Diversification in Investment Portfolios: Evaluating the Performance of Mutual Funds, ETFs, and Fixed Income Securities in Volatile Markets

Srinivasa Rao Challa

Sr. Manager, Charles Schwab, srinivas.r.challa.sm@gmail.com

Mutual funds seek to provide investors with exposure to a diversified portfolio of assets at a relatively low cost. Exchange-traded funds are a relatively novel financial tool that has also been proving better suited to investors while requiring lower management costs. Both mutual funds and ETFs are often held for long periods of time. However, another important investment category is that of fixed income securities. Fixed income securities can provide investors with a higher level of predictability and less risk while held to maturity. This text looks into different investment alternatives that can be part of investors' portfolios. Its main purpose is to sort them out according to their different performance as economic conditions evolve over time. The three main purposes for holding investments are consumption smoothing, saving for future investment, and being able to consume on a regular basis once they begin to accumulate savings.

The expected results show that changes in market conditions can lead to variations in the performance of investment funds, ETFs, and fixed securities, proving the market to be efficient in a general sense. In volatile markets, mutual funds evaluate different types of risks than ETFs. Bond investments were the ones to provide better results over time, being those that require the lowest degree of management skills. It is also shown that while management fees may affect the performance of funds and ETFs in different ways, market conditions lead to both costs, and when diversification principles are well achieved, they, when taken into consideration by managers, legal restrictions may not be so harmful. Legal constraints do not restrict the free movement of managers to hold portfolios of different securities, and they acquire some degree of protection provided by other members towards their own respective default risks.

Keywords: Mutual Funds, Exchange-Traded Funds, Fixed Income Securities, Diversified Portfolio, Investment Alternatives, Economic Conditions, Risk Management, Consumption Smoothing, Future Investment, Market Efficiency, Bond Investments, Management Fees, Portfolio Diversification, Volatile Markets, Legal Constraints, Investment Performance, Saving Strategies, Management Skills, Risk Evaluation, Predictability, Investment Risk.

1. Introduction

This study evaluates the performance and diversification potential of investment portfolios using exchange-traded funds and fixed-income securities. It also analyzes different economic conditions, assessing the reduced risk and expected return of funds with these asset classes. The first portfolio represents low-cost funds of investments by exchange-traded funds and

fixed-income securities with a minimum of $25,000. The total expense of funds is the weighted sum of the fees from all securities. The minimum investment is $1,000 to invest in the index mutual funds account, and a new account fee of $15 applies when first transferring. You must read the prospectus, which explains the fund's objectives, investment strategy, and charges and expenses. Carefully consider the investment options and risks.

In general, the team's findings give fresh insight into the diversification merits of which, along with the links between the size, expenses, and the fees of funds, can be interesting to retail and institutional investors who seek to diversify and reduce mutual interest rate risk, especially in turbulent market conditions. As domestic and international investors continue to invest in portfolios with mutual funds and exchange-traded funds, a deeper understanding of the diversification merits, economic volatility, stable parts of the market, and fixed-income securities is essential. From examining and investing in these assets, investors can develop new tools and gain related diversification that may be present in investment portfolios.

Keywords: Investment Portfolios, Exchange-Traded Funds, Fixed Income Securities, Economic Conditions, Risk Reduction, Expected Return, Diversification, Fund Performance, Low-Cost Funds, Asset Classes, Investment Strategy, Expense Ratios, Mutual Funds, Portfolio Management, Economic Volatility, Retail Investors, Institutional Investors, Interest Rate Risk, Asset Allocation, Portfolio Diversification.

