MUTUAL FUND PERFORMANCE AND THE VALIDITY OF FUND MANAGERS' OUTPERFORMANCE CLAIMS IN G7 ECONOMIES: AN EMPIRICAL INVESTIGATION

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MUTUAL FUND PERFORMANCE AND THE VALIDITY OF FUND MANAGERS' OUTPERFORMANCE CLAIMS IN G7 ECONOMIES: AN EMPIRICAL INVESTIGATION

ABSTRACT

Mutual funds are prominent in the global capital market, offering diversification and professional management to individual investors. In view of their crucial role in the global financial landscape, this study aims to assess mutual funds' ability to outperform market benchmarks, evaluate fund managers' stock selection skills, and investigate market timing across G7 countries The dataset includes 50 mutual funds (25 equity-based and 25 bond-based) from each G7 nation between 2015 and 2022. Various performance metrics such as Sharpe Ratio, Treynor Ratio, Jensen's Alpha, and market timing models are employed.

Our findings generally support the efficient market hypothesis (EMH), as most G7 mutual funds fail to outperform market benchmarks. Negative Sharpe and Treynor ratios across the sample suggest insufficient risk-adjusted returns. Additionally, the lack of positive Jensen's Alpha and weak performance under the Fama-French three-factor model indicate that most fund managers lack stock-picking skill. However, a few funds from the US and UK do exhibit positive Jensen's Alpha, suggesting that skilled management may be present in some cases. In terms of market timing, only Italian fund managers demonstrate statistically significant positive abilities, while fund managers in other countries show limited or negative timing skills.

These findings suggest that, contrary to the hopes of active management, most G7 mutual funds do not consistently outperform the market, aligning with the core prediction of EMH. Similarly, actively managed exchange-traded funds (ETFs) show limited success in outperforming passive benchmarks. These findings emphasize the importance of carefully evaluating fund performance before making investment decisions and tempering expectations regarding the potential for abnormal returns from actively managed funds. Investors should consider

focusing on low-cost passive investment strategies, particularly in light of the limited evidence for consistent outperformance in active management.

Keywords: Mutual Fund, Exchange-Traded Funds, Stock Selectivity, Market Timing Ability, G7
JEL Classification: G11, G12

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CHAPTER 1 INTRODUCTION

1.1 Why do People Invest in Mutual Funds and Exchange-Traded Funds?

As the great philosopher-economist Adam Smith famously articulated in his seminal work "The Wealth of Nations" published in 1776, the essence of wealth lies in the tireless efforts of individuals to enhance the human condition. Smith explained that this relentless pursuit of improvement inevitably leads to the accumulation of capital by nations, thereby fostering economic prosperity and societal advancement. Drawing upon the insights of economic consensus, it is widely acknowledged that a significant portion of global income, approximately 20 percent, is allocated towards savings. These savings serve as the bedrock for future investments, a considerable portion of which finds its way into mutual funds and other financial instruments. This allocation of resources, as posited by the Consumption Investment Trade-off Theorem, reflects humanity's innate inclination to forego immediate consumption in favor of securing future income streams, thereby ensuring sustained prosperity and well-being.

In diving deeper into the economic rationale behind this phenomenon, one encounters the time preference theorem, also known as the agio theory of interest. This fundamental principle, pioneered by the esteemed economist Irving Fisher, underscores the notion that individuals exhibit a preference for present consumption over future consumption, thus necessitating compensation in the form of positive interest rates. Essentially, this theory asserts that the value of a unit of currency diminishes over time, thereby incentivizing individuals to invest and save in order to mitigate the effects of this temporal erosion of value.

Fisher's neoclassical interpretation of the time preference theorem further explains the intricate interplay between individuals' utility functions and their evaluation of present versus future consumption. Through graphical analysis and empirical observation, Fisher demonstrated how individuals weigh the trade-offs inherent in allocating resources between present consumption

and future investment, thereby shaping their preferences and behaviour within the broader economic landscape.

Figure 1.1, as depicted by Fisher, serves as a visual representation of this dynamic relationship between time preference, utility maximization, and intertemporal decision-making. By elucidating the complex interplay between individual choice, economic incentives, and temporal considerations, Fisher's insights continue to inform our understanding of wealth accumulation, investment behavior, and the broader dynamics of economic growth and development.

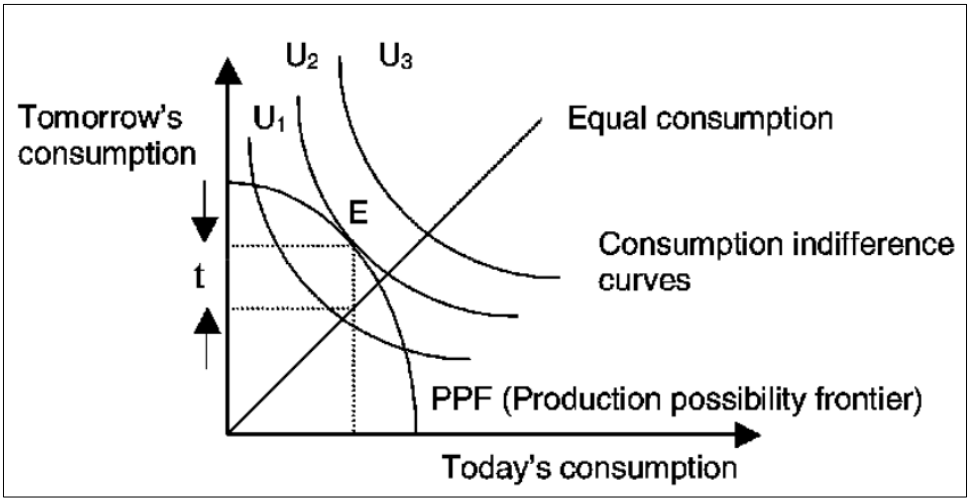

Figure 1.1: Fisher's Time Preference Theory

According to Figure 1.1, the combination of two goods across the indifference curve gives consumers same level of utility and satisfaction to consumers making consumers indifferent. Consumers can choose the most preferred consumption among those attainable which is represented analytically using the utility function (Stigler,1950). Since resources are scarce hence the constraints can be described by the production possibility frontier (PPF). The PPF demonstrates the varying amount of two products that can be produced when both depend on the same resources. The PPF and the indifference curves can be combined in order to create an equilibrium model of the economy. Kenneth Arrow, a Nobel Laureate proofed that

equilibrium levels of demand and supply are optimal and the interaction between demand and supply will result in overall general equilibrium (Arrow, 1951).

Thus, it becomes readily apparent that humans possess a natural inclination to allocate a portion of their earnings towards investments, driven by the desire to secure future financial growth while balancing associated risks. Consequently, the quest for identifying the optimal investment avenue, capable of yielding favourable returns commensurate with a predetermined risk threshold, assumes paramount importance. Presently, a prevalent trend among individuals is to entrust their investment capital to funds managed by reputable investment firms, thereby leveraging their expertise in the acquisition and management of diverse securities and portfolios (Bodie et al., 2007).

In the contemporary financial landscape, mutual fund investments have risen to prominence as one of the foremost and convenient strategies for wealth accumulation. This surge in popularity can be attributed to various factors, including the accessibility and ease of participation afforded by mutual funds, as well as the potential for diversification and professional management that they offer. As such, mutual funds have garnered widespread appeal among investors seeking to navigate the complexities of the financial markets while striving to achieve their long-term financial objectives.

Mutual funds have played an important role in the global capital market over-time, and they are generally managed by investment companies (Bodie et al., 2004). Mutual fund is an open-ended financial vehicle that is formed when a fund house or asset management company pools money from several investors including individual and institutional investors to invest in securities such as bonds, stocks, money market, instruments, and other assets. Mutual funds are managed by professional fund managers who allocates and purchases securities to maximize capital gains for the investors. The existence of mutual fund investment gives

individual investors an excellent opportunity to access professionally managed investment portfolios.

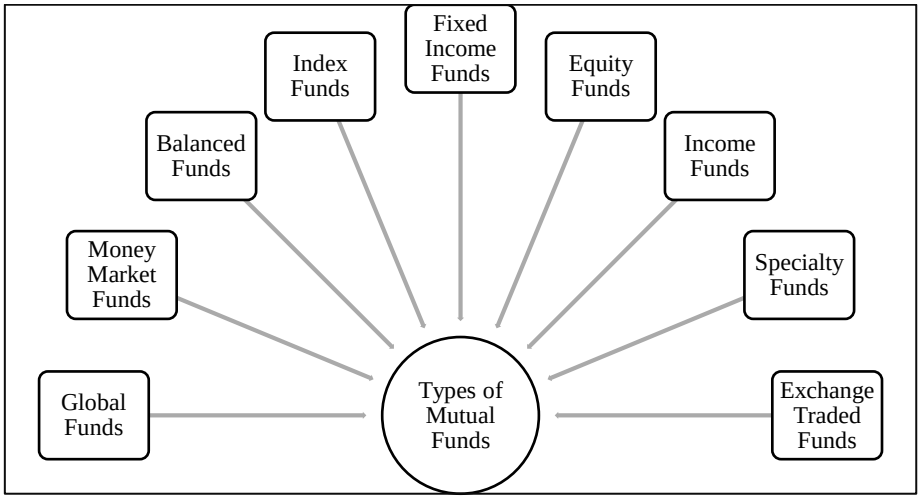

Figure 1.2: Types of Mutual Funds

Mutual funds represent a diverse array of investment vehicles, offering investors a plethora of options to match their risk tolerance and investment goals. These funds can be categorized into several distinct types, each tailored to different investment objectives and strategies. One common classification method is based on the type of securities held within a fund's portfolio. For example, global funds provide exposure to international markets, while money market funds focus on short-term, low-risk securities. Balanced funds aim to strike a balance between stocks and bonds, while index funds track a specific market index's performance. Furthermore, mutual funds can also be classified based on their risk profiles. Equity funds, for instance, invest primarily in stocks and carry higher potential returns but also higher risk. Fixed income funds, on the other hand, focus on bonds and offer more stability in returns. Income funds target regular income through interest or dividends, while specialty funds concentrate on specific sectors or themes.

Exchange-traded funds (ETFs) have gained popularity in recent years for their flexibility and liquidity. These funds trade on stock exchanges like individual stocks but provide diversification benefits similar to mutual funds. One of the key attractions of mutual funds is their ability to cater to a wide range of investors with varying needs and preferences. Whether an investor seeks long-term growth, steady income, or a blend of both, there's likely a mutual fund to suit their objectives.

Fundamentally, the investment objective of a mutual fund guides its investment decisions. For instance, a fund focused on capital appreciation aims to generate returns primarily through capital gains, typically by investing in growth-oriented securities. In contrast, an income-focused fund prioritizes generating regular income for investors, often through interest payments or dividend distributions. In conclusion, mutual funds offer investors a convenient and diversified way to access the financial markets. By understanding the various categories and investment objectives of mutual funds, investors can make informed decisions that align with their financial goals and risk tolerance.

Evaluating the performances of fund portfolios has always been a central problem in finance. This is because the analysis of portfolio performance or fund managers will be able to increase returns by minimizing risk and predicting the future correctly (Jensen, 1968). Since the debate on whether mutual fund investments can outperform the market never ends, researchers find evidence of mutual fund persistent performance to differentiate skill or from luck.

Market timing is a contentious topic within the realm of finance, drawing diverse perspectives from financial professionals, academicians, and investors alike. Many argue that attempting to time the market is a futile endeavor, attributing this belief to the inherent unpredictability and volatility of financial markets. According to this viewpoint, market movements are influenced

by a multitude of factors, including economic indicators, geopolitical events, investor sentiment, and unexpected occurrences, making precise timing nearly impossible.

Contrastingly, proponents of market timing, particularly active traders and certain investors, vehemently advocate for its significance, often citing the substantial rewards reaped by those with purported timing skill. This belief underpins the justification for the substantial compensation received by individuals possessing such skills. Market timing is regarded as a valuable skill set, particularly among fund managers, who are tasked with overseeing and optimizing investment portfolios.

Fund managers reputedly possess the ability to gauge market direction and anticipate future trends, allowing them to strategically adjust portfolio allocations to capitalize on anticipated market movements. For instance, in anticipation of an impending market downturn, fund managers may opt to mitigate risk by increasing cash holdings and reducing exposure to high-beta assets. Conversely, during bullish market conditions, they might adopt a more aggressive stance, allocating capital towards higher-risk, higher-reward opportunities.

The premise underlying the efficacy of market timing lies in the potential to generate superior returns by exploiting short-term market inefficiencies and capitalizing on favorable risk-return dynamics. Advocates argue that adept market timing can enhance portfolio performance, enabling investors to outperform benchmarks and achieve superior risk-adjusted returns over the long term.

However, critics contend that the ability to consistently and accurately time the market is inherently elusive, citing empirical evidence that suggests the majority of market timing attempts fail to yield positive results over extended periods. Moreover, they caution against the

pitfalls of market timing, including the risks of overtrading, transaction costs, and the psychological pressures associated with attempting to predict market movements.

The debate surrounding market timing remains unresolved, with proponents and critics offering compelling arguments to support their respective positions. While the attraction of market timing as a means to achieve superior returns persists, the complexities and uncertainties inherent in financial markets underscore the challenges associated with its implementation. As such, investors are advised to exercise caution and prudence when considering the merits of market timing strategies within the broader context of their investment objectives and risk tolerance.

Even though there is a possibility for fund managers to outperform that market by possessing market timing ability, the question remains on why fund managers are never able to predict a downturn during a financial crisis? If there is a systematic way of selecting funds, then fund managers should be able to select funds that will still manage to outperform during any crisis period. However according to finance literature, the poor market performance from 2007 to 2011 that is the period after the Global Financial Crisis initiated investors to monitor their funds as they were disappointed with the mutual fund performance which increased investor's anxiety (Mansor et al.,2015). Whether or not successful market timing is possible is still uncertain across numerous financial markets worldwide though this has been studied for at least the US market using what today I consider as basis statistics with statistical errors in estimation.

1.2 Background and Overview of the Study

Mutual funds have evolved into a pivotal intermediary facilitating the connection between financial markets and households, particularly within the equity market sphere. This role stems from their provision of low-cost, liquid shares, bundled within diversified portfolios of financial assets. These portfolios are meticulously chosen and managed by seasoned professional fund managers, thereby solidifying mutual funds as an enticing avenue for households seeking entry into the financial markets.

The appeal of mutual funds lies in their ability to offer investors exposure to a broad array of financial instruments at a fraction of the cost and effort required for direct investment. By pooling resources from multiple investors, mutual funds achieve economies of scale, enabling access to assets that may otherwise be inaccessible or cost-prohibitive for individual investors. Moreover, the inherent diversification within mutual fund portfolios serves as a buffer against market volatility, mitigating risk and providing a level of stability to investors' holdings. This diversification spreads investment risk across various asset classes, industries, and geographic regions, thereby reducing the impact of adverse events on overall portfolio performance.

Another significant advantage of mutual funds is their liquidity. Unlike individual securities, which may be illiquid and difficult to sell at fair market prices, shares in mutual funds can typically be bought or sold on any business day at the fund's net asset value (NAV). This liquidity feature provides investors with the flexibility to access their invested capital swiftly, especially during periods of financial stress or unforeseen circumstances.

Furthermore, the rising popularity of mutual funds can be attributed to the increasing aversion among investors to engage directly in portfolio decision-making. Many investors prefer to delegate the management of their investments to seasoned professionals who possess the

expertise and resources to navigate complex financial markets effectively. However, the proliferation of mutual fund offerings has also led to a proliferation of choice, presenting investors with a daunting array of options. The decision-making process has become increasingly intricate as investors must weigh factors such as investment objectives, risk tolerance, fees, and performance history when selecting the most suitable mutual funds for their portfolios.

In summary, mutual funds have emerged as a cornerstone of the modern investment landscape, offering households an accessible and efficient means to participate in financial markets. With their diverse array of investment options, cost-effectiveness, liquidity, and professional management, mutual funds continue to attract a growing number of investors seeking to achieve their financial goals while minimizing the complexities associated with direct portfolio management.

Although there are many factors that investors consider prior to deciding, but still performance of the funds still stands as the main determining factor (Capon et al.,1996; Ippolitio,1992). From an investors' point of view, it is essential to understand how the investment policies work and how managers perform as well. In the past, the aggregated performance of mutual fund was dominating the research world but now the attention has shifted to test the stock selection and market timing abilities. This does not only allow us to measure the performance more accurately but also deals with doubts of which activities are more economically rewarding.

This chapter will give an overview of the research by first introducing the investment funds that will be included in this study that are mutual funds and exchange-traded funds. Then the background on the countries that will be studied upon that is the G7 countries will be provided followed by the problem statement research objective, research questions, and significance of the study. The concept of pooling money together for the purpose of investment was

established in the Dutch Republic in response to the 1772-1773 financial crisis. An Amsterdam based businessman Abraham formed a trust aiming to provide small investors an opportunity to diversify. Subsequently, mutual funds were introduced in the United States in the early 1980s. On 21st March 1924, the first official open-ended mutual fund the Massachusetts Investors Trust with redeemable shares was established. The global mutual fund net asset was valued at USD 54.9 trillion in 2019 according to the Investment Company Institute. In 2019, 45% of regulated open funds worldwide were concentrated in the United States and the total net assets of US registered mutual funds have doubled since 2009. There was about a 4% compound annual growth rate (CAGR) of the regulated open funds worldwide from 2011 to 2019 (Statistica Research Department, 2021).

According to the Statistica Research Department reports, it is projected that the global mutual fund assets are projected to reach USD101.2 trillion by 2027 growing at a CAGR of 11.3% from 2020 to 2027. In 2020, the total global net assets of mutual fund registered in the US reached approximately €23.9 trillion and it is recorded to be the largest mutual fund industry in the world. The second largest mutual fund industry in the world as of 2020 is in Luxembourg with mutual funds asset under management (AUM) worth €4.95 trillion. The reason for Luxembourg playing a major role in the mutual fund industry is due to the fact it is home to several financial entities attracted to that place due to its tax incentives.

The dominance of U.S based mutual fund companies in the global market is evident when examining the top players in terms of assets under management (AUM). As of 2020, nine out of the ten top mutual fund companies by AUM hail from the United States. BlackRock Funds leads the pack, followed closely by the Vanguard Group, Charles Schwab, Fidelity Investments Inc., and State Street Global Advisors, all of which boast substantial AUM figures.

The Vanguard Total Stock Market Index Fund Admiral Shares (VTSAX) stands out as the largest mutual fund in the world, with an impressive AUM of USD 921.4 billion. This fund's popularity and success can be attributed to various factors, including its robust performance metrics and low expense ratio. With a 3-year annualized return of 13.21% and an expense ratio of just 0.04%, VTSAX offers investors an attractive combination of growth potential and cost-effectiveness.

These statistics underscore the significant role that U.S based mutual fund companies play in shaping the global investment landscape. Their prominence reflects not only the depth and sophistication of the U.S. financial markets but also the trust and confidence investors place in these institutions to manage their assets effectively. As investors continue to seek diversified and cost-efficient investment options, the appeal of funds like VTSAX is likely to endure, further solidifying the position of U.S. mutual fund companies at the forefront of the industry.

Hence, it is evident that the mutual fund industry has been growing tremendously in recent years leading to fierce competition and studying the performance of mutual funds is essential to understand the operation of investment funds and to know if the mutual fund performance could persist in the future. The existence of persistent performance for mutual funds will play an important role in explaining how investors could develop their investment strategies and choose funds prior to investing as well. In line with this debate on mutual fund performance, many studies have established models to evaluate the performance (Sharpe,1966; Jensen,1968; Fama & French,1992). Early works from classic research on which most of the current literature is based on focused on the mutual fund performance as well the market timing ability of fund managers (Treynor & Mazuy,1966; Henriksson & Merton,1981).

Exchange-traded funds (ETFs) have emerged as a significant player in global financial markets alongside mutual funds. While mutual funds have long been a staple investment option, ETFs

have been gaining traction due to their unique advantages and flexibility. The history of ETFs traces back to the early 1990s, with notable introductions in both the United States and Canada. The American Stock Exchange launched the Standard & Poor's Depository Receipts (SPDR) in January 1993, marking a pivotal moment in the ETF landscape. Shortly thereafter, in Canada, the Toronto Stock Exchange (TSE) introduced the first ETF known as the Toronto Index Participation unit (TIPS) in 1990. TIPS was designed to track the performance of the 35 largest stocks on the TSE, offering investors exposure to a diversified portfolio within a single investment vehicle. The introduction of ETFs initially faced a lukewarm response from investors. The unfamiliarity with this innovative financial product contributed to a slow start, particularly in the early years. However, as the 1990s progressed, investors began to recognize the benefits of passive investments offered by ETFs. These advantages include low costs, transparency, and liquidity, which appealed to a wide range of investors, especially those with a more risk-averse stance following the 1987 market crash.

As awareness and understanding of ETFs grew, so did their popularity. Investors started to appreciate the simplicity and efficiency of passive investing, which involves tracking market indices rather than actively selecting individual securities. This shift in investor sentiment catalyzed the expansion of ETF offerings beyond broad market indices. ETF providers began to replicate specific sectors such as technology and healthcare, catering to investors' evolving preferences for targeted exposure.

Furthermore, ETFs expanded beyond equities to include other asset classes such as commodities, real estate, and fixed income. This diversification allowed investors to build well-rounded portfolios tailored to their investment objectives and risk profiles. By incorporating a wide range of asset class indices, ETFs provided investors with unprecedented access to global markets and investment opportunities. In summary, the evolution of ETFs from their modest

beginnings in the early 1990s to their current prominence underscores their growing importance in the investment landscape. As investors continue to seek cost-effective, diversified, and easily tradable investment options, ETFs are likely to remain a popular choice, offering versatility and convenience in an ever-changing financial environment.

Nowadays, one of the preferred investment vehicles that have emerged in the financial markets is ETFs. ETF allows investors to hold a diversified portfolio and it is traded continuously during market hours unlike mutual funds that can be traded till end of the day (Gastineau, 2001). At early stages of ETF introduction, most of the ETFs were passive in nature which means they track a specific benchmark index and are also better known as the classical ETFs. ETFs are hybrid funds that fund managers implement bets on broad market movements. It combines the positive features of open-ended and closed-ended mutual funds. ETFs are said to have more advantages compared to mutual funds dude to the flexibility in trading, more tax efficient, lower expense ratio, and diverse asset classes. The reason of ETFs having a lower expense ratio as compared to mutual funds is because of the entry and exit loads.

According to Blackrock (2023), the global ETFs are expected to increase to 12 trillion dollars by the end of 2023. The yearly ETF growth rate is expected to increase possibly reaching to a new high of 25 trillion dollars by 2027. The figure below describes the potential growth of ETF asset.

Figure 1.3: Global ETF Asset Growth

Source: BlackRock, Global Business Intelligence May 2018

Since ETF has gained its recognition in the financial markets, XETRA, Deutsche Borse first introduced 11 active ETFs in 2000 while US launched their first ETF in 2008. The reasons actively managed ETF was introduced is to provide investors an option to invest in an ETF that is designed to track fund managers' best picks to mirror mutual fund performances that can outperform the benchmark index since the passive ETFs can only match the benchmark index performance. Besides, the number of market makers require by each type of ETF that is two for passive and at least one for active ETF, the relationship between ETF manager and market maker and the minimum size of investment are some of the key differences of active and passive ETF. To be specific, the passive ETFs participants are unrelated to one another whereas the manager and market maker for active ETFs belong to the same corporation (Rompotis, 2009).

The presence of active ETF first came up in the year 2000 and the reason it was not widely available in all stock exchanges is due to the arbitrage opportunity that the passive ETFs offers but not the active ETFs. When there is a declination in the value of securities and trading prices of ETFs, there is a possibility for arbitrage profits to be made. Contrarily, the information on

the active ETFs is not published until end of trading day because these funds are meant to outperform the benchmark, hence if the information is disclosed that it will weaken the ability for the actively managed ETF to beat the market.

1.3 Background of G7 Countries

The Group of Seven (G7) composes seven of the largest advanced economies of the world that includes United States, United Kingdom, Canada, France, Japan, Italy, Germany. In 1975, the United States, United Kingdom, France, Italy, and Japan formed the Group of Six (G6) to provide a platform for noncommunist powers to address economic issues including recession and inflation caused by the OPEC oil embargo. The following year, Canada joined the group to form G7 (Council on Foreign Relations, 2023). The first G7 summit was held in France in November 1975.

The G7 countries accounts for 27 percent of the world gross domestic product (GDP) and 15 percent of the world GDP growth over the past 10 years (World Economics, 2023). The G7 nations have played a significant part in addressing the global challenges, forming the global economic policies and promoting international cooperation. Although the mutual fund industry has been researched upon thoroughly in various stock markets, however as far as our knowledge there has not been studies conducted in the G7 market. Hence, this research will fill in the literature gap in terms of the countries studied with updated dataset.

The G7 is worth examining since it has a wide economic influence in the global market position and policy making will have a substantial impact on financial stability, trade flows and global markets. By studying the investment environment in the G7 countries, we will have a bigger picture on the fund managers' ability in these countries as compared to other developed and developing nations as well. It allows us to identify if the fund managers in the developed 7 countries in the world possess better skill sets as compared to the rest of the world. Although

the G7 does not account for the entire world economy, but the members of the G7 have a significant contribution in the economy globally. Figure 1.4 below shows the historical trend of the GDP in G7 countries. It is evident that the G7 GDP accounts for more than 50% of the world GDP. This highlights the importance of studying the investment environment in the G7 economies.

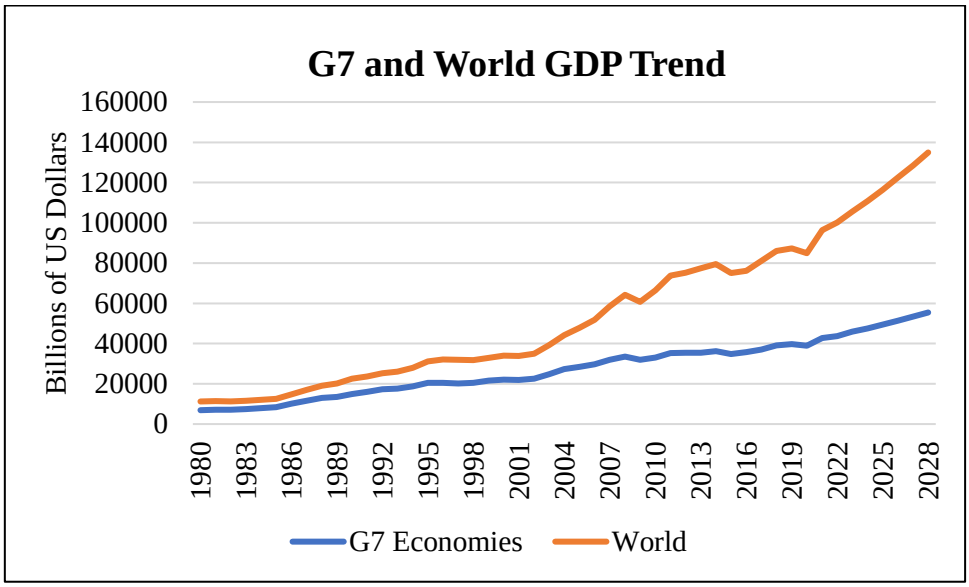

Figure 1.4: G7 and World GDP Trend

Source: IMF 2023: World Economic Outlook (April 2023)

1.3.1 United States

The United States of America is the first nation to join the G7 group. In the year 2021, the United States of America and its mutual funds accounted for nearly forty percent of the total number of mutual funds worldwide. The mutual fund industry in the United States maintained its position as the largest in the world in 2021, with a total net asset of nearly 27 trillion dollars (Mordor Intelligence, 2023). Statistica (2022) reports that there are a total of 7,393 mutual funds operating in the United States. These funds are comprised of a diverse range of asset classes, including bonds, stocks, industries, sectors, and styles. Parallel to the expansion of the

assets held by mutual funds, the number of households in the United States that own mutual funds also experienced a rapid growth during this time period.

According to Fernando et al. (2003), the percentage of households that owned mutual funds increased from approximately 6 percent to 27 percent between the years 1980 and 1992, and then the percentage increased by 44 percent in 1998. Mutual funds were gaining their presence in the financial markets during the 1990s. The growth of mutual funds was fueled by the presence of multinational firms and an increase in globalisation in the financial market, which led to a strong performance in the bond and equity markets. Mutual funds were gaining their presence in global markets.

1.3.2 United Kingdom

The year 1931 marked the beginning of Foreign & Colonial, which was the first investment trust to be established in the United Kingdom. Small-time investors will have the opportunity to participate in a diversified portfolio through this investment, which is the end goal of this investment. The mutual fund industry in the United Kingdom experienced tremendous growth as a direct result of the success of this investment trust in the United Kingdom. The asset under management industry in the United Kingdom reached a peak of 1.9 trillion dollars in 2021, according to figures provided by the Investment Association (2021). This represents a sizeable asset under management industry. At the moment, there are approximately four thousand distinct funds that make themselves available to investors. These funds are classified into a variety of asset classes.

1.3.3 Canada

According to the Investment Fund Institute of Canada (2023), the first open-ended mutual fund was established in 1932 in Montreal, Quebec, during the middle of the Great Depression. At the time, individuals with limited financial resources were participating in investment products

that were managed by individuals with professional expertise. After that, this sector gradually expanded over the course of time in Canada, eventually reaching a total of twenty funds by the time the 1960s ended. At the moment, approximately 47 percent of Canadians who have investments in mutual funds do so with the intention of establishing retirement funds.

According to the Canadian Conference Board, the mutual fund industry is estimated to contribute approximately 37 billion dollars, which is equivalent to approximately 1.5% of Canada's gross domestic product. By making a contribution to the expansion of the Canadian gross domestic product, it is clear that the mutual fund industry is providing a significant contribution to the process of reshaping the Canadian economy. More than four thousand funds are made available by more than one hundred fund management companies, and this number continues to increase enormously over the course of many years. This is reflected in the percentage of households that have invested in them, which is approximately 38 percent of the household wallet. The confidence of investors has also been rapidly increasing, and this is a reflection of this rapidly increasing confidence. Due to the fact that investors are eager to use this platform to invest, approximately eighty percent of investors in mutual funds return to fund managers to invest. As a result, it is necessary for us to determine whether or not fund managers are providing investors with the appropriate benefits and skills.

1.3.4 Germany

Mutual funds, which are more commonly referred to as Investmentfonds in Germany, began to emerge in the early 1950s, following the implementation of the Investment Act in 1952. The Investment Act was initiated with the intention of establishing a framework to govern the regulations governing mutual funds. Currently, the mutual fund industry in Germany generates revenue of 3680 billion dollars, and it is anticipated that this industry will account for a compound annual growth rate of 8 percent by the year 2028, according to Mordor Intelligence (2023).

Whether it be mutual funds or other investment and retirement schemes, it is reported that fifty million investors in twenty-one million households in Germany invest in investment funds ranging from mutual funds to other investment schemes. As a result of the intense competition that exists in the mutual fund market in Germany, key players are working to enhance their offerings in order to broaden their recognition within the sector. Over five hundred international companies are responsible for the distribution of mutual funds in Germany. This is due to the fact that Germany is a powerful fund location and an attractive market for fund management companies.

1.3.5 Italy

Ersel Asset Management SGR was the first company in Italy to manage mutual funds. It was established in 1983 and currently operates under the name Ersel Asset Management. Following the Great Recession, the asset management industry in Italy experienced unprecedented growth, reaching 111 percent of GDP in 2016. This growth was a direct result of the macroeconomic scenario in Italy, which triggered the industry to achieve this growth. According to Statistica (2023), the assets of investment funds in terms of their financial status The opportunities available in Italy are extensive due to the fact that it is one of the largest economies in the region and has a high number of companies that are experiencing growth. In 1984, when the first mutual fund was introduced in Italy, the total assets under management (AUM) was only 568 million euros. However, by 2015, the AUM had increased to 850 billion euros, a tremendous growth. A statement like this makes it abundantly clear that the mutual fund industry is the dominant player in the Italian financial sector today.

1.3.6 France

The French Asset Management Association estimates that France has 4,800 billion euros of assets under management (AUM) that are spread across a variety of investment funds, making it the country that leads the pack in terms of asset management and ranks first in continental Europe. In 1964, the first mutual fund in France, which was known as SCPI, was a real estate investment (REIT) based fund that enabled investors to invest in portfolios of properties. This fund was the first of its kind in France.

Investors who had the opportunity to invest in the real estate industry without having to purchase physical properties were able to take advantage of this relatively new opportunity. Over the course of time since then, the mutual fund industry in France has experienced significant expansion. At the present time, the asset management industry in France is situated at the intersection of financial circuits between companies and investors who are looking for a risk return tradeoff. The equity and investment fund shares in France amounted to 975 billion euros, making them the most valuable financial assets in the country.

1.3.7 Japan

It is anticipated that the size of the Japan asset management market, measured in terms of assets under management value, will increase from USD 4.10 trillion in 2023 to USD 4.88 trillion by 2028 (Mordor Intelligence, 2023). This growth is expected to occur at a compound annual growth rate (CAGR) of 3.56%. The management of financial assets that belong to Japanese individuals is overseen by the largest institutional investors in Japan, which include Japan Post Bank, GPIF, and Norinchukin Bank, amongst others. As a result of the persistently low domestic growth rates and interest rates, Japanese investors are actively looking for opportunities to invest overseas in order to achieve higher returns.

As a consequence of this, influential Japanese institutional investors are always looking for exceptional foreign managers to oversee their portfolios of foreign assets. Due to the language barrier, tax rate disadvantages, and stringent and intricate regulations, Japan may need to adjust to becoming a favourable market for foreign asset managers. This may require some time. At the moment, the government of Japan is making concerted efforts to establish Tokyo as a prominent international financial centre by putting into effect a variety of measures that are aimed at removing obstacles that prevent market access.

1.4 Problem Statement

The evolution of mutual funds has been a captivating subject, capturing the intrigue of researchers and investors alike within the realm of financial economics over an extensive period. Numerous scholarly endeavors have been dedicated to delving into the intricate nuances of mutual fund performance, spanning across various markets and employing a diverse array of performance evaluation measures and methodologies.

Over the past decade, the global landscape has witnessed a notable surge in the mutual fund sector, characterized by a staggering 120% increase in assets under management (AUM), surging from a modest USD 32.3 trillion to an impressive USD 71.1 trillion (Investment Company Institute, 2022). This meteoric rise not only underscores the growing significance of mutual funds within the financial ecosystem but also underscores their pivotal role in shaping investment dynamics on a global scale.

The origins of mutual funds can be traced back to the early 20th century, with the establishment of the first investment trust in the United States in 1924. Initially conceived as a means of pooling resources to invest in a diversified portfolio of securities, mutual funds offered

individual investors an opportunity to access professional portfolio management and diversification benefits typically enjoyed by institutional investors. However, it was not until the post-World War II era that mutual funds gained widespread popularity among retail investors, fueled by favorable regulatory changes and increasing demand for investment vehicles capable of delivering superior risk-adjusted returns.

Throughout the latter half of the 20th century, mutual funds evolved significantly in terms of structure, investment strategies, and regulatory oversight. The proliferation of mutual fund offerings led to the emergence of specialized funds catering to specific asset classes, investment styles, and risk preferences. Concurrently, advancements in technology and financial innovation facilitated the development of sophisticated portfolio management techniques, such as index tracking, factor investing, and alternative strategies, further diversifying the mutual fund landscape.

The globalization of financial markets in the late 20th and early 21st centuries paved the way for the international expansion of mutual fund companies, enabling investors to access a broader array of investment opportunities across borders. This trend was reinforced by regulatory reforms aimed at harmonizing investment regulations and facilitating cross-border fund distribution. As a result, mutual funds have become integral components of diversified investment portfolios, offering investors exposure to a wide range of asset classes, including equities, fixed income securities, real estate, and commodities, among others.

In recent years, the mutual fund industry has witnessed a paradigm shift driven by technological innovation, demographic changes, and shifting investor preferences. The rise of digital platforms and robo-advisors has democratized access to investment products, allowing investors to customize their portfolios and execute trades seamlessly. Moreover, the increasing prevalence of environmental, social, and governance (ESG) considerations has prompted

mutual fund managers to incorporate sustainability criteria into their investment processes, reflecting growing investor awareness of the broader societal impacts of their investment decisions.

Looking ahead, the future of mutual funds is likely to be shaped by ongoing regulatory developments, technological advancements, and evolving market dynamics. While challenges such as fee compression, regulatory scrutiny, and market volatility may pose near-term headwinds, the fundamental value proposition of mutual funds as a vehicle for long-term wealth accumulation and risk management remains intact. As such, mutual funds are poised to continue playing a pivotal role in meeting the diverse investment needs of individuals, institutions, and sovereign wealth funds alike, driving innovation, fostering capital formation, and contributing to the overall resilience and efficiency of global financial markets.

1.4.1 Practical Problems

The fact that people's livelihood in general are affected by mutual funds due to their consideration of mutual funds as a preference for their savings and pension for retirement is the intriguing part that should be discovered and researched on. According to the recent research conducted by the Investment Company Institute (ICI) in 2023, 54.4% of American households held investments in mutual funds or ETFs. Based on the report, it is evident that the primary goal was to save for retirement. Therefore, it is evident that the performance of funds holds greater significance today than ever before, particularly for people worldwide as they save for their future (Investment Company Institute, 2023).

As per the mutual fund investment process, the manager is tasked with making decisions encompassing asset allocation, sector selection, industry selection, and timing. It is crucial for performance measurement to accurately depict the outcomes resulting from the manager's decisions rather than mere luck. From an investor's point of view, the relationship between

performance and fund characteristics is too complex, thus they rely purely on the fund manager's advice to which fund should their money be invested in. This makes it crucial for us to investigate if the fund managers can fulfill their responsibilities even when there is a market downturn.

The primary problem addressed in this thesis is the ambiguity surrounding fund managers stock selectivity and market timing ability. While some studies suggest that fund managers can generate alpha through successful stock selection and market timing, others argue that stock selection and market timing is largely a result of luck rather than skill. This thesis aims to investigate and clarify the true nature of fund managers ability to produce superior returns as compared to the benchmark. Why is it interesting to examine the fund manager's ability in the G7 countries? The possibility stock selectivity and market timing depend on the efficiency of the market. The less the degree of market efficiency, there is a higher chance of beat-the-market opportunity by fund managers by adjusting portfolio allocation weights.

1.4.2 Theoretical Problems

The efficient market hypothesis posits that stock prices reflect all available information, rendering it nearly impossible for investors to consistently outperform the market. However, proponents of market timing counter this theory, asserting that certain investors possess the insight to predict market movements and adjust their investments strategically to capitalize on perceived opportunities. In the realm of mutual funds, where investors rely on fund managers to make these strategic decisions, understanding the extent of managers' market timing abilities is essential for investors aiming to maximize returns and manage risk effectively.

Despite numerous studies on mutual funds, the debate over whether fund managers truly possess stock selectivity skills and market timing ability persists. While some research indicates evidence of market timing prowess among specific managers, other studies find no significant support for such claims. This inconsistency raises fundamental questions about the reliability and effectiveness of market timing strategies within the mutual fund industry. Therefore, the central objective of this thesis is to delve into the theoretical exploration of the existence and ramifications of mutual fund managers' skills and their claims of outperformance.

1.5 Research Questions

Prior literature has investigated on the performance of mutual funds in several countries. However, there are mixed and inconclusive results when it comes to studying the performance of mutual fund performance at a multi-country level. Additionally, it is found that most studies are based in the US market and does not cover many countries (Sharpe. 1965; Lee & Rahman, 1990: Blake et al., 2017). This paper will start off with six significant objectives. Hence, the following are the research questions that will be addressed in this study:

- Do mutual funds provide superior returns as compared to the market benchmark in the G7 countries?
- Do mutual fund managers develop a stock selection strategy to obtain superior performance in the G7 countries?
- Are mutual fund managers successful market timers in the G7 countries?

The first three research questions will address the mutual fund performances in the G7 countries. The key performance measures are utilized to compute the performance returns of mutual funds. The portfolio returns will be compared to the benchmark returns to see if the mutual funds manage to outperform the market or it produces inferior returns. Subsequently, the stock selectivity skills and market timing ability of the mutual fund managers are also tested

to identify if managers have any skills to produce returns. If mutual fund managers possess market timing ability, the investment portfolios should be adjusted by forecasting the market conditions. In order to separate the market timing ability and stock selectivity skills, the market timing models will be tested to identify if mutual fund managers have market timing ability (Henriksson & Merton,1981; Treynor & Mazuy,1966)

- Do actively managed ETFs produce better returns than passive ETFs in United States?
- Do active ETF fund managers develop a stock selection strategy to obtain superior performance compared to passive ETF in United States?
- Are active ETF fund managers successful market timers in the United States?

ETF is an investment that allows investors to access a diverse portfolio of equities and is consists of many appealing features that allows investors to gain exposure in broad markets. The actively managed ETFs are ETFs that has a manager making decisions on the underlying portfolio allocation. Contrarily the passive ETFs are meant to track and replicate the benchmark index performance. Hence, if market timing ability is present in active ETF managers, then the actively managed ETFs should yield higher returns compared to the passive ETFs.

The conclusion of this research will most importantly aid fund managers to identify their managerial ability and performance to help develop future strategies for their funds under management. Additionally, investors that are pursuing investment options to allocate their assets will have a clear picture and idea on the history of mutual fund and ETF performances. Hence, this thesis intends to help policy makers and regulators decisions with regards to providing an apparent understanding on the mutual fund industry in the G7 countries.

1.6 Research Objectives

This research has been motivated by the recent increase in investors towards mutual funds and actively managed ETFs. The main objective of this research is to explain the mutual fund performance in the G7 countries comprehensively. This fills in one of the gaps in knowledge since studies on mutual fund performance in this G7 region is scarce based on existing approach and small data sample that have been used. This research uses a sample of 50 mutual funds from all the G7 countries.

Subsequently, this research encompasses six main objectives, each pivotal in its contribution to understanding mutual fund performance within the context of the G7 countries. The primary aim of this study is to conduct a comprehensive evaluation of mutual fund performance vis-à-vis market benchmarks across the G7 nations. Through meticulous analysis, we endeavor to ascertain the extent to which a subset of 50 funds in each country surpasses the performance of their respective market benchmarks. This examination not only provides insights into the relative success rates of funds but also sheds light on the overarching trends prevalent in the mutual fund landscape.

Furthermore, our investigation delves deeper into the intricacies of fund management by probing into the stock selectivity skills exhibited by fund managers. This facet of the study seeks to discern the proficiency of fund managers in identifying and selecting stocks that yield superior returns for investors. By scrutinizing the investment choices made by these managers, we aim to glean insights into the strategies employed and the factors influencing their decision-making processes.

Moreover, our research extends its purview to explore the market timing abilities of mutual fund managers operating within the G7 countries. This aspect of the study examines the

adeptness of fund managers in strategically entering and exiting the market to capitalize on favorable market conditions. By evaluating the efficacy of timing decisions made by fund managers, we aim to clarify the impact of market timing on fund performance and, subsequently, investor outcomes.

In summary, this multifaceted study endeavors to unravel the complexities of mutual fund performance within the G7 countries, shedding light on the factors influencing fund success and the strategies employed by fund managers to navigate dynamic market environments. Through rigorous analysis and comprehensive examination, we seek to provide valuable insights that contribute to a deeper understanding of mutual fund dynamics and empower investors to make informed decisions.

The next three objectives of this this study is with respect to another investment fund that is examined in this study that is the ETFs. The ETFs in this study will include actively managed ETF in the United States. This is because active ETFs are relatively very new and are now gaining popularity, hence the database available for the actively traded ETF is not available in all the G7 countries. Hence, in this study we will include the United States ETF market. First and foremost, the performance of actively managed ETFs is examined against the passively managed ETF to see the if it yields better returns. Next, the stock selectivity skills and market timing ability of active ETF fund managers is also analyzed in this study.

This research has the following objectives.

1. To measure the mutual fund performance of the G7 countries against the market benchmark using various performance measures.
2. To investigate the stock selectivity skills of mutual fund managers in the G7 countries.
3. To examine the market timing ability of mutual fund managers in the G7 countries.

4. To measure the performance of active ETFs against the passive ETFs in the United States.
5. To investigate the stock selectivity skills of active ETF fund managers in the United States.
6. To examine the market timing ability of active ETF fund managers in the United States.

All the research objectives in this study are interrelated to some extent. For example, objectives (1),(2) and (3) are investigating mutual fund performance in the G7 countries whereas objectives (4), (5) and (6) aims to examine the actively managed ETFs in United States.

The inspiration and motivation behind selecting this particular topic for research stems from the noticeable surge in investment activities within the contemporary era. It's evident that there's a burgeoning interest among individuals who are actively seeking out optimal investment avenues. Consequently, this burgeoning interest underscores a notable gap within the realm of empirical research, particularly concerning mutual fund performances. There exists a pressing need to delve deeper into the intricacies of mutual fund performances to effectively gauge the managerial prowess of fund managers. This dearth in comprehensive research serves as the primary impetus driving this thesis forward. The overarching goal is to furnish investors with a comprehensive understanding of the risk and return tradeoff inherent in their investment portfolios. Additionally, it seeks to ascertain whether fund managers are delivering on the promised returns, thereby instilling a sense of transparency and accountability within the investment landscape.

1.7 Significance of Study

Despite the staggering significance of human investment, which surpasses a remarkable US$104 billion in the thriving domain of financial markets dedicated to fund investment, only a mere handful of studies have delved into its major issues. This glaring gap in research prompted the inception of this paper, poised to bridge the void by meticulously scrutinizing the performance of mutual funds in the illustrious G7 region. At its core, this endeavor seeks to shed light on the efficacy of mutual fund managers' performance at a macro level, aiming to discern whether they truly augment investment portfolios with added value or merely dissipate potential benefits that rightfully belong to investors.

1.7.1 Practical Contributions

Evaluating the performance of mutual funds has long been a focal point within the realm of finance. Over the years, numerous studies have delved into scrutinizing mutual fund performance across diverse markets, employing a range of measurement techniques and risk adjustments. Despite this extensive research, relatively scant attention has been devoted to analyzing mutual fund performance from a multi-country perspective and discerning fund managers' purported ability to outperform. Previous investigations have yielded mixed results regarding whether mutual fund investments can indeed outpace the broader market. This ambiguity underscores the complexity inherent in evaluating the efficacy of mutual funds and underscores the need for further comprehensive analysis to shed light on this intricate aspect of investment strategy.

The practical implications of the findings on mutual fund performance are manifold and relevant to various stakeholders. These include mutual fund subscribers (investors), fund providers (fund managers), and policymakers. A significant contribution of this research to the

literature is the countries included that is the G7 group. These markets are shown to be semi-strong form efficient, so price data are accurate. This is a new and important contribution to literature since the G7 group has not been extensively researched upon in terms of investment fund performances. According to the Council on Foreign Relations (2023), the G7 group may serve as a forum to coordinate global policies. Therefore, by conducting this study on the G7 countries, we have a clear outcome on the investment environment in these countries which may lead to better outcomes in terms of global policy implementations and strategies.

The outcome of this study could produce evidence on how historical performance of mutual funds can be useful to investors who choose mutual funds as a platform to earn excess returns. Also, the outcome of studying if fund managers have market timing ability will help investors to be aware if there is a possibility to outperform the market. Most of the studies look at individual mutual fund performances but there is a gap in examining the performance by benchmarking to the national optimal performance. There is a believe that the mutual fund management fee charged reduces the investors returns by about 10% for a horizon of 20 years (Mansor et al.,2015). Although the charges could decrease the total returns, however this area has not been scrutinized and paid attention to up to the Global Financial Crisis. Hence to address this, in this study a group of funds including will be selected, and the average performance of the fund will be determined and analyzed over a 6-year period over 7 countries.

Additionally, in this study the risk-adjusted performance of different kinds of funds will be analyzed, that means normal mutual funds and active ETFs. This will add on to the existing literature that have yet to examine the market timing ability of the ETFs across a multi-country aspect. The study on active ETF is still scarce as active ETF is a new type of investment vehicle that is still in the midst of gaining popularity amongst investors. By studying this new investment vehicle called the active ETF, we can confirm if active ETF is a preferred investment option over passive ETFs for investors. Such information is valuable for investors

to help them in choosing specified funds that can earn them excess returns. Therefore, this study will fill the gap in knowledge in investment performance using (a) advanced econometrics and (ii) latest data, and (c) investment managers' claim of timing and selectivity skills.

1.7.2 Theoretical Contributions

Previous research has predominantly concentrated on mutual fund performances within nations such as the United States. The primary aim of the present study is to enrich this domain by furnishing evidence from G7 countries, offering a comprehensive examination of mutual fund performance and managers' abilities in market timing and stock selection. This research adds to the existing body of knowledge in various dimensions:

Firstly, this study introduces new empirical evidence, thereby contributing to resolve the debate among academicians surrounding mutual fund risk-adjusted performance and managerial skills within the G7 nations. A fundamental idea of the Efficient Market Hypothesis (EMH) is that no investor can consistently surpass the market without assuming additional risks, owing to the perfect rationality of all market participants. While existing literature has largely concentrated on the US and other developed markets, it's imperative to recognize that the findings derived from these markets may not universally apply to all G7 countries.

Secondly, this study makes noteworthy contributions to comprehending the performance of mutual funds in G7 countries by addressing critical methodological voids in existing literature. Firstly, it meticulously compares mutual fund performances with the respective benchmark indices of the countries. Secondly, the research incorporates diverse risk-adjusted metrics to discern consistency in the results obtained, employing various models of market timing ability

and robustness measures. This methodological approach heightens the accuracy of risk-adjusted performance evaluation, offering a fresh outlook on fund assessment.

Thirdly, conducting a direct comparison between the performance of active and passive ETF funds yields valuable insights into these two competing investment strategies. Frino and Gallagher (2001) have raised concerns about the conventional method of measuring active fund performance against 13 benchmark indices (representing passive returns) due to the non-investable nature of indices (paper portfolios) and their lack of associated expenses. Consequently, unlike the traditional practice of comparing active fund performance solely with benchmark index returns, juxtaposing active and passive fund performance offers novel evidence through a realistic assessment of the most viable investment strategy within the G7 countries.

1.8 Scope of Study

The scope of this study encompasses a comprehensive evaluation of various attributes within the mutual fund industry, incorporating analyses of mutual fund performance, mutual fund managers' stock selectivity skills, and mutual fund managers' market timing abilities. This holistic approach ensures a nuanced understanding of the dynamics shaping mutual fund operations and performance within the financial landscape.

However, it's important to note that the study's focus remains confined to the mutual fund industry specifically within the G7 countries. By centering the research within this geographical context and within the mutual fund companies operating within these nations, the study maintains a targeted and contextually relevant scope. This deliberate limitation allows for a detailed examination of the mutual fund landscape within a defined set of countries, thereby facilitating deeper insights into industry practices, market dynamics, and managerial strategies within this specific context.

1.9 Organisation of Study

This research endeavour is organised into six chapters that are particularly comprehensive, and each of these chapters explores into a different aspect of the study. A comprehensive overview of the research domain is provided at the beginning of the first chapter, which begins with an overall presentation. In addition to providing contextual insights into the G7 countries, it provides a detailed overview of the history of the mutual fund and exchange-traded fund (ETF) industries, elaborating on the significance of these industries within the context of the financial landscape. In this chapter, a concise summary encapsulates the thesis by outlining the research objectives, the motivating factors driving the study, the consequential significance of the study, and a discernible identification of knowledge gaps. All of these elements are intricately interwoven with a delineation of the structural framework of the thesis.

In the following chapter, Chapter 2, a comprehensive analysis of relevant literature is carried out, with a particular emphasis on the performance dynamics of both mutual funds and exchange-traded funds (ETFs). It begins with a taxonomy of investment funds and then moves on to establish a robust theoretical framework that serves as the basis for the study. After that, it conducts a thorough analysis of the empirical literature, and it evaluates the performance trajectories of mutual funds and exchange-traded funds (ETFs), as well as an assessment of the market timing techniques employed by fund managers. The purpose of this chapter is to lay the groundwork for subsequent analytical exploration by culminating with a synthesis of key findings from previous studies and a thoughtful exploration of unresolved issues that require further investigation.

A methodological stance is taken in Chapter 3, which describes the framework within which the research is carried out. In it, an exhaustive explanation of the study's hypotheses is provided, as well as an explanation of the various models that are used to evaluate the performance of

mutual funds. These models are drawn from the existing body of literature. In addition to this, it meticulously outlines the process of data selection and sample compilation, which guarantees that the subsequent analyses will be methodologically rigorous and coherent.

The empirical findings and subsequent discussions that resulted from the analysis of the performance of mutual funds across the G7 nations are presented in Chapter 4. It begins with a comprehensive overview of descriptive statistics pertaining to the mutual funds that were studied, and then it moves on to investigate the stock selectivity and market timing acumen of fund managers. It does this by employing analytical models to determine whether or not these characteristics are present. In addition, this chapter examines the performance differences between actively managed and passively managed exchange-traded funds (ETFs), which adds to the breadth of understanding that was obtained from the empirical studies.

In the final chapter, which serves as the culmination of the research journey, a synthesis of the insights gained from the chapters that came before it is presented. It encapsulates the essence of the study, drawing nuanced conclusions while also explaining potential policy implications that may arise as a result of the findings of the research. Furthermore, it outlines potential directions for future research endeavours, which contributes to the enhancement of the academic discourse and the advancement of the collective understanding of the performance dynamics of mutual funds and exchange-traded funds within the context of the G7 landscape.

1.10 Definition of Key Terms

Mutual Fund: A mutual fund is a type of investment vehicle consisting of a portfolio of stocks, bonds, or other securities, which is managed by a professional investment company.

Exchange-Traded Funds: ETFs are investment funds traded on stock exchanges, offering investors exposure to diversified portfolios of assets like stocks, bonds, or commodities.

Stock Selectivity: The capacity of fund managers to choose individual stocks that outperform the market through diligent research and analysis, aiming for superior returns.

Market Timing: Fund managers' strategy of buying or selling assets (such as stocks or mutual funds) based on predictions or forecasts about future market movements.

Outperformance: When an investment, portfolio, or financial instrument achieves better returns or performance relative to a benchmark, index, or comparable assets over a specific period.

Underperformance: When an investment, portfolio, or financial instrument achieves lower returns or performance relative to a benchmark, index, or comparable assets over a specific period.

1.11 Chapter Summary

Within the context of the research topic of mutual fund investment, the introduction chapter offers a fundamental summary of the information. The purpose of this chapter was to provide a comprehensive introduction to the mutual fund sector. This introduction covered a variety of topics, such as the many types of funds, the history of mutual funds according to each country, and the benefits and drawbacks associated with each form of mutual fund. This chapter also includes a discussion of the countries and regions that were examined in their respective studies. Following this, the previous research and literature that has been conducted in the field of mutual funds will be discussed and elaborated upon in the following chapter.

CHAPTER 2 LITERATURE REVIEW

2.1 Introduction to Current Literature

In this chapter, a comprehensive exploration of existing theories and empirical literature findings pertaining to the proposed research topic, focusing on the mutual fund investment performance persistency across selected countries over an extended timeframe, will be presented. This chapter will be structured into several distinct sections to facilitate a systematic analysis.

The first section will provide a foundational understanding by categorizing various types of investment funds, subsequently delving into a detailed description of mutual funds' classifications and characteristics. Following this, the subsequent section will delve into theoretical underpinnings relevant to the analysis of mutual fund performance. It will commence with an explaination of the theory of performance, encompassing discussions on the general equilibrium theory and the consumption-investment trade-off. Subsequently, it will expound upon key theoretical frameworks such as the Efficient Market Hypothesis (EMH), the Capital Asset Pricing Model (CAPM), and the Modern Portfolio Theory (MPT), shedding light on their implications for mutual fund performance analysis.

The third section will pivot towards an examination of studies pertaining to mutual fund managers' selective skills, scrutinizing the empirical evidence and theoretical constructs surrounding this aspect of fund management. In the subsequent section, the focus will shift towards investigating mutual fund performance persistency, analyzing past research findings and theoretical perspectives to discern patterns and determinants of performance persistence over time. Following this, the fifth section will critically review literature concerning the market timing abilities of mutual fund managers, evaluating empirical findings and theoretical

frameworks explaining the efficacy of market timing strategies within the mutual fund landscape. Transitioning to the realm of Exchange-Traded Funds (ETFs), the sixth section will explore literature pertaining to the market timing abilities of ETFs, tracing historical trends and theoretical debates surrounding this aspect of ETF performance.

Lastly, the chapter will culminate with a discerning identification of gaps in existing knowledge gleaned from the literature survey, theoretical frameworks, and empirical findings, paving the way for further inquiry and exploration in subsequent research endeavors. Additionally, Tables 2.1 and 2.2 will be provided at the conclusion of Chapter 2, summarizing the main studies related to mutual fund and ETF performances, thereby offering a concise synthesis of key findings and insights gleaned from the literature review.

2.2 Proposed Classification of Investment Funds and Mutual Funds

In this paragraph, a review is conducted into a proposed classification that encompasses all different kinds of funds. Due to the fact that not all funds are considered to be mutual funds, this conclusion has been reached. The sole purpose of investment funds is to fulfil the requirements of investors in a manner that is in line with the levels of risk that are deemed appropriate from a financial standpoint. A consequence of this is that the stocks that constitute the assets are subject to change in accordance with the objectives and goals that are being pursued. For instance, if the objective of the fund is to provide a steady flow of income, then the managers of the fund will devise appropriate investing strategies that will select the securities that will constitute the assets of the fund from among those that are available. Funds that are gathered from individual investors by financial intermediaries and then invested in a wide variety of securities are referred to as managed funds, which is a term that is frequently used (Bodie et al., 2007). The types of assets that managed funds hold, the kinds of investments that they make, the legal structure that they have, the amount of risk that they are willing to

take, the regulations that they adhere to, the source of their funding, and other aspects are some of the ways that managed funds could be classified.

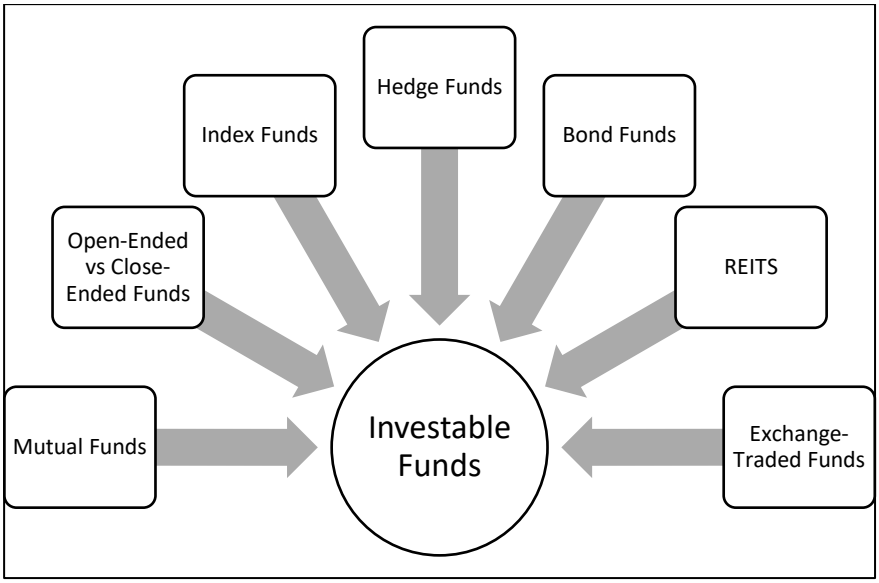

Figure 2.1: Type of Investable Funds

The fundamental objective of each and every investment fund is to accomplish the same thing, which is to enable investors to build a diversified portfolio. On the other hand, the characteristics of each fund could be different from one another.

2.2.1 Mutual Funds

Mutual funds are one of the oldest types of investment funds. Mutual funds are a vehicle that combines money from a number of individual investors in order to purchase securities. Mutual funds typically provide investors with the benefit of being able to purchase a diverse portfolio of assets based on their level of comfort with risk without having to manage the portfolio itself. Mutual funds are a type of investment vehicle that pool the capital contributed by a number of different investors in order to make investments in a diversified portfolio that includes a variety of assets such as stocks, bonds, government securities, gold, and other assets. Companies that meet the requirements to establish mutual funds do so by establishing Asset Management

Companies (AMCs) or Fund Houses. These organisations are responsible for the collection of funds from investors, oversight of investments, promotion of mutual funds, and facilitation of investor transactions.

The management of mutual funds is the responsibility of fund managers, who are experts in the fields of investment analysis and management. The managers of mutual funds invest the money that is raised from investors in a variety of financial assets, such as stocks, bonds, and other assets, in accordance with the investment objective of the fund. There are a variety of responsibilities that fall under the purview of fund managers, including the determination of the favourable locations and timing for investments. The investor is charged a fee that is referred to as the expense ratio by the management of the fund. It is not possible to standardise the fee structure, and the fee structure varies from mutual fund to mutual fund.

2.2.2 Open-Ended Funds

On a continuous basis, open-ended funds are able to generate an unlimited number of new units into circulation. On a daily basis, the prices of these newly established units are established by considering their closing net asset value (NAV). The number of shares that can be issued by this mutual fund is not restricted in any way, as it serves as an unrestricted mutual fund. As long as there is a sufficient level of demand, the fund will continue to issue shares, regardless of the number of investors that are contributing to the effort. In addition, open-end funds repurchase shares whenever investors decide to sell their holdings. Furthermore, another key feature of the open-ended funds is unable to use leverage as a component of their investment strategy because they are unable to borrow against their assets. This means that they cannot use leverage.

Open-ended funds provide customers with an array of advantages, the most important of which is the convenience of gaining access to liquidity. If the investor wants to redeem the units of

the funds, they can do so without any restrictions. It provides an alternative to liquidity that is quick. In addition, on the day of redemption, these units can be traded in at their Net Asset Value (NAV), which is equal to their current market value.

Next, we need to take into consideration how easily those previous accomplishments can be accessed. Keeping track of the net asset value, which is calculated on a daily basis, allows investors to keep track of the performance of these funds and make decisions based on accurate information. In addition, open-ended funds also provide systematic investment strategies. Through the utilisation of systematic plans, investors are able to make use of these funds for investment and withdrawal purposes. The Systematic Investment Plan (SIP), the Systematic Withdrawal Plan (SWP), and the Systematic Transfer Plan (STP) are the three planning options that investors have available to them. The consistent investment of a predetermined sum into the scheme is made easier by the utilisation of these respective tools.

Additionally, investors have the opportunity to acquire a portfolio that is diversified. One of the characteristics of open-ended funds is that they distribute their investments across a wide variety of assets that belong to a variety of businesses and industries. It is possible to reduce investment risk by diversifying the portfolio. Furthermore, open-ended funds have a low initial investment requirement for their investors. They require a relatively small financial investment. With a relatively small amount of money, the investor can get started on a methodical investment plan.

One of the disadvantages of open-ended funds is that they are susceptible to significant volatility, which is in addition to the benefits listed above. Because of the performance of the underlying securities, the Net Asset Value (NAV) of these funds is subject to frequent fluctuations. As a result, these funds are susceptible to market risks. There is still a certain amount of risk involved, despite the fact that diversifying the portfolio can help reduce the risk

of certain outcomes. In addition, open-ended funds might have exit loads attached to them. The term "exit loads" refers to the fees that investors are required to pay if they withdraw their money from the fund before a certain year has passed, which is typically the case. When compared to closed-end funds, open-ended funds experience a higher volume of both incoming and outgoing capital. As a consequence of this, a sudden outflow can potentially force the manager of the fund to sell holdings at the lowest possible level, which will ultimately result in losses for all investors.

2.2.3 Closed-Ended Funds

On the other hand, to a greater extent than open-end funds, closed-end funds exhibit characteristics that are comparable to those of stocks. During an initial public offering, they make a predetermined number of shares available to the general public. After the offering is complete, these shares are then able to be traded on a stock exchange. Through the use of initial public offerings, a closed-ended fund will be able to generate capital, and brokerage accounts will be used to acquire the fund. It is possible for the market price of a closed-end fund to be different from its net asset value, and this difference can be either lower or higher, depending on the particular scenarios. The difference between open-ended funds and closed-ended funds is that the former allow new investors to join at any time, while the latter do not allow new investors to join after they have concluded their operations.

2.2.4 Index Funds

The next fund that will be discussed are the well-known index funds. Index funds are a collection of funds that are comprised of all of the stocks that are included in a specific index. A mutual fund or an exchange-traded fund (ETF) is the specific type of financial product that is referred to as an index fund. The purpose of an index fund is to replicate the investment returns of a particular index. Currently as investors in the financial market, we do not possess

the capability to directly invest in an index today. You do, however, have the choice to put your money into an index fund, which is formed in such a way as to replicate the performance of the index that you are interested in. In order to invest in the securities that make up the index that the fund is tracking, a professional manager will collect funds from a number of different investors and then invest those funds.

As an example, take the S&P 500 index into consideration. The S&P 500 Index is a weighted index that is comprised of 500 common stocks that were chosen for inclusion based on their market capitalization, liquidity, and representation of various industry groups. The performance of US equities is evaluated with the help of this metric. In its most basic form, it is an index that tracks the overall average performance of stocks belonging to 500 of the most prominent companies in the United States. Although a rise in the value of the S&P 500 index does not necessarily imply that all 500 companies experienced gains, it does indicate that a sufficient number of those companies did experience gains, which led to an increase in the overall average value. In order to determine the value of an S&P 500 index fund, the performance of the S&P 500® index is taken into consideration. Therefore, the value of an investment in that index fund would typically increase in tandem with the overall performance of the S&P 500 index. This would be the case that the value of the investment would increase. Purchasing an index fund, to put it more simply, has the potential to produce results that are comparable to those that would be achieved by purchasing all of those stocks individually, but with a significantly lower level of effort and at a lower cost. The cost of a single share of an index fund is typically lower than the cost of purchasing individual shares of each stock or bond that is included in a particular index. As a result, investing in an index fund is typically a more accessible investment option than investing in individual stocks or bonds.

2.2.5 Hedge Funds

The next type of investable fund that will be discussed is the hedge funds. The objective of a hedge fund is to generate a profit regardless of the fluctuations in the investment market. It makes use of a substantial amount of capital from wealthy individuals and engages in the trading of assets that are relatively liquid. When it comes to managing hedge funds, managers typically employ a wide variety of methods in order to achieve returns for their clients that are higher than the average market return. A hedge fund is a type of collective investment fund that is comprised of assets that are easily convertible and employs sophisticated trading and risk management strategies in order to improve investment performance and protect returns from the volatility of the market. The use of leverage and derivative instruments, as well as short selling, are two portfolio strategies that can be implemented. Individuals with high net worth and institutional investors are the only types of investors who are permitted to market hedge funds in the United States due to the regulations that govern the financial sector.

Funds that invest in hedges are considered to be alternative investments. One of the characteristics that differentiates them from regulated investment funds that are available to the retail market, such as mutual funds and exchange-traded funds (ETFs), is their ability to make use of leverage and implement more complex investment strategies. It is common practice to differentiate hedge funds from private equity funds and other closed-end funds by the fact that hedge funds primarily invest in assets that are relatively simple to buy and sell, and they typically do not have a predetermined date by which they will cease operations. Consequently, they typically allow investors to make periodic investments and withdrawals of capital based on the net asset value of the fund. On the other hand, private-equity funds primarily invest in assets that are difficult to convert into cash and only return capital after a predetermined amount of time has passed. Different people have different ideas about what constitutes a "hedge fund"

because there are no predetermined or rigid definitions of fund types. The only thing that can be considered a "hedge fund" is the regulatory status of the fund.

2.2.6 Bond Funds

Additionally, the next fund that will be discussed are the bond funds. A bond fund is comparable to a stock mutual fund in terms of its characteristics. In order to accomplish the goal of the fund, the manager of the fund will acquire bonds or other debt instruments rather than purchasing stocks.

In the world of fund management, it is extremely rare for bond managers to keep bonds until the date of maturity. Alternately, they will engage in more frequent buying and selling of bonds in order to guarantee that the maturities of the bonds held within the fund will continue to fall within the limits that have been specified. Additionally, in order to keep the average maturity between seven and ten years, the manager of a bond fund that focuses on investing in government Treasury bonds that mature within that time frame will sell bonds that mature earlier. This is done in order to maintain the average maturity. It is the responsibility of bond funds to make interest payments to their shareholders. In general, payments are made on a monthly basis; however, the amount of money that is paid out can change from one month to the next depending on how well the bonds that are held in the fund portfolio are performing.

Fees are required to be paid by investors in order to cover the expenses of the bond fund. These expenses include covering the compensation of the fund manager as well as other operational costs. An expense ratio, which is a fee that is determined by the total value of assets invested in the fund, is imposed by the majority of bond funds. Depending on the circumstances, certain organisations may levy a sales fee or a redemption fee, both of which must be paid at the time of purchase or sale, respectively. Certain organisations impose a yearly fee that is always the same.

Due to the fact that bond funds primarily invest in fixed-income assets, they are also sometimes referred to as debt funds. With a very small initial commitment, this fund offers investors the opportunity to diversify their holdings. Because of this, it is well knowledge that mutual funds are funds that invest solely in bonds. When compared to short-term bonds, long-term bonds are subject to a higher level of interest rate risk due to the fact that the connection between the two is inverse.

2.2.7 Real Estate Investment Trust Funds (REITs)

Moreover, another important fund that is gaining popularity in the investment market are the Real Estate Investment Trust Funds (REITs). The term "Real Estate Investment Trust" (REIT) refers to a corporate entity that either owns, manages, or provides financial support for real estate properties that generate income. In the same way that mutual funds provide an investment opportunity, real estate investment trusts (REITs) make it possible for average investors, as opposed to Wall Street, banks, and hedge funds, to reap the benefits of valuable real estate. They make it possible to gain access to income and total returns that are based on dividends, and they contribute to the expansion, prosperity, and revitalization of communities. In a manner similar to how individuals invest in other industries, real estate investment trusts (REITs) give individuals the opportunity to invest in real estate assets. The purchase of individual company stock, as well as investments in exchange-traded funds (ETFs) and mutual funds, are all viable options for accomplishing this goal. Real Estate Investment Trust (REIT) stockholders are entitled to a portion of the income generated by the trust, and they do not have to personally acquire, manage, or fund the properties in order to receive this income. There are approximately 170 million households in the United States of America that have investments in real estate investment trusts (REITs) through their pension plans, and other investment funds. The business model that real estate investment trusts (REITs) typically adhere to is straightforward and easy to understand. REITs normally generate income by leasing out their

real estate and collecting rent, which is then distributed to shareholders in the form of dividends. The vast majority of real estate investment trusts (REITs) are required to distribute at least ninety percent of their taxable income to their shareholders.

However, the majority of REITs distribute one hundred percent of their income. Therefore, shareholders are the ones who are accountable for paying the income taxes that are associated with the dividends that they receive. Mortgage REITs also known as mREITs do not possess real estate assets directly. Rather than that, they offer financing for real estate ventures and generate revenue from the interest that is accrued on these investments. All throughout their history, Real Estate Investment Trusts (REITs) have consistently delivered competitive overall returns. This has been made possible by a combination of substantial and consistent dividend income as well as long-term growth in capital value. There is a relatively low correlation between them and other assets, which makes them an effective portfolio diversifier. This results in a reduction in the overall risk of the portfolio while simultaneously increasing returns. The following is a list of characteristics that represent real estate investments that are based on REITs. In addition to experiencing long-term growth in stock prices, real estate investment trusts (REITs) have been steadily and consistently increasing their dividends over the course of the past 45 years. Investors have benefited from attractive overall returns as a consequence of this, which have outperformed the overall stock market, bonds, and other assets in the majority of historical time periods.

Real estate investment trusts (REITs) that are listed on public exchanges are companies that are managed by professionals and run their businesses with the intention of increasing the value of their shareholders. This includes effectively managing their property portfolios and engaging in the buying and selling of assets in order to enhance value over extended periods of time during periods of fluctuation in the real estate market. Additionally, this involves strategically positioning their properties in order to attract tenants and generate rental income.

2.2.8 Exchange-Traded Funds (ETF)

ETFs, short term for "exchange-traded funds," are investment funds that are traded on exchanges and typically replicate the performance of a particular index. The exchange-traded fund (ETF) is a type of investment that is open-ended and combines the characteristics of index funds and stocks. ETFs allow investors to acquire exposure to a variety of markets, industries, sectors, geographical regions, commodities, and other specific investments. Additionally, investors can gain exposure to any other specific assets. You will have access to a collection of assets that can be bought and sold during market hours if you invest in an exchange-traded fund (ETF). In addition to helping you diversify your investment portfolio, this has the potential to lower the amount of risk and exposure you are exposed to when you invest. Exchange-traded funds (ETFs) are traded on stock exchanges in a manner that is comparable to that of common stocks. In a manner analogous to that of stocks, exchange-traded funds (ETFs) are subject to price fluctuations throughout the day and are actively traded. In most cases, exchange-traded funds (ETFs) are comprised of a single fund that contains a portfolio of stocks, bonds, or other securities. It is also possible for them to offer exposure to a particular stock or bond by means of a single-security exchange-traded fund (ETF). In the event that you are looking for a method that is both cost-effective and tax-efficient to gain exposure to a wide variety of asset classes, investing in exchange-traded funds (ETFs) might be an option that is suitable for you. There are many reasons why exchange-traded funds (ETFs) are beneficial for a significant number of investors. The first consideration is expanding one's horizons.
For investors, exchange-traded funds (ETFs) offer the opportunity to invest in a diverse array of asset classes, including domestic and international stocks, bonds, and commodities, among other asset classes. The decreased costs are yet another advantage that comes along with this. When compared to actively managed mutual funds, exchange-traded funds (ETFs) typically have operating expense ratios (OERs) that are lower. Additionally, the flexibility of trading is

an additional important factor to take into consideration. Exchange-traded funds, also known as ETFs, are able to meet a wide range of investment requirements because they combine the trading flexibility that is available in individual securities with the diversified characteristics that are associated with mutual funds. Moreover, exchange-traded funds (ETFs) have a higher tax efficiency. In comparison to actively managed mutual funds, exchange-traded funds (ETFs) are generally considered to have a higher tax efficiency and efficiency.

On the basis of the body of research that is currently available, it is possible to see that the majority of the studies have been biased in favour of mutual funds. This is because funds like hedge funds and exchange-traded funds (ETFs) do not have their data readily available to investors. This is the reason why this is the case. Because of this, the public data that is available on mutual funds is utilised in research to a significant degree. This is because of the circumstances described above. Furthermore, mutual funds can be classified according to their structure, nature, investments, and other schemes. This is a multifaceted classification system. These plans will be tailored by fund managers to the customer's level of comfort with risk and the objectives they wish to achieve with their investments. The classification of mutual funds is discussed in the figure that can be found below.

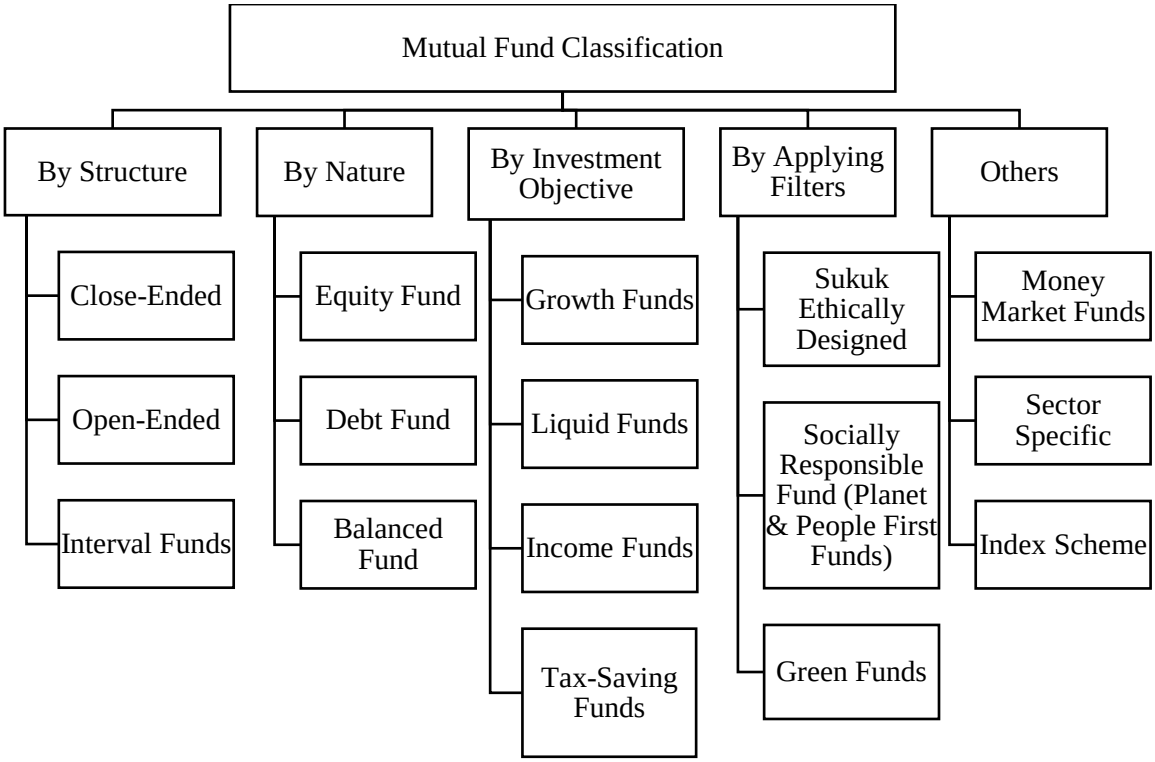

Figure 2.2: Classification of Mutual Funds

Mutual funds are classified according to a number of criteria, which include their structure, nature, investment objectives, filters, asset classes, investment styles, and geographic focus. These criteria combine to determine the classification of mutual funds. In the following paragraphs, you will find an explanation providing an explanation of the classification of mutual funds.

The mutual funds that are largely invested in equities or equity securities are referred to as equity-based mutual funds. In addition, they might concentrate on particular industries, market capitalizations (for example, large-cap, mid-cap, or small-cap), or investment styles (for example, growth, value, or blend). Bonds, treasury securities, and various other debt instruments are the next types of investments that the fixed-income funds make. Bonds issued by the government, corporate bonds, and municipal bonds are all examples of different types of bonds that might differ in terms of credit quality, length, and geographic focus. In addition, we offer balanced funds, which are funds that invest in a combination of stocks and bonds in

order to accomplish the goals of diversification and risk management. Depending on their investing goals and their level of comfort with risk, they may choose to divide their assets between fixed income and equity investments.

In terms of the mutual fund classification based on nature, we have primarily three different funds that are the commonly known as equity-based funds, debt-based funds and balanced or hybrid funds. Stock funds are another name for equity funds because the majority of their investments are in stocks. Equity funds are one type of investment vehicle. The funds that they have collected from a wide range of investors who come from a variety of different backgrounds are then invested in the purchase of shares or stocks in a number of different companies. The profits and losses that are associated with these funds are entirely dependent on the performance of the shares that are invested in the stock market, measured by whether or not the price of the shares increases or decreases. Over a specified period of time, equity funds have the potential to generate substantial returns with their investments. Because of this, the level of risk that is associated with these funds is typically higher in comparison to other possibilities.

Fixed-income securities, such as bonds, securities, and treasury bills, are the primary investments that debt funds allocate their capital to. Fixed Maturity Plans (FMPs), Gilt Funds, Liquid Funds, Short-Term Plans, Long-Term Bonds, and Monthly Income Plans are just some of the fixed income instruments that they invest in. Their portfolio also includes a variety of other fixed income instruments. Investments that have a fixed interest rate and maturity date are an excellent choice for passive investors who are looking for a consistent income (interest and capital appreciation) while taking on a minimal amount of risk. Within the context of the stock market, investors are typically involved in the buying and selling of stocks. Also known as the capital market or cash market, the money market is where investors put their money. Other names for this market include the capital market and the cash market. By issuing money

market securities like bonds, T-bills, dated securities, and certificates of deposit, the government works in conjunction with banks, other financial institutions, and other corporations to accomplish its operations. The fund manager is responsible for allocating your funds and, as a result, distributing dividends on a regular basis. The investment risk that is associated with these funds can be significantly reduced by selecting a plan that is short-term (meaning that it does not last for more than thirteen months).

The term "balanced funds" refers to hybrid funds, which are investment vehicles that combine bonds and stocks in order to create a balanced portfolio that bridges the gap between equity funds and debt funds. Hybrid funds are also known as blend funds. Both a variable and a constant ratio are possible for the ratio. By allocating approximately sixty percent of the assets to stocks and the remaining portion to bonds, or vice versa, this strategy essentially combines the most advantageous aspects of two mutual funds into a single investment vehicle. When compared to investors who adhere to lower-yield but more stable income schemes, hybrid funds are suitable for investors who are willing to take on greater risks in order to obtain the benefit of both debt and returns.

The next classification of mutual funds will be focused upon the classification based on investment objectives. In this scenario, we have a few types of funds that are the growth funds, liquid funds, income funds and tax-saving funds. Typically, growth funds invest a sizeable portion of their assets in stocks and industries that are anticipated to experience robust growth in the coming years. These funds are appropriate for investors, particularly Millennials, who have surplus funds available for investment in higher-risk plans that have the potential to offer potentially high returns and who have a positive outlook on the investment strategy.

Income funds are a type of debt mutual fund that invest their money in a variety of investments, including bonds, certificates of deposit, and securities, among other types of investments. It is

possible for income funds, which are managed by knowledgeable fund managers, to effectively align the portfolio with fluctuations in interest rates while simultaneously maintaining the creditworthiness of the portfolio. Throughout the course of history, income funds have consistently offered investors higher returns in comparison to deposits. Investors who need to exercise caution and have a long-term perspective of two to three years are the ones who should consider these investments.

A maximum tenure of 91 days is allowed for liquid funds, which are similar to income funds and fall under the category of debt funds. This is because liquid funds allocate their investments to debt instruments and the money market during their investment period. The method that is utilised in the computation of the Net Asset Value is one of the distinguishing characteristics that liquid funds have in comparison to other types of debt funds. For the purpose of calculating the Net Asset Value (NAV) of liquid funds, a period of 365 days is taken into consideration, which includes Sundays. On the other hand, when it comes to calculations involving other funds, only business days are taken into consideration. Within the definition of investment goals funds, the tax-saving funds constitute the fourth fund in the category. Over the years, equity-linked savings schemes, also known as ELSS, have become increasingly popular among investors of all different types. These investments not only offer the benefit of maximising wealth and enabling tax savings, but they also have the benefit of having the shortest lock-in period, which is only three years. The majority of their investments are in equity and other affiliated products, which are known to generate returns that are exempt from taxation and range from 14% to 16%. Investors who have a long-term investment timeframe and receive a fixed salary are the ones who are best suited to invest in these funds.

In addition to this common classification of mutual funds, we do have some very specifically targeted mutual funds. These includes the sukuk funds, socially responsible funds and green funds. Sukuk, which are also referred to as Islamic bonds, are financial instruments that adhere

to the principles of Shariah and have a fixed income distribution. In the past ten years, these instruments have consistently gained a larger portion of the global market because of their extensive market presence. At first, the global market for sukuk was restricted to jurisdictions that had a predominantly Muslim population. However, over the course of the last decade, this market has experienced significant growth.

The participation of numerous governments in the market as well as the issuance of sukuk by prominent corporations in the market are both indicators of this growth. Financial instruments known as sukuk are those that are governed by the principles of sharia and have the objective of producing returns that are comparable to those of traditional fixed-income securities such as bonds. In contrast to a conventional bond, a sukuk is a type of financial instrument that represents a stake in a funding arrangement that is operated in accordance with the principles of sharia. This gives the holder the right to receive a proportionate share of the returns that are generated as well as the return of the capital at a future date that has been specified. When it comes to adhering to shariah compliance, it is generally required that any profits obtained from these funding arrangements must come solely from commercial risk-taking and trading. Additionally, it is prohibited to receive any form of conventional interest income. It is necessary that the assets that are a part of the funding arrangement are of a permissible (halal) characteristic. In the case of a conventional bond, in which the bondholder is considered to be a debtor of the issuer, the overall risk profile and economic return of the investor are comparable to those of a conventional bond.

A socially responsible investing (SRI) strategy recognises the correlation between profitable investment returns and ethical corporate conduct. SRI investors assert that by integrating specific environmental, social, and governance (ESG) criteria with stringent investment standards, they can discern securities that will generate competitive returns while contributing to the development of a more favourable world. Given the diverse range of values and beliefs

held by individuals, fund managers face considerable difficulties in identifying stocks that best align with the ideal blend of values to attract investors. The selection criteria for stocks are determined by the fund's theme, values, and goals.

For instance, funds that are highly responsive to environmental concerns, such as lithium mining, will select stocks of companies that surpass the minimum environmental standards. Several socially responsible mutual funds allocate a portion of their portfolios specifically for community investments. There is a widespread misunderstanding that these investments are actually donations. This is false. These investments enable investors to contribute to a disadvantaged community while also earning a financial profit. A significant portion of community investments is allocated to community development banks in developing nations or in economically disadvantaged regions of the United States, with the specific purpose of supporting affordable housing and venture capital initiatives.

Another interesting mutual fund that has been gaining popularity in recent times are the green funds. Green investing has seen a surge in popularity over the past few years as a result of increased awareness of climate change, an increase in the demand for corporate social responsibility, and the development of regulations that encourage sustainable business practices. Additionally, the total value of assets managed in sustainable funds has reached levels that have never been seen before, which indicates that the global market for green investments has experienced significant growth. It is clear that both individual and institutional investors are becoming increasingly interested in investment opportunities that have positive effects on the environment and society, as evidenced by the fact that this proportion has increased.

Green funds are investment instruments that primarily target businesses and projects that advance environmental sustainability. They are also known as sustainable funds or eco-friendly

funds. Green funds are also referred to as green funds. The primary objective of these funds is to achieve financial returns that are comparable to or superior to those of other investments, while simultaneously providing active support to the global initiative to combat climate change, preserve natural resources, and promote sustainable development. By purchasing shares in Green Funds, investors have the opportunity to bring their financial goals into alignment with their social and environmental values. Investors have access to a wide variety of mutual funds, and it is essential for them to have a thorough understanding of the advantages and disadvantages that are associated with each type of mutual fund. Investing portfolios should be carefully selected by investors, taking into consideration their individual risk preferences and levels of tolerance.

2.3 Relevant Theories/ Underpinning Theories

The aim of this section is to provide a summary of the relevant theories in order to follow the direction of the relevant theories. There are many different types of financial economics that are included in the literature that I am going to evaluate, and it is applicable. In the first place, it is relevant to the research that is being done on investment funds. During the course of the theoretical review, we will discuss a few of the concepts and theoretical frameworks that are connected to the performance of mutual funds. These will be discussed in detail. A number of different theories, such as the Efficient Market Hypothesis (EMH), the Capital Asset Pricing Model (CAPM), and the Modern Portfolio Theory (MPT), are examples of theories that could be taken into consideration in order to successfully capture this phenomenon. A critical analysis of the reasons why the theories are relevant to this investigation will also be presented, along with an explanation of the reasons why they are relevant.

2.3.1 Efficient Market Hypothesis

In 1970, Fama was the first person to develop the efficient market hypothesis (EMH), which asserts that the market is the primary factor in determining the values of securities. The efficient market hypothesis (EMH), which is also known as the efficient market theory, is a theory that proposes that share prices consider all of the information that is available to investors and that it is impossible to generate consistent alpha. According to the Efficient Market Hypothesis (EMH), stocks are always traded on exchanges at their intrinsic value. This eliminates the possibility for investors to buy stocks that are undervalued or to sell stocks at prices that are inflated. Because of this, it should be impossible to outperform the overall market through the use of skilled stock picking or market timing, and the only way for an investor to achieve higher returns is by purchasing investments that are riskier overall.

In addition, the efficient market hypothesis is predicated on the idea that insider knowledge is believed to be unlawful. Furthermore, even if insider knowledge were to be accessible, there would still be a small number of investors who would have access to non-public information in order to have a major influence on the total stock returns. The efficient market theory incorporates three distinct variations, each of which constitutes a distinct variation. The differences between these variations represent various degrees of market efficiency.

The weak form of efficiency corresponds to the first variation of the efficient market theory. This assumes that the prices of all financial instruments on the market accurately reflect all of the information that is available to the public regarding the market. Any information that has not been made available to the general public is not disclosed by it. Furthermore, according to the efficient market hypothesis, there is no correlation between the historical data of a financial instrument, such as its price and returns, and the price that it will be in the future with regard to that instrument. Additionally, the findings of this empirical study indicate that the

implementation of various strategies by traders does not result in consistent returns and returns. The reason for this is that it is generally accepted that historical price data cannot accurately forecast the value of the market in the future. In spite of the fact that this particular version of the Efficient Market Hypothesis (EMH) does not accept the concept of technical analysis, it does permit the possibility of conducting fundamental analysis. The acquisition of additional information is made easier as a result of this, and it also makes it possible for all market participants to achieve an investment return that is higher than the average.

Following this, the second variation of the efficient market hypothesis is the semi strong form of efficient. The argument of semi-strong form efficiency states that the prices of securities consider information about the market that is accessible to the general public, and that any subsequent price changes reflect the adjustment to new equilibrium levels based on that information. Despite the fact that the EMH hypothesis is widely considered to be the most pragmatic of all hypotheses, it is unable to offer an explanation for the context of material non-public information (MNPI). When it comes to achieving superior gains, the study concludes that fundamental analysis and technical analysis are both insufficient. Instead, it suggests that investors who are looking for above-average returns on their investments would benefit from looking only at material non-public information (MNPI). As an additional point of interest, in the semi-strong form of efficient market, the stock prices will adapt in accordance with the new information until a new equilibrium is reached.

The final variation of the efficient market hypothesis is the strong form of efficient market hypothesis. When referring to a market, the term "strong form efficiency" is used to describe a market in which share prices accurately and completely incorporate not only all information and historical data that is accessible to the general public, but also all information that is considered to be private, such as information that is contained within the company itself. Whenever one is dealing with a market such as this one, it is not possible to achieve

extraordinary profits through the analysis of any kind of information. Although it is against the law to use insider information, it is still possible to make abnormal gains. This is because of the fact that insider information is available. Because of this, even highly developed capital markets are not considered to be highly efficient. This is the reason why. In spite of this, investors and analysts frequently demonstrate accuracy in their assessments of the internal affairs of companies. Furthermore, according to the theory of financial management, capital markets that have been around for a long time are considered to be extremely efficient.

In their study, Chen et al. (2013) found that political connections are not only associated with abnormal earnings, but also with political ties. This was discovered through the findings of their research. According to the findings, businesses that have significant political connections are subject to more pronounced fluctuations in their share prices when compared to businesses that do not have political connections. This is as a result of the anticipated value of preferential treatments, state benefits, and preferences regarding project selection.

According to Fama (1970), the information that is currently available in the market is what is responsible for the stock price. Because of this, the stock will be traded at a reasonable price in the market that is characterised by its high level of efficiency. The EMH is built on the basis of three primary assumptions, which together form its overall structure. In accordance with these presumptions, investors are provided with all information in the same manner. Second, according to the EMH, an investor will not be able to make more money than other investors with the same amount of investment because the amount of information that is available to them is the same, which means that they will receive the same amount of return. This is because the other investors will have access to the same amount of information. The last assumption that is being made is that there are no investors who are capable of outperforming the market that is currently being considered. There is a possibility that it will be difficult to identify an incorrect security price in a market that acts efficiently. Due to the fact that the premium tasks

of mutual fund managers will include portfolio analysis, security analysis, and portfolio selection based on the desired risk class, this is the reason why this is the case. Furthermore, in recent years, the profession of managing mutual funds has been receiving a significant amount of attention (Sharpe, 1966).

In their argument, Goetzmann and Ibbotson (1994) stated that mutual funds are unable to sell overvalued stocks or purchase undervalued stocks in order to earn an excess return. Furthermore, according to the EMH, any superior returns displayed by mutual funds are the result of luck rather than skill. It has been frequently discussed in previous literature that the analysis of fund performance to test the EMG and the mutual fund performance persistency testing is an effective method to differentiate between pure luck and skills (Fama & French, 1993).

Based on the fact that the purpose of this study is to investigate the performance of mutual funds in the G7 countries, efficient market hypothesis is an important component of this study. Even while academic research has been present for quite some time, it wasn't until the seventies and eighties that these studies started to garner more attention in the financial literature. This is despite the fact that academic research has been around for quite some time. At the moment that this article is being written, it is essential to highlight the fact that there is a considerable disagreement between the concepts that are linked with EMH and those that are being researched by behavioural experts. There are a number of authors, such as Thaler, De Bondt, Statman, and Shiller, who have ideas that are in contradiction to those of Eugene Fama and other EMH theorists. On the other hand, there are a number of authors who have concepts that vary from one another.

