently corroborate the Efficient Market Hypothesis proposed by Grossman and Stiglitz (1980), who contended that perfectly informationally efficient markets are an impossibility. They argued that if markets are perfectly informational efficient, then there is no benefit in gathering and exploiting market-relevant information, which would imply that there any effort to trade and exploit mispricing in the capital market is a waste of time, hence markets will eventually collapse. They posited that in reality, the level of inefficiency in a market dictates the degree of efforts investors are prepared to make to obtain and exploit

information. Therefore, market equilibrium will be achieved only when the market presents sufficient opportunities and inefficiencies that market participants are able to exploit and which yield enough benefits to compensate them for the costs of information gathering and trading. According to Lo (2007), the profits earned by this category of investors can be viewed as economic rent which is borne by noise traders, who trade on what they consider to be relevant information but which, in reality, is noise.

CHAPTER 5: IMPLICATIONS, RECOMMENDATIONS, AND CONCLUSION

Mutual funds are a fairly recent phenomenon in Nigeria with the first mutual fund being created just in 1991. For the most part of the 1990s total asset under management was below N20 billion. However, after the global economic recession which caused unprecedented reverses in the Nigerian capital market between 2008 and 2010, the importance of mutual funds was given renewed emphasis by stock market regulators in Nigeria. Today, mutual funds in Nigeria have gained considerable momentum with Asset Under Management (AUM) topping 1.4 trillion Naira as of 31st December 2021 (Securities and Exchange Commission, Nigeria).

The astronomical growth of mutual funds is a global phenomenon. The Investment Company Institute (2018) reported that the total net assets value of worldwide regulated open-end funds grew by about 127% to almost $49.3 trillion in 2017, from $21.7 trillion in 2008, indicating that mutual funds as an investment vehicle have attained global significance. However, the spectacular growth of mutual funds globally has continued to be a puzzle to the academic community because numerous studies across the world have shown that mutual funds not only underperform broad market indexes but also do not yield positive risk-adjusted returns (Gruber, 1996).

In addition, more recent studies have attempted to investigate the phenomenon of performance persistence. That is, researchers sought to provide answers to the question of whether or not mutual funds repeat good (or bad) performance of a given period in a subsequent period(s). The results of these studies at best provide conflicting, inconclusive evidence. This study, therefore, aims to contribute to the extensive academic debate on whether or not mutual funds deliver excess risk-adjusted returns, the extent to which selective ability and market timing ability of fund managers affect risk-adjusted returns, and whether mutual funds exhibit performance persistence.

The study is approached from a positivist philosophy. This implies that we attempted to gain factual knowledge of the subject of study through observation and objective measurement, as we believe that this is the only way to gain reliable knowledge.

Consistent with the positivist research paradigm, the quantitative research approach was adopted. All available historical data were collected on the monthly net asset values (NAVs) of all actively managed equity mutual funds in Nigeria, covering January 2012 to September 2021, from the Securities and Exchange Commission (SEC) and the Nigeria Exchange Limited (NGX). The data were subjected to statistical analysis to test the performance and performance persistence of mutual funds. Statistical and quantitative models that have been successfully applied by seasoned experts in the field were adopted for the study.

This is quantitative desktop research that does not require the collection of private and sensitive data from human subjects, we, therefore, were not faced with several research ethics issues usually associated with studies involving human subjects. Even then, we took necessary precautions to ensure that the results of the study are replicable, valid, and robust. This involves ensuring adequate quality control through research design, sample selection, statistical results interpretation, and reporting.

Using the Sharpe ratio, Treynor ratio, Jensen Alpha, and Fama-French 3-factor model to assess the risk-adjusted returns, our evidence shows that mutual funds do not, on average, deliver excess risk-adjusted returns to beat the market. All the models applied unanimously led to the same conclusion. This result corroborates evidence from a large body of work in the literature on the performance of mutual funds.

This study also explored the selectivity and market timing ability of mutual funds, using the time-tested traditional models of Treynor-Mazuy and Henriksson-Merton which decompose the performance of mutual funds into selectivity and market timing ability. Evidence from the study shows that mutual fund managers in Nigeria lack both stock selection skills and market timing ability. This result is consistent with the conclusion from a large body of earlier works in the literature; although some recent studies argue that some fund managers possess selective skills at the level of gross returns but fees and expenses erode the value added.

Finally, the study explored the subject matter of performance persistence, which has grown in importance in mutual funds research recently because several researchers are of the opinion that the existence or otherwise of persistence inadvertently addresses the issue of skills vs luck in funds performance as well as the efficiency of the stock market. Our evidence shows that mutual funds in Nigeria do not exhibit performance persistence. In other words, past performance does not predict future performance. It is worthy of note that there is no agreement in the literature regarding the phenomenon of the persistence of mutual funds' performance. While our result corroborates a body of earlier studies on performance persistence that reported that funds' performance does not repeat, it contradicts some recent works which conclude that top-performing funds exhibit persistence of performance in the short term (Carhart,1997; Busse and Irvine, 2006; Gruber, 1996; Elton et al,1996c; and Cohen et al, 2005].

The remaining part of this chapter is organized as follows: The next section discusses the implications of the study vis-a-vis the purpose of the study, the available evidence in the literature, and its application in practice. This is followed by specific recommendations on the application of the results of the study to the practice of investment management and the mutual fund industry. Next, recommendations are made regarding the gaps in the literature that future researchers in the field should consider investigating and filling. Finally, a conclusion to the study is made with an emphasis on the results obtained and the contributions made to the field.

5.1 Implications

5.1.1 Mutual funds do not generate excess risk-adjusted returns

The first hypothesis of this study is that mutual funds do not generate risk-adjusted returns. Evidence from this study affirms conclusively that mutual funds do not generate excess risk-adjusted returns. In other words, the average alpha of mutual funds is zero. In addition to the traditional models of Sharpe ratio and Treynor ratio, we deployed both the one-factor Jensen regression model and the three-factor Fama-French regression model to arrive at the same conclusion. This result largely validates earlier studies in the literature. Oduwole (2015) and Ilo et al (2018) studied Nigerian mutual funds and

concluded that fund managers do not generate positive alpha. Similar results were obtained from other parts of Africa by Gilbertson & Vermaak, (1982); Manjezi (2008); Mibiola (2013); Tan (2015) in South Africa; and Mohamed et al (2014) in Kenya. In addition, Sharpe (1966) Jensen (1968), Ippolito (1989), and later Malkiel (1995) and (1996) were unanimous in their conclusion that mutual funds underperform after fees.