Fig 1: Portfolio Diversification

1.1. Background and Rationale

Investments in financial markets can serve as a way to grow capital when economic and market conditions are stable, but they can also serve as a means of accumulating and diversifying an investment portfolio when an economic or market environment is highly uncertain and unstable. The latter is particularly relevant during the current crisis, which has not only weakened the global economy and the rate of its recovery but has also led to high uncertainty and instability. The extension of this crisis is unique for a volatile market, as most economic and financial crises in the past ten years have been relatively short-term. The long, evolving, and persistent nature of this crisis also affects the magnitude and duration of its impacts, including its influence on the next and future generations. In addition to the high rates of unemployment, this crisis has contributed to the withdrawal of people from the workforce, increased costs for businesses, and intensified how major institutions, such as the family and social and medical systems, address the needs of the public. The progression and outcomes of this crisis, along with similar future issues, make it worthwhile to reassess how financial markets, with a focus on mutual funds, exchange-traded funds, and fixed-income securities, offer alternative ways to invest in volatile markets as a means to grow and diversify investment portfolios.

Equation 1: Portfolio Variance with Diversification

$$\sigma_p^2 = \sum_{i=1}^{n} w_i^2 \sigma_i^2 + 2 \sum_{i<j} w_i w_j \text{Cov}(r_i, r_j)$$

where:

σ_p^2 = Portfolio variance

w_i = Weight of asset i

σ_i^2 = Variance of asset i

$\text{Cov}(r_i, r_j)$ = Covariance between assets i and j

1.2. Research Objectives

By conducting the work herein, the purpose of the study is to evaluate the benefits of diversifying a portfolio with either mutual funds, exchange-traded funds, or fixed-income securities in volatile markets. Therefore, the objectives of this study are as follows. First, by utilizing a model, this analysis aims to improve upon the current gap in the literature by taking into account the higher moments of mutual fund, ETF, and fixed-income returns as a result of the fat tails and skewness in the return distribution. It is important to account for these higher moments in volatility models because the occurrence of extreme events is probable during a volatile market. By accounting for each moment, an investor is more willing to invest in these respective assets knowing they have identified the amount of risk exposure. Diversification may increase the Sharpe ratio, which explains the excess return per unit of total risk, and the excess return per unit of systematic, and unsystematic risk. Therefore, it is important and worth exploring which of these three asset classes lowers the risk of the investment portfolio the most when included in the diversified portfolio.

The second objective of this study is to compare the effects of each asset by specifying three diversified investment portfolios. Hence, the investor is looking for safety and wants to allocate his portfolio in a way that provides the safest possible investment. The objective of this analysis is to construct three diversified investment portfolios using a sample of mutual funds, ETFs, and fixed-income securities. The three investment portfolios are constructed as follows: the first portfolio only includes 100% in mutual funds, the second portfolio only includes 100% in ETFs, and the third portfolio includes 100% in fixed-income securities. In each diversified portfolio, the investor must allocate his investments across asset classes, and the portfolio returns are the total returns of the corresponding asset classes. The investment portfolios are constructed using both the mean-variance framework and the mean-variance-skewness-kurtosis utility model. The returns included must be geometric. These diversified portfolios are then re-estimated using a model. After the appropriate models are estimated, the portfolio's expected returns and variances are netted to form the expected return and variance of the investment portfolios, which in turn form the efficient frontier and the region of domination of the efficient portfolios. Next, each investor calculates his corresponding Sharpe ratio for each portfolio and chooses the portfolio that provides the largest accommodated utility.

2. Literature Review

As a comprehensive study concerning the investment performance of mutual funds and exchange-traded funds, our review encompasses information from past research and falls into four main areas. The opening subject area evaluates the comparison between actively managed mutual funds and passively managed index funds and whether active management outperforms the benchmark in the short and long term. The subsequent subfield reports on research investigating the effect trading strategies, market conditions, and volatility have on mutual funds and exchange-traded funds returns, investment selection decisions, sector allocation, and portfolio risk. Then there is literature that investigates the effects specific country characteristics and global events have on results obtained from emerging and developed market funds. Finally, in the performance attributes subject area, we discuss how sector funds and bond funds compare to index-bond benchmarks in terms of selection techniques, yields, systemic risks, and credit risks.