One of the most noteworthy advantages of the traditional paradigm is the ease with which it may be represented from the point of view of the researcher. Additionally, the paradigm

benefits from its simplicity. The only way to determine whether or not this paradigm is accurate in explaining market activity is through empirical research. However, this is a matter that can only be settled by inquiry. If the theories that are based on the idea of a rational agent were able to adequately explain the fundamental phenomena that are investigated in the literature on finance, then there would be no reason, or at the very least, no compelling incentive, to investigate the principles that underlie these theories and to propose alternative approaches. However, a considerable body of empirical data that has been accumulated in the most recent decades reveals that the existing theories, which are based on the premise that humans are rational, are insufficient in effectively describing various phenomena that are often observed in financial markets.

Two alternative solutions become apparent when one considers the factual inadequacies of the traditional hypothesis. As a first stage, the theory needs to be reconfigured while ensuring that the premise of rationality among individuals is preserved. The second is a fundamental change in perspective, anchored in the acknowledgement that people do not consistently act in a rational manner. This current course of action acts as a guiding concept for the entire field of research known as behavioural finance, which is a field of study that is quickly evolving and expanding.

The core ideas of the behavioural finance technique were initially established by Shleifer and Summers (1990), who were the pioneers in identifying the boundaries between arbitration and psychology. A connection can be made between the limitations placed on arbitrage and the difficulties that rational investors can face when attempting to correct distortions caused by investors with fewer rationalities. These aberrations can be explained by the hypothetical departures from complete reason that are provided by psychology, which provides a more extensive explanation of these abnormalities.

According to Thaler and Barberis (2003), human nature involves aberrations from rational behaviour. These deviations ought to be taken into consideration in economic analysis as an extension of existing models. Based on the facts, it appears that individuals have a tendency to make systemic errors, and that these errors have important repercussions for the economy. Research that is considered to be of critical importance in the subject of behavioural finance demonstrates that in an economy that has both rational and irrational players, irrational behaviour can have a significant influence on the valuations of assets. Behavioural models, on the other hand, need to specify the nature of agents' irrationality, or the manner in which their behaviour deviates from the traditional normative theory, in order to provide more accurate projections.

Hence, it is noticed that the efficient market hypothesis has been critiqued over the past few decades. As far as this research is concern, in the event that the results of this analysis demonstrate that the variables have a positive association with alpha, this demonstrates that the market suffers from inefficiency. The Efficient Market Hypothesis will therefore play an important part throughout the entirety of this study. In the event that the conclusion reveals that there is no statistically significant association between the qualities of the fund and its performance, then the Efficient Market Hypothesis theory is accurate. This indicates that investors are unable to get anomalous returns by selecting mutual funds with a variety of features.

2.3.2 Capital Asset Pricing Model

Through the publication of his key work "Portfolio Theory and Capital Markets" in 1970, William Sharpe, a renowned financial economist and recipient of the Nobel Prize, presented the Capital Asset Pricing Model (CAPM). The revolutionary model developed by Sharpe delineated investment risk into two distinct categories: systematic risk and unsystematic risk.

This model was responsible for revolutionising the knowledge of investment risk. Systematic risk is comprised of elements that are inherent to the market as a whole and cannot be managed just by diversification. These elements include swings in interest rates and geopolitical concerns. On the other hand, unsystematic risk refers to hazards that are peculiar to individual assets and can be mitigated via the utilisation of a portfolio that is well-structured. This distinction sheds light on the portion of a stock's returns that is considered to be independent of the movements of the market.

For the Capital Asset Pricing Model (CAPM), there are five fundamental assumptions that serve as the foundation. To begin, the model is based on the assumption that all investors are rational, have a low tolerance for risk, and are motivated by the objective of increasing their wealth to its maximum potential. Secondly, it is predicated on the assumption that the decision-making processes are consistent, that they cover a single time frame for investment, and that all investors have the same expectations. Furthermore, the model operates under the assumption that all securities possess the qualities of being marketable and divisible, which guarantees a consistent presence of individuals willing to buy and sell these securities in small increments. According to the fourth assumption, investors are considered to be price takers. This implies that there are no dominant investors who have the ability to influence the prices of securities. In conclusion, the model conceives of the securities markets as being smooth and unhindered, in addition to being exempt from taxes and offering unrestricted opportunities for short-selling, money lending, and borrowing at the risk-free rate. In addition, the model presupposes that there are no costs associated with transactions performed by traders. The Capital Asset Pricing Model (CAPM) is built on the fundamental basis of these assumptions, which collectively form the fundamental basis of the model. However, there may be deviations from actual market conditions.

Even though portfolio diversification offers the opportunity to eliminate unsystematic risk, systematic risk continues to be a persistent obstacle to overcome. Systematic risk is something that continues to exist even in a portfolio that includes all market shares. Sharpe's CAPM model was developed in 1970 as a result of the necessity to measure and comprehend systematic risk. This necessity led to the development of the model. This model offers a standardised framework for evaluating the relationship between risk and returns in investments, which provides valuable insights into the decision-making process as it pertains to decisions regarding investments. The Capital Asset Pricing Model (CAPM) formula is a fundamental component of contemporary finance. It offers a quantitative instrument for evaluating the systematic risk that is inherent in investment assets. The Capital Asset Pricing Model (CAPM) framework provides us with insights into the relationship between risk and returns, which are provided by:

$$\mathbf{E(Ra) = Rf + \beta a\ E(Rm - Rf)} \qquad \mathbf{(1)}$$

Where: Rf = Risk free rate of return in a given economy,

βa = Beta of the security, which is the marginal change relative to market risk premium,

Rm = Expected market return of the market portfolio, and

(Rm - Rf) = Equity market premium in a given market.

It is because of the numerous benefits that the Capital Asset Pricing Model (CAPM) possesses in comparison to other methods for determining the required rate of return that it has maintained its popularity for more than four decades of use. In the first place, it only takes into account systematic risk, which is a reflection of the fact that the majority of investors have diversified portfolios that have effectively eliminated unsystematic risk. Additionally, it is a relationship that is derived from theory and pertains to the required return and systematic risk. This relationship is a relationship. The empirical research that has been conducted has been used to

investigate and test this relationship in great detail. As an additional point of interest, the cost of equity is generally considered to be a more superior method to the dividend growth model (DGM) due to the fact that it explicitly considers the level of systematic risk that a company possesses in comparison to the stock market as a whole. When it comes to determining discount rates for investment evaluation, the method is far superior to the Weighted Average Cost of Capital (WACC) method.

On the other hand, just like every other theory, the capital asset pricing model (CAPM) is also known to have arguments against it, which can be considered to be the model's disadvantages. It is possible to argue that the beta of the stock and the overall market return can frequently change, which can have a significant impact on the calculation of the capital asset pricing model (CAPM). It is important to note that the anticipated return can change multiple times over the course of a long period of time, depending on the performance of the stock and the conditions of the market. The Capital Asset Pricing Model (CAPM) has been subjected to criticism for its reliability, despite the fact that it has been widely used in the financial industry for a considerable amount of time. The CAPM, like any other model, has some limitations that can have an impact on how accurate it is.

Using the Capital Asset Pricing Model (CAPM) to construct a portfolio in the context of mutual fund investments is beneficial to investors because it assists them in managing their risk. If the CAPM model were to be used perfectly, an optimal portfolio of investments would exist on the efficient frontier curve, as shown in the graph below.

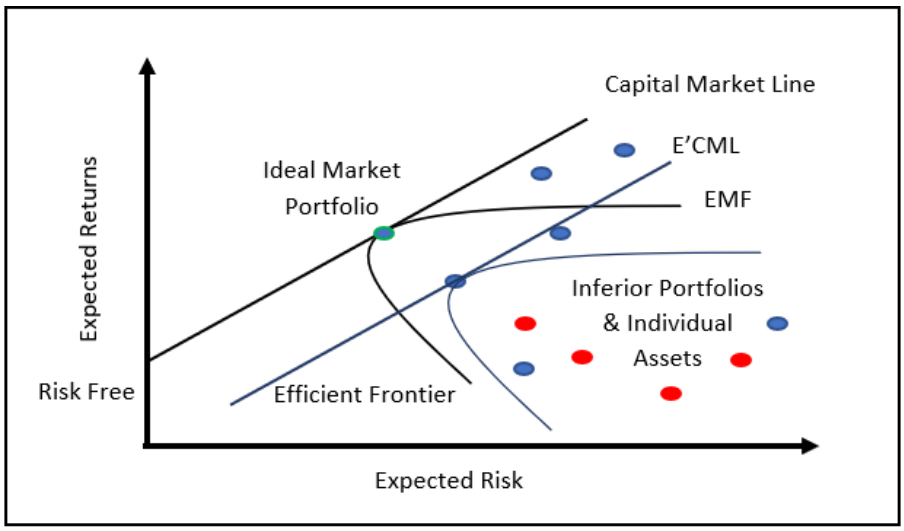

Figure 2.3: Portfolio Theory

The graph above displays that the as the expected returns increases the expected risk also increases accordingly. The capital market line (CML) and the efficient frontier is an important concept for investors as it illustrates the trade-off between risk and return. Since it is not possible to construct a perfect portfolio that fits on the CML, hence often times investors take too much risk in search of higher returns. The CAPM framework was initially applied to measure the performance of fund managers. (Sharpe, 1966; Treynor,1965; Jensen,1968). For instance, two funds X and Y are actively managed fund and are hoping to outperform the market. Supposedly the funds have a return of 11% and 17% where the risk-free rate is 5% with market returns about 15% and the standard deviations of 40% and 30% respectively. Which fund performed better?

Briefly, it may look like fund X has higher risk and lower returns as compared to fund Y, so fund Y appears to be better. Though according to the CAPM model, it is misleading to focus on a stand-alone risk if investors can diversify their portfolios. If mutual fund managers have stock selectivity skills, then they do not need to rely on news to pick stocks. Hence, we can question if mutual fund managers possess the skills to identify the red dotes on the efficient frontier to outperform the market.

To conclude firmly, we have to consider how both the funds are managed. Investors can create portfolios with high beta by leveraged position in the market and that becomes the key concept that obtaining high returns by holding high beta stocks does not require a skill. Hence, investors need to analyze performances based on risk adjusted returns and the CAPM model offers a clear framework for this issue.

To further develop the CAPM model, A model that was developed by Eugene Fama and Kenneth French in 1993 was a response to criticisms of the Capital Asset Pricing Model (CAPM), which held that beta was not an ideal risk factor. As a result, Fama and French (1993) developed an updated model to extend the Capital Asset Pricing Model (CAPM). This model endeavours to explain stock returns based on three factors, namely market risk, size, and value. The variables that are included in this model are the book to market (HML) and the variable of size (SMB, which stands for small minus big).

In their presentation, Fama and French emphasised how important it is for investors to have the capacity to withstand the additional volatility and occasional periods of underperformance that may occur within a short period of time. The compensation for any losses that are incurred in the short term will be provided to investors who have a time horizon of fifteen years or longer. In order to validate their model, Fama and French examined a large number of random stock portfolios through a series of studies. They found that by combining the size and value factors with the beta factor, they were able to explain up to 95% of the return in a diversified stock portfolio. This was a significant discovery.

As a result of the fact that it is able to account for 95% of a portfolio's return in comparison to the overall market, investors are able to construct a portfolio that generates an average expected return based on the relative risks that they take in their portfolios. Market sensitivity, size sensitivity, and value stock sensitivity are the primary factors that influence projected returns.

Additionally, the book-to-market ratio is used to evaluate the sensitivity of these factors. There is a possibility that unpriced or unsystematic risk is responsible for any additional average expected return increase.

In light of the fact that investors in mutual funds rely on the capital asset pricing model (CAPM) to evaluate the returns on mutual fund performance, an alternative theory to the CAPM model was then proposed. When compared to the CAPM framework, this alternative theory provides assumptions that are open to greater flexibility. This is known as the Arbitrage Pricing Theory (APT).

Stephen Ross, a well-known economist, is credited with making the development of the arbitrage pricing theory (APT) in the year 1976. It is a multi-factor asset pricing model that is founded on the idea that it is possible to forecast the return on an asset by making use of the linear relationship that exists between the asset's returns and the risk factors. For certain macroeconomic factors, such as inflation and interest rates, the APT framework makes use of the risk premium and expected return of the risky asset, whereas the CAPM framework necessitates the market's expected return (Ross, 1976).

By taking advantage of the mispricing of securities, arbitrageurs are able to make a profit without taking any risks. This is how the APT model works. There is a possibility that this will occur due to the fact that the model's theoretical price prediction will be different from the mispriced security itself. It is possible to provide a description of the APT model in the following manner, where it is derived from parts of asset returns that are unpredictable. The unpredictable aspect is dependent on the economic factors that are present.

A performance measure that was proposed by Connor and Korajczyk (1986) was based on an equilibrium version of the APT. This measure was proposed in the context of a study that they conducted. In order to develop estimators for the performance measures, the APT analogues

were derived for both the Treynor-Black measure and Jensen's measure, and their theoretical compatibility with the model was demonstrated. However, according to this model, the only circumstance in which the portfolio return will have a positive Jensen's alpha is when the investor possesses superior information.

Furthermore, they demonstrated that the only circumstance in which an investor is able to achieve a higher Treynor & Black appraisal ratio is when he is in possession of a more favourable information set. In light of this, they have demonstrated that the appraisal ratio proposed by Treynor and Black (1973) and the alpha proposed by Jensen (1968) are theoretically compatible with the APT. The selection of an appropriate pattern of sensitivities is the primary focus of the portfolio in the process of portfolio strategy. This alternative is contingent upon the economic criteria of the income generated by the portfolio. Specifically, whether or not it is more or less concerned with the economic risk factor compared to the average investors (Roll & Ross, 1984).

2.3.3 Modern Portfolio Theory

The modern portfolio theory (MPT) hypothesis was formed by Harry Markowitz, who was awarded the Noble Prize, in the year 1952. This hypothesis was founded on the idea that investors who are risk-averse might construct portfolios in order to maximise or optimise returns based on a level of market risk (Markowitz,1952). Investors should take use of the benefits of diversity in order to lower the riskiness of their portfolios, according to the Modern Portfolio Theory (MPT), which suggests that the focus should not be on the risk and return of a single stock. In the Modern Portfolio Theory (MPT), one of the most important assumptions is that investors do not want to maximise expected returns rather instead want to maximise variance. When calculating the expected return of the underlying portfolio, the expected probability value of the possible returns that investors may attain is taken into consideration.

On the other hand, the variance is a measurement of the dispersion that is anticipated. Therefore, this relationship is founded on the choices made by investors, and as a result, it does not take into account any decisions that are based on beliefs (Elton et al., 1996).

It is possible, according to the Modern Portfolio Theory (MPT), to design an efficient frontier of optimal portfolios that is capable of providing the highest possible projected returns while maintaining a specified degree of risk. This is a task that can be accomplished. There is a definition that states that the efficient frontier is the combination of assets that results in the highest possible returns. Due to the fact that mutual funds are composed of a wide range of financial instruments, the MPT can be applied to mutual funds. Mutual funds are designed to achieve the highest possible returns while still maintaining a certain level of risk. It was Shipway (2009) who provided the explanation that the MPT was developed as a result of the fact that investors combine a number of investments into a portfolio rather than holding a single holding. A calculation will be made in accordance with the MPT to determine the return on the portfolio. This calculation will involve adding the predicted returns of each component of the portfolio, which will then be displayed in the manner that is described below.

$$\mathbf{E}(\boldsymbol{Rp}) = \Sigma\, \boldsymbol{wi}\, \mathbf{E}(\boldsymbol{Ri}) \qquad \textbf{(2)}$$

Where: *Rp* = Rate of return of a constructed portfolio

Ri = Expected return of a given economy

wi = Weightage of a given economy

Taking into consideration the MPT, one can reach the conclusion that diversification will lead to the possession of a portfolio that is superior to the one that was previously held. As a result of the fact that it will be ensured that none of the assets have a significant degree of correlation with one another, the variance will be reduced to a level that is relatively low. There has been

a change in the way that investors perceive risk and returns as a result of the Modern Portfolio Theory (MPT). The principles of the Modern Portfolio Theory (MPT) are still adhered to by modern fund managers when it comes to the allocation of stocks or the development of an ideal portfolio of stocks. This is done in order to achieve the highest possible returns while maintaining a predetermined level of risk. A primary decision-making guide for portfolio allocation decisions for mutual funds and other types of funds has emerged as a result of the Modern Portfolio Theory (MPT), which was developed as a result of its investigation into the manner in which investors are able to design an optimal portfolio by taking into consideration the interchange between expectations of returns and market risks. As a result of the fact that it gives us the information that investors ought to have an ideal portfolio holding on the assumption that all funds have the same level of risk, the MPT has been incorporated for the purpose of this investigation. With the help of this information, we are able to ascertain whether or not the returns of the mutual funds exhibit any abnormalities in their performance.

A comprehensive framework for evaluating the performance of mutual funds is provided by Modern Portfolio Theory. This framework makes use of metrics such as annualised returns, risk-adjusted returns, and standard deviation to evaluate the performance of mutual funds. Nevertheless, it is of the utmost importance to have a thorough understanding of the limitations of the Modern Portfolio Theory (MPT) and to incorporate qualitative aspects in addition to quantitative metrics. Investors can improve their investment decisions and effectively navigate the dynamic mutual fund market by recognising the shifting landscape of performance evaluation and incorporating advancements such as factor-based investing and environmental, social, and governance considerations.

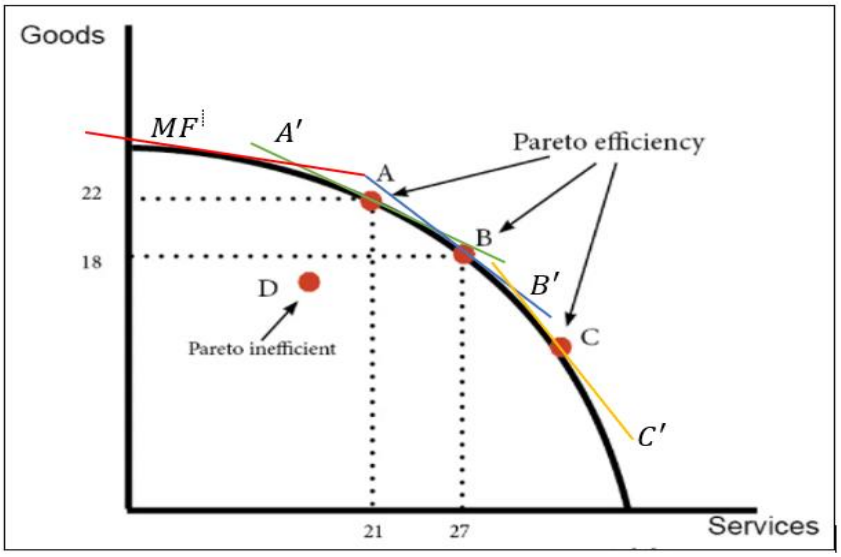

Figure 2.4: Production Possibility Frontier

According to Figure 2.4, the green tangent (A') suggests that mutual fund managers have optimal portfolios, but the blue tangent (B') indicates that fund managers have stock selectivity or stock choosing skills, which enables them to achieve a greater return than the market. Both of these tangents are shown in the figure. The yellow tangent (C') demonstrates that fund managers are able to time the market, that the PPF curve is efficient, that fund managers have superior performance, and that they are able to exceed the market. For instance, if there is an additional return of 2%, it is because of the stock selectivity skills and market timing abilities of fund managers. The mutual fund tangent is a measure of the returns that mutual funds are able to generate, and fund managers are now asserting that it is conceivable to outperform the market, despite the fact that they maintain that this is not possible. It is possible to refer to this as the "Impossibility Theorem," and with the help of this study, we intend to investigate whether or not fund managers are able to outperform the market.

2.4 Mutual Fund Performance and Selectivity Skills

There has been an increase of academic study over the past several years that explores the capabilities of fund managers in terms of market timing and stock selection. This is in response to the fact that the mutual fund industry is continuing its massive development. In the course of this research, a wide variety of time periods, lengths, and methodologies have been incorporated. The following section presents, in a methodical fashion, a comprehensive study of empirical research that have been conducted on the performance of mutual funds. The industry of mutual funds is widely acknowledged to be a vibrant and continuously expanding sector around the globe. Chordia (1996) suggests that in the context of an imperfect financial landscape, investment in mutual funds may emerge as the best suitable alternative for individual investors.

After taking into account the large size of the mutual fund industry as well as the changing character of the industry, it is very necessary to examine the criteria for selecting individual funds from among the possibilities that are available. Ever since the early 1960s, mutual fund investments have received a substantial amount of attention from both academics and investors, which has resulted in a multiplicity of studies that have been undertaken with the objective of comprehending the performance of mutual funds. There are three authors who are regarded as pioneering contributions in this field: Sharpe (1966), Treynor (1965), and Jensen (1968). These authors are responsible for producing foundational works that are considered to be fundamental. The aforementioned foundational studies played a significant role in shaping the discourse around the evaluation of the performance of mutual funds. These studies laid the groundwork for other research initiatives that were conducted at later stages.

2.4.1 Under Performance

William Sharpe, in the year 1966, carried out one of the pioneering investigations with the purpose of expanding the study that had been done by Jack L. Treynor. This was done in order to further the research that had been done. During the course of his research, Treynor came up with a novel technique for predicting the performance of mutual funds. There is a significant difference between this new predictor and all of the other variables that were utilised in the earlier studies. Within the scope of his research, Treynor incorporated the volatility of a fund's return in a manner that was not only straightforward but also significant. In the subsequent years, William Sharpe extended this study in order to investigate its capacity to make predictions about the future. He did this by mandating that his measure be tested through empirical research.

William Sharpe conducted research on the capital-market model, which was founded on the presumption that the performance of mutual funds is considered to be straightforward. It was pointed out by him that if all of the funds are managed and diversified in the appropriate manner, then the returns and risk should be in a linear pattern. In the event that there are any points that deviate from this relationship, it will indicate that the influence is simply transient and not a difference that is permanent. If particular funds are not diversified in the appropriate manner, the returns, on the other hand, will always be lower than average, and the performance will be expected to be worse.

This is because the returns will always be lower than average. Therefore, in order to investigate these implications, Sharpe applied his method of measuring the performance of mutual funds, which is the reward-to-variability (R2V) ratio, to 34 open-ended mutual funds and the Dow Jones Industrial Average (DJIA). He arrived at a landmark conclusion that only 11 funds outperformed the benchmark index, which was the DJIA, while 23 funds underperformed only the benchmark. This demonstrates that the performance of investments in mutual funds is

significantly lower than the performance of investments in the DJIA, which suggests that managers of mutual funds may lack the ability to select stocks.

The risk-adjusted return was a method that Jensen (1968) utilised in order to evaluate the performance of mutual funds. This evaluation was carried out within the context of his research. When Jensen was conducting research on the performance of mutual funds, he utilised a time series model. This investigation ultimately resulted in the invention of the capital asset pricing model (CAPM). In the following step, he made use of the Capital Asset Pricing Model (CAPM) framework in order to acquire the alpha value. The alpha value is the difference between the anticipated returns and the actual returns of the funds that were included in the same portfolio. The zero single index alpha is a representation that can be utilised within the framework of the market portfolio purchase and hold policy.

According to Jensen (1968), a positive alpha indicates that fund managers have the ability to select stocks well, whereas a negative alpha suggests that fund managers do not have the ability to select stocks well enough to outperform the market. Not only does this single index alpha focus on analysing the performance of the fund in comparison to the performance of other funds, but it also compares the fund's performance to the benchmark that has been selected. Prior to the implementation of the risk-adjusted return as a performance measurement for mutual funds, the sole method by which the stock selection capabilities of fund managers could be evaluated was by comparing the returns of the fund to those of other funds that had returns that were comparable to the results of the fund.

According to Maginn and Tuttle (1990), if the performance of a mutual fund is evaluated based on the raw returns without considering the risk of the portfolio, then the overall performance of the fund will be significantly influenced by changes in cash flow, which will then lead to a biassed result regarding the stock selection abilities of the fund manager. As a result, the single

index model alpha has emerged as one of the most widely utilised measurements for analysing the performance of mutual funds and the selectivity abilities of fund managers (Grinblatt & Titman, 1993).

During the period of time spanning from 1945 to 1964, Jensen incorporated into his research the returns of 116 mutual funds as well as the benchmark market index, which was the S&P 500. He makes the discovery that 115 of the funds in the sample did not succeed in outperforming the market, even when it was assumed that the transaction cost was free. Furthermore, the average alpha was found to be -1.1% when using net returns and 0.4% when using gross returns simultaneously. His explanation is that fund managers, in general, do not possess the skills necessary to select stocks. The findings, as stated by Jensen (1968), are evidence of a strong form of efficiency because the stock prices reflect all of the information that is available that is currently available. As a result, the research and expenditures that mutual funds put into analysis do not provide a continuous superior performance to that of random portfolios.

During the 1970s, Chang and Lewellen (1985) investigated on the stock selectivity abilities of fund managers by analysing 67 funds through the lens of the Arbitrage Pricing Theory (APT). This method was used to investigate the stock selectivity abilities of fund managers. They arrived at the conclusion that only two funds exhibited characteristics that managers need to possess in order to be able to select stocks efficiently. According to the findings of another study that was conducted by Chen and Stockhum (1986) using regression to investigate the selectivity skills, beta instability, and market timing of mutual fund managers, it was discovered that only thirty percent of managers possessed selectivity skills, and fourteen percent exhibited negative market timing ability. Hence, they concluded that there was an underperformance of the mutual funds that were analysed in this study.

Another study was carried out by Cumby and Glen (1990) on 15 different mutual funds based in the United States between the years 1982 and 1988. This study utilised the Jensen's Alpha and Grinblatt and Titmann (1989) methodology. They discovered that only three of the funds had positive alpha, but that was not enough to be considered significant.

Another study that was carried out by Malkiel (1995) came to the same conclusion and confirmed the findings of Jensen (1968). When evaluating the performance of mutual funds in the United States market, he utilised a method that was very similar. The single-index alpha was computed after the quarterly data from 1972 to 1991 were obtained and analysed thoroughly. The conclusion that was reached as a result of this investigation was that mutual funds do not generate any positive superior returns for investors because the alpha was insignificant over the course of the duration. Due to the fact that mutual funds have not been able to outperform the market, the findings indicate that fund managers may not possess stock selectivity skills. This is because the negative significant alpha based on the S&P 500 confirms that stocks have not been selected by fund managers.

Using Jensen's Alpha and a multifactor model, Gruber (1996) investigated the performance of 270 mutual funds in the United States that were invested in equity funds between the years 1985 and 1994. The difference between small and large cap stocks, the market return premium, the bond return premium, and the difference between value and growth are the four variables that are included in the multifactor model. Based on the single factor model, he came to a conclusion that the mutual funds underperform the market by 1.56 percent, while the multifactor model showed that they underperform the market by 0.65 percent.

Within the market of the United Kingdom, Blake and Timmermann (1998) conducted an investigation that was very similar to the one described above. The three-index model was going to be used in order to accomplish their goal of evaluating a collection of unit trusts.

Following the examination of a substantial amount of data spanning the years 1972 to 1995, they came to the conclusion that there was a performance that was 1.8 percent below the average. Quingley and Sinquefield (2000) carried out a second study in the United Kingdom and arrived at a conclusion that was extremely comparable to the one they had previously arrived at for the period of time spanning 1978 to 1997.

Matallin-Saez (2006) conducted a study to investigate the performance of mutual funds in Spain. The study was carried out in Spain. In the course of the investigation, a variety of performance indicators were utilised, including Jensen's Alpha, the Treynor-Mazuy (TM) model, and various other multi-factor models. The results of the investigation showed that the returns generated by Spanish mutual funds were lower than the market benchmark. According to the findings of the investigation.

Furthermore, Bessler et al. (2009) carried out a study to investigate the performance of monthly German mutual funds for the period of time spanning from 1994 to 2003. The study was conducted in order to examine the performance of these funds. This investigation made use of the MSCI Germany total return index and the DAFOX as benchmark indexes. Both of these indexes were utilised for the purpose of this investigation. Through the application of the three-factor model developed by Fama and French (1993), it was found that the mean abnormal return was exactly 260 basis points in the negative direction. Generally speaking, the alpha that was generated was negative by 55 basis points on average. Furthermore, according to the time-varying beta model that Ferson and Schadt (1996) developed, they found that the conditional alpha measures approximately negative 150 basis points each year. This was discovered by the researchers. Both the findings of this study and the findings of the research that Bams and Otten (2002) conducted on German mutual funds agree with one another. As a consequence of this,

the authors arrived at the conclusion that German mutual funds are not able to generate returns that are superior to the benchmark for the market.

In the study that Blake et al. (2017) conducted, they utilised both bootstrap methods in order to evaluate the performance of the mutual fund manager for equity mutual funds in the United Kingdom. A data set of the equity returns of domestic mutual funds in the United Kingdom is collected for the period of time spanning from January 1998 to September 2008 in this study. The purpose of this study is to evaluate the performance of the mutual fund manager. After that, two different kinds of bootstrap methods are compared by using the same sample period and the same criteria for including funds in that comparison. In order to investigate the excess return of the particular mutual fund in comparison to the risk-free rate, the original 4-factor model developed by Jensen's Alpha is utilised. In the event that the mutual fund does not exhibit any signs of abnormal performance, the alpha should be defined as 0. The bootstrap method is an approach that is utilised when dealing with abnormal returns.

Additionally, a new set of data was obtained to analyse the Jensen's alpha and Treynor & Mazuy (1966) performance measures of mutual fund manager skills. This study made two contributions to the existing body of literature. The first of these contributions was a new set of data. Second, the bootstrap methods that Kosowski et al. (2006) and Fama & French (2010) develop in order to evaluate the performance of mutual funds are also directly compared to one another. According to the findings of the study, the managers of mutual funds in the United Kingdom were unable to achieve profits that were higher than the market benchmark. Furthermore, the study found that the fund managers lacked the ability to time the market or select stocks. According to the bootstrap model developed by Kosowski et al. (2006), the top performing fund managers were able to achieve a higher level of gross return performance than the other fund managers. On the other hand, the bootstrap method developed by Fama and

French (2010) did not uncover any evidence that fund managers had outperformed the market benchmark.

Božović (2022) examined the performance persistence of US-based emerging-market mutual funds. The analysis used a sample of 275 actively managed funds from July 1989 to December 2020, with returns regressed against emerging-market benchmark portfolios. On average, the funds showed a significant negative alpha. Contrary to some previous studies, the results reveal that short-term performance consistency is primarily driven by losses from underperforming funds. The return spread between short-term winners and losers generates a significant positive alpha, which can be fully explained by momentum in emerging-market stocks. However, we find no evidence of long-term performance persistence. Overall, the findings suggest that the behavior of these funds closely mirrors that of their developed-market counterparts, offering insights that help resolve inconsistencies in earlier research.

Moreover, Galloppo et al. (2024) investigated the flow-performance relationship through the lens of investor preferences, using a mutual fund dataset focused on European and US markets. By incorporating a novel measure of asset managers' market timing ability, they analyzed how performance persistence influences mutual fund investment decisions, specifically focusing on top performers within a short time frame. The empirical results show that investor preferences significantly affect the returns-flow dynamics, particularly when considering asset type, geographic focus, and management style. This sheds new light on the behavior of specific investor groups. Additionally, evidence was found of a long-term informational effect, with past returns positively influencing flows, driven by the smart money effect.

2.4.2 Superior Performance

Certain researchers have arrived at the conclusion that mutual funds are able to generate superior returns and that fund managers possess stock selectivity skills. However, there are contrasting viewpoints on this subject, with some researchers coming to this conclusion. Despite the fact that a number of ground-breaking studies have arrived at the conclusion that mutual funds are unable to outperform the benchmark index and the market, this is the situation that has arisen. Using the S&P 500 index as the benchmark, one of the early studies that was carried out in accordance with Jensen's (1968) methodology retested the findings of Sharpe (1966) and Jensen (1968) by utilising returns for 82 funds from 1948 to 1967 (Carlson, 1970). This was done in order to determine whether such findings were accurate. According to the findings that were gathered, mutual funds have a positive excess return of 0.60 percent than other types of investments. The findings of the previous studies that were examined are in direct opposition to this, and the author argues that the findings of Sharpe (1966) and Jensen (1968) may be subject to bias as a result of the time period that was examined and the index. This is a direct contradiction to the findings of the previous studies that were examined.

Furthermore, Mains in 1977 used the same methodology as Jensen (1968) by collecting monthly data from 1955 to 1964. This research was conducted using the same data. When using yearly returns, he found that mutual funds were able to generate a negative alpha of 0.62%, while when using monthly returns, they were able to generate a positive alpha of 9 basis points. During the time that Mains adopted the methodology, this was the situation. According to Mains (1977), the research that Jensen carried out may have been subject to bias due to the fact that it assumed the dividend yields of mutual funds before conducting the research. In his argument, he stated that when annual returns are used, the issue of dividend reinvestment might be overlooked, which would lead to an underestimation of the performance of the mutual fund.

The findings of this study allow one to reach the conclusion that the majority of funds have superior performance, regardless of commission and expenses, and that fund managers have selective abilities based on the positive excess returns.

According to the findings of another study conducted by Ippolito, 143 mutual funds in the United States market were analysed using annual data from 1965 to 1984. A selection of market indices was made, which included the S&P 500, the New York Stock Exchange (NYSE), and S&P stock. However, the results that were obtained were not in agreement with Jensen's study, despite the fact that Ippolito used a methodology that was comparable to that of Jensen (1968) and used a dataset that was more recent. The findings led to the conclusion that 127 mutual funds differ from zero in a manner that is statistically significant, while 12 funds have a significant positive alpha score. The weighted mean alpha is positive 1.87 percent based on the New York Stock Exchange (NYSE), 0.81 percent based on the S&P 500 index, and 2.48 percent based on the S&P 500 stock. Ippolito (1989) came to the conclusion that mutual fund managers, on average, possess the ability to act selectively and are successful in their characteristics to compensate for outlays.

Lee and Rahman (1990) investigated the selectivity abilities of fund managers by employing a straightforward regression technique. According to Fama (1972), the ability of portfolio managers to make accurate forecasts can be broken down into two distinct components: micro forecasting and macro forecasting. One of the tasks involved in micro forecasting is the identification of specific stocks that are either overvalued or undervalued in comparison to the overall equity market. From the perspective of the Capital Asset Pricing Model (CAPM), a micro forecaster is someone who attempts to identify securities whose returns are significantly off the line that represents the security market. Consequently, if the portfolio manager possesses the capability to make accurate forecasts, the intercept alpha will exhibit a positive

value. On the other hand, if the manager is not performing their duties effectively, then the intercept will be negative. There is an expectation that the buy and hold strategy will result in a zero intercept. After that, the term "macro forecasting" refers to the process of predicting the eventual returns of the market portfolio. In the event that a macro forecaster has any expectations regarding the behaviour of market returns, he will make an effort to capitalise on those expectations. If the manager maintains his current level of success, he will be able to outperform the market.

Lee and Rahman (1990) collected monthly returns for a sample of 93 mutual funds over the course of 87 months, beginning in January 1977 and ending in March 1984. The purpose of this study was to determine whether or not it is possible to effectively time the market and whether or not one possesses the skills necessary to select stocks. This information was gathered over the course of a period of five years. The monthly rate of return on the value weighted index that takes dividends into account was utilised in order to arrive at the market returns. This was done in order to extract the market returns. In addition, the rate on Treasury bills with a maturity of 91 days was used as the risk-free rate specifically for the purpose of this investigation. By employing a method known as generalised least squares (GLS), which takes into account heteroscedasticity corrections, it is possible to obtain estimates of parameters that are both accurate and efficient. When the findings were taken into consideration, fourteen funds demonstrated significant stock selectivity skills. It is implied by the results that the fund managers have superior forecasting ability on an individual level. This is demonstrated by the fact that the results show that there is superior forecasting ability. This study's findings also have a significant impact, which is that funds that are unable to make accurate forecasts may be considered passive management. In this type of management, the owners are merely provided with portfolio diversification management services. This is a significant impact.

The benchmarks that were utilised in this research were criticised by Elton et al. (1993), who stated that it was inefficient due to the fact that mutual funds might have stocks in their portfolios that were not included in the S&P 500. Consequently, after adjusting for the possibility of bias in the benchmark, they discovered results that were in conflict with those of Ippolito's study and stated that the findings were not reliable. On the other hand, Ippolito (1993) retested the results and was able to confirm that there is superior performance in terms of the performance of mutual funds. Based on his findings, Ippolito concludes that passive funds that outperformed the market after taking into account expenses and fees are large enough to compensate for load charges. According to Grossman and Stiglitz (1980), who make use of the concept of costly information, these findings agreed with their findings.

Grinblatt and Titman (1989) conducted an analysis of the performance of mutual funds by utilising monthly and quarterly returns from mutual funds from 1974 to 1984. These returns were adjusted for cash distribution, transaction fee, and expenses. Using Jensen's alpha measure, this was carried out in the appropriate manner. Following the completion of this step, the excess returns, which are also referred to as alpha, are computed simultaneously for the quarterly and monthly returns. They arrived at the conclusion that mutual funds were able to outperform the market after considering the fees and expenses that were associated with the financial instruments. These findings led to this conclusion, which was the result of the results that were obtained. A new metric was developed after that in order to evaluate the performance of mutual funds without the need for other benchmarks (Grinblatt & Titman, 1993). This was done in order to eliminate the need for other benchmarks. First, a quarterly portfolio and an annual portfolio were established. The weights of the annual portfolio were calculated by subtracting the weight of the portfolio at the beginning of the quarter from the weight of the portfolio one year earlier. This was done in order to determine the weights of the annual portfolio. The difference between the weight in the current quarter and the weight in the

previous quarter was used to determine the weights of the quarterly portfolio. This ratio was used to determine the weights of the portfolio. It has been determined through statistical analysis that the annual portfolio, on average, maintains a value that is significantly positive throughout the course of the year. As a consequence of this, they arrived at the conclusion that their findings agree with the research that was carried out in 1989. This research suggested that managers of mutual funds might have the ability to exercise selectivity and be able to achieve positive excess returns.

Wermers (2000) presented a comprehensive collection of data that covered the period from 1975 to 1997 and included total net assets, expense ratio, net returns, turnover ratio, and investment aim. Combining data from quarterly and monthly intervals allowed for this to be accomplished. According to the findings of the exhaustive inspections that were carried out, the stocks of mutual funds outperformed the market by 1.3 percent; however, the net returns of mutual funds underperformed the market by 1 percent. This was the result of the comprehensive inspections that were carried out. Wermers asserts that the different findings are due to transaction costs and the underperformance of non-stock assets. He says that these two factors are responsible for the differences. In addition, he asserts that these considerations are to blame for the situation. Despite the fact that managers of mutual funds have the ability to choose stocks, the findings of the study indicate that they do not possess the expertise required to compensate for the costs and expenses that are associated with transactions.

In addition, a different study that was carried out in the United States market for the time period spanning from 1975 to 2002 discovered that the alpha is approximately 0.5 percent lower than the market benchmark (Kosowski et al., 2006). On the other hand, there were some funds that were able to achieve better returns than the market. After that, the authors conducted additional research to determine whether or not this outperformance was the result of luck or the actual skills of fund managers. Following that, a bootstrapping method was utilised in order to

investigate this matter. The results demonstrated that the superior performance was not solely attributable to luck, but rather that twenty percent of the funds outperformed the benchmark as a result of the abilities of the managers. The research was then expanded to include the market in the United Kingdom, where it was discovered that the superior returns of mutual funds were determined to be the result of luck rather than the skills of fund managers (Cuthbertson et al., 2008).

Similarly, the performance of mutual funds in emerging markets is characterised by a diverse range of outcomes, as studies have reported conflicting results. This is because of the variety of outcomes that have been reported. For instance, Kiymaz (2015) and Rao et al. (2017) evaluated a total of 581 and 817 mutual funds in China, respectively, over a range of time periods as part of their assessment. Both of these studies concluded that managers of mutual funds in China were capable of producing alpha that was both positive and substantial. In the research that he conducted, Kiymaz (2015) divided the funds into a number of distinct categories. According to his findings, the funds with the highest alpha were those with aggressive allocation, followed by those with moderate allocation. At the other end of the spectrum, the alpha for conservative allocation funds was the lowest.

Both the Treynor and Mazuy model and the Henriksson Merton unconditional model were utilised by Vashisht et al. (2017) in order to conduct an analysis of 107 selected equity diversified growth mutual fund schemes that were available on the Indian mutual fund market between the years 2011 with 2015. Using the TM model, the findings of the study provided evidence that demonstrated the existence of stock selection abilities that were both effective and noteworthy. According to the HM model, fund managers exhibit a noteworthy and meaningful ability to select stocks, whereas their ability to time the market is negative but not statistically significant. This shows that fund managers have a significant ability to select stocks.

Zhang et al. (2024) studied mutual fund investor behaviour in China. They found little evidence of the "redemption puzzle" or the disposition effect, as investors don't redeem funds based on past performance. Market conditions significantly influence investment decisions, with investors taking more risks in bull markets and being more cautious in bear markets. Institutional investors focus more on past performance, while both institutional and individual investors are more responsive to complex performance metrics in bad times. It was observed that Chinese investors tend to chase "star" funds and are capable of distinguishing between good and bad funds, supporting the presence of the "smart money" effect.

Besides, Zhang & LV (2024) conducted another study in the Chinese mutual fund environment to explore whether portfolio managers' style drift provides useful insights. They found that style drift is driven by public information rather than peer imitation. Managers adjust their portfolios to meet market expectations, especially in stable conditions, but show irrational herd behavior during market turbulence and style rotations. While style drift can offer short-term benefits, such as positive risk-adjusted returns, funds with excessive drift tend to underperform in the long run. Sophisticated investors are more likely to move away from funds with significant drift in favor of those with a consistent strategy. Overall, style drift may be a reaction to market conditions, but its benefits are temporary and not aligned with the preferences of experienced investors.

Additionally, a study was conducted to assess whether the classification of equity mutual funds depends on the performance measure used. The sample includes stock mutual funds from the USA, Europe, and emerging market economies, covering the period from 2010 to 2020. With over 20 performance measures, the results were compared using the Sharpe ratio as a benchmark. The findings suggest that performance measures based on absolute reward-risk ratios, such as Sortino and Treynor, generally produce similar rankings, as the numerator (mean

excess return) tends to be consistent. However, when other performance metrics, particularly those focused on 'incremental returns' like alphas, are used, the results can vary considerably (Duron Santomil et al., 2024).

A recent study by Hamdan and Al-Malkawi (2024) examined the performance of mutual funds in Saudi Arabia during the global financial crisis. Using secondary data from 12 Saudi mutual funds spanning from January 2000 to December 2018, the analysis evaluated various performance metrics, including average return, standard deviation, Sharpe ratio, Treynor ratio, Information Ratio (IR), and the M2 measure. The findings indicate that fund managers made strategic decisions during the crisis to minimize investor losses, as most of the funds maintained a positive Information Ratio. Despite the negative impact of the crisis on mutual funds in Saudi Arabia, they ultimately outperformed the broader market.

Additionally, the investment environment surrounding Islamic mutual funds has garnered significant attention over the recent years (Al Rahahleh & Bhatti, 2024; Husin et al., 2024). Elfakhani (2024) studied mutual fund superiority to compare 646 Islamic mutual funds with 475 ethical funds and conventional proxies and found that conventional funds managed to outperform specifically during recessionary periods.

2.5 Market Timing Ability of Mutual Fund Managers

In the event that the systematic risk is not stationary, the single-index alpha estimate had the potential to be a measurement that was influenced by bias. As stated by Jensen (2003), in order to address the issue of non-stationary risk that exists within the investment industry, it is recommended that fund managers separate their ability to time the market from their ability to select stocks. According to Fama (1972) and Treynor and Black (1973), the ability of fund managers to forecast should be divided into two categories: market timing ability and

selectivity. Both of these individuals have made this assertion. Fund managers have the ability to select stocks that are undervalued and sell off equities that are overvalued. This ability is referred to as selectivity. The term "market timing ability" refers to the capacity of fund managers to accurately anticipate the conditions of the market and adjust their investments in accordance with those conditions.

The academic community took notice of a groundbreaking model that was developed by Henriksson and Merton (1981) to evaluate the ability to time the market. Henriksson (1984) carried out research that evaluated the market timing ability of 116 open-ended mutual funds for the period of time spanning from 1968 to 1980. This research was carried out after the previous research was completed. Only three of the 116 funds that were investigated were found to have a significant positive market timing ability, according to the findings of this research. The research that was carried out by Chen et al. (1992) utilised the quadratic market model with changing parameter regression technique to test market timing ability and stock selection skill for 93 mutual funds in a separate manner. The findings of this research revealed that only five of the funds demonstrated positive market timing performance. In spite of the fact that a significant number of the funds were able to successfully select stocks, this was the situation instead. The findings of the study indicated that investments in mutual funds do not have the ability to influence market timing. This was the conclusion reached by all of the evidence that was gathered.

Treynor and Mazuy (1966) conducted a study in which they evaluated the ability of 57 fund managers to time the market. The method of analysis that they used was a non-linear CAPM quadratic regression analysis. The researchers came to the conclusion that only one of the 57 funds possessed significant market timing skill, while the remaining funds did not possess market timing capacity. This was the conclusion reached by the researchers after they had completed their research. Between the years 1983 and 1995, Sawicki and Ong (2000)

conducted an investigation into 97 balance mutual funds by conducting an analysis of the Australian market using the Treynor and Mazuy models as well as Jensen's measure metric. The time period from 1983 to 1995 was the primary focus of their investigation. In terms of market timing ability, the findings of this study demonstrated that there was a negative market timing ability and inconsequential performance. This was demonstrated by the overall performance of the market.

As part of their investigation into the performance of mutual funds, Mansor et al. (2015) conducted a study. The primary focus of their investigation was on the influence that mutual fund fees have on performance, as well as the market timing of mutual fund managers. The Global Financial Crisis (GFC), which took place between 2007 and 2008, had a significant impact on the returns that investors received, which in turn made investors' fears even more intense. It is for this reason that these subjects have attracted a lot of attention. Through the process of retrieving a data collection that included information on 106 equity funds in Malaysia, the objectives of this research project were successfully accomplished. The length of time that was covered by this data set was twenty years, beginning in the year 1990 and ending in the year 2009. The remaining 53 funds were Islamic equity funds, while the remaining 53 funds were conventional equity funds. The total number of funds in Islamic equity funds was 53.

The gross returns are computed first, and then the net returns are computed after all fees have been subtracted from the latter. It is also possible to use the single-factor CAPM model to test the market timing ability, which is one of the primary reasons why fees are charged. Additionally, the regression model that was developed by Treynor and Mazuy (1966) is extended in order to investigate the stock market timing ability of funds that achieve comparable returns. Following the application of the ordinary least squares (OLS) regression in the market timing study, the panel OLS method that makes use of the panel data regression

is utilised in this study. Based on the findings, it was determined that the fund managers do not possess the ability to perfectly time the market.

Chen and Jang (1994) employed the modified Treynor and Mazuy methodology to analyse the performance of a subset of 15 US-based international mutual funds in terms of selection and timing performance from 1980 to 1989. In contrast to a previous study, the outcome of this study showed that the majority of international mutual funds performed better than the markets in terms of both their ability to select securities and their timing skills. This was particularly evident when the funds used the S&P 500 as a benchmark, as opposed to the MSCI World index. Kao et al. (1998) also conducted a study on international mutual funds. According to the monthly return data of 97 international mutual funds between January 1989 and December 1993, the researchers concluded that the managers of these funds demonstrated strong skill in selecting investments and delivering overall performance, but showed a lack of ability in timing their investment decisions. Additionally, a negative correlation was discovered between the ability to select secure investments and the ability to time investments. Specifically, European fund managers exhibited inferior performance compared to other international mutual fund managers.

In recent times, Cagnazzo (2022) conducted research on the subject of the ability of investors in mutual funds in developing countries to time the market. This research was conducted in recent times. He investigated all of the open-ended funds that invest in equity funds and fixed income funds for emerging markets over the course of the period of time spanning from the year 2000 to 2019. He did this by employing a panel regression model. In order to determine whether or not investors in mutual funds are capable of making excellent timed judgements, he was able to identify the performance gap, which serves as the verification of this capability. As a result of his careful consideration, he arrived at the conclusion that the performance disparity in emerging market funds is statistically significant and, on average, negative.

Ali et al. (2022) utilised an analysis in order to evaluate the performance of mutual funds in Pakistan, which is a nation that is considered to be in the process of developing. Several metrics, including the Sharpe Ratio, Jensen's Alpha, and market timing ability models, were utilised by the researchers in order to conduct an analysis of the performance of 25 funds starting in 2011 and continuing through 2019. The analysis was conducted using weekly returns. Through the course of the investigation, it was found that investors in the 25 funds that were selected for the duration did not possess any market timing abilities or stock selectivity skills. Researchers came to this realisation as a result of their investigation.

2.6 Exchange-Traded Fund (ETFs)

Instead of being constrained by the rules of tracking an index, as is the case with a passively managed exchange-traded fund (ETF), an actively managed ETF is a type of investment fund in which a portfolio manager is given the freedom to adjust the investments contained within the fund according to their own discretion. The objective of the active fund manager is to achieve a higher level of performance than a benchmark by conducting research and making strategic decisions. Both actively managed and passively managed exchange-traded funds (ETFs) disclose their positions on a daily basis and are priced regularly throughout the day, in contrast to comparable mutual funds. In spite of the fact that passive exchange-traded funds (ETFs) have traditionally held a dominant position in the industry and continue to contain the vast majority of ETF assets, the active market has witnessed substantial growth and substantial inflows.

This section will be where the discussion of the findings of previous research on the performance of actively managed exchange-traded funds (ETFs) will take place. Additionally, this section will be where the market timing ability and stock selectivity skills of ETF managers

will be discussed. The following papers are those that pertain to the most significant study that has been done on this subject, and they are the ones that are being considered.

2.6.1 Performance of Active ETFs

The use of actively managed exchange-traded funds (ETFs) is a relatively recent innovation in the financial sector. There are not many countries, including developed countries, that have not yet launched actively managed exchange-traded funds (ETFs), despite the fact that this is gaining popularity. Therefore, the United States was one of the first countries to launch a small number of actively managed exchange-traded funds (ETFs), which researchers have identified as being worthwhile to investigate in order to evaluate the performance of these actively managed ETFs.

It was in the United States stock market that one of the earliest studies on actively managed exchange-traded funds (ETFs) was carried out. The purpose of this study was to evaluate three pairs of active and passive ETFs (Rompotis, 2011a). The objective of this study was to investigate the performance of actively traded individual funds, also known as ETFs. All three-active exchange-traded funds (ETFs) were found to have underperformed the passively managed fund, as demonstrated by the findings of this study, which made use of a regression analysis. Furthermore, the data suggested that active fund managers lacked the ability to select stocks and to time the market with their investments.

Following that, Rompotis conducted a second study in the same year in the United States to investigate the performance of active exchange-traded funds (ETFs) in comparison to the performance of other assets. As a consequence of this, he conducted an analysis of the performance of fourteen active exchange-traded funds (ETFs) in the United States, using the S&P 500 as the market benchmark. This analysis was carried out over a period of time that lasted from the beginning of each active ETF until the 30th of June in 2010. Based on the

findings of this study, it was determined that the performance of active exchange-traded funds (ETFs) is not capable of outperforming the market benchmark (Rompotis, 2011b).

In addition, the author broadened the scope of his investigation to include nine different combinations of active and passive exchange-traded funds (ETFs) in the United States stock market in 2013, and he found the same results. According to him, active exchange-traded funds (ETFs) are more expensive than passive ETFs; however, the performance of active ETFs is not sufficient to justify the increased cost (Rompotis, 2013). More evidence is provided by the findings of this study, which indicate that active fund managers are unable to successfully implement strategies that involve market timing.

The results of a subsequent study that was conducted on 22 active exchange-traded funds (ETFs) on the Canadian stock market revealed results that were comparable to those of the earlier study. The purpose of this study was to investigate the performance of fund managers and their ability to time the market. When it comes to the Canadian stock market, exchange-traded funds (ETFs) that are actively traded have not been able to outperform the market. On the other hand, the vast majority of the funds produce return patterns that are not typical, which are sometimes referred to as negative alphas. The research conducted by Rompotis (2015) also revealed that active fund managers do not have the ability to time the market in an effective manner. Another one of the author's discoveries was this one.

Rompotis (2020) has increased the number of exchange-traded funds (ETFs) that he looked at for his research to include 37 equity exchange-traded funds (ETFs) that were active or passive up until the month of December in 2016. He carried out a cross-sectional regression analysis in order to take into consideration the factors that could potentially have an effect on the performance of exchange-traded funds (ETFs). This was done in addition to examining the ability of ETF managers to time the market. This conclusion is supported by his findings, which

are in line with his earlier research, which demonstrated that active exchange-traded funds (ETFs) did not outperform passive ETFs and that managers were unable to outperform the market.

Kumar (2021) investigated 95 active exchange-traded funds (ETFs) and 376 smart beta equity ETFs in the United States stock market since the year 2000. Only twenty percent of the ninety-five-active exchange-traded funds (ETFs) and fifteen percent of the smart beta ETFs were able to outperform the market benchmark over the course of five years, according to his statement. The Fama-French Carhart six-factor models were also added by the author in order to consider other variables. The author discovered that ten percent of the active exchange-traded funds (ETFs) and twenty percent of the smart beta equities ETFs generate significant alpha values.

As a result of the contradictory findings about the outperformance of active exchange-traded funds (ETFs), academics are more interested in determining whether or not active ETFs underperform the market. The first active exchange-traded fund (ETF) based on risk and returns was the subject of an investigation that was carried out by Schizas (2014). The study utilised volatility and returns models for the underlying assets. When compared to the performance of other investment vehicles, such as mutual funds, hedge funds, and passive ETFs, he examines the performance of an active exchange-traded fund (ETF). According to the data, active exchange-traded funds (ETFs) have a higher level of volatility compared to passive ETFs; nonetheless, the performance of both types of ETFs is equivalent. According to Dolvin (2014), active exchange-traded funds (ETFs) have a higher level of volatility; nevertheless, the returns do not warrant the additional risk that is taken on. These findings are consistent with his findings. Active exchange-traded funds (ETFs) are not considered to be a suitable alternative to passively managed funds that are designed to replicate the performance of the benchmark index. On the other hand, the author finds that contrary to the findings of

earlier studies, active exchange-traded funds (ETFs) that have higher trading volumes produce better results than their passive counterparts.

Using the Fama-French Four Factor Model and weekly data on ten active exchange-traded funds, Garyn (2013) investigated on the performance of active exchange-traded funds (ETFs) over a period of four years, from 2008 to 2012. An investment strategy in active exchange-traded funds (ETFs) that yielded a positive return was discovered by the author on the basis of the R^2 factor that was acquired from the regression model.

Rompotis (2011) extended his research to investigate the ability of active ETF fund managers to time the market. He came to a conclusion that active ETF fund managers do not exhibit market timing abilities for any of the three funds that were taken into consideration throughout his investigation. Studies of the performance of 37 passive and active exchange-traded funds (ETFs) have been conducted in recent times, with data sampling going all the way up to 2016. Even after computing many return metrics, such as risk-adjusted returns, buy-and-hold, and cross-sectional regression analysis on active versus passive exchange-traded funds (ETFs), the results were still the same: active ETFs underperformed their passive counterparts for the period of time under consideration. Additionally, active exchange-traded funds were unable to obtain greater returns and did not outperform the market, which indicates that the fund managers lacked the ability to time the market (Rompotis, 2020).

In addition to that, the pioneering author named Rompotis has carried out a study to investigate the performance of active exchange-traded funds (ETFs) in the United States. The study utilised a dataset spanning from 2018 to 2021 and focused on fifty ETFs that are currently active in the US stock market. In conclusion, he came to a conclusion that the findings are in line with his previous research, which showed that actively managed exchange-traded funds

(ETFs) did not provide greater returns when compared to the S&P 500, and that active fund managers were unable to pace and beat the market.

Marszk & Lechman (2024) addressed gaps in the study of sustainable (ESG) investing, particularly at the macro level, by focusing on the growth of ESG exchange-traded funds (ETFs) in Europe. It explores key determinants of ESG ETF adoption across five European countries—France, Germany, Italy, Switzerland, and the UK—over the period 2006–2020. Using panel regression analysis, the study examined twenty variables that may influence the development of these ETFs. The findings highlighted that the growth of ESG ETFs is positively influenced by the development of insurance companies, pension funds, stock markets, ICT adoption, financial access, literacy, and higher education. In contrast, financial performance and tax levels were found to have a neutral effect, suggesting that financial motives are less important than other factors. The results for mutual funds and institutional variables were mixed.

2.7 Impossibility Theorem for Mutual Fund Outperforming the Optimal Portfolio

The majority of the research that has been conducted on the performance of active exchange-traded funds (ETFs) and mutual funds, as well as the ability of fund managers to time the market, is brought to light in the part that came before this one. Theoretical and empirical examinations of these components have been conducted within the framework of specific nations. Using data that has been updated and procedures that have been improved, the first knowledge gap is that the performance of mutual funds has not been analyzed in line with the G7 countries aspect. This is the first gap in knowledge. Despite the fact that earlier studies focused on a specific market, such as the market in the United States, the conclusions regarding whether or not mutual funds are capable of providing larger returns are still conflicting and ambiguous. This is because the research was conducted on a specific market.

When it comes to the second category, which is the ability of mutual fund managers to timing the market, there have not been a considerable number of studies carried out. The ability of fund managers to time the market in order to produce returns that are superior to the market benchmark has been the subject of inquiry in a few articles. These works have been published in investment journals. However, this has not been shown at a cross-country level, and the research continues to reveal that the market timing ability of fund managers is present in certain time periods and countries, while it is not present in other cases. This is the case despite the fact that this has not been established.

Furthermore, the exchange-traded fund (ETF) market has been gaining popularity among investors in recent years due to the flexibility it provides in terms of investment. This is the third point. In addition, the prevalence of market timing abilities in actively managed exchange-traded funds (ETFs) has not been adequately researched in the past using updated datasets and a variety of econometrics models. This is something that has prevented a proper investigation from being conducted.

Moreover, this study has the capability of establishing the knowledge gap that occurs in the event that management competence has a strategic impact on both performance and investment opportunity. This is a significant advantage of the study. The competence and expertise of individuals who are in a managerial position to carry out the obligations that are associated with management is referred to as managerial ability. Therefore, if it is established whether or not the performances are going to be impacted by this capability, it will be helpful for investors as well as individuals to select their particular mutual funds or investment funds. This is because it will be easier for them to choose their mutual funds or investment funds.

2.8 Chapter Summary

For the purpose of providing a concise review, this chapter investigates a wide range of topics pertaining to the performance of mutual funds that have been discussed in the previous literature. Over the past few decades, there has been a substantial expansion in the range of themes that are associated with fund performance. It has been suggested by a number of academics that a number of performance indicators and performance-related problems should be implemented in order to provide significant insights on fund performance. Despite this, the results have not made a definitive determination. Variations in surroundings and the lengths of time spent conducting research are also responsible for this. The examination of whether or not fund managers are able to provide additional value to investors is the primary subject of the majority of research that are conducted on mutual funds. Taking into consideration the metric that is utilized, it is possible to get the conclusion that fund managers do not offer remarkable returns. This is mostly because of the influence that their fees and charges have. Newer research, on the other hand, have turned their focus to examine and forecast the performance of funds that outperform others by evaluating the individual characteristics of those funds. Based on the information that is currently available, it appears that funds that belong to a certain style have the potential to better perform than funds that belong to other styles. In a similar vein, other characteristics, including as historical returns, fees and costs, and fund inflows, offer evidence that style may be able to shed light on fund performance.

This chapter examines a number of factors that have been taken into consideration in the prior literature in relation to the performance of mutual funds. In conclusion, this chapter offers a summary of the problems that have been encountered. As time has progressed over the course of the past several decades, it has become abundantly evident that concerns regarding the performance of funds have attracted a great deal of attention. It is clear, based on the literature review that was conducted on the performance of mutual funds, that investment plays a key

role in fuelling the expansion of economies all over the world. There are many different performance indicators that have been produced by academicians and researchers with the purpose of assisting in the examination of information regarding the performance of investment funds. Despite this, it is quite clear that the results are rather contradictory and inconsistent with one another.

Table 2.1 Summary of theoretical and empirical literature on mutual fund performance

Author	Objectives	Fund Sample	Methodology	Findings
Sharpe (1966)	To further Treynor's work and propose the Reward to-Variability ratio (R2V).	34 Mutual Funds United States 1954-1963	i) Sharpe Ratio (R2V) to examine performance of mutual funds	Sharpe introduced a new performance measure in this study and found that only 11 funds outperformed the benchmark index. He concluded that fund managers do not possess stock selectivity skills.
Treynor & Mazuy (1966)	Proposing a model to measure the market timing ability of fund managers and investigate if fund managers can predict the changes in the stock market.	57 Mutual Funds United States 1953-1962	i) Treynor & Mazuy Market Timing Model	No evidence was found that fund managers possess market timing ability.
Jensen (1968)	He introduced a single index model from the CAPM model to evaluate fund performance.	116 Mutual Funds United States 1945-1964	i) Jensen's Alpha	Jensen discovers that 115 fund out of the sample did not manage to outperform the benchmark index.
Carlson (1970)	To identify the mutual fund performance using alpha computation.	82 Mutual Funds United States 1948-1967	i) Jensen's Alpha ii) Sharpe Ratio	Mutual funds displayed a positive excess return of 0.6% indicating superior returns.

Author	Objectives	Fund Sample	Methodology	Findings
Mains (1977)	To identify the superior performance of mutual funds using the Jensen's methodology.	United States 1955-1964	i) Jensen's Alpha	Author argues that negative alpha was obtained when using yearly data and positive alpha were obtained when using monthly data.
Chang & Lewellen (1985)	To examine the stock selectivity skills of fund managers.	67 Mutual Funds United States 1970	i) Arbitrage Pricing Theory	Results obtained shows that only 2 funds have stock selectivity skills.
Chen & Stockhum (1986)	To examine the stock selectivity skills and market timing skills.	43 Mutual Funds United States	i) Generalized Parameter Regression	30 percent of funds have selectivity skills and 14 percent had negative market timing ability.
Grinblatt & Titman (1989)	To compare the passive and active funds in the US.	Active vs Passive Mutual Funds United States 1975-1984	i) Jensen's Alpha	Results displayed that mutual funds have positive superior returns when using gross returns. However, when actual returns are used, there is no superior returns observed.
Ippolito (1989)	To evaluate fund performance and examine the fund managers stock selectivity skills.	143 Mutual Funds United States 1965-1984	i) Jensen's Alpha ii) Cross-Sectional Regression	Results concluded that 12 funds were significantly positive and fund managers may have selectivity skills. .

Author	Objectives	Fund Sample	Methodology	Findings
Cumby & Glen (1990)	To examine the mutual fund performance and stock selectivity skills.	15 Mutual Funds United States 1982-1988	i) Jensen's Alpha and ii) Grinblatt & Titmann Measure	Results indicated that only 3 funds demonstrated positive alpha but insignificant.
Ippolito (1992)	Examine the investors' reaction to quality of the mutual funds.	143 Mutual Funds United States 1965-1984	i) Pooled regression	Investors move towards good performers and try to avoid poor performers.
Grinblatt & Titman (1993)	Proposing a new measure to study mutual fund performance.	155 Mutual Funds United States 1975-1985	A new measure was introduced that does not require a benchmark but uses portfolio holding details.	Overall, the aggressive growth funds displayed positive returns using this new measure.
Henriksson (1984)	To examine the market timing ability of fund managers in an extended model of TM.	116 Mutual Funds United States 1968-1980	i) Henriksson & Merton Market Timing Model	Results indicated that only 3 funds out of 116 mutual funds displayed market timing ability.
Lee & Rahman (1990)	To identify the market timing ability and stock selection skills.	93 Mutual Funds United States 1977-1984	ii) Simple Regression	14 out of 93 funds managed to outperform the benchmark indicating managers stock selectivity skills.
Chen et al. (1992)	To independently measure market timing ability.	93 Mutual Funds United States	i) Varying Parameter Regression	Authors reported that only 5 funds showed market timing ability.

Author	Objectives	Fund Sample	Methodology	Findings
Malkiel (1995)	Evaluate mutual fund and performance persistency.	239 Mutual Funds United States 1971-1991	i) Single-Index Jensen's Alpha	The outcome of this analysis stated that mutual funds do not produce any positive superior returns as the alpha was insignificant.
Gruber (1996)	Aims to investigate the mutual fund performance as compared to the market benchmark.	270 Mutual Funds United States 1985-1994	i) Jensen's Alpha ii) Multifactor Model	The findings proved that the mutual funds underperform the market by 1.56% using the single factor model and 0.65% using the multifactor model.
Blake & Timmermann (1998)	Investigate the performance of unit trust in the United Kingdom.	2300 Mutual Funds United Kingdom 1972-1995	i) Three-Index Model	The unit trust in UK underperformed the market by 1.8 percent.
Sawicki & Ong (2000)	To examine the managed funds performance using unconditional and conditional measures.	97 Mutual Funds Australia 1983-1995	i) Jensen's Alpha ii) Treynor & Mazuy Market Timing Models	Both models indicated insignificant performance and negative market timing ability among fund managers.

Author	Objectives	Fund Sample	Methodology	Findings
Wermers (2000)	To investigate if fund managers have ability to select stocks that can produce abnormal returns.	United States 1975-1997	Decompose returns and cost to multiple components	The mutual funds managed to outperform the market by 1.3% 0.7% of this is due to fund managers skills.
Kosowski et al. (2006)	To investigate mutual fund performance in United States.	United States 1975-2002	i) Jensen's Alpha ii) TM Model iii) Bootstraping Analysis	Mutual fund outperformance was not solely due to luck but also managers skills.
Matallin-Saez (2006)	To study the mutual fund managers market timing ability.	220 Mutual Funds Spain 1998-2004	i) Multi-Index Model	The results obtained proved that there was no market timing ability present.
Bessler et al. (2009)	To identify the alpha which indicated the superior returns of the fund as compared to market benchmark.	Germany 1994-2003	i) Fama & French Three Factor	The alpha obtained was negative and author concluded that the funds were unable to produce superior returns.
Mansor et al. (2015)	To study the impact of mutual fund fees on the performance and mutual fund manager's market timing.	106 Mutual Funds Malaysia 1990-2009	i) CAPM Model ii) OLS Regression iii) Panel Regression	Authors concluded there was not market timing present in the findings of the study.

Author	Objectives	Fund Sample	Methodology	Findings
Blake et al. (2017)	To assess the mutual fund performance in United Kingdom.	United Kingdom 1998-2008	i) Jensen's Alpha ii) TM Model iii) Bootstrapping Analysis	Findings displayed that using the Fama-French Bootstrap method, there were no evidence to indicate outperformance. However, using the Kosowski Bootstrap method, top performing funds managed to outperform.
Cagnazzo (2022)	To examine the market timing ability in emerging countries.	Emerging Market 2000-2019	i) Market Timing Model	On average the performance gap in the emerging markets funds are statistically significant and negative.
Ali et al. (2022)	To evaluate the risk-adjusted performance in an emerging nation.	25 Mutual Funds Pakistan 2011-2019	i) Sharpe Ratio ii) Jensen's Alpha iii) Market Timing Model	There was no market timing ability and stock selectivity skills observed in fund managers.

Table 2.2 Summary of empirical literature on Active Exchange-Traded Funds

Author	Objectives	Fund Sample	Methodology	Findings
Rompotis(2011a)	To compare the performance of active equity ETF to the equivalent passive ETF.	3 pairs of Active vs Passive ETFs United States	i) Single-Factor Regression Analysis	Active ETFs did not perform better than passively managed ETF. Active ETF fund manager do not have stock selectivity. and market timing ability.
Rompotis(2011b)	To compare the performance of active equity ETF to the benchmark.	14 Active ETFs United States Jun-10	i) Single-Factor Regression Analysis	Results concluded that active ETFs performance are unable to beat the market benchmark (S&P 500).
Rompotis (2013)	To study active vs passive ETFs following a common benchmark.	9 pairs of Active vs Passive ETFs United States	i) Single-Factor Regression Analysis	Author concludes that active ETFs were more expensive as compared to passive ETFs but the performance is still not justified for the higher cost.
Garyn (2013)	To study if ETF performance is affected by active management.	10 Active ETFs United States 2008-2012	i) Fama-French Carhart Four Factor Model	Author found a strategy that earns positive excess returns for active ETFs.
Schizas (2014)	To investigate the first active ETF based on risk and returns using volatility and returns models.	1 Active ETF United States	i) Volatility and Returns Models	Findings shows that active ETFs have higher volatility than passive ETFs, but the performance is comparable to each other.

Author	Objectives	Fund Sample	Methodology	Findings
Rompotis (2015)	To evaluate the performance and market timing ability of fund managers.	22 Active ETFs Canada	i) Single-Factor Regression Analysis	The active ETFs in the Canadian stock market failed to outperform and producing negative alpha values.
Rompotis (2020)	To evaluate the performance and market timing ability of active ETF fund managers.	37 Active and Passive ETFs United States Dec-16	i) Cross-Sectional Regression Analysis	Findings were consistent with the previous studies that show active ETFs did not outperform the passive pears and fund managers did not beat the market.
Kumar (2021)	To study the active and smart beta equity ETF performance in the US.	95 Active ETFs and 376 Smart Beta Equity ETFs United States	i) Fama-French Carhart Six Factor Model	The author concluded that only 20% of active ETFs manage to outperform the benchmark and 10 percent produced significant alphas.
Rompotis (2022)	Using updated dataset, author wants to examine active ETF performance.	50 Active ETFs United States 2018-2021	i) Fama-French Carhart Four & Six Factor Model	Active ETFs did not outperform the market and active fund managers fail to beat the market.

CHAPTER 3 DATA, VARIABLES, AND METHODOLOGY

3.1 Introduction

In this chapter, we will talk about the methodology of this research, as well as the data sources, the descriptions of the variables, and the variables themselves. To recap the discussion of the study, this research has 6 major parts: (i) To measure the mutual fund performance for G7 countries to see the superior or inferior performance as compared to the market benchmark using the Sharpe ratio and Treynor Ratio (ii) Identifying if mutual fund managers in the G7 countries possess the stock selectivity skill using the Jensen's Alpha model and the Fama-French Three Factor Model iii) To examine if the mutual fund managers in the G7 countries have the market timing ability that gives them the advantage to time the market accordingly and produce superior returns as compared to the benchmark using the Treynor-Mazuy and Henriksson-Merton market timing models iv) the fourth part is to examine if the actively managed exchange -traded funds can outperform the passively managed exchange traded funds in the United States ETF environment using the Sharpe ratio and Treynor Ratio v) Investigating the stock selectivity skills of active exchange -traded fund managers using the using the Jensen's Alpha model and the Fama-French Three Factor Model vi) To examine if the mutual active ETF fund managers in the United States have the market timing ability using the Treynor-Mazuy and Henriksson-Merton market timing models.

A comprehensive discussion of the pertinent theories that serve as the basis for this investigation was undertaken in the chapter that came before this one. In addition, the previous research and literature on the performance of exchange-traded funds and mutual funds that are actively managed has also been debated among the participants.

In this chapter, we will discuss the methodology that was utilized in this investigation into the performance of actively managed exchange-traded funds in the United States and mutual funds

in the nations that make up the G7. To be more specific, measurements have been applied to the capabilities of stock selection and market timing. The performance of mutual funds has been the subject of a significant amount of research; however, studies that pertain to the G7 countries have been relatively limited up until their current point in time. Because of this, the methodology that is being presented has the objective of filling in the gaps in the existing body of research by investigating the performance of mutual funds in the G7 countries.

This chapter will be categorized as follows;

Section 3.2 will begin by providing a description of the data sample that was chosen for this particular investigation. Additionally, a description of all of the mutual funds that were chosen, as well as the benchmark indices that were chosen for each country, will be included in this part. This section has also provided an explanation of the relevant risk-free rates that were utilized for the derivation of these performance indicators. After that, we will proceed to detail the database that was utilized for the investigation of the Fama-French Three Factor Model following that. Last but not least, this part also includes a discussion of the many actively managed exchange-traded funds that are available.

After that, we proceed to the section 3.3, which is where we address the hypothesis that was investigated in this study. The hypotheses will be divided into two categories, with the first three hypotheses concentrating on the performance of mutual funds in the G7 nations. The G7 nations will be the subject of the second hypotheses. The actively managed exchange-traded funds in the United States will serve as the focal point of the three hypotheses that will be presented in detail below.

Following that, we proceed to the next section, which is 3.4, which provides an explanation of the research models and the computation of returns applicable to all of the actively managed exchange-traded funds and mutual funds that are utilized in this study. Subsequently, the section 3.5 of this study addresses an essential aspect of the investigation, which is the

mathematical description of all the performance measures that are utilized to evaluate the performance and stock selectivity skills of mutual fund managers. Some of these models include the Sharpe Ratio, Treynor Index, Jensen's Alpha and Fama-French Three Factor Model.

Following that, the market timing measurement models, which include the Treynor and Mazuy model as well as the Henriksson and Merton model, are discussed in section 3.6. An explanation of the research method, which includes the sampling method, regression analysis, and research work flow, has been provided in the following section, which is section 3,7. This section demonstrates how the entire research process has been carried out.

The final section, which is section 3.8, is where the results and analysis of all the descriptive statistics for all of the mutual funds that were used in this study are discussed. This is done in order to obtain an overall picture of the returns on mutual funds before moving on to the subsequent chapter, which is where the empirical analysis is discussed.

3.2 Sample Data

3.2.1 Selection of Mutual Funds

For the purpose of this research, the secondary mutual funds data were gathered from the EIKON (Thompson Reuters) database that is located in the library of Sunway University. The EIKON database is a platform that provides professionals working in the financial industry with the ability to receive real-time market data, financial research, and economic indicators via the platform. Between the years 2015 and 2022, the data collection for this study contains fifty open-ended mutual funds for each of the seven countries that make up the G7. On the Thompson Reuters Datastream, the ISIN code for each fund was utilised in order to identify

the variables that were necessary in order to acquire the data. After that, the data was accessed by using add-ins for Excel.

Daily closing prices data have been collected from 1st January 2015 to 31st December 2022 data comprising of total 2087 observations for each fund that is analysed. The time frame 2015 to 2022 is being analysed because it includes various key events such as the Brexit referendum in June 2016, the trade tensions between US and China and the Covid-19 pandemic. These are some of the events that have significantly influenced the financial markets and shaped investor sentiment and behaviour for this span of time. Hence, we would want to examine how mutual funds have performed through all these tensions in the financial markets.

A random selection was used to choose the mutual funds, which included 25 equity-based mutual funds and 25 bond-based mutual funds. This was done because there were limitations on the data that could be used. Following the acquisition of the prices, the returns are then computed in order to carry out the performance and market timing predictions. Daily observations are utilized because they are able to capture greater timing skills of managers, which cannot be captured by monthly or annual observations. This is the reason why daily observations are utilized. The research conducted by Goetzmann et al. (2000) is an example of a study that makes use of daily returns. According to them, the monthly observation might not be able to adequately capture the timing activities carried out by fund managers. This is due to the fact that the majority of fund decisions and strategies are carried out on a more frequent basis, rather than just on a monthly or yearly basis. Chance and Hemler (2001) and Bollen and Busse (2001) are two examples of empirical evidence that are examples of studies that have used daily observations rather than monthly observations. The authors explained that there is evidence proving that there is a greater capacity for synchronization when investigating managers' market timing skills with daily data rather than monthly data. This is because daily data is more likely to be accurate than monthly data.

3.2.2 Selection of Market Benchmark Index

Index funds are a type of investment vehicle in which the portfolios are structured in a manner that is consistent with a particular stock index. As a consequence of this, the performance of these funds ought to be identical to that of the stock index. If everything went according to plan, the benchmark index that was used in this investigation would be representative of the entire market portfolio, or at the very least, a sizeable portion of the market. A benchmark fund (also known as a benchmark fund) is required to include a diverse assortment of asset classes in order to adequately cover the majority of market groups. Choosing a market benchmark that provides a risk return profile that is comparable to that of the mutual funds that are being investigated in this study is of the utmost importance. This is because the mutual funds are being compared to the market benchmark.

A hypothetical basket of stocks is referred to as an index, and because it is a hypothetical basket, it cannot be directly invested in with money. In accordance with FTSE Russell (2017), fund managers typically acquire licenses for the indexes in order to make use of them as the basis for passively invested products that are a reflection of an index. Securities such as exchange-traded funds (ETFs), swaps, mutual funds, and structured products are included in this category of products. Therefore, for the purpose of this investigation, the exchange-traded fund (ETF) that tracks an index will act as a substitute for the benchmark index in each of the countries for the purpose of this investigation.

To begin, the Standard & Poor 500 index is selected to act as the benchmark index for the United States of America stock market. The S&P 500, which is the market index in the United States, is responsible for monitoring the performance of the four hundred largest companies that are listed in the United States. On a daily basis, the S&P 500 is the equity index that is utilized the most frequently in the United States of America. The FTSE RAFI UK 100 is the

next index that will be discussed. This index is made up of one hundred companies that have been selected from the all-share index based on the exceptional scores that they have received. The FTSE RAFI 100 is an investment that is made up of stocks that are diversified to provide exposure to a wide range of industries. These industries include oil and gas, the banking sector, pharmaceuticals, telecommunications, real estate, and other industries.

The S&P/TSX 60 index is chosen to serve as the benchmark index for securities trading in the Canadian market. Since its inception in December 1998, this index has been tracking the sixty most significant companies that are traded on the Toronto Stock Exchange. In addition to having a weightage distribution that is well-balanced across the industries in which it is invested, the S&P/TSX 60 index is intended to be a representation of the most successful businesses in these sectors. Following this, the CAC 40 is utilized as a market benchmark for France. This particular index is a weighted measure of the forty stocks that are considered to be the most significant on the Euronext Paris exchange. On the European stock market, it is considered to be one of the most important national indices. According to the analysis conducted in Italy, the FTSE MIB exchange-traded fund (ETF) that follows the FTSE MIB, which is the stock market index for the Italian Stock Exchange (Borsa Italiano), is also taken into consideration. The forty stocks that are traded the most on the exchange are tracked by this index.

The next thing to take into consideration is the fact that the Nomura NF Nikkei 225 ETF is used in the Japanese market as an alternative to the Nikkei 225 index. Nikkei 225 index was established in July of 1950, making it 72 years old. It is currently serving as the index for the Tokyo Stock Exchange (TSE), which is the largest stock exchange in Japan. The 225 publicly traded companies in Japan that have reached the highest levels of performance are included in this index. These companies come from a wide range of different industries. Consequently, this

will be an accurate depiction of the performance of the market in Japan because of this. Finally, the Deka DAX Exchange Traded Fund (ETF) is a proxy for the DAX index, which is made up of forty of the most important German companies in terms of market capitalization that are traded on the Frankfurt Stock Exchange. The ETF is a proxy for the DAX index.

In terms of our selection of mutual funds that are centred on blended funds, we are able to provide investors with the opportunity to evaluate the performance of the funds in comparison to a selection of market benchmarks that are widely recognized and easily accessible. The mutual funds that were chosen are primarily based on bonds and stocks, but each of these funds contains a combination of both stocks and bonds under their investment portfolio. It is possible to gain insight into the capacity of bond funds to provide diversification benefits or to serve as a hedge against equity market downturns by observing how bond funds perform in relation to the stock market index. Since bonds and stocks have different risk-return profiles, this observation can provide valuable information. When it comes to making decisions regarding asset allocation and evaluating the overall performance of a portfolio, comparing the returns of bond funds to the benchmark of the stock market can be helpful from the perspective of an investor. Understanding how bond funds perform in comparison to a stock market index can provide context for evaluating portfolio diversification and risk management strategies. This is because investors frequently hold a combination of stocks and bonds in their portfolios. For the purpose of this investigation, the following Table 3.1 provides a list of countries along with the benchmarks that are applicable to each of them.

Table 3.1: G7 Market Benchmarks

Country	Market Benchmark	ETF Tracker
United States	S&P 500	IShares Core S&P 500 ETF
United Kingdom	FTSE RAFI UK 100	Invesco FTSE RAFI UK 100 UCITS ETF
Canada	TSX 60	Ishares S&P/TSX 60 IDX.ETF
France	CAC 40	Xtrackers CAC 40 UCITS ETF
Italy	FTSE MIB	FTSE MIB Index ETF
Japan	Nikkei 225	Nomura NF Nikkei 225 ETF
Germany	DAX 40	Deka DAX ETF

Daily closing prices of all the market benchmarks have been obtained from Thompson Reuters from 1st January 2015 to 31st December 2022 to make a total of 2087 observations for a period of seven years. Subsequently the returns of the benchmark indices are also computed prior to running the respective analysis to test the stock selectivity and market timing ability of the mutual fund managers.

When looking at the performance of mutual funds from 2015 to 2022, there are many benefits to be gained. The first thing that we need to do is conduct an analysis of the market's performance. It makes it possible for you to evaluate the performance of mutual funds under a variety of market conditions, including bull markets, bear markets, and periods of volatility. The ability of the fund to generate profits in a variety of economic conditions is better understood as a result of this. In addition, it is beneficial to recognize developments in the market. We will be able to identify patterns in asset classes, sectors, and investment styles that have either been successful or have encountered difficulties by conducting an analysis of the performance of mutual funds during this time frame.

The distribution of assets within a portfolio can be influenced by this observation, which can provide direction for future investment decisions. Additionally, risk management is an additional essential component to take into consideration. Through the examination of mutual funds over an extended period of time, it is possible to evaluate returns that have been modified

to account for risk. By gaining an understanding of the performance of funds during times of market downturns and turbulent conditions, one can gain valuable insights into the risk management strategies employed by these funds as well as their capacity to withstand challenges.

Additionally, we are able to move forward with a comparative analysis. Through the process of comparing the performance of different mutual funds to relevant indices or peer groups, we are able to identify mutual funds that consistently outperform or underperform expectations. Your investment goals and your level of comfort with risk can be taken into consideration when selecting funds to invest in with the assistance of this comparative analysis. In addition, evaluating the dependability and expertise of fund managers can be accomplished by monitoring the performance of mutual funds over a period of several years. The process of gaining an understanding of how investment managers adjust to shifting market conditions and achieve returns in relation to their investment goals provides investors with valuable insights that can be utilized when making decisions.

An additional point to consider is the significance of adopting a long-term investment strategy, which is highlighted by conducting an analysis of mutual funds over an extended period of time. Investors are able to avoid short-term market fluctuations and instead focus on the fundamental factors that determine long-term investment gains with the assistance of this tool. When it comes down to it, drawing knowledge from historical data offers valuable lessons and insights that can be utilized in the future to make informed decisions regarding investments.

It provides investors with the opportunity to gain insights from previous market cycles, trends, and events, which assists them in making investment decisions that are well-informed and cautious. Investors are able to acquire a comprehensive understanding of these aspects by analyzing the performance of mutual funds, the characteristics of risk, and investment

strategies over a long period of time, such as from 2015 to 2022. Having this knowledge gives them the ability to make investment decisions that are well-informed.

3.2.3 Risk-Free Rate

Given that the majority of the prior research has focused on the market in the United States, pioneering researchers in this field, such as Sharpe (1966), Jensen (1968), and Elton et al. (1996), have all utilized the risk-free rate of the United States Treasury Bills in their respective studies. This is because the majority of the previous research has concentrated on the market in the United States. Taking into consideration the fact that this study makes a contribution to the existing body of literature by incorporating an updated data set and a larger group of countries, specifically the G7 countries, the risk-free rates that are provided by each country will be incorporated into this study. The term "risk-free rates" refers to the interest that is paid to an investor on an investment that does not involve any risk whatsoever. In accordance with the findings of the Corporate Finance Institute (2023), the risk-free rate is typically comparable to the interest that is paid to an investor on a Treasury bill issued by the government. When it comes to investment options, this particular type of investment is frequently considered to be the most secure option available to an investor.

For the purpose of this research, the yield on 10-year government Treasury bonds for each of the countries was obtained from the database that is continuously maintained by Thompson Reuters. The yield on 10-year Treasury bills is a significant signal that investors consider to be a significant indicator of their level of confidence in the market's performance. As a result of the fact that the models that are utilized to investigate the market timing ability and performance of mutual funds incorporate the risk-free rate as one of the major data, this variable is of utmost significance in the investigation that is being conducted. A collection of daily data has been compiled from the for the time period spanning from 2015 to 2022.

3.2.4 Selection of Active Exchange-Traded Funds (ETFs)

The ability of active exchange-traded funds (ETFs) to time the market in the G7 countries is being investigated as part of this study, which was mentioned earlier. This study is being expanded to investigate this ability. However, despite the fact that active exchange-traded funds (ETFs) in general have gained a growing amount of popularity on a global scale, not all countries currently have active ETFs. This is the case despite the fact that ETFs in general have gained popularity. Although every developed nation is a member of the Group of Seven (G7), not all of them have exchange-traded funds (ETFs) that are actively engaged in trading. This is because not all of the G7 currencies are actively traded. Since 2008, exchange-traded funds, also known as ETFs, have been a significant presence in the market in certain countries, such as the United States of America. This group of nations includes the United States of America. According to Bank of New York (2023), the Securities and Exchange Commission (SEC) of the United States of America is the entity responsible for enacting regulations that govern exchange-traded funds (ETFs) that are actively traded. In spite of this, the regulatory environment in some countries might not be completely favourable for the issuance and development of exchange-traded funds (ETFs) that are actively trading.

Regarding this particular matter, it is important to take it into consideration. This is due to the fact that some countries may have restrictions and regulations that are more stringent than others, and these restrictions and regulations may apply to the various types of investment strategies that are discussed in this article. Therefore, in this study, the G7 countries that have active exchange-traded funds (ETFs) for a longer period of time, specifically the United States, will be analyzed to determine whether or not the managers have the ability to effectively time the market and select stocks according to their preferences. Specifically, the United States will be the focus of this analysis.

3.2.5 Selection of Fama-French Variables

There are three key pieces of information that are included in the Fama-French three factor model. These are the size of the firms, the book to market values, and the excess market returns. The Kenneth R. French Database, more specifically the Fama-French 3 Factors for Developed Market, was the source from which the database was obtained. It is possible to acquire the daily returns for the time period beginning on January 1, 2015 and ending on December 31, 2022. The stocks in the region have been divided into three book-to-market equity groups and two market cap groups in order to construct the HML and SMB as a result of this sorting. According to Fama and French (2012), the SMB (Small Minus Big) variable is calculated by subtracting the weighted average returns of three small stock portfolios from the weighted average returns of three stocks portfolios that are considered to be large. The explanation of the formula is as follows.

$$SMB = \frac{1}{3}\,Small(Value + Neutral + Growth) - \frac{1}{3}\,Big(Value + Neutral + Growth)$$

According to Fama and French (2012), the HML (High Minus Low) variable is calculated by subtracting the weighted average returns of two high book to market portfolios from the weighted average returns of two low book to market portfolios. The explanation of the formula is as follows.

$$HML = \frac{1}{2}\,(Big\ Value + Small\ Value) - \frac{1}{2}\,(Big\ Growth + Small\ Growth)$$

The importance of investors being able to withstand the additional volatility and occasional periods of underperformance that may occur within a short period of time was emphasized by both Fama and French. Those investors who have a time horizon of fifteen years or longer will be compensated for any losses that they incur in the short term. In order to validate their model, Fama and French examined a large number of random stock portfolios through a series of

studies. They found that by combining the size and value factors with the beta factor, they were able to explain up to 95% of the return in a diversified stock portfolio. This was a significant discovery.

As a result of the fact that it is able to account for 95% of a portfolio's return in comparison to the overall market, investors are able to construct a portfolio that provides an average expected return based on the relative risks that they take in their portfolios. When it comes to determining projected returns, the most important factors to consider are market sensitivity, size sensitivity, and value stock sensitivity, which can be measured using the book-to-market ratio calculation. As a possible explanation for any additional average expected return, the presence of unpriced or unsystematic risk may be included.

3.2.6 Survivorship Bias

When conducting research, it is essential to take into account mutual funds that have not been able to survive within the time period that the study was conducted, according to the findings of Bodie et al. (2011). This is because the research was conducted during the time period that the study was conducted. If we decide to select only the funds that are still operational, then we will come across a survivorship bias in the dataset that is currently available to us. According to what was stated earlier, this study takes into consideration a selection of fifty mutual equity and bond funds that were chosen at random from the years 2015 to 2022.

It is essential to take this into consideration because, if the study is only carried out with the funds that are still operational, then the funds that have been halted will not be represented in the study. However, despite this, there is a possibility that this study is affected by a slight survivorship bias. This is because the Thompson Reuters EIKON database does not provide access to all of the data, which means that some of the data may not be accessible. This means that any and all funds that have been removed from the database will no longer be viewable by

anyone. Funds, on the other hand, are not removed based on the time range in which they operate. This is done in order to reduce the amount of bias that is present in the data collected.

3.3 Hypotheses

This research will consist of six main hypotheses that can be tested, which is in line with the objectives of this undertaking. The first three hypotheses will be put to the test in order to answer the first three research questions of the study. These questions pertain to the performance of mutual funds in the G7 countries, the stocks selectivity skills of mutual fund managers in the G7 countries, and the ability of mutual fund managers to execute market timing. The performance of actively managed exchange-traded funds in the United States, the stock selectivity skills of active exchange-traded fund managers in the United States, and their ability to time the market are going to be put to the test by the three hypotheses that wil be discussed below.

The first hypothesis of this investigation will examine the disparity between the performance of mutual funds and the returns of market benchmarks in order to test the assertion that mutual funds outperform the market. The well-known Sharpe Ratio and Treynor Ratio will be utilized in order to evaluate the performance of the mutual funds in order to assess the validity of this hypothesis. Taking into consideration the perspective of an investor, the Sharpe Ratio provides an explanation of the degree to which the investor is adequately compensated in terms of returns on their investment portfolio for the level of risk that they are willing to take. In general, investors will put their money into funds that have a higher Sharpe Ratio value. This is due to the fact that when the historical returns of two funds are compared with the same benchmark, the fund that has a higher Sharpe Ratio will provide a higher return for the same level of risk.

According to the findings of previous research (Sharpe, 1966; Jensen, 1968), mutual funds were not able to achieve a higher level of performance than the benchmark index. In spite of the fact that a great number of ground-breaking studies have reached the conclusion that mutual funds, in general, do not outperform benchmark indices and the overall market, there are contrasting points of view regarding this subject. A number of researchers have arrived at findings that demonstrate that particular mutual funds are able to generate returns that are superior to those of other funds. Carlson's research performed in 1970 utilized Jensen's methodology, which had been established in his research conducted in 1968, in order to retest the findings of Sharpe's research conducted in 1966. In Carlson's study, the S&P 500 index served as the benchmark, and the researchers examined the returns of 82 funds that were used during the time period spanning from 1948 to 1967. Carlson's research revealed that mutual funds achieved a positive excess return of 0.60 percent, as indicated by the findings obtained from the study. The results of previous studies, in particular those conducted by Sharpe (1966) and Jensen (1968), were contradicted by an unexpected finding.

Hypothesis 1:
H_i: Mutual funds outperform the market benchmark in the G7 countries.

Whether or not mutual fund managers in the G7 countries have the ability to select stocks is the subject of the second hypothesis that is being investigated in this study. There is a comparison made between the selected benchmark of each country and the fifty mutual funds that have been chosen from each country. This comparison is done in order to test the first hypothesis. If these mutual funds are able to achieve a performance that is superior to the market benchmark, then the managers of these mutual funds are considered to have the ability to select stocks accordingly. First and foremost, the Jensen's Alpha method is utilized on each fund in order to generate the risk-adjusted return, which is also referred to as the single-index alpha. When the Jensen's alpha is positive, it indicates that the fund managers have a superior

ability in stock selection and that they outperform the passively managed funds that served as the benchmark index during the time period of the research. A negative Jensen's alpha, on the other hand, indicates that the mutual funds are unable to outperform the benchmark index during the period of research and that the fund managers do not possess the skills necessary to select stocks.

There have been multiple studies that have provided evidence of the performance of mutual funds.

Using Jensen's Alpha and a multifactor model, Gruber (1996) conducted research on 270 American mutual funds that were active between the years 1985 and 1994. Through the use of the single factor model, he discovered that the funds underperformed by 1.56%, while the multifactor model only underperformed by 0.65%. Matallin-Saez (2006) investigated the performance of Spanish mutual funds using Jensen's Alpha, the Treynor-Mazuy model, and multi-factor models. What she discovered was that these models did not perform as well as the market benchmark. During their investigation of equity mutual fund managers in the United Kingdom, Blake et al. (2017) collected data from January 1998 to September 2008 and discovered that there was no stock selectivity skills. In contrast to these findings, a number of studies have suggested that they discovered that managers of mutual funds actually possess the ability to select stocks that produce superior returns (Kosowski et al.,2206; Cuthbertson et al., 2008; Wermers, 2000). Consequently, it is clearly apparent that the findings of the previous literature are inconsistent with one another.

Hypothesis 2:
H_i: Mutual funds managers in the G7 countries possess stock selectivity skills.