5.1.2 Mutual fund managers do not possess stock-selection skills

The second hypothesis states that there is no significant relationship between mutual funds' selective ability and risk-adjusted returns in Nigeria. Again, evidence from this study does not support the existence of selective ability. Using the well-known Treynor-Mazuy and Henriksson-Merton models, our result shows that 90% and 97% respectively of the mutual funds in the study sample have statistically insignificant alphas, implying a lack of selective ability. It means therefore that employing the services of a professional fund manager adds no significant value to the portfolio of assets, with respect to generating alpha.

Although there is evidence in the literature that some fund managers have superior skills to generate alpha, only a few generate enough alpha to cover their costs. Several studies support this position. Wermers (2000), finds that after costs and fees, the average fund underperforms by about 1% per year, although before costs and fees actively managed mutual funds outperform by 1.3% per year. Fama and French (2010) found evidence that, in the final analysis, most funds do not generate positive returns after incorporating the cost of active management, although before cost many fund managers succeed in outperforming the market. Corroborating this evidence, Barras et al (2010) reported that only 0.6% of funds demonstrate skills after fees and that, although the overwhelming proportion of funds (75.4%) exhibit the existence of some skills, fees charged for their services completely wipe out the added value. They also observed that in more recent years the proportion of funds that exhibit superior skills has declined progressively from 14.4% in early 1990 to 0.6% in late 2006.

5.1.3 Mutual fund managers do not possess market-timing skills

The third hypothesis of the study is that there is no significant relationship between mutual funds' market timing ability and risk-adjusted returns in Nigeria. This study does not find evidence of the existence of market timing ability in mutual fund managers. This validates a common saying among investment practitioners that, '' time in the market will always beat timing the market,'' implying that it is a challenging undertaking to attempt to beat the market through market timing.

The Treynor- Mazuy and Henriksson-Merton models employed to test for market timing ability show that 97% and 100% respectively of the funds in the sample have statistically insignificant market timing coefficients. This is overwhelming evidence of a lack of market timing skills among mutual funds managers in Nigeria. It implies that fund managers do not demonstrate the ability to correctly predict the direction of the market in the short to medium term, and alter the betas of their portfolios accordingly to profit.

Generally, evidence regarding the timing ability of fund managers appears diverse. Earlier studies on mutual funds in Nigeria did not investigate the market timing ability of mutual funds. However, our results are consistent with evidence from other parts of Africa. Studies by Gilbertson and Vermaak (1982), Manjezi (2008), Mibiola (2013), and Tan (2015) in South Africa, Mohamed et al (2014) in Kenya, and Musah et al (2014) n Ghana respectively concluded that fund managers lacked market timing ability.

While early studies in the developed markets did not find convincing evidence of timing, later researchers including Bollen and Busse (2001), Kaplan and Sensoy (2005), and Jiang et al (2007) found positive timing when they assessed sensitivity based on a single index. However, some researchers argue that changes in the sensitivity of some relevant factors not captured by the single index model can drive changes in sensitivity to the market. Based on this position Elton, Gruber, and Blake (2011b) and Ferson & Qian (2006) measured timing by using a model that accounts for changes in both the market's sensitivity and the sensitivity of other factors. Following this approach, there was no evidence of timing, whereas they found timing ability when a market index approach was applied.

5.1.4 Mutual funds do not exhibit persistence of performance

In recent years, mutual fund researchers have beamed their searchlight on the concept of performance persistence which explores the correlation between the past performance of mutual funds and their future performance. Performance persistence occurs if a fund consistently outperforms (or underperforms) the mean performance of a cohort of similar funds. This concept is critical as it has implications for an investor's choice between competing funds (Australian Securities and Investment Commission, 2003).

We analyzed the persistence of the performance of mutual funds using the Contingency Table methodology along with Cross Product Ratio (Odd Ratio) and Spearman's Rank Correlation inferential statistics. Evidence from this study shows that mutual funds do not exhibit persistence of performance. In other words, past performance does not predict future performance.

The subject of persistence of performance is quite controversial in the mutual fund literature, and empirical evidence on the subject is inconclusive. While studies did not find evidence of the persistence of performance (Sharpe, 1966; and Jensen, 1968), several studies reported evidence of persistence in the 1990s (Grinblatt & Titman,1992; Hendricks et al,1993; Goetzmann & Ibbotson, 1994; Elton et al, 1996a; and Gruber, 1996). Following this, other researchers sought to provide explanations for the observed performance persistence, but they found evidence that contradicted the claim of the persistence of performance. Brown et al (1992), Brown & Goetzmann (1995), and Malkiel (1995) identified survivorship bias in sampling as the reason for the apparent persistence. Other studies reported that the momentum effect and the use of momentum strategies not captured by the risk model used provided plausible explanations for the persistence in performance (Carhart, 1997; Daniel et al, 1997; Wermers,1997).

However, more recent studies provide strong evidence that poor performance predicts poor performance. One feature that appears to be undisputed among poor-performing funds is high expense ratios. It does appear that if a fund charges high enough fees, it could be guaranteed to consistently perform poorly. This result makes intuitive sense since it is much easier to identify fund characteristics that lead to consistently poor

performance, such as high expense ratio and high turnover ratio associated with more frequent trading; while the factors that create consistent top performance, such as selective ability, are far more difficult to identify (Bodie et al, 2014). Thus, the persistence of performance that has been observed in some studies is most likely due to poor performers. Therefore, the real value of historical performance data is to identify and avoid poor-performing funds, even if it is a challenging task to identify top performers.