Concerning the first area of investigation reviewed, the materials reviewed assert that the arbitration argument for mutual funds to apply fundamental and technical analysis and to use research to find and exploit undervalued stocks is still a subject that has not been formally tested. Conversely, much of the literature focuses on results that show that actively managed mutual funds cannot beat the market or meet the return on a passive index fund. Indeed, many studies suggest that a buy-and-hold strategy of investment in a passive index vehicle is the wise investment option. Set to answer the question of why so few managers outperform a passive strategy, the management inefficiency literature presumes market participants are rational agents with rational expectations, or passively seeking the market return and accepting market risk. The main empirical contributions of these studies provide the idea that much of managers reported excess performance as the result of information produced as a market response to the traded stocks. Moreover, a specific imprint of behavioral economics, investor overconfidence, is also indirectly included.

2.1. Concept of Diversification

In 1952, Markowitz conceptualized the modern portfolio theory (MPT) by showing that, given a level of expected return, the mean-variance efficient frontier is the set of portfolios that has the minimum variance. This can be interpreted as the set of portfolios that present the lowest level of risk, or standard deviation, for a given level of expected return. By doing this, Markowitz introduced the concept of diversification (also referred to as asset allocation). The intuition of Markowitz's analysis lies in the fact that if a given stock presents a large positive surprise, likely, the loss of another stock will likely not be large enough to offset it. In other words, when the stock market goes down, the stock prices do not move simultaneously. But this is not true only for stocks. If there exists a positive correlation between stocks and the real estate market, the same result can be expected. If there is a recession, not only will stocks suffer, but real estate will also suffer.

The idea of Markowitz's MPT is to provide an entity that wants to invest in financial instruments with plenty of baskets, so they do not bear the risk of putting all their eggs in the same basket. This idea is formalized by Markowitz when he finds that an investor can diversify the risk of a stock that presents a specific risk (also known as idiosyncratic risk) with another stock that has a perfect negative correlation with the first one. In this case, if the first stock

presents a positive surprise, the second stock presents a negative surprise, offsetting the two returns and nullifying the risk. In practice, it is unlikely to find assets that are perfectly negatively correlated, but it is possible to find assets that are strongly negatively correlated. So, from this analysis, how should the investor divide their budget among the assets that maximize their expected return given their level of risk aversion? In this case, the optimization problem is finding the best risk-return trade-off by solving the equation that maximizes the expected return with the constraint of the agent's total budget.
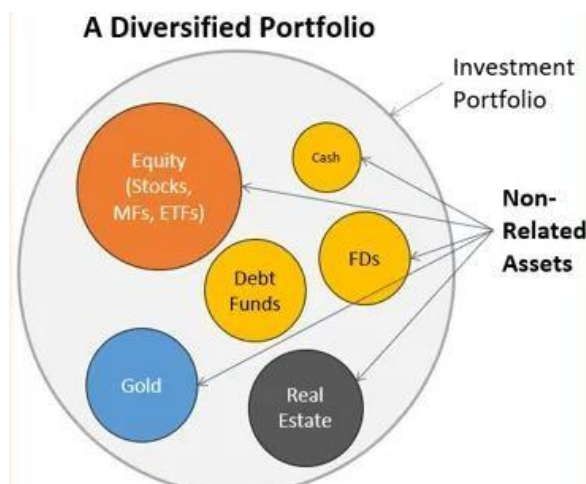

Fig 2: Investment Diversification

2.2. Types of Investment Vehicles

The origin and evolution of investment vehicles are inextricably linked to technological advancements in the financial markets. The development of investment vehicles started in 1868 with the establishment of the first real estate investment trust. In 1900, the Wide Board Trust became the first mutual fund. Unit investment trusts, the predecessor of the modern ETF, were launched in 1924. Closed-end funds, as the other type of investment company at the time, were introduced in 1929. The two types of funds were designed to offer diversification and professional management with ease of liquidation for small investors. However, the necessity to switch shares in the secondary market led to the development of open-end funds in 1928.