In the third hypothesis, we will investigate whether or not the managers of mutual funds in the G7 countries possess the ability to time the market, also known as the ability to beat the market. It is possible that the investment proportions and structure may need to be altered in order to achieve the investors' investment objective during different market conditions (Elton & Gruber, 1995; Grinblatt & Titman, 1989a). This is because the risk levels of mutual funds are constantly changing in order to assist in improving the performances based on the market conditions. Given that the Jensen's Alpha method is subject to the non-stationary systematic risk, it is possible that the method will produce a biassed result. Market timing ability and stock selectivity skills should be reflected separately by mutual fund managers. Market timing ability refers to the ability of mutual fund managers to anticipate market conditions and adjust their portfolios accordingly, whereas stock selectivity skills refer to the ability of managers to anticipate movements in stock prices (Fama, 1972; Treynor & Black, 1973). Both of these abilities should be reflected separately.

If there is the ability of mutual fund managers to time the market, then the relationship between market returns and the performance of mutual funds is not linear. According to Treynor and Mazuy (1966). As a result, Treynor and Mazuy incorporated a quadratic component into Jensen's model in the form of an excess market returns square in order to demonstrate the existence of market timing ability. The presence of market timing ability in mutual fund managers is indicated by the presence of a positive coefficient on the excess market returns.

Hypothesis 3:
H_i: Mutual funds managers in the G7 countries have market timing ability

The performance of active exchange-traded funds (ETFs), which are a different kind of managed fund, will be investigated in order to determine whether or not they are able to outperform the market benchmark. This is the fourth hypothesis that will be tested. During this

process, the active exchange-traded funds (ETFs) will be analyzed with the most recent dataset in order to determine whether or not the recent growth of the ETF market has been driven by the performance records of these actively managed funds. This will be done in order to determine whether or not the ETF market has been expanding. Active exchange-traded funds (ETFs) are a relatively new type of investment vehicle; however, as of today, they are not yet available in all countries. This is particularly true in the United States.

The objective of this study is to determine whether or not the active exchange-traded funds (ETFs) that are ostensibly managed by a fund management firm are going to have a better performance than the passive ETFs, which are solely designed to replicate the performance of the index. This is the reason why this study is being conducted. In his research on early actively managed exchange-traded funds (ETFs) in the United States, Rompotis (2011a) compared three distinct pairs of active and passive ETFs. These pairs included both active and passive managers. When compared to the performance of the passive ETF, it was discovered that the performance of all three active ETFs was significantly lower. In a subsequent study that Rompotis (2011b) carried out in the same year, he determined the performance of 14 active equity exchange-traded funds (ETFs) in comparison to the benchmark of the S&P 500 up until June of 2010. The conclusion that he arrived at was that active exchange-traded funds (ETFs) did not consistently outperform the benchmark. Following up on his previous research in 2013, Rompotis (2013) conducted an investigation into nine distinct pairs of exchange-traded funds (ETFs) that were both active and passive, and he found the same results. However, active exchange-traded funds were unable to justify their higher costs by demonstrating superior performance. This was the case despite the fact that they were more expensive.

Hypothesis 4:

H_i: There is a significant difference between the active Exchange-Traded Funds and passive Exchange-Traded Funds performance.

The objective of the fifth hypothesis is to determine whether or not actively managed exchange-traded funds (ETFs) in the United States are able to generate significant alpha values. If significant alpha values are produced, this would imply that the managers have the ability to choose stocks. If the alpha value is statistically significant and positive, it is an indication that active ETF fund managers are able to select stocks that yield returns that are superior to the benchmark. Other indicators include the fact that the alpha value is positive. As a result of the breadth of their scope, previous studies that investigated the stock selection abilities of ETF managers have produced a variety of findings. Rompotis (2015) conducted research that revealed that active exchange-traded funds (ETFs) in Canada did not outperform the benchmark and displayed negative alpha values. This was discovered through the research that was conducted. On the other hand, Kumar (2021) conducted research on exchange-traded funds (ETFs) in the United States that were active and smart beta equity funds. Twenty percent of active exchange-traded funds (ETFs) were able to achieve a higher level of performance than the benchmark, and ten percent of funds generated significant alphas, according to the findings of this study.

Hypothesis 5:

H_i: Active ETF fund managers in United States possess stock selectivity skills.

As part of this research, the sixth hypothesis that will be investigated is the ability of ETF managers in the United States to perform an analysis of their market timing abilities. The investigation into the market timing capabilities of active ETF managers was expanded according to the findings of the research that Rompotis (2011) had conducted. He came to the conclusion that these managers lacked this ability across all three funds that were the subject of the investigation under scrutiny. A study that was conducted more recently utilized a number

of different return metrics, including risk-adjusted returns and cross-sectional regression analysis, in order to analyze the data for 37 exchange-traded funds (ETFs) that were either passive or active strategies. The data was gathered up until the year 2016, when it concluded. According to Rompotis's research from 2020, the findings consistently demonstrated that active exchange-traded funds (ETFs) performed worse than passive ETFs. This suggests that fund managers do not possess the ability to accurately time the market. The most recent study conducted by Rompotis conducted an analysis of the performance of fifty exchange-traded funds (ETFs) that are currently active in the United States stock market. The data used for this study covered the period from 2018 to 2021. The findings were in line with his earlier research, which demonstrated that actively managed exchange-traded funds (ETFs) did not outperform the S&P 500 and that fund managers were unable to effectively time the market or beat it. The findings were consistent with his earlier research. The purpose of this hypothesis is to investigate the market timing ability of active ETF fund managers in the United States. This is being done for the same reason that the ability of managers of mutual funds is being investigated.

Hypothesis 6:
H_i: Active Exchange-Traded Fund (ETFs) managers in United States possess market timing ability.

3.4 Research Models

3.4.1 Raw Returns

First after obtaining the daily prices for the mutual funds and ETFs, the returns are computed in percentage terms over the period of 2015 to 2022 with daily trade data found on Eikon.

The daily return for the mutual funds is computed using equation 3.1 as stated by Jensen (1968) and Bodie et al. (2004).

$$\boldsymbol{R_p = \left(\frac{P_t - P_{t-1}}{P_{t-1}}\right)} \quad \textbf{(3.1)}$$

Where in this equation R_p is the returns of fund in the month, P_t is the price of the fund at time t and P_{t-1} is the price of the fund at time t-1. All the funds will be tested using six different performance measures that will be discussed in the following section.

3.5 Standard Risk-Adjusted Performance Measures

There are a few different approaches to evaluating the performance of mutual funds that have been presented in previous research. The stock selection models are among the models that are utilized frequently in the process of evaluating the performance of mutual funds. These models, which are used to determine the performance of funds, are referred to as risk-adjusted measures. Sharpe (1966), Treynor (1965), and Jensen's Alpha (1968) are the standard risk-adjusted performance measures that will be utilized in this study in order to obtain more accurate results. These measures were developed by John Sharpe. There is a strong connection between the modern portfolio theory (MPT) developed by Stuart and Markowitz in 1959 and the process of constructing a portfolio through the utilization of the asset diversification strategy. For the purpose of putting hypotheses 1, 2, 4, and 5 to the test, the following

performance measures will be computed and calculated for two different groups of investment funds, namely exchange-traded funds (ETFs) and mutual funds.

3.5.1 Sharpe Ratio

The purpose of the research that William Sharpe carried out in 1966 was to broaden the scope of Jack L. Treynor's investigation. During the course of his research, Treynor proposed a novel predictor for the performance of mutual funds. This new predictor is distinct from all of the others that were utilized in the earlier studies. In his study, he incorporated the volatility of a fund's return in a manner that was both straightforward and significant. The capital-market model was investigated by Sharpe, and according to this model, the performance of mutual funds is straightforward. The returns and risk should be able to be represented by a linear line, according to him, provided that all funds are properly managed and diversified. A transitory effect, rather than a persistent difference, will be indicated by any points that deviate from this relationship. When certain funds are not diversified in the appropriate manner, however, the returns will always be lower than average, and it is reasonable to anticipate that the performance will be subpar (Sharpe, 1966).

The fact that the funds with higher returns displayed a greater degree of variability made it abundantly clear that the capital asset pricing theory's hypothesis regarding the relationship between risk and return was, in fact, accurate. It is worth noting that there were variations in efficiency, wherein certain funds exhibited a lower standard deviation (V_i) and a higher return (A_i). Therefore, in order to investigate these disparities, Sharpe devised the Reward to Variability Ratio (R2V), which is also referred to as the Sharpe Ratio (SR). This ratio indicated that the higher the ratio, the better the performance of the mutual fund. On a large scale, the SR has been utilized to evaluate the performance of mutual funds in order to assess the returns and risk associated with a fund portfolio. The ability to recognize risk-free returns in portfolios

is one of the reasons why SR is considered to be one of the precise risk-return measures with relations to risk adjusted measures on the list (Eling & Faust, 2010).

According to the Sharpe Ratio, it always refers to the returns of an asset that has zero risk, which is an asset that has zero standard deviation. It is possible for fund managers to select the risk-free asset to be a part of their portfolio as a preference to a risky portfolio that they have chosen. This gives them the ability to choose the absolute level of risk that they are willing to take. In spite of the fact that the standard deviation and the coefficient of variation are both capable of measuring risk, it is important to note that both of these methods have certain limitations. Specifically, neither of them can measure the risk and returns of the portfolio independently. In contrast to the standard deviation, which is widely used to measure risk, the coefficient of variation is utilized to specify the proportion of returns that are based on the standard deviation units. Therefore, the Sharpe Ratio is able to overcome the limitations of these measurements by evaluating and comparing the performance of the portfolio based on risk and return (DeFusco et al. 2007).

The Sharpe ratio is a composite risk-adjusted measure that was developed by William F. Sharpe, who was awarded the Nobel Prize in economics, for the purpose of evaluating the performance of mutual funds. He suggested that "the performance of a managed portfolio should be evaluated in relation to its overall risk exposure" (Sharpe, 1966; 1994). This was one of his recommendations. It is generally accepted that any investor can gain access to the additional return that is offered on the market portfolio without it being necessary for them to use any selection or portfolio management skills. In light of this, the additional return that can be obtained from the market portfolio for each unit of risk is an excellent standard by which to evaluate a manager. In order to raise the Sharpe ratio, a competent manager will maximize the amount of additional return that is generated for each unit of risk.

According to Sharpe (1966), this ratio presents us with the opportunity to forecast the variations in the performance of mutual funds, which ultimately results in an accurate prediction of the performance of the fund in the future. The Sharpe Ratio method takes into account the overall risk of the portfolio and computes the risk premium that is earned for each individual unit of total risk carried. Ex post Sharpe Ratio is the term used to describe the Sharpe Ratio that is derived from historical data. Calculating the Sharpe Ratio can be done using the formula that is provided below:

$$\boldsymbol{Sharpe\ Ratio} = \frac{\overline{r}_p - \overline{r}_f}{\sigma_p} \qquad \textbf{(3.2)}$$

*w*here $\overline{r}_p$ represents the mean returns to each of a portfolio, $\overline{r}_f$, the mean returns to a risk-free asset, and σ_p, the standard deviation of returns on the portfolio. The $\overline{r}_p - \overline{r}_f$ in the ratio is known as the mean excess return on a portfolio. The combination of portfolio p and the risk-free asset that lies on a line with a slope that is equal to the quantity divided by standard deviation is the ratio of excess return to standard deviation of a return of portfolio. Hence, larger SR is preferred especially for investors who are risk averse (DeFusco et al.,2007).

Both ex post and ex ante types of the SR are possible. The ex post type is the only one. When calculating the risk and return based on the performance of historical data, the ex post SR is the calculation that takes place. Ex ante SR, on the other hand, refers to a portfolio that is constructed in advance and is based on the expected risk-free rate, standard deviation, and excess mean returns (Hodges et al., 1997). Because it makes use of the historical data to reflect the actual performance of the fund portfolio, the ex post is the more accurate approach to measuring performance. However, the ex-ante method is not widely utilized because it requires a greater number of assumptions to be made, and it is not possible to estimate the data using this method. As a result, the ex post SR is utilized in this investigation; despite the fact that the

actual result might differ from the predictions, the results are sufficient enough to be utilized for the empirical tests (Sharpe, 1965b).

3.5.2 Treynor Index

Nevertheless, the Sharpe Ratio alone is not sufficient because there is no guarantee that past performance is the best forecast of future mutual fund performance as predicted according to the Sharpe Ratio model (Sharpe,1966). This is despite the fact that Sharpe's measure has been widely used as a proxy for evaluating the performance of funds.

Because of this, the Treynor Index (TI), which is also referred to as Treynor's measure, will be used to supplement the performance measure of the mutual fund. Regarding the method of ranking funds, the Treynor Index (1965) is quite comparable to the Sharpe Ratio. Both of these indices were developed in 1965. However, the Treynor Index provides a ratio to systematic risk rather than the standard deviation of the overall risk. To be more specific, the Treynor Index provides an excess return per unit of risk that is determined by the beta of the portfolio rather than the standard deviation of the portfolio. The systematic risk, also known as the beta of the portfolio, is calculated by dividing the expected standard deviation of the portfolio by the expected standard deviation of the market.

The first composite measure of portfolio performance that took risk into account was developed by Jack L. Treynor in the year 1965. He suggested that there are two categories of risk: the risk associated with the overall market volatility and the risk associated with portfolio security-specific volatility. Treynor devised the characteristic line in order to evaluate the risk that was brought about by changes in the market. The characteristics line is a relationship that describes the connection between the rates of return for a portfolio over time and the rates of return for a market portfolio that is suitable for the portfolio. The direction of the slope of the characteristic line is a measure of how volatile the returns of a portfolio are in comparison to the returns of

the market as a whole. A portfolio that has a higher slope, also known as beta, is more susceptible to market risk and is more sensitive to market fluctuations.

Treynor (1965) proposed that the systematic or non-diversifiable risk of the fund return is relevant risk for the evaluation of the majority of portfolios. This is due to the fact that mutual funds are presumed to have a high level of diversification. One of the suggestions that was made was that portfolios should be evaluated according to the excess return that they generated in comparison to the risk-free rate in relation to their beta. When evaluating performance, the excess return on the market portfolio is used as the benchmark, and the relationship between the excess return and the beta of the capital asset pricing model (CAPM) was taken into consideration.

$$\boldsymbol{Treynor\ Index} = \frac{\overline{r}_p - \overline{r}_f}{\beta_p} \quad \textbf{(3.3)}$$

Where TI is the Treynor Index; $\overline{r}_p$, average return on the portfolio, $\overline{r}_f$, risk-free rate and β_p belongs to beta for the portfolio p. β_p is calculated as follows:

$$\boldsymbol{\beta_p} = \frac{\sigma_{pM}}{\sigma_M^2} \quad \textbf{(3.4)}$$

A higher T value indicates a higher slope and a better portfolio, although it is important to note that this is true regardless of the risk preferences of an investor. In order to determine the abnormal return for each unit of systematic risk, the Treynor ratio formula is utilized. Due to the fact that the risk premium is the numerator of the ratio and a measure of risk is the denominator, the entire expression is a representation of the risk premium return per unit of risk that the portfolio generates. The market portfolio will be considered to have outperformed the market portfolio if the portfolio has a T value that is higher than the market portfolio and

charts above the Security Market Line, which indicates that the portfolio has performed better when risk is taken into account.

3.5.3 Single-Index Jensen's Alpha Model for Mutual Funds' Risk-Adjusted Returns

The Jensen's alpha, which is also referred to as the Jensen's measure, is going to be the first risk-adjusted measure that will be utilized in order to evaluate the performance of mutual funds. On account of the fact that it is one of the most well-known and well-established models for performance measures in contemporary portfolio management theory, this measure has been utilized by a significant number of practitioners and academicians. This single factor regression model, which is solely based on the CAPM model, was proposed by Jensen in the year 1968. This model measures the average return on the portfolio in addition to the CAPM (Bodie et al., 2007). It does so by taking into account the beta of the portfolio as well as the average return over the market. Jensen's portfolio alpha measure (α_p) can be described as follows:

$$\boldsymbol{R_{pt} - R_{ft} = \alpha_p + \beta_p\,(R_{mt} - R_{ft}) + e_{pt}} \qquad \textbf{(3.5)}$$

Where;

α_p is the intercept known as Jensen's alpha that is the excess return on the portfolio, β_p is the sensitivity of the excess return on the portfolio t with the excess return on the market, R_{pt} is the return on portfolio at time t, R_{ft} is the risk-free rate at time t and R_{mt} is the return on the market portfolio at time t.

The Jensen's alpha measures the fund manager's ability to forecast future returns of mutual funds. The intercept estimation explains the fund manager's forecasting ability while the beta captures the systematic risk involved. If a fund outperforms the benchmark returns or the market, then the Jensen's alpha will yield a positive value and if it underperforms the benchmark then the alpha value will be negative (Mayo, 2011). A zero intercept is expected for a fund with buy and hold strategy.

The Jensen’s Alpha is also known as the single-index alpha which the intercept term represents inferior or superior performance of the fund if the alpha is less or greater than zero (Jensen,1968). The error terms are assumed to be normally distributed and independent with constant variance and zero mean for all observations. Jensen's alpha coefficient can be either positive or negative, depending on whether the asset demonstrates greater or inferior risk-adjusted performance in comparison to its expected return. This is because the coefficient is a measure of the asset's expected return. When Jensen's alpha is positive, it indicates that the asset has surpassed its expected returns in relation to the level of risk it carries. Conversely, when Jensen's alpha is negative, it indicates that the asset has underperformed its expected returns in relation to the level of risk it currently carries. When evaluating the performance of different assets or portfolios that have variable levels of risk, Jensen's alpha is a handy tool to have at your disposal.

Having a higher Jensen's alpha suggests that the performance is superior, whereas having a lower Jensen's alpha indicates that the performance is poor. When used as performance indicators, anomalous return and Jensen's alpha offer a number of advantages to the organisation under consideration. To begin, the Jensen Alpha measure is able to evaluate the influence of both systematic and unsystematic risk variables on the return of the asset. This is accomplished by employing the actual return rather than the return that is higher than the risk-free rate. Both the magnitude and the direction of the deviation from the expected return are taken into consideration by this metric, which enables it to provide a more comprehensive and precise evaluation of the asset's performance.

3.5.4 Fama French Three Factor Model

When analysing the performance of mutual funds, the Fama French model is the next stock selection model that is utilised in this research. This model takes into account a number of different criteria when analysing the performance of mutual funds. The book-to-market ratio and the amount of the mutual fund allocation are two additional characteristics that are included in this model, which is an addition to the Jensen's Alpha model. The three-factor model developed by Fama French is shown in the following:

$$R_{pt} - R_{ft} = \alpha_p + \beta_1 (R_{mt} - R_{ft}) + \beta_2 SMB + \beta_3 HML + e_{pt} \quad (3.6)$$

Where;

R_{pt} is the return on portfolio at time t, R_{ft} is the risk-free rate at time t and R_{mt} is the return on the market portfolio at time t. α_p is the intercept that measures the stock selectivity skills, β_1 is the sensitivity of the excess return on the portfolio t with the excess return on the market, β_2 is the coefficients that measures the funds exposure that is if statistically significant and positive, then the fund is associated with small-capitalization stocks. β_3 is the coefficient that fund exposure where is statistically significant and positive then the fund is exposed to high book-to-market stocks.

When considering the practical implementation of the Fama French 3 Factor Model, it is crucial to comprehend the concept of 'Alpha' in the model. Alpha is often described as the secret ingredient in a portfolio, representing the part of a portfolio's performance that cannot be explained by market volatility. Alpha is a quantitative term that evaluates performance by taking into account the level of risk involved. It represents the disparity between the projected returns forecasted by the model and the actual returns observed. A positive alpha in a portfolio indicates that the portfolio has exceeded the forecasted performance of the model. On the other

hand, a negative Alpha indicates that the portfolio has not fared as well as the model's projection. Alpha is essential in evaluating a portfolio manager's success when it comes to application. When a portfolio achieves returns that are higher than what is expected based on the Fama French 3 Factor Model, the manager has achieved a positive alpha. Similarly, if the manager's performance is worse than what is predicted by the model, it indicates a negative alpha.

Investors have the ability to deliberately design a well-diversified portfolio by employing the Fama French 3 Factor Model. This model allows investors to factor in market sensitivity, incorporate both small and large companies, and take into account the relative attractiveness of value and growth shares. In a manner analogous to the manner in which an architect develops architectural designs for a long-lasting structure, this model functions as a blueprint for the development of a robust investment portfolio.

To provide a brief summary, all of these stock selection models are utilised in this study in order to investigate the performance of mutual funds in the G7 countries respectively. The models that were chosen were chosen because of their significant presence in the most recent empirical research that were carried out to explore the characteristics of mutual fund stock selectivity and performance. A description of the market timing models that will be utilised in this investigation may be found in the next section.

3.6 Market Timing Ability Measurement Models

The capacity of a fund manager to pick and alter the portfolio in accordance with the conditions of the market is referred to as market timing ability. The literature on mutual fund performance analysis has, in the past, proposed a great number of measurement models that can be used to evaluate the capacity of mutual fund managers to time the market. In spite of this, the Treynor and Mazuy (1966) and Henriksson and Merton models, which have been considered pioneers

in this field of research, will be utilised in this study to evaluate the efficacy of fund managers in terms of their ability to time the market.

3.6.1 Treynor & Mazuy Model (TM)

Within the scope of this investigation, the Treynor and Mazuy model is utilised to examine hypothesis 3 and hypothesis 6 respectively. It is possible for the Treynor and Mazuy model to allow the risk factor of a game to change over time in accordance with the amount of the market return. Treynor and Mazuy (1966) claimed that if fund managers have the ability to forecast future market circumstances and anticipate that the market will be a bull market, then they may maintain a greater share of the market portfolio. This is because they have the ability to anticipate the market to be. In contrast, if the managers anticipate that the market will perform poorly, they can hold a lower proportion of the positions. Therefore, the beta, which is the coefficient of the excess market returns in Jensen's mode, will adjust accordingly and is not linear. This is because the beta function is not linear.

$$\boldsymbol{\beta_{it} = \beta_{i0} + \beta_{i1}\,(R_{mt} - R_{ft})} \qquad \textbf{(3.7)}$$

Treynor & Mazuy (1966) includes a square term of the market return by to capture this non-linear relationship as follows:

$$\boldsymbol{R_{it} - R_{ft} = \alpha_i + \beta_{i0}(R_{mt} - R_{ft}) + \beta_{i1}(R_{mt} - R_{ft})^2 + \varepsilon_t} \qquad \textbf{(3.8)}$$

Where α_i represents the timing ability of mutual fund managers. If α_i is a positive value, then it indicates that mutual fund managers possess time adjusted selective ability and if the value is negative, it indicates a lack of ability. The β_{i1} is the mutual funds managers market timing

ability and the quadratic term in the equation is the market timing factor. If the mutual fund manager does not possess the ability to time the market, then the estimated figure of β_{i1} should not be significantly different from zero. They argue that if the manager concentrates on stock selection and does not attempt to time the market then the average portfolio beta over time should be constant. A straight line will be formed if the fund's excess return versus the market's excess returns over the risk-free rate is plotted.

If the mutual fund manager is successful in analyzing the market direction and had attempted to change the portfolio's beta in response to dynamic changes in the market, then a higher-than-normal beta for up-market condition can be expected. The plots will then lie above the linear relationship in this scenario. If this continues then it will impart a curve to the scatter of points. The quadratic term in the TM model is added to capture this curvature. However, if the manager is unsuccessful in assessing the market's direction, then the plot will still be linear maybe with additional scatters.

Compared to the traditional Capital Asset Pricing Model (CAPM), the Treynor and Mazuy model offers a number of advantages that are worth considering. In the first place, there is a discussion on the incorporation of market timing. One of the most significant advantages of the Treynor and Mazuy model is that it acknowledges the availability of the ability to timing the market. According to this model, investors are able to alter their portfolios in accordance with their expectations of market trends, in contrast to the Capital Asset Pricing Model (CAPM), which suggests that investors are unable to anticipate variations in the market. This flexibility has the potential to increase returns by offering opportunities to capitalise on patterns in the market.

The next feature is the enhanced predictive power, which is described below. The market timing component is incorporated into the model in order to provide a more realistic

representation of the activities taken by investors who actively shift their portfolios in response to changes in market circumstances. This has the potential to result in more accurate projections of asset returns, particularly in markets where timing approaches are widely used. In addition, there is evidence from direct experience that supports this assertion. The Treynor and Mazuy model provides a more sophisticated framework that correlates to observed investor behaviour. This is in contrast to the Capital Asset Pricing Model (CAPM), which has been found to have issues in empirical testing due to the fact that it makes assumptions that are overly simplistic. It has been established through empirical research that incorporating market timing into a model can improve its ability to explain and anticipate asset returns. The flexibility to adapt to different risk management situations is a major advantage. It is possible for investors to actively change the amount of market risk that they are exposed to thanks to this notion. During times of market volatility or economic uncertainty, this technique can be especially helpful because it enables investors to potentially reduce their risk exposure when it is projected that markets would crash and to increase their risk exposure during periods when market optimism is high.

In essence, the Treynor and Mazuy model is superior to the Capital Asset Pricing Model (CAPM) because it recognises and incorporates market timing as a factor that helps determine asset returns. It is possible that putting this strategy into practice will result in more accurate projections of asset values and more informed investment decisions in situations that are based in the real world.

3.6.2 Henriksson - Merton Model (HM)

A similar model was proposed by Henriksson-Merton (1981) to test the fund manager's market timing ability. This model is employed in this study to test hypothesis 3 and 6. Treynor & Mazuy's proposed their model based on fluctuating beta of their portfolio. However, the HM model follows a more qualitative approach to analyze the market timing ability of fund

managers. It is assumed according to this model that the mark timers are required to forecast whether down-market ($R_{mt} \leq R_{ft}$) or up-market ($R_{mt} \geq R_{ft}$) and select a fund beta accordingly.

Within the framework of this binary option strategy, it is presumed that the managers of the mutual funds have the ability to forecast whether the performance of the stock market would be worse or better than the default risk-free rate. In the event that reliable forecasting is available, managers of mutual funds are able to modify the proportions of the portfolios accordingly. Therefore, if managers of mutual funds have the capacity to time the market, they would choose high up market beta and low market beta. The value of this relationship can be determined by including a dummy variable in the equation (Tripathy, 2005). In order to create the Henriksson and Merton model, a put option that does not incur any costs is incorporated into Jensen's model. The equation for this model is as follows:

$$\boldsymbol{R_{it} - R_{ft} = \alpha_i + \beta_i(R_{mt} - R_{ft}) + \delta_i Max(0, R_{ft} - R_{mt}) + \varepsilon} \qquad \textbf{(3.9)}$$

The Max (0, $R_{ft} - R_{mt}$) in the equation is the binary option and δ_i is the market timing ability of mutual fund managers. If the value is positive, then it indicates that the fund managers possess market timing ability. This formula can be rewritten using a dummy variable as follows:

$$\boldsymbol{R_{it} - R_{ft} = \alpha_i + \beta_{i1}(R_{mt} - R_{ft}) + \beta_{i2}[D(R_{mt} - R_{ft})] + \varepsilon} \qquad \textbf{(3.10)}$$

Where D is the dummy variable which will be zero if the risk-free rate is lower than the market returns. The β_{i1} is the estimator of systematic risk when market is in upswing and $\beta_{i1} - \beta_{i2}$ is the fund's beta when market crashes. The positive value of β_{i2} indicates superior market timing

ability of mutual fund managers and a negative figure indicates that they have inferior market timing ability. A positive intercept α_i shows that mutual fund managers have market timing ability, and a negative figure shows otherwise.

Some constraints that have been found in other models, such as the Sharpe ratio, are especially targeted for elimination by this approach. There are many advantages associated with the Henriksson-Merton model. To begin, the Henriksson-Merton model takes into consideration systematic risk, in contrast to more straightforward performance metrics like as the Sharpe ratio, which only evaluate total risk, which is the volatility of returns. The results of a portfolio are broken down into two distinct categories: those that are influenced by systematic factors that are associated with the market, and those that are influenced by unsystematic elements that are peculiar to the portfolio. The objective of the methodology is to disentangle the portion of portfolio results that can be attributed to the manager's expertise in actively managing investments. This provides a more accurate evaluation of whether the portfolio manager has generated value through extraordinary stock selecting or market timing. This is accomplished by distinguishing between the systematic and unsystematic components of returns. As an additional point of interest, the Henriksson-Merton model employs statistical approaches in order to analyse the performance of a portfolio through quantitative analysis. In order to complete the calculation, you will need to determine a performance metric that takes into consideration not just the level of risk but also the investor's ability to time the market or select assets. The application of this quantitative method has the potential to produce observations that are more precise and provide more specific information regarding the effectiveness of portfolio management strategies.

The dynamic assessment of active management technique is extremely useful for evaluating the performance of portfolios that are actively managed, as stated in the previous sentence. Taking into account the various risk factors, the analysis takes into consideration how the

returns of a portfolio compare to a benchmark. This provides investors and fund managers with assistance in identifying whether the actions taken by active management have had a good or negative influence on the performance of the fund. By separating portfolio returns into systematic and unsystematic components, the Henriksson-Merton model offers useful insights into the effectiveness of market timing and securities selection strategies. These insights can be used to make more informed management decisions. The enhancement of investment strategies and the optimisation of performance over time can be facilitated with the assistance of portfolio managers. To recap, the Henriksson-Merton model incorporates a number of advantageous features. This makes it possible to conduct a comprehensive analysis of the performance of the portfolio, taking into account both systematic and unsystematic kinds of risks. In addition to this, it allows for quantitative research on market timing and securities selection strategies, and it establishes a correlation between performance and the expertise of the manager. As a result of these qualities, it is an effective tool for investors and portfolio managers who are striving to evaluate and improve the performance of their investments.

In this study, to examine and investigate the market timing ability of mutual funds managers and active exchange-traded fund managers, both the Treynor and Mazuy and Henriksson and Merton Models are utilized in this research. The findings from both these market timing models will verify the presence of market timing ability amongst fund managers in the G7 countries.

3.7 Research Method

3.7.1 Sampling Method

To conduct the sample, a probability sample needs to be used hence in this study a random selection is conducted. According to Bryman & Bell (2007), the reason of selecting random sampling technique is to minimize the likelihood of sampling errors. The difference between the population and the sample is known as the sampling error. In this study, a total of 50 funds has been selected from each country, however the entire population is much larger and is difficult to be incorporated in the analysis due to limitation of data. Therefore, a random sampling method is chosen to select the data for this study allowing each fund in the population will have equal probability to be included in this study. This reduces the human biasedness when selecting the sample funds. There are various advantages of using this technique in selecting funds.

The representativeness is the first and most important criterion. Random sampling ensures that every single person in the population has an equal chance of being chosen for the sample based on the criteria that have been established. This results in an increase in the sample's level of representativeness, which indicates that the characteristics of the sample are more likely to properly reflect those of the population from which it was collected. The ability to draw conclusions from the sample to the entire population that are more generally applicable is facilitated as a result of this.

The elimination of selection bias, which occurs when certain segments of the population are persistently over- or under-represented in the sample, is accomplished through the use of random sampling. An identical probability is assigned to each individual member of the population when using random sampling. This decreases the possibility of bias and increases the likelihood of receiving a sample that is both objective and representative of the rest of the

population. It is the statistical inference that comes in third. The deployment of statistical inference procedures is made possible by the usage of random sampling. It is more likely that random samples will be representative of the population as they are chosen at random. As a result, statistical methods can be utilised to estimate population parameters, such as means, proportions, or correlations, by making use of sample data that has a known likelihood of error. Because of this, researchers are able to draw conclusions about the population that are reliable and accurate by analysing data acquired from a sample. Furthermore, when compared to other methods of sampling, the efficiency of random sampling is considered to be significantly higher. It is possible that it would be impractical or impossible to conduct surveys or studies on each and every individual in a large group. The researchers are able to get a representative sample that is of a manageable size through the use of random sampling, which in turn reduces the costs, amount of time, and resources that are required for the data gathering and analysis processes. To recap, random sampling offers a number of advantages, such as the capacity to accurately represent a population, the reduction of bias, the facilitation of statistical inference, the efficient collection of data, the uncomplicated implementation, and the enhancement of transparency and objectivity. The widespread use of this methodology and its reputation in research and survey methodology are both partially attributable to these benefits.

3.7.2 Regression Analysis

For the purpose of this investigation, regression analysis will be utilised to carry out the stock selectivity and market timing models for each fund with respect to each country. According to Studenmund (2014), regression analysis is an appropriate research approach that may be utilised to define economic relationships in a quantitative study such as this one in order to provide answers to the research questions. One of the primary goals of conducting a regression

analysis is to determine whether or not there is a significant link between the variables that are independent and those that are dependent.

For the purpose of a regression analysis, it is necessary to have a sample in addition to theory concerning the variables that are being researched. This is done so that the changes in the dependent variable that are caused by movements in the independent variables may be observed. For the purpose of presenting the direction and strengths of the quantitative relationships in our models that are being analysed, this is a suitable metric.

3.7.3 Research Work Flow

A summary of the framework that is used to investigate the hypothesis of this study is presented in Figure 3.1, which can be found below. The framework provides an explanation of the steps that were followed from the stage of data collection to the stage of data analysis and discovery. In order to investigate the stock selectivity abilities and market timing capabilities of mutual fund managers, each of the funds is subjected to regression analysis.

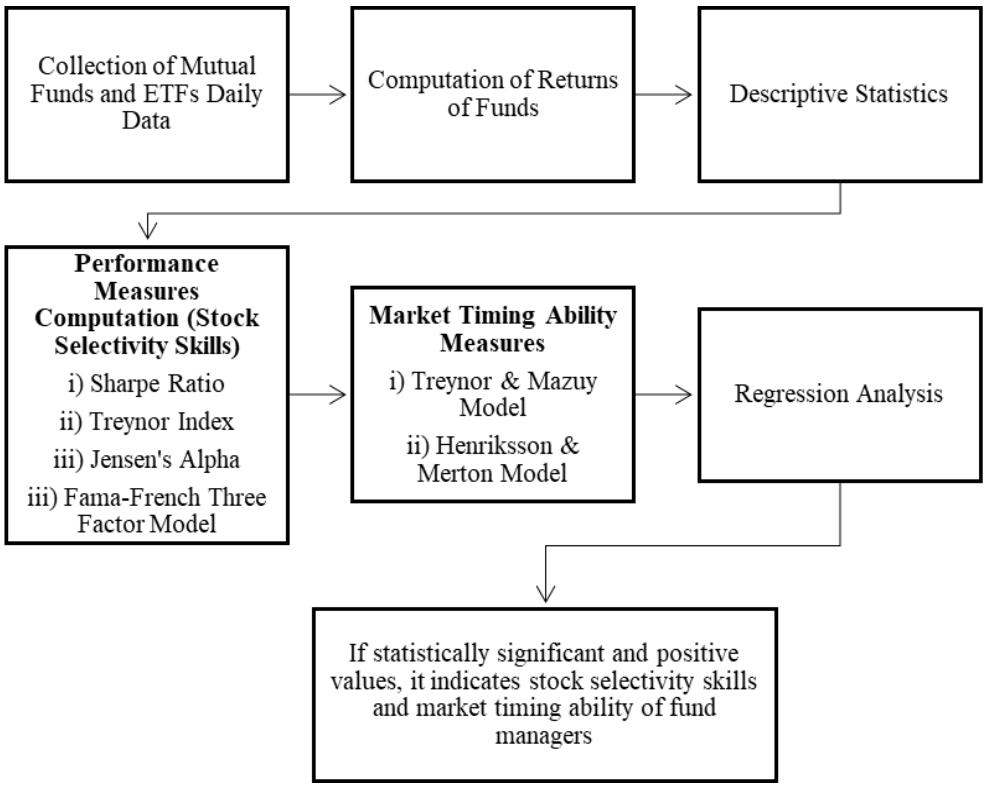

Figure 3.1: Data Analysis Framework

3.8 Descriptive Statistics

Before beginning the process of developing the regression model, it is essential to have a high-level overview and summary of the sample dataset. In accordance with Wooldridge (2013), it is of the utmost importance to construct a collection of descriptive analysis and to summarise all of the statistics that pertain to the data. The objective of the descriptive statistics is to fulfil the function of providing information regarding the sample and the predominant values. For the period of time spanning from 2015 to 2022, this section will provide a description of the descriptive statistics of the fifty mutual funds that are evaluated in this study for seven different countries. This results in a total of 2087 observations being included in the sample for each jurisdiction. There are 25 funds that are based on bonds and 25 funds that are based on equity for each country that is being monitored. Furthermore, the benchmarks for each country are also covered in this comprehensive report. Additional topics that will be covered in this part include the mean, median, standard deviation, minimum return, and maximum return.

3.8.1 Mutual Funds Descriptive Statistics

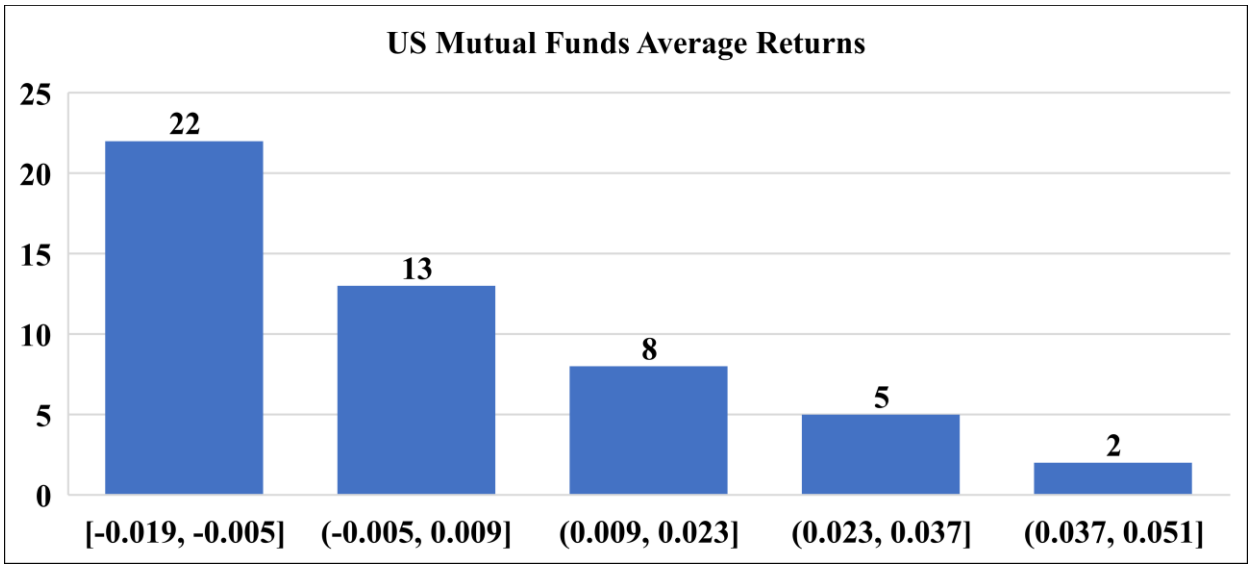

Figure 3.2: Histogram of US Mutual Funds Average Returns

Appendix A.1 has a display of the descriptive statistics for each of the fifty mutual funds in the United States that were included in this study. Overall, the average returns for the mutual funds examined in the United States market displays that the returns vary from -0.019 to 0.051. From the figure that follows, it is possible to see that the average returns of the mutual funds that were investigated for this study in the United States that lie between the range of -0.019 to -0.005 which was majority of funds of 22 out of the 50 mutual funds having returns that fall within this specified range. Moreover, 13 out of 50 mutual funds documented an average return between -0.005 to 0.009. A return of 0.037 was found to be the average returns of market benchmark, which is the S&P 500 index. As a result, it is clear that just two equity funds are able to provide average returns that are equal to the market benchmark. These funds are the Adaptive Growth Opportunities Funds, which have an average return of 0.039, and the Invesco Gold and Special Minerals Funds, which have an average return of 0.044. In addition, the average median of returns for the fifty mutual funds in the United States was documented to be 0.012, which shows that it is still lower than the median of the benchmark, which was 0.029. The dispersion of the data in relation to the mean value is what the standard deviation is a measurement of. The fund in the United States has a standard deviation that is approximately 0.813 on average.

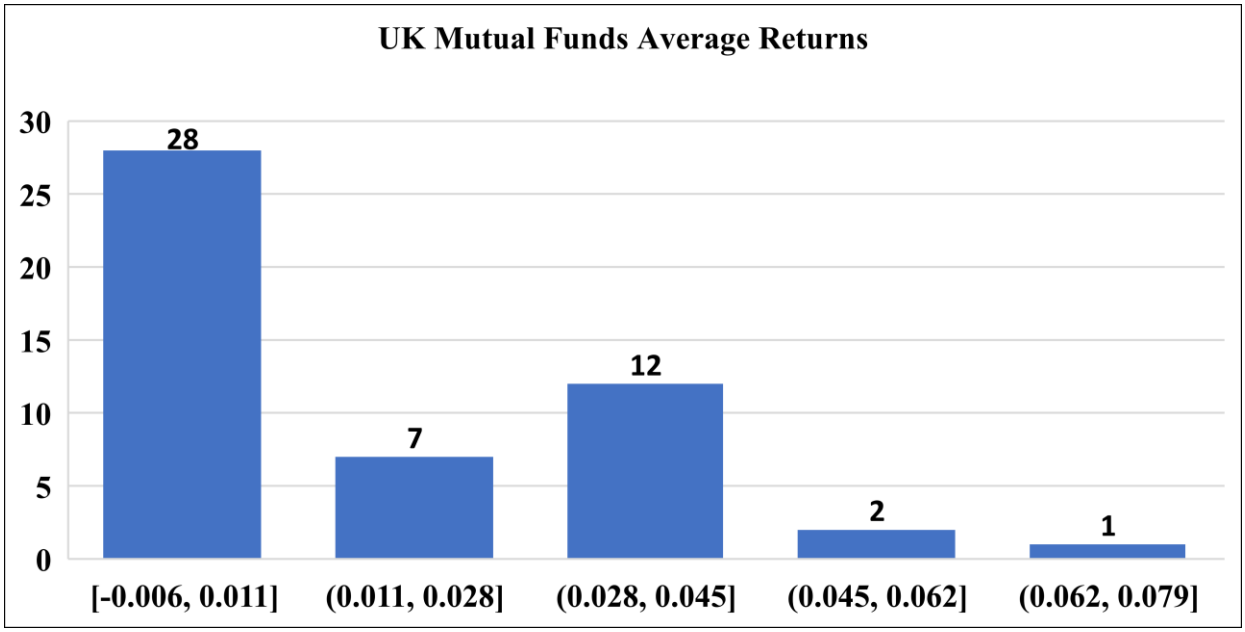

Figure 3.3: Histogram of UK Mutual Funds Average Returns

Furthermore, the appendix A.2 contains a summary of the statistics that pertain to the mutual funds that were investigated in the United Kingdom. The research revealed that the average return on the market benchmark in the United Kingdom was reported at 0.012 throughout the time period under consideration. As a whole, the average returns for the mutual funds that were investigated in the market of the United Kingdom show that the returns range from -0.006 to 0.079. According to Figure 3.3, it is possible to observe that 28 out of fifty funds generated average returns that were lower than the benchmark, which falls between the range of -0.006 to 0.011. The remaining 22 mutual funds that were investigated had an average return that was greater than the market benchmark. returns compared to the benchmark index returned higher than the market benchmark. The Baillie Gifford American Fund, which is an equity-based mutual fund that concentrates the majority of its investments in the technology sector, garnered the greatest average return of 0.067 and the median return of 0.085. This fund is the mutual fund that earned the highest return. It is noteworthy that the average median returns of mutual funds in the United Kingdom are 0.022, which is greater than the average median returns of the benchmark. A standard deviation of approximately 0.690 is found to be the average for the data sample.

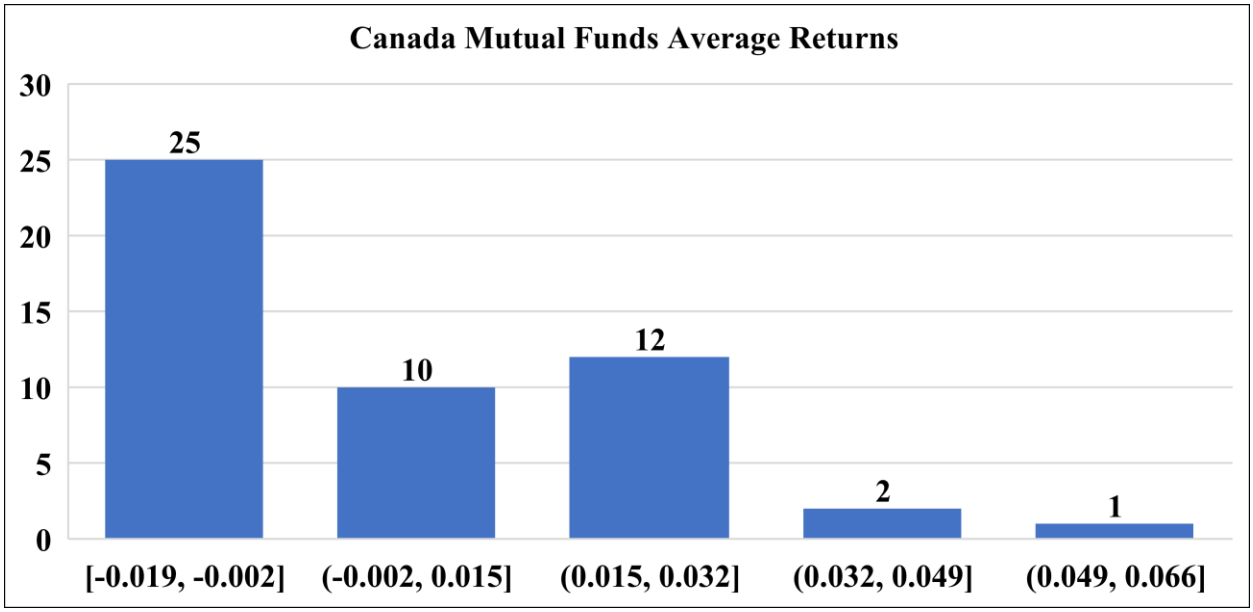

Figure 3.4: Histogram of Canada Mutual Funds Average Returns

While the TSX 60 stock index, which serves as the market benchmark for Canada, is expected to generate around 0.020 percent of return from 2015 to 2022, the average returns of the fifty mutual funds that are currently being probed in Canada are expected to generate 0.005 percent of return. The descriptive statistics of the mutual funds that are available in Canada are included in Appendix A.3, which you may find here. From -0.019 to 0.066, the average returns of the fifty mutual funds that were investigated in the Canadian market ranged from negative to positive. Out of the fifty funds that were looked into, twenty-five of them had an average return that fell somewhere between -0.019 and -0.002. According to the statistics, only eleven out of fifty funds in Canada are able to create returns that are higher than the market benchmark. This is a really impressive achievement. This constitutes around twenty-two percent of the mutual funds that were subjected to the investigation. The fund that earned the highest returns during the time period that was under review in Canada was the AGF American Growth Class, which is an equity fund that has assets in a number of industries including industrials, health care, and financials. The investigation was conducted in Canada. Relative to the median of the benchmark, which is 0.039, the median of the returns on mutual funds in Canada is 0.011,

which is lower than the average. This is because the benchmark median is 0.039. The standard deviation for the funds is relatively low, coming in at 0.662, which suggests that the majority of the data is concentrated around the mean than any other point in the distribution.

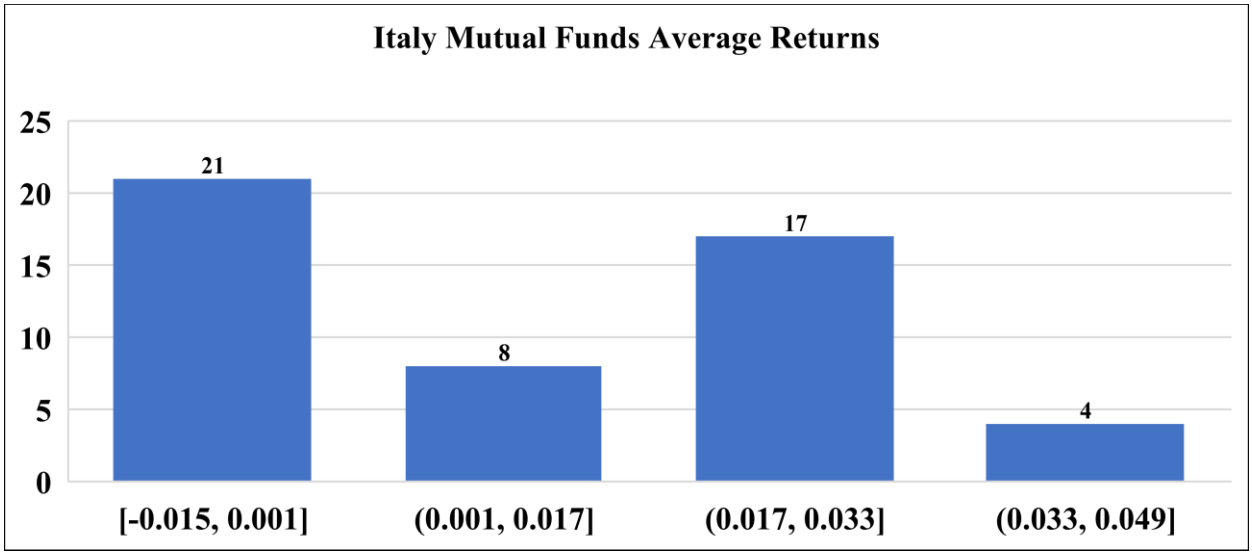

Figure 3.5: Histogram of Italy Mutual Funds Average Returns

An investigation is being conducted into Italy, which is the fourth country in the group of seven countries known as the G7. The descriptive data of the Italian mutual funds that are currently available can be found in the appendix A.4 of this document. An average return of 0.021 percent is anticipated to be generated by the market benchmark in Italy, according to estimates. The average returns of the mutual funds that were investigated in Italy range from -0.015 to 0.049 according to the overall data. There are twenty mutual funds that are capable of generating better average returns in comparison to the benchmark, and these funds are the subject of the investigation that is being conducted in Italy. Based on this information, it can be deduced that a smaller percentage of mutual funds are capable of achieving returns that are higher than the average. In addition, the median returns are lower than the median returns of the benchmark, which are 0.052, which range from around 0.017 to 0.052 respectively. The standard deviation of the funds in Italy is roughly 0.682 percentage points on average. This is something that may be found in Italy. Over the course of the time period in question, BNZ

Azioni America, which is an equity-based fund that predominantly invests about forty percent of its assets in the technical sector, achieved the remarkable achievement of generating the greatest average return in Italy.

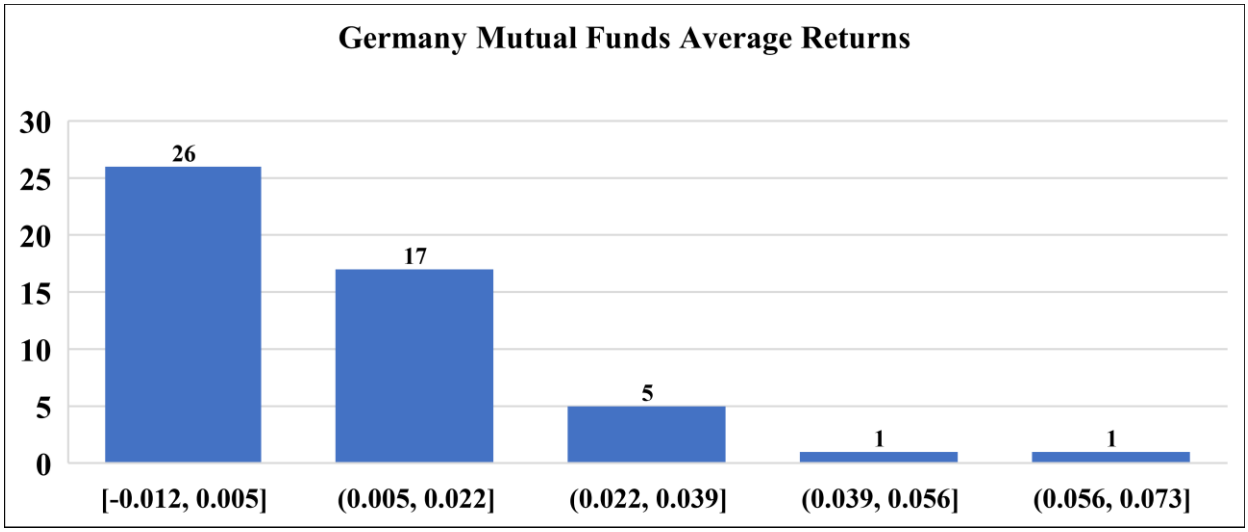

Figure 3.6: Histogram of Germany Mutual Funds Average Returns

The following thing to take into consideration is that the average return generated by the fifty mutual funds in Germany is 0.007, which is a significant amount lower than the average return generated by the market benchmark, which is 0.022. The statistics that pertain to the mutual funds that are available in Germany are summarised in Appendix A.5, which can be found here. The average returns of the fifty mutual funds range from -0.012 to 0.073, with the average return being -0.012. Only seven of the fifty funds were able to generate higher average returns in comparison to the returns of the benchmark index in Germany, which falls in the range above 0.022. This is according to the findings of the investigation, which were presented in the report. An equity mutual fund is a type of mutual fund that includes each and every one of these seven funds. The median returns of mutual funds in Germany are 0.017, and the average standard deviation is 0.673. The median returns are based on the average standard deviation. The Earth Gold Equity Fund is the fund that has generated the highest average returns among all of its investments, with a mean of 0.071. This fund has been the most successful overall. The

beginning of this equity-based fund can be traced back to the year 2008, and it is currently primarily concerned with investments in the basic materials sector.

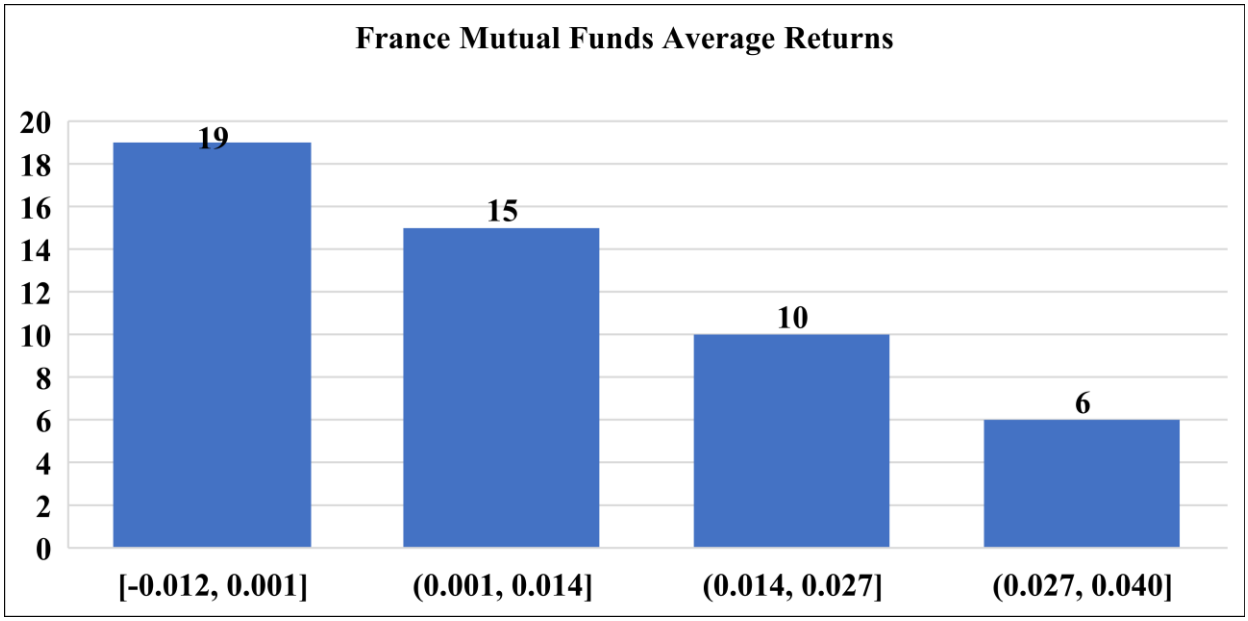

Figure 3.7: Histogram of France Mutual Funds Average Returns

When we take a look at the statistical overview that is provided in Appendix A.6, we can see that the average return of the benchmark index for France is approximately 0.028 percent, whereas the average return of all fifty funds that were investigated was approximately 0.009 percent. This is something that we can see by looking at the data. In general, the mutual funds that were investigated in France have a range that goes from -0.012 to 0.040. Within the context of France, the majority of the funds exhibit positive average returns. With Hanseatique B recording the highest average return of 0.039 percent, there is a very small probability that twelve percent of the funds in France will be able to provide better average returns than the benchmark. However, this probability is extremely low. One can observe this by looking at the distribution of mean returns, which is depicted in Figure 3.7, which can be found in the previously mentioned section. It is clear from looking at the figure that this is the situation that will occur. By way of example, the fund in question is an equity-based investment vehicle that holds assets in a wide variety of different industries. These industries include manufacturing,

energy, technology, and basic materials, among others. It is important to note that the average median value that was obtained for the funds is 0.014, which is significantly lower than the value of the CAC 40 index, which is 0.040.

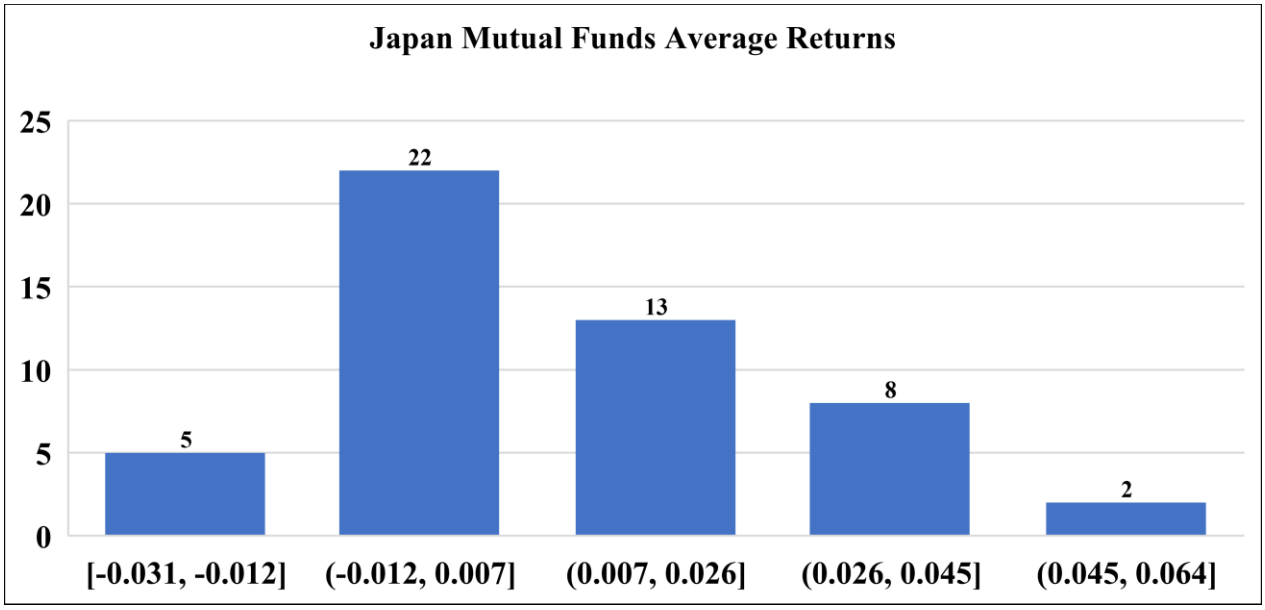

Figure 3.8: Histogram of Japan Mutual Funds Average Returns

Japan is listed seventh on the list of countries that represent the Group of Seven (G7). The funds that were investigated in Japan had average returns that fell somewhere in the range of -0.012 to 0.007 percent based on the findings of the investigation. According to the histogram, the majority of the funds averages fell into the range of -0.012 to 0.007. This was the case. An average return of 0.027 percent is being offered to investors by the market benchmark at the present time. The total number of funds that are available is fifty; however, only ten of those funds are able to generate returns that are greater than the index that serves as the benchmark. It was determined that the funds generated an average return of 0.008 percent over the course of the investment. The investment vehicle that has managed to generate the highest return up to this point in time is the BNYMellon US Manufacturing Industry Equity Fund. The median rate of return for the funds was 0.006 during the period beginning in January 2015 and ending

in December 2022. A calculation was made to determine this rate of return for the time period beginning in January of 2015. A presentation of the statistics that constitute a summary of each individual fund is also included in Appendix A.7.

3.8.2 Exchange-Traded Funds (ETFs) Descriptive Statistics

Following the explanation of the descriptive statistics of the mutual funds in the G7 countries, exchange-traded funds, the next analysis in this study will be carried out to explain the descriptive statistics of the exchange-traded funds. Analysis of actively managed exchange-traded funds in the United States is the focus of this particular research project. Throughout the course of this investigation, the descriptive statistics of these funds will be thoroughly discussed.

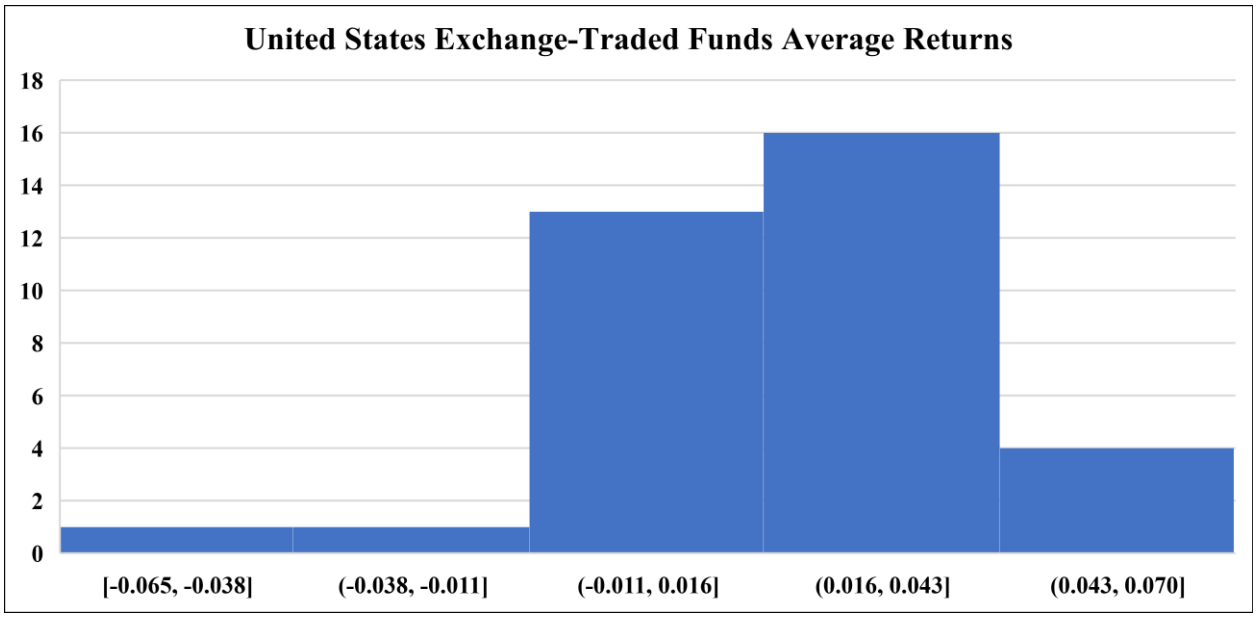

Figure 3.9: Histogram of United States Exchange-Traded Fund Average Returns

Within the context of the analysis on exchange-traded funds (ETFs), the United States market is examined using a total of thirty-five actively managed ETFs. According to the descriptive statistics that are presented in Appendix A.8, the average returns of the 35 funds each range from 0.021 to 0.039, with the passively managed exchange-traded fund having the highest average return. Across the board, the average returns of the 35 actively managed exchange-

traded funds in the United States ranged from -0.065 to 0.070. Among the 35 funds, only five of them were able to generate an average return that was higher than the passively managed exchange-traded fund (ETF). This is an intriguing discovery. The Ark Next Generation Internet ETF is the fund that has the highest average return, followed by the Ark Innovation ETF and the Ark Genomic Revolution ETF and then the Ark Next Generation Internet ETF. From January 2017 until December 2023, the funds had a median rate of return of 0.026 percent. This rate of return was calculated over the specified time period. In the following chapter, we will talk about the analysis that was done to study the skills of stock selectivity and market timing ability.

3.9 Chapter Summary

The methodology that was utilised to carry out the study is described in this chapter. This methodology includes the research design, the methods that were utilised to gather data, and the strategies that were utilised to analyse the data. These methods were selected in order to answer the research questions and achieve the study objectives. Specifically, a quantitative analytical approach is utilised in the research. When it comes to conducting performance measures and analysis, a sequential explanatory design is utilised, beginning with the collection and assessment of quantitative data. This is done for the goal of performance evaluation. Data for fifty mutual funds from each of the seven nations that make up the G7 are included in the sample, in addition to thirty-five actively managed exchange traded funds from the United States. Both mutual funds and exchange-traded funds are subjected to a comprehensive analysis and debate in this chapter, which includes a comprehensive review of its descriptive statistics. A complete analysis of a number of performance metrics, such as market timing ability measurements and stock selectivity skills measures, will be presented in the following chapter on top of that. A comprehensive analysis and explanation of these measurements will be provided in this chapter.

CHAPTER 4 RESEARCH FINDINGS

4.1 Introduction

In this chapter, a comprehensive analysis of the overall performance of mutual fund managers in the G7 nations will be explained and discussed. The outcomes of the study, as well as the findings of the empirical research, will be presented. The first part of this article talks about the performance of mutual funds based on the Treynor Index and the Sharpe Ratio. Following that, the outcomes of the stock selection skills of mutual fund managers will be shown in the second segment, which will also include the Single Index. Additionally, the Fama-French Three Factor Model and Jensen's Alpha. Following that, the results on the market timing abilities of mutual fund managers, which includes the Treynor and Mazuy market timing model as well as the Henriksson and Merton market timing model, will be analysed and described in this chapter. In addition, the conclusions and findings of the analysis that was carried out on actively managed exchange-traded funds in the United States will be discussed in this chapter.

4.2 Mutual Fund Performance

An evaluation of the performance of mutual funds and a determination of whether or not the funds have the potential to outperform the market are the primary goals of this study. The performance of the funds will be superior to that of the market if the performance metric is higher than the benchmark, which is the return on the market. To illustrate the comparison of excess returns to total risk (standard deviation), as determined by the Sharpe ratio and the Treynor ratio, the following table presents the results for each fund in each of the seven countries that were investigated. Through the use of this metric, the unit of profit that was earned while taking on additional risk is displayed.

Both the Sharpe ratio and the Treynor ratio are metrics that are utilised in the process of evaluating the performance of investment portfolios or mutual funds, taking into consideration the level of risk that is involved throughout the process. Their respective approaches to risk, on the other hand, are quite different from one another.

A high Sharpe ratio indicates that a mutual fund has generated superior returns in relation to its level of risk, when compared to a risk-free asset such as Treasury bills, after taking volatility into account. One example of such an asset is the United States Treasury bills. The essence of the matter is that it indicates that the fund has generated higher returns in comparison to the amount of risk that it has taken. As a general rule, investors prefer funds that have higher Sharpe ratios because these funds are able to provide superior returns that are adjusted for risk exposure.

On the other hand, a low Sharpe ratio indicates that the fund has not generated sufficient returns in relation to the amount of risk that it has taken on. Based on this information, it appears that the returns offered by the fund might not be adequate in relation to the level of risk or volatility that it makes available to investors.

In contrast to the Sharpe ratio, the Treynor ratio evaluates the performance of the fund in relation to the amount of systematic risk (beta) that it takes on. When the Treynor ratio is high, it indicates that the fund has produced superior returns in comparison to the amount of systematic risk that it carries. Systematic risk is the risk that cannot be eliminated by diversifying investments across a variety of assets, this type of risk cannot be eliminated. Investors who are primarily concerned with systematic risk may have a preference for funds that have higher Treynor ratios because these funds offer superior returns in comparison to this particular type of risk.

When the Treynor ratio is low, it indicates that the fund's returns are not sufficient when compared to the level of systematic risk that it is exposed to. The fact that this is the case suggests that the fund may not be compensating investors adequately for the level of systematic risk that it exposes them to in comparison to the market as a whole. In general, high Sharpe and Treynor ratios are indicative of superior risk-adjusted performance. The Sharpe ratio takes into account both systematic and unsystematic risk, whereas the Treynor ratio is specifically designed to evaluate systematic risk.

Understanding the performance of mutual funds is essential for investors because it provides vital information about the efficiency with which a fund has historically managed investments in relation to the goals and standards that it has set for itself. The level of stability, level of risk, and cost-effectiveness of the fund can be evaluated by investors with the assistance of performance measurements. These measurements include returns, risk-adjusted measures, and expense ratios. Through the provision of information regarding whether or not the fund is in accordance with an individual's financial aims, ability to handle risk, and projected returns, this comprehension influences the choices that are made regarding investments. As an additional benefit, investors are able to analyse their progress towards their goals, make any required adjustments to their portfolios, and continue to retain openness and responsibility in the administration of funds when performance is continuously monitored.

4.2.1 United States

The results obtained from the fifty funds that were examined in the United States are presented in Table 16 of the appendix. The results show that every single fund produced a Sharpe Ratio that was negative. According to this research, the Sharpe ratio of funds in the United States falls somewhere in the range of -27.73 to -0.45. When the value is negative, it implies that the risk-free rate is higher than the historical returns of the portfolio of investments. On the other

hand, the Sharpe ratio of the market benchmark in the United States is 0.84. The fact that this is the case demonstrates that there are no funds that are able to generate a Sharpe ratio that is higher than the market benchmark. The Sharpe Ratio of the market index is 0.84, which is higher than the average Sharpe ratio of all fifty mutual funds in the United States, which is -3.00. The fund that displayed the highest Sharpe ratio in the United States was the Invesco Gold and Special Minerals Fund A, which had a ratio of -0.45. On the other hand, the fund that displayed the lowest Sharpe ratio was the Invesco Conservative Income Fund, which had a Sharpe ratio of -27.77. The findings that were collected indicate that it is difficult for mutual funds to achieve a higher level of performance than the market benchmark. In his study, Sharpe emphasised that fund managers who aim to outperform their competitors typically do so by allocating and picking the securities, but not by perfectly timing the market (Sharpe, 1966). Sharpe's paper was published in 1966. Justification for the failure of mutual fund managers to outperform the market is provided by the fact that the Sharpe ratio for all of the funds is negative.

Following that, the Treynor Index is computed using the sample funds that were presented previously in the process. The Treynor index values for the funds reveal a range that extends from -3.04 to -0.91, with a value of -1.87 serving as the average. The range of values is indicated by the Treynor index. A benchmark for the market, the Treynor index, is currently at 0.98. This index serves as a standard for the market. It was not possible for any mutual funds to achieve a ratio that was higher than the market benchmark. The vast majority of the mutual funds, which accounted for all of the funds, had a Treynor ratio that was lower than the average for the market. This was the case for all of the funds. One of the funds that had the greatest Treynor ratio was the AllSpring Discovery SCG Fund, which had a score of -0.91 on the index. On the other side, the Treynor ratio for the bond fund known as Vanguard Long-Term Investment Grade FD was the lowest of all the investment funds, coming in at -3.04.

4.2.2 United Kingdom

Within the context of mutual funds in the United Kingdom, the funds had a Sharpe ratio that was positive and ranged from 0.015 to 0.165. 0.02 was the value that was recorded for the Sharpe ratio of the benchmark index. By delivering a higher Sharpe ratio, this demonstrates that 47 out of 50 funds, which accounts for 94% of the total number of mutual funds in the United Kingdom, are able to exceed the benchmark index. The positive readings are an indication that the mutual fund is performing well in terms of its performance. The average Sharpe ratio of all fifty mutual funds in the United Kingdom is 0.051, which is greater than the market benchmark. This indicates that the market is performing better than the market benchmark. The fund that had the highest Sharpe ratio in the United Kingdom was the Liontrust Monthly Income Bond, which had a ratio of 0.165. On the other hand, the fund that had the lowest Sharpe ratio was the Scottish Widows UK Equity Income Fund, which had a value of 0.015. Through the utilisation of the Sharpe Ratio, the data reveal that mutual funds throughout the United Kingdom demonstrated greater performance in comparison to the benchmark. This was seen. On the other hand, the Treynor ratios of the sample funds display a range of values that extends from 0.024 to 0.263, with 0.11 being the average value. The evidence that is currently available reveals that every single fund has a Treynor ratio that is higher than the benchmark for the market index, which is 0.022. When compared to the market portfolio, the performance of mutual funds in the United Kingdom is significantly higher, as demonstrated by this noteworthy observation, which provides solid proof. The best Treynor index value was attained by the M&G Gilt & Fixed Interest Income bond fund, which was 0.263. This score indicates that the fund experienced outstanding risk-adjusted performance. On the other hand, the NFU Mutual UK Equity Income fund had the lowest Treynor index value, which was 0.024, but it still managed to surpass the market benchmark. The gap in outcomes that was discovered between the Sharpe ratios and Treynor ratios implies that mutual funds are exposed to a large

amount of unsystematic risk. As a result, investors anticipate bigger returns as a sort of compensation for taking on a greater level of risk.

4.2.3 Canada

Based on Table 18 from the Appendix, the findings that were obtained from the fifty funds that were examined in Canada demonstrate that each and every fund produced a Sharpe Ratio that was negative. The Sharpe ratio of funds in this study for Canada runs from -22.23 to -1.50, with the market benchmark in Canada registering a Sharpe ratio of -1.96. The market benchmark in Canada is a Canadian market. This demonstrates that out of the fifty funds that were examined, nine funds, which is equivalent to eighteen percent of the total funds, were able to generate a Sharpe ratio, and all of these funds were equity-based. Despite the fact that the funds achieved a greater Sharpe ratio than the market, the ratio is still in the negative levels. The fund that recorded the highest Sharpe ratio in Canada is the Desjardins American Equity Growth Fund, which has a ratio of -1.50. On the other hand, the fund that recorded the lowest Sharpe ratio is the Educators Mortgage & Income Class fund, which is a bond fund. Based on the statistics, it appears that mutual funds are having a difficult time outperforming the market benchmark in terms of performance.

With a mean value of -6.18, the Treynor index of mutual funds in Canada has a range that extends from -12.84 all the way down to -2.08, with a mean value of -6.18. Due to the fact that the Treynor index of the market benchmark is currently at -1.96, it is possible to draw the conclusion that not even a single one of the fifty funds was able to achieve a Treynor ratio that was higher than the benchmark. The fact that the performance of the mutual funds has been significantly lower than that of the market portfolio is made abundantly clear by this. With a score of -2.084, the CI American Small Companies stock fund has the highest Treynor index of any diversified investment vehicle. Compared to other funds, this provides it with the

greatest advantage. The opposite is true for the Desjardins Emerging Markets Bond fund, which has a Treynor ratio value of -12.84, making it the fund with the lowest value. This fund represents the fund with the lowest value.

4.2.4 Italy

The findings that were reported in Table 19 from the Appendix indicated that every single one of the fifty funds that were evaluated in Italy exhibited a Sharpe Ratio that was significantly negative. In this section, an overview of these findings is offered. According to the findings of this study, the Sharpe ratio for funds that are invested in Italy might fall anywhere between -51.26 and -1.35, whilst the Sharpe ratio for the market benchmark in Italy is reported as being -1.27. This illustrates that among the fifty funds that were evaluated, none of them were able to generate a Sharpe ratio that was higher than the market throughout the time period that was under consideration for the investigation. Bond Strategia Prudente Class is the name of the Italian bond fund that has the Sharpe ratio that is the lowest among all Italian funds. With a Sharpe ratio of -1.35, the Arca Azioni Italia fund is the one that holds the distinction of having the highest Sharpe ratio in Italy. Bond Strategia Prudente Class is the Italian fund that has the greatest Sharpe ratio of any other fund in the country.

Additionally, according to the statistics, none of the fifty mutual funds are able to successfully create Treynor ratios that are higher than the market benchmark. This is in contrast to the market benchmark. In line with the Treynor index, which was utilised for the purpose of performance evaluation, this is the case. With the Treynor ratio for the market benchmark being recorded as -1.855 and the range for the Treynor ratio being from -7.93 to -2.02, we are able to draw the conclusion that even when systematic risk was taken into consideration, none of the funds were able to achieve a higher level of performance than the market benchmark. This is because the Treynor ratio ranged from -7.93 to -2.02. One of the funds that has the highest Treynor Index is Arca Azioni Italia, which has a value of -2.03 for its index. According to the

results of the Sharpe ratio, this agrees with the findings. Alternatively, the fund that has the lowest Treynor Index is the Allianz Reddito Globale, which is a bond-based fund.

4.2.5 Germany

The Sharpe ratios of the fifty different mutual funds that were examined when looking specifically at Germany ranged from -1.52 to -0.063. This was the case when looking at Germany in particular. It turned out that this encompassed a good deal of ground. It turned out that every single one of the fifty funds had a Sharpe ratio that was in the negative value. For the benchmark market in Germany, the Sharpe ratio was recorded as being -0.15, which is a negative value, according to the information that is currently available. A Sharpe ratio that was higher than the benchmark was only found in three funds, which accounts for 6% of the total pool of mutual funds in Germany. The only funds that had a Sharpe ratio that was higher than the benchmark were these three types of funds. Equity-based funds are a specialised type of fund that can be utilised in conjunction with all three of the funds that were previously mentioned. With a value of -0.063, the Earth Gold Fund has the highest Sharpe ratio of any investment vehicle. This is a fact that is particularly noteworthy. When compared to the other funds that were investigated, the Sharpe ratio of the HSBC Strategie Substanz Ad fund, which was classified as a bond fund, resulted in the lowest value.

Additionally, the findings indicate that only one out of fifty mutual funds is successful in producing Treynor ratios that are higher than the market benchmark. This comes as a result of the statistical analysis. According to the Treynor index, which evaluates the performance of funds in comparison to market benchmarks, this is the correct conclusion. While the Treynor ratio of the market benchmark was -0.191, the Treynor ratios of the fifty mutual funds ranged from -1.377 to -0.19 across the board. The market benchmark was categorised as a market benchmark. When compared to the other funds that were investigated, the HSBC German Equity fund had the highest Treynor Index value, which was 0.19. Alternatively, the Union

Investment PrivatFonds Unirent, which is a bond fund, has the lowest Treynor Index with a value of -1.38. This is in contrast to the other bond funds.

4.2.6 France

According to the findings of the research that was carried out on the French mutual funds, each and every one of the funds has a negative Sharpe ratio, with the range of values ranging from -9.56 to -0.42, as demonstrated by the data that was obtained. Given that the benchmark for equity funds in France produced a Sharpe ratio of -0.44, it can be deduced that both the Mandarine Valeur G Gest and the Oddo BHF Metropole Selection were able to achieve a Sharpe ratio that was higher than the benchmark. There was only one fund in the top 96 percent that did not manage to outperform the market benchmark, and that fund was the Octo Credit Court Terme bond fund. It had the lowest Sharpe ratio, with a value of -9.76, and it was the only fund in the top 96 percent.

In addition, the incorporation of systematic risk makes it possible to compute the Treynor ratio, which reveals that all of the funds had negative ratios. This is made possible by the fact that the Treynor ratio is computed. After careful analysis, it was determined that the ratio with the highest value was -2.84, while the ratio with the lowest value was recorded as -0.58. The Treynor ratio of the benchmark was -6.62, which would be considered a negative value. In the current scenario, there are three funds that have demonstrated superior performance in comparison to the index that serves as the benchmark. Every one of these equity-based funds is one of the three funds that have shown impressive performance over the course of their existence. The fund that not only had the highest Treynor ratio but also the highest Sharpe ratio was the Mandarine Valeur G gest fund. It was the fund that had the highest Treynor ratio. The Treynor ratio for this fund was -0.58, and the Sharpe ratio for this fund was also the highest of any fund in the universe. The Allianz Obligations Internationales D bond fund, on the other hand, had the Sharpe ratio that was the lowest of all the funds that were investigated.

4.2.7 Japan

The Sharpe ratio and the Treynor ratio are both utilised in order to evaluate the performance of Japanese mutual funds in comparison to the market. This evaluation is done from the perspective of the market. All of the mutual funds that were investigated had negative Sharpe ratios that fell within the range of -0.61 to -0.02, according to the findings of the research. The median Sharpe ratio for the fifty different mutual funds that were investigated was found to be -0.15. A Sharpe ratio of -0.04 was obtained by the benchmark index, and eleven out of the total of fifty funds were able to achieve a result that was superior to this rating. Equity-based funds are the foundation of each and every one of these eleven distinct funds. The BNYMellon US Manufacturing Industry Equity Fund had the highest Sharpe ratio of all the funds that were evaluated, with a value of -0.02 for the metric. This was the case because the fund had the highest performance. The Sompo Japan Bond Fund, on the other hand, had the lowest Sharpe ratio, earning a value of -0.61 for its performance. This was the fund that had the worst performance.

Additionally, it is essential to take note that all fifty funds had negative Treynor ratios, with the BNYMellon US Manufacturing Industry Equity Fund recording the highest ratio and the Sompo Japan Bond Fund having the lowest ratio. This is an important fact to keep in mind. It is important to point out that the BNYMellon US Manufacturing Industry Equity Fund had the highest ratio of assets to liabilities. Both the results that were obtained and those that were discovered through the use of the Sharpe ratio agree. It was determined that the Treynor ratio for the market benchmark was -0.05, which indicated that the performance was not as good as it could have been. However, it is interesting to note that three equity funds had performance that was superior to that of the benchmark.

4.3 Jensen’s Single Index Alpha Model

The ability of mutual fund managers in the G7 nations to select stocks is the subject of the second objective of this research project. According to Jensen's alpha, the difference between the return that the portfolio generated above the risk-free rate and the return that was predicted by the market model is the amount of variance. Jensen (1968) asserts that the alpha measure of portfolio performance is the basis for determining a portfolio manager's selectivity capabilities and that it serves as the foundation for evaluating a portfolio manager's ability to outperform the market.

It is possible for Jensen's alpha to take on either positive or negative values, which indicates whether a portfolio has outperformed (positive alpha) or underperformed (negative alpha) its benchmark. A condensed explanation of the typical implications of high and low values of Jensen's alpha is provided in the following paragraphs. A positive alpha of a high magnitude indicates that the portfolio has generated returns that are greater than what would be anticipated based on the level of risk (beta) that it possesses in comparison to the benchmark. In most cases, this is considered to be an indication that the portfolio manager has effectively managed the portfolio or has demonstrated exceptional performance.

For example, if a portfolio has a Jensen's alpha of +2%, this indicates that the portfolio achieved a return that was 2% higher than the benchmark, provided that the level of risk that the portfolio was exposed to was taken into consideration. Having a marginally positive alpha that is getting closer to zero indicates that the performance of the portfolio is approximately consistent with the outcome that was anticipated, taking into consideration the risk level that it possesses in comparison to the benchmark. That the portfolio manager has achieved results that are neither significantly better nor significantly worse than what was anticipated is the implication of this

statement. A negative alpha, on the other hand, indicates that the portfolio has performed worse than the benchmark when taking into consideration the level of risk it carries.

It serves as evidence that the decisions made by the portfolio manager regarding the selection of stocks or the timing of market movements have had a detrimental effect on performance in comparison to the benchmark. Positive Jensen's alpha values indicate superior performance in comparison to the benchmark, which may suggest the presence of managerial expertise or effective investment strategies.

Additionally, high Jensen's alpha values indicate exceptional performance. When Jensen's alpha values are low, which means they are close to zero or negative, it indicates that the performance is either at the expected level or below it. Investors and analysts who are interested in determining the effectiveness of investment decisions and portfolio management strategies will find this metric to be extremely beneficial.

4.3.1 United States

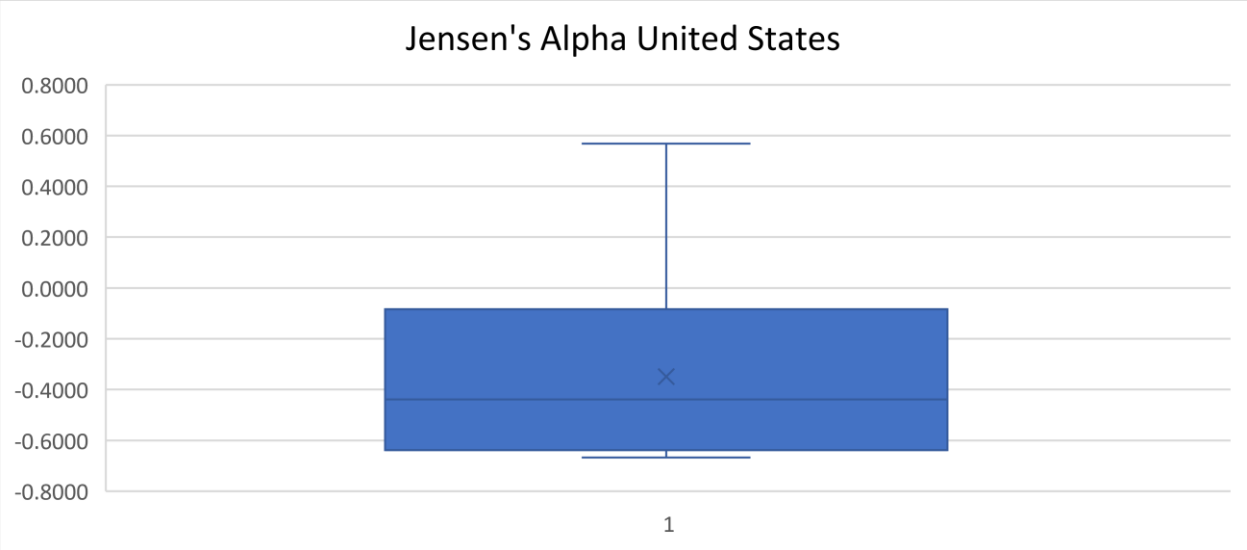

Figure 4.1: Box Plot on Jensen's Alpha in United States
Note: Jensen's Alpha regression analysis results have been presented in Appendix 4.

This study has begun with an examination of the United States of America as the first country to be examined. The Jensen's Alpha analysis conducted in the United States revealed that the average alpha is -0.35, with the highest alpha occurring at 0.57 and the lowest alpha occurring at -0.67. This information is based on Figure 4.1. Considering the level of systematic risk that was present, the findings indicate that the mutual funds, on average, did not perform as expected and earned a sum that was -0.35 less than what was anticipated. On the other hand, out of the fifty funds that were investigated, only six funds achieved positive numbers and alphas that were greater than zero, while forty-four funds achieved negative values. On the other hand, the distribution of alpha frequencies is significantly skewed to the left, with only six funds having positive alpha values and forty-four funds having alpha values that are less than zero. It is clear from this that the management of the fund is unable to accurately forecast future prices with a level of precision that would allow them to outperform the market on average.

A test of the significance of the results at the 5% level suggests that only three of the six funds with positive alpha are statistically significant, while the remaining funds do not meet the

criteria for statistical significance. There are 39 out of 44 funds that are statistically significant at the 5% significance level when it comes to the negative alpha values. The ability of mutual fund managers to select stocks is demonstrated by three different mutual funds among the mutual fund industry. These funds are primarily invested in the equity market, with a specific concentration on companies based in the United States. The Fidelity SMCP Discovery Fund stands out among these funds because it has the highest alpha, which is 0.57. This indicates that it has produced superior performance in comparison to its benchmark. Approximately ninety-five percent of this fund's investments are placed in the stock market. Although there are a few mutual funds that exhibit stock selectivity capabilities, our research indicates that, on average, fund managers in the United States do not possess such capabilities. To be more specific, only three funds had positive alpha values that were statistically significant, which provides substantial evidence to support this conclusion.

4.3.2 United Kingdom

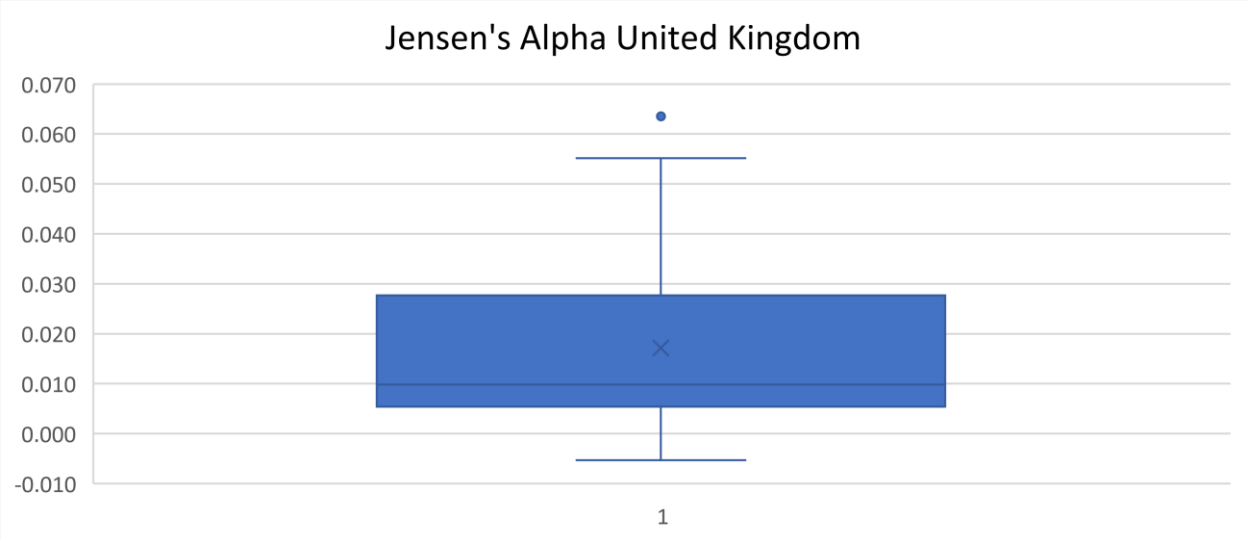

Figure 4.2: Box Plot on Jensen's Alpha in United Kingdom
Note: Jensen's Alpha regression analysis results have been presented in Appendix 4.

According to the findings of an investigation that was carried out on a selection of fifty mutual funds in the United Kingdom, the alpha coefficient is 0.017 on average, with the highest alpha coefficient being 0.064 and the lowest alpha coefficient being -0.005. Based on the results of the regression analysis, it can be concluded that 48 out of the fifty funds have positive alphas throughout the entire investing period. Based on this finding, it appears that a sizeable percentage of fund managers possess the ability to select stocks with proficiency. Nevertheless, it is essential to acknowledge a significant limitation of the regression findings, which is the fact that only four funds demonstrate statistical significance at a significance level of 5%.

The distribution of alpha frequencies displays a significant right skew, as demonstrated by the fact that only two funds have alpha values that are negative, while 48 funds have alpha values that are greater than zero. This demonstrates that, on average, the management of the fund is capable of accurately forecasting future prices to a degree that puts them in a position to outperform the performance of the market. On the other hand, it is essential to take into consideration the fact that, out of the total 48 funds that have a positive alpha, only four of them demonstrate statistical significance according to a significance test that was carried out at the 5% level. A statistically significant relationship cannot be established between the remaining funds. There is not a single fund that demonstrates statistically significant negative alpha values when the significance level is set at 5%.

Mutual fund managers have the ability to select stocks, and there are four mutual funds that serve as examples of this capability. The equity market is the primary focus of these funds, which are primarily invested in the market. Due to the fact that it has the highest alpha value of 0.055, the Fundsmith Equity I Acc is one of the funds that stands out due to its extraordinary characteristics. The fact that this value is higher than the benchmark indicates that it performs better than the benchmark. Due to the fact that approximately 95% of the fund's assets are invested in the equity market, the fund's investment allocation is primarily concentrated on the

equity market. According to the findings of our research, it is clear that the majority of fund managers in the United Kingdom do not have the ability to choose stocks in a selective manner. On the other hand, there are a few mutual funds that do demonstrate the ability to do so. As a result of the fact that only four funds displayed statistically significant positive alpha values, this assertion is supported by substantial evidence.