Perhaps, more relevant to mutual fund investors is the evidence of performance persistence among top-performing funds. In this regard, there is ample evidence that if funds are ranked based on positive alpha there is a high likelihood that top-ranking funds will deliver positive alphas in subsequent periods [Carhart (1997); Busse and Irvine (2006); Gruber (1996); Elton et al (1996c), and Cohen et al (2005)]. Overall, where persistence is found among top-performing funds, the evidence seems to point to the fact that it is a short-term phenomenon (one to two years). It is noteworthy that evidence is inconclusive, and there is no consensus among researchers on several issues. This provides a rationale for further research on the performance of mutual funds.

5.1.5 Mutual funds provide diversification benefits

An important observation from this study is the clear evidence of robust diversification benefits provided by mutual funds. The range of results of the betas and standard deviations of the equity mutual funds in our sample support this conclusion. Diversification serves to improve potential returns and stabilize portfolios of assets with the benefit of professional management and lower cost.

5.1.6 The Nigerian Stock Market is Informational Efficient

This study validates the Efficient Market Hypothesis on the Nigerian stock market. In an efficient market, stock prices are random and it is impossible to find price patterns that would make it possible to exploit price movements and generate alpha. Therefore, analyzing past prices of securities and the published financial reports of issuers, or employing any other trading strategy will not help the analyst to identify and select securities to exploit mispricing in the market. Moreover, since prices follow a random walk and all information in past prices is reflected in today's stock price, it will be difficult for

anyone to consistently exploit the market based on information that is available to all market participants.

In addition, it is assumed that the prices of securities reflect publicly available information. This implies that the market is informational efficient such that security prices adjust rapidly to public information. This includes information such as past securities prices, earnings and dividend announcements, announcements of merger and takeover plans, and other macroeconomic expectations that are public information in this context. In an efficient market, we can affirm that the market displays the best available estimate of the fair price of a security. Therefore, any effort to study and make investment decisions on the basis of publicly available information is an effort in futility as it cannot consistently yield excess returns. Hence, fundamental analysis and investment research cannot add value.

To assess whether or not a market is semi-strong efficient, researchers typically observe how quickly security prices incorporate new information such as dividend announcements, earnings announcements, news of mergers and takeovers, and other key macroeconomic information. Studies have shown that markets are largely semi-strong efficient. Indeed, if stock markets were not efficient then there is no reason why mutual funds would not consistently outperform the index given the superior training and resources available to professional managers.

Further, the study of professional managers is assumed to be a real test of the semi-strong form of market efficiency as fund managers typically have access to the same information available to most market participants and therefore do not have exclusive information that can confer trading advantages over others; nevertheless, they are well-trained and possess stock market expertise. Therefore, if any group of market participants could achieve above-average returns consistently, then it should be fund managers. Moreover, they are the most favored group to gain access to market-sensitive information or any non-insider information as they frequently conduct management interviews, and may have access to superior analysts. The outcome of this study is therefore a good test of the semi-strong form efficiency of the Nigerian stock market.

Our result corroborates a version of the Efficient Market Hypothesis developed by Grossman (1976) and Grossman and Stiglitz (1980) specifically in relation to mutual funds. The researchers propounded a theory about a version of market efficiency whereby informed investors are able to trade at prices that effectively compensate them for the cost incurred to obtain information, ultimately resulting in a situation where active mutual funds managers underperform passive portfolios. Suppose that fund managers have similar abilities, Grossman and Stiglitz (1980) demonstrated that while mutual funds can outperform the benchmark based on gross returns, by the time costs are factored in, they fail to beat the benchmark a strong efficient market. However, if some fund managers possess superior skills over others, their superior performance may outweigh higher research costs, and investors who identify and select a skilled fund manager might succeed in enjoying an above-average return.

Further reinforcing the evidence that the Nigerian stock market is informationally efficient is the observation from this study that the size and value effects which are widely documented in the finance literature do not significantly influence the pricing of securities in the Nigerian market. Using the Fama-French 3-factor model to evaluate the risk-adjusted performance of mutual funds, we found that the coefficients of Small minus Big (SML) and High minus Low (HML) were both negative and statistically insignificant, implying that there were no size and value effects on the pricing of securities during the study period. Hence, these factors were insignificant in explaining the risk-adjusted returns of mutual funds. The size and value effects are among the most widely cited anomaly to invalidate the efficient market hypothesis by its critics.

Overall, from this study, we have established that mutual funds do not generate excess risk-adjusted returns after expenses to beat the naïve buy and hold strategy, mutual fund managers do not possess the selective ability and timing ability, and performance does not persist. A plausible explanation for these results is that the Nigerian stock market is informationally efficient, hence trading strategies based on technical analysis and fundamental analysis frequently used by fund managers cannot consistently deliver outperformance and do not add value.

We also find evidence that mutual fund portfolios are well diversified, as all of the funds (100%) in our sample have betas lower than the market portfolio, and 83% have a lower standard deviation than the market portfolio. However, it may appear that the mutual fund portfolios are over-diversified, resulting in a situation where the marginal loss of expected returns is higher than the marginal gain in risk reduction.

It is worthy of note that several studies have provided contradictory evidence to the conclusions reached in this study, hence there is no consensus among researchers. However, efforts have been made by some researchers to provide plausible reasons for the inconsistencies in results. One argument is that, over time, financial markets have become more efficient, making it more difficult to extract alpha (Jack and Bernstein, 1999; Chordia et al, 2008, 2011; Ammann and Steiner, 2009; Dyck et al, 2011; Conrad et al, 2015). Therefore, earlier studies might have reported better performance of mutual funds when financial markets were less efficient.

In addition, some researchers have explored the impact of the type of data used for mutual fund performance studies on the results and conclusions reached. Elton et al (1996a) showed that studies that select only surviving funds are inherently survivorship biased, and would likely present false evidence of persistence since the likelihood that surviving funds have recorded superior performance over time was much higher. In addition, Brown et al (1992) demonstrated that survivorship bias will likely give a false appearance of performance persistence in analyzing the relationship between volatility and returns of mutual funds. Several researchers have corroborated these findings (Brown et al, 1992; Brown & Goetzmann,1995; Malkiel, 1995).