In time, technological advancements have given these vehicles the necessary infrastructure to mobilize the savings of millions of retail investors. For 60 years, funds were the only alternative for risk-averse investors who wanted professional diversification. However, funds faced several limitations, including portfolio opacity, low liquidity, and inertia. The modern portfolio theory describes a favorable solution for these drawbacks. The theory suggested that all the advantages of a fund could be achieved with a lower fee through a portfolio managed under standardized rules. The breakthrough arose in 1993 when a trust was created to track the performance of the S&P 500 and enhance intraday market liquidity, breaking the inertia obstructing diversification.

2.3. Performance Evaluation in Volatile Markets

In this section, we focus on how securities differ in their effectiveness at hedging against

uncertainty in the broader financial market and the economy. The data used are daily observations of index returns that are thought to be particularly sensitive to uncertainty, for fifteen selected U.S. sectors over the period January 1990 to December 2016. Consistent with previous research, for the sample window that covers January 2002 to December 2016, the coefficient on the S&P 500 index return is negative for all funds, but only the coefficient for the EAFE fund is statistically significant. These results suggest that, although EAFE tends to focus on developed countries and hence is expected to reflect less overall market uncertainty, the fund has a significant capability to protect investor wealth. In contrast, ASEAN has a positive coefficient, and the fund is particularly ineffective at hedging against an increase in broader market uncertainty.

Uncertainty does not usually increase in the short term, but the observations that represent positive uncertainty tend to have larger absolute values than those that account for negative readings of this risk. Consequently, it is difficult for the funds to show significant results. During the recent period, significant participation in broader market uncertainty is documented. Furthermore, consistent with earlier results on the full sample, EAFE can provide limited protection to investor wealth when the broader market environment is uncertain. Finally, all index funds that participate in broader market uncertainty benefit to the extent of lower risk.

3. Methodology

Faced with an environment of increasing uncertainty, investors are more concerned with minimizing profit volatility and losses. Furthermore, investors must know the assets they invest in. There is a relationship between diversification and performance, and it is quite common for investors to increase the price of securities such as mutual funds, trusts, or exchange-traded funds rapidly and invest without full knowledge of these assets. Amid errors, investors can make adjustments to investments in securities classified as fixed income, such as debentures and convertible bonds, financial reports, and real estate, among others. Even cryptocurrencies can be used for diversification. Using a model, we carry out analyses of different portfolio compositions for entering a new security that is gold and with a hybrid table based on the previous ones.

The study answers the following questions: What is the adequate financial rule/classification for the same three portfolios? Is there a better model produced by the rule/classification proposed for statistically evaluating and quantitatively evaluating the portfolios? To answer the questions, we used qualitative research and developed quantitative research using a method; model evaluation of variables; pooled regression; and neural networks. In this sense, the research contributes in a relevant way to bring contributions and information to managers, economists, shareholders, students, and public authorities, who seek to improve the allocation of investment resources.
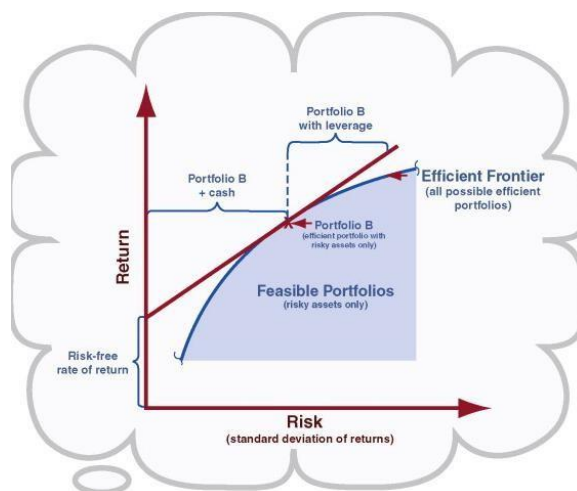
Fig 3: Portfolio Theory

3.1. Data Collection and Sources

Data used in this study represent financial instruments that were carefully selected to provide a relatively balanced mix of fixed-income, equity, and asset allocation funds, worthwhile comparisons between those funds and fixed-income securities, as well as the equity-like features of the ETFs. Data on the weekly net asset values (NAVs) and daily prices of mutual funds and ETFs, respectively, were downloaded using software. Indices representing different markets and similar investment objectives are predominantly preferred when better constructing mutual fund portfolios while utilizing information on the same markets. Due to the large number of variously designed bond ETFs or fixed-income securities, there is no clear preference for markets or the type of fixed-income securities from many more combinations because of these funds' diversifications and correlations with the different equity and bond markets.