4.3.3 Canada

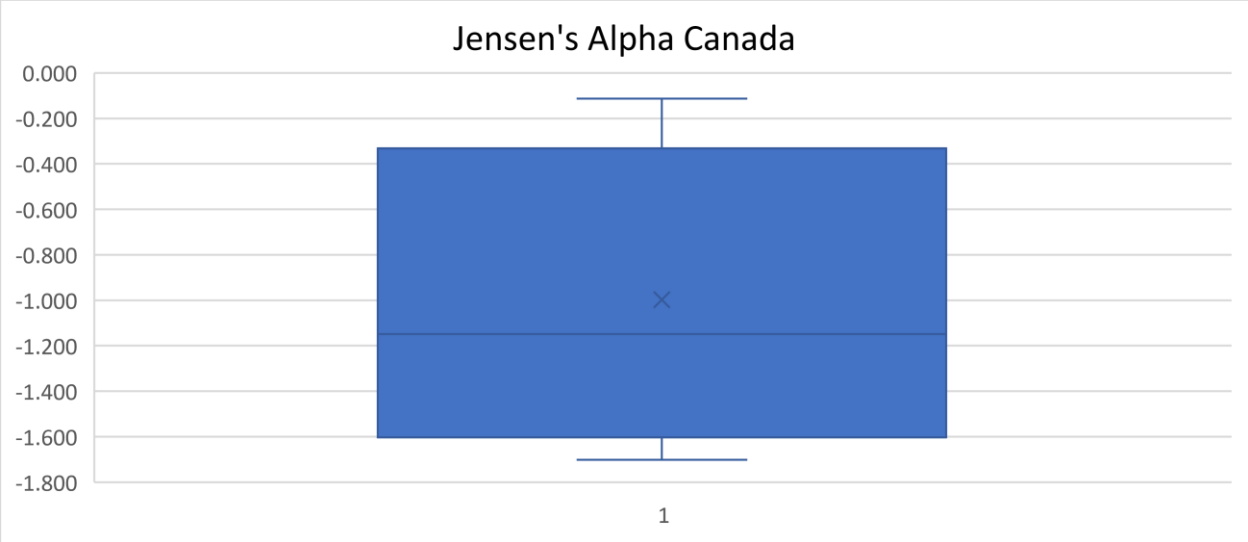

Figure 4.3: Box Plot on Jensen's Alpha in Canada
Note: Jensen's Alpha regression analysis results have been presented in Appendix 4.

In this analysis, Canada is the third country evaluated. The findings of an analysis that was carried out on a sample that was representative of fifty different mutual funds in Canada revealed that the average alpha value was found to be -0.968. This was determined by the findings of the analysis done on the sample. Among the values that were recorded as having the lowest value, -1.702% was one of them. On the other hand, the value that was observed to have the highest alpha value was -1.101. The alphas that were generated as a result of an investigation into fifty different mutual funds in Canada had negative values during the time period that was designated for investing, as indicated by the findings. This was the case during the time period that was designated for investing. Furthermore, when a significance level of five percent is taken into consideration, it is possible to arrive at the conclusion that each of the

fifty funds possesses statistical significance. This conclusion can be reached because it is possible to arrive at this conclusion. This is the conclusion that can be reached in this situation. The information that has been provided suggests that there is a strong indication that the managers of mutual funds in Canada do not have sufficient expertise in the process of stock selection. This is consistent with the information that has been provided. The box plot that has been presented up to this point makes it abundantly clear that all of the funds are located entirely within the negative range. This is the case because the box plot has been presented. According to the alpha value, the fund that has the highest value is the RBC Canadian Mid-Cap Equity Fund, while the fund that has the lowest value is the Invesco Canadian Core Plus Bond Series. Both of these funds are managed by the same company. According to the results of our investigation, the presence of a negative alpha term is indicative of the presence of a managerial performance that is below a level that is considered to be acceptable.

4.3.4 Italy

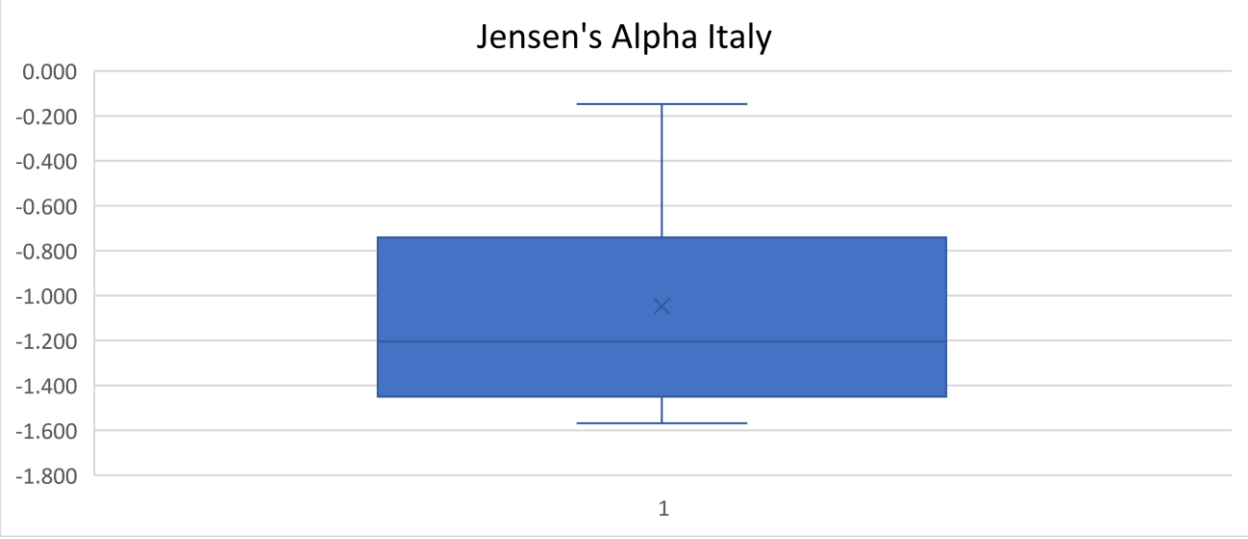

Figure 4.4: Box Plot on Jensen's Alpha in Italy
Note: Jensen's Alpha regression analysis results have been presented in Appendix 4.

A comprehensive investigation was conducted on a representative sample consisting of fifty different mutual funds in Italy, and the results of that investigation led to the conclusion that the mean alpha value was observed to be -1.048. This conclusion was reached based on the

findings of the investigation. The alpha value that was recorded to have the lowest magnitude was, while the alpha value that was observed to have the highest magnitude was -0.147. This was the case in terms of magnitude. According to the findings of the study, it was observed that the alphas that were produced by an investigation of fifty different mutual funds in Italy displayed negative values during the time period that was under consideration. This phenomenon was observed during the period of time that was under consideration. It is also possible to arrive at the conclusion that all fifty funds are statistically significant if one takes into consideration a significance level of five percent.

According to the evidence that is currently available, it would appear that Italian mutual fund managers are lacking in expertise when it comes to the process of selecting stocks. Every single fund is situated solely within the negative margin, as can be seen from the box plot that was just presented to the audience. Among the funds, the Arca Azioni Italia fund has the highest alpha value, while the Allianz Reddito Globale stock has the lowest alpha value. Both of these funds are considered to be in the same category. It has been determined that the results that have been produced by the Sharpe and Treynor ratios are in agreement with the conclusions that have been drawn regarding the superior and inferior performance of the fund. The existence of a negative alpha term is indicative of the presence of managers who perform their jobs poorly, as indicated by the findings of our investigation, which were presented in the previous sentence.

4.3.5 Germany

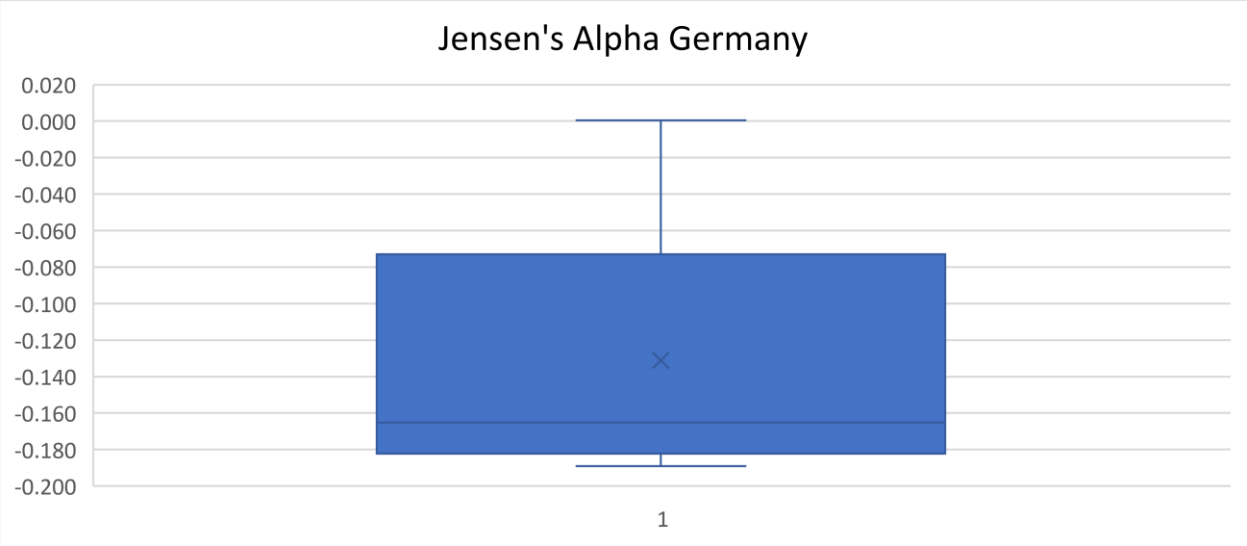

Figure 4.5: Box Plot on Jensen's Alpha in Germany
Note: Jensen's Alpha regression analysis results have been presented in Appendix 4.

According to the findings that are presented in Figure 4.5, the Jensen's Alpha analysis that was carried out in Germany indicates that the average alpha value is -0.131. An alpha value of 0 is the highest that has been observed, while a value of -0.189 is the lowest that has been recorded. The findings indicate that, on average, the mutual funds exhibited poor performance, which resulted in an average deviation of -0.131 from the returns that were predicted, taking into consideration a certain degree of systematic risk. On the other hand, it was demonstrated that each of the fifty funds that were investigated had alpha values that were negative. It demonstrates the poor managerial performance of fund managers, as there are no funds that are able to produce positive alpha values. Furthermore, fund managers do not possess the ability to select stocks. As can be seen from the box plot that was just presented, each and every fund is situated within the region that is regarded as being negative.

The alpha value of the HSBC German equities fund is the highest, while the HSBC Strategie Substanz bond fund has the lowest alpha value, which is -0.181. Both funds are managed by HSBC. Nevertheless, there is one fund that has recorded an alpha of zero, and that fund is the HSBC German Equity mutual fund. In the event that Jensen's Alpha is found to be zero, it

indicates that the investment or portfolio has generated a return that is in perfect accordance with the outcome that was predicted based on the systematic risk of the investment or portfolio, as determined by the Capital Asset Pricing Model (CAPM). To phrase it another way, the performance of the investment has been such that it is consistent with the results that were anticipated, taking into consideration the level of risk exposure that it has to the market.

The fact that there is not a single German mutual fund that has a positive alpha demonstrates that managers are unable to successfully select stocks. 47 out of fifty funds are statistically significant when the significance level is set at 5%. When the beta is compared to the market, the negative alpha values across all funds indicate that investors have not been adequately compensated by the return on their investment for the systematic risk that they have taken on. This is determined by the relationship between the beta and the market. This is due to the fact that investors have not received a return that is favourable to them.

4.3.6 France

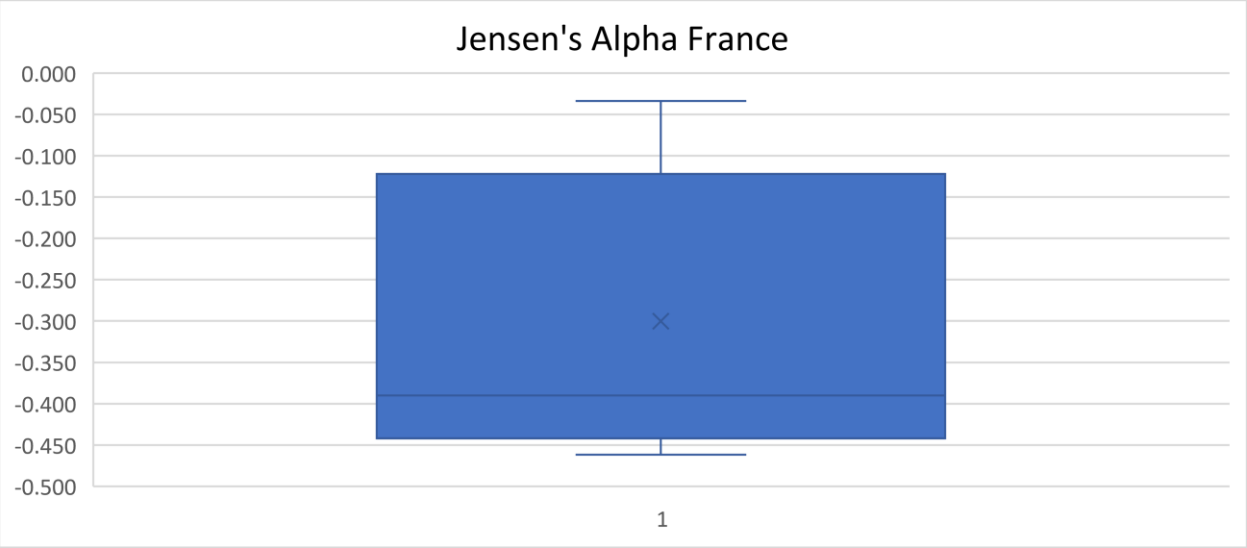

Figure 4.6: Box Plot on Jensen's Alpha in France
Note: Jensen's Alpha regression analysis results have been presented in Appendix 4.

For the purpose of this analysis, fifty different mutual funds are taken into consideration, and the mean alpha that these funds offer is determined to be -0.307 when applied to the French

market. With negative alpha values that ranged from -0.469 to -0.034, France, along with Canada, Italy, and Germany, was among the countries evaluated. These numbers were approximately in the middle of the range. At the 5% level of statistical significance, every single one of the values that were observed is statistically significant. There are no funds that generate positive alpha values, which is an indication of poor managerial performance. This suggests that fund managers are unable to select stocks in an efficient manner. As can be seen from the box plot that has been presented, all of the funds are located within the negative zone.

The fund with the highest alpha value was the Mandarine Valeur G.Gest fund, while the fund with the lowest alpha value was the Allianz Obligations Internationales D.Eur fund. These findings are also in agreement with the ratio that was calculated by Sharpe and Treynor. The value of alpha is still negative, despite the fact that the score was the highest that could be achieved. Based on this information, it appears that managers of mutual funds in France do not possess the necessary skills to select stocks based on discerning criteria. According to the beta's link to the market, which can be seen by the negative alpha values across all funds, investors have not been adequately repaid for the systemic risk that they have taken on. This is the conclusion that can be drawn from the negative alpha values.

4.3.7 Japan

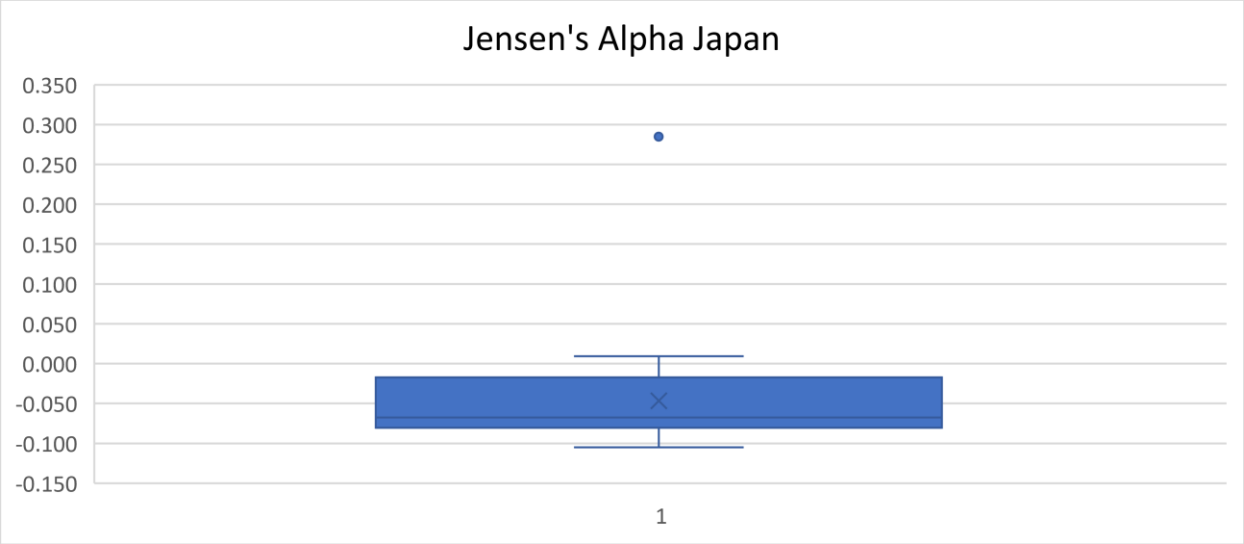

Figure 4.7: Box Plot on Jensen's Alpha in Japan
Note: Jensen's Alpha regression analysis results have been presented in Appendix 4.

The seventh nation in this paper to be analysed is Japan. Four of the fifty mutual funds that were investigated exhibited a positive alpha, while forty-six of the funds demonstrated a negative alpha, according to the findings that were derived from the application of the single-index Jensen's Alpha model in Japan. The alpha values varied from -0.105 to 0.285, with a mean value of -0.047. The range of alpha values was quite wide. All four of the funds that displayed a positive alpha value are equity-oriented funds, which are the primary type of investment vehicles. All of these funds, however, do not demonstrate statistical significance at a level of significance equal to or greater than five percent.

In contrast, it is noteworthy that 31 of the 46 funds that demonstrated a negative alpha value demonstrate statistical significance at a level of significance equal to or greater than 5%. This is observed among the funds that demonstrated a negative alpha value. It is common practice to refer to these funds as "negative alpha funds." The total number of funds is 31, and it has been found that only five of those funds are classified as equity-based funds. The remaining twenty-six funds, on the other hand, are classified as bond funds. In comparison to the benchmark, the GS Japan Equity Index Plus fund had the highest alpha value, which was -

0.021. This indicates that the fund performed exceptionally well in comparison to the benchmark. However, the Pictet Global Inc Equity fund had the lowest alpha value, which was -0.105. This fund was the least profitable of the three. The fact that this number was statistically significant indicates that the fund in question did not perform as well as the benchmark.

4.4 Fama-French Three Factor Model Robustness Test

Furthermore, the Fama-French Three Factor Model is utilised to examine the capacity of fund managers to generate greater returns through the possession of selectivity skills. The intercept term in the single-index model signifies the surplus returns of each fund within the observed sample. The Fama-French three-factor model seeks to explain the heterogeneity in stock returns across different equities by examining the impact of several factors on their relative performance. This model facilitates the understanding of pricing anomalies observed in the stock market, while comprehending market underperformance and outperformance through the inclusion of value and size aspects. The alpha component of the Fama-French five factor model represents the excess return obtained by an active portfolio manager beyond the anticipated return attributable to market, size, and value.

In the Fama-French model, a positive alpha indicates that the portfolio or investment strategy has achieved better performance than anticipated, taking into consideration the level of exposure it has to market risk, size, and value factors. The conclusion that can be drawn from this is that the portfolio manager has increased the value of the portfolio by selecting exceptional stocks or by incorporating other variables that are not taken into account by the three primary factors in the model. A portfolio, for example, that displays a Fama-French alpha of +1% indicates that the portfolio has outperformed its expected performance by 1% based on its exposures to market, size, and value factors. This is because the portfolio has outperformed

its expected performance by 1%. From the perspective of the Fama-French model, a negative alpha indicates that the portfolio or investment strategy has performed at a level that is lower than the return that was anticipated. The conclusion that can be drawn from this is that the decisions made by the portfolio manager regarding the selection of stocks or other investment decisions have had a detrimental effect on the performance of the portfolio in comparison to what would be expected based on the factor exposures.

When determining whether or not a portfolio manager has generated superior returns that cannot be accounted for by systematic risk (beta) and the additional factors of size and value, the Fama-French model makes use of alpha as a metric to evaluate the performance of the portfolio manager. While a negative alpha indicates underperformance in comparison to the model's predictions, a positive alpha indicates that the management or strategy employed was exceptional or that the management was skilled. Because of this, alpha within the Fama-French framework can display both positive and negative values, which provides valuable insights into the effectiveness of investment decisions and strategies in relation to the factors that are incorporated into the model.

4.4.1 United States

In the United States, the Fama French model was analysed, and the results showed that the alpha value can range anywhere from -0.548 to 0.592 depending on the circumstances. Following the incorporation of the market, size, and value factors into the Jensen's Alpha model, it was discovered that 42 out of fifty funds produced negative alpha values. On the other hand, only eight funds were able to generate positive alphas, and all of these funds were classified as equity funds. At a level of statistical significance equal to five percent, six of the eight funds that had a positive alpha were found to be statistically significant. Similar to the previous example, out of the 42 funds that had a negative alpha, 39 of them demonstrated statistical significance at the same level of 5 percent. It was found that the Fidelity SMCP

Discovery Fund had the highest alpha value, which was 0.592, while the Fidelity US Bond Index Fund had the lowest alpha value, which was -0.548. In layman's terms, if a fund has generated a positive and statistically significant alpha, it indicates that the portfolio has generated returns that are greater than what the three-component model would anticipate based on the level of exposure to market risk, size, and value of the fund.

4.4.2 United Kingdom

On the basis of the investigation of the Fama French model within the framework of the United Kingdom, it has been demonstrated that the alpha coefficient has a spectrum that ranges from -0.005 to 0.064. This was demonstrated by the fact that the results of the investigation were presented. This was uncovered as a consequence of the investigation that was conducted on the United Kingdom. When Jensen's Alpha model was modified to include market, size, and value components, it was discovered that only two out of fifty funds had negative alpha values. This was the case. The incorporation of these factors into the model allowed for the determination of this. However, there were a total of 48 funds that were able to demonstrate the capability of developing positive alphas. This was a significant achievement. Although there were a total of 48 funds that displayed positive alpha, only five of them were able to achieve statistical significance at the threshold of five percent. The Fundsmith Equity I Acc fund had an exceptionally high alpha rating of 0.057, which indicates that the fund had better performance in comparison to the benchmark. Therefore, the fund was considered to have a higher level of performance. There are some parallels to be drawn between the findings that were discovered in Jensen's alpha model and the results that were obtained. Taking into account the level of exposure that the portfolio has to market risk, size, and value components, it has delivered returns that are higher than the projected outcomes that were forecasted by the three-component model. For example, the portfolio has delivered returns that are greater than the value components.

4.4.3 Canada

According to the findings of the Fama-French model applied to the Canadian mutual funds market, it was discovered that 49 out of 50 funds displayed a negative alpha, which indicates underperformance. On the other hand, only one fund displayed a positive alpha value, which indicates outperformance. At a significance threshold of five percent, it was determined that each of the 49 negative alpha values were statistically significant. On the other hand, the positive alpha value did not demonstrate any statistical significance. Alpha values in Canada range from -1.57 to 0.038, making it a country with a diverse range of alpha values. The fund that presented the most significant level of alpha value was the CI American Small Companies Corporation, which had an alpha value of -0.146. It is clear from this that the fund generates a return that is lower than what the three-factor model forecasts it will produce. Based on the findings, it appears that mutual funds that are traded on the Canadian market do not exhibit superior performance in the same way that the Jensen's Alpha model does. The conclusion that can be drawn from the examination of the data is as follows.

4.4.4 Italy

In the context of Italy, the analysis that was carried out with the Fama-French model revealed that every single one of the fifty funds had negative alpha values, with the range of these values ranging from -1.521 to -0.134 at the most. Furthermore, every single one of the funds had a beta value that was much lower than 1. Additionally, it was determined that each and every one of these values possessed a statistically significant impact by employing a significance level of 5%. This was the conclusion that was reached. When compared to all of the mutual funds, the Allianz Reddito Global bond fund has the lowest alpha value, which is -1.521. On the other hand, the Arca Azioni Italia equity fund has the highest alpha value, which is -0.134. The findings that were obtained are in agreement with Jensen's alpha model, which forecasts that the funds that were mentioned earlier will have the highest and lowest alpha values,

respectively. Given the extent to which the portfolio is exposed to systematic factors, the presence of a negative alpha indicates that the performance of the portfolio has not been up to the standards that it had established for itself in terms of the returns that it would receive.

4.4.5 Germany

As far as Germany is concerned, the majority of funds had a negative alpha value; to be more specific, 49 out of the fifty funds had a negative alpha value. The only fund that produced a positive alpha value was the HSBC German Equity fund, which was the only one of the available funds. There was no other fund available besides this one. Statistical tests, on the other hand, revealed that this result did not have any significant bearing. It was found that the alpha values in Germany varied from -0.186 to 0.002, with 0.002 being the value that was most commonly observed. The statistical significance of a negative alpha value was determined to be present in 48 out of the 49 funds when the significance level was set at 5%. Despite the fact that there were only 49 funds in total, this was the situation throughout. The Helaba Invest KPl Dividend Plus equities fund is the fund that has the highest significant alpha of any fund, despite the fact that the fund has generated a negative alpha throughout its entire history. The fact that the returns that were anticipated to be generated by the mutual funds were not generated by the mutual funds is confirmed by this additional evidence.

4.4.6 France

After investigating the Fama French model within the context of France, it was found that the alpha coefficient displays a spectrum that extends from -0.453 to -0.039. This was discovered as a result of the investigation. The conclusion that was reached was as follows. Following an in-depth examination of the market's risk, size, and value, it was found that each of the fifty funds has negative alpha values. This was discovered upon the completion of the analysis. Every single one of the fifty funds demonstrated statistical significance when considering the

threshold of significance, which was set at five percent. Out of the fifty different mutual funds that were investigated, the Mandarine Valeur R equities fund has the highest alpha, which comes in at -0.039. This Mandarine Valeur R equity fund was found to have the highest alpha according to the findings of the study that were obtained through the utilisation of Jensen's Alpha single index model. Additionally, the fund was found to have a negative value. As a result of the presence of a statistically significant negative alpha value, there is evidence to suggest that the performance of the mutual fund did not meet the returns that were anticipated.

4.4.7 Japan

When the Japanese context was taken into consideration, the alpha values displayed a range that extended from -0.104 to 0.013. Among the fifty mutual funds that were investigated, only four had positive alpha values, while the remaining forty-six funds all had negative alpha values. Alpha values were measured in percentage terms. For the purpose of the investigation, a total of fifty different mutual funds were examined. There was not a single one of the positive alpha values that displayed any patterns that could be regarded as statistically significant. On the other hand, when a significance level of 5% was applied, it was found that 31 of the total 46 mutual funds that were evaluated had a negative alpha value that was statistically significant. This indicates that the alpha value was statistically significant. The GS Japan Equity Index Plus fund is the most successful fund in this category, with an alpha of -0.020, which is considered to be particularly significant. This particular fund has the highest significant alpha of all the funds. The majority of the investments that are made by mutual funds are equity investments.

Mutual funds are a type of investment vehicle. In spite of the fact that it achieved the highest alpha in Japan, the value is still considered to be negative. This indicates that the portfolio does not meet its expectations of returns because it is exposed to the market risk, size, and value variables. This also indicates that the portfolio does not meet its expectations of returns. It does

not change the fact that it is a negative value, despite the fact that it recorded the highest alpha in Japan. A single index Jensen model also gave this fund the highest possible score for an alpha with a negative value. This fund also received the highest possible score. The fund in question was awarded the highest possible score.

4.5 Treynor and Mazuy (TM) Market Timing Ability Model

Treynor and Mazuy (1966) conducted an examination to determine the level of market timing ability possessed by fund managers. If they believe that the market is going to continue to rise, fund managers have the ability to change the composition of their portfolio from securities that are less volatile to securities that are highly volatile. During times when the market is falling, they change the composition of their portfolio from securities that are highly volatile to securities that are less volatile. In the event that fund managers are adept at market timing, they will construct their portfolios on the basis of their forecasts of the trends in the market. The Treynor and Mazuy model is an extension of the conventional model that incorporates a market timing component, which is denoted by the symbol gamma. This section will discuss the gamma estimates for each fund across all seven countries in order to determine whether or not managers of mutual funds have the ability to make accurate market timing decisions.

This indicates that the portfolio manager has demonstrated the ability to time the market effectively, which has resulted in higher returns for the portfolio that cannot be solely attributed to systematic risk (beta). A positive gamma in this context indicates that the portfolio manager has demonstrated this ability. The fact that this is the case suggests that the timing decisions have played a role in the performance of the portfolio. The presence of a negative gamma indicates that the returns on the portfolio have been reduced in comparison to the risk-free rate and systematic risk (beta) as a result of market timing decisions. It can be deduced from this that the activities involving timing have either been unsuccessful or have had a negative impact

on performance. Management of portfolios is one of the practical applications that can be obtained from this model. In the Treynor and Mazuy model, a positive gamma is regarded as desirable because it indicates the existence of market timing strategies that are successful. It is necessary, however, to conduct a careful analysis in order to differentiate between talent and chance. Next, we will talk about the behaviour of investors. The Treynor and Mazuy model includes a parameter called gamma that is responsible for determining the degree to which risk aversion influences the evaluation of market timing. When the gamma value is higher, it indicates that the evaluation is more cautious, which may have an impact on the investment decisions and risk management strategies available.

4.5.1 United States

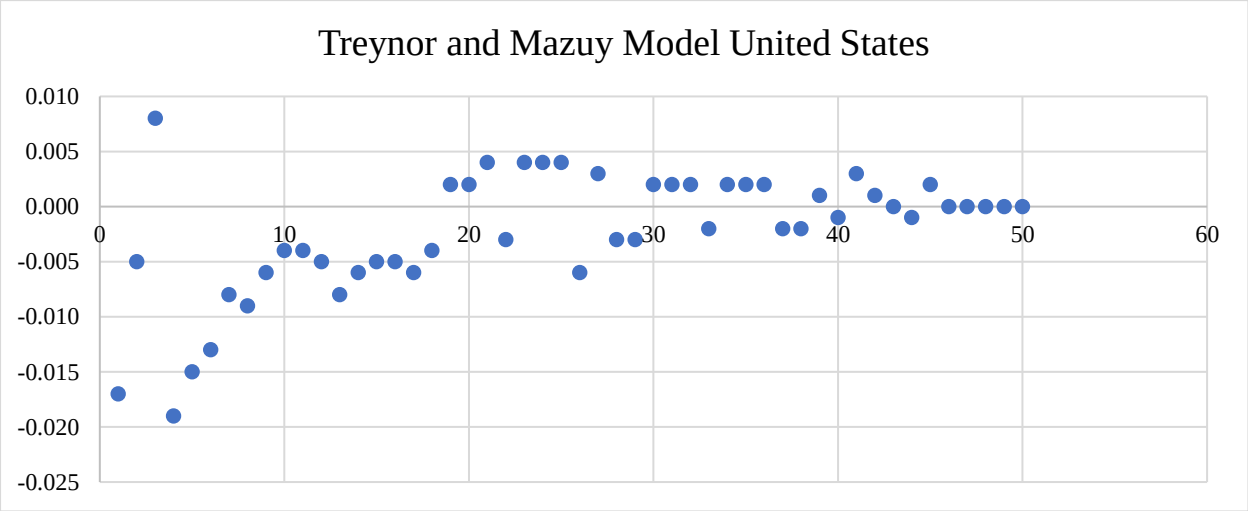

Figure 4.8: Treynor and Mazuy Market Timing Ability Model United States
Note: TM Model regression analysis results have been presented in Appendix 6.

Taking into consideration the findings, it is clear that the average market timing index for the fifty funds that were investigated in the United States is -0.002, which indicates a slight overall negative trend in market timing performance. When one investigates the data in greater depth, it becomes apparent that among the sample, there are 18 funds that exhibit positive market timing, which is indicated by a square coefficient that is greater than zero. These funds account for approximately 36% of the funds that were examined. At the other end of the spectrum, six

out of the total thirty-two funds have a market timing value of zero, which indicates that they do not have any observable market timing ability. The remaining 26 funds have square term coefficients that are considered to be negative, which indicates that there is a prevalent trend towards poor timing performance.

For example, when the statistical significance is examined at a level of 5%, only one of the 18 funds with positive square term coefficients demonstrates statistical significance. This is in stark contrast to the 15 out of 26 funds with negative coefficients that demonstrate significance at the same level. The majority of mutual fund managers do not demonstrate market timing abilities that are statistically significant, which suggests that there is a significant disparity in the predictive capability of mutual fund managers across the board.

There is a slight inclination towards the left in the distribution of the market timing index, which further supports the idea that the funds that were examined have inadequate timing performance. Particularly noteworthy is the fact that the Fidelity SMCP Discovery Fund stands out as an anomaly, demonstrating that its managers are skilled at market timing. Previous investigations into the fund's stock selectivity abilities using metrics such as Jensen's alpha and the Fama-French model. These investigations also highlighted the fund's superior performance in comparison to the overall market. This finding lends credence to those investigations.

Despite the fact that there is only one mutual fund available However, the more comprehensive analysis highlights a widespread lack of such ability among mutual fund managers in the United States. This is despite the fact that market timing proficiency is demonstrated among managers. A negative market timing coefficient indicates that the investor is unable to accurately predict the movements of the market, which is a pattern that was observed in the majority of the funds that were analysed. It is interesting to note that there are six funds that have a market timing coefficient of zero, which further emphasises the lack of tangible evidence that supports market timing prowess among mutual fund managers.

4.5.2 United Kingdom

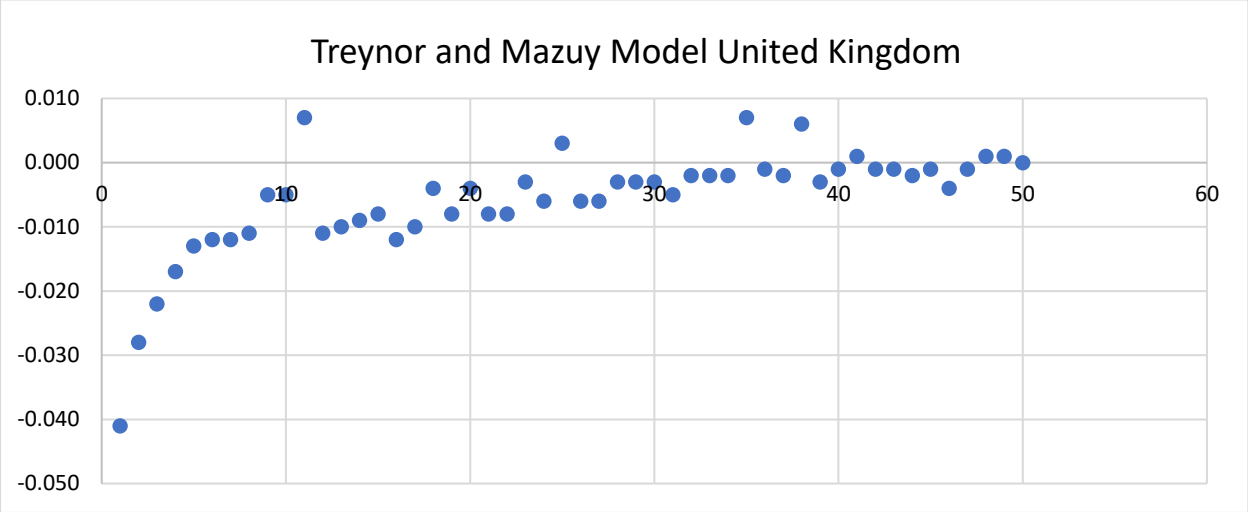

Figure 4.9: Treynor and Mazuy Market Timing Ability Model United Kingdom

Note: TM Model regression analysis results have been presented in Appendix 6.

In order to shed light on the market timing proficiency among fund managers, an empirical evaluation of fifty mutual funds in the United Kingdom was conducted using the Treynor and Mazuy model. As can be seen in Figure 4.9, a sizeable proportion of these funds exhibit a negative gamma coefficient, which is indicative of a lack of proficiency in market timing. The prevalence of this trend is highlighted by the range of gamma values, which extends from -0.041 to 0.007. To be more specific, out of the fifty funds that were investigated, forty-two of them have a negative gamma coefficient. This accounts for approximately eighty-four percent of the sample, which indicates that a significant majority of the funds have a negative gamma.

It has been determined through additional analysis that out of the 42 funds that make up this subset, 21 of them have statistical significance at a level of 5%. Furthermore, out of these various funds, eight of them exhibit positive coefficients in the square term, which indicates that they have favourable market timing. On the other hand, only one of these eight funds demonstrate statistical significance at the level of 5% that was determined beforehand. The existence of such a disparity indicates that there is a lack of evidence that is statistically significant and supports positive market timing abilities among fund managers.

While analysing the distribution of the market timing index, it is possible to identify a slight leftward bias. This suggests that mutual fund managers in the United Kingdom do not possess a significant amount of market timing expertise. Particularly noteworthy is the fact that the M&G Gilt & Fixed Interest Income Sterling Bond Fund is the only fund that demonstrates empirical evidence of market timing capabilities. The presence of a positive coefficient for gamma indicates that the manager is skilled in adjusting market exposure in anticipation of market movements. This is a skill that is lacking in the majority of other funds.

Because of this, the more comprehensive analysis sheds light on the widespread lack of market timing skills among managers of mutual funds in the United Kingdom, despite the fact that this particular instance is an isolated occurrence. When the negative observation is taken into consideration, it would appear that managers have a limited capacity to accurately forecast the trends in the market. Because of this, the extensive body of evidence does not lend credence to the idea that fund managers in the United Kingdom possess significant market timing abilities. This is because of the fact that the evidence is comprehensive.

4.5.3 Canada

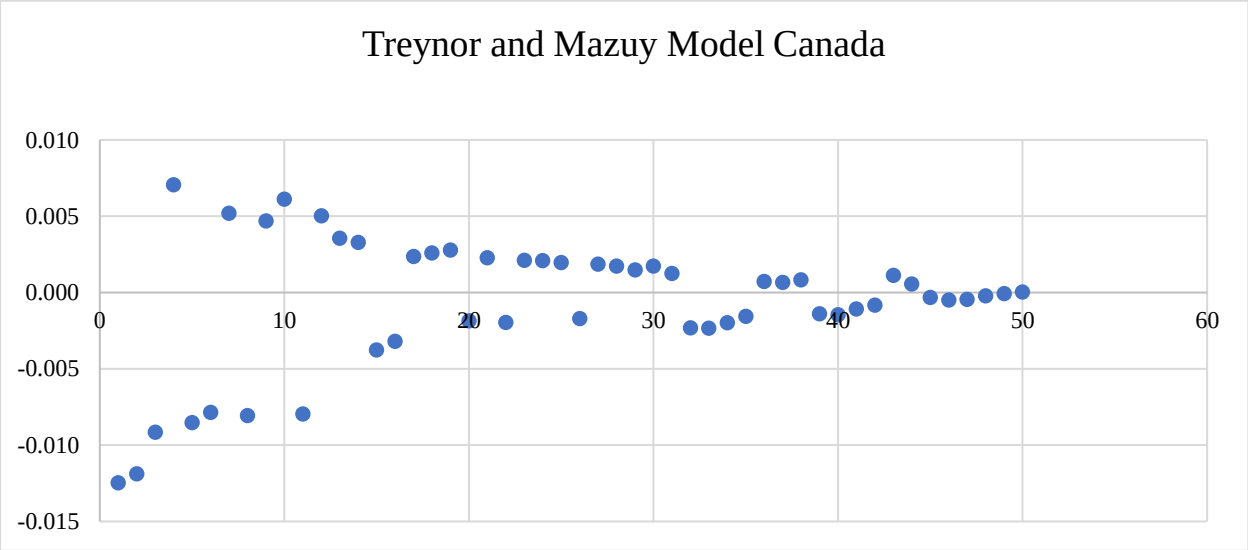

Figure 4.10: Treynor and Mazuy Market Timing Ability Model Canada
Note: TM Model regression analysis results have been presented in Appendix 6

In the context of Canada, the Treynor and Mazuy market timing model generated a range of gamma values that varied from -0.012 to 0.007. These values were produced by the model. Twenty of the fifty mutual funds in Canada that were included in the sample had a negative square coefficient, which is also referred to as gamma. The sample includes a total of fifty mutual funds. Approximately forty percent of the sample population is represented by this. As an additional indication of the lack of market timing expertise among fund managers, it was also observed that six funds had a square coefficient of zero. This serves as a further indication of the lack of market timing proficiency among fund managers. The fact that the square coefficient was identical to zero was evidence of this observation. In the end, a greater proportion of the sample, specifically 48 percent, which is equivalent to 24 out of fifty funds, had a gamma value that was positive.

It is possible to observe, on the basis of a statistical significance level of 5%, that only five of the twenty-four positive gamma square terms are statistically significant, whereas seven of the twenty negative gamma coefficients are statistically significant. This realisation is possible because of the fact that the statistical significance level is 5%. Although there are twenty-four

funds, only five of them are statistically significant. One can make the observation that the market timing index has a slight bias to the left, which indicates that the timing performance is not very promising. This can be seen by looking at the distribution of the index. The Fidelity SMCP Discovery Fund is the only fund that has demonstrated evidence of managers exhibiting market timing abilities. This fund is the only one for which such evidence has been presented. In a previous investigation, Jensen's alpha and the Fama-French model were utilised in order to evaluate the stock selectivity capabilities. This evaluation was carried out. In line with the findings of that particular investigation, this discovery was made.

Additionally, it was demonstrated by both performance measures that the Fidelity SMCP Discovery Fund had a performance that was superior to that of the market as a whole. The findings of the analysis indicate that the majority of mutual fund managers in the United States do not possess the ability to time the market. It is true that there is one mutual fund that demonstrates market timing ability among its managers; however, the majority of mutual fund managers in the United States possess this ability. In contrast, a negative value indicates that the managers of mutual funds do not possess the ability to accurately predict the market. There are six funds that have demonstrated a market timing coefficient value of zero, which is an interesting piece of information to take into consideration. In light of this, it can be concluded that there is no evidence to support the claim that managers of mutual funds are capable of market timing.

4.5.4 Italy

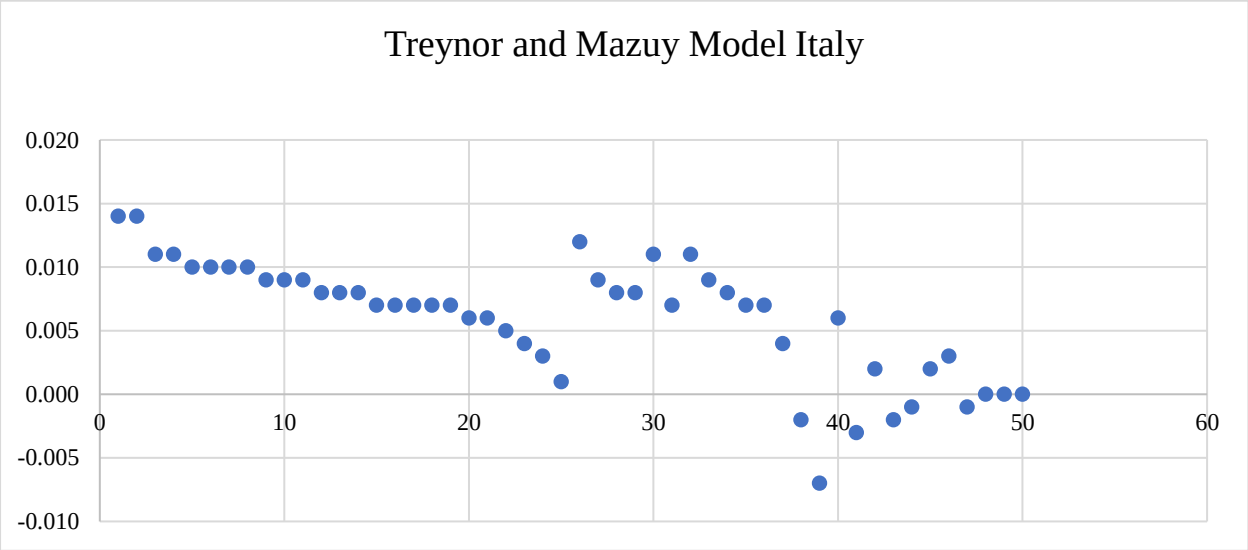

Figure 4.11: Treynor and Mazuy Market Timing Ability Model Italy
Note: TM Model regression analysis results have been presented in Appendix 6

Taking into consideration the findings, the market timing index for the fifty funds that were investigated in Italy was found to be 0.006 on average. In addition, it has been demonstrated that out of a total of fifty funds, forty-one of them demonstrate positive market timing, as demonstrated by a square coefficient that is greater than zero within the sample. It is estimated that this accounts for approximately 82% of the total funds examined in the sample. The gamma coefficient of three funds in particular is zero, indicating that they do not have the ability to time the market. The remaining six mutual funds each exhibit a square term coefficient that points in a negative direction. Using a level of statistical significance of 5%, it can be concluded that 36 out of the 41 positive square term funds exhibit statistical significance. In contrast, it is observed that only two of the six funds with negative square term coefficients exhibit statistical significance at a level of significance of 5%.

Based on these findings, it can be concluded that the majority of Italian funds generated gamma values that were statistically significant and positive. This demonstrates that managers of mutual funds possess the ability to perfectly time the market. Thirteen of these 36 funds are

equity-based mutual funds, while the remaining 23 funds are mutual funds that primarily invest in bonds. These funds are considered to be positively significant. Fund managers are able to precisely distribute the portfolio and effectively time the market. They also have the ability to control the market. Both the Alliance Reddito Globale and the Fondersel Internazionale ESG bond fund have a gamma value of 0.014, making them the two funds offering the highest gamma value. As a consequence of this, it is possible to draw the conclusion, on the basis of the research that was carried out on the Italian market, that the majority of managers of mutual funds are skilled in market timing.

4.5.5 Germany

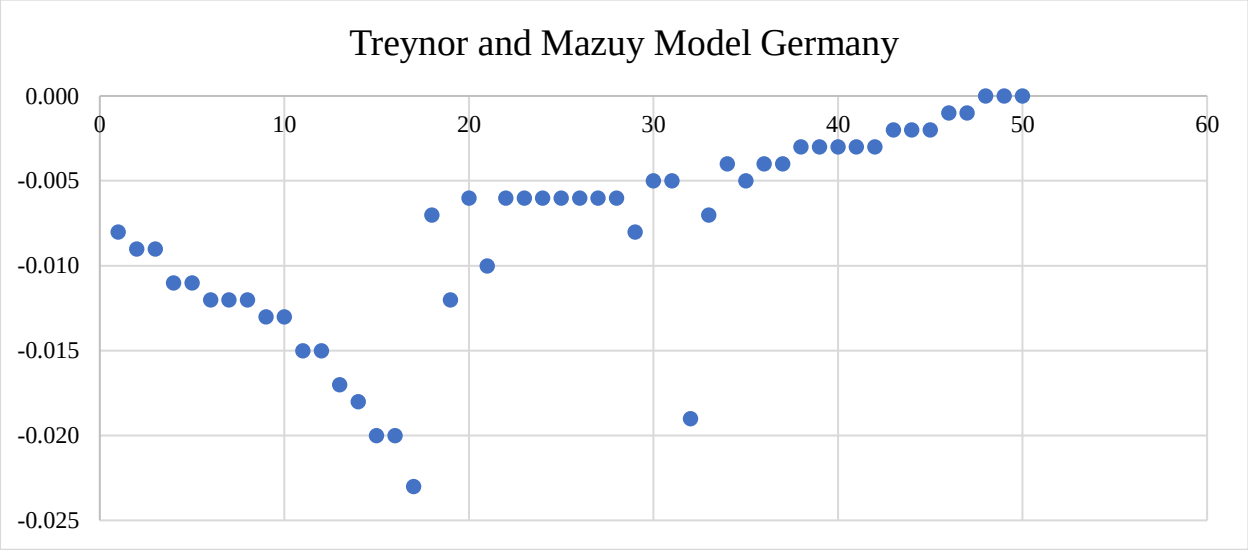

Figure 4.12: Treynor and Mazuy Market Timing Ability Model Germany
Note: TM Model regression analysis results have been presented in Appendix 6

Figure 4.12 illustrates that the Treynor and Mazuy market timing model analysis performed on fifty mutual funds in Germany reveals that there is no positive gamma square coefficient. This is the conclusion that can be drawn from the findings. In comparison to the other fifty funds, the gamma that is considered to be the highest is found to be 0. As a result of the fact that three funds were able to successfully generate a gamma value of zero, it can be deduced that the managers of these mutual funds do not have the ability to be able to time the market. A total of

47 funds have been identified, and 32 of those funds have generated a gamma coefficient that is greater than zero. There are 32 of these funds that are statistically significant at the 5% significance level.

This investigation has led to the conclusion that the managers of mutual funds in Germany do not have the ability to effectively time the market. This conclusion can be reached based on the findings of the investigation. On the basis of this observation, it is possible to draw the conclusion that the method of investing that fund managers have been employing has not been very successful and has not been able to generate any additional value that is in addition to what could have been obtained through a passive investment in the market. The BFS Nachhaltigkeitsfonds Green Bonds and the Amundi Bkk Rent bond fund have the most significant gamma value, which is -0.005, among all of the funds that were subjected to the examination. It is essential to point out that a negative association is still visible, despite the fact that it achieved the highest gamma value among the fifty funds that were investigated. This is because the relationship between the two is still negative.

4.5.6 France

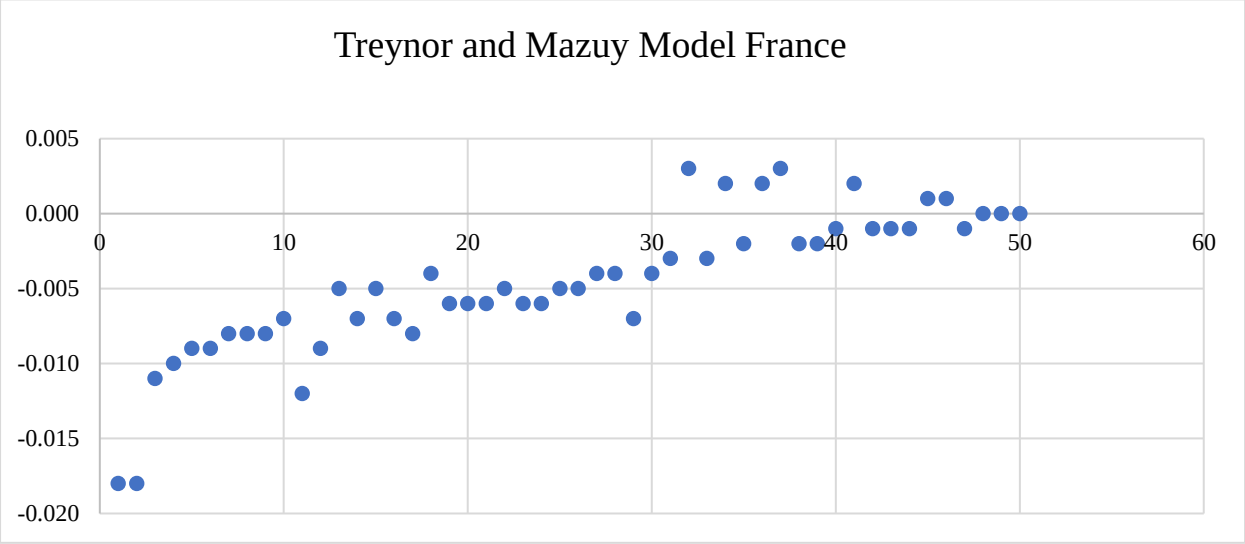

Figure 4.13: Treynor and Mazuy Market Timing Ability Model France
Note: TM Model regression analysis results have been presented in Appendix 6

According to the findings of the study that was carried out in Germany, the market timing coefficient, also known as gamma, was discovered to be somewhere around 0.005 on average. According to the findings, the gamma coefficient can take on values ranging from -0.018 to 0.003 at most. Seven out of the fifty different mutual funds that were put under scrutiny were found to have a square coefficient gamma that was positive. On the other hand, a negative gamma figure was presented by the bulk of the forty funds, which accounted for over 80 percent of the total. The gamma coefficient was found to be 0 in each of the remaining three funds. It is possible to draw the conclusion from the following picture, which is based on a visual study, that mutual fund managers in Germany, on average, do not have the skill of market timing. After additional investigation of these data, using a significance level of 5 percent, it was discovered that just 26 of the 40 negative gamma values exhibited statistical significance. On the other hand, not a single one of the gamma values that are positive demonstrates statistical significance.

The results obtained from this study suggest that there is a lack in the ability of mutual fund managers in France to accurately predict and capitalize on market timing opportunities. This observation suggests that the investment strategy utilized by fund managers has shown minimal effectiveness and has not produced any additional value beyond what might have been achieved through a passive investment in the market. The EDR Sicav Tricolore Rendement B Eur equity fund exhibit the highest significant gamma value of -0.004 among the funds analyzed. Despite this fund achieving the greatest gamma in the study, it still indicates no market timing ability among fund managers.

4.5.7 Japan

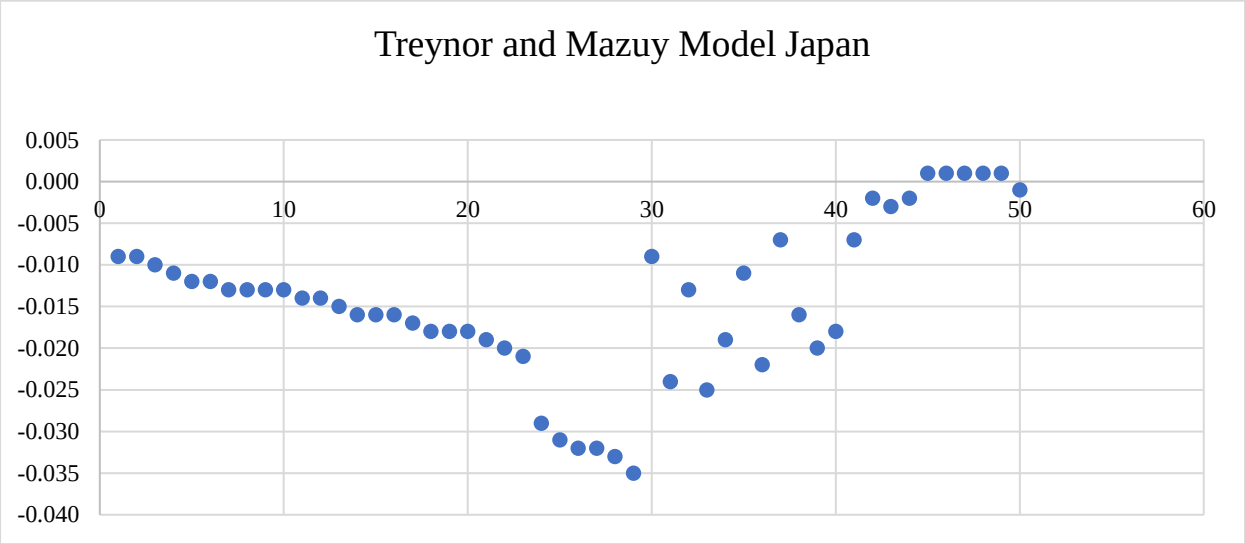

Figure 4.14: Treynor and Mazuy Market Timing Ability Model Japan
Note: TM Model regression analysis results have been presented in Appendix 6

Based on the findings, the mean market timing index for the 50 funds analyzed in Japan is -0.014 on average. Moreover, empirical evidence has demonstrated that within a selected group of 50 funds, a total of 5 funds display a positive market timing ability, as evidenced by a coefficient greater than zero. This accounts for around 10% of the total. The 45 remaining funds have a negative coefficient, gamma, for the square term. Based on a statistical significance criterion of 5%, it can be inferred that none of the five positive square term funds demonstrate statistical significance. On the contrary, it is seen that 41 out of the total 45 funds, which possess negative square term coefficients, demonstrate statistical significance at a 5% level of significance.

It can be seen that the market timing index's distribution is skewed to the left, indicating poor timing performance. The results obtained from this study suggest that the ability of mutual fund managers in Japan to accurately predict market timing is limited. This observation suggests that the investment strategy utilized by fund managers has demonstrated minimal effectiveness and has not produced any additional value beyond what might have been achieved by a passive investment in the market. Among the funds investigated, the Nochu US bond fund and the

Amundi Target Japan equity fund demonstrate the significantly highest gamma value of -0.007. Although this fund exhibits the highest gamma among the 50 mutual funds in Japan, it still provides no evidence on the presence of market timing ability among mutual fund managers in Japan.

4.6 Henriksson and Merton (HM) Market Timing Ability Model

The Henriksson-Merton model is a powerful instrument that can be utilised to assess the level of expertise possessed by portfolio managers. It can accomplish this by analysing their capacity to generate superior returns and to time the market in an expert manner. When compared to the Treynor and Mazuy model, the Henriksson-Merton approach is distinguished by the fact that it takes into account the complexities of market timing, makes systematic risk adjustments, and employs a threshold technique to determine the level of market participation of managers. Within the framework developed by Henriksson and Merton, the concept of contractility takes centre stage, delving into the complex relationship that exists between the excess return of a portfolio and that of a benchmark.

Through the utilisation of regression analysis, the beta coefficient emerges as a crucial metric that quantifies the manager's talent in market timing endeavours. Within the context of this model, a positive beta value indicates that fund managers have successfully navigated the market timing process, whereas a negative beta value indicates that they do not possess such an aptitude. As a result, this model offers a comprehensive lens that can be utilised to examine and evaluate the effectiveness of portfolio management strategies. It also sheds light on the complex dynamics that are involved in market timing proficiency.

The presence of a positive coefficient in the Henriksson-Merton model indicates that the portfolio manager has demonstrated exceptional skills in terms of timing the market and/or selecting stocks. This indicates that the manager's ability to time market movements has

resulted in better returns than what could be achieved through a passive strategy or what is explained by the model's systematic risk factors (such as beta in traditional models). A positive coefficient indicates that the manager has been successful in achieving these returns. As an additional point of interest, it suggests that the manager's selections of stocks have added value to the portfolio, potentially surpassing the benchmark or market index. In general, a positive Henriksson-Merton coefficient indicates that the management is skilled and that the investor has the ability to generate additional returns by strategically timing and/or selecting stocks from the market.

A negative coefficient, on the other hand, indicates that the portfolio manager has not created any additional value through market timing or stock selection. This is shown by the fact that the coefficient is negative. The presence of a negative coefficient indicates that the timing decisions made by the manager have resulted in a negative impact on the returns of the portfolio in comparison to what would be anticipated based on the systematic risk factors that are accounted for by the model. In addition, it gives the impression that the manager's stock selection has been below average. It may indicate either a lack of ability to accurately predict market movements and select profitable stocks, or a series of unwise choices that resulted in lower performance in comparison to the benchmark or market index. Both of these possibilities are possible.

When it comes to evaluating the capacity of portfolio managers to generate excess returns (alpha) by effectively timing the market and selecting stocks, the Henriksson-Merton model is a helpful tool that investors and analysts can utilise.

4.6.1 United States

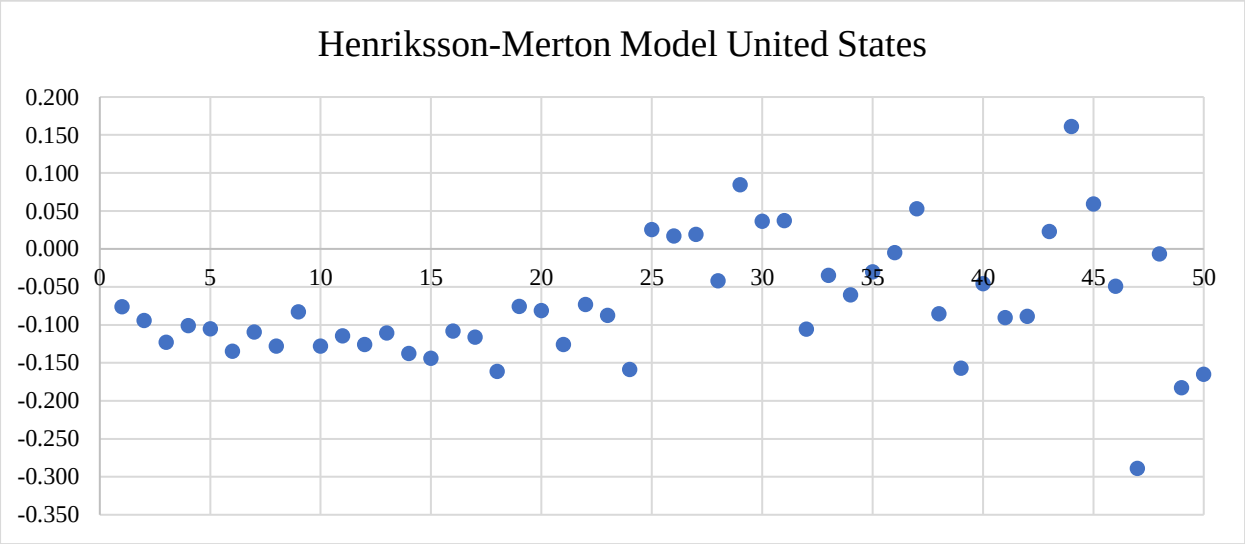

Figure 4.15: Henriksson-Merton Market Timing Ability Model United States
Note: HM Model regression analysis results have been presented in Appendix 7.

Based on the data shown in Figure 4.15, it is evident that the average value of the beta coefficient in the HM model within the United States is approximately -0.072. The investigation yielded a range of beta coefficients ranging from -0.289 to 0.161. Out of the total of 50 funds analyzed, only 10 funds exhibited a positive beta coefficient, representing a mere 20% of the sample. Conversely, 40 funds displayed a negative beta coefficient, suggesting the absence of any market timing ability among mutual fund managers. Among the set of 10 positive beta values, it is observed that just one fund, specifically the Columbia Acron European equities fund, exhibits statistical significance at a significance threshold of 5 percent. This finding is consistent with that of the Treynor and Mazuy analysis where only one fund exhibited positive market timing ability among mutual fund managers.

In contrast, a total of 24 of the 40 funds that had negative beta coefficients demonstrated statistical significance at a significance level of 5%. As a result, it is possible to demonstrate that a big fraction of funds has negative effects, which suggests that the mutual fund managers

lack the capacity to properly time the market and generate returns that are higher than those generated by the market benchmark.

4.6.2 United Kingdom

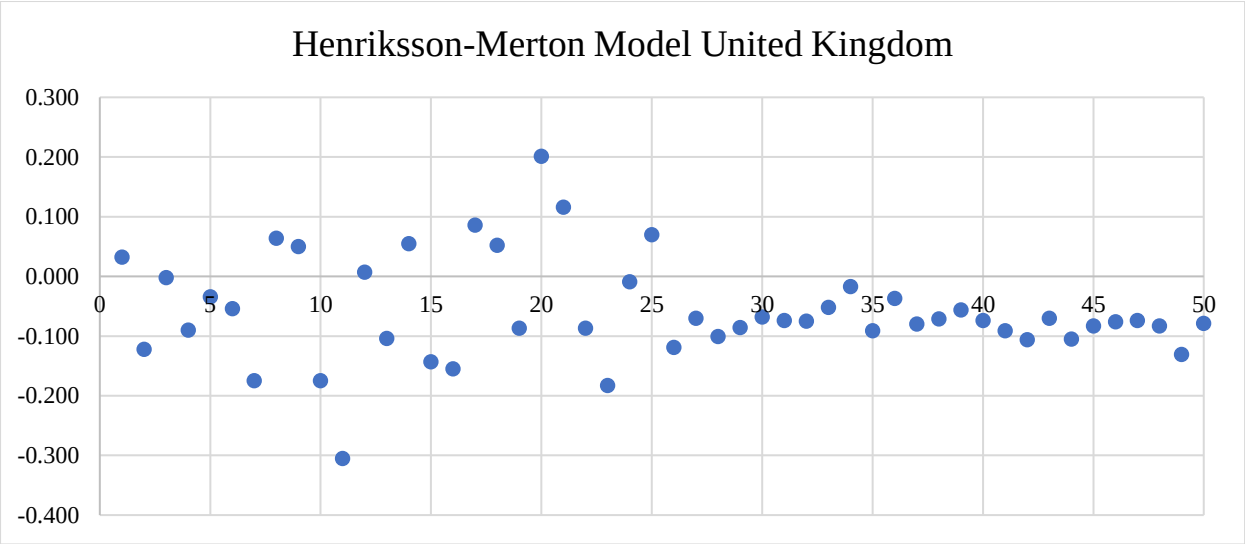

Figure 4.16: Henriksson-Merton Market Timing Ability Model United Kingdom
Note: HM Model regression analysis results have been presented in Appendix 7.

In the context of the United Kingdom, the beta coefficient, which serves as an indicator of market timing ability, exhibited a range of -0.305 to 0.201, with an average value of -0.059. Among the 50 funds that were examined, 10 funds displayed a positive beta coefficient, accounting for only 20% of the total sample. On the contrary, it was observed that 40 funds exhibited a negative beta coefficient, indicating a lack of market timing skills among mutual fund managers.

Among the set of 10 positive beta values, it is observed that four equity-based funds are statistically significant at 5 per cent significance level. The fund with the highest beta coefficient is the Scwid.UK Equity Inc Cl fund with a significant coefficient of 0.201 followed by the TM Stonehg Flm Opps Equity fund. The fund with the lowest beta coefficient it the

Liontrust Chine GBP C equity fund. In contrast, at a significance level of 5%, 30 out of the 40 funds with negative beta coefficients showed statistical significance. Consequently, it is feasible to illustrate that a significant portion of funds yields adverse outcomes, indicating an absence in the ability of mutual fund managers to effectively time the market and generate returns surpassing those of the market benchmark.

4.6.3 Canada

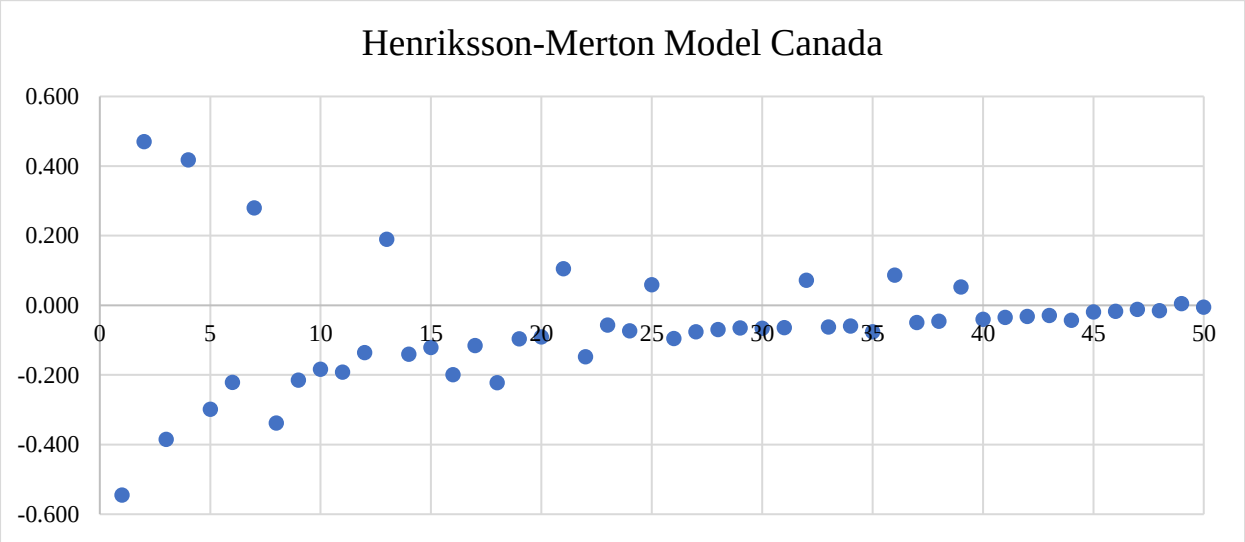

Figure 4.17: Henriksson-Merton Market Timing Ability Model Canada
Note: HM Model regression analysis results have been presented in Appendix 7.

The examination conducted on mutual funds in Canada revealed a range of beta coefficients, which are used as indicators of market timing abilities, from -0.546 to 0.470. The average beta coefficient was found to be -0.061. Out of the 50 funds that were examined, it was observed that 10 funds exhibited a positive beta coefficient, representing a mere 20% of the entire sample. In contrast, it was noted that a total of 40 funds displayed a negative beta coefficient, so suggesting a deficiency

Within a given set of 10 positive beta values, it has been determined that three equity-based funds exhibit statistical significance at a significance threshold of 5 percent. The aforementioned three funds had the most significant coefficient, suggesting that the fund managers of these specific funds possess the ability to time the market. The RBC Canadian

Mid-Cap Equity Fund exhibits the greatest beta coefficient, indicating the market timing skill, followed by the Barometer Equity Pool Class and Canoe Canadian Small Mid Cap Portfolio.

The Fidelity Canadian Large Cap Series exhibits the lowest beta coefficient among the funds evaluated, and this coefficient is statistically significant and negative. Out of the 40 funds that exhibited negative coefficients, a total of 7 funds demonstrated statistical significance at a significance level of 5 percent. This observation suggests that most of the substantial funds demonstrates the inability of fund managers to accurately predict market timing and generate satisfactory returns relative to the level of risk they assume.

4.6.4 Italy

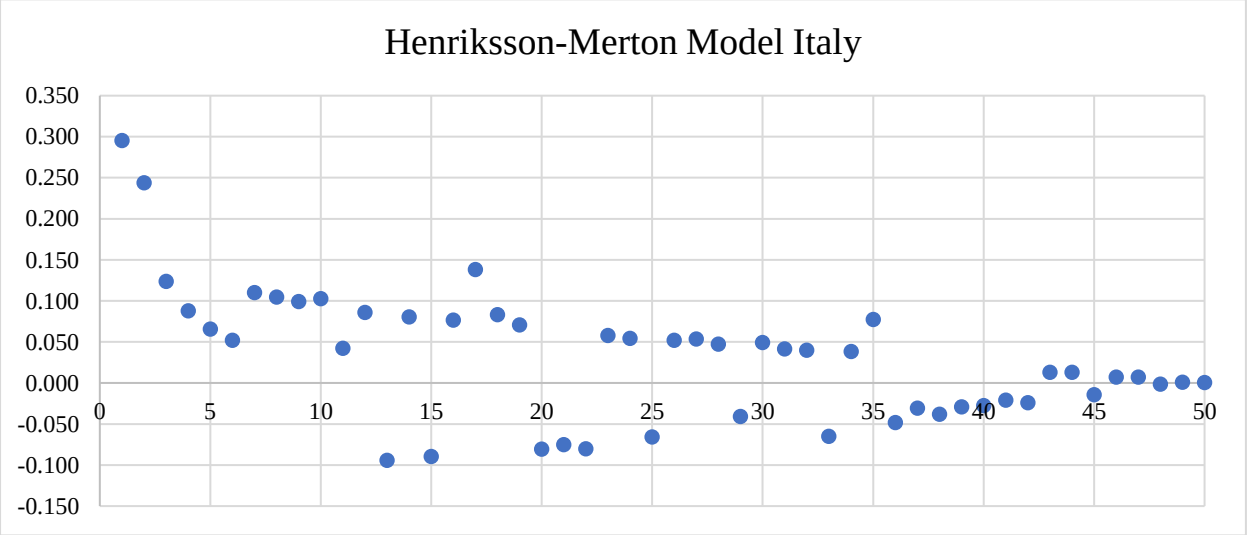

Figure 4.18: Henriksson-Merton Market Timing Ability Model Italy
Note: HM Model regression analysis results have been presented in Appendix 7.

According to the data presented in Figure 4.18, it is evident that in the context of Italy, a majority of funds beta exceed zero, surpassing the 50% threshold. Specifically, out of the total 50 funds examined, 32 funds exhibited a positive beta coefficient, one fund had a beta coefficient of zero, and the remaining 17 funds demonstrated a negative beta coefficient. A zero value indicates that the mutual funds do not vary significantly from the market benchmark. An interesting finding from this examination of Italian mutual funds is that none of the negative

funds and only 6 out of 32 positive coefficient funds are statistically significant at the 5% level of significance. This finding indicates that equities fund managers in Italy possess a greater likelihood of accurately timing the market. The equity funds that exhibit the highest level of statistical significance is the Eurizon Azioni PMI Italia fund. These data indicate a different outcome, as only six funds exhibit statistical significance. Moreover, all six of these funds demonstrate the presence of market timing expertise among their respective fund managers.

4.6.5 Germany

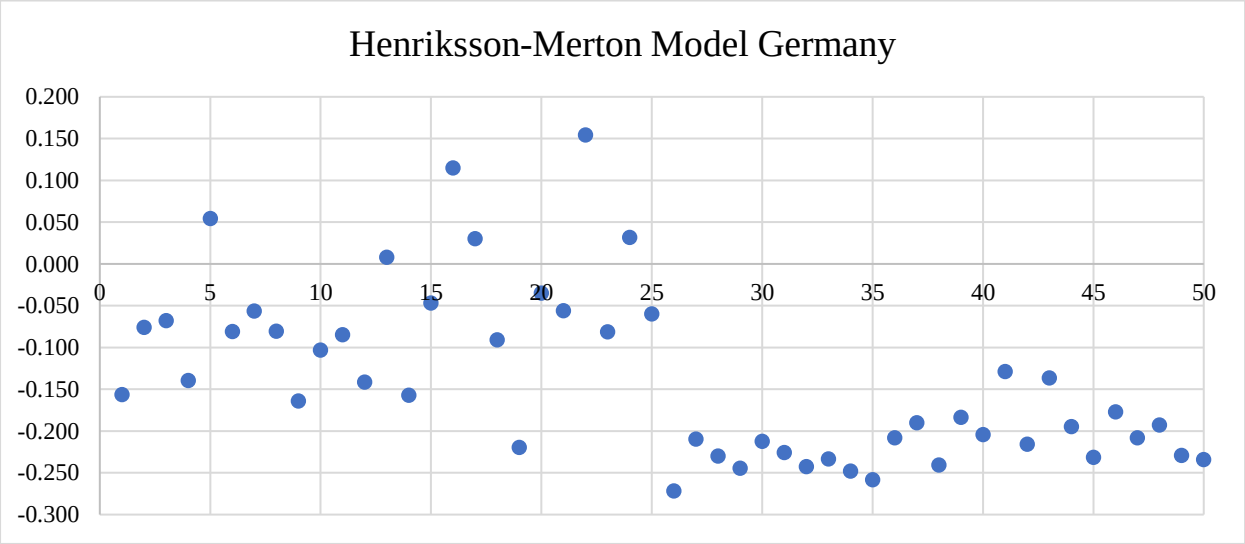

Figure 4.19: Henriksson-Merton Market Timing Ability Model Germany
Note: HM Model regression analysis results have been presented in Appendix 7.

Based on the Henriksson-Merton analysis done on the mutual funds in Germany, the market timing coefficient ranges from -0.272 to 0.154 with an average of approximately -0.137. 88 per cent of funds analysed that is 44 funds displayed a negative coefficient and only 6 funds recorded a positive coefficient indicating market timing ability. However, in order to draw conclusions about the market timing skills of fund managers, it is necessary for the data provided to exhibit statistical significance. Out of the total of 44 funds examined, a significant negative relationship was observed at a 5% level of significance for 33 funds. Conversely, just one out of the six funds shown market timing ability among fund managers, specifically the

Helaba Invest KPL DividendPlus Equity fund. As a consequence of this, one may claim that a sizeable proportion of funds produce unfavourable results, which may point to a potential weakness in the capacity of mutual fund managers to accurately predict the market and provide returns that are superior to those generated by the market benchmark.

4.6.6 France

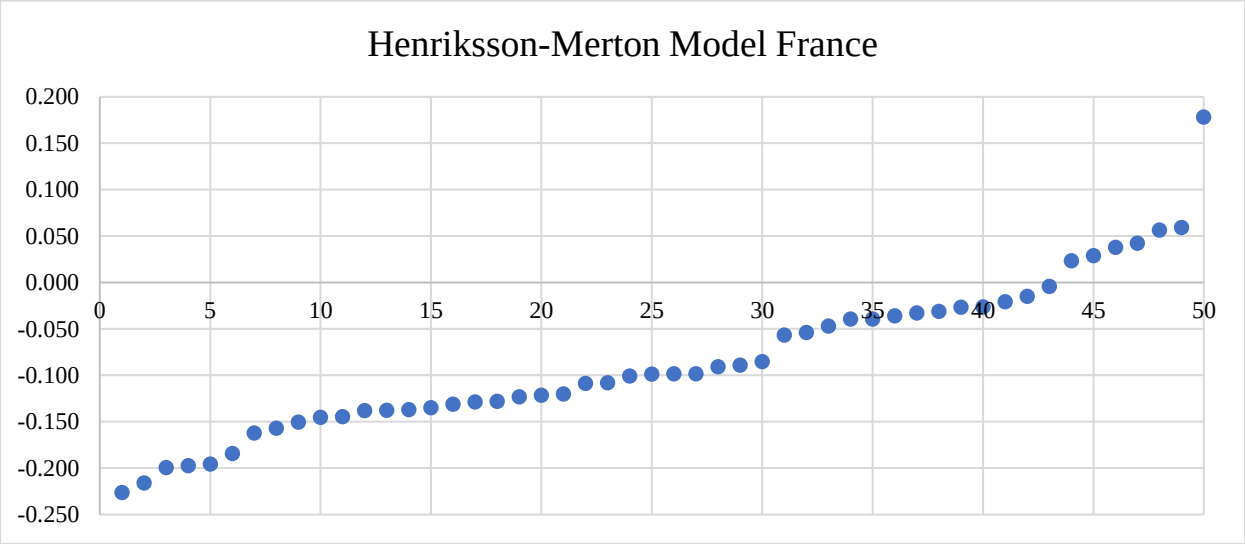

Figure 4.20: Henriksson-Merton Market Timing Ability Model France
Note: HM Model regression analysis results have been presented in Appendix 7.

The analysis conducted on French mutual funds revealed a range of beta coefficients, or measures of market timing ability, from -0.226 to 0.470. A mean beta coefficient of -0.083 was found to be the result of the study. In the course of the investigation, it was discovered that seven of the fifty funds under consideration exhibited a positive beta coefficient. This represented around fourteen percent of the whole sample. On the other hand, it has been discovered that a group of 43 funds had a negative beta coefficient, which indicates that they are unable to accurately time the market. There was not a single fund that demonstrated favourable market timing abilities when the significance level was set at 5-percent. In point of fact, the statistical study showed that out of the 47 funds that had negative coefficients, 31 of them were considered to be statistically significant.

When the results produced via the use of a passive approach are compared to the results

obtained through the use of market timing selections, the presence of a negative coefficient indicates that the investor's market timing selections have resulted in a negative impact on the performance of the portfolio. If the investor had opted to utilise a buy-and-hold strategy rather than engaging in market timing, they would have been in a better position to achieve their financial goals in this particular scenario. To having done so would have led to more substantial gains.

4.6.7 Japan

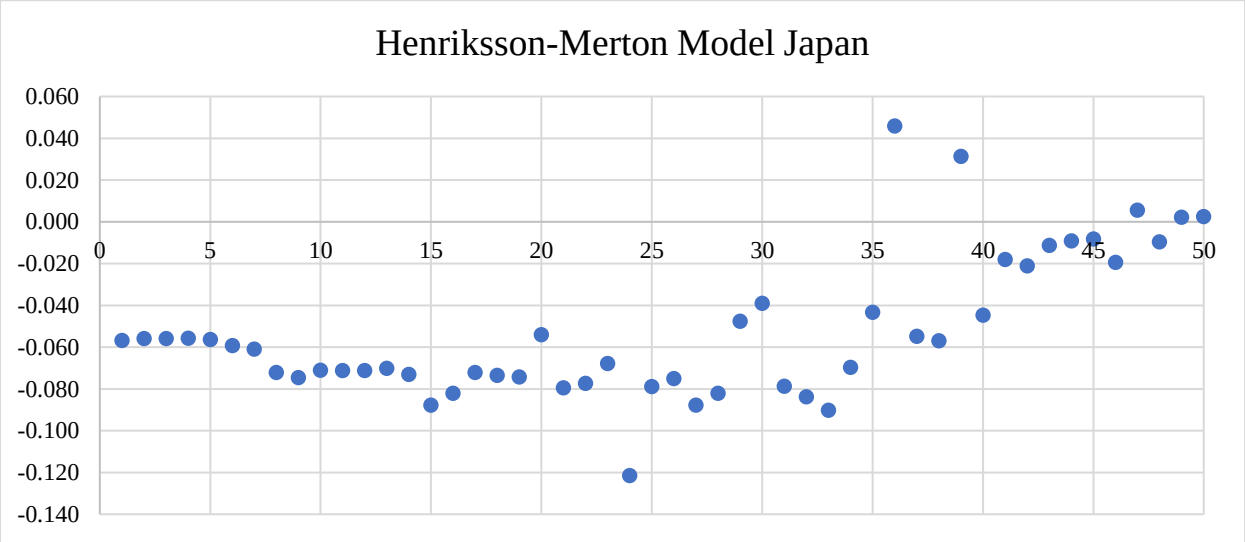

Figure 4.21: Henriksson-Merton Market Timing Ability Model Japan
Note: HM Model regression analysis results have been presented in Appendix 7

The coefficient, which is a measurement of market timing ability in mutual fund managers, had a value that ranged from -0.122 to 0.046 and had an average value of -0.049 within the context of Japan. The value is a measurement of the ability of mutual fund managers to time the market. A particular five funds out of the fifty funds that were investigated had a positive beta coefficient, which is equivalent to ten percent of the total sample. These five funds were selected at random. It was observed that a total of 45 funds exhibited a negative beta coefficient, which indicates that mutual fund managers have a lack of ability to time the market. On the other hand, it was observed that the beta coefficient was negative. At a significance level of

5%, it was discovered that none of the positive values were statistically significant. On the other hand, 23 out of 45 negative coefficient funds were discovered to be statistically significant. The results of the analysis that was performed determined this to be the case. In spite of the fact that it has a coefficient of -0.054, the Noura High Yield Bond Open Course fund is the fund that demonstrates that fund managers do not have the ability to time the market. This fund is the one that has the most relevance.

One can reach the conclusion that an investment manager consistently makes decisions on market timing that are less effective than those that are determined by random chance. This is a conclusion that can be drawn because it is possible to draw this conclusion. Instead, humans have a propensity to engage in inefficient timing of asset purchases or sales, which results in inferior performance in comparison to the anticipated outcomes that can be achieved through a passive investment technique. This is because humans have a tendency to make decisions based on their own preferences.

4.7 Exchange-Traded Fund Performance United States

4.7.1 Sharpe Ratio and Treynor Ratio

An additional category of managed funds, known as actively managed exchange-traded funds (ETFs), which bear a striking resemblance to mutual funds, is the subject of the following portion of the research review. Exchange-traded funds (ETFs) that are actively managed are a relatively new invention in many countries. In these ETFs, fund managers are responsible for achieving greater returns, in contrast to passively managed ETFs, which simply replicate the returns of the index. First and foremost, we intend to examine the performance of the actively managed exchange-traded funds (ETFs) by analysing the different performance measures.

The results that were obtained as shown in Table 51 indicate that every single one of the 35 active ETFs that were examined in the United States had a Sharpe Ratio that was negative. According to this analysis, the Sharpe ratio of funds falls somewhere in the range of -1.80 to -0.50. When the value is negative, it implies that the risk-free rate is higher than the historical returns of the portfolio of investments. It has been shown that the exchange-traded funds (ETFs) in the United States that are managed passively have a Sharpe ratio of 0.86. Taking into consideration this fact, it can be concluded that none of the exchange-traded funds (ETFs) that are actively managed were able to achieve a Sharpe ratio that was higher than the market benchmark.

Following that, based on the Treynor Index, which is a performance measure that takes into account the beta, it was discovered that the index has a range that goes from -4.16 to 1.52 with an average of -1.77 percent. At the moment, the Treynor index of the passively managed exchange-traded fund (ETF) with the purpose of serving as a benchmark for the market is at 0.97. There is only one fund that was able to achieve a ratio of 1.52, which is higher than the ratio of the passive fund. This fund is the Advisorshares Ranger Equity Bear ETF. When the Treynor measure is positive, it indicates that the portfolio has generated returns that are higher than the risk-free rate, while also taking into account the probability of systematic risk.

4.7.2 Jensen's Alpha and Fama French Model

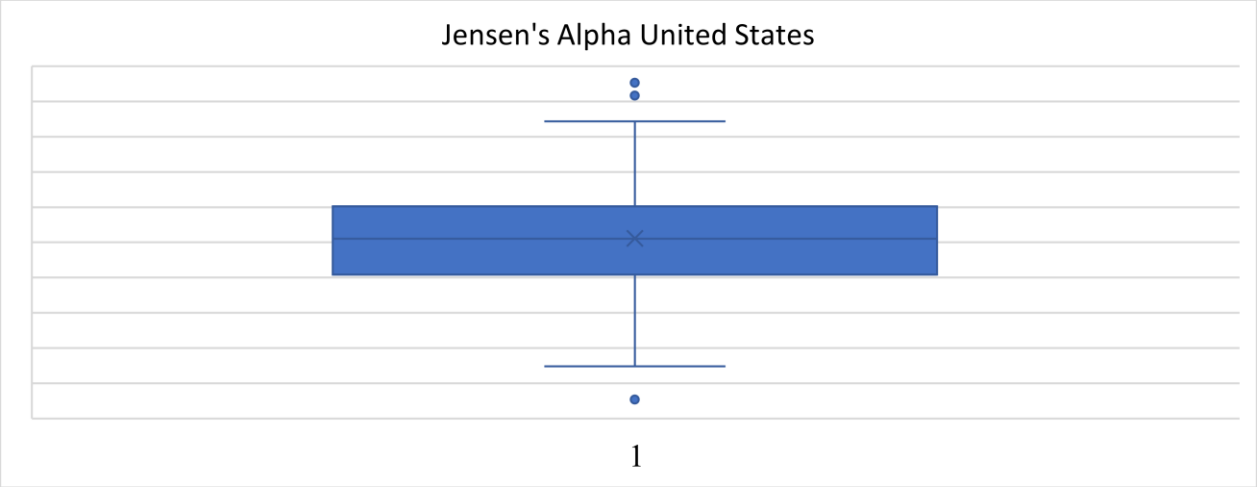

Figure 4.22: Box Plot on Jensen's Alpha in United States Exchange-Traded Funds

Note: Jensen's Alpha regression analysis results have been presented in Appendix 8.

According to the findings that are provided in Figure 4.22, the Jensen's Alpha analysis that was carried out on the Exchange-Traded Funds (ETFs) that are located within the United States indicated that the average alpha value is -0.266. The alpha value that was recorded as being the lowest was -0.287, while the alpha value that was found to be the greatest was 0.707. A total of 35 funds were evaluated, and eight of them earned positive alphas that were bigger than zero. There were a total of six funds that were found to be statistically significant at a significance level of 5%. On the other hand, the remaining 27 funds displayed negative alphas, with 26 of them being statistically significant at the same 5% statistical level.

The Ark Innovation ETF, which has an alpha value of 0.707, is the active exchange-traded fund (ETF) that has recorded the greatest alpha value. This is followed by the Ark Next Generation Internet ETF and the Ark Genomic Revolution ETF. Every single one of these three funds is managed by the same group of fund managers. The Infracap MLP ETF, the Cambria Shareholder Yield ETF, and the FST NAE En Infrastructure ETF were the other three funds that recorded positive alphas from their respective performance. These six exchange-traded funds (ETFs) that are actively managed are examples of the stock picking skills of fund managers.

Following that, the Fama-French model is also utilised in order to conduct an analysis of the performance of the active ETF fund from the point of view of multi-factor regression methodology. According to the findings of the study conducted on the Fama French model in the United States, the alpha value displays a range that extends from -1.466 to -1.335. In the process of applying Jensen's Alpha model, all active exchange-traded funds (ETFs) generated negative alpha values when the market, size, and value criteria were taken into consideration. In this particular case, the portfolio produced a positive alpha according to Jensen's model; nevertheless, when compared to the performance of the market, value stocks, and small-cap companies, which are all components of the Fama-French Model, the portfolio underwent a poor performance.

4.7.3 Market Timing Ability of Actively Managed ETFs in United States

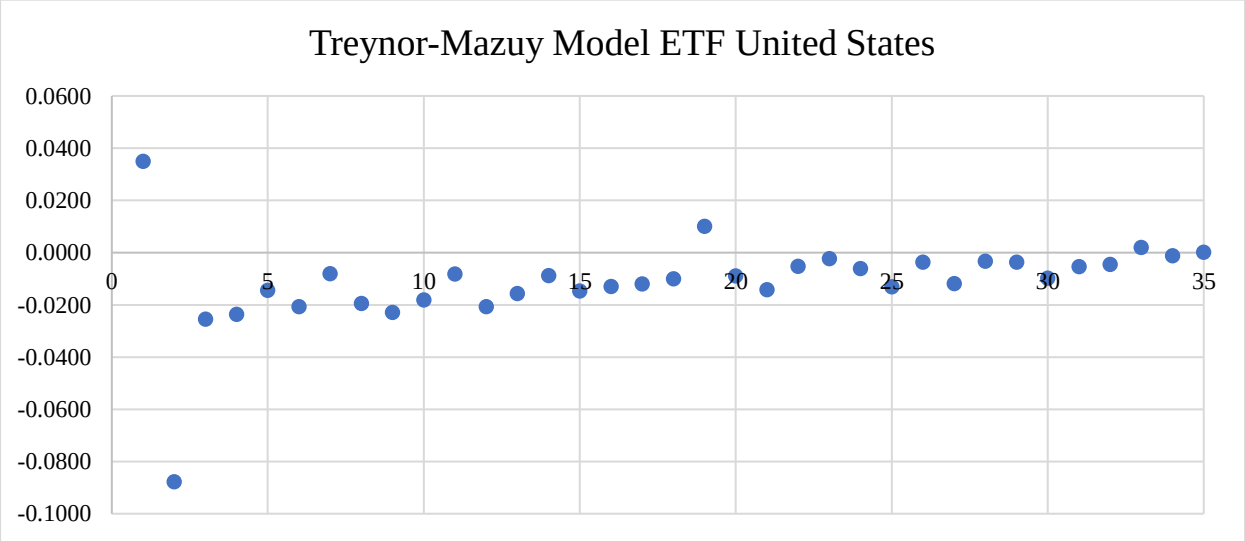

Figure 4.23: Treynor and Mazuy Market Timing Ability Model ETFs United States
Note: TM Model regression analysis results have been presented in Appendix 8

In the United States, the actively managed exchange-traded funds (ETFs) that were investigated have an average market timing index of -0.011, according to the Treynor and Mazuy model. Only four of the thirty-five active exchange-traded funds (ETFs) that were investigated had a positive market timing coefficient, as demonstrated by a square efficient value that was greater

than zero. This was because the market timing coefficient was positive. There was a total of 31 funds that displayed a coefficient that had a square term that was negative. Using a statistical significance level of 5%, it is possible to draw the conclusion that only two of the four positive square term funds have statistical significance. On the other hand, it is possible to see that out of the 31 funds that have negative square term coefficients, a total of twenty funds exhibits statistical significance at a level of significance of five percent.

Both the Invesco S&P 500 Downside Hedged ETF and the Advisorshares Ranger Equity Bear ETF are examples of actively managed exchange-traded funds (ETFs) that demonstrate the ability of their managers to identify and capitalise on market opportunities. Fund managers have the ability to effectively forecast and anticipate variations in the financial markets, which enables them to adapt their investment strategies in a manner that maximises their returns from these fluctuations. These findings demonstrate that fund managers possess the potential to do so. Although it is true that there are two exchange-traded funds (ETFs) that have managers that are skilled in market timing, the result of the analysis that was carried out reveals that the majority of active ETF fund managers in the United States do not possess this expertise.

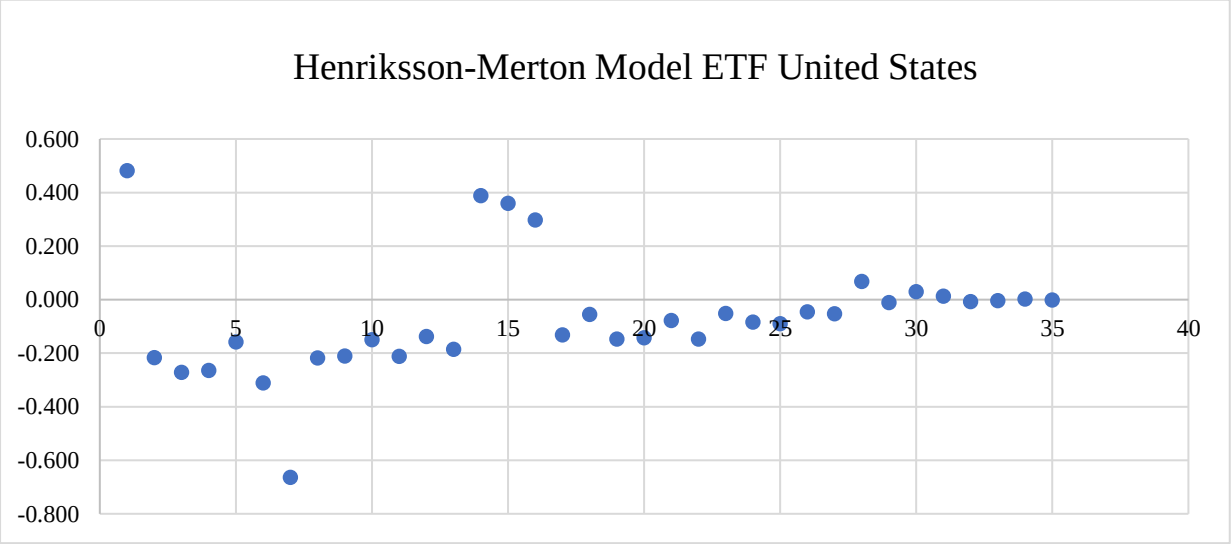

Figure 4.24: Henriksson-Merton Market Timing Ability Model ETFs United States
Note: HM Model regression analysis results have been presented in Appendix 8

The actively managed exchange-traded funds (ETFs) that were investigated in the United States had an average market timing index of -0.068, as indicated by the Henriksson-Merton model. Eight of the thirty-five active exchange-traded funds (ETFs) that were examined were found to have a positive market timing coefficient, which was denoted by a square efficient value that was greater than zero. In total, there were 27 funds that had a coefficient that contained a square term that was negative. Due to the fact that the level of statistical significance is set at 5%, it is possible to draw the conclusion that only one of the eight positive square term funds represents statistical significance. In spite of this, it is important to point out that only eleven of the twenty-seven funds that have negative square term coefficients demonstrate statistical significance at a level of significance of five percent.