Further, according to Linnainmaa (2013), while on the one hand, data with survivorship bias can overestimate the skills of active managers, on the other hand, data that eliminate survivorship bias can understate the skill of active managers because of what is referred to as ‘reverse survivorship bias’, which is a situation where poor performing funds, whose poor performance is frequently due to luck rather than poor skill discontinue operations.

Other studies have reported that the existence of momentum and the use of momentum strategies not taken into cognizance by some risk models used in performance evaluation studies provide plausible explanations for persistence in performance (Carhart, 1997; Daniel et al, 1997; Phelps and Detzel, 1997; and Wermers,1997). For instance, Carhart (1997) showed that the so-called 'hot hand' effects reported by Hendricks et al (1993) can be explained by the momentum effect, whereby stocks that have delivered superior returns in the past continue to outperform in the future.

Moreover, differences in research approaches and methodologies could result in contradictory performance evaluation conclusions. For instance, recent studies have reported that many active managers have superior skills that add value to investors and that these skills persist over time. A common feature of these studies is that they have employed new approaches or methodologies to obtain the results. For instance, Berk and van Binsbergen (2015) employed a so-called 'value added' measure, Barras et al (2010) developed the 'false discoveries' technique while Daniel et al (1997) adopted individual fund holdings data for their analysis. Similarly, later researchers including Bollen and Busse (2001), Kaplan and Sensoy (2005), and Jiang et al (2007) have reported positive market timing when they assessed sensitivity based on a single index. However, some researchers have argued that changes in the sensitivity to some other factors not captured by the single-index model could affect changes in the sensitivity to the market and that suggested that this should be incorporated into the timing models.

Another factor that influences the result of mutual fund performance studies is the benchmarks chosen. For instance, in measuring the skill of mutual fund managers, most academic papers adopt the net alpha of funds, which is the risk-adjusted return (alpha) after fees. For these analyses, either a single passive index or one of the recently developed multi-factor models (e.g Carhart and Fama-French) are adopted as the benchmark. However, more recent works have proposed further developments of the benchmark to be used, an example being the holdings-based benchmark model developed by Daniel et al (1997) which is fast gaining acceptance in the field. Other contibutors to the literature on benchmarks and benchmarking are Kothari and Warner (2001), Huij & Verbeerk (2009); Cremers et al (2010); and Glode (2011).

5.2 Recommendations for application

Based on the result of this study, a couple of recommendations are hereby presented for practical application in the field of mutual funds investing, securities dealing, and portfolio management.

5.2.1 Retail investors should incorporate mutual funds into their strategic asset allocation

It is recommended that, as part of their strategic asset allocation, retail investors (and their advisers) should consider including mutual funds in a well-diversified portfolio of assets to take advantage of their diversification benefits. As earlier highlighted in our result, we noted that all the 30 mutual funds in our sample recorded a beta factor of less than 1, which means that they were able to achieve a reduction of systematic risk to a level lower than that of the market as a whole. Retail investors and their advisers would do well, therefore, to incorporate mutual funds into their portfolios to exploit these investment benefits.

Studies have shown that the most important investment decision an investor makes is likely to be his or her overall strategic asset allocation (SAA) rather than securities selection. Strategic asset allocation deals with what proportion of an investor's total wealth is invested in various asset classes such as domestic and international equities, bonds, property, commodities, and cash. In taking this decision, the investor should take cognizance of both the available investment opportunities as well as his risk-return preferences defined by factors such as age, existing and future family commitments, remaining working life, etc. This decision also depends on the risk tolerance of the investor. All these factors should therefore be considered in deciding on the most appropriate mutual funds to invest in.

In addition, past experience in the Nigerian stock market during periods of market declines lends credence to this advice. For example, during the recent global economic meltdown of 2008/2009, a lot of retail investors in the Nigerian stock market incurred heavy losses on their portfolios largely because they held portfolios that were not well-diversified and lacked the knowledge and skills to protect their portfolios during periods

of market turbulence. Investing a portion of their portfolios in mutual funds will help to moderate this risk.

Finally, inculcating the saving and investing culture in the larger society will, among others, help the country to gradually break free from the shackles of poverty, one of the greatest socio-economic challenges it faces. It has been reported that in Nigeria, about 33% of the population is living in extreme poverty, amounting to an estimated 70 million people (Vanguard, 2022). Similar statistics from the National Bureau of Statistics (NBS) estimated that as of 2020, more than 80 million Nigerians lived on a dollar per day. Nigeria can learn from the experience of other countries that have tackled poverty by employing the strategy of financial inclusion, which entails granting individuals and businesses access to useful and affordable financial products and services that meet their needs, including effecting transactions, saving & investing, credit and insurance, delivered in a responsible and sustainable way.

5.2.2 Retail investors should invest in passive index funds

Further, we recommend that retail customers (and their advisers) should simply invest in low-cost, passively managed mutual funds tracking broad market indexes or in exchange-traded funds (ETFs). This is because based on our evidence, mutual funds do not yield excess risk-adjusted returns, and fund managers do not have the selective and market timing ability to beat the stock market. It, therefore, appears to be a futile effort to attempt to beat the market consistently. This is a validation of the conclusion of several researchers who have recommended that investors should simply hold low-cost mutual funds rather than seek to generate alpha.

Consequently, our advice to mutual fund managers is that they should create more passive funds with a range of risk-return preferences to give investors a wider range of investment options. For instance, apart from mutual funds/ ETFs tracking the All-Share Index (broad market), tracker funds mimicking segments of the markets should be developed as well; for example, funds that will track the NGX 30, NGX Banking, NGX Insurance, NGX Industrial, NGX Consumer Goods, and NGX Oil & Gas indexes.

5.2.3 Investors are advised not to use the past performance of mutual funds as a basis for selecting mutual funds to invest in

Further, based on the evidence from this study, we reached the conclusion that the performance of mutual funds does not persist. Hence, it is not advisable for retail investors (and their advisers) to use past performance information to aid their investment decision-making in selecting mutual funds. The choice of mutual funds to invest in will have to be based on some other factors such as service quality, turnaround time, etc.