Given this, indices such as the Composite Average Index, Industrial Average, Composite Index, and other bond indices are mainly represented by various bond ETFs. Two other ETFs were mainly employed to behave as a proxy for the U.S. economy and to assess if active portfolios (e.g., mutual funds) outperformed their benchmarks during periods following the extreme declines that occurred during the financial crisis. Data on the daily net asset values of fixed-income securities were acquired from daily yield historical data, which provided similar additional information and the ratings issued by various rating agencies.

$$E(R_p) = \sum_{i=1}^{n} w_i \cdot E(R_i)$$

Equation 2 : Expected Return of a Diversified Portfolio

where:

$E(R_p)$ = Expected return of the portfolio

w_i = Weight of asset i

$E(R_i)$ = Expected return of asset i

3.2. Research Design

To avoid biases in other performance evaluations, we used quantitative methods for measuring the performance of mutual funds, exchange-traded funds, and fixed-income securities in times of stable markets and in times of stress caused by events such as the Greek debt restructuring. Standard performance measures applied in quantitative studies can distort true performance. We also used other adjustments to performance measures proposed by several researchers. Value-at-risk (VaR) is used for estimating the stress in securities. Many studies created high interest in portfolio performance during the financial crisis because it raised questions about the liquidity of investments in mutual funds and exchange-traded funds and the credibility of fund managers' management.

The main aim of this evaluation is to the performance of equity and fixed-income securities in stable and volatile market times using the H-model, which was developed in 2011. Instead of the standard Capital Asset Pricing Model (CAPM), only two indexes that represent the market are used as a suitable and convenient alternative to the market portfolio. The H-model incorporates each security return and the market return, their covariance, and the expected market return instead of the only previously mentioned return. The comparison is made to see whether these simplified models can provide an equal ability to explain the mutual fund and exchange-traded fund proxy indexes' return and if the results are more interesting than those based on classical beta coefficients. The next aim is to verify if an alternative to the market excess return improves performance estimation and to compare the effect of different stress periods. If a high growth of capital market instruments is observed, investors should consider using other proxies for daily market movements. Normally used data for researchers are end-of-day indexes, and analyses that use daily data could underestimate the portfolio's VaR.

3.3. Analytical Techniques

For panel data evaluation, one can use the Ordinary Least Squares regression, where each term is an individual panel member in the data set, and the time series for the specified period of analysis is the firm or panel number. Based on the dependent variable, the results would mostly be used in the modeling of asset pricing and performance. If these evaluation models present good performance unique to conditions of data analysis, then it would encourage related research into areas such as risk and return analysis, market segmentation, and any regulatory impacts that change or alter the regulatory environment. The multi-factor models can help evaluate the significance of the institutional rankings that financial professionals use to evaluate the current cross-section of performance. The use of the market beta as a primary factor in the capital asset pricing model and the Fama-French model can be extended to other regions when the regional factors have an impact.

The use of time series evaluation from an accumulating body of results can lead to the analysis

of a belief that mutual funds tend to exhibit some aggressive market timing results. Another model that can be used for the evaluation of portfolios or funds is the conditional multi-factor model. This model is an equilibrium theory that is said to be aimed at cross-sectional asset pricing. Its widely used integrated model has the potential to develop both factor and time series approaches using the basic underlying framework of the factor data model. Other models, such as the four-factor linear model, can provide composite equity styles based on this configuration and the periodic factor. A higher variability of returns confronts the target client-funded asset class with some of the highest operating cost measures.