In accordance with the findings of the Treynor and Mazuy model, the Invesco S&P 500 Downside Hedged ETF was the only active exchange-traded fund (ETF) that provided evidence that the fund management possesses the ability to time the market. Based on the findings, it appears that fund managers are responsible for accurately predicting and anticipating developments in the financial markets. Because of this, they are able to modify their investing strategy in a manner that will allow them to derive the greatest possible benefit from these changes. According to the findings of the analysis that was carried out, the majority of active ETF fund managers in the United States do not have the ability to implement market timing strategies, with only one ETF displaying such capabilities.

4.8 Discussion on Mutual Fund Performances

4.8.1 Hypothesis One: H_i: Mutual funds outperforms the market benchmark in the G7 countries.

The Sharpe ratio and the Treynor ratio are two ratios that are frequently used in the process of evaluating the performance of an investment portfolio in relation to the risk that it entails. It is possible to observe that positive numbers indicate that the mutual funds have generated returns that are higher than the rate at which there is no risk involved. This is the case in either of the two scenarios when it is possible to make this observation. This is the conclusion that we have reached after taking into consideration the level of risk that is involved. For the purpose of evaluating and analysing a wide range of investment opportunities, investors and portfolio managers make extensive use of these ratios. Choosing assets that have the highest risk-adjusted returns that are attainable is the goal of this endeavour.

Table 4.1: Summary Findings of Performance Measure in G7 Countries

	Sharpe Ratio			**Treynor Ratio**		
Countries	Positive	Negative	Funds Outperformed Benchmark	Positive	Negative	Funds Outperformed Benchmark
United States	0	50	**0**	0	50	**5**
United Kingdom	50	0	**47**	50	0	**50**
Canada	0	50	**9**	0	50	**0**
Italy	0	50	**0**	0	50	**0**
Germany	0	50	**3**	0	50	**1**
France	0	50	**2**	0	50	**3**
Japan	0	50	**12**	0	50	**4**

Note: This is the performance measure analysis findings for the G7 countries.

Taking into consideration the information that was gathered in Chapter 4, it is possible to draw the conclusion that the only entities that exhibited favourable Sharpe and Treynor ratios were the mutual funds that were active in the United Kingdom. In the context of the United Kingdom, it is noticed that the bond-based funds had the biggest Sharpe and Treynor ratios, while the equity funds demonstrated the lowest ratios. The majority of mutual funds in the United Kingdom exhibit higher performance in comparison to the market benchmark. This

substantiates our primary research purpose, which was to establish that mutual funds exceed the benchmark in accordance with these performance criteria.

On the other hand, it is fascinating to notice that every single other country that was investigated in the study displayed negative values for both ratios. There is evidence to support the idea that mutual fund managers are constrained in their potential to beat the market, as seen by the fact that all funds have Sharpe and Treynor ratios that are negative. When it comes to portfolio returns, funds that have negative Sharpe and Treynor ratios often imply that investors have not been adequately paid for the level of risk that they have already accepted. Negative numbers for these ratios are generally undesirable for investors since they indicate that the investment has not met the investor's expectations in terms of risk-adjusted returns. Positive values, on the other hand, convey the opposite message. When it comes to investors who are trying to make judgements regarding their finances, this could be a warning sign. When faced with such situations, investors may consider re-evaluating the decisions they have made regarding their investments. They may also explore the possibility of searching for new assets or modifying their portfolios in order to achieve better risk-adjusted performance.

To be more specific, seventeen funds based on the Sharpe ratio and five funds based on the Treynor ratio are the only ones that are able to achieve superior performance than the benchmark in the United States. When looking at the Canadian context, it is observed that only nine funds surpassed the benchmark when the Sharpe ratio was taken into consideration. However, when the Treynor ratio was taken into consideration, no funds had higher performance. In the instance of Italy, not a single fund was able to achieve a higher level of performance than the benchmark. Within the framework of Germany, it was seen that three funds and one fund displayed greater performance in comparison to the benchmark, as evidenced by their Sharpe and Treynor ratios. This was the case in the context of Germany. When the Sharpe and Treynor ratios were compared, it was found that two and three funds

were able to surpass the benchmark in France, which is the sixth country located on the list. Based on the Sharpe ratio, it was noted that 11 funds in Japan demonstrated superior performance, while the Treynor ratio demonstrated superior performance for three funds.

Both ratios were used to evaluate the performance of funds. In conclusion, it can be observed that all of the funds that exceed the benchmark are purely equity-based funds. This is the case within the six countries that have ratios that are both negative and negative. In addition, it is important to highlight that the funds that achieved the highest rankings in each of the six countries are solely composed of equity-based funds, whilst the funds that exhibited the lowest ratios were primarily composed of bond funds. This finding is in contrast to the one that was found in the United Kingdom, where the equities fund was ranked the lowest and the bond fund was ranked the highest. When it comes to the six countries, it is clear that it is not possible to reach the conclusion that fund managers are displaying great performance. This is mostly due to the fact that only a tiny percentage of funds are capable of outperforming the market, and in addition, investors are not getting returns that are proportional to the level of risk that is associated with their portfolios.

According to the findings that were obtained, it is possible to make an observation that positive ratios were only found in the United Kingdom over the entire period of time that was stated. This is mostly attributable to the current risk-free rate environment, which implies that the average risk-free rate during the study period was comparatively lower in contrast to the other six countries. This is the primary reason for this. Based on these two performance indicators, it can be concluded that six out of seven mutual funds from the G7 countries have significantly underperformed. The conclusions of this study are in agreement with the research carried out by Sharpe (1966), which discovered that both the Sharpe and Treynor ratios were negative.

4.8.2 Hypothesis Two: H_i: Mutual fund managers in G7 countries possess stock selectivity skills.

By taking into account both the average return of the benchmark and the beta of the portfolio, the Jensen's Single Risk-Adjusted Alpha model is able to quantify the mean excess return of a portfolio in comparison to the expected return that is forecasted by the Capital Asset Pricing Model (CAPM). In order to determine whether or not a portfolio is generating a satisfactory return in relation to the level of risk, it is one of the strategies that is usually utilised.

Table 4.2: Summary Findings of Stock Selectivity Skills in G7 countries

Countries	Positive	Statistically Significant	Negative	Statistically Significant
United States	6	**3**	44	**38**
United Kingdom	48	**4**	2	**0**
Canada	0	**0**	50	**50**
Italy	0	**0**	50	**50**
Germany	1	**0**	49	**47**
France	0	**0**	50	**50**
Japan	4	**0**	46	**31**

Note: This is the Jensen's Alpha Single-Index Risk Adjusted analysis findings for the G7 countries.

According to the data that are summarised in table 4.2, it is clear that just a few mutual funds in the United Kingdom are able to demonstrate that their fund managers have the ability to display stock selectivity skills. The remaining six nations have alpha values that are negative, which implies that the fund managers did not provide any value to the portfolio through the decisions they made on investments.

Table 4.3: Summary Findings of Stock Selectivity Skills in G7 countries

Countries	Positive	Statistically Significant	Negative	Statistically Significant
United States	8	**6**	42	**39**
United Kingdom	48	**5**	2	**0**
Canada	1	**0**	49	**49**
Italy	0	**0**	50	**50**
Germany	1	**0**	49	**48**
France	0	**0**	50	**50**
Japan	4	**0**	46	**31**

Note: This is the Fama-French Three Factor Model analysis findings for the G7 countries.

In addition, when the Fama-French model was utilised, findings that were comparable to those obtained using Jensen's alpha model were seen. Among the managers of mutual funds, only a small number of individuals in the United States and the United Kingdom possess the ability to select stocks. One can reach the conclusion that a specific number of mutual funds that are active in the United States and the United Kingdom were the only ones to exhibit positive and significant alpha values. This is a conclusion that can be drawn. As a result of these values, it is clear that the managers of the fund are able to choose the proper stocks for their portfolio within the time period that was investigated in this study.

The majority of funds, on the other hand, were found to be adversely significant in every country with the exception of the United Kingdom. This indicates that the managers of mutual funds chose equities that resulted in the worst performance possible given the level of risk that was present. Investors often view negative values for these ratios as unfavourable because they indicate that their investment has resulted in losses or produced lower returns than anticipated in relation to the level of systematic risk. This is because negative values indicate that the investment has been subject to systematic risk. This insight has the potential to serve as a warning signal for investors who are looking to make informed decisions regarding their financial situation. In these kinds of circumstances, investors might think about rethinking their investing choices, looking into alternative assets, or making adjustments to their portfolios in order to obtain better risk-adjusted performance.

In the context of the United States and the United Kingdom, it has been discovered that all of the funds that have displayed stock selectivity skills are equity-based funds that have more than 95% of their assets invested only in stocks. This is consistent with the findings of the previous research. It is demonstrated that fund managers in the G7 countries do not exhibit the stock selectivity skills by the fact that more than fifty percent of the mutual funds in those countries have significant negative values. It is very clear that it is not possible to arrive at a conclusion

concerning the exceptional performance of fund managers by considering all six countries. This problem can be primarily due to the fact that only a small fraction of funds are able to demonstrate that their fund managers possess the abilities necessary for stock selectivity. The findings that fund managers do not possess any stock selectivity abilities are consistent with the conclusions that were acquired from the research carried out by Jensen (1968), Bessler et al. (2009), and Sharpe (1966).

Based on the outcomes of the analysis that was performed on the fifty mutual funds that are available in the United States, it was discovered that approximately fifty percent of the funds produced a negative alpha when the Jensen's Alpha model and the Fama-French Model were utilised. There are just a few mutual funds that have statistically significant alpha, which indicates that they have some degree of stock selectivity. In each of the models, the Fidelity SMCP Discovery Fund was found to have the greatest alpha value. This is a discovery fund for small-cap companies that was founded in the year 2000. There is a method that the management of the fund adopt that is centred on selecting stocks in order to achieve long-term outperformance while simultaneously minimising the influence of other factors. One of the most important aspects of their strategy is to avoid paying an excessive amount for a stock at the beginning of the process. Additionally, they look for stocks that offer an adequate margin of safety in accordance with our criteria. In addition to this, they perform an analysis of management as well as other relevant factors in order to find organisations that we consider to be of higher quality (Fidelity Investments, 2023).

The majority of funds in the United Kingdom had a positive alpha value, according to the data that were derived from the stock selectivity skills models. The findings of this study are in line with the findings of a study that was carried out by Cuthbertson and colleagues (2008). They discovered that there is a stock selection ability among a relatively limited number of top performing equity funds in the United Kingdom. This indicates that the performance may be

due to talent rather than owing to luck alone. According to the empirical evidence that was gathered from the research that was carried out in the United States mutual fund market (Mains, 1977; Ippolito, 1989; Lee & Rahman, 1990), this may also be stated to be broadly compatible with the findings.

4.8.3 Hypothesis Three: H_i: *Mutual funds managers in the G7 countries have market timing ability*

The purpose of this hypothesis is to investigate the ability of fund managers in G7 countries to time the market precisely. For the purpose of determining the market timing abilities of fund managers in these seven nations, the Treynor-Mazuy Model and the Henriksson-Merton Model have both been utilised. Whenever fund managers believe that the market is going to move in an upward direction, they make adjustments to the makeup of their portfolios by raising the proportion of high-volatility assets in their holdings. On the other hand, when they anticipate a downward movement in the market, they adjust the structure of their portfolio by decreasing the allocation of high-volatility assets and raising the allocation of companies that are less volatile. When fund managers have the ability to time the market, they make adjustments to the composition of their portfolios based on their forecasts of whether the market will be expected to move in an upward or negative direction. The results of the regression analysis are summarised in tables 4.4 and 4.5. These tables contain the findings based on the Treynor and Mazuy models as well as the Henriksson-Merton model for each of the seven nations that were examined.

Table 4.4: Summary Findings of Treynor-Mazuy Market Timing Ability Model in G7 countries

Countries	Positive	Statistically Significant	Negative	Statistically Significant
United States	24	**1**	26	**14**
United Kingdom	8	**1**	42	**21**
Canada	30	**5**	20	**7**
Italy	44	**36**	6	**2**
Germany	3	**0**	47	**32**
France	10	**0**	40	**26**
Japan	5	**0**	45	**41**

Note: This is the Treynor-Mazuy market timing model summary findings for the G7 countries.

The Treynor and Mazuy (1966) test is designed to evaluate the ability of fund managers to accurately time the market. In the event that fund managers are adept at market timing, they will construct their portfolios on the basis of their forecasts of the trends in the market. As a result of this analysis, we are able to observe that the bulk of the funds had a negative significance, with the exception of the Italian funds, which showed favourable market timing skills. The United States of America, the United Kingdom, Canada, and Italy are the only four countries that have been able to successfully report a few mutual funds that have the capacity to positively time the market.

Table 4.5: Summary Findings of Henriksson-Merton Market Timing Ability Model in G7 countries

Countries	Positive	Statistically Significant	Negative	Statistically Significant
United States	10	**1**	40	**24**
United Kingdom	10	**4**	40	**30**
Canada	10	**3**	40	**7**
Italy	33	**6**	17	**0**
Germany	6	**1**	44	**33**
France	7	**0**	43	**31**
Japan	5	**0**	45	**23**

Note: This is the Henriksson-Merton market timing model summary findings for the G7 countries.

Furthermore, according to the Henriksson-Merton market timing model, comparable and consistent findings are discovered, wherein the majority of mutual funds in six out of seven nations had a negative market timing skill. By the same token, the investigation that utilised the Henriksson-Merton model discovered that Italy was the sole nation that possessed 33 mutual funds that possessed the ability to positively time the market, with six of those funds

being statistically significant. According to Henriksson (1984) and Henriksson and Merton (1981), it has been discovered that when the value of γ is negative, it signifies a lack of market timing ability. To put it another way, managers of mutual funds are unable to precisely forecast the conditions of the market and modify the allocations of their portfolios accordingly.

As a whole, the discussion that was presented earlier demonstrates that somewhat less than ten percent of funds across six countries have exhibited market timing ability. These findings are in line with those of other research conducted by Treynor and Mazuy (1966), Henriksson (1984), Blake et al. (2017), Cagnazzo (2022), and Ali et al. (2021), which discovered that mutual fund managers often lacked the ability to accurately predict the market. It is only in the instance of Italy that the majority of mutual funds have demonstrated that their managers are skilled at managing the market timing.

Generally speaking, the majority of the research that have been conducted so far indicate that fund managers often demonstrate poor timing skills and overall performance. There were several researchers who concluded that the average market-timing performance of mutual funds was not significant. These researchers included Treynor and Mauzy (1966), Henriksson and Merton (1981), Becker et al. (1999), and Jagannathan and Korajczyk (1986). Research on this topic was carried out by Merton (1981), Henriksson and Merton (1981), Veit and Cheney (1982), Chang and Lewellan (1984), Chen and Stockum (1986), and Elton et al. (1993), all of whom concluded that fund managers do not have the ability to timing the market.

Several researchers, including Chang and Lewellen (1984), Henriksson (1984), and Lee and Rahman (1992), found evidence that market-timing talents were lower than expected. During the course of their research, Friesen and Sapp (2007) conducted an analysis of the timing proficiency of cash flows in mutual funds. They came to the conclusion that the timing judgements that investors in equities funds made had a negative impact on the overall

performance of the funds. On the other hand, researchers such as Kon (1983), Lehmann and Modest (1987), Lee and Rahman (1990), Cumby and Glen (1990), Grinblatt and Titman (1994), Jiang et al. (2007), and Elton, Gruber, and Blake (2012) found that mutual funds exhibited a significant capacity to time their investments.

4.8.4 Summary on Mutual Fund Performance

The statistics from the G7 countries make it abundantly clear that the majority of fund managers are deficient in both the ability to select stocks and the ability to time the market, and as a result, they typically lag behind the market benchmark in terms of performance. The Efficient Market Hypothesis (EMH) is supported by this scenario, which indicates that investors are unable to get extraordinary returns by selecting funds based on a variety of attributes.

4.9 Discussion on Exchange-Traded Fund Performance

4.9.1 Active ETF Stock Selectivity Skills

In the first place, the empirical findings demonstrate that throughout the time period under investigation, the active exchange-traded funds (ETFs) in the sample attained a negative Sharpe ratio, and the returns they generated were not higher than those of the ETF fund that was managed passively. When compared to the passively managed exchange-traded fund (ETF), just one fund was able to achieve a higher Treynor ratio. Both the single-factor model and the multi-factor model found that the majority of active exchange-traded funds (ETFs) had average alpha estimations that were negative. A few six alphas have been determined as positively statistically significant, which implies that fund managers possess the stock selectivity skills. This information is based on Jensen's Single-Factor Model. It is important to note that the findings indicate that the Ark Funds are responsible for managing all three of the funds that have the highest alpha values. The Ark Innovation ETF is the active exchange-traded fund that

has the greatest alpha value that was recorded. This discovery is consistent with the research that Rompotis conducted in 2022 on the Active ETF market in the United States.

The ARK Innovation Exchange-Traded Fund (ARKK) is generally recognised as a highly popular equity exchange-traded fund (ETF) that is professionally managed and has assets that surpass $12 billion. Conventional investors have a tendency to place a higher priority on benchmarks and passive methods as a means of assuring security. However, ARK is of the opinion that such behaviour is not conducive to obtaining the outcomes that are desired. Because of the introduction of innovation, there have been substantial disruptions, which has led to an increase in the dangers that are linked with the traditional order of the world. Our goal is to distribute resources in a manner that is proportional to the rate of technical growth and progress (ARK Invest, 2023). Indicating an emphasis on stock selection rather than frequent adjustments based on market conditions, the purpose of this fund manager is to prioritise long-term gains. This is shown by the aforementioned statement.

4.9.2 Active ETF Market Timing Ability

Regarding the investigation that was carried out to determine the level of market timing expertise possessed by active ETF fund managers, it is obvious that, in accordance with the Treynor-Mazuy model, two funds, namely the Invesco S&P 500 Downside Hedged ETF and the Advisorshares Ranger Equity Bear ETF, demonstrated market timing skill. To the contrary, according to the Henriksson-Merton model, the only exchange-traded fund (ETF) that displayed market timing capabilities was the Invesco S&P 500 Downside Hedged ETF. The research that is currently available implies that the majority of funds provide evidence of a lack of competency among fund managers in efficiently timing the market in order to create returns that are higher than the benchmark return.

The examination of the market timing models reveals a consistent pattern of outcomes, which indicates that the Invesco S&P 500 Downside Hedged ETF demonstrates the capacity to time the market. The Invesco S&P 500 Downside Hedged Exchange-Traded Fund (Fund) is an exchange-traded fund (ETF) that is actively managed and designed to generate favourable overall returns in both bullish and bearish market conditions. Additionally, the fund is designed to maintain a lack of direct correlation with the performance of broader equity or fixed-income markets (Invesco Distributors,2023). In summary, the results suggest that fund managers hold various intents and purposes, with certain funds demonstrating ability in stock selection while others primarily highlight competence in market timing.

4.9.3 Summary on Actively Managed ETF Performance

Despite the fact that there is some evidence to the contrary, the findings show that the managers of active exchange-traded funds (ETFs) do not possess the ability essential to properly select stocks or time the market. This is the conclusion that can be drawn from the data. According to Rompotis (2022) and Rompotis (2013), the findings that were acquired from this study are in agreement with the seminal work that was done in the field of active exchange-traded funds (ETFs) in the past. This is something that Rompotis has proved. The motivations behind this study are the growing interest among investors in actively managed exchange-traded funds (ETFs), the major development of these products, and the significant sums of capital that have been invested in them over the course of the preceding few years. All of these factors have contributed to the production of this study. The goal of this attempt is to evaluate whether or whether the recent rise of the active exchange-traded fund (ETF) market may be linked to the great performance records of these funds. This will be accomplished by undertaking an analysis of the most recent return data.

4.10 Chapter Summary

In this chapter, one of the subjects that is examined is the lack of study that has been conducted on the performance of mutual funds. This can be attributed to the significant increase in investments that have been made in mutual funds. For the purpose of this study, which makes use of data ranging from 2015 to 2022, a complete examination of the performance of mutual funds across all of the G7 countries is offered. In addition to this, the chapter explores the performance of exchange-traded funds (ETFs) that are actively managed in the market in the United States. There are many other aspects that are taken into consideration when determining the profitability of the fund. These aspects include stock selectivity skills, market timing ability and management strategies of funds managers.

The data indicates that mutual fund managers, on average, exhibit a lack of both stock selection and market timing competence, which leads in a marginal underperformance in contrast to market benchmarks. This is the case because mutual fund managers make poor stock selection decisions. There are certain funds, on the other hand, that have exceptional stock selection capabilities and the ability to time the market, which enables them to surpass market benchmarks. On the other hand, it would appear that the vast majority of fund managers do not possess these talents. As a result, any potential outperformance is typically attributed to luck rather than skill. Within the conclusion of the report, which is the final chapter of the report, a comprehensive summary of the findings of the study will be provided.

The Sharpe ratio and the Treynor ratio, both of which analyse the performance of mutual funds, are two examples of performance measures that have been utilised in order to evaluate the expertise of mutual fund managers. There is a certain index or indicator that is referred to as the Single-Index. Both the Jensen's Alpha model and the Fama-French Three Factor model were utilised in order to assess the performance of mutual fund managers in terms of their

inventory selection abilities. For the purpose of determining whether or not mutual fund managers are capable of accurately timing the market, this research utilised the Treynor and Mazuy as well as Henriksson and Merton market timing models.

CHAPTER 5 CONCLUSION

5.1 Introduction

We have reached the conclusion of our analysis of the performance of mutual funds and fund managers throughout the G7 nations, which we have been discussing in this chapter. When we were in the chapter that came before this one, we participated in discussions and presented the findings of the study that we had conducted. Both exchange-traded funds (ETFs) and mutual funds are subjected to a comprehensive analysis in Chapter 5, which delves into their respective performance. This chapter is a compilation of the information that was originally presented in preceding chapters. At the same time that it delivers thorough answers to the research questions that were offered in the first chapter, it also provides a full description of how the research objectives were attained. In addition to this, it discusses the implications of the study as well as the constraints that were placed on the research. Furthermore, it offers recommendations for additional research avenues that could be of great use.

5.2 Overview of the Study

When discussing the main components that are required for achieving success as a manager, it is customary practice to highlight two essential features. Initially, the selection of stocks for the portfolio, because it is essential to select the suitable stocks in order to achieve success. This is the first step in the process. The ability to determine when it is appropriate to sell stocks or when it is suitable to hold them is the second talent. Timing refers to the capacity to determine when it is appropriate to sell stocks. When it comes to mutual funds, the essential principles stress how important it is to maximise rewards while simultaneously limiting risk through diversification when it comes to mutual funds. The management of this is handled by watchful fund managers. The use of a strategic approach to the allocation of capital, the selection of stocks, and the timing of market transactions are all critical components of efficient

investment management. The objective of this study is to analyse the capabilities of fund managers with regard to the selection of stocks and the ability to time the market. There are three hundred and fifty exchange-traded funds (ETFs) that are currently active in the United States that are included in the sample for the study. Furthermore, fifty mutual funds from each of the seven countries that make up the G7 are featured in this compilation as well. With regard to the extent of the research that was carried out, the years 2015 through 2022 are included. It is vital to study these observations in connection to the market benchmarks that correlate to them in order to determine whether or not they are capable of outperforming the actual market. This may be done by comparing them to the benchmarks.

There were a variety of models that were utilised in order to evaluate the ability of fund managers in terms of market timing and stock selection. These models included Jensen's Alpha, the Fama-French Three Factor Model, Henriksson-Merton, and Treynor-Mazuy. On the other hand, these data do not offer a great deal of evidence to back up the notion that managers of mutual funds tend to possess these skills. There is no basis for the assertion that G7 fund managers have techniques to foresee changes in the market, according to the empirical evidence that these models give. The findings of this study indicate that only a very small percentage of mutual funds in the G7 countries are able to outperform the market benchmark and demonstrate that they have managerial expertise.

According to the findings of this study, this is the broad conclusion that can be derived from the findings. The difference between the two is not truly clear, despite the fact that it is obvious that certain funds are able to create returns that are greater than those of the benchmark market. However, the differentiation between the two has not been particularly clear. This conclusion has been arrived at as a result of the Treynor Index and the Sharpe Ratio having a significant

impact on the overall statistical significance. On the other hand, the difference between the two is not one that could be considered to be very obvious.

Furthermore, it has been found that the ability of the fund manager to select stocks and to time the market almost always has a negative correlation. On the basis of the information that has been provided in this article, it is simple to draw the conclusion that fund management organisations are choosing stocks that provide them with returns that are lower than what they had expected receiving. Continuing along the same lines, it is quite evident that only a small number of funds operating inside the active exchange-traded fund business are able to demonstrate the capacity to select stocks and to time the market. This is a fact that is abundantly clear. Through the discerning expertise of fund managers, they are able to select stocks and effectively anticipate market moves, which is evidence of their strategic competency and investment portfolio approach. This demonstrates that they are capable of selecting stocks that will allow them to achieve the returns they promise to the investors in smart manner when making decisions.

5.3 Summary of Findings

According to the information presented in Chapter 1, this section investigates the six key study objectives and the hypotheses that are linked with them in relation to Exchange-Traded Funds and mutual funds in the G7 countries. In this section, a condensed overview of the replies to each objective is shown, and an analysis of the findings of the study is performed in comparison to the findings of other research endeavours.

5.3.1 RO 1 Summary of Findings

Utilising a variety of performance indicators, the primary purpose of this research is to evaluate the performance of mutual funds originating from the G7 countries in contrast to the market benchmark. In order to accomplish this objective, the research makes use of well-known metrics, such as the Treynor Ratio and the Sharpe Ratio, to assess the performance of mutual funds.

When seen from the point of view of an investor, the Sharpe and Treynor Ratio provides insight into the degree to which they are rewarded with returns on their investment portfolio in relation to the level of risk that they are willing to take on. When it comes to investing, investors typically go towards funds that have greater Sharpe Ratio values. This preference originates from the realisation that when comparing the historical returns of two funds against the same benchmark, the fund with the higher Sharpe Ratio gives more returns for a comparable degree of risk. This realisation led to the formation of this personal preference. The results of the study indicate that positive ratios were only seen in the United Kingdom within the period of time that was specified. It is primarily possible to ascribe this to the current risk-free rate environment, which suggests that the average risk-free rate over the period of the study was somewhat lower than the rates in the other six countries. In general, according to these two performance parameters, mutual funds from six out of seven countries that make up the G7 have demonstrated poor performance. The findings of this study are consistent with those of Sharpe's (1966) research, which similarly found that Treynor and Sharpe ratios were negative.

5.3.2 RO 2 Summary of Findings

A complete examination of the stock selectivity skills of mutual fund managers in the G7 countries is the second purpose of this research. This inquiry will be carried out in order to investigate the matter. As part of this investigation, we have utilised well-established measures such as Jensen's Alpha and the Fama-French model in order to evaluate the performance of mutual funds in order to accomplish the goal that we have set for ourselves. Only a small number of mutual fund managers in the United States and the United Kingdom demonstrate great stock-picking ability. However, certain funds exhibit positive alpha values, which indicates that they are skilled in stock selection. However, in other nations, with the exception of the United Kingdom, the majority of funds do poorly, which suggests that stock selection is inadequate in relation to risk. It is possible that this will serve as a warning to investors, prompting them to reconsider their investments or diversify their portfolios respectively. It is important to note that successful funds in the United States and the United Kingdom are mostly equity-based, whereas more than half of the G7 funds lack the ability to select stocks. Therefore, it is difficult to draw conclusions about the performance of fund managers for these six countries. This is similar to the findings of earlier studies conducted by Jensen (1968), Bessler et al. (2009), and Sharpe (1966), which discovered that there was limited evidence of stock-picking skills among managers.

5.3.3 RO 3 Summary of Findings

This study has three research objectives, the third of which is to investigate the capacity of mutual fund managers in the G7 countries to time the market. For the purpose of evaluating the market timing capabilities of fund managers in these seven nations, the Treynor-Mazuy and Henriksson-Merton models have both been utilised. The managers of the portfolios make adjustments to their portfolios by boosting their allocations to high-volatility assets when they

predict an upward surge in the market. On the other hand, in order to prepare for a downward trend in the market, they alter their portfolios by decreasing the number of high-volatility assets and increasing the number of stocks with lower volatility. This means that managers are able to adjust portfolio compositions in reaction to market projections, which is essential for effective market timing. Following the conclusions of the investigation, it was discovered that fewer than ten percent of funds across six countries demonstrated market timing proficiency. These findings are consistent with those of other studies conducted by Treynor and Mazuy (1966), Henriksson (1984), Blake et al. (2017), Cagnazzo (2022), and Ali et al. (2021), which indicate that mutual fund managers generally lack the ability to accurately predict the market.

5.3.4 RO 4 Summary of Findings

The performance of active exchange-traded funds (ETFs) in comparison to that of passive ETFs in the United States is the fourth target of this researcher's investigation. Within the scope of this investigation, the Sharpe and Treynor ratios were utilised in order to accomplish this purpose. Active exchange-traded funds (ETFs) are a relatively new financial product that are not yet all-encompassing in terms of availability across all nations. As a result, the purpose of this study is to evaluate if actively managed exchange-traded funds (ETFs), which are managed by fund management firms, have a higher performance than passive ETFs, which are meant only to mirror the performance of indexes. During the course of the research, the active exchange-traded funds (ETFs) that were examined exhibited a Sharpe ratio that was negative, which indicated that their returns did not exceed those of passively managed ETFs. In terms of the Treynor ratio, there was just one fund that was able to outperform passively managed exchange-traded funds. According to both single-factor and multi-factor models, the majority of active exchange-traded funds (ETFs) had average alpha estimations that were negative.

5.3.5 RO 5 Summary of Findings

A fifth purpose of this study is to explore the stock selectivity skills of active ETF fund managers in the United States. This is the second objective of this investigation. Additionally, the Jensen's Alpha and Fama-French models were utilised in this research project in order to accomplish this goal. Only six alphas have been recognised as statistically significant, as indicated by Jensen's Single-Factor Model. These alphas are indicative of the stock selectivity skills of fund managers. Notably, Ark Funds is responsible for managing all three of the funds that have the greatest alpha values, particularly the Ark Innovation Exchange-Traded Fund (ETF). Rompotis's research on the Active ETF market in the United States, which was carried out in 2022, is supported by this finding. It's evident that only select funds succeed in outperforming the benchmark index, suggesting the capacity of fund managers to develop unique techniques for surpassing benchmark performance. For instance, in the case of the ARK Innovation Exchange-Traded Fund (ARKK), the emphasis is placed on prioritising long-term gains, which suggests that the focus is on stock selection rather than making regular modifications based on the conditions of the market.

5.3.6 RO 6 Summary of Findings

In conclusion, the objective of this study is to carry out an investigation on the ability of active ETF fund managers in the United States to accurately time the market. Two funds, notably the Invesco S&P 500 Downside Hedged ETF and the Advisorshares Ranger Equity Bear ETF, were found to have displayed market timing ability, as indicated by the Treynor-Mazuy model. This was determined through an investigation that was conducted to determine the market timing competency of active ETF fund managers. Therefore, according to the Henriksson-Merton model, the only exchange-traded fund (ETF) that demonstrated market timing competence was the Invesco S&P 500 Downside Hedged ETF. When market timing models

are analysed, it has been repeatedly shown that the Invesco S&P 500 Downside Hedged ETF has the capacity to time the market accurately. This has been proved on multiple occasions. The information that is now available indicates that the majority of funds exhibit a lack of skill in terms of their capability to correctly time the market in order to generate returns that are higher than the benchmark returns. This is the case because the majority of funds do not have the ability to properly time the market. The actively managed exchange-traded fund (ETF) that aims to generate favourable returns in both bullish and bearish market conditions, while maintaining a lack of direct correlation with broader equity or fixed-income markets, the Invesco S&P 500 Downside Hedged ETF, demonstrates market timing ability, according to the findings of the analysis of market timing models. This ETF is a good example of market timing ability. In conclusion, the findings provide light on the numerous aims and objectives that fund managers work towards accomplishing. Not only do certain funds demonstrate expertise in stock selection, but others also demonstrate expertise in market timing in relation to their objectives and ambitions.

5.4 Implications of Study

It is important to note that the implications that are made from this thesis have broad significance across a variety of theoretical and practical areas, which highlights the contributions that it makes to the processes of investment decision-making. More specifically, these contributions are of tremendous importance to three very important stakeholder groups: investors in mutual funds, fund managers, and legislators.

When it comes to navigating the complexity of the investment landscape, the insights that were obtained from this research provide investors in mutual funds with essential information. Providing investors with information that sheds light on the performance dynamics of mutual funds and exchange-traded funds (ETFs) gives them the ability to make informed decisions on

the selection of funds and the allocation of resources. Additionally, the identification of performance measurements that are not constrained by the Capital Asset Pricing Model (CAPM) provides investors with powerful tools that enable them to accurately evaluate the performance of funds, which in turn improves the efficiency of their particular investment strategy.

When it comes to improving fund performance and refining investment strategies, the findings of this thesis offer fund managers insights that may be put into action. The research emphasises the critical role that managerial experience plays in determining the returns that are generated by funds by drawing attention to the significance of using competent stock selection and market timing.

Furthermore, the investigation of alternative performance indicators provides managers with the chance to re-evaluate the frameworks that they use to evaluate employee performance and to optimise their decision-making processes in accordance with the findings. The ramifications of this thesis extend to the sphere of regulatory monitoring and market governance, which are both important for policymakers to consider. The research highlights the necessity of regulatory frameworks that promote openness and accountability within the investment industry. It does this by shedding light on the limits of the performance evaluation models that are currently in use and by arguing for the development of alternative metrics. Furthermore, with the emphasis placed on the significance of investor education and protection, governments are encouraged to enact measures that are targeted at promoting investor literacy and protecting investor interests in the constantly shifting financial landscape.

In short, the contributions of this thesis are felt across a variety of domains, providing investors in mutual funds, fund managers, and policymakers with significant insights and recommendations at the same time. This study acts as a catalyst for informed decision-making

and sustainable growth within the investment ecosystem. It makes this possible by tackling important obstacles and expanding our understanding of investment dynamics.

5.4.1 Theoretical Implications

Ultimately, the mutual funds industry is currently experiencing significant growth. However, it is crucial to have a transparent performance measure that is easily understandable. The main objective of this study is to contribute to this field by providing evidence from G7 countries, conducting a thorough analysis of mutual fund performance and managers' capabilities in market timing and stock selection. The findings from this research contributes to the body of literature by resolving the academic debate regarding mutual fund risk-adjusted performance and managerial skills within the G7 nations. Existing performance measures indicate that, on average, mutual funds have a negative performance. In addition, there is no evidence to suggest that mutual funds have returns that are superior to those of the market.

As a result of the fact that the funds are unable to achieve higher returns than the market benchmarks, this evidence reveals that the efficient market hypothesis (EMH) is valid in this particular circumstance. The fundamental idea behind the Efficient Market Hypothesis (EMH) is that due to the fact that all market participants are perfectly rational, it is impossible for any investor to consistently outperform the market without taking on additional risks. This demonstrates that the majority of mutual fund managers in the G7 countries do not possess the appropriate level of selectivity or timing abilities that would allow them to generate the returns that they have promised to investors. The fact that investors are unable to outperform the market is demonstrated by this. It is possible that investors may once again rely on the Capital Asset Pricing Model (CAPM) in a variety of scenarios due to the fact that it is able to provide a clear explanation of the relationship between the expected returns on assets and risk.

5.4.2 Practical Implications

Mainly, the findings obtained from this study would offer valuable support to mutual fund investors, assisting them in their investment planning and analytical efforts. The initial discovery of this study emphasizes the capacity of mutual funds to surpass the benchmark. This provides investors with clear insights into the differing performance of various mutual funds, enabling them to assess risk levels before making informed investment choices. Furthermore, additional findings from the study highlight unique behaviors in mutual fund performance and the performance disparities between active ETFs and passive funds, along with the market timing skills of fund managers. These findings furnish investors with valuable information to enhance their decision-making processes in investments.

Furthermore, the findings have major significance for mutual fund providers, as they are able to adjust their product portfolios and investing strategies based on the findings. According to the findings of the study, a number of different mutual funds displayed considerable underperformance as well as outperformance. These findings need to inspire fund providers to investigate the factors that led to underperformance, while fund managers might look into developing new methods in order to outperform market benchmarks.

In conclusion, the findings of this research on the performance of mutual funds have the potential to significantly impact management skills in a variety of different ways. To begin, managers have the potential to benefit from the conclusions of research concerning market trends, investor behaviour, and economic situations. An increase in awareness of these aspects makes the process of making well-informed judgements regarding investments easier to accomplish. In addition, fund managers can make use of the data from this research to develop novel strategies that are in line with the conditions of the market and the preferences of investors.

5.5 Limitations and Future Research Directions

Despite the preliminary findings yielded by the research on mutual funds and exchange-traded funds (ETFs), it's imperative to acknowledge and confront several limitations. Firstly, a notable limitation lies in the scarcity of information surrounding ETFs and mutual funds. The empirical analysis conducted in this research drew data from fifty mutual funds across the G7 countries and thirty-five active ETFs in the United States. However, obtaining this data posed challenges due to restrictions, necessitating the utilization of a random sampling technique. Consequently, inconsistencies among the funds emerged as a consequence of these limitations. Similar constraints have been encountered in other studies on ETFs and mutual funds, such as those by Sharpe (1966) and Rompotis (2013), which also relied on relatively small sample sizes.

Furthermore, it is crucial to address another weakness in this analysis, which is the timeframe that encompasses significant market shocks such as the Covid-19 epidemic and the trade dispute between Ukraine and China. The importance of recognising this temporal restriction cannot be overstated. A review of the data spanning the years 2015 to 2022 demonstrates that the selected exchange-traded funds (ETFs) and mutual funds underperformed significantly in terms of asset allocation throughout this time period. This performance trend highlights the significance of the ability of mutual fund managers to improve their stock selection and market timing capabilities. This is because returns indicate a spectrum of outcomes, ranging from highly favourable to essentially non-existent, depending on the managerial proficiency of the fund managers.

In light of the fact that the performance of mutual funds is a crucial factor in the overall decision-making process for investors, it is of the utmost importance to develop and evaluate alternative performance indicators that are able to circumvent application limits. The measurements that are currently being used have shown that they have limitations in their application, which is why new evaluation metrics need to be developed and validated. When

investors are armed with a broad array of assessment metrics, they are able to select the most appropriate metric for evaluating the performance of mutual funds and choose investment vehicles that guarantee the highest possible returns. In addition, the study highlights the significance of mutual funds as investment vehicles with the objective of achieving normal returns, while also advising against having unreasonable expectations of abnormal returns.

In conclusion, the findings of the study highlight the importance of conducting additional research using evaluation methods that are not constrained by the limits that are imposed by the assumptions of the Capital Asset Pricing Model (CAPM). This hints at a potentially fruitful direction for further investigation and improvement in the evaluation of the performance of exchange-traded funds and mutual funds.

5.6 Conclusion

Study Objective: The purpose of this study is to examine the performance of mutual funds in terms of exceeding market benchmarks, evaluate the stock selection skills of fund managers, and investigate market timing ability of fund managers across the G7 countries.

Dataset: The dataset consists of 50 mutual funds from United States, United Kingdom, Canada, Italy, France, Germany and Japan between 2015-2022

Performance Metrics: Various metrics such as Sharpe Ratio, Treynor Ratio, Jensen's Alpha, and market timing models are employed to assess mutual fund performance.

Overall Findings:

- Given that both the Sharpe ratio and the Treynor ratio are negative, it is clear that the G7 mutual funds have a difficult time outperforming market benchmark.
- Jensen's Alpha and the Fama-French three-factor model both demonstrate that the majority of fund managers are not skilled in stock selectivity. This is the case.

- Market timing abilities differ among G7 countries, with Italian mutual fund managers exhibiting strong positive capabilities. • Only some funds in the United States and the United Kingdom demonstrate positive alpha values, which suggests skilled management.
- Exchange-traded funds (ETFs) that are actively managed confront similarly difficult hurdles, with the majority of them failing to outperform market benchmarks.
- Only a select few active exchange-traded funds (ETFs) are good at both stock selection and market timing.

Implications: Investors face a myriad of choices when it comes to selecting funds for investment. In this complex landscape, it's crucial to adopt a comprehensive approach that goes beyond mere returns. While performance measures such as returns are important, they only offer a partial view of a fund's performance. Therefore, investors should broaden their analysis to include a range of metrics that provide insights into various aspects of fund performance, such as risk-adjusted returns, volatility, Sharpe ratio, alpha, beta, and consistency of returns over time.

By considering multiple performance measures, investors can gain a more nuanced understanding of a fund's strengths and weaknesses. For example, a fund might deliver high returns, but if those returns come with exceptionally high volatility, it may not be suitable for all investors, especially those with low risk tolerance. On the other hand, a fund with more modest returns but lower volatility may offer a more stable investment option for risk-averse investors.

Moreover, investors should conduct thorough due diligence to assess a fund's historical performance, investment strategy, portfolio composition, fund manager expertise, and

expenses. This holistic analysis helps investors identify funds that align with their investment objectives, time horizon, and risk tolerance.

Managing expectations is also paramount in the investment process. While every investor hopes for above-average returns, it's essential to acknowledge that abnormal returns are not guaranteed and may not be sustainable over the long term. Instead of chasing after short-term gains or the latest hot fund, investors should focus on building a diversified portfolio tailored to their individual risk-return preferences and financial goals.

In conclusion, a prudent approach to fund selection involves considering multiple performance measures, conducting thorough analysis, and managing expectations. By prioritizing funds aligned with their risk-return preferences and investment objectives, investors can build a resilient portfolio poised for long-term success.

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APPENDIX

Appendix 1

Table 1: List of United States Mutual Funds

Fund Name	Fund Code	Fund Type	Inception
AAM/INSIGHT SELECT INCOME FUND A	CPUAX	Bond	19-Apr-13
AB CALIFORNIA PORTFOLIO C	ACACX	Bond	3-May-93
AB GLOBAL BOND FUND A	ANAYX	Bond	5-Nov-07
AB VIRGINIA PORTFOLIO C	AVACX	Bond	29-Apr-94
ALLSPRING MUNICIPAL BOND FUND ADM	WMFDX	Bond	8-Apr-05
AMERICAN FUND.PRESERVN. PRTF.CL.A	PPVAX	Bond	18-May-12
ARCHER INCOME FUND	ARINX	Bond	11-Mar-11
BLACKROCK CORE BOND PORTFOLIO K	CCBBX	Bond	1-May-97
BLACKROCK INCOME FUND INST	BMSIX	Bond	26-Feb-10
BLKRK IMPACT MTGE FD INSTL	PNIGX	Bond	20-Apr-92
BNY MELLON CORE PLUS FUND Y	DCPYX	Bond	2-Dec-10
BUFFALO HIGH YIELD FUND INVESTOR	BUFHX	Bond	19-May-95
CALVERT BOND FUND A	CSIBX	Bond	24-Aug-87
DWS TOTAL RETURN BOND FUND INSTITUTIONAL	SZIAX	Bond	25-Jun-01
FIDELITY LIMITED TERM BOND FUND	FJRLX	Bond	1-Nov-13
FIDELITY TOTAL BOND FUND	FTBFX	Bond	15-Oct-02
FIDELITY US BOND INDEX FUND	FXNAX	Bond	4-May-11
INVESCO CONSERVATIVE INCOME FUND R6	ICIVX	Bond	15-May-15
INVESCO CORPORATE BOND FD.CL.R6	ICBFX	Bond	24-Sep-12
INVESCO MUN.INC.FD.INVR. CL.	VKMMX	Bond	1-Aug-99
JP MORGAN CORE PLUS BD.A	ONIAX	Bond	5-Mar-93
JP MORGAN CORPORATE BOND I	CBRAX	Bond	1-Mar-13
THRIVENT INCOME FUND S	LBIIX	Bond	31-Oct-97
VANGUARD BD.IDX.FD.SHT. TM.PRTF.	VBILX	Bond	11-Dec-01
VANGUARD LONG-TERM INV. GDE.FD.INVR.SHS.	VWESX	Bond	7-Sep-73
AB CONCENTRATED GROWTH FUND A	WPSGX	Equity	28-Feb-94
AB CORE OPPORTUNITIES FUND A	ADGAX	Equity	22-Dec-99
AB DISCOVERY GROWTH FUND A	CHCYX	Equity	1-Oct-96
AB LARGE CAP GROWTH FUND A	APGYX	Equity	1-Oct-96
AB LARGE CAP GROWTH FUND ADVISOR	APGYX	Equity	1-Oct-96
AB SMALL CAP VALUE PORTFOLIO C	SCCVX	Equity	3-Dec-14
ABRDN DYNAMIC DIVIDEND FUND INST	ADVDX	Equity	22-Sep-03
ABRDN GLOBAL INFRASTRUCTURE FUND INST	AIFRX	Equity	3-Nov-08
ABRDN US SMALL CAP EQUITY FUND R	GSXAX	Equity	2-Nov-98
ADAPTIVE GROWTH OPPORTUNITIES	AGOX	Equity	20-Sep-90
ALLSPRING DISCVRY SCG FD INST	WFDSX	Equity	31-Aug-06
ALLSPRING GROWTH FUND A	SGRAX	Equity	24-Feb-00
ALLSPRING INDEX FUND A	WFILX	Equity	4-Nov-98
ALPHA MARK FUND	AMLCX	Equity	31-Oct-08
AMERICAN FDS WASHINGTON MUTUAL INV FD 529-C	CWMCX	Equity	15-Feb-02
AMERICAN FUNDS AMERICAN MUTUAL FUND F2	AMRFX	Equity	5-Aug-08
AMERICAN MUTUAL FD.CL.C SHS.	AMFCX	Equity	15-Mar-01
ARTISAN GLOBAL VALUE FUND ADV	APDGX	Equity	1-Apr-15
COLUMBIA ACORN EUROPEAN FUND I	MUTF	Equity	8-Nov-12
FID.SMCP. DISCOVERY FUND	FSCRX	Equity	26-Sep-00
FIDELITY LOW PRICE STK. FD.	MUTF	Equity	27-Dec-89
FRANKLIN GOLD AND PRECIOUS METALS FUND R6	FGPMX	Equity	1-May-13
HARTFORD MUT.FUND.MID. CAP.VAL.C	HMVCX	Equity	30-Apr-01
INVESCO GOLD & SPECIAL MINERALS FUND A	OPGSX	Equity	19-Jul-83
KINETICS MUT.FUND.THE MED.FD.	KRXCX	Equity	30-Sep-99

Table 2: List of United Kingdom Mutual Funds

Fund Name	Fund Code	Fund Type	Inception
BLACKROCK GOLD &GENERAL D AC.	GB00B5ZNJ896	Equity	07-Apr-88
FUNDSMITH EQUITY I ACC	GB00B41YBW71	Equity	01-Nov-10
BAILLIE GIFFORD AMERICAN C ACC	GB0006062151	Equity	22-Feb-00
JPM EMERGING MKTS.B ACC	GB00B1YX4S73	Equity	1-Feb-94
ORBIS OEIC GLOBAL EQUITY STANDARD SC ACC	GB00BJ02KW01	Equity	01-Jan-14
SCHRODER QEP GLOBAL CORE I AC.	GB00B5310487	Equity	16-Nov-10
ABERDEEN UK EQUITY INCOME Z AC.	GB00B0XWN705	Equity	11-Apr-88
ABRDN UK ALL SHARE TRACKER FUND A ACC	GB00B632C647	Equity	26-Mar-10
AI UK INDEX TRACKING CLASS 8 ACC	GB0004459797	Equity	31-Oct-89
JPM ASIA GROWTH C NET ACC	GB00B235GR40	Equity	20-Aug-12
LIONTRUST CHINA GBP C ACC	GB00B5Q38588	Equity	03-Oct-12
ARTEMIS SMART GARP GLOBAL EQUITY C ACC GBP	GB00BHL2C631	Equity	01-Jan-04
FP RUSSELL INV INTERNATL GRO ASSTS C ACC	GB00BYXJKN47	Equity	30-Dec-09
EDEN TREE RESP AND SUST EUROPEAN EQUITY C	GB0008446626	Equity	10-Sep-99
JANUS HENDERSON AS-PAC CAPITAL GRO C ACC	GB0007680183	Equity	28-Sep-90
LF CANLIFE ASIA PACIFIC C ACC	GB00B719QW87	Equity	28-May-12
MAN GLG INCOME PROFESSIONAL ACC C GBP	GB00B0117C28	Equity	25-May-04
NFU MUTUAL UK EQUITY INCOME C INCOME	GB00B82F8821	Equity	03-Dec-12
PREMIER MITON GLOBAL SUSTAINABLE GROWTH C ACC	GB00B6740K61	Equity	21-Feb-11
SCWID.UK EQ.INC.CL.C INC.	GB0031744963	Equity	23-Sep-02
TM STONEHG FLM OPPS ACC C	GB00B9F9Z985	Equity	15-May-13
WS SEQUEL GROWTH TARGET RETURN STRAT STAND C	GB00BBDRR709	Equity	06-Oct-13
ALLIANZ EMERGING MARKETS EQUITY A ACC GBP	GB00B0WDH725	Equity	22-Feb-06
ARTEMIS GLOBAL INCOME C ACC GBP	GB00BHL2C748	Equity	19-Jul-10
BAILLIE GIFF UK EQUITY ALPHA B AC.	GB0005858195	Equity	07-Apr-95
M&G GILT&FIXED INTEREST INCOME STERLING A ACC	GB0031108433	Bond	09-Dec-80
ISHARES CORPORATE BOND INDEX (UK) D ACC	GB00B84DSW83	Bond	29-Jun-12
ABRDN AAA BOND INSTITUTIONAL ACC GBP	GB0006573439	Bond	06-Apr-99
ABRDN ETHICAL CORPORATE BOND FUND INST ACC	GB00B708KW45	Bond	30-May-12
ABRDN STRATEGIC BOND FUND A ACC	GB00BWK27X12	Bond	11-Sep-15
AVIVA INVESTORS CORP BD FD CLS 8 ACC	GB00B29KNZ01	Bond	02-Jan-08
AXA ACT CBN.TSTN.STG B&M CRDT FD Z ACC	GB00B7VXY261	Bond	31-Oct-12
BLACKROCK CORPORATE BOND D AC.	GB00B4QC3311	Bond	10-Jun-11
BLLE.GIFF HIGH YIELD BD. B AC.	GB00B1W0GF10	Bond	24-May-07
CG UK GLOBAL HIGH INCOME OPPORTUNITIES P ACC GBP	LU0817814949	Bond	29-Apr-13
CT STRATEGIC BOND INST GROSS ACC GBP	GB00BLSNCC38	Bond	17-Oct-14
DIMENSIONAL GLOBAL SHORT DATED BOND ACC	GB00B735N017	Bond	03-Jan-12
EDEN TREE AMITY STERLING BOND C	GB00B2PF8D20	Bond	07-Apr-08
FID LNG DATED STER CORP BD FD W ACC	GB0033144634	Bond	02-Jun-03
HSBC CPRT.BD. INSTL.AC.	GB00B3K7SR40	Bond	19-Dec-08
IFSL CAF FIXED INTEREST A ACC	GB00B5LSVX77	Bond	14-Mar-11
INSIGHT INV.UK GVT.ALL MT BD.GR.PTRS2 AC.	GB00BYQKQN62	Bond	10-Mar-05
INVESCO CORPORATE BOND (UK) ACC	GB0033028779	Bond	31-Jan-18
JPM GLOBAL HIGH YIELD BD .C ACC	LU0344579213	Bond	18-Aug-08
JUPITER INVESTMENT GRADE BOND FUND I GBP ACC	GB00B1XG6V40	Bond	17-Jun-00
L&G ACTIVE GLOBAL HIGH YIELD BOND F ACC	GB00B0CNHH27	Bond	26-Aug-05
LF CANLIFE CORPORATE BOND C ACC	GB00B6ZMK027	Bond	18-Mar-13
LIONTRUST MONTHLY INCOME BOND B ACC	GB00B44MQ015	Bond	12-Jul-10
MARKS & SPEN.HI.INC.AC.	GB0030013345	Bond	19-Feb-97
NATIXIS LS STGC INC I/A ACC	IE00B23XCZ83	Bond	11-Oct-07

Table 3: List of Canada Mutual Funds

Fund Name	Fund Code	Fund Type	Inception
FIDELITY CANADIAN LARGE CAP SERIES F	FID631	Equity	01-Feb-88
RBC NORTH AMERICAN GROWTH SR F	RBF611	Equity	13-Aug-01
ABRDN CANADA EAFE PLUS EQUITY	01-Nov-22	Equity	01-Jan-10
AGF AMERICAN GROWTH CLASS SERIES F	AGF854	Equity	20-Jan-00
AXIOM ALL EQUITY PORTFOLIO CLASS A	ATL782	Equity	15-Mar-05
BAROMETER EQUITY POOL CLASS A	BCM120	Equity	01-May-07
BGC.NORTH AMER.FOCD.EQ SRS D	BTG302	Equity	04-Oct-10
BMO ASIAN GROWTH AND INCOME ADVISOR SERIES	BMO22120	Equity	25-Aug-03
BMO EQUITY GROWTH ETF PORTFOLIO ADVISOR SERIES	BMO99705	Equity	08-Dec-13
BRANDES EMERGING MARKETS VALUE FD SRS F	BIP571	Equity	07-Feb-02
CANADA LIFE CANADIAN EQUITY FUND A	MAX6202	Equity	07-Dec-16
CANADA LIFE CANADIAN GROWTH FUND F	MAX8225	Equity	21-Nov-15
CANADA LIFE EUROPEAN EQUITY FUND A	MAX8030	Equity	16-Dec-11
CANADA LIFE US ALL CAP GROWTH FUND SERIES W	MAX7926	Equity	27-Jan-95
CANADA LIFE US SMALL-MID CAP GROWTH FUND N	MAX8829	Equity	23-Feb-10
CANOE CANADIAN SMALL MID CAP PORTFOLIO CLASS SR D	GOC1304	Equity	20-Nov-86
CAPITAL GROUP GLOBAL EQUITY SERIES D	CIF833	Equity	11-Jan-02
CAPITAL GROUP US EQUITY SERIES F	CUSEX	Equity	01-Apr-11
CI AMERICAN SMALL COMPANIES CORP CL IT8	CIG033T8	Equity	04-Aug-22
CI ASIAN OPPORTUNITIES CORPORATE CLASS A	CIPACCAU	Equity	30-Nov-87
CI ASIAN OPPORTUNITIES FUND SERIES I	CIG651	Equity	30-Oct-81
CIBC ASIA PACIFIC INDEX CLASS A	CIB518	Equity	26-Sep-00
DESJARDINS AMERICAN EQUITY GROWTH I	DJT00072	Equity	01-Dec-04
RBC CANADIAN MID-CAP EQUITY FUND SR I	RBF10208	Equity	08/21/03
NBI GLOBAL DIVERSIFIED EQUITY INVESTOR SERIES	NBC482	Equity	12-Jun-09
ABERDEEN EMERGING MARKETS DEBT	AKFCX	Bond	31-Oct-12
ADDENDA ACTIVE DURATION BOND POOL CL A	20-Jan-12	Bond	26-Apr-13
AGF EMERGING MARKETS BOND SERIES F	AGF5014	Bond	11-Feb-10
BEUTEL GOODMAN CORE PLUS BOND SERIES B	BTG312	Bond	04-Oct-10
BEUTEL GOODMAN INCOME SERIES D	BTG771	Bond	12-Nov-90
BMO EMERGING MARKETS BOND ADVISOR SERIES	BMO97158	Bond	08-Dec-13
BRANDES CORPORATE FOCUS BOND CL I HEDGED	BSCMX	Bond	19-Jan-07
CANOE BOND ADVANTAGE PORTFOLIO CLASS SERIES A	GOC702	Bond	01-Oct-12
CANSO CANADIAN BOND FD CLASS F	CFM174F	Bond	26-Feb-10
CIBC CANADIAN BOND CLASS A	CIB476	Bond	31-Dec-87
DESJARDINS EMERGING MARKETS BOND F	DJT07146	Bond	05-Nov-18
DYNAMIC ADVANTAGE BOND SERIES F	DYN3058	Bond	04-Aug-02
DYNAMIC SHORT TERM BOND SERIES I	DYN2144	Bond	15-Mar-11
EDUCATORS BOND CLASS A	OTG0227	Bond	31-Mar-11
EDUCATORS MORTGAGE & INCOME CLASS A	OTG105	Bond	24-Jun-84
FDP CANADIAN BOND PORTFOLIO SERIES A	FPQ074	Bond	31-Mar-78
FIDELITY FLOATING RATE HIGH INCOME SERIES A	FFRHIFB	Bond	19-Sep-02
FRANKLIN BRANDYWINE GLBL SUSTNBL INC OPTM SR A	TML387	Bond	17-Feb-03
HSBC CANADIAN BOND FUND INVESTOR SERIES	HKB506	Bond	16-Jan-95
IG MACKENZIE GLOBAL BOND SERIES C	IGI100	Bond	09-Aug-92
INVESCO CANADIAN CORE PLUS BOND SERIES A	AIM1651	Bond	05-Dec-94
LEITH WHEELER CORE BOND SERIES B	LWF00	Bond	27-Apr-94
MACKENZIE CANADIAN BOND ADVISOR SERIES	MFC302	Bond	02-Oct-89
MANULIFE CANADIAN BOND SERIES F	MMF4601	Bond	27-Jun-08
MANULIFE STRATEGIC INCOME FUND SERIES FT6	MMF1030	Bond	08-Oct-12

Table 4: List of Italy Mutual Funds

Fund Name	Fund Code	Fund Type	Inception
ANIMA SELEZIONE GLOBALE B	IT0001036257	Equity	04-Mar-85
ARCA AZIONI INTERNAZIONALI P	IT0000382264	Equity	18-May-87
ACOMEA AMERICA A1	IT0000382108	Equity	21-Jul-86
ANIMA VALORE GLOBALE A	IT0000386026	Equity	03-Oct-89
BNL AZIONI AMERICA	IT0000388808	Equity	20-Nov-91
FIDEURAM ITALIA R	IT0000388147	Equity	01-Jul-91
ACOMEA EUROPA A1	IT0000388535	Equity	13-May-91
ALLIANZ AZIONI EUROPA	IT0000386588	Equity	11-Mar-91
ALLIANZ AZIONI AMERICA	IT0000386562	Equity	11-Mar-91
ALLIANZ AZIONI PACIFICO	IT0000386604	Equity	11-Mar-91
ARCA AZIONI ITALIA P	IT0000388907	Equity	03-Apr-92
EUROMOBILIARE AZIONI ITALIANE A	IT0001013520	Equity	01-Apr-93
INVESTIMENTI AZIONARI ITALIA A	IT0001023628	Equity	21-Feb-94
EURIZON AZIONI PMI ITALIA R	IT0001470183	Equity	05-Jul-00
EPSILON Q VALUE	IT0365359545	Equity	28-Jul-08
ARCA AZIONI PAESI EMER.	IT0003021992	Equity	02-Jan-01
ANIMA INIZIATIVA EUROPA A	IT0003098149	Equity	04-Jun-01
BANCOPOSTA AZIONARIO INTERNAZIONALE	IT0003110860	Equity	22-May-01
AGORA MATERIALS R	IT0004147135	Equity	28-Nov-06
FIDEURAM MASTER SEL.EQ. USA	IT0003940738	Equity	09-Jan-06
SYMPHONIA AZIONARIO TREND GLOBALE I	IT0004764392	Equity	04-Oct-04
BNP PARIBAS JAPAN EQUITY CLASSIC H EUR CAP	IT0194438338	Equity	29-Jun-04
ZENIT PIANETA ITALIA I	IT0005240210	Equity	13-Feb-16
SYMPHONIA AZION SMCP ITALIA CL I	IT0005154445	Equity	01-Jan-16
FIDEURAM MASTER SELECTION BALANCED	IT0005005738	Equity	01-Apr-14
ALLIANZ REDDITO EURO	IT0000380045	Bond	21-Jun-84
ARCA RR DIVERSIFIED BOND	IT0000380029	Bond	18-Sep-84
BOND STRATEGIA ATTIVA A	IT0000380383	Bond	31-Jan-85
EURIZON OBBLIGAZIONI CEDOLA D	IT0000380524	Bond	04-Mar-85
EUROMOBILIARE EURO AGGREGATE A	IT0000380649	Bond	02-Sep-85
ALLIANZ REDDITO GLOBALE	IT0000384062	Bond	11-Jul-88
FIDEURAM RISPARMIO ATTIVO	IT0000384500	Bond	03-Oct-88
MEDIOLANUM STRATEGIA GLOBALE MULTI BOND L	IT0001178125	Bond	03-Oct-88
ACOMEA PERFORMANCE A1	IT0000384583	Bond	21-Jan-89
EURIZON OBBLIGAZIONI EURO BREVE TERMINE D	IT0000386646	Bond	21-May-90
FONDERSEL INTERNAZIONALE ESG	IT0000388584	Bond	05-Jun-91
BNL OBBLIGAZIONI EMERGENTI	IT0000388840	Bond	20-Nov-91
ANIMA OBBLIGAZIONARIO EURO BT A	IT0004124407	Bond	26-Feb-98
BOND STRATEGIA PRUDENTE A	IT0001023560	Bond	21-Feb-94
FONDERSEL EURO	IT0001063764	Bond	11-Mar-96
AZIMUT TREND TASSI	IT0001055133	Bond	20-Jan-96
CONSULTINVEST REDDITO C	IT0001076600	Bond	22-Aug-96
INVESTIPER OBBLIGAZIONARIO GLOBALE	IT0001079398	Bond	28-Oct-96
AMUNDI OBBLIGAZIONARIO BREVE TERMINE - C	IT0001250205	Bond	24-Mar-97
BOND PAESI EMERGENTI ESG A	IT0001316303	Bond	29-Mar-99
INVESTIPER OBBLIG PAESI EMERGENTI	IT0001484739	Bond	01-Aug-00
ANIMA TRICOLORE AD	IT0004786395	Bond	17-Jan-12
ARCA BD PAESI EM VALUTA LOCALE P	IT0004687148	Bond	01-Mar-11
CONSULTINVEST BREVE TERMINE C	IT0004511033	Bond	03-Jul-09
ALLIANZ GLOBAL MULTI- ASSET CREDIT FUND	IT0000382983	Bond	11-Jul-88

Table 5: List of Germany Mutual Funds

Fund Name	Fund Code	Fund Type	Inception
DEKA INV.GLOBALCHAMPIONS CF	DE000DK0ECU8	Equity	27-Dec-06
LBBW GLOBAL WARMING R	DE000A0KEYM4	Equity	15-Jan-07
ACATIS AKTIEN GLOBAL FONDS B	DE000A0HF4S5	Equity	02-Jan-06
ACATIS ASIA PACIFIC PLUS FONDS	DE0005320303	Equity	03-Jul-00
AKTIV CHANCE	DE000A0JEK49	Equity	05-Feb-06
ALLIANZ ADIFONDS - A - EUR	DE0008471038	Equity	15-Oct-58
AMUNDI GERMAN EQUITY A ND	DE0009752303	Equity	01-Oct-90
BALOISE-AKTIENFONDS DWS	DE0008474057	Equity	01-Oct-71
BERENBERG AKTIEN GLOBAL PLUS R D	DE000A0RC5G8	Equity	15-Jan-09
BREMEN KAPITAL AKTIEN	DE000A1J67E0	Equity	14-Dec-12
CH GLOBAL	DE000A0KFFU3	Equity	10-Sep-06
CHOM CAPITAL ACTIVE RETURN EUROPE UI - AK I	DE000A1JCWS9	Equity	20-Dec-11
DEGUSSA AKTIEN UNIVERSAL-FONDS	DE0005316988	Equity	06-Sep-00
DEKA INV.GLOBALCHAMPIONS TF	DE000DK0ECV6	Equity	27-Dec-06
DIT ALLIANZ VALUE GLOBAL	DE0008471467	Equity	19-Sep-96
EARTH GOLD FUND UI (EUR R)	DE000A0Q2SD8	Equity	01-Jul-08
FIRST PRIV.INV.MAN.KAG EUROPA AKTIEN ULM B	DE0009795831	Equity	26-Jan-99
FONDSPICKER GLOBAL UI	DE000A0MRAC3	Equity	22-Aug-07
GAMAX FUNDS ASIA PACIFIC A	LU0743995689	Equity	14-Mar-12
GLS BANK AKTIENFONDS AK A	DE000A1W2CK8	Equity	16-Dec-13
HAL SYSTEMATIC MULTI ASSET DYNAMIC RT	DE000A0MVZU4	Equity	15-May-08
HELABA INVEST KPL. DIVIDENDENPLUS FONDS	DE0002544483	Equity	01-Jun-84
HP&P EURO SELECT UI FONDS A	DE0009790766	Equity	01-Sep-99
HSBC GERMAN EQUITY AC	DE0008489808	Equity	11-Jul-89
INVESCO KPL.EUROPA CORE AKTIENFDS	DE0008470337	Equity	25-Jan-91
UNION INV.PRIVATFONDS UNIRENTA	DE0008491028	Bond	30-Dec-68
AMUNDI BKK RENT	DE0008472895	Bond	04-Jun-82
DEKARENT INTERNATIONAL	DE0008474560	Bond	17-Nov-69
FRANKFURT TRUST INV. FT INTERZINS	DE0008478017	Bond	01-Mar-84
DWS EURO BOND FUND LD	DE0008476516	Bond	01-Dec-70
BALOISE-RENTENFONDS DWS	DE0008474065	Bond	01-Oct-71
ALLIANZ EURO RENTENFONDS - A - EUR	DE0008475047	Bond	24-Jan-66
HANSAINVEST HANSEATISCHE INV.GESELL.HANSA INTL.	DE008479015	Bond	01-Apr-88
AMPEGA GLOBAL RENTENFONDS	DE0008481086	Bond	30-Oct-88
DWS INVESTMENT INTL. RENTEN TYP O	DE0009769703	Bond	12-Dec-94
MEAG MUNICH ERGO KPL. EURORENT	DE0009757443	Bond	20/05/1991
LBBW RENTEN EURO FLEX NACHHALTIGKEIT	DE0009766964	Bond	03-Feb-97
MONEGA KPL.EURO BOND	DE0005321061	Bond	04-Dec-00
LBBW ASTMGMT.INV.GESELL. MBH RENTAMAX R	DE0005326144	Bond	03-Dec-01
BFS NACHHALTIGKEITSFONDS GREEN BONDS	DE0009799981	Bond	19-Oct-01
HELABA INVEST KPL.HIY. FONDS	DE000A0B6H22	Bond	08-Nov-04
UNI INSTL EUR COVERED BONDS 4-6 YEARS SUST	DE0009757633	Bond	10-Oct-06
LAZARD ASST.MAN.DTL.EUR. HIGHYIELD	DE0005319016	Bond	11-Feb-00
FBG INDIVIDUAL R-PA	DE000A0RCCW8	Bond	02-Jan-09
AVANA INV.AKTGSF.MIT TGHF.GEN KAG EU. CNTL	DE000Q0RHDE3	Bond	09-Feb-09
METZLER EURO CORPORATES SUSTAINABILITY AI	DE000A0RBZB5	Bond	02-Mar-09
HSBC STRATEGIE SUBSTANZ AD	DE000A1C0TA1	Bond	22-Sep-10
CORPORATE M SUSTAINABLE (I)	DE000AIJSWXS	Bond	01-Oct-12
WI GLOBAL CHALLENGES CORPORATE BONDS	DE000A1J3WP0	Bond	15-Jul-13
AMPEGA RENDITE RENTENFONDS	DE0008481052	Bond	01-Apr-70

Table 6: List of France Mutual Funds

Fund Name	Fund Code	Fund Type	Inception
RENAISSANCE EUROPE I COMGEST	FR0010913624	Equity	16-Jul-10
AA MMF EMERGING COVT. NEULIZE OBC INMS.	FR0010449231	Equity	4-Mar-07
ABACUS QUALITY I	FR0011109081	Equity	18-Nov-11
ABEILLE VALEURS	FR0007082136	Equity	22-Apr-03
ABERDEEN WACTIONS CR. SUISSE ASTMGMT.GEST.	FR0007056924	Equity	24-Apr-01
AGF ASAC ACTIONS (D) AGF ASSET MANAGEMENT	FR0007460944	Equity	1-Feb-96
ALLIANZ ACN.ER.C GLOBAL INVRS.FRN.	FR0010004663	Equity	1-Nov-99
AMERI-GAN O SUSP	FR0010891432	Equity	1-Sep-86
AXA AEDIFICANDI A C EUR	FR0000172041	Equity	25-Apr-03
EQUI CONVICTIONS B GEST.	FR0010824482	Equity	29-Jan-10
HANSEATIQUE B	FR0010291195	Equity	16-Jun-06
EDR SICAV TRICOLORE RENDEMENT B EUR	FR0010588350	Equity	2-Oct-00
ODDO BHF METROPOLE SELECTION B	FR0011412592	Equity	28-Feb-13
TURGOT SMIDCAPS FRANCE BC TURGOT ASSET MAN.	FR0011414374	Equity	19-Mar-13
MIROVA ACTIONS EUROPE F (EUR)	FR0010456590	Equity	18-May-07
SUNNY MANAGERS F	FR0010922963	Equity	19-Jul-10
UBS (F) EUROPN OPPTY UNCONSTR PEA EUR I	FR0010999607	Equity	2-Nov-11
AMUNDI ACTIONS EMERGENTS ESR F (C)	QS0009091420	Equity	1-May-07
BETAMAX EUROPE SMART FOR CLIMATE F	FR0011560168	Equity	12-Apr-13
SEEYOND ACTIONS EUROPEENNES ESG F	FR0010731471	Equity	3-Feb-09
G FUND OPPORTUNITIES EUROPE IC	FR0010631275	Equity	24-Feb-06
ECHIQUIER AGRESSOR G	FR0010581702	Equity	22-Feb-08
GROUPAMA EURO STOCK G ASST.MAN.	FR0010890970	Equity	21-Sep-12
MANDARINE VALEUR G GEST.	FR0010806778	Equity	31-Oct-09
PLUVALCA BIOTECH Z	FR0012285856	Equity	19-Dec-14
G FUND CREDIT EURO ISR I C	FR0010702167	Bond	3-Dec-09
G FUND CREDIT EURO ISR M	FR0010702159	Bond	3-Dec-09
G FUND GLOBAL GREEN BONDS I	FR0010213397	Bond	20-May-05
GROUPAMA CR.ER.CT I ASST.MAN.	FR0000171837	Bond	23-Aug-96
ALLIANZ EURO HIGH YIELD R D EUR	FR0007472691	Bond	12-Feb-03
ALM CREDIT EURO ISR IC	FR0007071006	Bond	24-Mar-05
FONDO BNPP SEICEDOLE B	FR0011319110	Bond	20-Dec-12
EDMOND DE ROTH.SICAV ER.SUST CRED B EUR	FR0010789313	Bond	2-Mar-10
LA FRANCAISE EURO INFLATION B	FR0011335793	Bond	10-Aug-12
OCTO CREDIT COURT TERME B	FR0011299429	Bond	10-Aug-12
ALLIANZ EURO HIGH YIELD I C/D EUR	FR0010371609	Bond	26-Oct-06
ANAXIS SHORT DURATION K (EUR)	FR0011352202	Bond	28-Dec-12
TIKEHAU CREDIT PLUS K- ACC-EUR	FR0011257351	Bond	10-May-12
EXANE ELLIPSIS CONVS FD J CHF (EUR)	FR0011042142	Bond	27-Jun-11
REGARD CONVERTIBLES EURO H	FR0007389853	Bond	1-Feb-96
DANONE COMMUNITIES D ISR PRUDENT (C/D)	FR0010439935	Bond	25-May-07
ARC FLEXIBOND D	FR0011513530	Bond	26-Feb-14
CD ALPHA BONDS D	FR0010249680	Bond	1-Feb-96
CONFIANCE SOLIDAIRE D CREDIT COOPERATIF	FR0010532903	Bond	24-Oct-07
ALLIANZ OBLIGATIONS INTERNATIONALES D EUR	FR0000011918	Bond	25-Jul-96
AXA EURO CREDIT (D) AXA INVESTMENT PARIS	FR0000288813	Bond	25-Jun-99
BRONGNIART VARIFONDS D	FR0007497359	Bond	1-May-96
BSO CONVERTIBLE D	FR0000424707	Bond	04-Sep-98
CAPITOP REVENUS (D)	FR0000983330	Bond	26-Jun-02
COVEA EURO SOUVERAIN (D) FINANCE	FR0000939951	Bond	31-Jan-96

Table 7: List of Japan Mutual Funds

Fund Name	Fund Code	Fund Type	Inception
GS NET WIN GS TECH EQTY FD B (NON HGD)	JP90C0000Y15	Equity	19-Nov-99
ALLIANCE US GROWTH EQUITY B	JP90C00025J4	Equity	25-May-06
SMDS CHINA A & H SHARES OPEN	JP90C0004GU8	Equity	4-Oct-07
PICTET GLBL INC EQTY (MTHLY DIST)	JP90C00027Q5	Equity	28-Feb-05
UBS NEXT GENERATION TECHNOLOGY FUND	JP90C0006KW1	Equity	23-Oct-09
ABRDN ABERDEEN JAPAN OPEN	JP90C0002918	Equity	30-Sep-97
ALLIANCE GLOBAL GROWTH OPPORTUNITIES (2Y)	JP90C00027W3	Equity	31-Jul-98
AMUNDI TARGET JAPAN FUND	JP90C00013G6	Equity	31-Aug-00
BARINGS ASIA FUTURE GROWTH EQUITY FUND	JP90C0000029	Equity	4-Jan-97
BNYMELLON US MNFG INDUSTRY EQUITY FUND	JP90C0008CD4	Equity	31-May-12
BRJ BLACKROCK NATURAL RESOURCES EQUITY FUND	JP90C00057F5	Equity	21-Dec-07
CLOVER KODOMO FUND	JP90C00093P9	Equity	15-Apr-03
DAIWA ACTIVE NIPPON (MUSASHI)	JP90C0003PG0	Equity	20-Nov-98
DAIWA JAPAN OPEN	JP90C0003JU4	Equity	4-Jan-97
DWS DEUTSCHE JAPAN GROWTH OPEN	JP90C0004237	Equity	30-Jul-99
EAST SPRING GROWING ASIA EQUITY OPEN	JP90C0004S92	Equity	29-Jun-07
FIDELITY ASIA EQUITY FUND	JP90C00035H7	Equity	12-Jan-98
GS JAPAN EQUITY INDEX PLUS	JP90C0000WR9	Equity	10-Mar-05
HSBC ASIA PLUS	JP90C0004P53	Equity	31-May-07
INVESCO GT GLOBAL (INVESTMENT OPEN)	JP90C0002B69	Equity	4-Jan-97
INVESCO JAPAN GROWTH FUND	JP90C0002EH4	Equity	4-Jan-97
INVESCO MSCI KOKUSAI PORTFOLIO	JP90C0002EK8	Equity	210-11-07
JPM GLOBAL HEALTH CARE RELATED EQ FUND	JP90C0009CS0	Equity	26-Jul-13
JPM JAPAN MEISTER	JP90C00099U	Equity	7-Dec-13
JPM THE JAPAN	JP90C0001C10	Equity	4-Jan-97
ALLIANCE HIGH YIELD OPEN	JP90C00025K2	Bond	4-Jan-97
NOMURA HIGH YIELD BOND OPEN A COURSE	JP90C0003D17	Bond	4-Jan-97
FIDELITY US HIGH YIELD	JP90C00035F1	Bond	4-Jan-98
SMDS SB JAPAN BOND FUND	JP90C0002LA4	Bond	23-Mar-98
INVESCO MONTHLY INCOME FUND	JP90C0002EL6	Bond	25-Feb-98
GS VARIETY OPEN FUND	JP90C0000XQ9	Bond	2-Dec-98
NOCHU US BOND OPEN	JP90C0001217	Bond	16-Jan-98
SOMPO JAPAN BOND FUND	JP90C0001US9	Bond	31-Jul-00
SMDS DC FOREIGN BOND FUND	JP90C0002LL1	Bond	21-Sep-00
MYAM FOREIGN BOND OPEN	JP90C0000KQ6	Bond	29-Aug-03
HITACHI DOMESTIC BOND INDEX FUND	JP90C0003ME2	Bond	12-May-01
GS DC GALILEO	JP90C0000YQ7	Bond	21-Dec-01
MYAM DC FOREIGN BOND OPEN	JP90C0002JH3	Bond	30-Nov-01
NOMURA DOMESTIC BOND INDEX FUND	JP90C0002QQ9	Bond	25-Nov-02
SMT DC FOREIGN BOND INDEX L	JP90C00003B8	Bond	15-Jan-03
EAST SPRING US HIGH YIELD BOND OPEN	JP90C00005D9	Bond	30-Jan-03
DAIWA HIGH GRADE CAD BOND OPEN	JP90C0003KZ1	Bond	21-May-03
UBS AUSTRALIA BOND OPEN (M)	JP90C0002GD8	Bond	15-Aug-03
SMT GLOBAL BOND INDEX OPEN	JP90C00055Z7	Bond	1-Sep-08
SMT FOREIGN BOND INDEX OPEN(SMA)	JP90C0004C90	Bond	16-Feb-07
BRJ WORLD INCOME STRATEGY	JP90C0002DG8	Bond	7-Jul-05
SMDS T ROWE PRICE US INCOME FUND	JP90C0002M25	Bond	12-May-03
AM-ONE LOOMIS US INVESTMENT GRADE BOND F	JP90C0003148	Bond	31-Oct-03
NIKKO INDEX FUND JAPANESE BOND DC	JP90C0003UF2	Bond	11-Jul-03
SHINKIN US SOVEREIGN BOND PORTFOLIO	JP90C00000S8	Bond	7-Jan-03

Table 8: Market Benchmarks

Country	Market Benchmark	ETF Tracker
United States	S&P 500	IShares Core S&P 500 ETF
United Kingdom	FTSE RAFI UK 100	Invesco FTSE RAFI UK 100 UCITS ETF
Canada	TSX 60	Ishares S&P/TSX 60 IDX.ETF
France	CAC 40	Xtrackers CAC 40 UCITS ETF
Italy	FTSE MIB	FTSE MIB Index ETF
Japan	Nikkei 225	Nomura NF Nikkei 225 ETF
Germany	DAX 40	Deka DAX ETF

Appendix 2

Table 9: Descriptive Statistics United States

Types	Names	Mean	Median	Stdev	Min	Max	Kurtosis	Skewness
Equity	AB CONCENTRATED GROWTH FUND A	0.030	0.035	1.307	-13.505	10.550	16.0237	-0.9521
Equity	AB CORE OPPORTUNITIES FUND A	0.007	0.046	1.233	-14.777	8.244	10.6401	-0.6332
Equity	AB DISCOVERY GROWTH FUND A	0.011	0.091	1.634	-16.530	10.220	19.7324	-1.1864
Equity	AB LARGE CAP GROWTH FUND A	0.032	0.057	1.266	-12.073	9.126	18.4805	-0.9698
Equity	AB LARGE CAP GROWTH FUND ADVISOR	0.035	0.062	1.261	-12.098	9.134	12.1698	-0.7360
Equity	AB SMALL CAP VALUE PORTFOLIO C	0.019	0.000	1.519	-13.823	9.077	18,6595	-1.6827
Equity	ABRDN DYNAMIC DIVIDEND FUND INST	0.007	0.000	1.070	-11.927	9.191	17.2546	-1.5774
Equity	ABRDN GLOBAL INFRASTRUCTURE FUND INST	0.010	0.000	1.048	-11.717	8.245	4.2341	-0.0018
Equity	ABRDN US SMALL CAP EQUITY FUND R	0.012	0.000	1.455	-21.804	8.406	4.2726	-0.1737
Equity	ADAPTIVE GROWTH OPPORTUNITIES	0.039	0.000	1.009	-12.314	8.998	14.3052	-0.6370
Equity	ALLSPRING DISCVRY SCG FD INST	0.000	0.065	1.795	-23.248	9.672	30.0288	-2.5221
Equity	ALLSPRING GROWTH FUND A	-0.019	0.058	1.800	-24.780	10.500	13.2068	-1.3656
Equity	ALLSPRING INDEX FUND A	-0.014	0.025	1.472	-23.731	9.385	10.4088	-0.5734
Equity	ALPHA MARK FUND	-0.007	0.000	1.234	-16.324	6.777	11.1737	-0.7250
Equity	AMERICAN FDS WASHINGTON MUTUAL INV FD 529-C	0.018	0.019	1.110	-12.452	8.688	28.5230	-1.1943
Equity	AMERICAN FUNDS AMERICAN MUTUAL FUND F2	0.017	0.029	0.971	-9.730	7.438	32.3609	-2.7508
Equity	AMERICAN MUTUAL FD.CL.C SHS.	0.017	0.027	0.967	-9.759	7.447	43.3273	-3.8757
Equity	ARTISAN GLOBAL VALUE FUND ADV	0.012	0.000	1.189	-13.148	10.215	71.4789	-4.9461
Equity	COLUMBIA ACORN EUROPEAN FUND I	0.026	0.056	1.298	-11.841	9.699	23.0914	-1.4554
Equity	FID.SMCP.DISCOVERY FUND	-0.002	0.000	1.469	-13.737	9.787	34.3380	-2.5200
Equity	FIDELITY LOW PRICE STK. FD.	0.002	0.023	1.469	-11.381	8.528	40.2532	-3.4883
Equity	FRANKLIN GOLD AND PRECIOUS METALS FUND R6	0.031	0.000	2.056	-13.465	14.159	16.1196	-0.9317
Equity	HARTFORD MUT.FUND.MID. CAP.VAL.C	0.002	0.000	1.437	-15.748	11.177	20.5511	-1.6450
Equity	INVESCO GOLD & SPECIAL MINERALS FUND A	0.044	0.000	2.095	-13.507	15.666	16.8272	-1.4050
Equity	KINETICS MUT.FUND.THE MED.FD.	0.009	0.000	1.193	-13.879	7.625	5.4286	-0.6127
Bond	AAM/INSIGHT SELECT INCOME FUND A	-0.006	0.000	0.325	-4.264	2.355	25.3690	-1.7760
Bond	AB CALIFORNIA PORTFOLIO C	-0.005	0.000	0.209	-3.189	3.226	94.6826	-1.3282
Bond	AB GLOBAL BOND FUND A	-0.011	0.000	0.244	-5.517	1.282	132.2187	-6.6712
Bond	AB VIRGINIA PORTFOLIO C	-0.004	0.000	0.201	-2.778	3.173	84.7727	-1.1665
Bond	ALLSPRING MUNICIPAL BOND FUND ADM	-0.004	0.000	0.204	-2.824	3.252	14.0583	-1.0947
Bond	AMERICAN FUND.PRESERVN. PRTF.CL.A	-0.003	0.000	0.137	-1.246	0.970	5.9467	-0.2785
Bond	ARCHER INCOME FUND	-0.005	0.000	0.132	-1.744	0.757	92.4428	-1.4225
Bond	BLACKROCK CORE BOND PORTFOLIO K	-0.008	0.000	0.279	-3.802	2.122	7.3075	-0.3331
Bond	BLACKROCK INCOME FUND INST	-0.007	0.000	0.249	-3.680	3.002	24.6809	-2.2279
Bond	BLKRK IMPACT MTGE FD INSTL	-0.007	0.000	0.249	-1.974	2.599	24.4980	-1.7888
Bond	BNY MELLON CORE PLUS FUND Y	-0.005	0.000	0.255	-2.574	2.059	12.8459	0.0336
Bond	BUFFALO HIGH YIELD FUND INVESTOR	-0.006	0.000	0.300	-3.371	2.371	13.0639	-0.8539
Bond	CALVERT BOND FUND A	-0.006	0.000	0.249	-2.057	2.049	35.5751	-3.0406
Bond	DWS TOTAL RETURN BOND FUND INSTITUTIONAL	-0.007	0.000	0.257	-2.015	1.891	8.5530	-0.6689
Bond	FIDELITY LIMITED TERM BOND FUND	-0.003	0.000	0.127	-1.133	0.869	13.6111	-0.8925
Bond	FIDELITY TOTAL BOND FUND	-0.006	0.000	0.259	-2.613	1.864	4.3708	-0.0872
Bond	FIDELITY US BOND INDEX FUND	-0.006	0.000	0.268	-1.799	2.018	66.0591	-2.8778
Bond	INVESCO CONSERVATIVE INCOME FUND R6	0.000	0.000	0.035	-0.448	0.224	24.5881	-1.6572
Bond	INVESCO CORPORATE BOND FD.CL.R6	-0.008	0.000	0.337	-3.698	2.665	96.7070	-1.7913
Bond	INVESCO MUN.INC.FD.INVR. CL.	-0.007	0.000	0.256	-3.652	4.026	8.0944	-0.6594
Bond	JP MORGAN CORE PLUS BD.A	-0.007	0.000	0.247	-1.907	1.868	15.2145	-1.5926
Bond	JP MORGAN CORPORATE BOND I	-0.009	0.000	0.372	-3.913	2.168	15.1530	-0.9630
Bond	THRIVENT INCOME FUND S	-0.008	0.000	0.322	-3.663	2.125	23.1468	-1.9285
Bond	VANGUARD BD.IDX.FD.SHT. TM.PRTF.	-0.003	0.000	0.119	-0.698	0.819	20.8720	-1.1767
Bond	VANGUARD LONG-TERM INV. GDE.FD.INVR.SHS.	-0.013	0.000	0.663	-5.077	3.567	10.3419	-0.5641
Benchmark	ISHARES CORE S&P 500 ETF	0.037	0.029	1.171	-11.574	9.450	14.3052	-0.6370

Table 10: Descriptive Statistics United Kingdom

Types	Names	Mean	Median	Stdev	Min	Max	Kurtosis	Skewness
Equity	BLACKROCK GOLD &.GENERAL D AC.	0.048	0.000	1.979	-15.739	16.565	7.5718	0.2438
Equity	FUNDSMITH EQUITY I ACC	0.056	0.050	0.961	-5.979	6.167	3.6729	-0.1434
Equity	BAILLIE GIFFORD AMERICAN C ACC	0.067	0.085	1.801	-8.652	10.100	3.1137	-0.0751
Equity	JPM EMERGING MKTS.B ACC	0.033	0.056	1.078	-5.913	5.643	2.7194	-0.3533
Equity	ORBIS OEIC GLOBAL EQUITY STANDARD SC ACC	0.040	0.042	0.993	-10.581	8.823	14.6043	-0.7345
Equity	SCHRODER QEP GLOBAL CORE I AC.	0.044	0.042	0.926	-5.705	5.485	4.6364	-0.3423
Equity	ABERDEEN UK EQUITY INCOME Z AC.	0.011	0.000	0.555	-4.318	3.430	8.9262	-0.3475
Equity	ABRDN UK ALL SHARE TRACKER FUND A ACC	0.024	0.056	0.998	-12.254	5.937	16.7434	-1.3421
Equity	AI UK INDEX TRACKING CLASS 8 ACC	0.025	0.036	0.986	-10.220	8.780	12.3619	-0.6971
Equity	JPM ASIA GROWTH C NET ACC	0.043	0.039	1.119	-5.652	6.191	2.5477	-0.1670
Equity	LIONTRUST CHINA GBP C ACC	0.027	0.000	1.461	-8.714	12.587	5.8121	0.2633
Equity	ARTEMIS SMART GARP GLOBAL EQUITY C ACC GBP	0.036	0.028	0.934	-8.121	4.873	7.1352	-0.7650
Equity	FP RUSSELL INV INTERNATL GRO ASSTS C ACC	0.035	0.042	0.890	-7.792	7.156	9.8889	-0.7182
Equity	EDEN TREE RESP AND SUST EUROPEAN EQUITY C	0.035	0.031	1.019	-11.189	4.768	10.5666	-0.9568
Equity	JANUS HENDERSON AS-PAC CAPITAL GRO C ACC	0.030	0.020	0.996	-7.486	5.672	4.0014	-0.3412
Equity	LF CANLIFE ASIA PACIFIC C ACC	0.027	0.047	1.005	-6.107	4.606	2.6515	-0.2664
Equity	MAN GLG INCOME PROFESSIONAL ACC C GBP	0.033	0.066	1.013	-13.302	6.231	22.5269	-1.5930
Equity	NFU MUTUAL UK EQUITY INCOME C INCOME	0.007	0.023	0.965	-9.943	7.597	11.5905	-0.6807
Equity	PREMIER MITON GLOBAL SUSTAINABLE GROWTH C ACC	0.042	0.050	0.993	-7.421	5.774	4.7717	-0.3753
Equity	SCWID.UK EQ.INC.CL.C INC.	0.004	0.025	1.056	-11.271	8.049	13.0685	-1.0753
Equity	TM STONEHG FLM OPPS ACC C	0.034	0.054	0.952	-14.621	8.424	39.2770	-2.1309
Equity	WS SEQUEL GROWTH TARGET RETURN STRAT STAND C	-0.006	0.000	0.240	-6.890	1.677	334.0161	-11.7387
Equity	ALLIANZ EMERGING MARKETS EQUITY A ACC GBP	0.024	0.015	0.982	-6.097	4.666	2.4462	-0.2551
Equity	ARTEMIS GLOBAL INCOME C ACC GBP	0.030	0.048	0.968	-8.302	4.816	7.4803	-0.9615
Equity	BAILLIE GIFF UK EQUITY ALPHA B AC.	0.027	0.039	1.256	-9.472	7.570	7.1261	-0.5937
Bond	M&G GILT&FIXED INTEREST INCOME STERLING A ACC	-0.003	0.000	0.553	-4.399	5.804	12.0984	0.4293
Bond	ISHARES CORPORATE BOND INDEX (UK) D ACC	0.004	0.000	0.349	-2.866	2.299	9.3501	-0.7873
Bond	ABRDN AAA BOND INSTITUTIONAL ACC GBP	0.000	0.000	0.269	-2.004	2.002	6.6132	-0.2488
Bond	ABRDN ETHICAL CORPORATE BOND FUND INST ACC	0.003	0.011	0.370	-3.088	3.051	13.3780	-0.8619
Bond	ABRDN STRATEGIC BOND FUND A ACC	0.006	0.013	0.225	-3.223	1.435	41.8608	-3.4157
Bond	AVIVA INVESTORS CORP BD FD CLS 8 ACC	0.003	0.011	0.349	-2.761	3.153	12.0075	-0.6273
Bond	AXA ACT CBN.TSTN.STG B&M CRDT FD Z ACC	0.004	0.000	0.370	-2.911	2.973	10.4064	-0.7497
Bond	BLACKROCK CORPORATE BOND D AC.	0.006	0.022	0.311	-3.184	2.202	19.6112	-1.1894
Bond	BLLE.GIFF HIGH YIELD BD. B AC.	0.010	0.037	0.522	-10.990	4.712	111.0825	-4.5933
Bond	CG UK GLOBAL HIGH INCOME OPPORTUNITIES P ACC GBP	0.025	0.000	0.586	-4.124	6.727	10.9451	0.6008
Bond	CT STRATEGIC BOND INST GROSS ACC GBP	0.007	0.017	0.212	-2.395	2.389	42.2217	-1.6864
Bond	DIMENSIONAL GLOBAL SHORT DATED BOND ACC	-0.001	0.000	0.114	-0.797	0.533	4.8528	-0.4567
Bond	EDEN TREE AMITY STERLING BOND C	0.000	0.000	0.120	-1.119	1.215	40.3350	-3.6962
Bond	FID LNG DATED STER CORP BD FD W ACC	0.004	0.027	0.634	-4.909	5.337	10.8780	-0.5018
Bond	HSBC CPRT.BD. INSTL.AC.	0.007	0.026	0.384	-4.068	2.904	15.1682	-1.0795
Bond	IFSL CAF FIXED INTEREST A ACC	0.001	0.009	0.212	-2.293	2.202	19.5767	-0.9720
Bond	INSIGHT INV.UK GVT.ALL MT BD.GR.PTRS2 AC.	0.005	0.000	0.248	-1.542	2.970	19.2284	0.6216
Bond	INVESCO CORPORATE BOND (UK) ACC	0.003	0.013	0.224	-2.605	1.432	25.4730	-1.9769
Bond	JPM GLOBAL HIGH YIELD BD .C ACC	0.011	0.000	0.437	-4.976	4.981	37.8920	-0.7747
Bond	JUPITER INVESTMENT GRADE BOND FUND I GBP ACC	0.004	0.000	0.361	-3.258	2.554	15.8783	-1.2351
Bond	L&G ACTIVE GLOBAL HIGH YIELD BOND F ACC	0.008	0.000	0.363	-4.310	4.370	40.3055	-1.4596
Bond	LF CANLIFE CORPORATE BOND C ACC	0.004	0.016	0.338	-2.791	2.737	15.2840	-1.1839
Bond	LIONTRUST MONTHLY INCOME BOND B ACC	0.006	0.000	0.110	-0.786	1.376	22.6896	1.2793
Bond	MARKS & SPEN.HI.INC.AC.	0.002	0.000	0.509	-4.513	5.074	10.8276	-0.1557
Bond	NATIXIS LS STGC INC I/A ACC	0.001	0.000	0.210	-1.570	1.431	18.2088	0.1432
Benchmark	INVESCO FTSE RAFI UK 100 UCITS ETF	0.012	0.000	1.165	-11.352	9.394	7.5718	0.2438