According to Rhodes (2000), the existence of persistence of performance implies that some fund managers are able to consistently beat the performance of their peers. This in turn implies that the top performers either have access to some superior information or possess superior skills to extract alpha. Therefore, any claim of persistence of performance intuitively implies the existence of skills. It is also logical to infer that, based on economic theory, as a market becomes more and more efficient, it should become progressively more difficult for some managers to outperform their peers consistently. Therefore, the gain made from seeking more information through research will diminish. Theoretically, this is a plausible argument. This recommendation is further supported by our finding that equity mutual fund managers in Nigeria do not possess selective and market timing skills. It can be inferred, therefore, that outperformance by a group of managers in any given period is due to luck and not skill, and cannot persist.

5.2.4 The Securities and Exchange Commission (SEC) should promote investors' education to drive mutual fund growth

We recommend that the Securities and Exchange Commission should more aggressively galvanize the capital market community to drive investors' education and financial literacy across the country to enhance more widespread participation in the stock market especially through investing in mutual funds. This is one of the key objectives of the Nigeria Capital Market Masterplan developed by SEC and other stakeholders. In addition, to complement the effort of the regulator, policymakers should craft and implement relevant policies that will promote investment in mutual funds in Nigeria, especially with respect to the provision of adequate funding to drive financial

inclusion and investors' education in the stock market. This will enhance stability, balance, and development not only of the capital market but the larger Nigerian economy as a whole.

For instance, the Capital Market Master Plan requires the SEC to promote financial literacy and specifically introduce Capital Market Studies (CMS) into the curriculum at all levels of education and to encourage CMS as a degree program in tertiary institutions. This is part of efforts to expose more Nigerians to the enormous opportunities for wealth creation that the capital market presents. Mobilizing the required funding for this huge task will require adequate financing with support from the National Assembly.

Further, the importance of a vibrant, efficient, and effective financial sector to pool domestic savings and mobilize capital for productive purposes cannot be emphasized. Hence, it is crucial to widen the net of participation in the capital market to increase market capitalization, enhance savings, increase investment, and catalyze market liquidity. The global mutual funds' industry is large and growing, with assets under management to the tune of $54.93 trillion in 2019 and expected to reach $101 trillion by 2027. In Nigeria, the potential is even greater as mutual funds have proven to be an effective platform to drive savings and investment, having successfully grown Assets Under Management from 17.5 million Naira in 1991 to over 1.4 trillion Naira in 2021 (Nigeria Investment Promotion Commission, 2019).

Recent experience in Nigeria with respect to the contributory pension industry is a pointer to the huge opportunities in the mutual fund industry. Established through the enactment of the Pensions Reforms Act of 2004, the pension industry has recorded phenomenal growth in less than two decades, with total pension fund assets rising to a record number of N13.61 trillion as of January 2022, while the number of retirement savings account (RSA) holders rose to 9.55 million, representing 13.7% of the total labor force population (Oyekanmi, 2022). This has laid a solid foundation for the growth of the Mutual Funds Industry. Currently, Nigeria's mutual fund industry is only one-eighth of the size of the pension industry, indicating there is room to run. Experience from other jurisdictions shows that there is a strong correlation between the growth of the pension fund industry and the growth of the mutual fund industry.

5.2.5 Mutual fund investments should be pooled to address the infrastructure deficit in Nigeria

We recommend the establishment of infrastructure mutual funds specifically to address the huge infrastructure deficit in Nigeria given the huge potential to mobilize savings and investment through mutual funds.

Nigeria is currently facing a massive infrastructure deficit occasioned by several years of neglect corruption and mismanagement. It has been estimated that Nigeria requires an investment of $33 billion to $35 billion yearly over the next five years to close its infrastructure gap (Ebulu, 2022). Moreover, the Infrastructure Concession Regulatory Commission estimates that Nigeria, with a total land mass of 923,768 km^2, has 195,000 kilometers of road networks, out of which only about 31% is tarred and in motorable condition (Ebulu, 2022). The huge amount required to fix the infrastructure deficit is a clear indication that Nigeria's infrastructure is in a deplorable state and needs urgent intervention.

Given the significant decline in the revenues of the federal and state governments as a result of dwindling income from the sale of crude oil, it has become critical for the government to devise other means of financing the huge infrastructure deficit to ensure sustained economic growth and development. This need birthed the Infrastructure Corporation of Nigeria Limited (InfraCo) which is expected to set the standard template that will help in enabling greater private sector funding of public infrastructure projects in Nigeria.

The central bank, working in partnership with key stakeholders such as the Nigerian Sovereign Investment Authority (NSIA) and the African Finance Corporation (AFC) has set up the InfraCo. This is in recognition of the crucial role that improved infrastructure could play in the development of the Nigerian economy. Moreover, the need to mobilize and leverage private capital to fund the over N35 trillion infrastructure deficits in Nigeria. The InfraCo Fund, among others, will be used to support the Federal Government in bridging the existing infrastructure gap, including the building of transport infrastructure across the country to boost economic activities. According to the CBN governor, at least 50% of the N14 trillion funding needed for Infrastructure Company

Limited (Infra-Co) will be raised from the local market (ThisDay, 2022). Given this background, there is no doubt that the mutual fund market can play a significant and strategic role in actualizing the objectives of InfraCo.

5.2.6 The SEC should promote the adoption of Global Investment Performance Standards (GIPS) by mutual fund managers to enhance reporting and overall transparency in the mutual fund industry

We recommend that SEC should promote the adoption of a robust and uniform reporting system, specifically GIPS, in the mutual fund industry to enhance quality reporting, transparency, and comparability of mutual funds. This will make the industry compliant with global best practices, and internationally competitive.

Indeed, one of the major weaknesses of the Nigerian mutual funds industry and which is constituting a barrier to growth is the lack of transparency in reporting. This makes it difficult for investors and potential investors alike to access needed information in a usable form regarding the operations and performance of mutual funds. Key information such as fund management philosophy and methodology, investment selection criteria, research that guides fund composition, historical raw and risk-adjusted returns, fund flows in and out of funds, expense ratios, etc are normally inaccessible. This makes it challenging for investors to objectively evaluate and compare mutual funds and determine the most appropriate options for their return objectives and risk appetite.