4. Empirical Analysis

Having updated the necessary data and calculations, we reduce the performance of the Dow Jones Islamic Market World Index by calculating the annual arithmetic returns for each of the financial assets included in the key Islamic and market portfolios. Grouping the financial assets, we determine the average arithmetic mean of the mutual funds individually for (a) each investment category and (b) each investment sector. Thus, for the investment objectives categorized as Balanced and Growth, we calculate the average arithmetic mean from the Investment Objective Sector displayed in four distinct sectors. In turn, from the diversified investment sector, we compute the average arithmetic mean for two sectors: Asset Allocation and Global, totaling six observed investment sectors derived from this mutual funds-based investment objective. From the investment category Bond, we calculate the arithmetic mean average of mutual funds based on a single investment sector related to the investment objective, which in this case represents a diversified sector. Lastly, in the investment categories Equity, Real Estate, and Commodities, we calculate the Mean Average Arithmetic of the respective observed investment objectives. The performance of the selected mutual funds is also analyzed in total and for each assigned investment objective.

4.1. Comparison of Mutual Funds, ETFs, and Fixed Income Securities

In general, the composition of open-end mutual funds and ETFs is public, and they are subject to regulation. Both types are focused on diversification, risk management, and other objectives. The first question is whether ETFs are ready to effectively substitute mutual funds within investment portfolios. The diversification benefits of investment portfolios consisting of mutual funds and ETFs show that the difference in performance is negligible. However, the answer is not that straightforward since ETFs and mutual funds have different structures. The most important differences here are transaction costs and bids. It is important to remember that ETFs are exchange-traded funds and trade like equities on an exchange, whereas mutual funds trade at the end of day NAV. For this reason, investors may avoid liquidity and other costs.

We assume the following model is valid. Later on, we describe how to select ETFs, mutual funds, or fixed-income securities. Moreover, we suggest how to choose their shares and weights within the interval that is acceptable for the investor, within the meaning of an efficient level of transaction costs and risk diversification in the trade-off with the depth of industry and securities. Due to their structural differences, ETFs and mutual funds have different bid-ask spreads. While ETFs may have a lower bid-ask spread compared with mutual funds, their relative volume is less. However, the expenses of ETFs are cheaper compared with mutual

funds. ETFs are created by one or more authorized participants, and their shares are called creation units. Mutual funds are managed by fund managers, have record-breaking dates, and have corresponding charges. Of course, there are other important differences, such as taxes, transaction costs, and information transfer to stock market prices, between mutual funds and ETFs.
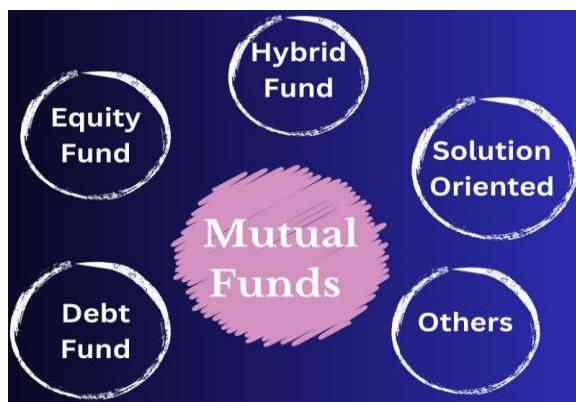

Fig 4: Mutual Funds

4.2. Case Studies

We aim to answer some representative questions of individual investors looking at diversifying well-established, actively and passively managed investment vehicles, funds having government and corporate fixed-income securities in their target portfolios during the European sovereign debt crisis. For these purposes, we have gathered the most appropriate three ETFs, three mutual funds, and three publicly traded fixed-income securities. Then we compared the risk-return performances of these investment vehicles. Our findings suggest that funds managed by autonomous professionals do not affect investment behavior in the fixed securities markets, providing adequate responses. There are also more critical applications, as with the increasing world sovereign debt crisis or non-market crash periods and high-volatility studies.