Table 11: Descriptive Statistics Canada

Types	Names	Mean	Median	Stdev	Min	Max	Kurtosis	Skewness
Equity	CI AMERICAN SMALL COMPANIES CORP CL IT8	-0.009	0.000	1.254	-14.301	10.165	74.2083	-3.6779
Equity	BRANDES EMERGING MARKETS VALUE FD SRS F	0.001	0.000	0.986	-9.062	6.234	27.8202	-0.7869
Equity	BMO ASIAN GROWTH AND INCOME ADVISOR SERIES	0.003	0.000	0.785	-8.325	4.735	77.3421	-3.8940
Equity	CI ASIAN OPPORTUNITIES CORPORATE CLASS A	0.004	0.000	0.967	-6.339	5.475	8.7559	-0.2213
Equity	CANADA LIFE EUROPEAN EQUITY FUND A	0.004	0.000	0.803	-7.503	5.162	22.3598	-0.8041
Equity	ABRDN CANADA EAFE PLUS EQUITY	0.006	0.019	0.937	-18.573	6.292	3.8090	-0.6851
Equity	CANADA LIFE CANADIAN EQUITY FUND A	0.011	0.041	0.970	-10.274	10.750	28.8460	-0.2168
Equity	BAROMETER EQUITY POOL CLASS A	0.011	0.000	1.098	-6.585	5.092	10.7559	-0.6521
Equity	FIDELITY CANADIAN LARGE CAP SERIES F	0.013	0.020	0.918	-15.034	9.823	22.1251	-0.8534
Equity	CIBC ASIA PACIFIC INDEX CLASS A	0.014	0.000	0.918	-7.961	6.184	9.2428	-0.8872
Equity	CANOE CANADIAN SMALL MID CAP PORTFOLIO CLASS SR D	0.015	0.048	1.066	-11.370	7.367	25.9407	-0.8347
Equity	CANADA LIFE CANADIAN GROWTH FUND F	0.016	0.049	0.934	-10.088	10.164	31.1859	-1.1486
Equity	NBI GLOBAL DIVERSIFIED EQUITY INVESTOR SERIES	0.018	0.000	1.017	-10.555	8.273	10.4738	-0.6643
Equity	BMO EQUITY GROWTH ETF PORTFOLIO ADVISOR SERIES	0.020	0.000	0.887	-9.527	8.319	9.6830	-0.2663
Equity	RBC CANADIAN MID-CAP EQUITY FUND SR I	0.021	0.041	1.116	-11.911	10.951	13.1695	-0.9189
Equity	CI ASIAN OPPORTUNITIES FUND SERIES I	0.023	0.053	0.945	-5.568	5.540	24.4025	-2.2937
Equity	CANADA LIFE US SMALL-MID CAP GROWTH FUND N	0.025	0.000	1.188	-11.580	8.906	12.6872	-0.7322
Equity	BGC.NORTH AMER.FOCD.EQ SRS D	0.025	0.000	0.963	-9.697	11.745	13.7812	-0.5031
Equity	RBC NORTH AMERICAN GROWTH SR F	0.026	0.040	0.993	-10.843	10.461	15.9147	-0.8655
Equity	AXIOM ALL EQUITY PORTFOLIO CLASS A	0.027	0.040	0.924	-10.369	8.904	4.7616	-0.5702
Equity	CAPITAL GROUP US EQUITY SERIES F	0.029	0.000	0.973	-9.735	7.227	3.5661	-0.3585
Equity	CAPITAL GROUP GLOBAL EQUITY SERIES D	0.030	0.030	0.986	-10.195	7.016	8.6115	-0.3088
Equity	DESJARDINS AMERICAN EQUITY GROWTH I	0.041	0.064	1.286	-12.039	9.072	9.2581	-0.3185
Equity	CANADA LIFE US ALL CAP GROWTH FUND SERIES W	0.049	0.048	1.227	-11.894	8.879	23.6149	-1.4891
Equity	AGF AMERICAN GROWTH CLASS SERIES F	0.058	0.044	1.178	-10.901	8.308	20.5361	-1.1676
Bond	FRANKLIN BRANDYWINE GLBL SUSTNBL INC OPTM SR A	-0.019	0.000	0.277	-6.308	2.366	192.7203	-9.8118
Bond	DESJARDINS EMERGING MARKETS BOND F	-0.018	0.000	0.442	-4.908	2.668	9.3892	-0.7824
Bond	MANULIFE STRATEGIC INCOME FUND SERIES FT6	-0.018	0.000	0.274	-5.836	2.100	2.7357	-0.3858
Bond	BMO EMERGING MARKETS BOND ADVISOR SERIES	-0.014	0.000	0.399	-5.296	3.186	7.9432	-0.6420
Bond	DYNAMIC ADVANTAGE BOND SERIES F	-0.012	0.000	0.266	-1.739	1.558	6.9026	-0.4143
Bond	INVESCO CANADIAN CORE PLUS BOND SERIES A	-0.009	0.000	0.336	-3.643	1.741	35.5925	-2.7010
Bond	IG MACKENZIE GLOBAL BOND SERIES C	-0.009	0.000	0.391	-4.463	1.906	16.0462	-1.0584
Bond	BEUTEL GOODMAN INCOME SERIES D	-0.008	0.000	0.314	-2.969	1.990	2.8864	0.0513
Bond	CANSO CANADIAN BOND FD CLASS F	-0.008	0.000	0.253	-2.770	1.549	11.6702	-1.4216
Bond	ADDENDA ACTIVE DURATION BOND POOL CL A	-0.008	0.000	0.267	-2.876	1.674	2.8510	-0.1483
Bond	CANOE BOND ADVANTAGE PORTFOLIO CLASS SERIES A	-0.008	0.000	0.318	-1.384	2.100	16.0419	-1.7132
Bond	AGF EMERGING MARKETS BOND SERIES F	-0.008	0.000	0.380	-2.296	1.963	5.7063	-0.2739
Bond	HSBC CANADIAN BOND FUND INVESTOR SERIES	-0.007	0.000	0.297	-2.128	1.831	8.0353	-0.8034
Bond	BEUTEL GOODMAN CORE PLUS BOND SERIES B	-0.007	0.000	0.308	-3.116	1.863	5.9417	-0.4030
Bond	BRANDES CORPORATE FOCUS BOND CL I HEDGED	-0.007	0.000	0.205	-2.390	1.278	3.1373	-0.1305
Bond	MANULIFE CANADIAN BOND SERIES F	-0.007	0.000	0.314	-2.530	1.818	4.5365	-0.1184
Bond	ABERDEEN EMERGING MARKETS DEBT	-0.007	0.019	0.532	-11.902	2.414	2.3941	-0.2455
Bond	CIBC CANADIAN BOND CLASS A	-0.007	0.000	0.301	-1.475	1.835	136.2391	-5.9458
Bond	EDUCATORS BOND CLASS A	-0.006	0.000	0.301	-2.670	1.752	4.2603	-0.2027
Bond	DYNAMIC SHORT TERM BOND SERIES I	-0.006	0.000	0.115	-0.990	0.823	15.7424	-1.2641
Bond	FDP CANADIAN BOND PORTFOLIO SERIES A	-0.006	0.000	0.307	-2.220	2.031	12.7238	-1.2010
Bond	MACKENZIE CANADIAN BOND ADVISOR SERIES	-0.006	0.000	0.289	-2.524	1.862	4.7842	-0.3408
Bond	LEITH WHEELER CORE BOND SERIES B	-0.006	0.000	0.318	-2.385	1.871	6.2307	-0.4172
Bond	EDUCATORS MORTGAGE & INCOME CLASS A	-0.003	0.000	0.089	-0.444	0.567	4.1471	-0.2961
Bond	FIDELITY FLOATING RATE HIGH INCOME SERIES A	0.004	0.000	0.480	-3.014	2.379	107.2919	-5.3071
Benchmark	ISHARES S&P/TSX 60 IDX. ETF	0.020	0.039	0.997	-12.255	12.254	74.2083	-3.6779

Table 12: Descriptive Statistics Italy

Types	Names	Mean	Median	Stdev	Min	Max	Kurtosis	Skewness
Equity	BNL AZIONI AMERICA	0.046	0.000	1.360	-12.388	8.523	9.1265	-0.6353
Equity	SYMPHONIA AZION SMCP ITALIA CL I	0.046	0.075	0.983	-10.804	5.277	13.9196	-1.2308
Equity	FIDEURAM ITALIA R	0.039	0.048	1.309	-15.426	7.757	15.7778	-0.5443
Equity	ALLIANZ AZIONI AMERICA	0.034	0.025	1.274	-12.618	8.644	12.9226	-0.9141
Equity	EURIZON AZIONI PMI ITALIA R	0.033	0.064	1.109	-12.000	5.703	7.6332	-0.3749
Equity	AGORA MATERIALS R	0.033	0.017	1.296	-12.760	11.832	15.4531	-1.3495
Equity	FIDEURAM MASTER SEL.EQ. USA	0.033	0.050	0.928	-6.812	5.688	19.3507	-1.3676
Equity	SYMPHONIA AZIONARIO TREND GLOBALE I	0.031	0.023	0.848	-4.993	5.336	9.9884	-0.6883
Equity	EUROMOBILIARE AZIONI ITALIANE A	0.029	0.036	1.313	-15.357	8.171	10.0587	-0.6468
Equity	INVESTIMENTI AZIONARI ITALIA A	0.029	0.036	1.273	-15.149	7.806	3.8341	-0.3424
Equity	ANIMA SELEZIONE GLOBALE B	0.027	0.037	1.015	-8.751	6.824	15.0575	-1.3308
Equity	ARCA AZIONI INTERNAZIONALI P	0.027	0.041	0.983	-10.093	6.946	15.1652	-1.2609
Equity	ACOMEA AMERICA A1	0.027	0.000	1.237	-12.480	11.128	16.1074	-1.3685
Equity	ARCA AZIONI ITALIA P	0.027	0.049	1.334	-15.506	7.607	10.3614	-1.2062
Equity	ANIMA INIZIATIVA EUROPA A	0.027	0.072	1.002	-9.623	8.005	13.6385	-1.2138
Equity	ANIMA VALORE GLOBALE A	0.026	0.030	1.019	-9.100	8.257	5.4350	-0.5266
Equity	BANCOPOSTA AZIONARIO INTERNAZIONALE	0.026	0.020	1.039	-9.574	8.756	10.4174	-0.9639
Equity	ZENIT PIANETA ITALIA I	0.022	0.051	1.106	-11.277	5.454	11.7912	-0.6539
Equity	ALLIANZ AZIONI EUROPA	0.021	0.041	1.129	-11.411	9.299	12.4864	-0.5883
Equity	EPSILON Q VALUE	0.021	0.013	1.127	-12.327	8.248	6.1118	-0.6962
Equity	ACOMEA EUROPA A1	0.020	0.030	1.181	-14.918	8.801	3.9837	-0.2497
Equity	BNP PARIBAS JAPAN EQUITY CLASSIC H EUR CAP	0.017	0.000	1.135	-7.738	8.019	6.4677	-0.4505
Equity	ALLIANZ AZIONI PACIFICO	0.016	0.000	0.975	-6.256	4.538	11.3781	-1.2361
Equity	ARCA AZIONI PAESI EMER.	0.014	0.010	1.092	-7.533	6.082	10.1930	-1.1306
Equity	FIDEURAM MASTER SELECTION BALANCED	0.008	0.018	0.430	-3.540	2.643	7.5451	-0.8992
Bond	BNL OBBLIGAZIONI EMERGENTI	0.007	0.000	0.614	-5.527	3.598	9.6791	-0.5055
Bond	CONSULTINVEST REDDITO C	0.004	0.023	0.441	-4.917	2.721	34.7304	-1.8900
Bond	ARCA BD PAESI EM VALUTA LOCALE P	0.003	0.000	0.499	-3.299	2.444	9.7266	-0.2812
Bond	CONSULTINVEST BREVE TERMINE C	0.003	0.016	0.272	-3.176	1.756	17.1671	-1.7882
Bond	ALLIANZ REDDITO GLOBALE	-0.001	0.000	0.392	-3.327	3.167	26.7317	-2.2414
Bond	FONDERSEL INTERNAZIONALE ESG	-0.001	0.000	0.398	-2.085	1.905	6.2742	-0.0216
Bond	BOND STRATEGIA PRUDENTE A	-0.002	0.000	0.037	-0.330	0.420	19.1034	-0.0300
Bond	INVESTIPER OBBLIGAZIONARIO GLOBALE	-0.002	0.000	0.139	-1.919	0.881	14.9755	-1.4435
Bond	AMUNDI OBBLIGAZIONARIO BREVE TERMINE - C	-0.002	0.000	0.178	-2.819	2.087	6.8941	-0.6885
Bond	ARCA RR DIVERSIFIED BOND	-0.003	0.000	0.201	-2.223	2.081	22.5180	-1.7220
Bond	EUROMOBILIARE EURO AGGREGATE A	-0.003	0.000	0.064	-0.718	0.415	2.9510	0.1000
Bond	ACOMEA PERFORMANCE A1	-0.003	0.000	0.631	-4.305	3.188	10.5810	-1.1632
Bond	EURIZON OBBLIGAZIONI EURO BREVE TERMINE D	-0.003	0.000	0.083	-0.803	0.763	40.6179	0.3352
Bond	AZIMUT TREND TASSI	-0.003	0.000	0.208	-3.007	1.269	21.4025	-0.6397
Bond	ANIMA OBBLIGAZIONARIO EURO BT A	-0.004	0.000	0.041	-0.376	0.575	5.1239	-0.0365
Bond	ALLIANZ GLOBAL MULTI- ASSET CREDIT FUND	-0.004	0.000	0.146	-1.918	1.342	26.7491	-1.8285
Bond	EURIZON OBBLIGAZIONI CEDOLA D	-0.005	0.000	0.125	-1.231	0.720	18.8795	-1.6809
Bond	FONDERSEL EURO	-0.005	0.000	0.288	-1.745	1.915	37.0719	-2.7919
Bond	BOND PAESI EMERGENTI ESG A	-0.005	0.000	0.389	-3.784	2.467	55.1402	-1.7428
Bond	ALLIANZ REDDITO EURO	-0.006	0.000	0.221	-1.785	1.660	12.3299	-1.1955
Bond	BOND STRATEGIA ATTIVA A	-0.006	0.000	0.205	-1.766	1.511	31.7252	-2.8501
Bond	FIDEURAM RISPARMIO ATTIVO	-0.006	0.000	0.056	-0.459	0.418	15.9121	-0.3868
Bond	ANIMA TRICOLORE AD	-0.008	0.000	0.440	-4.237	4.567	5.2540	-0.6341
Bond	INVESTIPER OBBLIG PAESI EMERGENTI	-0.009	0.000	0.244	-2.982	1.608	21.4379	-1.9206
Bond	MEDIOLANUM STRATEGIA GLOBALE MULTI BOND L	-0.015	0.000	0.286	-2.765	2.280	46.6254	-2.7381
Benchmark	FTSE MIB INDEX	0.021	0.052	1.458	-16.924	8.926	9.1265	-0.6353

Table 13: Descriptive Statistics Germany

Types	Names	Mean	Median	Stdev	Min	Max	Kurtosis	Skewness
Equity	DEKA INV.GLOBALCHAMPIONS CF	0.035	0.048	1.013	-6.330	6.394	4.9272	-0.4058
Equity	LBBW GLOBAL WARMING R	0.045	0.040	1.188	-10.187	9.039	7.7327	-0.3536
Equity	ACATIS AKTIEN GLOBAL FONDS B	0.033	0.032	1.068	-9.724	7.531	8.7414	-0.6453
Equity	ACATIS ASIA PACIFIC PLUS FONDS	0.015	0.000	0.782	-6.319	4.137	4.8200	-0.4204
Equity	AKTIV CHANCE	0.026	0.051	1.057	-9.470	8.619	8.5987	-0.5979
Equity	ALLIANZ ADIFONDS - A - EUR	0.017	0.040	1.192	-9.875	8.421	6.6856	-0.4475
Equity	AMUNDI GERMAN EQUITY A ND	0.013	0.000	1.217	-14.332	8.570	13.7486	-0.9647
Equity	BALOISE-AKTIENFONDS DWS	0.016	0.017	1.220	-15.266	7.258	15.3575	-1.2169
Equity	BERENBERG AKTIEN GLOBAL PLUS R D	0.016	0.041	0.856	-7.430	4.478	5.9088	-0.7023
Equity	BREMEN KAPITAL AKTIEN	0.009	0.016	0.766	-5.825	4.794	4.8959	-0.3822
Equity	CH GLOBAL	0.011	0.044	1.126	-7.259	5.401	4.6276	-0.5253
Equity	CHOM CAPITAL ACTIVE RETURN EUROPE UI - AK I	0.018	0.043	1.028	-9.308	5.875	5.6006	-0.7839
Equity	DEGUSSA AKTIEN UNIVERSAL-FONDS	0.021	0.023	1.094	-11.412	7.924	10.6662	-0.8151
Equity	DEKA INV.GLOBALCHAMPIONS TF	0.032	0.048	1.013	-6.328	6.394	4.9297	-0.4071
Equity	DIT ALLIANZ VALUE GLOBAL	0.015	0.009	0.959	-6.701	7.569	8.5520	-0.7212
Equity	EARTH GOLD FUND UI (EUR R)	0.071	0.000	2.262	13.768	148.471	3.1835	0.1373
Equity	FIRST PRIV.INV.MAN.KAG EUROPA AKTIEN ULM B	0.009	0.028	1.125	-11.696	8.633	13.1354	-1.1981
Equity	FONDSPICKER GLOBAL UI	0.014	0.036	0.657	-5.047	4.435	6.8648	-0.8674
Equity	GAMAX FUNDS ASIA PACIFIC A	0.021	0.000	0.980	-5.701	5.270	2.9984	-0.2036
Equity	GLS BANK AKTIENFONDS AK A	0.018	0.050	0.893	-8.707	6.500	9.9070	-0.8730
Equity	HAL SYSTEMATIC MULTI ASSET DYNAMIC RT	0.017	0.039	0.836	-7.033	5.550	8.4978	-0.8424
Equity	HELABA INVEST KPL. DIVIDENDENPLUS FONDS	0.013	0.027	1.250	-15.017	9.605	16.4714	-1.2234
Equity	HP&P EURO SELECT UI FONDS A	0.003	0.021	0.808	-7.289	6.347	7.8838	-0.3700
Equity	HSBC GERMAN EQUITY AC	0.025	0.034	1.285	-12.757	11.291	10.6425	-0.4279
Equity	INVESCO KPL.EUROPA CORE AKTIENFDS	0.013	0.047	0.888	-9.925	4.624	12.5692	-1.4850
Bond	UNION INV.PRIVATFONDS UNIRENTA	-0.007	0.000	0.400	-2.674	2.779	5.0904	-0.3170
Bond	AMUNDI BKK RENT	-0.009	0.000	0.172	-2.196	0.980	31.2050	-2.8616
Bond	DEKARENT INTERNATIONAL	-0.006	0.000	0.351	-3.258	3.188	12.7085	-0.4649
Bond	FRANKFURT TRUST INV. FT INTERZINS	-0.001	0.000	0.143	-2.215	0.597	52.5694	-3.9144
Bond	DWS EURO BOND FUND LD	-0.012	0.000	0.284	-2.442	2.499	17.7121	-1.4562
Bond	BALOISE-RENTENFONDS DWS	-0.012	0.000	0.284	-2.406	2.650	17.0712	-0.8719
Bond	ALLIANZ EURO RENTENFONDS - A - EUR	-0.012	0.000	0.331	-2.656	2.573	11.3294	-0.8140
Bond	HANSAINVEST HANSEATISCHE INV.GESELL.HANSA INTL.	-0.006	0.000	0.338	-2.837	1.433	7.3775	-0.9918
Bond	AMPEGA GLOBAL RENTENFONDS	-0.006	0.000	0.338	-2.914	1.533	6.9692	-0.7035
Bond	DWS INVESTMENT INTL. RENTEN TYP O	0.001	0.000	0.387	-2.694	2.888	4.5291	-0.0260
Bond	MEAG MUNICH ERGO KPL. EURORENT	-0.009	0.000	0.214	-2.932	1.265	30.7856	-2.5035
Bond	LBBW RENTEN EURO FLEX NACHHALTIGKEIT	-0.007	0.000	0.181	-2.276	2.050	42.9298	-2.3675
Bond	MONEGA KPL.EURO BOND	-0.010	0.000	0.221	-2.670	1.432	17.6264	-1.6348
Bond	LBBW ASTMGMT.INV.GESELL. MBH RENTAMAX R	-0.006	0.000	0.206	-2.714	1.454	35.9120	-2.9505
Bond	BFS NACHHALTIGKEITSFONDS GREEN BONDS	-0.008	0.000	0.163	-1.457	0.918	8.2973	-0.7342
Bond	HELABA INVEST KPL.HIY. FONDS	-0.008	0.016	0.342	-4.134	3.866	50.5317	-3.7653
Bond	UNI INSTL EUR COVERED BONDS 4-6 YEARS SUST	-0.007	0.000	0.171	-1.757	1.319	14.8755	-0.8476
Bond	LAZARD ASST.MAN.DTL.EUR. HIGHYIELD	-0.007	0.020	0.343	-4.556	2.094	58.7074	-5.3861
Bond	FBG INDIVIDUAL R-PA	-0.008	0.000	0.185	-2.537	1.279	58.7891	-5.0253
Bond	AVANA INV.AKTGSF.MIT TGHF.GEN KAG EU.CNTL	-0.003	0.000	0.168	-2.468	0.926	39.2871	-2.7703
Bond	METZLER EURO CORPORATES SUSTAINABILITY AI	-0.009	0.007	0.250	-3.238	1.368	45.9458	-3.9000
Bond	HSBC STRATEGIE SUBSTANZ AD	-0.007	0.000	0.145	-1.732	0.760	34.0564	-3.3019
Bond	CORPORATE M SUSTAINABLE (I)	-0.007	0.010	0.198	-3.037	1.123	67.3513	-5.5834
Bond	WI GLOBAL CHALLENGES CORPORATE BONDS	-0.005	0.000	0.148	-2.192	1.065	40.9052	-3.1336
Bond	AMPEGA RENDITE RENTENFONDS	-0.006	0.000	0.185	-2.188	1.074	24.4626	-2.4032
Benchmark	DEKA DAX ETF	0.022	0.041	1.273	-12.154	10.944	4.9272	-0.4058

Table 14: Descriptive Statistics France

Types	Names	Mean	Median	Stdev	Min	Max	Kurtosis	Skewness
Equity	RENAISSANCE EUROPE I COMGEST	0.037	0.077	1.040	-8.292	6.690	4.7504	-0.3487
Equity	AA MMF EMERGING COVT. NEULIZE OBC INMS.	0.007	0.000	0.513	-5.228	4.052	17.7866	-0.6254
Equity	ABACUS QUALITY I	0.011	0.005	1.104	-10.862	7.248	11.2238	-1.0082
Equity	ABEILLE VALEURS	0.028	0.053	0.908	-9.398	6.171	11.6718	-1.2064
Equity	ABERDEEN WACTIONS CR. SUISSE ASTMGMT.GEST.	0.021	0.018	0.888	-8.776	5.320	11.3214	-1.1182
Equity	AGF ASAC ACTIONS (D) AGF ASSET MANAGEMENT	0.005	0.000	0.182	-2.943	2.222	83.3930	-0.9798
Equity	ALLIANZ ACN.ER.C GLOBAL INVRS.FRN.	0.029	0.041	1.149	-12.076	7.348	10.1061	-0.7796
Equity	AMERI-GAN O SUSP - UNSUPPORTED	0.007	0.000	0.192	-2.483	2.807	88.3559	2.2427
Equity	AXA AEDIFICANDI A C EUR	0.012	0.007	1.129	-11.203	9.290	11.9957	-0.6173
Equity	EQUI CONVICTIONS B GEST.	0.016	0.043	0.995	-10.871	7.310	12.8856	-0.8865
Equity	HANSEATIQUE B	0.039	0.040	1.199	-11.968	9.153	9.1957	-0.7486
Equity	EDR SICAV TRICOLORE RENDEMENT B EUR	0.012	0.013	1.160	-12.107	6.711	11.1645	-0.8719
Equity	ODDO BHF METROPOLE SELECTION B	0.014	0.027	1.276	-13.459	10.466	14.3611	-0.7903
Equity	TURGOT SMIDCAPS FRANCE BC TURGOT ASSET MAN.	0.022	0.044	0.791	-7.841	4.321	11.1393	-1.2175
Equity	MIROVA ACTIONS EUROPE F (EUR)	0.027	0.052	1.125	-12.037	7.831	11.0074	-0.9495
Equity	SUNNY MANAGERS F	0.037	0.067	0.891	-10.083	4.059	18.9558	-1.9282
Equity	UBS (F) EUROPN OPPTY UNCONSTR PEA EUR I	0.008	0.000	0.571	-4.827	4.386	12.3038	0.0063
Equity	AMUNDI ACTIONS EMERGENTS ESR F (C)	0.019	0.005	1.071	-8.313	5.664	5.6194	-0.6480
Equity	BETAMAX EUROPE SMART FOR CLIMATE F	0.024	0.054	1.007	-11.241	7.826	13.0992	-1.0640
Equity	SEEYOND ACTIONS EUROPEENNES ESG F	0.022	0.035	1.078	-11.655	8.518	11.7702	-0.9087
Equity	G FUND OPPORTUNITIES EUROPE IC	0.028	0.034	1.157	-12.113	8.196	10.3573	-0.8967
Equity	ECHIQUIER AGRESSOR G	0.005	0.016	1.090	-11.423	7.504	12.2111	-1.0597
Equity	GROUPAMA EURO STOCK G ASST.MAN.	0.008	0.000	0.208	-2.598	3.183	76.0158	1.5231
Equity	MANDARINE VALEUR G GEST.	0.017	0.000	1.317	-13.430	9.445	11.3327	-0.7096
Equity	PLUVALCA BIOTECH Z	0.025	0.000	1.243	-10.381	9.314	7.5212	-0.1200
Bond	G FUND CREDIT EURO ISR I C	-0.002	0.002	0.201	-2.408	1.099	17.3509	-1.2599
Bond	G FUND CREDIT EURO ISR M	-0.001	0.000	0.201	-2.408	1.099	17.3614	-1.2622
Bond	G FUND GLOBAL GREEN BONDS I	-0.004	0.000	0.251	-2.111	1.437	6.4498	-0.4963
Bond	GROUPAMA CR.ER.CT I ASST.MAN.	-0.001	0.001	0.070	-0.830	0.454	24.6951	-1.8112
Bond	ALLIANZ EURO HIGH YIELD R D EUR	-0.006	0.016	0.341	-4.387	2.235	53.7627	-4.9225
Bond	ALM CREDIT EURO ISR IC	0.000	0.006	0.170	-2.264	1.223	24.9123	-1.4914
Bond	FONDO BNPP SEICEDOLE B	-0.005	0.000	0.183	-2.256	1.612	24.0411	-1.3671
Bond	EDMOND DE ROTH.SICAV ER.SUST CRED B EUR	-0.005	0.009	0.205	-2.343	1.968	32.6144	-2.5079
Bond	LA FRANCAISE EURO INFLATION B	0.009	0.000	0.323	-3.386	7.966	194.7458	6.9228
Bond	OCTO CREDIT COURT TERME B	-0.001	0.002	0.059	-0.776	0.468	34.5155	-2.9945
Bond	ALLIANZ EURO HIGH YIELD I C/D EUR	0.008	0.015	0.275	-3.409	2.234	38.2127	-2.5746
Bond	ANAXIS SHORT DURATION K (EUR)	0.005	0.000	0.545	-3.573	22.393	1364.5199	32.9941
Bond	TIKEHAU CREDIT PLUS K- ACC-EUR	0.003	0.008	0.185	-2.748	1.480	59.2129	-3.9935
Bond	EXANE ELLIPSIS CONVS FD J CHF (EUR)	0.008	0.000	0.447	-2.554	17.233	1057.2018	27.3139
Bond	REGARD CONVERTIBLES EURO H	0.005	0.012	0.357	-2.147	2.010	4.5007	-0.5078
Bond	DANONE COMMUNITIES D ISR PRUDENT (C/D)	-0.003	0.000	0.104	-0.901	0.585	10.6572	-1.2086
Bond	ARC FLEXIBOND D SUSP - UNSUPPORTED	-0.009	0.000	0.157	-1.527	1.133	21.2450	-2.6231
Bond	CD ALPHA BONDS D	0.000	0.000	0.223	-2.748	2.108	38.8953	-2.9181
Bond	CONFIANCE SOLIDAIRE D CREDIT COOPERATIF	-0.003	0.000	0.076	-1.038	0.546	31.0886	-2.6043
Bond	ALLIANZ OBLIGATIONS INTERNATIONALES D EUR	-0.007	0.000	0.227	-2.055	1.510	9.7239	-0.6807
Bond	AXA EURO CREDIT (D) AXA INVESTMENT PARIS	-0.005	0.000	0.186	-2.325	0.987	22.4171	-1.9456
Bond	BRONGNIART VARIFONDS D	-0.012	0.000	0.195	-3.254	1.096	110.7429	-7.4268
Bond	BSO CONVERTIBLE D	-0.001	0.000	0.298	-2.379	1.455	6.7820	-0.9297
Bond	CAPITOP REVENUS (D)	-0.012	0.000	0.157	-1.570	0.941	23.9328	-2.8059
Bond	COVEA EURO SOUVERAIN (D) FINANCE	-0.012	0.000	0.289	-2.424	1.584	11.7425	-1.2081
Benchmark	XTRACKERS CAC 40 UCITS ETF 1D	0.028	0.040	1.244	-12.531	8.438	4.7504	-0.3487

Table 15: Descriptive Statistics Japan

Types	Names	Mean	Median	Stdev	Min	Max	Kurtosis	Skewness
Equity	GS NET WIN GS TECH EQTY FD B (NON HGD)	0.030	0.048	1.643	-12.255	11.042	5.0445	-0.4210
Equity	ALLIANCE US GROWTH EQUITY B	0.050	0.036	1.388	-11.971	9.632	7.1415	-0.3450
Equity	SMDS CHINA A & H SHARES OPEN	0.029	0.000	1.460	-9.093	6.073	3.6725	-0.6033
Equity	PICTET GLBL INC EQTY (MTHLY DIST)	-0.031	0.000	1.077	-8.957	6.627	9.4527	-0.9471
Equity	UBS NEXT GENERATION TECHNOLOGY FUND	0.007	0.000	1.814	-13.087	12.810	6.0264	-0.6122
Equity	ABRDN ABERDEEN JAPAN OPEN	0.021	0.000	1.174	-6.858	8.695	4.7533	-0.0334
Equity	ALLIANCE GLOBAL GROWTH OPPORTUNITIES (2Y)	0.038	0.037	1.204	-8.482	8.919	5.8942	-0.5007
Equity	AMUNDI TARGET JAPAN FUND	0.022	0.000	1.114	-5.967	5.933	4.1740	-0.1255
Equity	BARINGS ASIA FUTURE GROWTH EQUITY FUND	0.021	0.012	1.220	-6.673	5.904	2.3470	-0.3979
Equity	BNYMELLON US MNFG INDUSTRY EQUITY FUND	0.056	0.004	1.461	-11.628	10.848	7.4773	-0.1708
Equity	BRJ BLACKROCK NATURAL RESOURCES EQUITY FUND	0.038	0.000	1.612	-11.150	10.274	4.4500	-0.3102
Equity	CLOVER KODOMO FUND	0.025	0.051	0.828	-5.385	4.258	5.1202	-0.6398
Equity	DAIWA ACTIVE NIPPON (MUSASHI)	0.017	0.012	1.187	-6.376	6.628	4.4243	-0.4069
Equity	DAIWA JAPAN OPEN	0.024	0.009	1.290	-9.211	7.021	5.1494	-0.5735
Equity	DWS DEUTSCHE JAPAN GROWTH OPEN	0.017	0.021	1.341	-8.681	6.772	4.1020	-0.4960
Equity	EAST SPRING GROWING ASIA EQUITY OPEN	0.008	0.000	1.054	-8.666	5.023	8.0045	-1.0057
Equity	FIDELITY ASIA EQUITY FUND	0.030	0.000	1.195	-7.581	7.067	3.9799	-0.4175
Equity	GS JAPAN EQUITY INDEX PLUS	0.013	0.000	1.159	-6.962	8.032	6.2692	-0.2959
Equity	HSBC ASIA PLUS	0.015	0.000	1.263	-7.640	6.276	3.3501	-0.4150
Equity	INVESCO GT GLOBAL (INVESTMENT OPEN)	0.018	0.000	0.921	-7.729	7.149	9.1741	-0.6900
Equity	INVESCO JAPAN GROWTH FUND	0.020	0.011	1.255	-8.749	6.607	4.8741	-0.4798
Equity	INVESCO MSCI KOKUSAI PORTFOLIO	0.037	0.025	1.233	-10.192	9.548	9.2383	-0.5446
Equity	JPM GLOBAL HEALTH CARE RELATED EQ FUND	0.000	0.000	1.397	-17.347	5.749	19.6324	-2.1255
Equity	JPM JAPAN MEISTER	0.035	0.000	1.185	-6.383	6.886	4.4336	-0.1578
Equity	JPM THE JAPAN	0.031	0.022	1.357	-7.353	6.571	3.4208	-0.4093
Bond	ALLIANCE HIGH YIELD OPEN	-0.005	0.000	0.624	-5.100	2.971	5.5545	-0.7118
Bond	NOMURA HIGH YIELD BOND OPEN A COURSE	-0.008	0.012	0.366	-3.437	3.191	23.3742	-1.7725
Bond	FIDELITY US HIGH YIELD	-0.027	0.000	0.705	-5.341	3.160	4.8660	-0.7964
Bond	SMDS SB JAPAN BOND FUND	-0.002	0.000	0.157	-1.297	1.164	9.0243	-0.5021
Bond	INVESCO MONTHLY INCOME FUND	-0.008	0.000	0.632	-4.991	2.463	5.3362	-0.7083
Bond	GS VARIETY OPEN FUND	-0.012	0.000	0.337	-3.275	2.412	10.6449	-0.9206
Bond	NOCHU US BOND OPEN	0.004	0.000	0.533	-5.186	3.205	9.3335	-0.8928
Bond	SOMPO JAPAN BOND FUND	-0.001	0.000	0.134	-1.129	0.885	7.5860	-0.3397
Bond	SMDS DC FOREIGN BOND FUND	-0.001	0.000	0.473	-5.443	2.594	11.8453	-0.9343
Bond	MYAM FOREIGN BOND OPEN	-0.009	0.000	0.486	-5.587	2.700	13.1576	-1.2574
Bond	HITACHI DOMESTIC BOND INDEX FUND	0.000	0.000	0.137	-1.204	0.872	7.3544	-0.3830
Bond	GS DC GALILEO	-0.008	0.000	0.229	-1.796	2.015	7.3440	-0.2019
Bond	MYAM DC FOREIGN BOND OPEN	-0.001	0.000	0.468	-5.592	2.703	13.4937	-1.0372
Bond	NOMURA DOMESTIC BOND INDEX FUND	-0.001	0.000	0.137	-1.182	0.864	7.1849	-0.3645
Bond	SMT DC FOREIGN BOND INDEX L	0.001	0.000	0.474	-5.741	3.367	14.8233	-1.0210
Bond	EAST SPRING US HIGH YIELD BOND OPEN	0.000	0.000	0.641	-5.151	2.851	5.4801	-0.6483
Bond	DAIWA HIGH GRADE CAD BOND OPEN	-0.031	0.000	0.632	-5.253	2.546	5.6107	-0.6964
Bond	UBS AUSTRALIA BOND OPEN (M)	-0.029	0.000	0.785	-5.861	3.734	3.5578	-0.4232
Bond	SMT GLOBAL BOND INDEX OPEN	0.000	0.000	0.474	-5.738	3.367	14.7866	-1.0206
Bond	SMT FOREIGN BOND INDEX OPEN(SMA)	0.000	0.000	0.474	-5.742	3.375	14.8226	-1.0213
Bond	BRJ WORLD INCOME STRATEGY	-0.001	0.000	0.564	-3.961	3.634	5.4617	-0.2750
Bond	SMDS T ROWE PRICE US INCOME FUND	-0.005	0.000	0.550	-3.806	2.964	5.2197	-0.5009
Bond	AM-ONE LOOMIS US INVESTMENT GRADE BOND F	-0.002	0.000	0.492	-4.022	2.356	5.6772	-0.5784
Bond	NIKKO INDEX FUND JAPANESE BOND DC	-0.001	0.000	0.136	-1.155	0.832	6.8645	-0.3769
Bond	SHINKIN US SOVEREIGN BOND PORTFOLIO	-0.003	0.000	0.486	-4.064	3.312	6.5472	-0.3103
Benchmark	NOMURA NF NIKKEI 225 ETF	0.027	0.000	1.225	-7.816	8.002	5.0445	-0.4210

Appendix 3

Table 16: Sharpe Ratio and Treynor Ratio United States

Name	Sharpe Ratio	Treynor Ratio
AAM/INSIGHT SELECT INCOME FUND A	-3.027	-2.654
AB CALIFORNIA PORTFOLIO C	-4.699	-2.545
AB CONCENTRATED GROWTH FUND A	-0.726	-0.924
AB CORE OPPORTUNITIES FUND A	-0.788	-1.033
AB DISCOVERY GROWTH FUND A	-0.593	-0.923
AB GLOBAL BOND FUND A	-4.049	-2.7
AB LARGE CAP GROWTH FUND A	-0.748	-0.961
AB LARGE CAP GROWTH FUND ADVISOR	-0.749	-0.958
AB SMALL CAP VALUE PORTFOLIO C	-0.632	-0.933
AB VIRGINIA PORTFOLIO C	-4.887	-2.557
ABRDN DYNAMIC DIVIDEND FUND INST	-0.909	-1.086
ABRDN GLOBAL INFRASTRUCTURE FUND INST	-0.925	-1.172
ABRDN US SMALL CAP EQUITY FUND R	-0.665	-0.972
ADAPTIVE GROWTH OPPORTUNITIES ETF	-0.932	-1.144
ALLSPRING DISCVRY SCG FD INST	-0.545	-0.91
ALLSPRING GROWTH FUND A	-0.555	-0.924
ALLSPRING INDEX FUND A	-0.675	-0.991
ALLSPRING MUNICIPAL BOND FUND ADM	-4.824	-2.576
ALPHA MARK FUND	-0.8	-1.104
AMERICAN FDS WASHINGTON MUTUAL INV FD 529-C	-0.866	-1.027
AMERICAN FUND.PRESERVN. PRTF.CL.A	-7.192	-2.703
AMERICAN FUNDS AMERICAN MUTUAL FUND F2	-0.99	-1.121
AMERICAN MUTUAL FD.CL.C SHS.	-0.995	-1.122
ARCHER INCOME FUND	-7.477	-2.617
ARTISAN GLOBAL VALUE FUND ADV	-0.814	-1.046
BLACKROCK CORE BOND PORTFOLIO K	-3.541	-2.746
BLACKROCK INCOME FUND INST	-3.954	-2.388
BLKRK IMPACT MTGE FD INSTL	-3.965	-2.732
BNY MELLON CORE PLUS FUND Y	-3.858	-2.652
BUFFALO HIGH YIELD FUND INVESTOR	-3.283	-2.193
CALVERT BOND FUND A	-3.961	-2.787
COLUMBIA ACORN EUROPEAN FUND I	-0.734	-1.128
DWS TOTAL RETURN BOND FUND INSTITUTIONAL	-3.836	-2.734
FID.SMCP.DISCOVERY FUND	-0.668	-1.546
FIDELITY LIMITED TERM BOND FUND	-7.721	-2.675
FIDELITY LOW PRICE STK. FD.	-0.665	-1.127
FIDELITY TOTAL BOND FUND	-3.809	-2.671
FIDELITY US BOND INDEX FUND	-3.671	-2.797
FRANKLIN GOLD AND PRECIOUS METALS FUND R6	-0.461	-1.423
HARTFORD MUT.FUND.MID. CAP.VAL.C	-0.68	-0.98
INVESCO CONSERVATIVE INCOME FUND R6	-27.773	-2.664
INVESCO CORPORATE BOND FD.CL.R6	-2.925	-2.618
INVESCO GOLD & SPECIAL MINERALS FUND A	-0.446	-1.345
INVESCO MUN.INC.FD.INVR. CL.	-3.858	-2.541
JP MORGAN CORE PLUS BD.A	-3.985	-2.756
JP MORGAN CORPORATE BOND I	-2.66	-2.689
KINETICS MUT.FUND.THE MED.FD.	-0.814	-1.189
THRIVENT INCOME FUND S	-3.062	-2.661
VANGUARD BD.IDX.FD.SHT. TM.PRTF.	-8.239	-2.724
VANGUARD LONG-TERM INV. GDE.FD.INVR.SHS.	-1.497	-3.041
ISHARES CORE S&P 500 ETF	0.836	-0.942

Table 17: Sharpe Ratio and Treynor Ratio United Kingdom

Name	Sharpe Ratio	Treynor Ratio
NFU MUTUAL UK EQUITY INCOME C INCOME	0.020	0.024
WS SEQUEL GROWTH TARGET RETURN STRAT STAND C	0.024	0.028
AI UK INDEX TRACKING CLASS 8 ACC	0.038	0.045
ABRDN UK ALL SHARE TRACKER FUND A ACC	0.037	0.055
SCWID.UK EQ.INC.CL.C INC.	0.015	0.059
BAILLIE GIFF UK EQUITY ALPHA B AC.	0.031	0.065
MAN GLG INCOME PROFESSIONAL ACC C GBP	0.045	0.068
ABERDEEN UK EQUITY INCOME Z AC.	0.042	0.069
DIMENSIONAL GLOBAL SHORT DATED BOND ACC	0.101	0.071
EDEN TREE AMITY STERLING BOND C	0.101	0.071
EDEN TREE RESP AND SUST EUROPEAN EQUITY C	0.046	0.076
NATIXIS LS STGC INC I/A ACC	0.065	0.077
IFSL CAF FIXED INTEREST A ACC	0.065	0.082
MARKS & SPEN.HI.INC.AC.	0.029	0.083
ARTEMIS GLOBAL INCOME C ACC GBP	0.044	0.083
ABRDN AAA BOND INSTITUTIONAL ACC GBP	0.047	0.086
ORBIS OEIC GLOBAL EQUITY STANDARD SC ACC	0.053	0.086
ALLIANZ EMERGING MARKETS EQUITY A ACC GBP	0.037	0.088
LIONTRUST CHINA GBP C ACC	0.027	0.091
LF CANLIFE ASIA PACIFIC C ACC	0.039	0.091
TM STONEHG FLM OPPS ACC C	0.049	0.091
ARTEMIS SMART GARP GLOBAL EQUITY C ACC GBP	0.052	0.095
JPM EMERGING MKTS.B ACC	0.042	0.097
INVESCO CORPORATE BOND (UK) ACC	0.068	0.097
ABRDN STRATEGIC BOND FUND A ACC	0.079	0.098
CT STRATEGIC BOND INST GROSS ACC GBP	0.090	0.098
ABRDN ETHICAL CORPORATE BOND FUND INST ACC	0.040	0.100
JANUS HENDERSON AS-PAC CAPITAL GRO C ACC	0.042	0.102
LIONTRUST MONTHLY INCOME BOND B ACC	0.165	0.102
BLLE.GIFF HIGH YIELD BD. B AC.	0.042	0.110
L&G ACTIVE GLOBAL HIGH YIELD BOND F ACC	0.056	0.112
SCHRODER QEP GLOBAL CORE I AC.	0.061	0.118
INSIGHT INV.UK GVT.ALL MT BD.GR.PTRS2 AC.	0.068	0.119
JPM ASIA GROWTH C NET ACC	0.050	0.123
BLACKROCK CORPORATE BOND D AC.	0.059	0.126
LF CANLIFE CORPORATE BOND C ACC	0.049	0.131
JPM GLOBAL HIGH YIELD BD .C ACC	0.052	0.131
AVIVA INVESTORS CORP BD FD CLS 8 ACC	0.043	0.132
ISHARES CORPORATE BOND INDEX (UK) D ACC	0.046	0.135
PREMIER MITON GLOBAL SUSTAINABLE GROWTH C ACC	0.054	0.141
JUPITER INVESTMENT GRADE BOND FUND I GBP ACC	0.045	0.142
AXA ACT CBN.TSTN.STG B&M CRDT FD Z ACC	0.044	0.145
HSBC CPRT.BD. INSTL.AC.	0.050	0.156
CG UK GLOBAL HIGH INCOME OPPORTUNITIES P ACC GBP	0.063	0.165
FP RUSSELL INV INTERNATL GRO ASSTS C ACC	0.053	0.170
BAILLIE GIFFORD AMERICAN C ACC	0.044	0.172
BLACKROCK GOLD &.GENERAL D AC.	0.030	0.179
FUNDSMITH EQUITY I ACC	0.071	0.217
FID LNG DATED STER CORP BD FD W ACC	0.026	0.243
M&G GILT&FIXED INTEREST INCOME STERLING A ACC	0.017	0.263
INVESCO FTSE RAFI UK 100 UCITS ETF	0.021	0.022

Table 18: Sharpe Ratio and Treynor Ratio Canada

Name	Sharpe Ratio	Treynor Ratio
EDUCATORS MORTGAGE & INCOME CLASS A	-22.227	-8.994
DYNAMIC SHORT TERM BOND SERIES I	-17.265	-9.037
BRANDES CORPORATE FOCUS BOND CL I HEDGED	-9.677	-7.670
CANSO CANADIAN BOND FD CLASS F	-7.827	-9.641
DYNAMIC ADVANTAGE BOND SERIES F	-7.475	-9.349
ADDENDA ACTIVE DURATION BOND POOL CL A	-7.423	-9.468
MANULIFE STRATEGIC INCOME FUND SERIES FT6	-7.262	-7.229
FRANKLIN BRANDYWINE GLBL SUSTNBL INC OPTM SR A	-7.205	-7.920
MACKENZIE CANADIAN BOND ADVISOR SERIES	-6.863	-10.314
HSBC CANADIAN BOND FUND INVESTOR SERIES	-6.674	-10.148
CIBC CANADIAN BOND CLASS A	-6.588	-10.078
EDUCATORS BOND CLASS A	-6.580	-10.259
FDP CANADIAN BOND PORTFOLIO SERIES A	-6.460	-10.382
BEUTEL GOODMAN CORE PLUS BOND SERIES B	-6.427	-10.491
BEUTEL GOODMAN INCOME SERIES D	-6.310	-10.409
MANULIFE CANADIAN BOND SERIES F	-6.306	-10.517
LEITH WHEELER CORE BOND SERIES B	-6.228	-10.468
CANOE BOND ADVANTAGE PORTFOLIO CLASS SERIES A	-6.223	-10.655
INVESCO CANADIAN CORE PLUS BOND SERIES A	-5.896	-9.900
AGF EMERGING MARKETS BOND SERIES F	-5.211	-8.582
IG MACKENZIE GLOBAL BOND SERIES C	-5.075	-12.251
BMO EMERGING MARKETS BOND ADVISOR SERIES	-4.989	-6.862
DESJARDINS EMERGING MARKETS BOND F	-4.506	-12.838
FIDELITY FLOATING RATE HIGH INCOME SERIES A	-4.106	-11.112
ABERDEEN EMERGING MARKETS DEBT	-3.720	-6.419
BMO ASIAN GROWTH AND INCOME ADVISOR SERIES	-2.511	-3.715
CANADA LIFE EUROPEAN EQUITY FUND A	-2.452	-3.403
BMO EQUITY GROWTH ETF PORTFOLIO ADVISOR SERIES	-2.202	-2.382
FIDELITY CANADIAN LARGE CAP SERIES F	-2.137	-2.796
CIBC ASIA PACIFIC INDEX CLASS A	-2.135	-2.907
AXIOM ALL EQUITY PORTFOLIO CLASS A	-2.107	-2.343
ABRDN CANADA EAFE PLUS EQUITY	-2.100	-3.401
CANADA LIFE CANADIAN GROWTH FUND F	-2.096	-2.172
CI ASIAN OPPORTUNITIES FUND SERIES I	-2.064	-4.831
CI ASIAN OPPORTUNITIES CORPORATE CLASS A	-2.038	-4.805
CANADA LIFE CANADIAN EQUITY FUND A	-2.024	-2.093
BGC.NORTH AMER.FOCD.EQ SRS D	-2.023	-2.227
BRANDES EMERGING MARKETS VALUE FD SRS F	-2.001	-2.904
CAPITAL GROUP US EQUITY SERIES F	-1.999	-2.422
CAPITAL GROUP GLOBAL EQUITY SERIES D	-1.972	-2.457
RBC NORTH AMERICAN GROWTH SR F	-1.962	-2.090
NBI GLOBAL DIVERSIFIED EQUITY INVESTOR SERIES	-1.923	-2.418
CANOE CANADIAN SMALL MID CAP PORTFOLIO CLASS SR D	-1.837	-2.372
BAROMETER EQUITY POOL CLASS A	-1.788	-2.876
RBC CANADIAN MID-CAP EQUITY FUND SR I	-1.750	-2.165
CANADA LIFE US SMALL-MID CAP GROWTH FUND N	-1.642	-2.333
AGF AMERICAN GROWTH CLASS SERIES F	-1.626	-2.254
CI AMERICAN SMALL COMPANIES CORP CL IT8	-1.581	-2.084
CANADA LIFE US ALL CAP GROWTH FUND SERIES W	-1.570	-2.204
DESJARDINS AMERICAN EQUITY GROWTH I	-1.503	-2.119
ISHARES S&P/TSX 60 IDX. ETF	-1.959	1.980

Table 19: Sharpe Ratio and Treynor Ratio Italy

Name	Sharpe Ratio	Treynor Ratio
ALLIANZ REDDITO GLOBALE	-4.784	-7.933
FONDERSEL EURO	-6.542	-7.595
ALLIANZ GLOBAL MULTI- ASSET CREDIT FUND	-12.921	-7.590
BOND STRATEGIA ATTIVA A	-9.194	-7.524
FIDEURAM RISPARMIO ATTIVO	-33.853	-7.410
ALLIANZ REDDITO EURO	-8.528	-7.358
ANIMA OBBLIGAZIONARIO EURO BT A	-45.930	-7.347
FONDERSEL INTERNAZIONALE ESG	-4.720	-7.332
BOND STRATEGIA PRUDENTE A	-51.261	-7.314
EUROMOBILIARE EURO AGGREGATE A	-29.151	-7.177
EURIZON OBBLIGAZIONI EURO BREVE TERMINE D	-22.575	-7.132
AMUNDI OBBLIGAZIONARIO BREVE TERMINE - C	-10.580	-6.999
EURIZON OBBLIGAZIONI CEDOLA D	-15.094	-6.987
INVESTIPER OBBLIGAZIONARIO GLOBALE	-13.510	-6.850
INVESTIPER OBBLIG PAESI EMERGENTI	-7.737	-6.720
AZIMUT TREND TASSI	-9.018	-6.534
ARCA RR DIVERSIFIED BOND	-9.342	-6.478
ANIMA TRICOLORE AD	-4.284	-6.365
MEDIOLANUM STRATEGIA GLOBALE MULTI BOND L	-6.605	-6.175
CONSULTINVEST BREVE TERMINE C	-6.878	-6.121
BOND PAESI EMERGENTI ESG A	-4.831	-6.015
CONSULTINVEST REDDITO C	-4.248	-5.431
BNL OBBLIGAZIONI EMERGENTI	-3.045	-5.416
ARCA BD PAESI EM VALUTA LOCALE P	-3.750	-5.226
FIDEURAM MASTER SELECTION BALANCED	-4.342	-4.713
ACOMEA PERFORMANCE A1	-2.980	-4.589
ALLIANZ AZIONI PACIFICO	-1.907	-4.582
BNP PARIBAS JAPAN EQUITY CLASSIC H EUR CAP	-1.638	-4.398
SYMPHONIA AZIONARIO TREND GLOBALE I	-2.177	-3.807
ARCA AZIONI PAESI EMER.	-1.705	-3.416
FIDEURAM MASTER SEL.EQ. USA	-1.987	-3.256
ARCA AZIONI INTERNAZIONALI P	-1.882	-3.129
BNL AZIONI AMERICA	-1.346	-3.069
ANIMA SELEZIONE GLOBALE B	-1.823	-3.065
AGORA MATERIALS R	-1.423	-3.063
BANCOPOSTA AZIONARIO INTERNAZIONALE	-1.780	-3.044
ALLIANZ AZIONI AMERICA	-1.446	-2.997
ANIMA VALORE GLOBALE A	-1.816	-2.945
SYMPHONIA AZION SMCP ITALIA CL I	-1.861	-2.881
ACOMEA AMERICA A1	-1.495	-2.847
ANIMA INIZIATIVA EUROPA A	-1.845	-2.762
EURIZON AZIONI PMI ITALIA R	-1.662	-2.602
EPSILON Q VALUE	-1.647	-2.473
ALLIANZ AZIONI EUROPA	-1.643	-2.461
ACOMEA EUROPA A1	-1.572	-2.414
ZENIT PIANETA ITALIA I	-1.677	-2.365
INVESTIMENTI AZIONARI ITALIA A	-1.451	-2.153
EUROMOBILIARE AZIONI ITALIANE A	-1.406	-2.038
FIDEURAM ITALIA R	-1.404	-2.038
ARCA AZIONI ITALIA P	-1.387	-2.025
FTSE MIB INDEX	-1.272	-1.855

Table 20: Sharpe Ratio and Treynor Ratio Germany

Name	Sharpe Ratio	Treynor Ratio
UNION INV.PRIVATFONDS UNIRENTA	-0.549	-1.377
DWS INVESTMENT INTL. RENTEN TYP O	-0.547	-1.235
AMPEGA GLOBAL RENTENFONDS	-0.647	-1.201
UNI INSTL EUR COVERED BONDS 4-6 YEARS SUST	-1.289	-1.199
MONEGA KPL.EURO BOND	-1.005	-1.196
DWS EURO BOND FUND LD	-0.793	-1.180
ALLIANZ EURO RENTENFONDS - A - EUR	-0.680	-1.177
BFS NACHHALTIGKEITSFONDS GREEN BONDS	-1.353	-1.172
WI GLOBAL CHALLENGES CORPORATE BONDS	-1.472	-1.172
BALOISE-RENTENFONDS DWS	-0.791	-1.165
AMPEGA RENDITE RENTENFONDS	-1.187	-1.165
FRANKFURT TRUST INV. FT INTERZINS	-1.499	-1.163
AMUNDI BKK RENT	-1.288	-1.148
HANSAINVEST HANSEATISCHE INV.GESELL.HANSA INTL.	-0.648	-1.146
MEAG MUNICH ERGO KPL. EURORENT	-1.038	-1.140
DEKARENT INTERNATIONAL	-0.624	-1.137
LBBW RENTEN EURO FLEX NACHHALTIGKEIT	-1.213	-1.118
HSBC STRATEGIE SUBSTANZ AD	-1.517	-1.102
CORPORATE M SUSTAINABLE (I)	-1.114	-1.086
GAMAX FUNDS ASIA PACIFIC A	-0.196	-1.066
METZLER EURO CORPORATES SUSTAINABILITY AI	-0.888	-1.053
AVANA INV.AKTGSF.MIT TGHF.GEN KAG EU.CNTL	-1.284	-1.047
LBBW ASTMGMT.INV.GESELL. MBH RENTAMAX R	-1.065	-1.039
FBG INDIVIDUAL R-PA	-1.195	-1.037
BREMEN KAPITAL AKTIEN	-0.267	-0.983
HELABA INVEST KPL.HIY. FONDS	-0.645	-0.830
LAZARD ASST.MAN.DTL.EUR. HIGHYIELD	-0.641	-0.815
CH GLOBAL	-0.180	-0.784
DEKA INV.GLOBALCHAMPIONS TF	-0.178	-0.501
FONDSPICKER GLOBAL UI	-0.303	-0.496
DEKA INV.GLOBALCHAMPIONS CF	-0.176	-0.495
ACATIS ASIA PACIFIC PLUS FONDS	-0.253	-0.485
DIT ALLIANZ VALUE GLOBAL	-0.207	-0.464
INVESCO KPL.EUROPA CORE AKTIENFDS	-0.225	-0.391
BERENBERG AKTIEN GLOBAL PLUS R D	-0.230	-0.374
EARTH GOLD FUND UI (EUR R)	-0.063	-0.342
HP&P EURO SELECT UI FONDS A	-0.260	-0.340
HAL SYSTEMATIC MULTI ASSET DYNAMIC RT	-0.235	-0.322
ALLIANZ ADIFONDS - A - EUR	-0.164	-0.307
GLS BANK AKTIENFONDS AK A	-0.218	-0.300
ACATIS AKTIEN GLOBAL FONDS B	-0.168	-0.276
AMUNDI GERMAN EQUITY A ND	-0.164	-0.273
BALOISE-AKTIENFONDS DWS	-0.162	-0.268
CHOM CAPITAL ACTIVE RETURN EUROPE UI - AK I	-0.190	-0.263
FIRST PRIV.INV.MAN.KAG EUROPA AKTIEN ULM B	-0.181	-0.247
AKTIV CHANCE	-0.177	-0.244
LBBW GLOBAL WARMING R	-0.142	-0.234
DEGUSSA AKTIEN UNIVERSAL-FONDS	-0.175	-0.234
HELABA INVEST KPL. DIVIDENDENPLUS FONDS	-0.160	-0.229
HSBC GERMAN EQUITY AC	-0.146	-0.190
DEKA DAX ETF	-0.15	-0.1912

Table 21: Sharpe Ratio and Treynor Ratio France

Name	Sharpe Ratio	Treynor Ratio
ALLIANZ OBLIGATIONS INTERNATIONALES D EUR	-2.568	-2.838
G FUND GLOBAL GREEN BONDS I	-2.311	-2.633
BRONGNIART VARIFONDS D	-3.003	-2.567
COVEA EURO SOUVERAIN (D) FINANCE	-2.031	-2.560
CONFIANCE SOLIDAIRE D CREDIT COOPERATIF	-7.580	-2.522
ANAXIS SHORT DURATION K (EUR)	-1.046	-2.480
GROUPAMA CR.ER.CT I ASST.MAN.	-8.274	-2.478
OCTO CREDIT COURT TERME B	-9.757	-2.461
AXA EURO CREDIT (D) AXA INVESTMENT PARIS	-3.107	-2.449
ALM CREDIT EURO ISR IC	-3.388	-2.428
DANONE COMMUNITIES D ISR PRUDENT (C/D)	-5.531	-2.418
ARC FLEXIBOND D SUSP - UNSUPPORTED	-3.730	-2.416
AMERI-GAN O SUSP - UNSUPPORTED	-2.951	-2.414
G FUND CREDIT EURO ISR I C	-2.874	-2.387
G FUND CREDIT EURO ISR M	-2.871	-2.385
CAPITOP REVENUS (D)	-3.739	-2.375
AGF ASAC ACTIONS (D) AGF ASSET MANAGEMENT	-3.126	-2.358
FONDO BNPP SEICEDOLE B	-3.165	-2.350
GROUPAMA EURO STOCK G ASST.MAN.	-2.723	-2.322
EDMOND DE ROTH.SICAV ER.SUST CRED B EUR	-2.834	-2.272
LA FRANCAISE EURO INFLATION B	-1.751	-2.174
CD ALPHA BONDS D	-2.573	-2.156
TIKEHAU CREDIT PLUS K- ACC-EUR	-3.097	-2.121
EXANE ELLIPSIS CONVS FD J CHF (EUR)	-1.267	-2.066
ALLIANZ EURO HIGH YIELD R D EUR	-1.703	-1.919
ALLIANZ EURO HIGH YIELD I C/D EUR	-2.062	-1.905
AA MMF EMERGING COVT. NEULIZE OBC INMS.	-1.108	-1.680
BSO CONVERTIBLE D	-1.935	-1.568
UBS (F) EUROPN OPPTY UNCONSTR PEA EUR I	-0.994	-1.483
REGARD CONVERTIBLES EURO H	-1.594	-1.428
ABERDEEN WACTIONS CR. SUISSE ASTMGMT.GEST.	-0.623	-1.037
TURGOT SMIDCAPS FRANCE BC TURGOT ASSET MAN.	-0.699	-0.937
AMUNDI ACTIONS EMERGENTS ESR F (C)	-0.519	-0.918
SUNNY MANAGERS F	-0.604	-0.907
PLUVALCA BIOTECH Z	-0.442	-0.904
AXA AEDIFICANDI A C EUR	-0.498	-0.809
ABEILLE VALEURS	-0.602	-0.777
EQUI CONVICTIONS B GEST.	-0.562	-0.742
BETAMAX EUROPE SMART FOR CLIMATE F	-0.547	-0.708
ECHIQUIER AGRESSOR G	-0.522	-0.693
RENAISSANCE EUROPE I COMGEST	-0.517	-0.680
ABACUS QUALITY I	-0.511	-0.672
SEEYOND ACTIONS EUROPEENNES ESG F	-0.512	-0.658
MIROVA ACTIONS EUROPE F (EUR)	-0.487	-0.644
HANSEATIQUE B	-0.447	-0.639
EDR SICAV TRICOLORE RENDEMENT B EUR	-0.485	-0.626
G FUND OPPORTUNITIES EUROPE IC	-0.473	-0.621
ALLIANZ ACN.ER.C GLOBAL INVRS.FRN.	-0.475	-0.609
ODDO BHF METROPOLE SELECTION B	-0.439	-0.590
MANDARINE VALEUR G GEST.	-0.423	-0.583
XTRACKERS CAC 40 UCITS ETF 1D	-0.440	-0.619

Table 22: Sharpe Ratio and Treynor Ratio Japan

Name	Sharpe Ratio	Treynor Ratio
SOMPO JAPAN BOND FUND	-0.607	-5710.486
NOMURA DOMESTIC BOND INDEX FUND	-0.598	-1997.550
SMDS SB JAPAN BOND FUND	-0.524	-1549.708
NIKKO INDEX FUND JAPANESE BOND DC	-0.598	-1250.786
HITACHI DOMESTIC BOND INDEX FUND	-0.587	-757.464
GS DC GALILEO	-0.389	-5.580
NOMURA HIGH YIELD BOND OPEN A COURSE	-0.243	-1.071
PICTET GLBL INC EQTY (MTHLY DIST)	-0.104	-0.945
GS VARIETY OPEN FUND	-0.273	-0.870
CLOVER KODOMO FUND	-0.067	-0.661
SHINKIN US SOVEREIGN BOND PORTFOLIO	-0.173	-0.608
MYAM FOREIGN BOND OPEN	-0.184	-0.523
AM-ONE LOOMIS US INVESTMENT GRADE BOND F	-0.168	-0.516
SMDS T ROWE PRICE US INCOME FUND	-0.155	-0.482
SMT FOREIGN BOND INDEX OPEN(SMA)	-0.171	-0.477
MYAM DC FOREIGN BOND OPEN	-0.174	-0.476
SMT GLOBAL BOND INDEX OPEN	-0.170	-0.476
NOCHU US BOND OPEN	-0.143	-0.474
SMDS DC FOREIGN BOND FUND	-0.172	-0.468
SMT DC FOREIGN BOND INDEX L	-0.168	-0.468
BRJ WORLD INCOME STRATEGY	-0.144	-0.459
DAIWA HIGH GRADE CAD BOND OPEN	-0.177	-0.450
FIDELITY US HIGH YIELD	-0.153	-0.426
INVESCO MONTHLY INCOME FUND	-0.140	-0.394
ALLIANCE HIGH YIELD OPEN	-0.137	-0.371
UBS AUSTRALIA BOND OPEN (M)	-0.139	-0.345
EAST SPRING US HIGH YIELD BOND OPEN	-0.125	-0.344
JPM GLOBAL HEALTH CARE RELATED EQ FUND	-0.058	-0.325
EAST SPRING GROWING ASIA EQUITY OPEN	-0.069	-0.292
HSBC ASIA PLUS	-0.052	-0.264
BARINGS ASIA FUTURE GROWTH EQUITY FUND	-0.049	-0.241
SMDS CHINA A & H SHARES OPEN	-0.035	-0.236
FIDELITY ASIA EQUITY FUND	-0.042	-0.181
INVESCO GT GLOBAL (INVESTMENT OPEN)	-0.068	-0.148
BRJ BLACKROCK NATURAL RESOURCES EQUITY FUND	-0.026	-0.124
UBS NEXT GENERATION TECHNOLOGY FUND	-0.040	-0.098
GS JAPAN EQUITY INDEX PLUS	-0.058	-0.078
AMUNDI TARGET JAPAN FUND	-0.052	-0.077
INVESCO MSCI KOKUSAI PORTFOLIO	-0.035	-0.076
GS NET WIN GS TECH EQTY FD B (NON HGD)	-0.031	-0.076
DWS DEUTSCHE JAPAN GROWTH OPEN	-0.047	-0.074
DAIWA ACTIVE NIPPON (MUSASHI)	-0.054	-0.073
ALLIANCE GLOBAL GROWTH OPPORTUNITIES (2Y)	-0.035	-0.073
INVESCO JAPAN GROWTH FUND	-0.048	-0.070
ABRDN ABERDEEN JAPAN OPEN	-0.051	-0.067
DAIWA JAPAN OPEN	-0.044	-0.061
JPM THE JAPAN	-0.037	-0.054
JPM JAPAN MEISTER	-0.039	-0.051
ALLIANCE US GROWTH EQUITY B	-0.022	-0.050
BNYMELLON US MNFG INDUSTRY EQUITY FUND	-0.017	-0.039
NOMURA NF NIKKEI 225 ETF	-0.044	-0.054

Appendix 4

Table 23: Jensen's Alpha United States

Types	Fund	Alpha	t-test	pvalue	Adjusted R2
Equity	AB CORE OPPORTUNITIES FUND A	-0.0846	-5.1832	0.0000	0.8295
Equity	AB DISCOVERY GROWTH FUND A	0.0568	2.2804	0.0227	0.7365
Equity	AB LARGE CAP GROWTH FUND ADVISOR	-0.0059	-0.4584	0.6467	0.8962
Equity	AB SMALL CAP VALUE PORTFOLIO C	0.0286	1.2710	0.2039	0.7606
Equity	ABRDN DYNAMIC DIVIDEND FUND INST	-0.1169	-11.9563	0.0000	0.9266
Equity	ABRDN GLOBAL INFRASTRUCTURE FUND INST	-0.1773	-11.9074	0.0000	0.8232
Equity	ABRDN US SMALL CAP EQUITY FUND R	-0.0166	-0.7353	0.4622	0.7440
Equity	ADAPTIVE GROWTH OPPORTUNITIES ETF	-0.1831	-11.0865	0.0000	0.7757
Equity	ALLSPRING DISCVRY SCG FD INST	0.0627	2.0525	0.0402	0.6566
Equity	ALLSPRING GROWTH FUND A	0.0335	1.0758	0.2822	0.6432
Equity	ALLSPRING MUNICIPAL BOND FUND ADM	-0.6279	-34.2613	0.0000	0.3814
Equity	AMERICAN FDS WASHINGTON MUTUAL INV FD 529-C	-0.0795	0.0000	-8.8372	0.9407
Equity	AMERICAN MUTUAL FD.CL.C SHS.	-0.1582	-16.7389	0.0000	0.9226
Equity	ARCHER INCOME FUND	-0.6322	-35.1855	0.0000	0.3865
Equity	BLKRK IMPACT MTGE FD INSTL	-0.6528	-33.5661	0.0000	0.3256
Equity	COLUMBIA ACORN EUROPEAN FUND I	-0.1147	-4.9646	0.0000	0.6845
Equity	DWS TOTAL RETURN BOND FUND INSTITUTIONAL	-0.6418	-33.2511	0.0000	0.3435
Equity	FIDELITY LIMITED TERM BOND FUND	-0.6394	-35.1340	0.0000	0.3679
Equity	FIDELITY LOW PRICE STK. FD.	-0.1515	-9.5163	0.0000	0.8158
Equity	FRANKLIN GOLD AND PRECIOUS METALS FUND R6	-0.3267	-6.2363	0.0000	0.1876
Equity	INVESCO CONSERVATIVE INCOME FUND R6	-0.6404	-35.6888	0.0000	0.3696
Equity	INVESCO CORPORATE BOND FD.CL.R6	-0.6185	-31.8972	0.0000	0.3722
Equity	INVESCO GOLD & SPECIAL MINERALS FUND A	-0.2841	-5.3810	0.0000	0.1997
Equity	KINETICS MUT.FUND.THE MED.FD.	-0.2105	-9.2560	0.0000	0.6478
Equity	VANGUARD LONG-TERM INV. GDE.FD.INVR.SHS.	-0.6675	-26.1658	0.0000	0.2100
Bond	AAM/INSIGHT SELECT INCOME FUND A	-0.6230	-32.0152	0.0000	0.3621
Bond	AB CALIFORNIA PORTFOLIO C	-0.6233	-34.1647	0.0000	0.3913
Bond	AB CONCENTRATED GROWTH FUND A	0.0198	1.6605	0.0970	0.9157
Bond	AB GLOBAL BOND FUND A	-0.6397	-33.6887	0.0000	0.3580
Bond	AB LARGE CAP GROWTH FUND A	-0.0089	-0.6638	0.5069	0.8903
Bond	AB VIRGINIA PORTFOLIO C	-0.6256	-34.1780	0.0000	0.3853
Bond	ALLSPRING INDEX FUND A	-0.0538	-2.2549	0.0242	0.7187
Bond	ALPHA MARK FUND	-0.1412	-7.2915	0.0000	0.7583
Bond	AMERICAN FUND.PRESERVN. PRTF.CL.A	-0.6469	-34.9234	0.0000	0.3496
Bond	AMERICAN FUNDS AMERICAN MUTUAL FUND F2	-0.1574	-16.2533	0.0000	0.9191
Bond	ARTISAN GLOBAL VALUE FUND ADV	-0.0895	-6.1499	0.0000	0.8570
Bond	BLACKROCK CORE BOND PORTFOLIO K	-0.6486	-33.1658	0.0000	0.3293
Bond	BLACKROCK INCOME FUND INST	-0.5852	-34.1237	0.0000	0.4733
Bond	BNY MELLON CORE PLUS FUND Y	-0.6323	-33.3612	0.0000	0.3620
Bond	BUFFALO HIGH YIELD FUND INVESTOR	-0.5508	-33.5874	0.0000	0.5354
Bond	CALVERT BOND FUND A	-0.6470	-33.5072	0.0000	0.3347
Bond	FID.SMCP.DISCOVERY FUND	0.5687	20.0667	0.0000	0.4490
Bond	FIDELITY TOTAL BOND FUND	-0.6373	-33.3335	0.0000	0.3523
Bond	FIDELITY US BOND INDEX FUND	-0.6571	-33.2943	0.0000	0.3125
Bond	HARTFORD MUT.FUND.MID. CAP.VAL.C	-0.0188	-0.9219	0.3567	0.7840
Bond	INVESCO MUN.INC.FD.INVR. CL.	-0.6223	-33.4136	0.0000	0.3856
Bond	JP MORGAN CORE PLUS BD.A	-0.6481	-33.5878	0.0000	0.3353
Bond	JP MORGAN CORPORATE BOND I	-0.6352	-31.4777	0.0000	0.3348
Bond	THRIVENT INCOME FUND S	-0.6299	-32.2457	0.0000	0.3540
Bond	VANGUARD BD.IDX.FD.SHT. TM.PRTF.	-0.6493	-35.1744	0.0000	0.3477

Table 24: Jensen's Alpha United Kingdom

Types	Fund	Alpha	t-test	pvalue	Adjusted R2
Equity	BAILLIE GIFFORD AMERICAN C ACC	0.064	1.660	0.097	0.108
Equity	FUNDSMITH EQUITY I ACC	0.055	2.638	0.008	0.165
Equity	BLACKROCK GOLD &.GENERAL D AC.	0.047	1.099	0.272	0.049
Equity	SCHRODER QEP GLOBAL CORE I AC.	0.040	2.237	0.025	0.377
Equity	JPM ASIA GROWTH C NET ACC	0.040	1.726	0.085	0.245
Equity	PREMIER MITON GLOBAL SUSTAINABLE GROWTH C ACC	0.040	1.903	0.057	0.228
Equity	FP RUSSELL INV INTERNATL GRO ASSTS C ACC	0.035	1.704	0.089	0.143
Equity	ORBIS OEIC GLOBAL EQUITY STANDARD SC ACC	0.034	2.039	0.042	0.530
Equity	ARTEMIS SMART GARP GLOBAL EQUITY C ACC GBP	0.032	1.807	0.071	0.416
Equity	TM STONEHG FLM OPPS ACC C	0.030	1.614	0.107	0.408
Equity	JPM EMERGING MKTS.B ACC	0.029	1.330	0.184	0.274
Equity	EDEN TREE RESP AND SUST EUROPEAN EQUITY C	0.029	1.641	0.101	0.520
Equity	JANUS HENDERSON AS-PAC CAPITAL GRO C ACC	0.027	1.300	0.194	0.251
Equity	MAN GLG INCOME PROFESSIONAL ACC C GBP	0.026	1.596	0.111	0.584
Equity	ARTEMIS GLOBAL INCOME C ACC GBP	0.026	1.397	0.163	0.394
Equity	LF CANLIFE ASIA PACIFIC C ACC	0.024	1.163	0.245	0.268
Equity	LIONTRUST CHINA GBP C ACC	0.024	0.765	0.445	0.137
Equity	ALLIANZ EMERGING MARKETS EQUITY A ACC GBP	0.022	1.056	0.291	0.257
Equity	BAILLIE GIFF UK EQUITY ALPHA B AC.	0.021	0.880	0.379	0.361
Equity	ABRDN UK ALL SHARE TRACKER FUND A ACC	0.018	1.154	0.249	0.620
Equity	AI UK INDEX TRACKING CLASS 8 ACC	0.016	2.235	0.026	0.922
Equity	ABERDEEN UK EQUITY INCOME Z AC.	0.010	0.753	0.451	0.353
Equity	SCWID.UK EQ.INC.CL.C INC.	0.004	0.148	0.882	0.117
Equity	NFU MUTUAL UK EQUITY INCOME C INCOME	-0.002	-0.202	0.840	0.886
Equity	WS SEQUEL GROWTH TARGET RETURN STRAT STAND C	-0.005	-0.536	0.592	0.269
Bond	CG UK GLOBAL HIGH INCOME OPPORTUNITIES P ACC GBP	0.025	1.856	0.064	0.192
Bond	JPM GLOBAL HIGH YIELD BD .C ACC	0.012	0.974	0.330	0.148
Bond	BLLE.GIFF HIGH YIELD BD. B AC.	0.011	0.794	0.427	0.167
Bond	HSBC CPRT.BD. INSTL.AC.	0.010	1.039	0.299	0.135
Bond	L&G ACTIVE GLOBAL HIGH YIELD BOND F ACC	0.009	0.839	0.401	0.191
Bond	BLACKROCK CORPORATE BOND D AC.	0.008	1.001	0.317	0.215
Bond	CT STRATEGIC BOND INST GROSS ACC GBP	0.008	0.976	0.329	0.319
Bond	FID LNG DATED STER CORP BD FD W ACC	0.008	0.614	0.539	0.024
Bond	LIONTRUST MONTHLY INCOME BOND B ACC	0.008	0.835	0.404	0.249
Bond	ABRDN STRATEGIC BOND FUND A ACC	0.007	0.819	0.413	0.280
Bond	INSIGHT INV.UK GVT.ALL MT BD.GR.PTRS2 AC.	0.007	0.754	0.451	0.170
Bond	LF CANLIFE CORPORATE BOND C ACC	0.007	0.778	0.436	0.156
Bond	AXA ACT CBN.TSTN.STG B&M CRDT FD Z ACC	0.007	0.761	0.447	0.122
Bond	JUPITER INVESTMENT GRADE BOND FUND I GBP ACC	0.007	0.767	0.443	0.130
Bond	ISHARES CORPORATE BOND INDEX (UK) D ACC	0.006	0.720	0.472	0.136
Bond	AVIVA INVESTORS CORP BD FD CLS 8 ACC	0.006	0.646	0.518	0.134
Bond	INVESCO CORPORATE BOND (UK) ACC	0.005	0.611	0.541	0.249
Bond	ABRDN ETHICAL CORPORATE BOND FUND INST ACC	0.005	0.471	0.638	0.158
Bond	MARKS & SPEN.HI.INC.AC.	0.004	0.281	0.778	0.121
Bond	IFSL CAF FIXED INTEREST A ACC	0.003	0.357	0.721	0.225
Bond	NATIXIS LS STGC INC I/A ACC	0.003	0.319	0.750	0.228
Bond	ABRDN AAA BOND INSTITUTIONAL ACC GBP	0.003	0.283	0.777	0.178
Bond	EDEN TREE AMITY STERLING BOND C	0.002	0.183	0.855	0.248
Bond	DIMENSIONAL GLOBAL SHORT DATED BOND ACC	0.001	0.138	0.890	0.243
Bond	M&G GILT&FIXED INTEREST INCOME STERLING A ACC	0.001	0.099	0.921	0.007

Table 25: Jensen's Alpha Canada

Types	Fund	Alpha	t-test	pvalue	Adjusted R2
Equity	BMO ASIAN GROWTH AND INCOME ADVISOR SERIES	-0.926	-29.308	0.000	0.410
Equity	CANADA LIFE EUROPEAN EQUITY FUND A	-0.829	-27.202	0.000	0.472
Equity	CI ASIAN OPPORTUNITIES FUND SERIES I	-1.145	-26.671	0.000	0.183
Equity	CI ASIAN OPPORTUNITIES CORPORATE CLASS A	-1.152	-26.394	0.000	0.182
Equity	ABRDN CANADA EAFE PLUS EQUITY	-0.823	-21.998	0.000	0.373
Equity	FIDELITY CANADIAN LARGE CAP SERIES F	-0.634	-20.448	0.000	0.538
Equity	CIBC ASIA PACIFIC INDEX CLASS A	-0.631	-19.864	0.000	0.527
Equity	NBI GLOBAL DIVERSIFIED EQUITY INVESTOR SERIES	-0.631	-19.864	0.000	0.527
Equity	BMO EQUITY GROWTH ETF PORTFOLIO ADVISOR SERIES	-0.338	-17.716	0.000	0.821
Equity	BRANDES EMERGING MARKETS VALUE FD SRS F	-0.588	-17.410	0.000	0.517
Equity	AXIOM ALL EQUITY PORTFOLIO CLASS A	-0.311	-14.442	0.000	0.786
Equity	BAROMETER EQUITY POOL CLASS A	-0.572	-14.050	0.000	0.426
Equity	CANADA LIFE CANADIAN GROWTH FUND F	-0.202	-13.574	0.000	0.899
Equity	CAPITAL GROUP US EQUITY SERIES F	-0.376	-13.474	0.000	0.668
Equity	CAPITAL GROUP GLOBAL EQUITY SERIES D	-0.371	-12.679	0.000	0.647
Equity	BGC.NORTH AMER.FOCD.EQ SRS D	-0.290	-12.627	0.000	0.769
Equity	CANADA LIFE CANADIAN EQUITY FUND A	-0.136	-9.676	0.000	0.915
Equity	CANOE CANADIAN SMALL MID CAP PORTFOLIO CLASS SR D	-0.260	-8.696	0.000	0.672
Equity	CANADA LIFE US SMALL-MID CAP GROWTH FUND N	-0.313	-8.028	0.000	0.528
Equity	RBC NORTH AMERICAN GROWTH SR F	-0.133	-7.272	0.000	0.863
Equity	AGF AMERICAN GROWTH CLASS SERIES F	-0.252	-6.595	0.000	0.547
Equity	CANADA LIFE US ALL CAP GROWTH FUND SERIES W	-0.223	-5.530	0.000	0.532
Equity	DESJARDINS AMERICAN EQUITY GROWTH I	-0.158	-3.790	0.000	0.534
Equity	RBC CANADIAN MID-CAP EQUITY FUND SR I	-0.101	-3.691	0.000	0.743
Equity	CI AMERICAN SMALL COMPANIES CORP CL IT8	-0.113	-3.059	0.002	0.619
Bond	BRANDES CORPORATE FOCUS BOND CL I HEDGED	-1.356	-57.324	0.000	0.312
Bond	MANULIFE STRATEGIC INCOME FUND SERIES FT6	-1.462	-68.370	0.000	0.280
Bond	HSBC CANADIAN BOND FUND INVESTOR SERIES	-1.487	-67.996	0.000	0.254
Bond	CANOE BOND ADVANTAGE PORTFOLIO CLASS SERIES A	-1.493	-73.147	0.000	0.266
Bond	BEUTEL GOODMAN CORE PLUS BOND SERIES B	-1.550	-61.661	0.000	0.158
Bond	LEITH WHEELER CORE BOND SERIES B	-1.568	-63.283	0.000	0.151
Bond	DYNAMIC SHORT TERM BOND SERIES I	-1.568	-68.766	0.000	0.175
Bond	FDP CANADIAN BOND PORTFOLIO SERIES A	-1.584	-80.390	0.000	0.201
Bond	EDUCATORS BOND CLASS A	-1.585	-79.576	0.000	0.200
Bond	ADDENDA ACTIVE DURATION BOND POOL CL A	-1.591	-69.326	0.000	0.155
Bond	EDUCATORS MORTGAGE & INCOME CLASS A	-1.602	-66.822	0.000	0.136
Bond	CIBC CANADIAN BOND CLASS A	-1.603	-70.282	0.000	0.149
Bond	DESJARDINS EMERGING MARKETS BOND F	-1.609	-66.758	0.000	0.131
Bond	BEUTEL GOODMAN INCOME SERIES D	-1.610	-66.442	0.000	0.130
Bond	IG MACKENZIE GLOBAL BOND SERIES C	-1.610	-67.273	0.000	0.132
Bond	FIDELITY FLOATING RATE HIGH INCOME SERIES A	-1.622	-66.832	0.000	0.121
Bond	BMO EMERGING MARKETS BOND ADVISOR SERIES	-1.623	-66.485	0.000	0.121
Bond	MACKENZIE CANADIAN BOND ADVISOR SERIES	-1.624	-66.281	0.000	0.118
Bond	DYNAMIC ADVANTAGE BOND SERIES F	-1.627	-57.704	0.000	0.096
Bond	MANULIFE CANADIAN BOND SERIES F	-1.627	-66.579	0.000	0.117
Bond	FRANKLIN BRANDYWINE GLBL SUSTNBL INC OPTM SR A	-1.636	-57.182	0.000	0.079
Bond	CANSO CANADIAN BOND FD CLASS F	-1.643	-66.438	0.000	0.106
Bond	INVESCO CANADIAN CORE PLUS BOND SERIES A	-1.702	-62.776	0.000	0.063
Bond	AGF EMERGING MARKETS BOND SERIES F	-0.369	-12.202	0.000	0.636
Bond	ABERDEEN EMERGING MARKETS DEBT	-0.158	-3.790	0.000	0.534

Table 26: Jensen's Alpha Italy

Types	Fund	Alpha	t-test	pvalue	Adjusted R2
Equity	FIDEURAM MASTER SELECTION BALANCED	-1.217	-58.458	0.000	0.454
Equity	SYMPHONIA AZIONARIO TREND GLOBALE I	-1.011	-34.960	0.000	0.415
Equity	ALLIANZ AZIONI PACIFICO	-1.162	-33.168	0.000	0.252
Equity	FIDEURAM MASTER SEL.EQ. USA	-0.903	-31.669	0.000	0.481
Equity	ZENIT PIANETA ITALIA I	-0.416	-31.189	0.000	0.908
Equity	ANIMA INIZIATIVA EUROPA A	-0.624	-29.870	0.000	0.746
Equity	ARCA AZIONI INTERNAZIONALI P	-0.821	-29.485	0.000	0.537
Equity	SYMPHONIA AZION SMCP ITALIA CL I	-0.638	-28.764	0.000	0.711
Equity	ANIMA SELEZIONE GLOBALE B	-0.806	-28.192	0.000	0.531
Equity	ANIMA VALORE GLOBALE A	-0.747	-28.179	0.000	0.596
Equity	BANCOPOSTA AZIONARIO INTERNAZIONALE	-0.800	-27.191	0.000	0.520
Equity	ARCA AZIONI PAESI EMER.	-0.927	-27.147	0.000	0.389
Equity	BNP PARIBAS JAPAN EQUITY CLASSIC H EUR CAP	-1.012	-27.135	0.000	0.305
Equity	EPSILON Q VALUE	-0.468	-25.008	0.000	0.824
Equity	EURIZON AZIONI PMI ITALIA R	-0.499	-23.946	0.000	0.779
Equity	ALLIANZ AZIONI EUROPA	-0.498	-23.484	0.000	0.777
Equity	ACOMEA EUROPA A1	-0.413	-22.188	0.000	0.836
Equity	ACOMEA AMERICA A1	-0.727	-20.896	0.000	0.471
Equity	ALLIANZ AZIONI AMERICA	-0.800	-20.747	0.000	0.383
Equity	AGORA MATERIALS R	-0.751	-19.851	0.000	0.415
Equity	BNL AZIONI AMERICA	-0.822	-19.379	0.000	0.324
Equity	INVESTIMENTI AZIONARI ITALIA A	-0.233	-18.623	0.000	0.934
Equity	EUROMOBILIARE AZIONI ITALIANE A	-0.167	-18.225	0.000	0.966
Equity	FIDEURAM ITALIA R	-0.161	-17.422	0.000	0.966
Equity	ARCA AZIONI ITALIA P	-0.147	-15.662	0.000	0.965
Bond	ACOMEA PERFORMANCE A1	-1.191	-48.276	0.000	0.398
Bond	CONSULTINVEST REDDITO C	-1.243	-58.067	0.000	0.423
Bond	BNL OBBLIGAZIONI EMERGENTI	-1.288	-48.385	0.000	0.288
Bond	ARCA BD PAESI EM VALUTA LOCALE P	-1.309	-54.986	0.000	0.322
Bond	CONSULTINVEST BREVE TERMINE C	-1.346	-66.041	0.000	0.362
Bond	BOND PAESI EMERGENTI ESG A	-1.359	-59.478	0.000	0.308
Bond	ANIMA TRICOLORE AD	-1.362	-57.362	0.000	0.290
Bond	MEDIOLANUM STRATEGIA GLOBALE MULTI BOND L	-1.388	-65.071	0.000	0.321
Bond	ARCA RR DIVERSIFIED BOND	-1.401	-68.019	0.000	0.313
Bond	INVESTIPER OBBLIG PAESI EMERGENTI	-1.409	-66.129	0.000	0.298
Bond	AZIMUT TREND TASSI	-1.432	-67.579	0.000	0.274
Bond	INVESTIPER OBBLIGAZIONARIO GLOBALE	-1.444	-70.153	0.000	0.273
Bond	AMUNDI OBBLIGAZIONARIO BREVE TERMINE - C	-1.447	-68.757	0.000	0.263
Bond	EURIZON OBBLIGAZIONI CEDOLA D	-1.464	-70.097	0.000	0.253
Bond	EURIZON OBBLIGAZIONI EURO BREVE TERMINE D	-1.478	-71.224	0.000	0.241
Bond	BOND STRATEGIA ATTIVA A	-1.480	-67.328	0.000	0.221
Bond	EUROMOBILIARE EURO AGGREGATE A	-1.484	-71.311	0.000	0.234
Bond	FONDERSEL EURO	-1.488	-63.939	0.000	0.195
Bond	ALLIANZ GLOBAL MULTI- ASSET CREDIT FUND	-1.494	-69.612	0.000	0.216
Bond	BOND STRATEGIA PRUDENTE A	-1.498	-71.627	0.000	0.219
Bond	ANIMA OBBLIGAZIONARIO EURO BT A	-1.501	-71.741	0.000	0.218
Bond	ALLIANZ REDDITO EURO	-1.505	-66.526	0.000	0.191
Bond	FIDEURAM RISPARMIO ATTIVO	-1.506	-71.472	0.000	0.213
Bond	FONDERSEL INTERNAZIONALE ESG	-1.534	-60.210	0.000	0.133
Bond	ALLIANZ REDDITO GLOBALE	-1.569	-60.954	0.000	0.108

Table 27: Jensen's Alpha Germany

Types	Fund	Alpha	t-test	pvalue	Adjusted R2
Equity	HP&P EURO SELECT UI FONDS A	-0.091	-8.128	0.000	0.748
Equity	BREMEN KAPITAL AKTIEN	-0.163	-7.884	0.000	0.095
Equity	FONDSPICKER GLOBAL UI	-0.121	-7.851	0.000	0.410
Equity	ACATIS ASIA PACIFIC PLUS FONDS	-0.119	-6.691	0.000	0.347
Equity	GAMAX FUNDS ASIA PACIFIC A	-0.155	-6.192	0.000	0.055
Equity	HAL SYSTEMATIC MULTI ASSET DYNAMIC RT	-0.079	-6.150	0.000	0.688
Equity	INVESCO KPL.EUROPA CORE AKTIENFDS	-0.101	-5.800	0.000	0.465
Equity	BERENBERG AKTIEN GLOBAL PLUS R D	-0.095	-5.669	0.000	0.498
Equity	CH GLOBAL	-0.151	-5.485	0.000	0.085
Equity	GLS BANK AKTIENFONDS AK A	-0.070	-5.453	0.000	0.719
Equity	DIT ALLIANZ VALUE GLOBAL	-0.115	-5.403	0.000	0.290
Equity	DEKA INV.GLOBALCHAMPIONS TF	-0.109	-4.613	0.000	0.193
Equity	DEKA INV.GLOBALCHAMPIONS CF	-0.107	-4.522	0.000	0.193
Equity	CHOM CAPITAL ACTIVE RETURN EUROPE UI - AK I	-0.052	-4.261	0.000	0.784
Equity	FIRST PRIV.INV.MAN.KAG EUROPA AKTIEN ULM B	-0.045	-4.031	0.000	0.842
Equity	DEGUSSA AKTIEN UNIVERSAL-FONDS	-0.035	-3.389	0.001	0.862
Equity	ALLIANZ ADIFONDS - A - EUR	-0.074	-3.370	0.001	0.450
Equity	AKTIV CHANCE	-0.040	-3.156	0.002	0.782
Equity	AMUNDI GERMAN EQUITY A ND	-0.060	-3.089	0.002	0.579
Equity	ACATIS AKTIEN GLOBAL FONDS B	-0.054	-2.957	0.003	0.552
Equity	BALOISE-AKTIENFONDS DWS	-0.056	-2.869	0.004	0.586
Equity	HELABA INVEST KPL. DIVIDENDENPLUS FONDS	-0.032	-2.346	0.019	0.799
Equity	LBBW GLOBAL WARMING R	-0.031	-1.574	0.116	0.572
Equity	EARTH GOLD FUND UI (EUR R)	-0.060	-1.197	0.232	0.065
Equity	HSBC GERMAN EQUITY AC	0.000	0.056	0.955	0.960
Bond	HSBC STRATEGIE SUBSTANZ AD	-0.181	-14.753	0.000	0.207
Bond	AMUNDI BKK RENT	-0.184	-14.684	0.000	0.191
Bond	BFS NACHHALTIGKEITSFONDS GREEN BONDS	-0.184	-14.592	0.000	0.182
Bond	FBG INDIVIDUAL R-PA	-0.180	-14.552	0.000	0.230
Bond	WI GLOBAL CHALLENGES CORPORATE BONDS	-0.182	-14.462	0.000	0.177
Bond	FRANKFURT TRUST INV. FT INTERZINS	-0.179	-14.437	0.000	0.176
Bond	AVANA INV.AKTGSF.MIT TGHF.GEN KAG EU.CNTL	-0.176	-14.433	0.000	0.217
Bond	UNI INSTL EUR COVERED BONDS 4-6 YEARS SUST	-0.185	-14.430	0.000	0.170
Bond	LBBW RENTEN EURO FLEX NACHHALTIGKEIT	-0.182	-14.391	0.000	0.196
Bond	CORPORATE M SUSTAINABLE (I)	-0.181	-14.322	0.000	0.206
Bond	AMPEGA RENDITE RENTENFONDS	-0.183	-14.261	0.000	0.175
Bond	MEAG MUNICH ERGO KPL. EURORENT	-0.184	-14.183	0.000	0.184
Bond	MONEGA KPL.EURO BOND	-0.186	-14.116	0.000	0.167
Bond	LBBW ASTMGMT.INV.GESELL. MBH RENTAMAX R	-0.178	-14.056	0.000	0.218
Bond	METZLER EURO CORPORATES SUSTAINABILITY AI	-0.181	-13.846	0.000	0.207
Bond	DWS EURO BOND FUND LD	-0.188	-13.628	0.000	0.158
Bond	BALOISE-RENTENFONDS DWS	-0.187	-13.618	0.000	0.162
Bond	ALLIANZ EURO RENTENFONDS - A - EUR	-0.188	-13.142	0.000	0.148
Bond	LAZARD ASST.MAN.DTL.EUR. HIGHYIELD	-0.167	-13.027	0.000	0.308
Bond	HELABA INVEST KPL.HIY. FONDS	-0.168	-13.005	0.000	0.300
Bond	AMPEGA GLOBAL RENTENFONDS	-0.183	-12.759	0.000	0.138
Bond	HANSAINVEST HANSEATISCHE INV.GESELL.HANSA INTL.	-0.182	-12.734	0.000	0.150
Bond	DEKARENT INTERNATIONAL	-0.182	-12.576	0.000	0.148
Bond	UNION INV.PRIVATFONDS UNIRENTA	-0.189	-12.186	0.000	0.093
Bond	DWS INVESTMENT INTL. RENTEN TYP O	-0.179	-11.772	0.000	0.110