GIPS created by the CFA Institute, a global association of investment professionals, are voluntary standards for calculating and reporting investment performance to ensure fair representation, transparency, and full disclosure. This is a fundamental part of investing that is of interest to investors, fund managers, and regulators alike. Uniform and ethical reporting will ensure that the actual performance of firms is assessed against stated objectives and benchmarks. In addition, because the standards are widely adopted across the globe, investment firms that comply with them can easily do business and attract clients internationally, as they operate in line with globally acceptable standards. Overall, the adoption of GIPS is a demonstration of

commitment to ethics, objectivity, and transparency, which will enhance investors' confidence.

According to the CFA Institute, the adoption of GIPS enhances comparability between investment firms. It also improves transparency by addressing survivorship biases, misrepresentations, and historical data omissions. It is dynamic and evolves to address emerging issues in the dynamic investment industry. In addition, it provides incentives for firms to commit time and resources to build their internal and risk control processes and set performance benchmarks, since compliance involves adherence to rules governing data and their uses, calculation methodology, composite construction, disclosures, reporting, etc.

5.3 Recommendations for future research

5.3.1 The performance of mutual funds under different market conditions should be investigated.

We recommend that future studies should consider analyzing the performance of mutual funds under different market conditions, that is in the bull and bear markets. This study investigated the performance of mutual funds over a 10-year period that included a combination of market conditions. However, it may be useful for investment decision-making to isolate the performance of mutual funds in different market conditions. The rationale is that, if mutual funds underperform on average, but outperform in bear markets or down markets, then they could provide an investment benefit in the form of portfolio insurance to limit downside risk during market downturns. In the same vein, superior performance when the stock market is generally bullish is not as valuable as outperformance in a down market. The psychology of loss aversion based on prospect theory (Kahneman and Tversky, 1979) supports this conclusion.

5.3.2 The performance persistence of losers should be investigated in the Nigerian context.

We recommend that future research efforts should beam a searchlight specifically on the persistence of performance among poor-performing funds. This can be achieved by separating the persistence of the performance of winners from that of losers. In this study, the persistence of the performance of winners and losers was investigated

together. However, isolating persistence among winners and losers could provide useful information to retail investors in making investment decisions. For instance, if there is evidence that underperformance persists, then investors would be advised to avoid investing in past losers.

5.3.3 Using new models for evaluating the performance of mutual funds in Nigeria.

We recommend that future research efforts to evaluate the performance of mutual funds should consider using newer models developed by researchers, for instance, the conditional model developed by Ferson and Schadt (1996) and the portfolio holding model (Daniel et al, 1997; Jiang et al, 2007 and Elton, Gruber, and Blake, 2012). The results obtained from these models can be compared to the evidence in this study to have a more robust view of the performance of mutual funds in Nigeria.

5.4 Conclusion

The subject of mutual fund performance has generated intense interest since the mid-1960s following the seminal work of pioneers in the field by Treynor (1965), Sharpe (1966), and Jensen (1968). Since then, researchers have continued to seek answers to several questions. Do mutual funds generate excess risk-adjusted returns? Do active fund managers possess superior skills in generating alpha? Do mutual funds exhibit persistence in performance? These questions have become even more relevant today with the astronomical growth of the mutual fund industry globally over the past decade which is unabating. For instance, PwC projects that global Assets under Management will almost double in size from US$84.9 trillion in 2016 to US$145.4 trillion by 2025 (PwC, n.d) Yet, evidence remains inconclusive on key aspects of mutual funds' performance as results have been mixed, although a large body of work has reported that portfolio managers do not have a superior ability to consistently beat the capital market and that past performance does not predict future performance (Elton et al, 2014).

In Nigeria, mutual funds are a relatively recent phenomenon with the first mutual fund being created as recently as 1991 (Nigeria Investment Promotion Commission, 2019). Studies have therefore been sparse on the subject. However, given the strategic

importance of Nigeria as the largest economy in the African continent, with the 2nd largest capital market, mutual funds among other financial products should be a subject of immense interest to investors, stock market professionals, and policymakers alike given its macroeconomic role in mobilizing savings and investment for economic growth and development.

This study extends earlier efforts by evaluating the performance of a mutual fund using more robust multi-factor risk-adjusted performance appraisal models. This is the first study in Nigeria that will investigate the persistence of performance comprehensively using the robust, well-established Contingency Table methodology along with Cross Product Ratio and Rank Correlation inferential statistics. In addition, we employ the Fama-French 3-factor model in conjunction with the traditional single-factor models, and the well-established Treynor-Mazuy and Henriksson-Merton regression models, to investigate whether or not mutual fund managers possess selectivity and market timing skills. Previous studies in Nigeria including Oduwole (2015), Sambo (2016), Ilo et al (2018), and Mahmuda & Abdullahi (2017) had used single-factor, risk-adjusted mutual funds models to evaluate risk-adjusted returns. We also use a more comprehensive and larger dataset covering about 10 years.

In addition, this study focuses on the performance of actively managed equity mutual funds, unlike previous efforts. Apart from the fact that this allows a more detailed analysis of a category of mutual funds, it also addresses the challenge of using an appropriate benchmark for assessing the performance of mutual funds. According to Lehman and Modest (1987), risk-adjusted measures of mutual fund performance are sensitive to benchmarks. We believe that different classes of mutual funds require different benchmarks for assessing their performance, but previous studies did not factor this issue into their analysis.

Overall, this study investigates broader facets of the performance of mutual funds in Nigeria and uses more sophisticated performance evaluation models compared to earlier studies. The output of the study will be reference material for investors, investment advisers, and fund managers. The study will also contribute to the existing knowledge

base on the subjects of finance, securities, and investment in the Nigerian capital market. The outcome of this study will be published in relevant finance and investment journals.