Looking at the currently managed portfolios with some of the best performances in low-volatility and high-volatility stock markets, we used three ETFs, three mutual funds, and three publicly traded fixed-income securities. Investment vehicles currently have the best risk-return performances. Lower expense ratios than mutual funds and other traditional low-cost equity investment funds do not apply to collateralized bonds, mutual funds, and ETFs following fixed-income and preferred stock indexes.

5. Discussion and Implications

The purpose of our paper is to determine the effect of diversification on the performance of different types of investment vehicles when alternative investments are added to the portfolios, which are traditionally viewed as equity investments. The results demonstrate that holding a diversified portfolio enhances the performance of individual security types. Our analysis shows that mutual fund performance benefits the most from investment in alternatives, while

ETFs demonstrate the least impact. This indicates that there is potential for investment in alternatives and in hedging the risk of investing.

A reason for investing in securities representing different asset categories is that they do not move in concert. Asset correlation and volatility are particularly important in this study. The lower the correlation between two funds, the less volatility there should be in a diversified portfolio containing these investments. This is the appealing nature of alternative investments and also mutual funds. In the long run, many analysts believe that adding alternatives, in particular, can help balance the risk of putting money in different types of equity-based investments. Mutual funds should also perform well by adding some investments in alternatives, commodities, and precious metals to help reduce the volatility and risk of investing. The results of our paper show that equity funds run in tandem with the stock market and are not as diversified as originally believed. ETFs have long been considered a less expensive alternative to mutual funds. Our results are consistent with this view; however, their performance lacks the diversity that other investments can provide to the investor.

5.1. Interpretation of Findings

The study extends the extant literature on portfolio diversification by comprehensively analyzing the performance of both mutual funds and ETFs in varying economic states long perceived to be crucial to asset allocation decisions and to the application of two alternative value-at-risk measures commonly debated in the risk management literature. This combination should provide actionable results to both practitioners and academics, which is an issue that has been recognized as a challenge to asset allocation model design by the literature. To address these needs, our multi-asset work does more than simply update earlier studies: we apply indices for a relatively long data period to account for business cycle dynamics and for investors to capture the cyclical variance in the return of mutual funds and ETFs that cover different investment concepts. Therefore, our findings could also help to trace the difference in performance between mutual funds and ETFs often seen in previous studies.

This study contributes to the behavioral and asset allocation literature by presenting an investigation into three key issues of great practical importance. Firstly, it is often suggested that, during periods of market volatility, fixed-income products may help to moderate the peaks and troughs in investment returns experienced by more aggressive hedged equity products. Yet, it is notable that previous results regarding the risk reduction benefits of fixed-income investment have deteriorated over time. Secondly, mutual funds that track a well-constructed index may underperform as a result of the investment process of the funds. However, when the underlying index provides the best return, there are calls for their wider use. Thirdly, ETFs have been found to suffer in their liquidity, wherein the bid-offer spread tends to grow as investors trade in times of heightened risk. With the rise of ETF-based algorithmic trading, a significant increase in the demand for high-frequency trading capacity from market makers in times of stress might push spreads out to levels that could inhibit the smooth operation of markets, as seen in recent years. The primary aim of this study, therefore, is to provide further insights into these continuing areas of market concern through rigorous empirical analysis.

5.2. Practical Implications for Investors

The empirical results show that mutual funds defined by investment strategies and category definitions are not homogeneous concerning the risk-return tradeoff in bearish and bullish market conditions. Based on these results, the following empirical regularities could be formulated: long-only funds underperform the static S&P 500 during bearish market conditions. Therefore, for all categories, hedge and bear market performance are better than bear market and hedge performance, respectively. In tough times, they act like a typical bear and perform beyond investors' expectations.

If investors have a concrete forecasted time horizon, portfolio managers can currently decide to invest in ETFs with maturities equal to the forecasted time horizon, as the latter argues in favor of the application of strategies called opportunistic tactical asset allocation strategies, as well as its architecture based on the efficient frontier and its critical line algorithm. Then, the explanation for outperformance in the short term is simple: investing in ETFs that have short maturities and that subsequently mature at high price per share levels leads to high market values for the increasing price per share and allows selling fewer ETF shares to create cash for the urgent liquidity demands of some participants in the ETF market.