Table 28: Jensen's Alpha France

Types	Fund	Alpha	t-test	pvalue	Adjusted R2
Equity	AGF ASAC ACTIONS (D) AGF ASSET MANAGEMENT	-0.440	-31.648	0.000	0.242
Equity	AMERI-GAN O SUSP - UNSUPPORTED	-0.441	-31.319	0.000	0.228
Equity	GROUPAMA EURO STOCK G ASST.MAN.	-0.436	-31.017	0.000	0.240
Equity	AA MMF EMERGING COVT. NEULIZE OBC INMS.	-0.384	-23.612	0.000	0.320
Equity	UBS (F) EUROPN OPPTY UNCONSTR PEA EUR I	-0.358	-22.518	0.000	0.389
Equity	TURGOT SMIDCAPS FRANCE BC TURGOT ASSET MAN.	-0.220	-16.181	0.000	0.688
Equity	ABERDEEN WACTIONS CR. SUISSE ASTMGMT.GEST.	-0.254	-13.268	0.000	0.474
Equity	ABEILLE VALEURS	-0.155	-12.789	0.000	0.794
Equity	SUNNY MANAGERS F	-0.196	-11.940	0.000	0.613
Equity	EQUI CONVICTIONS B GEST.	-0.143	-11.603	0.000	0.807
Equity	BETAMAX EUROPE SMART FOR CLIMATE F	-0.117	-10.751	0.000	0.854
Equity	AMUNDI ACTIONS EMERGENTS ESR F (C)	-0.219	-10.021	0.000	0.467
Equity	ECHIQUIER AGRESSOR G	-0.113	-9.707	0.000	0.850
Equity	SEEYOND ACTIONS EUROPEENNES ESG F	-0.085	-9.032	0.000	0.900
Equity	ABACUS QUALITY I	-0.101	-8.874	0.000	0.860
Equity	AXA AEDIFICANDI A C EUR	-0.171	-8.501	0.000	0.581
Equity	RENAISSANCE EUROPE I COMGEST	-0.106	-8.232	0.000	0.804
Equity	PLUVALCA BIOTECH Z	-0.201	-7.763	0.000	0.401
Equity	EDR SICAV TRICOLORE RENDEMENT B EUR	-0.068	-7.434	0.000	0.916
Equity	MIROVA ACTIONS EUROPE F (EUR)	-0.075	-6.556	0.000	0.863
Equity	ALLIANZ ACN.ER.C GLOBAL INVRS.FRN.	-0.052	-5.755	0.000	0.918
Equity	G FUND OPPORTUNITIES EUROPE IC	-0.060	-5.613	0.000	0.885
Equity	HANSEATIQUE B	-0.071	-4.411	0.000	0.755
Equity	ODDO BHF METROPOLE SELECTION B	-0.041	-3.396	0.001	0.869
Equity	MANDARINE VALEUR G GEST.	-0.034	-2.413	0.016	0.836
Bond	OCTO CREDIT COURT TERME B	-0.447	-33.251	0.000	0.252
Bond	CONFIANCE SOLIDAIRE D CREDIT COOPERATIF	-0.452	-33.161	0.000	0.241
Bond	ARC FLEXIBOND D SUSP - UNSUPPORTED	-0.449	-33.124	0.000	0.265
Bond	GROUPAMA CR.ER.CT I ASST.MAN.	-0.448	-33.114	0.000	0.247
Bond	DANONE COMMUNITIES D ISR PRUDENT (C/D)	-0.447	-32.784	0.000	0.254
Bond	CAPITOP REVENUS (D)	-0.447	-32.635	0.000	0.274
Bond	FONDO BNPP SEICEDOLE B	-0.443	-32.221	0.000	0.267
Bond	BRONGNIART VARIFONDS D	-0.462	-31.960	0.000	0.216
Bond	CD ALPHA BONDS D	-0.427	-31.583	0.000	0.305
Bond	AXA EURO CREDIT (D) AXA INVESTMENT PARIS	-0.445	-31.372	0.000	0.247
Bond	ALM CREDIT EURO ISR IC	-0.442	-31.365	0.000	0.248
Bond	TIKEHAU CREDIT PLUS K- ACC-EUR	-0.419	-31.360	0.000	0.322
Bond	BSO CONVERTIBLE D	-0.372	-31.336	0.000	0.522
Bond	EDMOND DE ROTH.SICAV ER.SUST CRED B EUR	-0.435	-31.238	0.000	0.285
Bond	ALLIANZ OBLIGATIONS INTERNATIONALES D EUR	-0.469	-30.946	0.000	0.170
Bond	G FUND CREDIT EURO ISR I C	-0.439	-30.858	0.000	0.254
Bond	G FUND CREDIT EURO ISR M	-0.439	-30.825	0.000	0.254
Bond	G FUND GLOBAL GREEN BONDS I	-0.453	-29.826	0.000	0.202
Bond	COVEA EURO SOUVERAIN (D) FINANCE	-0.455	-29.692	0.000	0.212
Bond	REGARD CONVERTIBLES EURO H	-0.349	-29.601	0.000	0.562
Bond	ALLIANZ EURO HIGH YIELD I C/D EUR	-0.396	-29.464	0.000	0.373
Bond	ALLIANZ EURO HIGH YIELD R D EUR	-0.407	-28.817	0.000	0.356
Bond	LA FRANCAISE EURO INFLATION B	-0.417	-28.224	0.000	0.270
Bond	EXANE ELLIPSIS CONVS FD J CHF (EUR)	-0.419	-25.633	0.000	0.229
Bond	ANAXIS SHORT DURATION K (EUR)	-0.446	-23.979	0.000	0.140

Table 29: Jensen's Alpha Japan

Types	Fund	Alpha	t-test	pvalue	Adjusted R2
Equity	PICTET GLBL INC EQTY (MTHLY DIST)	-0.105	-4.447	0.000	0.020
Equity	CLOVER KODOMO FUND	-0.051	-2.772	0.006	0.017
Equity	EAST SPRING GROWING ASIA EQUITY OPEN	-0.059	-2.641	0.008	0.087
Equity	INVESCO GT GLOBAL (INVESTMENT OPEN)	-0.040	-2.359	0.018	0.317
Equity	JPM GLOBAL HEALTH CARE RELATED EQ FUND	-0.067	-2.243	0.025	0.049
Equity	GS JAPAN EQUITY INDEX PLUS	-0.021	-2.135	0.033	0.850
Equity	HSBC ASIA PLUS	-0.052	-1.929	0.054	0.061
Equity	BARINGS ASIA FUTURE GROWTH EQUITY FUND	-0.046	-1.770	0.077	0.065
Equity	DAIWA ACTIVE NIPPON (MUSASHI)	-0.017	-1.511	0.131	0.817
Equity	FIDELITY ASIA EQUITY FUND	0.285	-1.390	0.165	0.084
Equity	AMUNDI TARGET JAPAN FUND	-0.018	-1.312	0.190	0.696
Equity	ABRDN ABERDEEN JAPAN OPEN	-0.013	-1.296	0.195	0.862
Equity	SMDS CHINA A & H SHARES OPEN	-0.039	-1.242	0.214	0.034
Equity	UBS NEXT GENERATION TECHNOLOGY FUND	-0.033	-0.970	0.332	0.259
Equity	INVESCO JAPAN GROWTH FUND	-0.014	-0.961	0.337	0.705
Equity	DWS DEUTSCHE JAPAN GROWTH OPEN	-0.017	-0.957	0.339	0.621
Equity	BRJ BLACKROCK NATURAL RESOURCES EQUITY FUND	-0.024	-0.698	0.485	0.068
Equity	INVESCO MSCI KOKUSAI PORTFOLIO	-0.013	-0.576	0.565	0.324
Equity	ALLIANCE GLOBAL GROWTH OPPORTUNITIES (2Y)	-0.011	-0.526	0.599	0.348
Equity	DAIWA JAPAN OPEN	-0.007	-0.517	0.605	0.787
Equity	GS NET WIN GS TECH EQTY FD B (NON HGD)	-0.015	-0.477	0.633	0.255
Equity	BNYMELLON US MNFG INDUSTRY EQUITY FUND	0.009	0.340	0.734	0.292
Equity	JPM JAPAN MEISTER	0.002	0.202	0.840	0.864
Equity	ALLIANCE US GROWTH EQUITY B	0.002	0.075	0.940	0.290
Equity	JPM THE JAPAN	-0.001	-0.033	0.974	0.694
Bond	NOMURA DOMESTIC BOND INDEX FUND	-0.082	-17.750	0.000	0.000
Bond	SOMPO JAPAN BOND FUND	-0.081	-17.744	0.000	0.000
Bond	NIKKO INDEX FUND JAPANESE BOND DC	-0.081	-17.679	0.000	0.000
Bond	HITACHI DOMESTIC BOND INDEX FUND	-0.081	-17.455	0.000	0.000
Bond	SMDS SB JAPAN BOND FUND	-0.082	-16.646	0.000	0.000
Bond	GS DC GALILEO	-0.088	-14.274	0.000	0.005
Bond	GS VARIETY OPEN FUND	-0.086	-11.264	0.000	0.126
Bond	NOMURA HIGH YIELD BOND OPEN A COURSE	-0.084	-9.820	0.000	0.066
Bond	MYAM FOREIGN BOND OPEN	-0.080	-7.869	0.000	0.175
Bond	DAIWA HIGH GRADE CAD BOND OPEN	-0.098	-7.806	0.000	0.226
Bond	MYAM DC FOREIGN BOND OPEN	-0.072	-7.391	0.000	0.188
Bond	SHINKIN US SOVEREIGN BOND PORTFOLIO	-0.076	-7.280	0.000	0.115
Bond	SMDS DC FOREIGN BOND FUND	-0.072	-7.275	0.000	0.188
Bond	SMT FOREIGN BOND INDEX OPEN(SMA)	-0.072	-7.214	0.000	0.180
Bond	SMT GLOBAL BOND INDEX OPEN	-0.071	-7.203	0.000	0.180
Bond	SMT DC FOREIGN BOND INDEX L	-0.070	-7.074	0.000	0.180
Bond	AM-ONE LOOMIS US INVESTMENT GRADE BOND F	-0.074	-7.060	0.000	0.149
Bond	FIDELITY US HIGH YIELD	-0.094	-6.630	0.000	0.193
Bond	SMDS T ROWE PRICE US INCOME FUND	-0.076	-6.544	0.000	0.150
Bond	BRJ WORLD INCOME STRATEGY	-0.072	-6.053	0.000	0.144
Bond	UBS AUSTRALIA BOND OPEN (M)	-0.092	-6.036	0.000	0.242
Bond	NOCHU US BOND OPEN	-0.068	-6.034	0.000	0.133
Bond	INVESCO MONTHLY INCOME FUND	-0.076	-5.926	0.000	0.186
Bond	ALLIANCE HIGH YIELD OPEN	-0.073	-5.797	0.000	0.202
Bond	EAST SPRING US HIGH YIELD BOND OPEN	-0.068	-5.209	0.000	0.196

Appendix 5

Table 30: Fama-French Three Factor Model United States

Fund	α	p-value	t-test	Rm-Rf	p-value	t-test	SMB	p-value	t-test	HML	p-value	t-stat	Adjusted R2
FID.SMCP.DISCOVERY FUND	0.592	0.000	20.814	0.691	0.000	39.503	-0.003	0.959	-0.052	0.490	0.000	12.556	0.487
AB SMALL CAP VALUE PORTFOLIO C	0.172	0.000	10.223	1.189	0.000	115.250	0.788	0.000	21.868	0.919	0.000	39.904	0.877
ALLSPRING DISCVRY SCG FD INST	0.150	0.000	5.168	1.192	0.000	66.908	0.919	0.000	14.760	-0.551	0.000	-13.848	0.715
AB DISCOVERY GROWTH FUND A	0.116	0.000	4.868	1.147	0.000	78.308	0.659	0.000	12.882	-0.461	0.000	-14.096	0.777
HARTFORD MUT.FUND.MID. CAP.VAL.C	0.084	0.000	4.718	1.118	0.000	101.576	0.581	0.000	15.110	0.635	0.000	25.850	0.847
ABRDN US SMALL CAP EQUITY FUND R	0.083	0.000	3.742	1.107	0.000	81.188	0.706	0.000	14.832	0.243	0.000	7.994	0.773
ALLSPRING GROWTH FUND A	0.026	0.393	0.855	1.088	0.000	57.909	0.205	0.002	3.127	-0.670	0.000	-15.986	0.684
AB CONCENTRATED GROWTH FUND A	0.015	0.216	1.237	1.023	0.000	134.644	-0.004	0.880	-0.151	-0.082	0.000	-4.844	0.917
COLUMBIA ACORN EUROPEAN FUND I	-0.008	0.730	-0.346	0.996	0.000	74.564	0.944	0.000	20.238	-0.205	0.000	-6.866	0.743
AB LARGE CAP GROWTH FUND ADVISOR	-0.026	0.018	-2.358	0.976	0.000	142.537	0.025	0.303	1.031	-0.476	0.000	-31.170	0.929
ARTISAN GLOBAL VALUE FUND ADV	-0.027	0.043	-2.024	0.992	0.000	122.026	0.341	0.000	12.021	0.429	0.000	23.681	0.891
AB LARGE CAP GROWTH FUND A	-0.029	0.012	-2.504	0.976	0.000	136.186	0.025	0.327	0.981	-0.476	0.000	-29.764	0.923
ALLSPRING INDEX FUND A	-0.054	0.031	-2.163	0.996	0.000	65.233	0.011	0.836	0.207	-0.027	0.427	-0.795	0.719
INVESCO GOLD & SPECIAL MINERALS FUND A	-0.054	0.301	-1.035	0.919	0.000	28.828	1.800	0.000	16.166	0.145	0.042	2.032	0.289
FIDELITY LOW PRICE STK. FD.	-0.061	0.000	-4.385	0.964	0.000	112.220	0.547	0.000	18.233	0.453	0.000	23.646	0.869
AB CORE OPPORTUNITIES FUND A	-0.063	0.000	-3.729	0.963	0.000	92.596	0.179	0.000	4.937	-0.014	0.558	-0.586	0.831
AMERICAN FDS WASHINGTON MUTUAL INV FD 529-C	-0.063	0.000	-7.506	0.951	0.000	183.579	0.029	0.105	1.622	0.256	0.000	22.131	0.952
ABRDN DYNAMIC DIVIDEND FUND INST	-0.068	0.000	-7.586	0.955	0.000	172.448	0.297	0.000	15.332	0.238	0.000	19.257	0.942
FRANKLIN GOLD AND PRECIOUS METALS FUND R6	-0.086	0.093	-1.681	0.898	0.000	28.615	1.895	0.000	17.288	0.117	0.094	1.674	0.289
ABRDN GLOBAL INFRASTRUCTURE FUND INST	-0.099	0.000	-7.380	0.917	0.000	110.785	0.474	0.000	16.383	0.392	0.000	21.235	0.867
ALPHA MARK FUND	-0.114	0.000	-5.700	0.923	0.000	75.255	0.158	0.000	3.675	0.161	0.000	5.893	0.763
AMERICAN FUNDS AMERICAN MUTUAL FUND F2	-0.134	0.000	-14.589	0.876	0.000	155.337	0.088	0.000	4.443	0.260	0.000	20.642	0.933
AMERICAN MUTUAL FD.CL.C SHS.	-0.135	0.000	-15.073	0.876	0.000	159.555	0.089	0.000	4.666	0.257	0.000	20.965	0.936
ADAPTIVE GROWTH OPPORTUNITIES ETF	-0.145	0.000	-8.581	0.840	0.000	80.610	0.287	0.000	7.884	0.042	0.068	1.825	0.782
KINETICS MUT.FUND.THE MED.FD.	-0.193	0.000	-8.298	0.824	0.000	57.532	0.228	0.000	4.558	-0.224	0.000	-7.006	0.659
BUFFALO HIGH YIELD FUND INVESTOR	-0.442	0.000	-29.926	0.569	0.000	62.656	0.827	0.000	26.104	0.134	0.000	6.624	0.653
BLACKROCK INCOME FUND INST	-0.476	0.000	-30.421	0.534	0.000	55.499	0.833	0.000	24.799	0.126	0.000	5.854	0.596
INVESCO CORPORATE BOND FD.CL.R6	-0.500	0.000	-28.131	0.508	0.000	46.390	0.938	0.000	24.528	0.034	0.166	1.386	0.512
AAM/INSIGHT SELECT INCOME FUND A	-0.508	0.000	-28.265	0.497	0.000	44.963	0.917	0.000	23.732	0.019	0.449	0.757	0.497
THRIVENT INCOME FUND S	-0.513	0.000	-28.533	0.494	0.000	44.614	0.931	0.000	24.077	0.018	0.468	0.726	0.494
JP MORGAN CORPORATE BOND I	-0.519	0.000	-27.688	0.490	0.000	42.522	0.934	0.000	23.191	0.011	0.667	0.431	0.471
BNY MELLON CORE PLUS FUND Y	-0.521	0.000	-29.687	0.483	0.000	44.768	0.885	0.000	23.445	0.024	0.314	1.008	0.495
INVESCO MUN.INC.FD.INVR. CL.	-0.522	0.000	-29.545	0.486	0.000	44.738	0.787	0.000	20.739	0.063	0.009	2.612	0.491
AB CALIFORNIA PORTFOLIO C	-0.523	0.000	-30.321	0.482	0.000	45.513	0.781	0.000	21.092	0.078	0.001	3.292	0.499
AB VIRGINIA PORTFOLIO C	-0.525	0.000	-30.346	0.479	0.000	45.025	0.784	0.000	21.092	0.071	0.003	2.993	0.494
FIDELITY TOTAL BOND FUND	-0.527	0.000	-29.603	0.479	0.000	43.762	0.878	0.000	22.988	0.036	0.142	1.468	0.483
ALLSPRING MUNICIPAL BOND FUND ADM	-0.528	0.000	-30.440	0.475	0.000	44.545	0.779	0.000	20.889	0.064	0.007	2.697	0.489
ARCHER INCOME FUND	-0.529	0.000	-31.430	0.476	0.000	45.963	0.798	0.000	22.083	0.090	0.000	3.908	0.504
DWS TOTAL RETURN BOND FUND INSTITUTIONAL	-0.532	0.000	-29.580	0.474	0.000	42.886	0.881	0.000	22.804	0.012	0.633	0.478	0.474
AB GLOBAL BOND FUND A	-0.534	0.000	-29.942	0.475	0.000	43.298	0.836	0.000	21.794	0.032	0.195	1.297	0.477
FIDELITY LIMITED TERM BOND FUND	-0.535	0.000	-31.404	0.467	0.000	44.522	0.811	0.000	22.162	0.073	0.002	3.133	0.489
CALVERT BOND FUND A	-0.537	0.000	-29.835	0.468	0.000	42.295	0.883	0.000	22.846	0.018	0.474	0.716	0.468
JP MORGAN CORE PLUS BD.A	-0.539	0.000	-29.927	0.467	0.000	42.175	0.876	0.000	22.649	0.013	0.610	0.510	0.466
BLACKROCK CORE BOND PORTFOLIO K	-0.540	0.000	-29.493	0.466	0.000	41.362	0.873	0.000	22.175	0.001	0.973	0.033	0.457
INVESCO CONSERVATIVE INCOME FUND R6	-0.542	0.000	-31.899	0.457	0.000	43.736	0.757	0.000	20.738	0.093	0.000	3.988	0.479
AMERICAN FUND.PRESERVN. PRTF.CL.A	-0.543	0.000	-31.171	0.458	0.000	42.686	0.808	0.000	21.576	0.063	0.008	2.642	0.468
VANGUARD LONG-TERM INV. GDE.FD.INVR.SHS.	-0.543	0.000	-22.460	0.468	0.000	31.516	1.055	0.000	20.328	-0.125	0.000	-3.764	0.346
VANGUARD BD.IDX.FD.SHT. TM.PRTF.	-0.546	0.000	-31.436	0.455	0.000	42.572	0.806	0.000	21.598	0.065	0.007	2.710	0.467
BLKRK IMPACT MTGE FD INSTL	-0.547	0.000	-29.885	0.458	0.000	40.709	0.850	0.000	21.596	0.005	0.854	0.184	0.449
FIDELITY US BOND INDEX FUND	-0.548	0.000	-29.636	0.457	0.000	40.159	0.881	0.000	22.179	-0.001	0.972	-0.035	0.444

Table 31: Fama-French Three Factor Model United Kingdom

Fund	α	p-value	t-test	Rm-Rf	p-value	t-test	SMB	p-value	t-test	HML	p-value	t-stat	Adjusted R2
FUNDSMITH EQUITY I ACC	0.057	0.005	2.840	0.413	0.000	24.952	0.592	0.000	11.940	-0.313	0.000	-8.692	0.237
SCHRODER QEP GLOBAL CORE I AC.	0.042	0.016	2.409	0.557	0.000	38.558	0.486	0.000	11.248	-0.236	0.000	-7.529	0.423
FP RUSSELL INV INTERNATL GRO ASSTS C ACC	0.040	0.030	2.169	0.372	0.000	24.193	0.942	0.000	20.493	-0.084	0.012	-2.509	0.286
AI UK INDEX TRACKING CLASS 8 ACC	0.014	0.032	2.149	0.856	0.000	157.750	-0.015	0.363	-0.909	-0.206	0.000	-17.525	0.932
PREMIER MITON GLOBAL SUSTAINABLE GROWTH C	0.042	0.036	2.095	0.474	0.000	28.624	0.612	0.000	12.343	-0.247	0.000	-6.860	0.290
ARTEMIS SMART GARP GLOBAL EQUITY C ACC GBP	0.034	0.051	1.954	0.564	0.000	39.185	0.410	0.000	9.515	-0.118	0.000	-3.763	0.442
JPM ASIA GROWTH C NET ACC	0.041	0.065	1.846	0.556	0.000	29.908	0.579	0.000	10.399	-0.360	0.000	-8.905	0.302
ORBIS OEIC GLOBAL EQUITY STANDARD SC ACC	0.029	0.067	1.831	0.617	0.000	47.432	-0.513	0.000	-13.177	-0.299	0.000	-10.581	0.591
TM STONEHG FLM OPPS ACC C	0.033	0.069	1.816	0.567	0.000	37.874	0.468	0.000	10.426	-0.023	0.487	-0.695	0.437
MAN GLG INCOME PROFESSIONAL ACC C GBP	0.028	0.077	1.766	0.706	0.000	52.947	0.390	0.000	9.774	-0.055	0.058	-1.900	0.602
BAILLIE GIFFORD AMERICAN C ACC	0.064	0.079	1.760	0.641	0.000	21.197	0.929	0.000	10.251	-0.733	0.000	-11.151	0.188
EDEN TREE RESP AND SUST EUROPEAN EQUITY C	0.029	0.091	1.689	0.676	0.000	46.952	0.261	0.000	6.061	-0.177	0.000	-5.643	0.534
ARTEMIS GLOBAL INCOME C ACC GBP	0.028	0.128	1.524	0.565	0.000	37.503	0.411	0.000	9.114	-0.128	0.000	-3.912	0.419
JPM EMERGING MKTS.B ACC	0.031	0.149	1.444	0.561	0.000	31.808	0.564	0.000	10.678	-0.331	0.000	-8.634	0.329
JANUS HENDERSON AS-PAC CAPITAL GRO C ACC	0.028	0.160	1.406	0.499	0.000	29.786	0.507	0.000	10.107	-0.289	0.000	-7.946	0.301
LF CANLIFE ASIA PACIFIC C ACC	0.026	0.198	1.286	0.522	0.000	31.316	0.556	0.000	11.146	-0.288	0.000	-7.971	0.323
ABRDN UK ALL SHARE TRACKER FUND A ACC	0.019	0.213	1.246	0.725	0.000	58.103	0.327	0.000	8.750	-0.161	0.000	-5.948	0.638
ALLIANZ EMERGING MARKETS EQUITY A ACC GBP	0.024	0.227	1.209	0.496	0.000	30.062	0.585	0.000	11.835	-0.221	0.000	-6.163	0.311
BLACKROCK GOLD &.GENERAL D AC.	0.046	0.275	1.091	0.403	0.000	11.426	0.269	0.011	2.548	-0.319	0.000	-4.158	0.058
BAILLIE GIFF UK EQUITY ALPHA B AC.	0.023	0.321	0.993	0.742	0.000	39.481	0.708	0.000	12.565	-0.447	0.000	-10.932	0.430
LIONTRUST CHINA GBP C ACC	0.026	0.379	0.880	0.578	0.000	23.259	0.910	0.000	12.227	-0.502	0.000	-9.298	0.217
ABERDEEN UK EQUITY INCOME Z AC.	0.010	0.457	0.743	0.354	0.000	32.162	0.063	0.057	1.902	-0.078	0.001	-3.248	0.357
WS SEQUEL GROWTH TARGET RETURN STRAT STAND C	-0.005	0.630	-0.482	0.214	0.000	26.124	0.091	0.000	3.711	-0.007	0.697	-0.390	0.273
SCWID.UK EQ.INC.CL.C INC.	0.007	0.749	0.321	0.332	0.000	17.134	0.539	0.000	9.301	0.053	0.211	1.252	0.153
NFU MUTUAL UK EQUITY INCOME C INCOME	-0.003	0.757	-0.310	0.823	0.000	121.909	0.042	0.038	2.078	-0.151	0.000	-10.327	0.891
CGUK GLOBAL HIGH INCOME OPPORTUNITIES PAC GBP	0.025	0.072	1.802	0.231	0.000	20.366	-0.064	0.059	-1.887	-0.046	0.062	-1.869	0.194
JPM GLOBAL HIGH YIELD BD .C ACC	0.014	0.259	1.129	0.199	0.000	19.526	0.257	0.000	8.432	0.001	0.975	0.031	0.176
HSBC CPRT.BD. INSTL.AC.	0.010	0.265	1.115	0.133	0.000	17.463	0.099	0.000	4.357	0.000	0.994	-0.007	0.142
CT STRATEGIC BOND INST GROSS ACC GBP	0.009	0.287	1.066	0.203	0.000	29.402	0.099	0.000	4.777	0.007	0.635	0.475	0.326
BLACKROCK CORPORATE BOND D AC.	0.009	0.293	1.053	0.156	0.000	22.715	0.071	0.001	3.453	-0.008	0.580	-0.554	0.219
L&G ACTIVE GLOBAL HIGH YIELD BOND F ACC	0.011	0.316	1.002	0.209	0.000	22.720	0.252	0.000	9.142	-0.005	0.810	-0.240	0.222
ABRDN STRATEGIC BOND FUND A ACC	0.008	0.347	0.940	0.194	0.000	27.242	0.133	0.000	6.238	0.013	0.414	0.818	0.294
BLLE.GIFF HIGH YIELD BD. B AC.	0.012	0.381	0.876	0.214	0.000	18.959	0.123	0.000	3.647	0.036	0.147	1.451	0.173
LIONTRUST MONTHLY INCOME BOND B ACC	0.008	0.384	0.871	0.177	0.000	23.681	0.026	0.253	1.144	0.021	0.195	1.297	0.250
LF CANLIFE CORPORATE BOND C ACC	0.007	0.400	0.842	0.135	0.000	18.942	0.087	0.000	4.047	-0.006	0.692	-0.397	0.162
JUPITER INVESTMENT GRADE BOND FUND I GBP ACC	0.007	0.402	0.838	0.124	0.000	17.234	0.095	0.000	4.428	-0.006	0.716	-0.363	0.137
AXA ACT CBN.TSTN.STG B&M CRDT FD Z ACC	0.007	0.418	0.811	0.120	0.000	16.387	0.071	0.001	3.274	-0.007	0.679	-0.414	0.126
INSIGHT INV.UK GVT.ALL MT BD.GR.PTRS2 AC.	0.007	0.427	0.795	0.139	0.000	18.550	0.029	0.190	1.310	0.024	0.134	1.498	0.171
ISHARES CORPORATE BOND INDEX (UK) D ACC	0.007	0.456	0.745	0.125	0.000	17.206	0.048	0.026	2.225	-0.013	0.401	-0.841	0.137
AVIVA INVESTORS CORP BD FD CLS 8 ACC	0.006	0.484	0.700	0.123	0.000	17.329	0.076	0.000	3.569	-0.008	0.620	-0.496	0.139
INVESCO CORPORATE BOND (UK) ACC	0.005	0.506	0.665	0.165	0.000	24.613	0.064	0.001	3.213	0.000	0.998	0.003	0.252
FID LNG DATED STER CORP BD FD W ACC	0.008	0.509	0.661	0.083	0.000	7.952	0.119	0.000	3.804	-0.029	0.200	-1.281	0.031
ABRDN ETHICAL CORPORATE BOND FUND INST ACC	0.005	0.609	0.512	0.160	0.000	19.160	0.085	0.001	3.398	-0.021	0.240	-1.176	0.162
IFSL CAF FIXED INTEREST A ACC	0.004	0.692	0.396	0.175	0.000	23.094	0.061	0.008	2.669	-0.006	0.695	-0.392	0.227
NATIXIS LS STGC INC I/A ACC	0.003	0.719	0.360	0.179	0.000	22.538	0.041	0.083	1.735	0.017	0.336	0.963	0.228
MARKS & SPEN.HI.INC.AC.	0.005	0.731	0.344	0.182	0.000	15.910	0.109	0.002	3.168	0.019	0.450	0.756	0.125
ABRDN AAA BOND INSTITUTIONAL ACC GBP	0.003	0.763	0.302	0.150	0.000	19.687	0.032	0.156	1.421	-0.005	0.746	-0.324	0.178
EDEN TREE AMITY STERLING BOND C	0.002	0.823	0.224	0.170	0.000	23.646	0.030	0.166	1.384	0.022	0.165	1.389	0.249
DIMENSIONAL GLOBAL SHORT DATED BOND ACC	0.001	0.874	0.158	0.161	0.000	23.302	0.012	0.567	0.573	0.012	0.425	0.797	0.243
M&G GILT&FIXED INTEREST INCOME STERLING A ACC	0.001	0.915	0.107	0.038	0.000	4.326	0.043	0.108	1.607	-0.026	0.170	-1.372	0.008

Table 32: Fama-French Three Factor Model Canada

Fund	α	p-value	t-test	Rm-Rf	p-value	t-test	SMB	p-value	t-test	HML	p-value	t-stat	Adjusted R2
BMO EMERGING MARKETS BOND ADVISOR SERIES	-1.228	0.000	-52.160	0.387	0.000	36.545	0.453	0.000	15.986	-0.104	0.000	-5.616	0.394
MANULIFE STRATEGIC INCOME FUND SERIES FT6	-1.375	0.000	-63.296	0.314	0.000	32.107	0.296	0.000	11.303	-0.134	0.000	-7.820	0.339
FRANKLIN BRANDYWINE GLBL SUSTNBL INC OPTM SR A	-1.392	0.000	-62.892	0.307	0.000	30.784	0.330	0.000	12.365	-0.132	0.000	-7.555	0.320
BRANDES CORPORATE FOCUS BOND CL I HEDGED	-1.394	0.000	-68.115	0.299	0.000	32.476	0.344	0.000	13.966	-0.123	0.000	-7.580	0.344
INVESCO CANADIAN CORE PLUS BOND SERIES A	-1.441	0.000	-58.935	0.276	0.000	25.084	0.437	0.000	14.839	-0.204	0.000	-10.579	0.265
DYNAMIC ADVANTAGE BOND SERIES F	-1.459	0.000	-64.066	0.268	0.000	26.156	0.377	0.000	13.728	-0.166	0.000	-9.209	0.268
AGF EMERGING MARKETS BOND SERIES F	-1.463	0.000	-56.708	0.264	0.000	22.756	0.296	0.000	9.517	-0.149	0.000	-7.323	0.210
DESJARDINS EMERGING MARKETS BOND F	-1.473	0.000	-52.651	0.264	0.000	20.939	0.544	0.000	16.147	-0.144	0.000	-6.533	0.208
ADDENDA ACTIVE DURATION BOND POOL CL A	-1.486	0.000	-64.865	0.252	0.000	24.459	0.355	0.000	12.864	-0.188	0.000	-10.366	0.251
EDUCATORS BOND CLASS A	-1.488	0.000	-62.432	0.251	0.000	23.342	0.388	0.000	13.494	-0.199	0.000	-10.559	0.240
CIBC CANADIAN BOND CLASS A	-1.494	0.000	-62.460	0.248	0.000	23.011	0.389	0.000	13.515	-0.206	0.000	-10.906	0.238
BEUTEL GOODMAN CORE PLUS BOND SERIES B	-1.494	0.000	-62.096	0.248	0.000	22.889	0.392	0.000	13.520	-0.204	0.000	-10.733	0.236
HSBC CANADIAN BOND FUND INVESTOR SERIES	-1.499	0.000	-63.032	0.245	0.000	22.908	0.374	0.000	13.036	-0.210	0.000	-11.171	0.237
CANSO CANADIAN BOND FD CLASS F	-1.500	0.000	-65.614	0.246	0.000	23.849	0.353	0.000	12.817	-0.173	0.000	-9.567	0.239
DYNAMIC SHORT TERM BOND SERIES I	-1.500	0.000	-74.170	0.245	0.000	26.857	0.295	0.000	12.111	-0.110	0.000	-6.852	0.266
EDUCATORS MORTGAGE & INCOME CLASS A	-1.500	0.000	-74.934	0.243	0.000	26.928	0.291	0.000	12.062	-0.106	0.000	-6.680	0.266
FDP CANADIAN BOND PORTFOLIO SERIES A	-1.506	0.000	-62.576	0.241	0.000	22.262	0.393	0.000	13.559	-0.210	0.000	-11.050	0.231
MACKENZIE CANADIAN BOND ADVISOR SERIES	-1.506	0.000	-63.836	0.241	0.000	22.700	0.390	0.000	13.715	-0.200	0.000	-10.700	0.234
BEUTEL GOODMAN INCOME SERIES D	-1.509	0.000	-62.246	0.241	0.000	22.048	0.384	0.000	13.141	-0.214	0.000	-11.181	0.228
MANULIFE CANADIAN BOND SERIES F	-1.511	0.000	-62.316	0.239	0.000	21.912	0.395	0.000	13.524	-0.212	0.000	-11.036	0.227
LEITH WHEELER CORE BOND SERIES B	-1.511	0.000	-61.974	0.239	0.000	21.732	0.381	0.000	12.984	-0.211	0.000	-10.954	0.222
CANOE BOND ADVANTAGE PORTFOLIO CLASS SERIES A	-1.526	0.000	-62.057	0.232	0.000	20.925	0.398	0.000	13.430	-0.206	0.000	-10.614	0.213
FIDELITY FLOATING RATE HIGH INCOME SERIES A	-1.574	0.000	-52.613	0.202	0.000	14.989	0.207	0.000	5.750	-0.124	0.000	-5.221	0.104
IG MACKENZIE GLOBAL BOND SERIES C	-1.579	0.000	-58.039	0.205	0.000	16.739	0.420	0.000	12.817	-0.197	0.000	-9.175	0.161
ABERDEEN EMERGING MARKETS DEBT	-1.207	0.000	-42.666	0.394	0.000	30.945	0.397	0.000	11.653	-0.125	0.000	-5.594	0.318
BMO ASIAN GROWTH AND INCOME ADVISOR SERIES	-0.872	0.000	-27.115	0.562	0.000	38.810	0.149	0.000	3.851	-0.327	0.000	-12.839	0.456
CANADA LIFE EUROPEAN EQUITY FUND A	-0.786	0.000	-25.031	0.606	0.000	42.868	0.118	0.002	3.126	-0.267	0.000	-10.738	0.501
BMO EQUITY GROWTH ETF PORTFOLIO ADVISOR SERIES	-0.393	0.000	-21.126	0.800	0.000	95.460	-0.237	0.000	-10.552	-0.236	0.000	-16.047	0.848
CI ASIAN OPPORTUNITIES FUND SERIES I	-0.880	0.000	-21.103	0.545	0.000	29.017	0.930	0.000	18.503	-0.263	0.000	-7.983	0.314
CI ASIAN OPPORTUNITIES CORPORATE CLASS A	-0.890	0.000	-20.878	0.550	0.000	28.638	0.921	0.000	17.925	-0.258	0.000	-7.657	0.306
FIDELITY CANADIAN LARGE CAP SERIES F	-0.640	0.000	-19.763	0.675	0.000	46.327	0.009	0.812	0.238	0.209	0.000	8.153	0.552
CAPITAL GROUP US EQUITY SERIES F	-0.510	0.000	-19.596	0.738	0.000	62.987	-0.540	0.000	-17.219	-0.362	0.000	-17.608	0.744
CIBC ASIA PACIFIC INDEX CLASS A	-0.610	0.000	-18.946	0.692	0.000	47.720	0.026	0.499	0.676	-0.361	0.000	-14.197	0.568
ABRDN CANADA EAFE PLUS EQUITY	-0.681	0.000	-18.531	0.658	0.000	39.729	0.452	0.000	10.205	-0.456	0.000	-15.703	0.462
AXIOM ALL EQUITY PORTFOLIO CLASS A	-0.364	0.000	-17.689	0.812	0.000	87.657	-0.238	0.000	-9.620	-0.321	0.000	-19.751	0.826
NBI GLOBAL DIVERSIFIED EQUITY INVESTOR SERIES	-0.492	0.000	-17.136	0.752	0.000	58.184	-0.505	0.000	-14.599	-0.391	0.000	-17.216	0.709
BGC.NORTH AMER.FOCD.EQ SRS D	-0.394	0.000	-16.911	0.797	0.000	75.893	-0.376	0.000	-13.379	0.047	0.011	2.531	0.788
BRANDES EMERGING MARKETS VALUE FD SRS F	-0.557	0.000	-15.577	0.724	0.000	45.004	0.109	0.011	2.541	-0.026	0.356	-0.924	0.518
CAPITAL GROUP GLOBAL EQUITY SERIES D	-0.397	0.000	-15.267	0.794	0.000	67.686	-0.182	0.000	-5.810	-0.596	0.000	-28.979	0.752
CANADA LIFE CANADIAN GROWTH FUND F	-0.207	0.000	-13.163	0.896	0.000	126.598	-0.025	0.188	-1.317	-0.050	0.000	-3.984	0.899
BAROMETER EQUITY POOL CLASS A	-0.514	0.000	-12.721	0.742	0.000	40.738	0.132	0.007	2.712	-0.542	0.000	-16.945	0.496
CANADA LIFE US ALL CAP GROWTH FUND SERIES W	-0.371	0.000	-12.632	0.801	0.000	60.481	-0.690	0.000	-19.468	-1.014	0.000	-43.635	0.778
RBC NORTH AMERICAN GROWTH SR F	-0.203	0.000	-11.858	0.895	0.000	116.239	-0.294	0.000	-14.261	-0.259	0.000	-19.190	0.893
AGF AMERICAN GROWTH CLASS SERIES F	-0.371	0.000	-10.801	0.794	0.000	51.300	-0.535	0.000	-12.913	-0.683	0.000	-25.112	0.674
CANADA LIFE CANADIAN EQUITY FUND A	-0.151	0.000	-10.261	0.928	0.000	140.188	-0.065	0.000	-3.681	-0.066	0.000	-5.664	0.917
CANADA LIFE US SMALL-MID CAP GROWTH FUND N	-0.359	0.000	-8.918	0.816	0.000	45.009	-0.213	0.000	-4.384	-0.318	0.000	-9.980	0.553
DESJARDINS AMERICAN EQUITY GROWTH I	-0.283	0.000	-8.288	0.849	0.000	55.235	-0.591	0.000	-14.358	-0.937	0.000	-34.729	0.724
CANOE CANADIAN SMALL MID CAP PORTFOLIO CLASS SR D	-0.149	0.000	-4.840	0.925	0.000	66.656	0.391	0.000	10.540	-0.098	0.000	-4.034	0.691
CI AMERICAN SMALL COMPANIES CORP CL IT8	-0.146	0.000	-3.721	0.941	0.000	53.416	-0.128	0.007	-2.714	-0.066	0.034	-2.126	0.621
RBC CANADIAN MID-CAP EQUITY FUND SR I	0.038	0.173	1.364	1.017	0.000	81.701	0.506	0.000	15.199	-0.013	0.544	-0.607	0.769

Table 33: Fama-French Three Factor Model Italy

Fund	α	p-value	t-test	Rm-Rf	p-value	t-test	SMB	p-value	t-test	HML	p-value	t-stat	Adjusted R2
ARCA AZIONI ITALIA P	-0.134	0.000	-14.034	0.925	0.000	236.655	0.073	0.000	4.819	-0.063	0.000	-6.044	0.966
FIDEURAM ITALIA R	-0.151	0.000	-16.052	0.909	0.000	235.126	0.076	0.000	5.090	-0.003	0.805	-0.246	0.966
EUROMOBILIARE AZIONI ITALIANE A	-0.156	0.000	-16.913	0.912	0.000	240.985	0.037	0.012	2.516	-0.092	0.000	-9.082	0.967
INVESTIMENTI AZIONARI ITALIA A	-0.213	0.000	-16.860	0.881	0.000	169.610	0.115	0.000	5.688	-0.069	0.000	-4.984	0.936
ZENIT PIANETA ITALIA I	-0.385	0.000	-29.002	0.792	0.000	145.154	0.181	0.000	8.540	-0.111	0.000	-7.634	0.913
ACOMEA EUROPA A1	-0.399	0.000	-21.314	0.785	0.000	102.151	0.192	0.000	6.436	0.134	0.000	6.559	0.843
EURIZON AZIONI PMI ITALIA R	-0.430	0.000	-21.505	0.761	0.000	92.700	0.390	0.000	12.244	-0.277	0.000	-12.655	0.807
EPSILON Q VALUE	-0.454	0.000	-23.824	0.755	0.000	96.562	0.048	0.113	1.586	-0.109	0.000	-5.245	0.826
ALLIANZ AZIONI EUROPA	-0.457	0.000	-21.835	0.754	0.000	87.840	0.167	0.000	5.015	-0.278	0.000	-12.140	0.794
SYMPHONIA AZION SMCP ITALIA CL I	-0.555	0.000	-27.455	0.687	0.000	82.750	0.397	0.000	12.310	-0.453	0.000	-20.472	0.771
ANIMA INIZIATIVA EUROPA A	-0.565	0.000	-27.795	0.692	0.000	82.967	0.314	0.000	9.707	-0.268	0.000	-12.055	0.771
AGORA MATERIALS R	-0.732	0.000	-18.933	0.598	0.000	37.664	0.188	0.002	3.050	0.069	0.102	1.635	0.418
ANIMA VALORE GLOBALE A	-0.801	0.000	-30.181	0.567	0.000	52.080	-0.426	0.000	-10.066	0.004	0.886	0.143	0.614
ACOMEA AMERICA A1	-0.829	0.000	-24.354	0.555	0.000	39.746	-0.781	0.000	-14.406	0.038	0.306	1.024	0.518
BANCOPOSTA AZIONARIO INTERNAZIONALE	-0.852	0.000	-30.228	0.541	0.000	46.782	-0.601	0.000	-13.393	-0.327	0.000	-10.604	0.581
ANIMA SELEZIONE GLOBALE B	-0.856	0.000	-31.642	0.539	0.000	48.475	-0.608	0.000	-14.102	-0.360	0.000	-12.167	0.600
ARCA AZIONI INTERNAZIONALI P	-0.858	0.000	-31.716	0.537	0.000	48.376	-0.472	0.000	-10.940	-0.308	0.000	-10.413	0.584
ARCA AZIONI PAESI EMER.	-0.866	0.000	-25.174	0.536	0.000	37.976	0.351	0.000	6.415	-0.236	0.000	-6.279	0.411
FIDEURAM MASTER SEL.EQ. USA	-0.885	0.000	-31.004	0.517	0.000	44.163	-0.038	0.401	-0.840	-0.313	0.000	-10.039	0.504
BNL AZIONI AMERICA	-0.899	0.000	-25.139	0.509	0.000	34.636	-1.145	0.000	-20.084	-0.925	0.000	-23.632	0.542
ALLIANZ AZIONI AMERICA	-0.899	0.000	-25.807	0.514	0.000	35.965	-1.090	0.000	-19.630	-0.535	0.000	-14.037	0.521
BNP PARIBAS JAPAN EQUITY CLASSIC H EUR CAP	-0.910	0.000	-24.755	0.508	0.000	33.692	0.764	0.000	13.054	-0.078	0.054	-1.930	0.357
SYMPHONIA AZIONARIO TREND GLOBALE I	-0.954	0.000	-32.976	0.479	0.000	40.347	0.301	0.000	6.532	-0.252	0.000	-7.965	0.441
ALLIANZ AZIONI PACIFICO	-1.055	0.000	-30.768	0.431	0.000	30.619	0.713	0.000	13.043	-0.223	0.000	-5.937	0.317
ACOMEA PERFORMANCE A1	-1.155	0.000	-46.134	0.389	0.000	37.872	0.259	0.000	6.495	-0.048	0.077	-1.769	0.410
FIDEURAM MASTER SELECTION BALANCED	-1.177	0.000	-56.908	0.372	0.000	43.824	0.180	0.000	5.451	-0.237	0.000	-10.476	0.487
CONSULTINVEST REDDITO C	-1.206	0.000	-55.762	0.358	0.000	40.381	0.239	0.000	6.938	-0.101	0.000	-4.265	0.440
BNL OBBLIGAZIONI EMERGENTI	-1.262	0.000	-46.692	0.327	0.000	29.465	0.102	0.018	2.359	-0.177	0.000	-5.983	0.301
ARCA BD PAESI EM VALUTA LOCALE P	-1.280	0.000	-52.882	0.319	0.000	32.089	0.165	0.000	4.282	-0.118	0.000	-4.463	0.333
CONSULTINVEST BREVE TERMINE C	-1.308	0.000	-63.676	0.304	0.000	36.023	0.243	0.000	7.418	-0.101	0.000	-4.514	0.383
BOND PAESI EMERGENTI ESG A	-1.311	0.000	-57.382	0.306	0.000	32.656	0.268	0.000	7.355	-0.184	0.000	-7.380	0.340
ANIMA TRICOLORE AD	-1.319	0.000	-55.295	0.304	0.000	31.026	0.235	0.000	6.197	-0.191	0.000	-7.328	0.319
MEDIOLANUM STRATEGIA GLOBALE MULTI BOND L	-1.340	0.000	-62.886	0.296	0.000	33.816	0.289	0.000	8.500	-0.149	0.000	-6.386	0.355
ARCA RR DIVERSIFIED BOND	-1.360	0.000	-65.755	0.279	0.000	32.804	0.249	0.000	7.560	-0.136	0.000	-5.993	0.341
INVESTIPER OBBLIG PAESI EMERGENTI	-1.360	0.000	-63.997	0.282	0.000	32.350	0.303	0.000	8.947	-0.154	0.000	-6.639	0.335
AZIMUT TREND TASSI	-1.393	0.000	-65.274	0.261	0.000	29.808	0.235	0.000	6.911	-0.132	0.000	-5.651	0.299
INVESTIPER OBBLIGAZIONARIO GLOBALE	-1.403	0.000	-67.854	0.255	0.000	30.003	0.251	0.000	7.602	-0.129	0.000	-5.705	0.302
AMUNDI OBBLIGAZIONARIO BREVE TERMINE - C	-1.405	0.000	-66.404	0.254	0.000	29.192	0.262	0.000	7.768	-0.113	0.000	-4.870	0.290
EURIZON OBBLIGAZIONI CEDOLA D	-1.420	0.000	-67.812	0.247	0.000	28.761	0.274	0.000	8.199	-0.127	0.000	-5.552	0.285
BOND STRATEGIA ATTIVA A	-1.433	0.000	-65.217	0.241	0.000	26.721	0.268	0.000	7.644	-0.174	0.000	-7.257	0.259
EURIZON OBBLIGAZIONI EURO BREVE TERMINE D	-1.438	0.000	-68.865	0.237	0.000	27.652	0.246	0.000	7.383	-0.119	0.000	-5.197	0.268
FONDERSEL EURO	-1.438	0.000	-61.978	0.238	0.000	24.996	0.275	0.000	7.431	-0.212	0.000	-8.343	0.238
EUROMOBILIARE EURO AGGREGATE A	-1.444	0.000	-68.962	0.234	0.000	27.212	0.250	0.000	7.511	-0.121	0.000	-5.268	0.262
ALLIANZ GLOBAL MULTI- ASSET CREDIT FUND	-1.450	0.000	-67.276	0.231	0.000	26.089	0.281	0.000	8.177	-0.116	0.000	-4.914	0.247
ALLIANZ REDDITO EURO	-1.457	0.000	-64.320	0.228	0.000	24.469	0.282	0.000	7.799	-0.159	0.000	-6.438	0.227
BOND STRATEGIA PRUDENTE A	-1.459	0.000	-69.258	0.225	0.000	26.039	0.241	0.000	7.193	-0.119	0.000	-5.176	0.246
ANIMA OBBLIGAZIONARIO EURO BT A	-1.462	0.000	-69.367	0.224	0.000	25.909	0.239	0.000	7.109	-0.119	0.000	-5.155	0.244
FIDEURAM RISPARMIO ATTIVO	-1.466	0.000	-69.127	0.223	0.000	25.633	0.242	0.000	7.172	-0.126	0.000	-5.445	0.240
FONDERSEL INTERNAZIONALE ESG	-1.492	0.000	-58.253	0.207	0.000	19.677	0.205	0.000	5.023	-0.219	0.000	-7.802	0.166
ALLIANZ REDDITO GLOBALE	-1.521	0.000	-58.901	0.191	0.000	18.034	0.260	0.000	6.309	-0.214	0.000	-7.587	0.146

Table 34: Fama-French Three Factor Model Germany

Fund	α	p-value	t-test	Rm-Rf	p-value	t-test	SMB	p-value	t-test	HML	p-value	t-stat	Adjusted R2
DEGUSSA AKTIEN UNIVERSAL-FONDS	-0.037	0.000	-3.585	0.816	0.000	110.282	-0.091	0.000	-3.676	0.021	0.219	1.230	0.863
FIRST PRIV.INV.MAN.KAG EUROPA AKTIEN ULM B	-0.043	0.000	-3.879	0.835	0.000	103.310	0.088	0.001	3.249	0.079	0.000	4.233	0.844
CHOM CAPITAL ACTIVE RETURN EUROPE UI - AK I	-0.047	0.000	-3.949	0.771	0.000	89.828	0.252	0.000	8.743	-0.164	0.000	-8.316	0.798
ACATIS AKTIEN GLOBAL FONDS B	-0.067	0.000	-4.019	0.627	0.000	52.157	-0.566	0.000	-14.013	-0.463	0.000	-16.741	0.636
GLS BANK AKTIENFONDS AK A	-0.068	0.000	-5.576	0.671	0.000	75.930	0.087	0.003	2.927	-0.293	0.000	-14.418	0.745
HAL SYSTEMATIC MULTI ASSET DYNAMIC RT	-0.079	0.000	-6.206	0.618	0.000	67.063	0.009	0.766	0.298	-0.153	0.000	-7.226	0.696
DEKA INV.GLOBALCHAMPIONS CF	-0.085	0.000	-3.903	0.449	0.000	28.390	1.036	0.000	19.516	-0.107	0.003	-2.948	0.319
DEKA INV.GLOBALCHAMPIONS TF	-0.087	0.000	-4.002	0.449	0.000	28.381	1.037	0.000	19.510	-0.107	0.003	-2.932	0.319
HP&P EURO SELECT UI FONDS A	-0.087	0.000	-8.670	0.646	0.000	89.031	0.221	0.000	9.061	-0.365	0.000	-21.812	0.800
INVESCO KPL.EUROPA CORE AKTIENFDS	-0.091	0.000	-5.415	0.557	0.000	45.975	0.474	0.000	11.627	-0.159	0.000	-5.687	0.504
DIT ALLIANZ VALUE GLOBAL	-0.098	0.000	-4.879	0.494	0.000	34.000	0.801	0.000	16.400	-0.019	0.575	-0.561	0.371
BERENBERG AKTIEN GLOBAL PLUS R D	-0.100	0.000	-6.585	0.531	0.000	48.351	-0.224	0.000	-6.073	-0.518	0.000	-20.472	0.588
FONDSPICKER GLOBAL UI	-0.108	0.000	-7.550	0.458	0.000	44.228	0.601	0.000	17.260	-0.151	0.000	-6.327	0.491
ACATIS ASIA PACIFIC PLUS FONDS	-0.112	0.000	-6.398	0.441	0.000	34.909	0.330	0.000	7.786	-0.120	0.000	-4.114	0.369
CH GLOBAL	-0.128	0.000	-5.003	0.352	0.000	19.068	1.092	0.000	17.582	-0.271	0.000	-6.372	0.214
BREMEN KAPITAL AKTIEN	-0.148	0.000	-7.504	0.265	0.000	18.507	0.693	0.000	14.391	-0.016	0.624	-0.490	0.176
GAMAX FUNDS ASIA PACIFIC A	-0.148	0.000	-5.938	0.219	0.000	12.169	0.337	0.000	5.558	-0.027	0.520	-0.644	0.068
LAZARD ASST.MAN.DTL.EUR. HIGHYIELD	-0.162	0.000	-12.790	0.295	0.000	32.137	0.258	0.000	8.383	-0.028	0.180	-1.341	0.331
HELABA INVEST KPL.HIY. FONDS	-0.163	0.000	-12.777	0.293	0.000	31.751	0.273	0.000	8.818	-0.045	0.033	-2.133	0.326
LBBW ASTMGMT.INV.GESELL. MBH RENTAMAX R	-0.173	0.000	-13.910	0.234	0.000	25.874	0.228	0.000	7.531	-0.103	0.000	-4.967	0.246
AVANA INV.AKTGSF.MIT TGHF.GEN KAG EU.CNTL	-0.173	0.000	-14.281	0.219	0.000	25.018	0.153	0.000	5.180	-0.078	0.000	-3.854	0.232
FBG INDIVIDUAL R-PA	-0.175	0.000	-14.389	0.234	0.000	26.580	0.219	0.000	7.383	-0.084	0.000	-4.130	0.254
FRANKFURT TRUST INV. FT INTERZINS	-0.176	0.000	-14.275	0.197	0.000	22.080	0.155	0.000	5.181	-0.070	0.001	-3.431	0.190
DWS INVESTMENT INTL. RENTEN TYP O	-0.176	0.000	-11.673	0.186	0.000	17.095	0.153	0.000	4.185	-0.141	0.000	-5.628	0.130
METZLER EURO CORPORATES SUSTAINABILITY AI	-0.176	0.000	-13.716	0.233	0.000	25.076	0.226	0.000	7.240	-0.118	0.000	-5.517	0.236
DEKARENT INTERNATIONAL	-0.177	0.000	-12.424	0.213	0.000	20.563	0.219	0.000	6.309	-0.122	0.000	-5.146	0.174
HSBC STRATEGIE SUBSTANZ AD	-0.177	0.000	-14.584	0.217	0.000	24.633	0.188	0.000	6.343	-0.073	0.000	-3.604	0.226
CORPORATE M SUSTAINABLE (I)	-0.177	0.000	-14.139	0.223	0.000	24.633	0.203	0.000	6.670	-0.069	0.001	-3.325	0.226
HANSAINVEST HANSEATISCHE INV.GESELL.HANSA INTL.	-0.178	0.000	-12.561	0.209	0.000	20.334	0.189	0.000	5.472	-0.089	0.000	-3.761	0.167
LBBW RENTEN EURO FLEX NACHHALTIGKEIT	-0.178	0.000	-14.246	0.215	0.000	23.826	0.180	0.000	5.931	-0.093	0.000	-4.476	0.216
WI GLOBAL CHALLENGES CORPORATE BONDS	-0.178	0.000	-14.290	0.202	0.000	22.334	0.176	0.000	5.791	-0.070	0.001	-3.366	0.194
AMPEGA GLOBAL RENTENFONDS	-0.179	0.000	-12.587	0.200	0.000	19.370	0.186	0.000	5.365	-0.088	0.000	-3.700	0.154
MEAG MUNICH ERGO KPL. EURORENT	-0.179	0.000	-14.039	0.216	0.000	23.315	0.216	0.000	6.935	-0.105	0.000	-4.904	0.210
AMPEGA RENDITE RENTENFONDS	-0.179	0.000	-14.098	0.206	0.000	22.374	0.194	0.000	6.270	-0.085	0.000	-4.019	0.195
AMUNDI BKK RENT	-0.180	0.000	-14.549	0.212	0.000	23.581	0.186	0.000	6.168	-0.099	0.000	-4.776	0.213
BFS NACHHALTIGKEITSFONDS GREEN BONDS	-0.180	0.000	-14.472	0.209	0.000	23.278	0.214	0.000	7.100	-0.112	0.000	-5.437	0.211
UNI INSTL EUR COVERED BONDS 4-6 YEARS SUST	-0.181	0.000	-14.321	0.202	0.000	22.157	0.194	0.000	6.314	-0.119	0.000	-5.640	0.196
BALOISE-RENTENFONDS DWS	-0.182	0.000	-13.472	0.214	0.000	21.879	0.243	0.000	7.390	-0.117	0.000	-5.186	0.192
MONEGA KPL.EURO BOND	-0.182	0.000	-14.025	0.207	0.000	21.975	0.195	0.000	6.180	-0.133	0.000	-6.163	0.195
DWS EURO BOND FUND LD	-0.183	0.000	-13.475	0.211	0.000	21.370	0.224	0.000	6.772	-0.109	0.000	-4.811	0.184
ALLIANZ EURO RENTENFONDS - A - EUR	-0.183	0.000	-12.992	0.212	0.000	20.695	0.234	0.000	6.813	-0.121	0.000	-5.137	0.176
UNION INV.PRIVATFONDS UNIRENTA	-0.186	0.000	-12.123	0.176	0.000	15.856	0.164	0.000	4.389	-0.171	0.000	-6.693	0.119
AKTIV CHANCE	-0.037	0.003	-2.982	0.783	0.000	86.466	0.131	0.000	4.302	-0.146	0.000	-7.013	0.788
LBBW GLOBAL WARMING R	-0.048	0.003	-2.961	0.681	0.000	58.571	-0.782	0.000	-20.002	-0.632	0.000	-23.597	0.708
ALLIANZ ADIFONDS - A - EUR	-0.058	0.006	-2.774	0.695	0.000	46.182	0.765	0.000	15.118	-0.151	0.000	-4.362	0.508
AMUNDI GERMAN EQUITY A ND	-0.050	0.009	-2.614	0.769	0.000	56.093	0.496	0.000	10.755	-0.072	0.022	-2.294	0.602
HELABA INVEST KPL. DIVIDENDENPLUS FONDS	-0.031	0.017	-2.393	0.873	0.000	92.727	0.043	0.173	1.364	0.337	0.000	15.558	0.820
BALOISE-AKTIENFONDS DWS	-0.045	0.017	-2.379	0.778	0.000	56.917	0.502	0.000	10.930	-0.058	0.066	-1.841	0.609
EARTH GOLD FUND UI (EUR R)	-0.039	0.432	-0.786	0.501	0.000	13.936	1.002	0.000	8.289	-0.159	0.055	-1.921	0.095
HSBC GERMAN EQUITY AC	0.002	0.770	0.292	0.992	0.000	220.241	0.069	0.000	4.560	-0.023	0.030	-2.178	0.961

Table 35: Fama-French Three Factor Model France

Fund	α	p-value	t-test	Rm-Rf	p-value	t-test	SMB	p-value	t-test	HML	p-value	t-stat	Adjusted R2
MANDARINE VALEUR G GEST.	-0.039	0.003	-2.986	0.945	0.000	106.631	0.028	0.346	0.943	0.392	0.000	19.167	0.861
ODDO BHF METROPOLE SELECTION B	-0.042	0.000	-3.718	0.945	0.000	123.753	0.112	0.000	4.360	0.344	0.000	19.512	0.891
ALLIANZ ACN.ER.C GLOBAL INVRS.FRN.	-0.046	0.000	-5.361	0.917	0.000	157.790	0.052	0.007	2.678	-0.200	0.000	-14.971	0.926
HANSEATIQUE B	-0.053	0.001	-3.364	0.879	0.000	82.293	0.343	0.000	9.553	-0.115	0.000	-4.687	0.768
G FUND OPPORTUNITIES EUROPE IC	-0.056	0.000	-5.274	0.898	0.000	123.813	0.060	0.013	2.474	-0.036	0.033	-2.138	0.886
EDR SICAV TRICOLORE RENDEMENT B EUR	-0.061	0.000	-6.725	0.917	0.000	148.778	0.134	0.000	6.479	-0.030	0.035	-2.107	0.917
MIROVA ACTIONS EUROPE F (EUR)	-0.069	0.000	-6.170	0.878	0.000	115.900	0.062	0.015	2.441	-0.195	0.000	-11.145	0.871
SEEYOND ACTIONS EUROPEENNES ESG F	-0.082	0.000	-8.691	0.862	0.000	135.291	0.045	0.037	2.083	-0.113	0.000	-7.703	0.902
RENAISSANCE EUROPE I COMGEST	-0.093	0.000	-8.996	0.818	0.000	116.500	0.091	0.000	3.849	-0.561	0.000	-34.657	0.876
ABACUS QUALITY I	-0.094	0.000	-8.314	0.859	0.000	111.376	0.125	0.000	4.819	-0.032	0.074	-1.786	0.862
ECHIQUIER AGRESSOR G	-0.104	0.000	-9.014	0.850	0.000	107.990	0.164	0.000	6.227	-0.056	0.002	-3.076	0.853
BETAMAX EUROPE SMART FOR CLIMATE F	-0.116	0.000	-10.611	0.797	0.000	107.520	0.003	0.912	0.111	-0.061	0.000	-3.598	0.855
EQUI CONVICTIONS B GEST.	-0.126	0.000	-10.657	0.790	0.000	98.470	0.307	0.000	11.382	-0.176	0.000	-9.515	0.825
AXA AEDIFICANDI A C EUR	-0.156	0.000	-7.828	0.742	0.000	54.786	0.256	0.000	5.637	-0.205	0.000	-6.568	0.595
ABEILLE VALEURS	-0.158	0.000	-13.227	0.715	0.000	88.164	-0.118	0.000	-4.325	-0.157	0.000	-8.402	0.802
PLUVALCA BIOTECH Z	-0.164	0.000	-6.983	0.704	0.000	44.036	0.533	0.000	9.926	-0.714	0.000	-19.354	0.510
SUNNY MANAGERS F	-0.175	0.000	-10.943	0.659	0.000	60.782	0.422	0.000	11.578	-0.118	0.000	-4.711	0.640
TURGOT SMIDCAPS FRANCE BC TURGOT ASSET MAN.	-0.199	0.000	-15.497	0.644	0.000	73.655	0.364	0.000	12.389	-0.227	0.000	-11.273	0.724
AMUNDI ACTIONS EMERGENTS ESR F (C)	-0.204	0.000	-9.410	0.641	0.000	43.448	0.251	0.000	5.058	-0.163	0.000	-4.783	0.479
ABERDEEN WACTIONS CR. SUISSE ASTMGMT.GEST.	-0.223	0.000	-12.220	0.598	0.000	48.356	0.624	0.000	15.021	-0.152	0.000	-5.326	0.530
REGARD CONVERTIBLES EURO H	-0.337	0.000	-29.180	0.424	0.000	53.938	0.213	0.000	8.071	-0.135	0.000	-7.440	0.585
UBS (F) EUROPN OPPTY UNCONSTR PEA EUR I	-0.353	0.000	-22.300	0.394	0.000	36.647	0.057	0.113	1.586	-0.175	0.000	-7.053	0.403
BSO CONVERTIBLE D	-0.361	0.000	-30.962	0.391	0.000	49.347	0.171	0.000	6.431	-0.137	0.000	-7.500	0.542
AA MMF EMERGING COVT. NEULIZE OBC INMS.	-0.374	0.000	-23.074	0.353	0.000	32.049	0.172	0.000	4.647	-0.109	0.000	-4.273	0.332
ALLIANZ EURO HIGH YIELD I C/D EUR	-0.382	0.000	-28.868	0.335	0.000	37.313	0.281	0.000	9.317	-0.069	0.001	-3.322	0.400
ALLIANZ EURO HIGH YIELD R D EUR	-0.394	0.000	-28.199	0.339	0.000	35.757	0.267	0.000	8.386	-0.072	0.001	-3.311	0.379
TIKEHAU CREDIT PLUS K- ACC-EUR	-0.406	0.000	-30.781	0.300	0.000	33.442	0.261	0.000	8.682	-0.071	0.001	-3.418	0.349
LA FRANCAISE EURO INFLATION B	-0.407	0.000	-27.625	0.289	0.000	28.835	0.199	0.000	5.912	-0.071	0.002	-3.079	0.285
EXANE ELLIPSIS CONVS FD J CHF (EUR)	-0.410	0.000	-25.109	0.285	0.000	25.628	0.159	0.000	4.277	-0.096	0.000	-3.743	0.240
CD ALPHA BONDS D	-0.416	0.000	-30.976	0.286	0.000	31.328	0.203	0.000	6.625	-0.041	0.053	-1.935	0.569
EDMOND DE ROTH.SICAV ER.SUST CRED B EUR	-0.420	0.000	-30.718	0.289	0.000	31.107	0.273	0.000	8.748	-0.111	0.000	-5.168	0.318
G FUND CREDIT EURO ISR M	-0.424	0.000	-30.335	0.275	0.000	28.933	0.266	0.000	8.329	-0.131	0.000	-6.002	0.289
G FUND CREDIT EURO ISR I C	-0.425	0.000	-30.368	0.275	0.000	28.933	0.266	0.000	8.337	-0.131	0.000	-6.000	0.289
GROUPAMA EURO STOCK G ASST.MAN.	-0.427	0.000	-30.480	0.254	0.000	26.697	0.164	0.000	5.145	-0.093	0.000	-4.224	0.255
ALM CREDIT EURO ISR IC	-0.428	0.000	-30.869	0.267	0.000	28.340	0.252	0.000	7.964	-0.126	0.000	-5.817	0.280
AGF ASAC ACTIONS (D) AGF ASSET MANAGEMENT	-0.430	0.000	-31.108	0.254	0.000	27.005	0.179	0.000	5.666	-0.097	0.000	-4.477	0.259
AXA EURO CREDIT (D) AXA INVESTMENT PARIS	-0.431	0.000	-30.862	0.268	0.000	28.266	0.259	0.000	8.139	-0.121	0.000	-5.530	0.279
AMERI-GAN O	-0.432	0.000	-30.786	0.247	0.000	25.872	0.168	0.000	5.252	-0.097	0.000	-4.422	0.243
FONDO BNPP SEICEDOLE B	-0.433	0.000	-31.659	0.267	0.000	28.805	0.193	0.000	6.184	-0.086	0.000	-4.018	0.284
DANONE COMMUNITIES D ISR PRUDENT (C/D)	-0.434	0.000	-32.309	0.261	0.000	28.669	0.238	0.000	7.770	-0.123	0.000	-5.829	0.285
OCTO CREDIT COURT TERME B	-0.435	0.000	-32.696	0.255	0.000	28.155	0.221	0.000	7.279	-0.086	0.000	-4.150	0.275
CAPITOP REVENUS (D)	-0.435	0.000	-32.111	0.275	0.000	29.861	0.230	0.000	7.445	-0.106	0.000	-5.005	0.300
GROUPAMA CR.ER.CT I ASST.MAN.	-0.436	0.000	-32.572	0.253	0.000	27.835	0.223	0.000	7.288	-0.094	0.000	-4.498	0.271
ANAXIS SHORT DURATION K (EUR)	-0.436	0.000	-23.450	0.243	0.000	19.252	0.179	0.000	4.227	-0.096	0.001	-3.298	0.151
ARC FLEXIBOND D SUSP - UNSUPPORTED	-0.437	0.000	-32.555	0.266	0.000	29.117	0.236	0.000	7.700	-0.076	0.000	-3.619	0.289
G FUND GLOBAL GREEN BONDS I	-0.438	0.000	-29.460	0.257	0.000	25.422	0.260	0.000	7.685	-0.188	0.000	-8.079	0.245
CONFIANCE SOLIDAIRE D CREDIT COOPERATIF	-0.440	0.000	-32.625	0.251	0.000	27.396	0.220	0.000	7.150	-0.098	0.000	-4.646	0.265
COVEA EURO SOUVERAIN (D) FINANCE	-0.442	0.000	-29.277	0.263	0.000	25.657	0.228	0.000	6.620	-0.174	0.000	-7.349	0.246
BRONGNIART VARIFONDS D	-0.448	0.000	-31.412	0.251	0.000	25.852	0.247	0.000	7.595	-0.103	0.000	-4.626	0.244
ALLIANZ OBLIGATIONS INTERNATIONALES D EUR	-0.453	0.000	-30.559	0.234	0.000	23.264	0.287	0.000	8.484	-0.173	0.000	-7.460	0.216

Table 36: Fama-French Three Factor Model Japan

Fund	α	p-value	t-test	Rm-Rf	p-value	t-test	SMB	p-value	t-test	HML	p-value	t-stat	Adjusted R2
EAST SPRING US HIGH YIELD BOND OPEN	-0.067	0.000	-5.176	0.227	0.000	21.259	0.136	0.000	4.320	0.070	0.001	3.230	0.206
NOCHU US BOND OPEN	-0.068	0.000	-6.054	0.165	0.000	17.812	-0.051	0.061	-1.875	0.070	0.000	3.735	0.139
SMT DC FOREIGN BOND INDEX L	-0.070	0.000	-7.077	0.173	0.000	21.150	-0.023	0.331	-0.973	0.026	0.124	1.540	0.181
BRJ WORLD INCOME STRATEGY	-0.071	0.000	-6.076	0.181	0.000	18.619	-0.054	0.059	-1.889	0.083	0.000	4.206	0.152
ALLIANCE HIGH YIELD OPEN	-0.072	0.000	-5.769	0.226	0.000	21.792	0.108	0.000	3.522	0.078	0.000	3.700	0.211
SMDS DC FOREIGN BOND FUND	-0.072	0.000	-7.280	0.177	0.000	21.723	-0.026	0.277	-1.087	0.031	0.059	1.890	0.189
MYAM DC FOREIGN BOND OPEN	-0.072	0.000	-7.395	0.175	0.000	21.654	-0.024	0.310	-1.016	0.030	0.071	1.808	0.188
SMT GLOBAL BOND INDEX OPEN	-0.072	0.000	-7.207	0.173	0.000	21.131	-0.024	0.322	-0.990	0.026	0.121	1.552	0.181
SMT FOREIGN BOND INDEX OPEN(SMA)	-0.072	0.000	-7.217	0.173	0.000	21.151	-0.024	0.330	-0.974	0.026	0.122	1.546	0.181
AM-ONE LOOMIS US INVESTMENT GRADE BOND F	-0.074	0.000	-7.083	0.165	0.000	19.112	-0.055	0.029	-2.180	0.030	0.090	1.698	0.151
INVESCO MONTHLY INCOME FUND	-0.075	0.000	-5.897	0.218	0.000	20.645	0.127	0.000	4.096	0.072	0.001	3.348	0.196
SMDS T ROWE PRICE US INCOME FUND	-0.076	0.000	-6.548	0.180	0.000	18.920	-0.024	0.396	-0.850	0.063	0.001	3.253	0.154
SHINKIN US SOVEREIGN BOND PORTFOLIO	-0.077	0.000	-7.327	0.145	0.000	16.758	-0.085	0.001	-3.347	0.020	0.250	1.151	0.119
MYAM FOREIGN BOND OPEN	-0.080	0.000	-7.873	0.174	0.000	20.746	-0.026	0.295	-1.048	0.026	0.136	1.491	0.175
SOMPO JAPAN BOND FUND	-0.081	0.000	-17.807	0.000	0.907	0.117	0.000	0.986	-0.018	-0.027	0.001	-3.486	0.004
HITACHI DOMESTIC BOND INDEX FUND	-0.081	0.000	-17.523	0.001	0.876	0.156	0.001	0.961	0.049	-0.028	0.000	-3.672	0.005
NIKKO INDEX FUND JAPANESE BOND DC	-0.081	0.000	-17.749	0.001	0.885	0.145	0.001	0.959	0.052	-0.029	0.000	-3.703	0.005
NOMURA DOMESTIC BOND INDEX FUND	-0.082	0.000	-17.819	0.000	0.896	0.130	0.001	0.928	0.091	-0.028	0.000	-3.673	0.005
SMDS SB JAPAN BOND FUND	-0.083	0.000	-16.708	0.001	0.862	0.174	-0.002	0.845	-0.196	-0.029	0.001	-3.473	0.004
NOMURA HIGH YIELD BOND OPEN A COURSE	-0.084	0.000	-9.876	0.075	0.000	10.666	0.161	0.000	7.796	-0.008	0.567	-0.572	0.092
GS VARIETY OPEN FUND	-0.087	0.000	-11.281	0.109	0.000	17.250	-0.015	0.422	-0.803	-0.018	0.161	-1.401	0.126
GS DC GALILEO	-0.088	0.000	-14.396	0.019	0.000	3.707	-0.018	0.240	-1.176	-0.051	0.000	-4.932	0.016
UBS AUSTRALIA BOND OPEN (M)	-0.092	0.000	-6.013	0.314	0.000	24.901	0.065	0.079	1.759	0.075	0.004	2.923	0.246
FIDELITY US HIGH YIELD	-0.093	0.000	-6.609	0.246	0.000	21.093	0.149	0.000	4.337	0.089	0.000	3.739	0.205
DAIWA HIGH GRADE CAD BOND OPEN	-0.098	0.000	-7.793	0.245	0.000	23.656	0.071	0.021	2.316	0.086	0.000	4.063	0.233
PICTET GLBL INC EQTY (MTHLY DIST)	-0.104	0.000	-4.422	0.103	0.000	5.330	0.353	0.000	6.189	-0.026	0.514	-0.652	0.037
CLOVER KODOMO FUND	-0.050	0.006	-2.741	0.082	0.000	5.418	0.117	0.009	2.619	0.030	0.337	0.961	0.020
EAST SPRING GROWING ASIA EQUITY OPEN	-0.057	0.010	-2.582	0.230	0.000	12.612	0.355	0.000	6.607	0.130	0.000	3.500	0.110
INVESCO GT GLOBAL (INVESTMENT OPEN)	-0.037	0.021	-2.313	0.388	0.000	29.176	0.585	0.000	14.913	0.026	0.343	0.949	0.382
JPM GLOBAL HEALTH CARE RELATED EQ FUND	-0.065	0.028	-2.194	0.221	0.000	8.997	0.526	0.000	7.274	-0.031	0.530	-0.628	0.072
GS JAPAN EQUITY INDEX PLUS	-0.020	0.037	-2.083	0.864	0.000	106.807	0.090	0.000	3.783	0.095	0.000	5.778	0.853
HSBC ASIA PLUS	-0.051	0.061	-1.876	0.235	0.000	10.587	0.271	0.000	4.140	0.141	0.002	3.119	0.072
BARINGS ASIA FUTURE GROWTH EQUITY FUND	-0.045	0.086	-1.719	0.236	0.000	11.010	0.235	0.000	3.713	0.161	0.000	3.685	0.076
DAIWA ACTIVE NIPPON (MUSASHI)	-0.017	0.131	-1.512	0.868	0.000	95.697	0.174	0.000	6.523	-0.127	0.000	-6.855	0.825
FIDELITY ASIA EQUITY FUND	-0.033	0.185	-1.327	0.262	0.000	12.621	0.302	0.000	4.950	0.144	0.001	3.403	0.099
ABRDN ABERDEEN JAPAN OPEN	-0.012	0.197	-1.289	0.887	0.000	112.175	0.085	0.000	3.634	-0.066	0.000	-4.111	0.864
AMUNDI TARGET JAPAN FUND	-0.017	0.216	-1.239	0.745	0.000	67.479	0.163	0.000	5.016	0.146	0.000	6.478	0.705
SMDS CHINA A & H SHARES OPEN	-0.038	0.232	-1.196	0.202	0.000	7.761	0.249	0.001	3.246	0.133	0.012	2.507	0.041
INVESCO JAPAN GROWTH FUND	-0.014	0.328	-0.979	0.849	0.000	70.666	0.233	0.000	6.570	-0.239	0.000	-9.776	0.723
DWS DEUTSCHE JAPAN GROWTH OPEN	-0.017	0.329	-0.976	0.846	0.000	58.700	0.335	0.000	7.892	-0.319	0.000	-10.862	0.651
UBS NEXT GENERATION TECHNOLOGY FUND	-0.029	0.384	-0.870	0.686	0.000	25.052	1.003	0.000	12.420	-0.002	0.967	-0.042	0.309
BRJ BLACKROCK NATURAL RESOURCES EQUITY	-0.021	0.529	-0.630	0.314	0.000	11.167	0.400	0.000	4.828	0.204	0.000	3.557	0.083
DAIWA JAPAN OPEN	-0.006	0.616	-0.502	0.924	0.000	86.723	0.186	0.000	5.919	-0.143	0.000	-6.596	0.794
BNYMELLON US MNFG INDUSTRY EQUITY FUND	0.013	0.618	0.499	0.589	0.000	27.382	0.830	0.000	13.090	0.019	0.658	0.442	0.345
INVESCO MSCI KOKUSAI PORTFOLIO	-0.009	0.660	-0.440	0.525	0.000	29.691	0.725	0.000	13.897	0.063	0.082	1.743	0.382
ALLIANCE GLOBAL GROWTH OPPORTUNITIES (2Y)	-0.008	0.688	-0.402	0.538	0.000	31.544	0.674	0.000	13.410	0.002	0.961	0.049	0.400
GS NET WIN GS TECH EQTY FD B (NON HGD)	-0.011	0.711	-0.370	0.619	0.000	24.883	0.923	0.000	12.592	-0.103	0.043	-2.026	0.308
JPM JAPAN MEISTER	0.002	0.827	0.218	0.895	0.000	113.295	0.098	0.000	4.221	-0.085	0.000	-5.276	0.866
ALLIANCE US GROWTH EQUITY B	0.005	0.832	0.212	0.560	0.000	27.363	0.796	0.000	13.206	-0.067	0.111	-1.596	0.345
JPM THE JAPAN	0.000	0.988	0.015	0.906	0.000	67.771	0.309	0.000	7.841	-0.168	0.000	-6.158	0.708

Appendix 6

Table 37: Treynor & Mazuy Market Timing Model United States

Fund	α	p-value	t-test	β	p-value	t-test	γ	p-value	t-test	Adjusted R2
AAM/INSIGHT SELECT INCOME FUND A	-0.618	0.000	-31.520	0.371	0.000	28.851	-0.005	0.059	-1.893	0.363
AB CALIFORNIA PORTFOLIO C	-0.625	0.000	-33.967	0.387	0.000	32.052	0.002	0.469	0.724	0.391
AB CONCENTRATED GROWTH FUND A	0.020	0.099	1.652	1.028	0.000	130.181	0.000	0.964	-0.045	0.916
AB CORE OPPORTUNITIES FUND A	-0.085	0.000	-5.130	0.941	0.000	87.109	0.000	0.950	-0.063	0.829
AB DISCOVERY GROWTH FUND A	0.072	0.004	2.882	1.049	0.000	64.038	-0.017	0.000	-4.703	0.739
AB GLOBAL BOND FUND A	-0.638	0.000	-33.316	0.367	0.000	29.188	-0.002	0.516	-0.650	0.358
AB LARGE CAP GROWTH FUND A	-0.005	0.707	-0.376	0.985	0.000	111.563	-0.004	0.029	-2.182	0.890
AB LARGE CAP GROWTH FUND ADVISOR	-0.002	0.869	-0.166	0.986	0.000	115.122	-0.004	0.026	-2.235	0.896
AB SMALL CAP VALUE PORTFOLIO C	0.036	0.110	1.601	1.029	0.000	69.230	-0.009	0.009	-2.617	0.761
AB VIRGINIA PORTFOLIO C	-0.628	0.000	-34.009	0.385	0.000	31.762	0.002	0.354	0.927	0.385
ABRDN DYNAMIC DIVIDEND FUND INST	-0.112	0.000	-11.409	0.896	0.000	138.980	-0.005	0.000	-3.737	0.927
ABRDN GLOBAL INFRASTRUCTURE FUND INST	-0.172	0.000	-11.486	0.827	0.000	84.090	-0.006	0.009	-2.609	0.824
ABRDN US SMALL CAP EQUITY FUND R	-0.011	0.620	-0.496	0.995	0.000	66.498	-0.006	0.071	-1.805	0.744
ADAPTIVE GROWTH OPPORTUNITIES ETF	-0.191	0.000	-11.475	0.822	0.000	75.425	0.008	0.000	3.491	0.777
ALLSPRING DISCVRY SCG FD INST	0.074	0.016	2.420	1.075	0.000	53.276	-0.013	0.003	-2.943	0.658
ALLSPRING GROWTH FUND A	0.039	0.216	1.238	1.081	0.000	52.406	-0.006	0.187	-1.320	0.643
ALLSPRING INDEX FUND A	-0.056	0.020	-2.321	1.001	0.000	63.489	0.002	0.509	0.661	0.719
ALLSPRING MUNICIPAL BOND FUND ADM	-0.630	0.000	-34.085	0.382	0.000	31.480	0.002	0.378	0.882	0.381
ALPHA MARK FUND	-0.140	0.000	-7.170	0.894	0.000	69.747	-0.001	0.652	-0.451	0.758
AMERICAN FDS WASHINGTON MUTUAL INV FD 529-C	-0.080	0.000	-8.806	0.937	0.000	157.492	0.000	0.729	0.347	0.941
AMERICAN FUND.PRESERVN. PRTF.CL.A	-0.650	0.000	-34.811	0.363	0.000	29.665	0.004	0.177	1.350	0.350
AMERICAN FUNDS AMERICAN MUTUAL FUND F2	-0.159	0.000	-16.325	0.858	0.000	134.015	0.002	0.117	1.568	0.919
AMERICAN MUTUAL FD.CL.C SHS.	-0.160	0.000	-16.799	0.857	0.000	137.182	0.002	0.130	1.513	0.923
ARCHER INCOME FUND	-0.633	0.000	-34.955	0.376	0.000	31.645	0.001	0.581	0.552	0.386
ARTISAN GLOBAL VALUE FUND ADV	-0.087	0.000	-5.923	0.925	0.000	96.081	-0.003	0.173	-1.364	0.857
BLACKROCK CORE BOND PORTFOLIO K	-0.649	0.000	-32.900	0.359	0.000	27.777	0.000	0.870	0.164	0.329
BLACKROCK INCOME FUND INST	-0.581	0.000	-33.592	0.413	0.000	36.449	-0.005	0.036	-2.099	0.474
BLKRK IMPACT MTGE FD INSTL	-0.656	0.000	-33.442	0.361	0.000	28.076	0.003	0.231	1.199	0.326
BNY MELLON CORE PLUS FUND Y	-0.631	0.000	-33.033	0.371	0.000	29.613	-0.001	0.756	-0.310	0.362
BUFFALO HIGH YIELD FUND INVESTOR	-0.546	0.000	-33.067	0.449	0.000	41.440	-0.005	0.043	-2.029	0.536
CALVERT BOND FUND A	-0.645	0.000	-33.129	0.354	0.000	27.679	-0.002	0.475	-0.715	0.335
COLUMBIA ACORN EUROPEAN FUND I	-0.097	0.000	-4.209	0.845	0.000	55.749	-0.019	0.000	-5.814	0.689
DWS TOTAL RETURN BOND FUND INSTITUTIONAL	-0.640	0.000	-32.881	0.361	0.000	28.258	-0.002	0.509	-0.661	0.343
FID.SMCP.DISCOVERY FUND	0.582	0.000	20.425	0.635	0.000	33.963	-0.015	0.000	-3.627	0.452
FIDELITY LIMITED TERM BOND FUND	-0.641	0.000	-34.923	0.367	0.000	30.504	0.002	0.490	0.690	0.368
FIDELITY LOW PRICE STK. FD.	-0.148	0.000	-9.236	0.867	0.000	82.414	-0.004	0.115	-1.575	0.816
FIDELITY TOTAL BOND FUND	-0.637	0.000	-33.050	0.369	0.000	29.167	0.000	0.969	0.039	0.352
FIDELITY US BOND INDEX FUND	-0.659	0.000	-33.097	0.352	0.000	26.990	0.002	0.500	0.675	0.312
FRANKLIN GOLD AND PRECIOUS METALS FUND R6	-0.330	0.000	-6.239	0.666	0.000	19.224	0.003	0.665	0.433	0.187
HARTFORD MUT.FUND.MID. CAP.VAL.C	-0.011	0.581	-0.552	0.998	0.000	73.991	-0.008	0.005	-2.812	0.785
INVESCO CONSERVATIVE INCOME FUND R6	-0.644	0.000	-35.582	0.368	0.000	30.991	0.004	0.154	1.427	0.370
INVESCO CORPORATE BOND FD.CL.R6	-0.613	0.000	-31.385	0.377	0.000	29.422	-0.006	0.038	-2.074	0.373
INVESCO GOLD & SPECIAL MINERALS FUND A	-0.286	0.000	-5.374	0.695	0.000	19.907	0.002	0.762	0.303	0.199
INVESCO MUN.INC.FD.INVR. CL.	-0.623	0.000	-33.179	0.388	0.000	31.514	0.001	0.681	0.412	0.385
JP MORGAN CORE PLUS BD.A	-0.648	0.000	-33.290	0.358	0.000	28.043	0.000	0.959	-0.052	0.335
JP MORGAN CORPORATE BOND I	-0.633	0.000	-31.084	0.368	0.000	27.549	-0.003	0.320	-0.994	0.335
KINETICS MUT.FUND.THE MED.FD.	-0.215	0.000	-9.356	0.817	0.000	54.292	0.004	0.173	1.363	0.648
THRIVENT INCOME FUND S	-0.627	0.000	-31.832	0.371	0.000	28.710	-0.003	0.266	-1.112	0.354
VANGUARD BD.IDX.FD.SHT. TM.PRTF.	-0.653	0.000	-35.058	0.361	0.000	29.537	0.004	0.181	1.338	0.348
VANGUARD LONG-TERM INV. GDE.FD.INVR.SHS.	-0.661	0.000	-25.695	0.326	0.000	19.357	-0.008	0.036	-2.094	0.211

Table 38: Treynor & Mazuy Market Timing Model United Kingdom

Fund	α	p-value	t-test	β	p-value	t-test	γ	p-value	t-test	Adjusted R2
AI UK INDEX TRACKING CLASS 8 ACC	0.025	0.001	3.416	0.822	0.000	155.156	-0.005	0.000	-4.044	0.922
NFU MUTUAL UK EQUITY INCOME C INCOME	0.008	0.354	0.928	0.793	0.000	125.711	-0.005	0.000	-3.510	0.887
ABRDN UK ALL SHARE TRACKER FUND A ACC	0.038	0.019	2.342	0.668	0.000	57.369	-0.011	0.000	-3.903	0.623
MAN GLG INCOME PROFESSIONAL ACC C GBP	0.047	0.006	2.729	0.660	0.000	53.107	-0.012	0.000	-3.798	0.586
FP RUSSELL INV INTERNATL GRO ASSTS C ACC	0.058	0.006	2.734	0.276	0.000	18.019	-0.013	0.000	-3.495	0.148
BAILLIE GIFF UK EQUITY ALPHA B AC.	0.061	0.015	2.434	0.605	0.000	33.436	-0.022	0.000	-5.001	0.368
TM STONEHG FLM OPPS ACC C	0.079	0.000	4.110	0.511	0.000	36.914	-0.028	0.000	-8.018	0.426
SCWID.UK EQ.INC.CL.C INC.	0.076	0.002	3.093	0.273	0.000	15.415	-0.041	0.000	-9.247	0.151
ORBIS OEIC GLOBAL EQUITY STANDARD SC ACC	0.052	0.003	2.953	0.606	0.000	47.584	-0.010	0.001	-3.187	0.532
ARTEMIS GLOBAL INCOME C ACC GBP	0.046	0.019	2.344	0.507	0.000	36.071	-0.011	0.001	-3.188	0.397
PREMIER MITON GLOBAL SUSTAINABLE GROWTH C ACC	0.062	0.005	2.806	0.381	0.000	24.162	-0.012	0.002	-3.133	0.231
EDEN TREE RESP AND SUST EUROPEAN EQUITY C	0.047	0.012	2.519	0.623	0.000	46.705	-0.010	0.003	-3.013	0.522
ARTEMIS SMART GARP GLOBAL EQUITY C ACC GBP	0.047	0.012	2.512	0.509	0.000	37.837	-0.008	0.012	-2.500	0.418
FUNDSMITH EQUITY I ACC	0.070	0.002	3.171	0.314	0.000	19.822	-0.008	0.036	-2.097	0.166
JPM EMERGING MKTS.B ACC	0.044	0.059	1.888	0.461	0.000	27.511	-0.008	0.050	-1.965	0.275
SCHRODER QEP GLOBAL CORE I AC.	0.052	0.007	2.711	0.478	0.000	34.903	-0.006	0.065	-1.846	0.378
LF CANLIFE ASIA PACIFIC C ACC	0.036	0.103	1.630	0.430	0.000	27.147	-0.006	0.098	-1.654	0.269
JANUS HENDERSON AS-PAC CAPITAL GRO C ACC	0.039	0.080	1.751	0.411	0.000	25.930	-0.006	0.105	-1.624	0.251
ALLIANZ EMERGING MARKETS EQUITY A ACC GBP	0.031	0.159	1.411	0.413	0.000	26.375	-0.005	0.199	-1.285	0.257
WS SEQUEL GROWTH TARGET RETURN STRAT STAND C	-0.002	0.856	-0.181	0.204	0.000	27.242	-0.002	0.306	-1.024	0.269
BLACKROCK GOLD &.GENERAL D AC.	0.034	0.453	0.751	0.338	0.000	10.411	0.007	0.362	0.913	0.049
BAILLIE GIFFORD AMERICAN C ACC	0.054	0.185	1.325	0.459	0.000	15.831	0.006	0.437	0.778	0.107
JPM ASIA GROWTH C NET ACC	0.046	0.060	1.881	0.453	0.000	25.648	-0.003	0.442	-0.769	0.245
LIONTRUST CHINA GBP C ACC	0.031	0.358	0.920	0.427	0.000	17.906	-0.004	0.541	-0.611	0.136
ABERDEEN UK EQUITY INCOME Z AC.	0.008	0.580	0.553	0.338	0.000	33.482	0.001	0.615	0.503	0.353
M&G GILT&FIXED INTEREST INCOME STERLING A ACC	-0.012	0.303	-1.030	0.035	0.000	4.343	0.007	0.000	3.525	0.012
L&G ACTIVE GLOBAL HIGH YIELD BOND F ACC	0.030	0.011	2.542	0.181	0.000	21.320	-0.012	0.000	-5.460	0.202
BLLE.GIFF HIGH YIELD BD. B AC.	0.041	0.004	2.863	0.200	0.000	19.487	-0.017	0.000	-6.593	0.184
JPM GLOBAL HIGH YIELD BD .C ACC	0.026	0.048	1.981	0.174	0.000	18.433	-0.008	0.001	-3.310	0.152
CG UK GLOBAL HIGH INCOME OPPORTUNITIES P ACC GBP	0.041	0.005	2.834	0.224	0.000	21.613	-0.009	0.001	-3.357	0.196
ABRDN STRATEGIC BOND FUND A ACC	0.015	0.102	1.636	0.183	0.000	27.864	-0.004	0.007	-2.692	0.283
BLACKROCK CORPORATE BOND D AC.	0.015	0.082	1.738	0.147	0.000	23.359	-0.004	0.014	-2.471	0.217
INVESCO CORPORATE BOND (UK) ACC	0.010	0.230	1.200	0.158	0.000	25.768	-0.003	0.052	-1.947	0.250
ABRDN AAA BOND INSTITUTIONAL ACC GBP	-0.003	0.765	-0.299	0.148	0.000	21.317	0.003	0.076	1.778	0.179
LF CANLIFE CORPORATE BOND C ACC	0.011	0.211	1.252	0.126	0.000	19.230	-0.003	0.107	-1.611	0.157
CT STRATEGIC BOND INST GROSS ACC GBP	0.013	0.151	1.437	0.195	0.000	30.710	-0.003	0.109	-1.603	0.319
MARKS & SPEN.HI.INC.AC.	0.010	0.492	0.687	0.175	0.000	16.629	-0.003	0.187	-1.319	0.122
AXA ACT CBN.TSTN.STG B&M CRDT FD Z ACC	0.010	0.302	1.033	0.112	0.000	16.746	-0.002	0.328	-0.978	0.122
AVIVA INVESTORS CORP BD FD CLS 8 ACC	0.008	0.361	0.914	0.115	0.000	17.664	-0.002	0.344	-0.947	0.134
ISHARES CORPORATE BOND INDEX (UK) D ACC	0.009	0.333	0.968	0.118	0.000	17.790	-0.001	0.369	-0.898	0.136
ABRDN ETHICAL CORPORATE BOND FUND INST ACC	0.008	0.471	0.721	0.149	0.000	19.473	-0.002	0.389	-0.862	0.158
JUPITER INVESTMENT GRADE BOND FUND I GBP ACC	0.009	0.333	0.969	0.115	0.000	17.385	-0.001	0.448	-0.760	0.130
DIMENSIONAL GLOBAL SHORT DATED BOND ACC	-0.001	0.920	-0.101	0.163	0.000	25.735	0.001	0.468	0.726	0.243
HSBC CPRT.BD. INSTL.AC.	0.012	0.229	1.204	0.124	0.000	17.793	-0.001	0.492	-0.688	0.135
EDEN TREE AMITY STERLING BOND C	0.004	0.696	0.391	0.170	0.000	25.891	-0.001	0.495	-0.682	0.248
FID LNG DATED STER CORP BD FD W ACC	0.011	0.428	0.792	0.068	0.000	7.127	-0.002	0.510	-0.659	0.024
LIONTRUST MONTHLY INCOME BOND B ACC	0.009	0.320	0.995	0.177	0.000	25.969	-0.001	0.524	-0.637	0.249
IFSL CAF FIXED INTEREST A ACC	0.005	0.608	0.512	0.169	0.000	24.311	-0.001	0.585	-0.546	0.225
INSIGHT INV.UK GVT.ALL MT BD.GR.PTRS2 AC.	0.005	0.585	0.546	0.141	0.000	20.555	0.001	0.599	0.526	0.170
NATIXIS LS STGC INC I/A ACC	0.004	0.717	0.363	0.178	0.000	24.504	0.000	0.849	-0.190	0.227