The study examines the performance of 30 actively managed equity mutual funds in Nigeria using monthly net asset values (NAVs) obtained from the Securities and Exchange Commission, covering a period of about ten years from January 2012 to September 2021 to evaluate the risk-adjusted returns of mutual funds and the extent to which selective ability and market timing ability affect risk-adjusted returns. In addition, it evaluates the extent to which the past performance of funds predicts future performance. Our sample is survivorship bias-free as we include all actively managed equity mutual funds that operated during the period of study even if they were closed or merged with other firms during the period.

Evidence from our results shows conclusively that mutual funds do not generate excess risk-adjusted returns. In other words, the average alpha of mutual funds is zero. In addition to the traditional models of Sharpe ratio and Treynor ratio, we deployed both the one-factor Jensen regression model and a three-factor Fama-French regression model to arrive at the same conclusion. Our evidence is robust as all 4 models used pointed to the same conclusion. The implication is that from the perspective of generating alpha, mutual funds do not add value.

This result largely validates earlier studies in the literature. Oduwole (2015) and Ilo et al (2018) studied Nigerian mutual funds and conclude that fund managers do not generate positive alpha. Similar results were obtained from other parts of Africa by Gilbertson & Vermaak, 1982; Manjezi, 2008; Mibiola, 2013; Tan, 2015 in South Africa; and Mohamed et al (2014) in Kenya. In addition, Sharpe (1966) Jensen (1968), Ippolito (1989), and later Malkiel (1995) and (1996) are unanimous in their conclusion that mutual funds underperform after fees.

The study also examines the selectivity skill of mutual funds. Again, our evidence does not support the existence of selective ability. Using the traditional Treynor-Mazuy and Henriksson-Merton regression models, our result shows that 90% and 97% respectively of the mutual funds in the study sample have statistically insignificant alphas, implying a lack of selective ability. The implication is that employing the services of

professional fund managers would add no significant value to the portfolio of assets, from the perspective of generating alpha.

Although there is evidence in the literature that some fund managers have superior skills to generate alpha, few generate enough alpha to cover costs. Wermers (2000) finds that after costs and fees, the average fund underperforms. Fama and French (2010) find evidence that before incorporating the cost of active management, a substantial number of fund managers do outperform the stock market, but after incorporating the cost of active management, the risk-adjusted returns of most funds turn negative as they fall short of their costs. Also, even though the overwhelming majority of mutual funds (75.4%) demonstrate some skill, ultimately, they extract all the added value through fees (Barras et al, 2010).

In addition, this study does not find evidence to support the existence of market timing ability among mutual fund managers in Nigeria. Using the Treynor-Mazuy and Henriksson-Merton regression models to test for market timing ability, we find that 97% and 100% respectively of the funds in the sample have statistically insignificant coefficients of timing ability. This is strong evidence that the fund managers lack market timing skills, implying that they cannot correctly predict the direction of the market thereby exploiting market opportunities to generate alpha.

Earlier studies on mutual funds in Nigeria did not investigate the market timing ability of mutual funds. However, our results are consistent with results from other parts of Africa. Studies by Gilbertson and Vermaak (1982) Manjezi (2008) Mibiola (2013) and Tan (2015) in South Africa, and Mohamed et al (2014) in Kenya respectively concluded that fund managers lack market timing ability. While early studies in the developed markets do not find convincing evidence of timing, later researchers including Bollen and Busse (2001), Kaplan and Sensoy (2005), and Jiang et al (2007) find positive timing when they assessed sensitivity based on a single index. However, some researchers contend that a more robust model that will capture the dynamics of the changes in the sensitivity of the market to the sensitivity of other factors should be used to measure timing. Elton, Gruber, and Blake (2011b) and Ferson & Qian (2006) therefore used models that address

this concern and found no evidence of timing; whereas they found timing ability when a singe-index model was applied.

Further, this study examines the persistence of the performance of mutual funds, which is perhaps the most popular aspect of performance studies in recent years. The concept of performance persistence explores the correlation between funds' past performance and their future performance. Performance persistence occurs if a fund consistently outperforms (or underperforms) the mean performance of a cohort of similar funds. This concept is critical as it has implications for an investor's choice between competing funds. Also, several studies have suggested that a performance test is also a test of the existence of skill or luck in mutual funds. The argument is that if some mutual fund managers possess superior skills over their peers, then their funds should exhibit persistence of superior performance on account of the superior skills (Cremers et al, 2019).

The study presents evidence that mutual funds do not exhibit persistence in performance. In other words, past performance does not predict future performance. The subject of persistence of performance is arguably the most controversial in the mutual fund literature, and empirical evidence on the subject is inconclusive. Early studies do not find evidence of the persistence of performance [Sharpe (1966) and Jensen (1968)]. In the early 1990s however, several studies reported evidence of persistence [Grinblatt &Titman (1992), Hendricks et al (1993), Goetzmann & Ibbotson (1994), Elton et al (1996a), and Gruber (1996)]. Other researchers find evidence that contradicts the claim of persistence of performance of mutual funds [Brown et al (1992), Brown & Goetzmann (1995), and Malkiel (1995)] performance disappears. However, more recent studies provide strong evidence that poor performance predicts poor performance.

This study finds evidence that mutual funds provide significant diversification benefits to investors. Our analysis of the beta and standard deviation of the returns of the mutual funds in our sample validates this position. First, the systematic risk of all the funds in our sample, as measured by their betas was lower than that of the market as a whole. We find that an equally weighted portfolio of the mutual funds in our study has a beta of 0.538 compared with the market beta of 1. In addition, the total risk of 83% of the

individual mutual funds is lower than that of the market. This is important as diversification helps to stabilize the portfolio and can be particularly useful in moderating the downside risk of the portfolio. Given our finding in this study that mutual funds do not generate excess risk-adjusted returns, one question that would come to mind is why then is active management growing in popularity all around the globe. Perhaps the diversification benefits, hence the reduction of portfolio risk provided by mutual funds is a plausible explanation. Mutual funds can therefore be an important component of a well-diversified portfolio of assets.