Fig 5: Implications for Investors

6. Conclusion

One principal style of mutual fund investment has shown the ability to provide reliability in negative-return environments: This fund overlooks conviction from deep value and income factors to manage risks by striving for its stocks to pay attractive dividends. Thus, dividend stocks play a significant role in identifying and forming a new market-based factor for deep value and income investment and in preserving gains in times of lagging market activity. Drawing on a diverse group of variables, a group of 15 attributes for deep value and income stocks has shown a significantly higher average long-term return for 13 of these. Evaluation of these factors shows superior portfolio performance during both economic expansion and economic contraction. This fund plays an important role in negative-return environments. Its left tail (loss) is symmetric. Its three-year worst 12 months are better than those of the lowest negative-return fund. In this fund, absolute gains are more important than beating the down

years, which we have seen since 2009. This study extends through 2013 and updates the performance of this fund running for additional years.

Equation 3: Performance of Fixed Income Securities (Duration and Yield)

where:

ΔP = Change in bond price

D = Duration of the bond

$$\Delta P = -D \cdot \frac{\Delta y}{(1 + y)}$$

Δy = Change in interest rates

y = Yield to maturity

6.1. Summary of Key Findings

The aim of the present research is to provide a comprehensive insight into the performance of the creative analysis on equities, mutual funds, exchange-traded funds, and fixed-income securities. We employed weekly quantitative data for the two largest stock markets worldwide over the period of 2000–2018. We identified and assessed financial crisis and non-crisis periods and also applied models to infer the performance of the securities under analysis. We distinguished investment constraints, liquidity, operating costs, and taxation issues in the framework of funds.

Our findings suggest that the top mutual funds can deliver an abnormal profit that surpasses the index profit even though mutual funds are characterized by much higher fees and general trading is hindered by more restrictions compared to buying/selling on the stock exchange. The particular success of mutual funds was particularly prominent for asset classes that can boast even a slightly reduced liquidity. Furthermore, the results are probably due to the deeper analysis of the investment projects compared to ETFs. ETFs appear to be similar to the passive strategy with a significant advantage. Its advantage is embodied by much lower fees paid from taxes and flexibility in changing fund assets. The greatest disadvantage of the passive strategy is the lack of analysis. Fixed-income securities returned the least profit. This fact appears to be supported by the use of just the single-factor model.

6.2. Limitations and Future Research Directions

Although the findings obtained in this study offer new insights for both institutional and individual investors from a multi-faceted perspective, its interpretive value is contingent upon the satisfaction of several conditions, such as those related to methodology, data, and approaches used in research, benchmarks for the evaluation of performance and portfolio risk. At the time when this research was conducted, related tools and indices were not available. Technically, this study focuses on partially static investment portfolios, whereas more dynamic and realistically operational portfolio optimization approaches often provide investors with reporting benefits and incorporate more meaningful risk metrics.
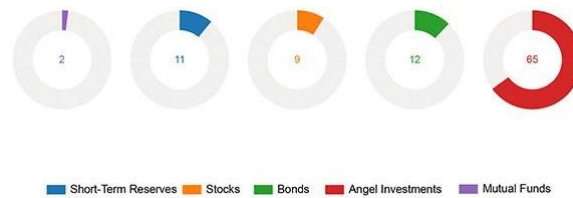
Fig 6: Analysis of Portfolio Diversification

These results come from the analysis of a limited pool of mutual funds and fixed-income securities. As such, although this study uses an extensive dataset encompassing research at different levels ranging from security, market, and economic factors, this set of fixed-income securities and energy-related mutual funds might not be representative of the entire financial system. In addition, individual investors often make investment decisions and implement portfolio strategies taking into consideration factors that go beyond the insights provided by the three-factor and enhanced four-factor models, not to mention other approaches used in analyzing dynamic management investment strategies.

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