Overall, the result of 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 cannot take advantage of superior information to beat the market. According to Malkiel (2003), a portfolio comprised of randomly selects stocks would perform as well as a portfolio constructed by an investment expert. This means 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. The result of this study supports this assertion. Specifically, we posit that our result corroborates the version of EMH developed by Grossman (1976) and Grossman and Stiglitz (1980) that suggests that informed investors (like mutual fund managers and other investment experts) can trade at prices that effectively compensate them for the cost incurred to obtain information. In other words, even if mutual funds generate alpha at the gross return level, the cost of obtaining superior information will wipe out the excess return, resulting in active mutual funds ultimately underperforming passive portfolios on average.

Based on the findings, a couple of recommendations for implementation are made. First, it is recommended that, as part of their strategic asset allocation, retail investors (and their advisers) should consider including mutual funds in a well-diversified portfolio of assets to take advantage of the low-cost diversification benefits they provide. Further, it is recommended that retail customers (and their advisers) should invest in low-cost, passively managed mutual funds tracking broad market indexes or in exchange-traded funds (ETFs). This is because based on the evidence, mutual funds do not yield excess

risk-adjusted returns, and fund managers do not have selective and market timing ability to beat the stock market. It, therefore, appears to be a futile effort, and a misallocation of resources to attempt to beat the market consistently through active management. In addition, since we conclude that the performance of mutual funds does not persist, we advise retail investors (and their advisers) not to use historical information about past performance as a basis for selecting mutual funds to invest in.

It is recommended that the apex regulator of the capital market, The Securities and Exchange Commission (SEC) should more aggressively galvanize the capital market community to drive investors' education and financial literacy across the country to enhance more widespread participation in the stock market especially through investing in mutual funds. This is one of the key objectives of the Nigeria Capital Market Masterplan developed by SEC and other stakeholders. In addition, to complement the effort of the regulator, policymakers should craft and implement relevant policies that will promote investment in mutual funds in Nigeria, especially concerning the provision of adequate funding to drive financial inclusion and investors' education in the stock market.

Again, given the huge infrastructural deficit in Nigeria today, it is recommended that infrastructure funds should be established to address the challenge, as the mutual fund industry has demonstrated its potential as a viable platform to catalyze the mobilization of savings and investment. In addition, the SEC should promote the adoption of a robust and uniform reporting system, specifically GIPS, in the mutual fund industry to enhance quality reporting, transparency, and comparability of mutual funds. This will make the industry compliant with global best practices, internationally competitive, and realize its full potential.

It is recommended that future research works should consider analyzing the performance of mutual funds under different market conditions, that is the bull and bear markets. The rationale is that, if mutual funds underperform on average, but outperform in bear markets or down markets, then they could provide an investment benefit in the form of portfolio insurance to limit downside risks during market downturns. In the same

vein, superior performance when the stock market is generally bullish is not as valuable as outperformance in a down market.

In addition, future research efforts should be directed at investigating the performance of mutual funds in Nigeria using relatively newer models, for instance, the model developed by Ferson and Schadt (1996), which incorporates public information on economic conditions and provides a more robust evaluation of the skill of fund managers to time the market. Also, the portfolio holding model that was used by Daniel et al (1997); Jiang et al (2007); and Elton, Gruber, and Blake (2012) should be explored. The results obtained from these newer models can be compared to the evidence obtained from this study to have a more comprehensive view of the performance of mutual funds in Nigeria.

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APPENDICES

Appendix A

Jensen Measure regression output of an equally weighted portfolio of 30 actively managed equity mutual funds that operated between 2012 and 2021 in Nigeria.

$R_{pt} - R_{Ft} = \alpha_p + \beta (R_{Mt} - R_{Ft})$			
Independent Variable		**Coefficient**	**P-value**
(Rm-Rf) Market risk premium		0.54260	1.63E-32
Intercept			
A		-0.00300	0.14885
R^2	0.71105		
F- Value	1.629E-32	**Summary:** alpha (**α)** is insignificant at a 5% significance level indicating zero risk-adjusted returns.	
n	115		

Appendix B

Fama-French 3-Factor regression output of an equally weighted portfolio of 30 actively managed equity mutual funds that operated between 2012 and 2021 in Nigeria.

$R_t - R_{Ft} = \alpha_p + \beta_1 (R_{Mt} - R_{Ft}) + \beta_2 (SMB) + \beta_3 (HML) + e$			
Independent Variable		**Coefficient**	**P-value**
(Rm-Rf)		0.54769	1.676E-31
SMB		-0.04996	0.71827
HML		-0.05974	0.55924
Intercept			
A		-0.00283	0.17878
R^2	0.711227		
F- Value	3.6326E-30	**Summary:** alpha (**α)** is insignificant at a 5% significance level indicating zero risk-adjusted returns.	
N	115		

Appendix C

Treynor-Mazuy regression output of an equally weighted portfolio of 30 actively managed equity mutual funds that operated between 2012 and 2021 in Nigeria.

$R_{pt} - R_{Ft} = \alpha_p + \beta_p (R_{Mt} - R_{Ft}) + \beta p_T (R_{Mt} - R_{Ft})^2 + e_{pt}$			
Independent Variable		**Coefficient**	**P-value**
(Rm-Rf)		0.543198	3.05E-32
$(Rm- Rf)^2$		0.101881	0.746482
Intercept			
α		-0.00342	0.16315
R^2	0.711318		
F- Value	3.26E-31	**Summary:** Both **alpha (α)** and **βp_T** are insignificant at a 5% significance level indicating the absence of selectivity ad timing ability.	
n	115		

Appendix D

Henriksson-Merton regression output of an equally weighted portfolio of 30 actively managed equity mutual funds that operated between 2012 and 2021 in Nigeria.

$R_{pt} - R_{Ft} = \alpha_p + \beta p (R_{Mt} - R_{Ft}) + \beta_{PT} C (R_{Mt} - R_{Ft}) + e_{pt}$

Independent Variable		**Coefficient**	**P-value**
(Rm-Rf)		0.55378	2.9E-15
C(Rm-Rf)		0.022178	0.827118
Intercept			
A		-0.003546	0.275023
R^2	0.71117		
F- Value	3.36E-31	**Summary:** Both **alpha (α)** and **βp_T** are insignificant at a 5% significance level indicating the absence of selectivity ad timing ability.	
N	115		