Table 39: Treynor & Mazuy Market Timing Model Canada

Fund	α	p-value	t-test	β	p-value	t-test	γ	p-value	t-test	Adjusted R2
RBC CANADIAN MID-CAP EQUITY FUND SR I	-0.127	0.000	-4.619	0.902	0.000	62.943	-0.012	0.000	-5.954	0.747
CANOE CANADIAN SMALL MID CAP PORTFOLIO CLASS SR D	-0.285	0.000	-9.465	0.826	0.000	52.809	-0.012	0.000	-5.198	0.676
BMO EMERGING MARKETS BOND ADVISOR SERIES	-1.375	0.000	-57.733	0.290	0.000	23.423	-0.009	0.000	-5.062	0.320
BGC.NORTH AMER.FOCD.EQ SRS D	-0.275	0.000	-11.873	0.875	0.000	72.792	0.007	0.000	4.021	0.771
DESJARDINS EMERGING MARKETS BOND F	-1.645	0.000	-57.795	0.155	0.000	10.496	-0.009	0.000	-3.942	0.102
ABERDEEN EMERGING MARKETS DEBT	-1.337	0.000	-47.795	0.309	0.000	21.233	-0.008	0.000	-3.702	0.269
EDUCATORS MORTGAGE & INCOME CLASS A	-1.573	0.000	-79.029	0.220	0.000	21.260	0.005	0.001	3.432	0.205
BRANDES EMERGING MARKETS VALUE FD SRS F	-0.605	0.000	-17.719	0.679	0.000	38.336	-0.008	0.002	-3.111	0.519
DYNAMIC SHORT TERM BOND SERIES I	-1.575	0.000	-78.237	0.219	0.000	20.954	0.005	0.002	3.064	0.203
FIDELITY CANADIAN LARGE CAP SERIES F	-0.621	0.000	-19.807	0.701	0.000	43.058	0.006	0.010	2.574	0.539
BAROMETER EQUITY POOL CLASS A	-0.589	0.000	-14.295	0.682	0.000	31.899	-0.008	0.011	-2.548	0.427
IG MACKENZIE GLOBAL BOND SERIES C	-1.692	0.000	-61.668	0.162	0.000	11.362	0.005	0.016	2.412	0.065
CANOE BOND ADVANTAGE PORTFOLIO CLASS SERIES A	-1.636	0.000	-65.336	0.186	0.000	14.303	0.004	0.061	1.877	0.107
CANSO CANADIAN BOND FD CLASS F	-1.596	0.000	-69.134	0.206	0.000	17.142	0.003	0.061	1.874	0.150
CAPITAL GROUP GLOBAL EQUITY SERIES D	-0.379	0.000	-12.790	0.791	0.000	51.374	-0.004	0.094	-1.675	0.648
INVESCO CANADIAN CORE PLUS BOND SERIES A	-1.575	0.000	-62.772	0.200	0.000	15.372	-0.003	0.094	-1.674	0.151
BRANDES CORPORATE FOCUS BOND CL I HEDGED	-1.488	0.000	-72.001	0.258	0.000	24.065	0.002	0.132	1.506	0.267
ADDENDA ACTIVE DURATION BOND POOL CL A	-1.585	0.000	-68.231	0.209	0.000	17.344	0.003	0.141	1.473	0.156
AGF EMERGING MARKETS BOND SERIES F	-1.544	0.000	-60.665	0.231	0.000	17.468	0.003	0.151	1.436	0.158
BMO EQUITY GROWTH ETF PORTFOLIO ADVISOR SERIES	-0.342	0.000	-17.695	0.820	0.000	81.781	-0.002	0.206	-1.265	0.821
MACKENZIE CANADIAN BOND ADVISOR SERIES	-1.616	0.000	-67.113	0.192	0.000	15.352	0.002	0.211	1.251	0.126
FRANKLIN BRANDYWINE GLBL SUSTNBL INC OPTM SR A	-1.491	0.000	-67.324	0.252	0.000	21.879	-0.002	0.243	-1.167	0.254
FDP CANADIAN BOND PORTFOLIO SERIES A	-1.617	0.000	-65.809	0.191	0.000	14.940	0.002	0.259	1.128	0.121
MANULIFE CANADIAN BOND SERIES F	-1.623	0.000	-65.561	0.188	0.000	14.651	0.002	0.265	1.115	0.117
LEITH WHEELER CORE BOND SERIES B	-1.620	0.000	-65.275	0.189	0.000	14.677	0.002	0.296	1.046	0.118
AXIOM ALL EQUITY PORTFOLIO CLASS A	-0.315	0.000	-14.423	0.831	0.000	73.265	-0.002	0.302	-1.032	0.786
BEUTEL GOODMAN INCOME SERIES D	-1.619	0.000	-65.484	0.190	0.000	14.830	0.002	0.324	0.987	0.121
CIBC CANADIAN BOND CLASS A	-1.605	0.000	-65.759	0.197	0.000	15.504	0.002	0.348	0.938	0.131
HSBC CANADIAN BOND FUND INVESTOR SERIES	-1.607	0.000	-66.285	0.195	0.000	15.508	0.001	0.418	0.809	0.132
FIDELITY FLOATING RATE HIGH INCOME SERIES A	-1.632	0.000	-56.325	0.177	0.000	11.783	0.002	0.429	0.791	0.079
MANULIFE STRATEGIC INCOME FUND SERIES FT6	-1.459	0.000	-67.374	0.276	0.000	24.493	0.001	0.443	0.766	0.280
CI ASIAN OPPORTUNITIES FUND SERIES I	-1.150	0.000	-26.441	0.404	0.000	17.885	-0.002	0.482	-0.704	0.183
CI ASIAN OPPORTUNITIES CORPORATE CLASS A	-1.157	0.000	-26.166	0.410	0.000	17.855	-0.002	0.487	-0.695	0.182
ABRDN CANADA EAFE PLUS EQUITY	-0.827	0.000	-21.825	0.579	0.000	29.394	-0.002	0.492	-0.687	0.373
CIBC ASIA PACIFIC INDEX CLASS A	-0.635	0.000	-19.711	0.674	0.000	40.320	-0.002	0.524	-0.637	0.526
CANADA LIFE CANADIAN GROWTH FUND F	-0.201	0.000	-13.300	0.901	0.000	115.072	0.001	0.529	0.630	0.899
CANADA LIFE CANADIAN EQUITY FUND A	-0.134	0.000	-9.453	0.938	0.000	127.208	0.001	0.533	0.623	0.915
RBC NORTH AMERICAN GROWTH SR F	-0.131	0.000	-7.083	0.932	0.000	97.142	0.001	0.550	0.598	0.863
CANADA LIFE EUROPEAN EQUITY FUND A	-0.832	0.000	-26.947	0.579	0.000	36.111	-0.001	0.553	-0.594	0.471
CI AMERICAN SMALL COMPANIES CORP CL IT8	-0.116	0.002	-3.101	0.952	0.000	48.898	-0.001	0.611	-0.509	0.619
BMO ASIAN GROWTH AND INCOME ADVISOR SERIES	-0.929	0.000	-29.002	0.531	0.000	31.911	-0.001	0.655	-0.447	0.410
NBI GLOBAL DIVERSIFIED EQUITY INVESTOR SERIES	-0.371	0.000	-12.101	0.809	0.000	50.814	-0.001	0.723	-0.355	0.636
DESJARDINS AMERICAN EQUITY GROWTH I	-0.156	0.000	-3.685	0.912	0.000	41.458	0.001	0.727	0.349	0.534
CANADA LIFE US ALL CAP GROWTH FUND SERIES W	-0.222	0.000	-5.430	0.874	0.000	41.197	0.001	0.858	0.179	0.532
BEUTEL GOODMAN CORE PLUS BOND SERIES B	-1.610	0.000	-65.610	0.189	0.000	14.817	0.000	0.863	-0.173	0.129
CANADA LIFE US SMALL-MID CAP GROWTH FUND N	-0.314	0.000	-7.950	0.836	0.000	40.692	0.000	0.869	-0.165	0.528
AGF AMERICAN GROWTH CLASS SERIES F	-0.253	0.000	-6.534	0.850	0.000	42.274	0.000	0.881	-0.149	0.547
DYNAMIC ADVANTAGE BOND SERIES F	-1.569	0.000	-67.897	0.212	0.000	17.696	0.000	0.899	-0.126	0.174
EDUCATORS BOND CLASS A	-1.602	0.000	-65.964	0.193	0.000	15.302	0.000	0.969	-0.038	0.136
CAPITAL GROUP US EQUITY SERIES F	-0.376	0.000	-13.297	0.803	0.000	54.641	0.000	0.988	0.015	0.667

Table 40: Treynor & Mazuy Market Timing Model Italy

Fund	α	p-value	t-test	β	p-value	t-test	γ	p-value	t-test	Adjusted R2
ALLIANZ REDDITO GLOBALE	-1.525	0.000	-58.121	0.237	0.000	16.349	0.014	0.000	6.979	0.128
FONDERSEL INTERNAZIONALE ESG	-1.490	0.000	-57.385	0.256	0.000	17.883	0.014	0.000	7.091	0.153
FIDEURAM MASTER SEL.EQ. USA	-0.866	0.000	-29.651	0.566	0.000	35.147	0.012	0.000	5.239	0.487
ALLIANZ REDDITO EURO	-1.472	0.000	-63.637	0.256	0.000	20.046	0.011	0.000	5.885	0.203
ARCA BD PAESI EM VALUTA LOCALE P	-1.275	0.000	-52.357	0.358	0.000	26.672	0.011	0.000	5.819	0.333
EUROMOBILIARE EURO AGGREGATE A	-1.453	0.000	-68.314	0.262	0.000	22.313	0.010	0.000	5.948	0.247
FIDEURAM RISPARMIO ATTIVO	-1.473	0.000	-68.462	0.254	0.000	21.389	0.010	0.000	6.178	0.226
ANIMA OBBLIGAZIONARIO EURO BT A	-1.468	0.000	-68.722	0.256	0.000	21.707	0.010	0.000	6.264	0.232
BOND STRATEGIA PRUDENTE A	-1.465	0.000	-68.609	0.257	0.000	21.798	0.010	0.000	6.288	0.233
FIDEURAM MASTER SELECTION BALANCED	-1.189	0.000	-55.779	0.396	0.000	33.723	0.009	0.000	5.523	0.462
EURIZON OBBLIGAZIONI CEDOLA D	-1.436	0.000	-67.159	0.269	0.000	22.822	0.009	0.000	5.394	0.263
EURIZON OBBLIGAZIONI EURO BREVE TERMINE D	-1.448	0.000	-68.240	0.264	0.000	22.513	0.009	0.000	5.733	0.253
AZIMUT TREND TASSI	-1.403	0.000	-64.686	0.288	0.000	24.039	0.009	0.000	5.586	0.284
ANIMA SELEZIONE GLOBALE B	-0.780	0.000	-26.559	0.603	0.000	37.241	0.008	0.000	3.599	0.534
BANCOPOSTA AZIONARIO INTERNAZIONALE	-0.774	0.000	-25.593	0.608	0.000	36.446	0.008	0.000	3.556	0.523
ACOMEA PERFORMANCE A1	-1.167	0.000	-46.045	0.409	0.000	29.290	0.008	0.000	3.949	0.402
INVESTIPER OBBLIGAZIONARIO GLOBALE	-1.419	0.000	-67.244	0.274	0.000	23.550	0.008	0.000	4.983	0.281
ALLIANZ GLOBAL MULTI- ASSET CREDIT FUND	-1.469	0.000	-66.745	0.248	0.000	20.407	0.008	0.000	4.653	0.223
ARCA RR DIVERSIFIED BOND	-1.381	0.000	-65.257	0.290	0.000	24.848	0.007	0.000	4.028	0.318
BOND STRATEGIA ATTIVA A	-1.459	0.000	-64.609	0.250	0.000	20.085	0.007	0.000	3.824	0.226
MEDIOLANUM STRATEGIA GLOBALE MULTI BOND L	-1.366	0.000	-62.375	0.306	0.000	25.357	0.007	0.000	4.127	0.327
FONDERSEL EURO	-1.466	0.000	-61.303	0.248	0.000	18.783	0.007	0.000	3.886	0.200
AMUNDI OBBLIGAZIONARIO BREVE TERMINE - C	-1.424	0.000	-65.945	0.268	0.000	22.524	0.007	0.000	4.316	0.269
ALLIANZ AZIONI AMERICA	-0.767	0.000	-19.344	0.615	0.000	28.107	0.011	0.001	3.459	0.386
ARCA AZIONI INTERNAZIONALI P	-0.798	0.000	-27.874	0.591	0.000	37.443	0.007	0.001	3.308	0.540
BOND PAESI EMERGENTI ESG A	-1.339	0.000	-57.025	0.313	0.000	24.145	0.006	0.001	3.427	0.311
BNL AZIONI AMERICA	-0.789	0.000	-18.081	0.596	0.000	24.777	0.011	0.002	3.137	0.327
ACOMEA AMERICA A1	-0.701	0.000	-19.571	0.649	0.000	32.883	0.009	0.002	3.069	0.473
ARCA AZIONI PAESI EMER.	-0.901	0.000	-25.655	0.545	0.000	28.123	0.008	0.002	3.032	0.391
ANIMA VALORE GLOBALE A	-0.726	0.000	-26.630	0.628	0.000	41.789	0.007	0.002	3.175	0.598
SYMPHONIA AZIONARIO TREND GLOBALE I	-0.989	0.000	-33.248	0.485	0.000	29.547	0.007	0.002	3.047	0.417
BNL OBBLIGAZIONI EMERGENTI	-1.268	0.000	-46.304	0.345	0.000	22.850	0.006	0.003	3.016	0.291
INVESTIPER OBBLIG PAESI EMERGENTI	-1.394	0.000	-63.579	0.281	0.000	23.196	0.005	0.004	2.846	0.300
CONSULTINVEST BREVE TERMINE C	-1.332	0.000	-63.515	0.306	0.000	26.451	0.004	0.007	2.708	0.364
ALLIANZ AZIONI EUROPA	-0.484	0.000	-22.180	0.754	0.000	62.642	0.004	0.009	2.630	0.778
INVESTIMENTI AZIONARI ITALIA A	-0.240	0.000	-18.685	0.858	0.000	120.932	-0.002	0.014	-2.456	0.934
BNP PARIBAS JAPAN EQUITY CLASSIC H EUR CAP	-1.033	0.000	-26.900	0.423	0.000	19.950	-0.007	0.024	-2.260	0.306
ALLIANZ AZIONI PACIFICO	-1.143	0.000	-31.693	0.406	0.000	20.407	0.006	0.034	2.123	0.254
EURIZON AZIONI PMI ITALIA R	-0.509	0.000	-23.714	0.708	0.000	59.782	-0.003	0.054	-1.925	0.780
ZENIT PIANETA ITALIA I	-0.411	0.000	-29.871	0.784	0.000	103.417	0.002	0.098	1.657	0.908
ANIMA TRICOLORE AD	-1.353	0.000	-55.286	0.296	0.000	21.924	0.003	0.109	1.603	0.291
ACOMEA EUROPA A1	-0.419	0.000	-21.816	0.769	0.000	72.644	-0.002	0.237	-1.182	0.836
ARCA AZIONI ITALIA P	-0.150	0.000	-15.464	0.913	0.000	170.711	-0.001	0.270	-1.102	0.965
ANIMA INIZIATIVA EUROPA A	-0.618	0.000	-28.719	0.670	0.000	56.401	0.002	0.280	1.081	0.746
AGORA MATERIALS R	-0.743	0.000	-19.051	0.602	0.000	27.982	0.003	0.391	0.858	0.415
SYMPHONIA AZION SMCP ITALIA CL I	-0.643	0.000	-28.105	0.635	0.000	50.359	-0.001	0.408	-0.827	0.711
CONSULTINVEST REDDITO C	-1.240	0.000	-56.166	0.345	0.000	28.318	0.001	0.499	0.677	0.423
FIDEURAM ITALIA R	-0.162	0.000	-17.032	0.902	0.000	171.658	0.000	0.586	-0.545	0.966
EPSILON Q VALUE	-0.466	0.000	-24.178	0.750	0.000	70.494	0.000	0.741	0.330	0.824
EUROMOBILIARE AZIONI ITALIANE A	-0.167	0.000	-17.639	0.906	0.000	173.689	0.000	0.871	0.162	0.966

Table 41: Treynor & Mazuy Market Timing Model Germany

Fund	α	p-value	t-test	β	p-value	t-test	γ	p-value	t-test	Adjusted R2
HAL SYSTEMATIC MULTI ASSET DYNAMIC RT	-0.063	0.000	-4.684	0.609	0.000	66.586	-0.008	0.000	-3.580	0.690
DEGUSSA AKTIEN UNIVERSAL-FONDS	-0.018	0.099	-1.649	0.818	0.000	112.637	-0.009	0.000	-4.889	0.864
LAZARD ASST.MAN.DTL.EUR. HIGHYIELD	-0.150	0.000	-11.094	0.270	0.000	29.576	-0.009	0.000	-3.972	0.313
ACATIS ASIA PACIFIC PLUS FONDS	-0.097	0.000	-5.200	0.408	0.000	32.361	-0.011	0.000	-3.570	0.350
HELABA INVEST KPL.HIY. FONDS	-0.148	0.000	-10.848	0.266	0.000	28.898	-0.011	0.000	-4.731	0.307
FIRST PRIV.INV.MAN.KAG EUROPA AKTIEN ULM B	-0.022	0.057	-1.901	0.823	0.000	103.792	-0.012	0.000	-6.037	0.844
GLS BANK AKTIENFONDS AK A	-0.046	0.001	-3.459	0.650	0.000	71.799	-0.012	0.000	-5.387	0.723
HELABA INVEST KPL. DIVIDENDENPLUS FONDS	-0.009	0.552	-0.595	0.870	0.000	89.477	-0.012	0.000	-5.083	0.801
BERENBERG AKTIEN GLOBAL PLUS R D	-0.071	0.000	-4.023	0.527	0.000	44.377	-0.013	0.000	-4.234	0.502
CHOM CAPITAL ACTIVE RETURN EUROPE UI - AK I	-0.027	0.038	-2.080	0.741	0.000	85.752	-0.013	0.000	-6.170	0.788
DIT ALLIANZ VALUE GLOBAL	-0.087	0.000	-3.867	0.428	0.000	28.293	-0.015	0.000	-3.924	0.295
INVESCO KPL.EUROPA CORE AKTIENFDS	-0.073	0.000	-3.979	0.511	0.000	41.509	-0.015	0.000	-4.774	0.471
FONDSPICKER GLOBAL UI	-0.089	0.000	-5.521	0.402	0.000	36.962	-0.017	0.000	-6.127	0.421
CH GLOBAL	-0.117	0.000	-4.024	0.258	0.000	13.190	-0.018	0.000	-3.670	0.090
DEKA INV.GLOBALCHAMPIONS CF	-0.070	0.005	-2.804	0.361	0.000	21.436	-0.020	0.000	-4.643	0.201
DEKA INV.GLOBALCHAMPIONS TF	-0.072	0.004	-2.887	0.361	0.000	21.430	-0.020	0.000	-4.654	0.201
GAMAX FUNDS ASIA PACIFIC A	-0.111	0.000	-4.228	0.180	0.000	10.166	-0.023	0.000	-5.177	0.067
HP&P EURO SELECT UI FONDS A	-0.079	0.000	-6.626	0.618	0.000	77.267	-0.007	0.001	-3.370	0.749
BREMEN KAPITAL AKTIEN	-0.139	0.000	-6.394	0.208	0.000	14.130	-0.012	0.001	-3.373	0.099
LBBW ASTMGMT.INV.GESELL. MBH RENTAMAX R	-0.166	0.000	-12.409	0.211	0.000	23.388	-0.006	0.004	-2.849	0.220
BALOISE-AKTIENFONDS DWS	-0.036	0.075	-1.778	0.735	0.000	53.283	-0.010	0.004	-2.921	0.588
CORPORATE M SUSTAINABLE (I)	-0.169	0.000	-12.666	0.203	0.000	22.573	-0.006	0.005	-2.834	0.209
LBBW RENTEN EURO FLEX NACHHALTIGKEIT	-0.170	0.000	-12.768	0.197	0.000	21.894	-0.006	0.007	-2.715	0.199
METZLER EURO CORPORATES SUSTAINABILITY AI	-0.169	0.000	-12.258	0.211	0.000	22.642	-0.006	0.007	-2.692	0.209
FBG INDIVIDUAL R-PA	-0.169	0.000	-12.949	0.213	0.000	24.257	-0.006	0.009	-2.622	0.232
AKTIV CHANCE	-0.029	0.030	-2.172	0.767	0.000	84.956	-0.006	0.011	-2.541	0.782
MEAG MUNICH ERGO KPL. EURORENT	-0.173	0.000	-12.622	0.195	0.000	21.058	-0.006	0.011	-2.545	0.186
MONEGA KPL.EURO BOND	-0.175	0.000	-12.560	0.186	0.000	19.810	-0.006	0.011	-2.540	0.169
ACATIS AKTIEN GLOBAL FONDS B	-0.038	0.048	-1.979	0.651	0.000	49.709	-0.008	0.011	-2.555	0.553
BFS NACHHALTIGKEITSFONDS GREEN BONDS	-0.174	0.000	-13.100	0.188	0.000	20.955	-0.005	0.025	-2.251	0.184
AMUNDI BKK RENT	-0.175	0.000	-13.203	0.193	0.000	21.616	-0.005	0.028	-2.200	0.193
EARTH GOLD FUND UI (EUR R)	-0.025	0.645	-0.461	0.415	0.000	11.557	-0.019	0.037	-2.087	0.066
LBBW GLOBAL WARMING R	-0.018	0.374	-0.889	0.718	0.000	51.889	-0.007	0.062	-1.867	0.573
HSBC STRATEGIE SUBSTANZ AD	-0.174	0.000	-13.385	0.200	0.000	22.786	-0.004	0.068	-1.823	0.208
AMPEGA GLOBAL RENTENFONDS	-0.175	0.000	-11.512	0.182	0.000	17.771	-0.005	0.076	-1.774	0.139
UNI INSTL EUR COVERED BONDS 4-6 YEARS SUST	-0.177	0.000	-13.121	0.184	0.000	20.129	-0.004	0.092	-1.686	0.170
HANSAINVEST HANSEATISCHE INV.GESELL.HANSA INTL.	-0.175	0.000	-11.570	0.191	0.000	18.746	-0.004	0.130	-1.513	0.151
WI GLOBAL CHALLENGES CORPORATE BONDS	-0.176	0.000	-13.261	0.186	0.000	20.728	-0.003	0.181	-1.338	0.177
AMPEGA RENDITE RENTENFONDS	-0.178	0.000	-13.088	0.188	0.000	20.577	-0.003	0.200	-1.283	0.175
BALOISE-RENTENFONDS DWS	-0.182	0.000	-12.496	0.193	0.000	19.642	-0.003	0.220	-1.227	0.162
DWS EURO BOND FUND LD	-0.182	0.000	-12.510	0.190	0.000	19.357	-0.003	0.225	-1.214	0.158
DEKARENT INTERNATIONAL	-0.177	0.000	-11.575	0.193	0.000	18.682	-0.003	0.307	-1.021	0.148
ALLIANZ EURO RENTENFONDS - A - EUR	-0.185	0.000	-12.215	0.191	0.000	18.717	-0.002	0.487	-0.695	0.148
AVANA INV.AKTGSF.MIT TGHF.GEN KAG EU.CNTL	-0.173	0.000	-13.438	0.206	0.000	23.667	-0.002	0.491	-0.689	0.217
AMUNDI GERMAN EQUITY A ND	-0.056	0.006	-2.727	0.732	0.000	52.777	-0.002	0.542	-0.610	0.579
UNION INV.PRIVATFONDS UNIRENTA	-0.186	0.000	-11.371	0.160	0.000	14.426	-0.001	0.615	-0.502	0.093
DWS INVESTMENT INTL. RENTEN TYP O	-0.176	0.000	-10.980	0.171	0.000	15.827	-0.001	0.617	-0.499	0.110
HSBC GERMAN EQUITY AC	0.000	0.999	0.001	0.987	0.000	221.614	0.000	0.872	0.161	0.960
FRANKFURT TRUST INV. FT INTERZINS	-0.178	0.000	-13.617	0.184	0.000	20.829	0.000	0.888	-0.141	0.176
ALLIANZ ADIFONDS - A - EUR	-0.073	0.002	-3.161	0.638	0.000	40.778	0.000	0.931	-0.087	0.450

Table 42: Treynor & Mazuy Market Timing Model France

Fund	α	p-value	t-test	β	p-value	t-test	γ	p-value	t-test	Adjusted R2
G FUND OPPORTUNITIES EUROPE IC	-0.051	0.000	-4.679	0.881	0.000	114.142	-0.007	0.000	-3.502	0.886
ABEILLE VALEURS	-0.144	0.000	-11.634	0.703	0.000	80.011	-0.008	0.000	-3.745	0.795
MIROVA ACTIONS EUROPE F (EUR)	-0.064	0.000	-5.449	0.851	0.000	102.892	-0.008	0.000	-4.199	0.864
ECHIQUIER AGRESSOR G	-0.102	0.000	-8.574	0.822	0.000	97.376	-0.008	0.000	-3.982	0.851
SEEYOND ACTIONS EUROPEENNES ESG F	-0.073	0.000	-7.614	0.839	0.000	122.705	-0.009	0.000	-5.424	0.901
ALLIANZ EURO HIGH YIELD I C/D EUR	-0.384	0.000	-27.921	0.298	0.000	30.507	-0.009	0.000	-3.727	0.377
BETAMAX EUROPE SMART FOR CLIMATE F	-0.104	0.000	-9.381	0.778	0.000	98.851	-0.010	0.000	-5.014	0.856
TURGOT SMIDCAPS FRANCE BC TURGOT ASSET MAN.	-0.205	0.000	-14.757	0.590	0.000	59.920	-0.011	0.000	-4.709	0.691
SUNNY MANAGERS F	-0.172	0.000	-10.263	0.593	0.000	50.043	-0.018	0.000	-6.447	0.621
PLUVALCA BIOTECH Z	-0.177	0.000	-6.680	0.608	0.000	32.424	-0.018	0.000	-3.956	0.406
ALLIANZ ACN.ER.C GLOBAL INVRS.FRN.	-0.045	0.000	-4.870	0.896	0.000	137.898	-0.005	0.001	-3.262	0.919
ALLIANZ EURO HIGH YIELD R D EUR	-0.396	0.000	-27.337	0.303	0.000	29.491	-0.009	0.001	-3.465	0.360
AXA AEDIFICANDI A C EUR	-0.155	0.000	-7.514	0.695	0.000	47.507	-0.012	0.001	-3.428	0.583
HANSEATIQUE B	-0.061	0.000	-3.692	0.838	0.000	71.866	-0.007	0.008	-2.661	0.756
ABACUS QUALITY I	-0.094	0.000	-8.050	0.839	0.000	101.813	-0.005	0.009	-2.633	0.860
LA FRANCAISE EURO INFLATION B	-0.409	0.000	-26.925	0.260	0.000	24.208	-0.007	0.010	-2.575	0.272
EDR SICAV TRICOLORE RENDEMENT B EUR	-0.062	0.000	-6.678	0.900	0.000	135.785	-0.004	0.013	-2.487	0.916
ABERDEEN WACTIONS CR. SUISSE ASTMGMT.GEST.	-0.243	0.000	-12.365	0.534	0.000	38.352	-0.008	0.013	-2.485	0.475
EDMOND DE ROTH.SICAV ER.SUST CRED B EUR	-0.427	0.000	-29.887	0.255	0.000	25.218	-0.006	0.014	-2.458	0.287
G FUND GLOBAL GREEN BONDS I	-0.444	0.000	-28.523	0.220	0.000	19.922	-0.006	0.017	-2.391	0.204
COVEA EURO SOUVERAIN (D) FINANCE	-0.447	0.000	-28.392	0.229	0.000	20.551	-0.006	0.017	-2.395	0.214
TIKEHAU CREDIT PLUS K- ACC-EUR	-0.412	0.000	-30.048	0.269	0.000	27.705	-0.005	0.025	-2.242	0.324
G FUND CREDIT EURO ISR I C	-0.432	0.000	-29.563	0.242	0.000	23.326	-0.006	0.027	-2.219	0.256
G FUND CREDIT EURO ISR M	-0.431	0.000	-29.531	0.242	0.000	23.328	-0.006	0.027	-2.217	0.256
EQUI CONVICTIONS B GEST.	-0.137	0.000	-10.822	0.754	0.000	84.100	-0.005	0.035	-2.114	0.808
AXA EURO CREDIT (D) AXA INVESTMENT PARIS	-0.438	0.000	-30.098	0.237	0.000	22.910	-0.005	0.041	-2.045	0.248
BSO CONVERTIBLE D	-0.366	0.000	-30.102	0.367	0.000	42.575	-0.004	0.065	-1.848	0.522
CAPITOP REVENUS (D)	-0.442	0.000	-31.373	0.247	0.000	24.752	-0.004	0.069	-1.821	0.275
AMUNDI ACTIONS EMERGENTS ESR F (C)	-0.209	0.000	-9.349	0.605	0.000	38.120	-0.007	0.071	-1.803	0.468
ALM CREDIT EURO ISR IC	-0.436	0.000	-30.156	0.237	0.000	23.118	-0.004	0.085	-1.724	0.249
REGARD CONVERTIBLES EURO H	-0.346	0.000	-28.540	0.399	0.000	46.440	-0.003	0.219	-1.231	0.562
GROUPAMA EURO STOCK G ASST.MAN.	-0.440	0.000	-30.470	0.244	0.000	23.842	0.003	0.236	1.185	0.241
ARC FLEXIBOND D SUSP - UNSUPPORTED	-0.446	0.000	-32.002	0.242	0.000	24.464	-0.003	0.280	-1.081	0.265
AGF ASAC ACTIONS (D) AGF ASSET MANAGEMENT	-0.443	0.000	-31.041	0.242	0.000	23.873	0.002	0.314	1.006	0.242
CD ALPHA BONDS D	-0.424	0.000	-30.531	0.266	0.000	27.090	-0.002	0.346	-0.942	0.305
AMERI-GAN O SUSP - UNSUPPORTED	-0.444	0.000	-30.703	0.235	0.000	22.913	0.002	0.349	0.937	0.227
EXANE ELLIPSIS CONVS FD J CHF (EUR)	-0.423	0.000	-25.163	0.274	0.000	23.025	0.003	0.360	0.916	0.229
FONDO BNPP SEICEDOLE B	-0.440	0.000	-31.160	0.247	0.000	24.649	-0.002	0.363	-0.910	0.267
MANDARINE VALEUR G GEST.	-0.032	0.028	-2.202	0.955	0.000	93.312	-0.002	0.522	-0.640	0.836
CONFIANCE SOLIDAIRE D CREDIT COOPERATIF	-0.450	0.000	-32.148	0.229	0.000	23.121	-0.001	0.570	-0.568	0.240
ANAXIS SHORT DURATION K (EUR)	-0.448	0.000	-23.459	0.230	0.000	16.972	0.002	0.603	0.520	0.140
ALLIANZ OBLIGATIONS INTERNATIONALES D EUR	-0.467	0.000	-30.015	0.205	0.000	18.595	-0.001	0.642	-0.464	0.170
OCTO CREDIT COURT TERME B	-0.445	0.000	-32.262	0.234	0.000	23.898	-0.001	0.654	-0.448	0.252
GROUPAMA CR.ER.CT I ASST.MAN.	-0.447	0.000	-32.146	0.232	0.000	23.586	-0.001	0.710	-0.372	0.246
RENAISSANCE EUROPE I COMGEST	-0.107	0.000	-8.087	0.791	0.000	84.196	0.001	0.744	0.326	0.804
AA MMF EMERGING COVT. NEULIZE OBC INMS.	-0.385	0.000	-23.040	0.338	0.000	28.554	0.001	0.800	0.253	0.320
DANONE COMMUNITIES D ISR PRUDENT (C/D)	-0.446	0.000	-31.857	0.239	0.000	24.089	-0.001	0.820	-0.227	0.253
BRONGNIART VARIFONDS D	-0.461	0.000	-31.069	0.229	0.000	21.735	0.000	0.869	-0.165	0.216
UBS (F) EUROPN OPPTY UNCONSTR PEA EUR I	-0.358	0.000	-21.895	0.382	0.000	33.032	0.000	0.922	-0.098	0.388
ODDO BHF METROPOLE SELECTION B	-0.041	0.001	-3.284	0.950	0.000	106.916	0.000	0.926	-0.093	0.869

Table 43: Treynor & Mazuy Market Timing Model Japan

Fund	α	p-value	t-test	β	p-value	t-test	γ	p-value	t-test	Adjusted R2
NOMURA HIGH YIELD BOND OPEN A COURSE	-0.070	0.000	-7.713	0.083	0.000	11.964	-0.009	0.000	-4.303	0.074
GS VARIETY OPEN FUND	-0.072	0.000	-8.860	0.106	0.000	17.123	-0.009	0.000	-4.940	0.136
AM-ONE LOOMIS US INVESTMENT GRADE BOND F	-0.059	0.000	-5.308	0.160	0.000	18.914	-0.010	0.000	-3.746	0.154
DAIWA ACTIVE NIPPON (MUSASHI)	0.000	0.995	-0.006	0.874	0.000	96.459	-0.011	0.000	-4.010	0.818
SMDS DC FOREIGN BOND FUND	-0.053	0.000	-5.068	0.173	0.000	21.793	-0.012	0.000	-5.055	0.198
MYAM FOREIGN BOND OPEN	-0.062	0.000	-5.703	0.171	0.000	20.793	-0.012	0.000	-4.828	0.183
DAIWA JAPAN OPEN	0.012	0.380	0.879	0.931	0.000	87.584	-0.013	0.000	-3.874	0.788
MYAM DC FOREIGN BOND OPEN	-0.053	0.000	-5.108	0.171	0.000	21.734	-0.013	0.000	-5.261	0.198
SMT GLOBAL BOND INDEX OPEN	-0.051	0.000	-4.844	0.169	0.000	21.193	-0.013	0.000	-5.521	0.192
BRJ WORLD INCOME STRATEGY	-0.052	0.000	-4.131	0.177	0.000	18.510	-0.013	0.000	-4.426	0.151
SMT DC FOREIGN BOND INDEX L	-0.050	0.000	-4.719	0.169	0.000	21.216	-0.014	0.000	-5.529	0.192
SMT FOREIGN BOND INDEX OPEN(SMA)	-0.051	0.000	-4.850	0.169	0.000	21.217	-0.014	0.000	-5.531	0.192
JPM THE JAPAN	0.023	0.198	1.287	0.919	0.000	68.619	-0.015	0.000	-3.742	0.696
DWS DEUTSCHE JAPAN GROWTH OPEN	0.007	0.727	0.349	0.858	0.000	58.265	-0.016	0.000	-3.538	0.623
DAIWA HIGH GRADE CAD BOND OPEN	-0.075	0.000	-5.587	0.248	0.000	24.445	-0.016	0.000	-4.995	0.234
SMDS T ROWE PRICE US INCOME FUND	-0.051	0.000	-4.156	0.177	0.000	18.998	-0.016	0.000	-5.717	0.163
EAST SPRING US HIGH YIELD BOND OPEN	-0.042	0.002	-3.029	0.234	0.000	22.312	-0.017	0.000	-5.329	0.206
INVESCO JAPAN GROWTH FUND	0.013	0.412	0.820	0.855	0.000	70.553	-0.018	0.000	-4.894	0.708
ALLIANCE HIGH YIELD OPEN	-0.046	0.001	-3.426	0.231	0.000	22.737	-0.018	0.000	-5.792	0.214
INVESCO MONTHLY INCOME FUND	-0.049	0.000	-3.617	0.224	0.000	21.654	-0.018	0.000	-5.587	0.198
FIDELITY US HIGH YIELD	-0.066	0.000	-4.355	0.254	0.000	22.151	-0.019	0.000	-5.369	0.204
ALLIANCE GLOBAL GROWTH OPPORTUNITIES (2Y)	0.020	0.394	0.852	0.577	0.000	33.212	-0.020	0.000	-3.821	0.353
INVESCO MSCI KOKUSAI PORTFOLIO	0.019	0.426	0.797	0.570	0.000	31.454	-0.021	0.000	-3.796	0.329
CLOVER KODOMO FUND	-0.007	0.727	-0.349	0.084	0.000	5.721	-0.029	0.000	-6.446	0.036
HSBC ASIA PLUS	-0.006	0.838	-0.205	0.250	0.000	11.438	-0.031	0.000	11.438	0.070
BARINGS ASIA FUTURE GROWTH EQUITY FUND	0.003	0.924	0.095	0.248	0.000	11.796	-0.032	0.000	-4.999	0.075
FIDELITY ASIA EQUITY FUND	0.013	0.629	0.484	0.278	0.000	13.632	-0.032	0.000	-5.086	0.095
EAST SPRING GROWING ASIA EQUITY OPEN	-0.009	0.707	-0.376	0.249	0.000	13.861	-0.033	0.000	-6.009	0.102
PICTET GLBL INC EQTY (MTHLY DIST)	-0.052	0.037	-2.087	0.118	0.000	6.225	-0.035	0.000	-5.988	0.036
SHINKIN US SOVEREIGN BOND PORTFOLIO	-0.063	0.000	-5.630	0.138	0.000	16.251	-0.009	0.001	-3.408	0.119
JPM GLOBAL HEALTH CARE RELATED EQ FUND	-0.031	0.330	-0.974	0.249	0.000	10.245	-0.024	0.001	-3.204	0.053
INVESCO GT GLOBAL (INVESTMENT OPEN)	-0.020	0.265	-1.115	0.424	0.000	30.926	-0.013	0.002	-3.115	0.320
SMDS CHINA A & H SHARES OPEN	-0.002	0.964	-0.045	0.216	0.000	8.446	-0.025	0.002	-3.178	0.038
ALLIANCE US GROWTH EQUITY B	0.031	0.265	1.114	0.606	0.000	29.028	-0.019	0.003	-2.962	0.293
UBS AUSTRALIA BOND OPEN (M)	-0.076	0.000	-4.648	0.318	0.000	25.643	-0.011	0.004	-2.868	0.245
GS NET WIN GS TECH EQTY FD B (NON HGD)	0.019	0.578	0.557	0.672	0.000	26.551	-0.022	0.004	-2.850	0.258
NOCHU US BOND OPEN	-0.057	0.000	-4.766	0.161	0.000	17.747	-0.007	0.012	-2.520	0.135
BNYMELLON US MNFG INDUSTRY EQUITY FUND	0.034	0.237	1.182	0.640	0.000	29.170	-0.016	0.014	-2.450	0.294
BRJ BLACKROCK NATURAL RESOURCES EQUITY FUND	0.006	0.873	0.159	0.341	0.000	12.252	-0.020	0.021	-2.309	0.070
UBS NEXT GENERATION TECHNOLOGY FUND	-0.006	0.862	-0.173	0.748	0.000	26.853	-0.018	0.037	-2.088	0.260
AMUNDI TARGET JAPAN FUND	-0.008	0.596	-0.530	0.757	0.000	68.857	-0.007	0.047	-1.984	0.696
GS DC GALILEO	-0.084	0.000	-12.801	0.016	0.001	3.189	-0.002	0.110	-1.599	0.005
JPM JAPAN MEISTER	0.006	0.566	0.574	0.899	0.000	114.655	-0.003	0.275	-1.092	0.864
ABRDN ABERDEEN JAPAN OPEN	-0.009	0.382	-0.874	0.891	0.000	113.889	-0.002	0.337	-0.961	0.862
SOMPO JAPAN BOND FUND	-0.083	0.000	-16.922	0.000	0.997	0.004	0.001	0.370	0.897	-0.001
SMDS SB JAPAN BOND FUND	-0.084	0.000	-15.814	0.000	0.989	0.013	0.001	0.500	0.674	-0.001
NIKKO INDEX FUND JAPANESE BOND DC	-0.082	0.000	-16.762	0.000	0.986	0.017	0.001	0.535	0.621	-0.001
NOMURA DOMESTIC BOND INDEX FUND	-0.083	0.000	-16.823	0.000	0.991	0.011	0.001	0.545	0.606	-0.001
HITACHI DOMESTIC BOND INDEX FUND	-0.082	0.000	-16.546	0.000	0.977	0.028	0.001	0.546	0.604	-0.001
GS JAPAN EQUITY INDEX PLUS	-0.019	0.069	-1.822	0.872	0.000	108.533	-0.001	0.617	-0.500	0.850

Appendix 7

Table 44: Henriksson and Merton Market Timing Ability United States

Types	Fund	α	p-value	t-test	B	p-value	t-test	γ	p-value	t test	Adjusted R2	Obs.
Bond	AB CALIFORNIA PORTFOLIO C	-0.578	0.000	-16.191	0.369	0.000	25.494	-0.076	0.131	-1.509	0.362	2087
Bond	AB CONCENTRATED GROWTH FUND A	-0.567	0.000	-16.966	0.365	0.000	26.894	-0.094	0.047	-1.992	0.392	2087
Bond	AB LARGE CAP GROWTH FUND A	-0.567	0.000	-16.288	0.348	0.000	24.649	-0.123	0.012	-2.503	0.360	2087
Bond	ABRDN DYNAMIC DIVIDEND FUND INST	-0.566	0.000	-16.860	0.360	0.000	26.460	-0.101	0.033	-2.130	0.386	2087
Bond	ALLSPRING MUNICIPAL BOND FUND ADM	-0.566	0.000	-16.837	0.357	0.000	26.178	-0.105	0.027	-2.213	0.383	2087
Bond	AMERICAN FUND.PRESERVN. PRTF.CL.A	-0.552	0.000	-16.783	0.348	0.000	26.061	-0.135	0.004	-2.899	0.389	2087
Bond	ARCHER INCOME FUND	-0.584	0.000	-16.281	0.338	0.000	23.242	-0.109	0.031	-2.162	0.330	2087
Bond	BLACKROCK CORE BOND PORTFOLIO K	-0.577	0.000	-16.190	0.330	0.000	22.806	-0.128	0.011	-2.541	0.327	2087
Bond	BLACKROCK INCOME FUND INST	-0.536	0.000	-17.051	0.410	0.000	32.110	-0.083	0.063	-1.861	0.474	2087
Bond	BLKRK IMPACT MTGE FD INSTL	-0.577	0.000	-16.190	0.330	0.000	22.806	-0.128	0.011	-2.541	0.327	2087
Bond	BNY MELLON CORE PLUS FUND Y	-0.564	0.000	-16.244	0.352	0.000	24.979	-0.115	0.020	-2.337	0.363	2087
Bond	BUFFALO HIGH YIELD FUND INVESTOR	-0.476	0.000	-15.854	0.437	0.000	35.854	-0.126	0.003	-2.967	0.537	2087
Bond	CALVERT BOND FUND A	-0.581	0.000	-16.424	0.338	0.000	23.512	-0.111	0.027	-2.215	0.336	2087
Bond	DWS TOTAL RETURN BOND FUND INSTITUTIONAL	-0.560	0.000	-15.845	0.340	0.000	23.675	-0.137	0.006	-2.753	0.346	2087
Bond	FIDELITY LIMITED TERM BOND FUND	-0.554	0.000	-16.624	0.337	0.000	24.885	-0.144	0.002	-3.060	0.370	2087
Bond	FIDELITY TOTAL BOND FUND	-0.573	0.000	-16.353	0.349	0.000	24.519	-0.108	0.029	-2.186	0.353	2087
Bond	FIDELITY US BOND INDEX FUND	-0.588	0.000	-16.260	0.327	0.000	22.243	-0.116	0.023	-2.274	0.314	2087
Bond	INVESCO CONSERVATIVE INCOME FUND R6	-0.545	0.000	-16.591	0.330	0.000	24.731	-0.161	0.001	-3.476	0.373	2087
Bond	INVESCO CORPORATE BOND FD.CL.R6	-0.574	0.000	-16.127	0.376	0.000	26.077	-0.076	0.131	-1.509	0.373	2087
Bond	INVESCO MUN.INC.FD.INVR. CL.	-0.574	0.000	-16.810	0.371	0.000	26.748	-0.081	0.093	-1.683	0.386	2087
Bond	JP MORGAN CORE PLUS BD.A	-0.573	0.000	-16.220	0.335	0.000	23.358	-0.126	0.012	-2.518	0.337	2087
Bond	JP MORGAN CORPORATE BOND I	-0.592	0.000	-15.987	0.361	0.000	24.020	-0.073	0.161	-1.401	0.335	2087
Bond	THRIVENT INCOME FUND S	-0.578	0.000	-16.133	0.362	0.000	24.898	-0.088	0.083	-1.732	0.355	2087
Bond	VANGUARD BD.IDX.FD.SHT. TM.PRTF.	-0.555	0.000	-16.434	0.323	0.000	23.569	-0.159	0.001	-3.322	0.351	2087
Bond	VANGUARD LONG-TERM INV. GDE.FD.INVR.SHS.	-0.683	0.000	-14.583	0.349	0.000	18.354	0.026	0.700	0.386	0.210	2087
Equity	AAM/INSIGHT SELECT INCOME FUND A	0.053	0.349	0.936	1.108	0.000	48.669	0.017	0.828	0.217	0.656	2087
Equity	AB CORE OPPORTUNITIES FUND A	0.009	0.697	0.390	1.031	0.000	116.050	0.019	0.539	0.615	0.916	2087
Equity	AB DISCOVERY GROWTH FUND A	-0.060	0.047	-1.991	0.934	0.000	76.779	-0.042	0.320	-0.995	0.830	2087
Equity	AB GLOBAL BOND FUND A	0.007	0.885	0.144	1.103	0.000	59.526	0.085	0.190	1.311	0.737	2087
Equity	AB LARGE CAP GROWTH FUND ADVISOR	-0.030	0.215	-1.240	1.002	0.000	100.643	0.036	0.295	1.047	0.890	2087
Equity	AB SMALL CAP VALUE PORTFOLIO C	-0.028	0.240	-1.176	1.002	0.000	103.860	0.037	0.269	1.105	0.896	2087
Equity	AB VIRGINIA PORTFOLIO C	0.091	0.027	2.212	1.029	0.000	61.443	-0.106	0.070	-1.812	0.761	2087
Equity	ABRDN GLOBAL INFRASTRUCTURE FUND INST	-0.096	0.000	-5.370	0.901	0.000	123.868	-0.035	0.171	-1.370	0.927	2087
Equity	ABRDN US SMALL CAP EQUITY FUND R	-0.141	0.000	-5.177	0.829	0.000	74.768	-0.061	0.117	-1.569	0.823	2087
Equity	ADAPTIVE GROWTH OPPORTUNITIES ETF	0.001	0.977	0.029	1.003	0.000	59.496	-0.030	0.608	-0.512	0.744	2087
Equity	ALLSPRING DISCVRY SCG FD INST	-0.180	0.000	-5.944	0.802	0.000	65.172	-0.005	0.907	-0.117	0.776	2087
Equity	ALLSPRING GROWTH FUND A	0.002	0.971	0.036	1.104	0.000	47.539	0.053	0.512	0.656	0.643	2087
Equity	ALLSPRING INDEX FUND A	-0.003	0.943	-0.072	0.981	0.000	55.233	-0.085	0.168	-1.380	0.719	2087
Equity	ALPHA MARK FUND	-0.048	0.177	-1.352	0.868	0.000	60.285	-0.157	0.002	-3.138	0.759	2087
Equity	AMERICAN FDS WASHINGTON MUTUAL INV FD 529-C	-0.052	0.002	-3.175	0.927	0.000	138.598	-0.046	0.050	-1.962	0.941	2087
Equity	AMERICAN FUNDS AMERICAN MUTUAL FUND F2	-0.104	0.000	-5.849	0.836	0.000	116.317	-0.091	0.000	-3.621	0.920	2087
Equity	AMERICAN MUTUAL FD.CL.C SHS.	-0.106	0.000	-6.107	0.836	0.000	119.162	-0.089	0.000	-3.631	0.923	2087
Equity	ARTISAN GLOBAL VALUE FUND ADV	-0.103	0.000	-3.861	0.936	0.000	86.304	0.023	0.544	0.607	0.857	2087
Equity	COLUMBIA ACORN EUROPEAN FUND I	-0.210	0.000	-4.973	0.919	0.000	53.505	0.161	0.007	2.700	0.685	2087
Equity	FID.SMCP.DISCOVERY FUND	0.534	0.000	10.262	0.680	0.000	32.201	0.059	0.421	0.805	0.449	2087
Equity	FIDELITY LOW PRICE STK. FD.	-0.122	0.000	-4.192	0.867	0.000	73.122	-0.049	0.235	-1.187	0.816	2087
Equity	FRANKLIN GOLD AND PRECIOUS METALS FUND R6	-0.155	0.106	-1.615	0.605	0.000	15.535	-0.289	0.033	-2.131	0.189	2087
Equity	HARTFORD MUT.FUND.MID. CAP.VAL.C	-0.015	0.693	-0.395	1.015	0.000	66.762	-0.007	0.898	-0.128	0.784	2087
Equity	INVESCO GOLD & SPECIAL MINERALS FUND A	-0.176	0.070	-1.813	0.656	0.000	16.698	-0.183	0.181	-1.337	0.200	2087
Equity	KINETICS MUT.FUND.THE MED.FD.	-0.113	0.007	-2.703	0.776	0.000	45.889	-0.165	0.005	-2.804	0.649	2087

Table 45: Henriksson and Merton Market Timing Ability United Kingdom

Types	Fund	α	t-test	p-value	B	t-test	p-value	γ	t-test	p-value	Adjusted R2	Obs.
Equity	BLACKROCK GOLD &.GENERAL D AC.	0.031	0.430	0.667	0.341	7.748	0.000	0.032	0.270	0.787	0.048	2087
Equity	FUNDSMITH EQUITY I ACC	0.116	3.269	0.001	0.287	13.364	0.000	-0.122	-2.119	0.034	0.166	2087
Equity	BAILLIE GIFFORD AMERICAN C ACC	0.065	0.994	0.320	0.455	11.553	0.000	-0.002	-0.019	0.984	0.107	2087
Equity	JPM EMERGING MKTS.B ACC	0.074	1.975	0.048	0.443	19.442	0.000	-0.090	-1.474	0.141	0.275	2087
Equity	ORBIS OEIC GLOBAL EQUITY STANDARD SC ACC	0.051	1.800	0.072	0.603	34.779	0.000	-0.034	-0.740	0.459	0.529	2087
Equity	SCHRODER QEP GLOBAL CORE I AC.	0.067	2.197	0.028	0.468	25.131	0.000	-0.054	-1.086	0.278	0.377	2087
Equity	ABERDEEN UK EQUITY INCOME Z AC.	0.097	4.327	0.000	0.292	21.429	0.000	-0.175	-4.806	0.000	0.360	2087
Equity	ABRDN UK ALL SHARE TRACKER FUND A ACC	-0.014	-0.536	0.592	0.691	43.548	0.000	0.064	1.507	0.132	0.620	2087
Equity	AI UK INDEX TRACKING CLASS 8 ACC	-0.009	-0.781	0.435	0.838	116.158	0.000	0.050	2.602	0.009	0.922	2087
Equity	JPM ASIA GROWTH C NET ACC	0.128	3.231	0.001	0.410	17.114	0.000	-0.175	-2.739	0.006	0.247	2087
Equity	LIONTRUST CHINA GBP C ACC	0.176	3.304	0.001	0.351	10.863	0.000	-0.305	-3.531	0.000	0.141	2087
Equity	ARTEMIS SMART GARP GLOBAL EQUITY C ACC GBP	0.029	0.952	0.341	0.515	28.173	0.000	0.007	0.141	0.888	0.416	2087
Equity	FP RUSSELL INV INTERNATL GRO ASSTS C ACC	0.086	2.514	0.012	0.258	12.331	0.000	-0.104	-1.868	0.062	0.144	2087
Equity	EDEN TREE RESP AND SUST EUROPEAN EQUITY C	0.002	0.056	0.956	0.643	35.411	0.000	0.055	1.130	0.259	0.520	2087
Equity	JANUS HENDERSON AS-PAC CAPITAL GRO C ACC	0.098	2.773	0.006	0.378	17.575	0.000	-0.143	-2.483	0.013	0.253	2087
Equity	LF CANLIFE ASIA PACIFIC C ACC	0.102	2.876	0.004	0.394	18.324	0.000	-0.155	-2.711	0.007	0.271	2087
Equity	MAN GLG INCOME PROFESSIONAL ACC C GBP	-0.017	-0.595	0.552	0.689	40.701	0.000	0.086	1.903	0.057	0.584	2087
Equity	NFU MUTUAL UK EQUITY INCOME C INCOME	-0.028	-1.962	0.050	0.810	94.312	0.000	0.052	2.281	0.023	0.886	2087
Equity	PREMIER MITON GLOBAL SUSTAINABLE GROWTH C ACC	0.083	2.346	0.019	0.366	17.051	0.000	-0.087	-1.515	0.130	0.228	2087
Equity	SCWID.UK EQ.INC.CL.C INC.	-0.097	-2.399	0.017	0.349	14.237	0.000	0.201	3.080	0.002	0.120	2087
Equity	TM STONEHG FLM OPPS ACC C	-0.028	-0.894	0.372	0.557	29.215	0.000	0.116	2.287	0.022	0.409	2087
Equity	WS SEQUEL GROWTH TARGET RETURN STRAT STAND C	0.038	2.257	0.024	0.183	18.021	0.000	-0.087	-3.187	0.001	0.272	2087
Equity	ALLIANZ EMERGING MARKETS EQUITY A ACC GBP	0.113	3.227	0.001	0.369	17.382	0.000	-0.183	-3.224	0.001	0.260	2087
Equity	ARTEMIS GLOBAL INCOME C ACC GBP	0.030	0.961	0.337	0.511	26.712	0.000	-0.009	-0.170	0.865	0.394	2087
Equity	BAILLIE GIFF UK EQUITY ALPHA B AC.	-0.014	-0.342	0.733	0.636	25.738	0.000	0.070	1.066	0.286	0.361	2087
Bond	M&G GILT&FIXED INTEREST INCOME STERLING A ACC	0.060	3.351	0.001	0.000	0.024	0.981	-0.119	-4.077	0.000	0.014	2087
Bond	ISHARES CORPORATE BOND INDEX (UK) D ACC	0.041	2.764	0.006	0.101	11.230	0.000	-0.070	-2.896	0.004	0.139	2087
Bond	ABRDN AAA BOND INSTITUTIONAL ACC GBP	0.053	3.401	0.001	0.120	12.801	0.000	-0.101	-4.005	0.000	0.184	2087
Bond	ABRDN ETHICAL CORPORATE BOND FUND INST ACC	0.047	2.769	0.006	0.128	12.342	0.000	-0.086	-3.084	0.002	0.161	2087
Bond	ABRDN STRATEGIC BOND FUND A ACC	0.041	2.781	0.005	0.168	18.853	0.000	-0.068	-2.845	0.004	0.283	2087
Bond	AVIVA INVESTORS CORP BD FD CLS 8 ACC	0.042	2.911	0.004	0.097	10.984	0.000	-0.074	-3.132	0.002	0.138	2087
Bond	AXA ACT CBN.TSTN.STG B&M CRDT FD Z ACC	0.044	2.946	0.003	0.094	10.338	0.000	-0.075	-3.091	0.002	0.126	2087
Bond	BLACKROCK CORPORATE BOND D AC.	0.034	2.445	0.015	0.136	15.882	0.000	-0.052	-2.295	0.022	0.217	2087
Bond	BLLE.GIFF HIGH YIELD BD. B AC.	0.019	0.832	0.406	0.205	14.592	0.000	-0.017	-0.450	0.652	0.167	2087
Bond	CG UK GLOBAL HIGH INCOME OPPORTUNITIES P ACC GBP	0.071	3.052	0.002	0.206	14.588	0.000	-0.091	-2.423	0.015	0.194	2087
Bond	CT STRATEGIC BOND INST GROSS ACC GBP	0.027	1.876	0.061	0.187	21.673	0.000	-0.037	-1.610	0.108	0.319	2087
Bond	DIMENSIONAL GLOBAL SHORT DATED BOND ACC	0.041	2.884	0.004	0.142	16.537	0.000	-0.080	-3.471	0.001	0.247	2087
Bond	EDEN TREE AMITY STERLING BOND C	0.037	2.539	0.011	0.152	17.106	0.000	-0.071	-3.011	0.003	0.251	2087
Bond	FID LNG DATED STER CORP BD FD W ACC	0.036	1.675	0.094	0.055	4.205	0.000	-0.056	-1.626	0.104	0.025	2087
Bond	HSBC CPRT.BD. INSTL.AC.	0.047	2.995	0.003	0.106	11.175	0.000	-0.074	-2.949	0.003	0.138	2087
Bond	IFSL CAF FIXED INTEREST A ACC	0.048	3.128	0.002	0.146	15.531	0.000	-0.091	-3.613	0.000	0.230	2087
Bond	INSIGHT INV.UK GVT.ALL MT BD.GR.PTRS2 AC.	0.060	3.908	0.000	0.113	12.199	0.000	-0.106	-4.287	0.000	0.177	2087
Bond	INVESCO CORPORATE BOND (UK) ACC	0.040	2.900	0.004	0.142	17.048	0.000	-0.070	-3.145	0.002	0.252	2087
Bond	JPM GLOBAL HIGH YIELD BD .C ACC	0.065	3.049	0.002	0.152	11.819	0.000	-0.105	-3.063	0.002	0.152	2087
Bond	JUPITER INVESTMENT GRADE BOND FUND I GBP ACC	0.048	3.267	0.001	0.094	10.525	0.000	-0.083	-3.484	0.001	0.135	2087
Bond	L&G ACTIVE GLOBAL HIGH YIELD BOND F ACC	0.047	2.478	0.013	0.169	14.507	0.000	-0.076	-2.455	0.014	0.193	2087
Bond	LF CANLIFE CORPORATE BOND C ACC	0.044	2.992	0.003	0.109	12.204	0.000	-0.074	-3.135	0.002	0.160	2087
Bond	LIONTRUST MONTHLY INCOME BOND B ACC	0.049	3.194	0.001	0.157	16.940	0.000	-0.083	-3.344	0.001	0.253	2087
Bond	MARKS & SPEN.HI.INC.AC.	0.069	2.947	0.003	0.143	10.051	0.000	-0.131	-3.443	0.001	0.126	2087
Bond	NATIXIS LS STGC INC I/A ACC	0.042	2.616	0.009	0.158	16.035	0.000	-0.079	-3.006	0.003	0.230	2087

Table 46: Henriksson and Merton Market Timing Ability Canada

Types	Fund	α	t-test	p-value	B	t-test	p-value	γ	t-test	p-value	Adjusted R2	Obs.
Equity	FIDELITY CANADIAN LARGE CAP SERIES F	-0.169	-1.727	0.084	0.645	42.141	0.000	-0.546	-5.006	0.000	0.543	2087
Equity	RBC NORTH AMERICAN GROWTH SR F	-0.070	-1.206	0.228	0.924	102.150	0.000	-0.074	-1.143	0.253	0.863	2087
Equity	ABRDN CANADA EAFE PLUS EQUITY	-0.896	-7.545	0.000	0.591	31.838	0.000	0.086	0.649	0.516	0.373	2087
Equity	AGF AMERICAN GROWTH CLASS SERIES F	-0.215	-1.773	0.076	0.849	44.755	0.000	-0.043	-0.320	0.749	0.547	2087
Equity	AXIOM ALL EQUITY PORTFOLIO CLASS A	-0.213	-3.111	0.002	0.830	77.598	0.000	-0.116	-1.516	0.130	0.786	2087
Equity	BAROMETER EQUITY POOL CLASS A	-0.928	-7.190	0.000	0.738	36.575	0.000	0.417	2.904	0.004	0.428	2087
Equity	BGC.NORTH AMER.FOCD.EQ SRS D	-0.101	-1.388	0.165	0.835	73.504	0.000	-0.221	-2.735	0.006	0.770	2087
Equity	BMO ASIAN GROWTH AND INCOME ADVISOR SERIES	-0.756	-7.542	0.000	0.522	33.309	0.000	-0.199	-1.786	0.074	0.411	2087
Equity	BMO EQUITY GROWTH ETF PORTFOLIO ADVISOR SERIES	-0.234	-3.872	0.000	0.820	86.641	0.000	-0.122	-1.803	0.072	0.821	2087
Equity	BRANDES EMERGING MARKETS VALUE FD SRS F	-0.462	-4.308	0.000	0.700	41.771	0.000	-0.148	-1.239	0.215	0.517	2087
Equity	CANADA LIFE CANADIAN EQUITY FUND A	-0.087	-1.958	0.050	0.932	134.010	0.000	-0.057	-1.149	0.251	0.915	2087
Equity	CANADA LIFE CANADIAN GROWTH FUND F	-0.252	-5.340	0.000	0.902	122.151	0.000	0.059	1.121	0.262	0.899	2087
Equity	CANADA LIFE EUROPEAN EQUITY FUND A	-0.574	-5.942	0.000	0.565	37.444	0.000	-0.299	-2.781	0.005	0.473	2087
Equity	CANADA LIFE US ALL CAP GROWTH FUND SERIES W	-0.218	-1.703	0.089	0.871	43.550	0.000	-0.006	-0.041	0.967	0.532	2087
Equity	CANADA LIFE US SMALL-MID CAP GROWTH FUND N	-0.025	-0.200	0.841	0.816	42.195	0.000	-0.338	-2.456	0.014	0.529	2087
Equity	CANOE CANADIAN SMALL MID CAP PORTFOLIO CLASS SR D	-0.498	-5.253	0.000	0.887	59.834	0.000	0.279	2.645	0.008	0.673	2087
Equity	CAPITAL GROUP GLOBAL EQUITY SERIES D	-0.415	-4.469	0.000	0.808	55.602	0.000	0.052	0.502	0.616	0.647	2087
Equity	CAPITAL GROUP US EQUITY SERIES F	-0.212	-2.394	0.017	0.791	57.095	0.000	-0.193	-1.952	0.051	0.668	2087
Equity	CI AMERICAN SMALL COMPANIES CORP CL IT8	0.215	1.835	0.067	0.933	50.912	0.000	-0.385	-2.950	0.003	0.621	2087
Equity	CI ASIAN OPPORTUNITIES CORPORATE CLASS A	-1.139	-8.215	0.000	0.418	19.274	0.000	-0.016	-0.103	0.918	0.182	2087
Equity	CI ASIAN OPPORTUNITIES FUND SERIES I	-1.130	-8.287	0.000	0.411	19.304	0.000	-0.018	-0.118	0.906	0.183	2087
Equity	CIBC ASIA PACIFIC INDEX CLASS A	-0.566	-5.613	0.000	0.675	42.801	0.000	-0.076	-0.678	0.498	0.526	2087
Equity	DESJARDINS AMERICAN EQUITY GROWTH I	0.032	0.238	0.812	0.894	43.099	0.000	-0.223	-1.509	0.131	0.534	2087
Equity	RBC CANADIAN MID-CAP EQUITY FUND SR I	-0.502	-5.785	0.000	0.977	72.082	0.000	0.470	4.864	0.000	0.746	2087
Equity	NBI GLOBAL DIVERSIFIED EQUITY INVESTOR SERIES	-0.359	-3.740	0.000	0.812	54.017	0.000	-0.012	-0.109	0.914	0.636	2087
Bond	ABERDEEN EMERGING MARKETS DEBT	-1.382	-15.704	0.000	0.342	24.859	0.000	0.071	0.728	0.467	0.264	2087
Bond	ADDENDA ACTIVE DURATION BOND POOL CL A	-1.535	-21.072	0.000	0.196	17.184	0.000	-0.065	-0.803	0.422	0.155	2087
Bond	AGF EMERGING MARKETS BOND SERIES F	-1.393	-17.467	0.000	0.209	16.784	0.000	-0.184	-2.076	0.038	0.159	2087
Bond	BEUTEL GOODMAN CORE PLUS BOND SERIES B	-1.575	-20.473	0.000	0.188	15.594	0.000	-0.041	-0.475	0.635	0.129	2087
Bond	BEUTEL GOODMAN INCOME SERIES D	-1.566	-20.207	0.000	0.179	14.814	0.000	-0.067	-0.772	0.440	0.120	2087
Bond	BMO EMERGING MARKETS BOND ADVISOR SERIES	-1.445	-19.245	0.000	0.330	28.106	0.000	0.105	1.251	0.211	0.312	2087
Bond	BRANDES CORPORATE FOCUS BOND CL I HEDGED	-1.415	-21.842	0.000	0.244	24.086	0.000	-0.091	-1.266	0.206	0.267	2087
Bond	CANOE BOND ADVANTAGE PORTFOLIO CLASS SERIES A	-1.578	-20.093	0.000	0.168	13.695	0.000	-0.077	-0.877	0.381	0.106	2087
Bond	CANSO CANADIAN BOND FD CLASS F	-1.543	-21.311	0.000	0.189	16.707	0.000	-0.070	-0.870	0.384	0.148	2087
Bond	CIBC CANADIAN BOND CLASS A	-1.579	-20.633	0.000	0.188	15.716	0.000	-0.035	-0.412	0.681	0.131	2087
Bond	DESJARDINS EMERGING MARKETS BOND F	-1.789	-19.993	0.000	0.198	14.177	0.000	0.190	1.902	0.057	0.097	2087
Bond	DYNAMIC ADVANTAGE BOND SERIES F	-1.552	-21.432	0.000	0.212	18.726	0.000	-0.019	-0.236	0.814	0.174	2087
Bond	DYNAMIC SHORT TERM BOND SERIES I	-1.469	-23.250	0.000	0.193	19.583	0.000	-0.136	-1.930	0.054	0.201	2087
Bond	EDUCATORS BOND CLASS A	-1.562	-20.524	0.000	0.190	15.999	0.000	-0.046	-0.548	0.584	0.136	2087
Bond	EDUCATORS MORTGAGE & INCOME CLASS A	-1.502	-24.016	0.000	0.195	19.922	0.000	-0.096	-1.381	0.167	0.202	2087
Bond	FDP CANADIAN BOND PORTFOLIO SERIES A	-1.569	-20.358	0.000	0.179	14.869	0.000	-0.062	-0.727	0.467	0.121	2087
Bond	FIDELITY FLOATING RATE HIGH INCOME SERIES A	-1.452	-16.003	0.000	0.157	11.100	0.000	-0.215	-2.133	0.033	0.081	2087
Bond	FRANKLIN BRANDYWINE GLBL SUSTNBL INC OPTM SR A	-1.445	-20.804	0.000	0.256	23.564	0.000	-0.050	-0.643	0.520	0.254	2087
Bond	HSBC CANADIAN BOND FUND INVESTOR SERIES	-1.585	-20.858	0.000	0.188	15.823	0.000	-0.029	-0.345	0.730	0.132	2087
Bond	IG MACKENZIE GLOBAL BOND SERIES C	-1.621	-18.826	0.000	0.137	10.216	0.000	-0.096	-0.998	0.318	0.063	2087
Bond	INVESCO CANADIAN CORE PLUS BOND SERIES A	-1.572	-19.982	0.000	0.212	17.260	0.000	0.005	0.056	0.955	0.150	2087
Bond	LEITH WHEELER CORE BOND SERIES B	-1.597	-20.524	0.000	0.180	14.796	0.000	-0.032	-0.368	0.713	0.117	2087
Bond	MACKENZIE CANADIAN BOND ADVISOR SERIES	-1.570	-20.796	0.000	0.180	15.242	0.000	-0.060	-0.709	0.478	0.126	2087
Bond	MANULIFE CANADIAN BOND SERIES F	-1.573	-20.264	0.000	0.177	14.563	0.000	-0.064	-0.743	0.457	0.117	2087
Bond	MANULIFE STRATEGIC INCOME FUND SERIES FT6	-1.341	-19.774	0.000	0.262	24.712	0.000	-0.141	-1.869	0.062	0.281	2087

Table 47: Henriksson and Merton Market Timing Ability Italy

Types	Fund	α	t-test	p-value	B	t-test	p-value	γ	t-test	p-value	Adjusted R2	Obs.
Equity	ANIMA SELEZIONE GLOBALE B	-0.771	-12.159	0.000	0.558	40.288	0.000	-0.048	-0.616	0.538	0.531	2087
Equity	ARCA AZIONI INTERNAZIONALI P	-0.806	-13.047	0.000	0.552	40.969	0.000	-0.021	-0.273	0.785	0.537	2087
Equity	ACOMEA AMERICA A1	-0.706	-9.146	0.000	0.604	35.822	0.000	-0.029	-0.305	0.760	0.471	2087
Equity	ANIMA VALORE GLOBALE A	-0.688	-11.708	0.000	0.587	45.725	0.000	-0.081	-1.117	0.264	0.596	2087
Equity	BNL AZIONI AMERICA	-0.878	-9.333	0.000	0.551	26.807	0.000	0.078	0.670	0.503	0.324	2087
Equity	FIDEURAM ITALIA R	-0.192	-9.359	0.000	0.908	203.009	0.000	0.042	1.682	0.093	0.966	2087
Equity	ACOMEA EUROPA A1	-0.384	-9.283	0.000	0.774	85.795	0.000	-0.041	-0.806	0.420	0.836	2087
Equity	ALLIANZ AZIONI EUROPA	-0.499	-10.599	0.000	0.732	71.258	0.000	0.001	0.016	0.987	0.777	2087
Equity	ALLIANZ AZIONI AMERICA	-0.783	-9.149	0.000	0.559	29.932	0.000	-0.024	-0.227	0.821	0.383	2087
Equity	ALLIANZ AZIONI PACIFICO	-1.142	-14.694	0.000	0.374	22.023	0.000	-0.027	-0.288	0.774	0.252	2087
Equity	ARCA AZIONI ITALIA P	-0.195	-9.359	0.000	0.924	202.978	0.000	0.066	2.564	0.010	0.965	2087
Equity	EUROMOBILIARE AZIONI ITALIANE A	-0.205	-10.077	0.000	0.911	205.114	0.000	0.052	2.077	0.038	0.966	2087
Equity	INVESTIMENTI AZIONARI ITALIA A	-0.296	-10.711	0.000	0.879	145.432	0.000	0.088	2.581	0.010	0.934	2087
Equity	EURIZON AZIONI PMI ITALIA R	-0.714	-15.530	0.000	0.753	75.047	0.000	0.295	5.228	0.000	0.782	2087
Equity	EPSILON Q VALUE	-0.446	-10.734	0.000	0.745	82.155	0.000	-0.031	-0.603	0.546	0.824	2087
Equity	ARCA AZIONI PAESI EMER.	-0.880	-11.615	0.000	0.497	30.066	0.000	-0.065	-0.697	0.486	0.389	2087
Equity	ANIMA INIZIATIVA EUROPA A	-0.700	-15.113	0.000	0.671	66.363	0.000	0.105	1.836	0.066	0.746	2087
Equity	BANCOPOSTA AZIONARIO INTERNAZIONALE	-0.800	-12.260	0.000	0.566	39.734	0.000	0.000	0.005	0.996	0.520	2087
Equity	AGORA MATERIALS R	-0.723	-8.620	0.000	0.585	31.934	0.000	-0.038	-0.367	0.713	0.415	2087
Equity	FIDEURAM MASTER SEL.EQ. USA	-0.844	-13.359	0.000	0.499	36.139	0.000	-0.080	-1.030	0.303	0.481	2087
Equity	SYMPHONIA AZIONARIO TREND GLOBALE I	-1.001	-15.598	0.000	0.448	32.003	0.000	-0.014	-0.179	0.858	0.414	2087
Equity	BNP PARIBAS JAPAN EQUITY CLASSIC H EUR CAP	-1.112	-13.449	0.000	0.470	26.011	0.000	0.138	1.359	0.174	0.305	2087
Equity	ZENIT PIANETA ITALIA I	-0.506	-17.145	0.000	0.787	122.170	0.000	0.124	3.415	0.001	0.909	2087
Equity	SYMPHONIA AZION SMCP ITALIA CL I	-0.815	-16.627	0.000	0.666	62.249	0.000	0.244	4.046	0.000	0.713	2087
Equity	FIDEURAM MASTER SELECTION BALANCED	-1.222	-26.460	0.000	0.352	34.847	0.000	0.007	0.124	0.901	0.454	2087
Bond	ALLIANZ REDDITO EURO	-1.514	-30.173	0.000	0.204	18.641	0.000	0.013	0.210	0.833	0.190	2087
Bond	ARCA RR DIVERSIFIED BOND	-1.457	-31.892	0.000	0.265	26.510	0.000	0.077	1.367	0.172	0.313	2087
Bond	BOND STRATEGIA ATTIVA A	-1.531	-31.414	0.000	0.224	21.010	0.000	0.071	1.184	0.237	0.222	2087
Bond	EURIZON OBBLIGAZIONI CEDOLA D	-1.502	-32.416	0.000	0.230	22.694	0.000	0.052	0.912	0.362	0.253	2087
Bond	EUROMOBILIARE EURO AGGREGATE A	-1.514	-32.802	0.000	0.217	21.516	0.000	0.042	0.735	0.463	0.234	2087
Bond	ALLIANZ REDDITO GLOBALE	-1.515	-26.529	0.000	0.158	12.697	0.000	-0.075	-1.067	0.286	0.108	2087
Bond	FIDEURAM RISPARMIO ATTIVO	-1.222	-26.460	0.000	0.352	34.847	0.000	0.007	0.124	0.901	0.454	2087
Bond	MEDIOLANUM STRATEGIA GLOBALE MULTI BOND L	-1.514	-30.173	0.000	0.204	18.641	0.000	0.013	0.210	0.833	0.190	2087
Bond	ACOMEA PERFORMANCE A1	-1.123	-20.522	0.000	0.362	30.255	0.000	-0.094	-1.398	0.162	0.398	2087
Bond	EURIZON OBBLIGAZIONI EURO BREVE TERMINE D	-1.512	-32.854	0.000	0.221	21.994	0.000	0.047	0.836	0.403	0.241	2087
Bond	FONDERSEL INTERNAZIONALE ESG	-1.486	-26.298	0.000	0.178	14.446	0.000	-0.066	-0.948	0.343	0.133	2087
Bond	BNL OBBLIGAZIONI EMERGENTI	-1.287	-21.790	0.000	0.313	24.271	0.000	-0.002	-0.021	0.983	0.288	2087
Bond	ANIMA OBBLIGAZIONARIO EURO BT A	-1.530	-32.962	0.000	0.208	20.512	0.000	0.040	0.697	0.486	0.217	2087
Bond	BOND STRATEGIA PRUDENTE A	-1.526	-32.888	0.000	0.208	20.582	0.000	0.038	0.672	0.502	0.219	2087
Bond	FONDERSEL EURO	-1.524	-29.515	0.000	0.217	19.205	0.000	0.049	0.775	0.438	0.195	2087
Bond	AZIMUT TREND TASSI	-1.491	-31.715	0.000	0.248	24.212	0.000	0.080	1.390	0.165	0.274	2087
Bond	CONSULTINVEST REDDITO C	-1.323	-27.878	0.000	0.350	33.746	0.000	0.110	1.886	0.059	0.424	2087
Bond	INVESTIPER OBBLIGAZIONARIO GLOBALE	-1.484	-32.491	0.000	0.239	23.933	0.000	0.054	0.967	0.334	0.273	2087
Bond	AMUNDI OBBLIGAZIONARIO BREVE TERMINE - C	-1.489	-31.901	0.000	0.238	23.342	0.000	0.058	1.011	0.312	0.263	2087
Bond	BOND PAESI EMERGENTI ESG A	-1.398	-27.584	0.000	0.287	25.925	0.000	0.054	0.863	0.388	0.308	2087
Bond	INVESTIPER OBBLIG PAESI EMERGENTI	-1.484	-31.409	0.000	0.266	25.827	0.000	0.103	1.770	0.077	0.298	2087
Bond	ANIMA TRICOLORE AD	-1.423	-27.013	0.000	0.289	25.116	0.000	0.083	1.286	0.199	0.290	2087
Bond	ARCA BD PAESI EM VALUTA LOCALE P	-1.244	-23.564	0.000	0.295	25.551	0.000	-0.090	-1.379	0.168	0.322	2087
Bond	CONSULTINVEST BREVE TERMINE C	-1.418	-31.387	0.000	0.294	29.773	0.000	0.099	1.789	0.074	0.363	2087
Bond	ALLIANZ GLOBAL MULTI- ASSET CREDIT FUND	-1.556	-32.706	0.000	0.216	20.833	0.000	0.086	1.471	0.141	0.216	2087

Table 48: Henriksson and Merton Market Timing Ability Germany

Types	Fund	α	t-test	p-value	B	t-test	p-value	γ	t-test	p-value	Adjusted R2	Obs.
Equity	DEKA INV.GLOBALCHAMPIONS CF	-0.030	-0.738	0.460	0.334	14.096	0.000	-0.156	-2.333	0.020	0.195	2087
Equity	LBBW GLOBAL WARMING R	0.007	0.211	0.833	0.703	36.206	0.000	-0.076	-1.386	0.166	0.573	2087
Equity	ACATIS AKTIEN GLOBAL FONDS B	-0.021	-0.661	0.509	0.639	34.762	0.000	-0.068	-1.305	0.192	0.552	2087
Equity	ACATIS ASIA PACIFIC PLUS FONDS	-0.050	-1.632	0.103	0.380	21.469	0.000	-0.140	-2.791	0.005	0.349	2087
Equity	AKTIV CHANCE	-0.067	-3.070	0.002	0.784	61.872	0.000	0.054	1.516	0.130	0.782	2087
Equity	ALLIANZ ADIFONDS - A - EUR	-0.034	-0.904	0.366	0.618	28.166	0.000	-0.081	-1.302	0.193	0.450	2087
Equity	AMUNDI GERMAN EQUITY A ND	-0.032	-0.965	0.335	0.719	36.972	0.000	-0.056	-1.025	0.305	0.579	2087
Equity	BALOISE-AKTIENFONDS DWS	-0.016	-0.477	0.634	0.721	37.218	0.000	-0.080	-1.468	0.142	0.586	2087
Equity	BERENBERG AKTIEN GLOBAL PLUS R D	-0.014	-0.480	0.631	0.494	29.605	0.000	-0.164	-3.480	0.001	0.500	2087
Equity	BREMEN KAPITAL AKTIEN	-0.112	-3.158	0.002	0.190	9.187	0.000	-0.103	-1.764	0.078	0.096	2087
Equity	CH GLOBAL	-0.109	-2.306	0.021	0.248	9.020	0.000	-0.085	-1.091	0.275	0.085	2087
Equity	CHOM CAPITAL ACTIVE RETURN EUROPE UI - AK I	0.018	0.846	0.397	0.714	58.613	0.000	-0.141	-4.104	0.000	0.786	2087
Equity	DEGUSSA AKTIEN UNIVERSAL-FONDS	-0.039	-2.194	0.028	0.825	80.594	0.000	0.008	0.272	0.785	0.862	2087
Equity	DEKA INV.GLOBALCHAMPIONS TF	-0.032	-0.783	0.434	0.334	14.086	0.000	-0.157	-2.343	0.019	0.195	2087
Equity	DIT ALLIANZ VALUE GLOBAL	-0.092	-2.515	0.012	0.426	19.997	0.000	-0.047	-0.775	0.438	0.290	2087
Equity	EARTH GOLD FUND UI (EUR R)	-0.117	-1.353	0.176	0.456	9.045	0.000	0.115	0.807	0.420	0.064	2087
Equity	FIRST PRIV.INV.MAN.KAG EUROPA AKTIEN ULM B	-0.060	-3.117	0.002	0.838	74.729	0.000	0.030	0.947	0.344	0.842	2087
Equity	FONDSPICKER GLOBAL UI	-0.076	-2.872	0.004	0.390	25.354	0.000	-0.091	-2.094	0.036	0.411	2087
Equity	GAMAX FUNDS ASIA PACIFIC A	-0.047	-1.084	0.279	0.140	5.600	0.000	-0.220	-3.110	0.002	0.059	2087
Equity	GLS BANK AKTIENFONDS AK A	-0.052	-2.386	0.017	0.649	50.769	0.000	-0.035	-0.969	0.333	0.719	2087
Equity	HAL SYSTEMATIC MULTI ASSET DYNAMIC RT	-0.052	-2.333	0.020	0.600	46.669	0.000	-0.056	-1.536	0.125	0.688	2087
Equity	HELABA INVEST KPL. DIVIDENDENPLUS FONDS	-0.108	-4.620	0.000	0.917	67.060	0.000	0.154	3.996	0.000	0.800	2087
Equity	HP&P EURO SELECT UI FONDS A	-0.051	-2.656	0.008	0.602	53.586	0.000	-0.081	-2.561	0.010	0.748	2087
Equity	HSBC GERMAN EQUITY AC	-0.015	-1.434	0.152	0.995	159.369	0.000	0.032	1.804	0.071	0.960	2087
Equity	INVESCO KPL.EUROPA CORE AKTIENFDS	-0.071	-2.388	0.017	0.505	29.122	0.000	-0.060	-1.216	0.224	0.465	2087
Bond	UNION INV.PRIVATFONDS UNIRENTA	-0.055	-2.074	0.038	0.092	5.993	0.000	-0.272	-6.254	0.000	0.110	2087
Bond	AMUNDI BKK RENT	-0.081	-3.773	0.000	0.144	11.542	0.000	-0.210	-5.960	0.000	0.205	2087
Bond	DEKARENT INTERNATIONAL	-0.068	-2.769	0.006	0.137	9.508	0.000	-0.230	-5.666	0.000	0.161	2087
Bond	FRANKFURT TRUST INV. FT INTERZINS	-0.058	-2.768	0.006	0.123	10.029	0.000	-0.244	-7.053	0.000	0.195	2087
Bond	DWS EURO BOND FUND LD	-0.083	-3.536	0.000	0.139	10.142	0.000	-0.212	-5.477	0.000	0.170	2087
Bond	BALOISE-RENTENFONDS DWS	-0.076	-3.236	0.001	0.138	10.098	0.000	-0.226	-5.848	0.000	0.175	2087
Bond	ALLIANZ EURO RENTENFONDS - A - EUR	-0.069	-2.810	0.005	0.131	9.250	0.000	-0.242	-6.034	0.000	0.162	2087
Bond	HANSAINVEST HANSEATISCHE INV.GESELL.HANSA INTL.	-0.067	-2.744	0.006	0.135	9.507	0.000	-0.234	-5.814	0.000	0.163	2087
Bond	AMPEGA GLOBAL RENTENFONDS	-0.061	-2.485	0.013	0.123	8.602	0.000	-0.248	-6.161	0.000	0.153	2087
Bond	DWS INVESTMENT INTL. RENTEN TYP O	-0.051	-1.983	0.047	0.107	7.132	0.000	-0.258	-6.061	0.000	0.125	2087
Bond	MEAG MUNICH ERGO KPL. EURORENT	-0.081	-3.676	0.000	0.146	11.341	0.000	-0.208	-5.711	0.000	0.196	2087
Bond	LBBW RENTEN EURO FLEX NACHHALTIGKEIT	-0.088	-4.073	0.000	0.153	12.190	0.000	-0.190	-5.363	0.000	0.207	2087
Bond	MONEGA KPL.EURO BOND	-0.067	-3.001	0.003	0.129	9.907	0.000	-0.241	-6.517	0.000	0.183	2087
Bond	LBBW ASTMGMT.INV.GESELL. MBH RENTAMAX R	-0.088	-4.045	0.000	0.169	13.415	0.000	-0.183	-5.151	0.000	0.227	2087
Bond	BFS NACHHALTIGKEITSFONDS GREEN BONDS	-0.083	-3.866	0.000	0.140	11.197	0.000	-0.204	-5.774	0.000	0.195	2087
Bond	HELABA INVEST KPL.HIY. FONDS	-0.105	-4.725	0.000	0.240	18.589	0.000	-0.129	-3.526	0.000	0.304	2087
Bond	UNI INSTL EUR COVERED BONDS 4-6 YEARS SUST	-0.078	-3.578	0.000	0.132	10.383	0.000	-0.216	-6.018	0.000	0.183	2087
Bond	LAZARD ASST.MAN.DTL.EUR. HIGHYIELD	-0.100	-4.541	0.000	0.241	18.852	0.000	-0.137	-3.772	0.000	0.313	2087
Bond	FBG INDIVIDUAL R-PA	-0.083	-3.964	0.000	0.168	13.703	0.000	-0.195	-5.621	0.000	0.241	2087
Bond	AVANA INV.AKTGSF.MIT TGHF.GEN KAG EU.CNTL	-0.062	-2.977	0.003	0.149	12.314	0.000	-0.232	-6.784	0.000	0.234	2087
Bond	METZLER EURO CORPORATES SUSTAINABILITY AI	-0.093	-4.182	0.000	0.170	13.086	0.000	-0.177	-4.824	0.000	0.215	2087
Bond	HSBC STRATEGIE SUBSTANZ AD	-0.079	-3.756	0.000	0.150	12.296	0.000	-0.208	-6.033	0.000	0.220	2087
Bond	CORPORATE M SUSTAINABLE (I)	-0.086	-3.979	0.000	0.159	12.642	0.000	-0.193	-5.431	0.000	0.217	2087
Bond	WI GLOBAL CHALLENGES CORPORATE BONDS	-0.069	-3.215	0.001	0.130	10.453	0.000	-0.229	-6.503	0.000	0.193	2087
Bond	AMPEGA RENDITE RENTENFONDS	-0.067	-3.086	0.002	0.131	10.329	0.000	-0.234	-6.517	0.000	0.191	2087

Table 49: Henriksson and Merton Market Timing Ability France

Types	Fund	α	t-test	p-value	B	t-test	p-value	γ	t-test	p-value	Adjusted R2	Obs.
Equity	RENAISSANCE EUROPE I COMGEST	-0.057	-2.480	0.013	0.770	66.474	0.000	-0.089	-2.563	0.010	0.805	2087
Equity	AA MMF EMERGING COVT. NEULIZE OBC INMS.	-0.298	-10.263	0.000	0.301	20.692	0.000	-0.157	-3.588	0.000	0.324	2087
Equity	ABACUS QUALITY I	-0.083	-4.069	0.000	0.841	82.551	0.000	-0.033	-1.077	0.282	0.860	2087
Equity	ABEILLE VALEURS	-0.101	-4.651	0.000	0.695	63.978	0.000	-0.099	-3.031	0.002	0.794	2087
Equity	ABERDEEN WACTIONS CR. SUISSE ASTMGMT.GEST.	-0.277	-8.096	0.000	0.558	32.433	0.000	0.042	0.818	0.413	0.474	2087
Equity	AGF ASAC ACTIONS (D) AGF ASSET MANAGEMENT	-0.330	-13.376	0.000	0.192	15.505	0.000	-0.199	-5.348	0.000	0.252	2087
Equity	ALLIANZ ACN.ER.C GLOBAL INVRS.FRN.	-0.049	-3.070	0.002	0.904	112.443	0.000	-0.004	-0.178	0.859	0.918	2087
Equity	AMERI-GAN O SUSP - UNSUPPORTED	-0.340	-13.565	0.000	0.189	15.048	0.000	-0.184	-4.872	0.000	0.236	2087
Equity	AXA AEDIFICANDI A C EUR	-0.269	-7.485	0.000	0.756	41.874	0.000	0.178	3.282	0.001	0.583	2087
Equity	EQUI CONVICTIONS B GEST.	-0.174	-7.896	0.000	0.774	69.988	0.000	0.056	1.696	0.090	0.808	2087
Equity	HANSEATIQUE B	-0.049	-1.712	0.087	0.842	58.434	0.000	-0.039	-0.910	0.363	0.755	2087
Equity	EDR SICAV TRICOLORE RENDEMENT B EUR	-0.084	-5.130	0.000	0.913	111.542	0.000	0.029	1.174	0.241	0.916	2087
Equity	ODDO BHF METROPOLE SELECTION B	-0.062	-2.844	0.005	0.959	87.467	0.000	0.038	1.140	0.255	0.869	2087
Equity	TURGOT SMIDCAPS FRANCE BC TURGOT ASSET MAN.	-0.205	-8.447	0.000	0.603	49.407	0.000	-0.026	-0.721	0.471	0.688	2087
Equity	MIROVA ACTIONS EUROPE F (EUR)	-0.053	-2.602	0.009	0.857	83.609	0.000	-0.040	-1.284	0.199	0.863	2087
Equity	SUNNY MANAGERS F	-0.229	-7.784	0.000	0.638	43.244	0.000	0.059	1.335	0.182	0.614	2087
Equity	UBS (F) EUROPN OPPTY UNCONSTR PEA EUR I	-0.249	-8.816	0.000	0.338	23.804	0.000	-0.198	-4.625	0.000	0.395	2087
Equity	AMUNDI ACTIONS EMERGENTS ESR F (C)	-0.211	-5.392	0.000	0.614	31.307	0.000	-0.015	-0.252	0.801	0.467	2087
Equity	BETAMAX EUROPE SMART FOR CLIMATE F	-0.086	-4.409	0.000	0.782	80.077	0.000	-0.057	-1.936	0.053	0.854	2087
Equity	SEEYOND ACTIONS EUROPEENNES ESG F	-0.068	-4.034	0.000	0.848	99.772	0.000	-0.031	-1.225	0.221	0.900	2087
Equity	G FUND OPPORTUNITIES EUROPE IC	-0.045	-2.366	0.018	0.886	92.795	0.000	-0.027	-0.931	0.352	0.885	2087
Equity	ECHIQUIER AGRESSOR G	-0.093	-4.476	0.000	0.828	79.203	0.000	-0.036	-1.147	0.251	0.850	2087
Equity	GROUPAMA EURO STOCK G ASST.MAN.	-0.317	-12.720	0.000	0.190	15.176	0.000	-0.216	-5.733	0.000	0.252	2087
Equity	MANDARINE VALEUR G GEST.	-0.047	-1.857	0.063	0.963	76.245	0.000	0.023	0.613	0.540	0.836	2087
Equity	PLUVALCA BIOTECH Z	-0.189	-4.090	0.000	0.635	27.312	0.000	-0.021	-0.300	0.764	0.401	2087
Bond	G FUND CREDIT EURO ISR I C	-0.385	-15.148	0.000	0.229	17.926	0.000	-0.098	-2.565	0.010	0.256	2087
Bond	G FUND CREDIT EURO ISR M	-0.385	-15.132	0.000	0.229	17.928	0.000	-0.098	-2.563	0.010	0.256	2087
Bond	G FUND GLOBAL GREEN BONDS I	-0.386	-14.243	0.000	0.204	14.956	0.000	-0.122	-2.970	0.003	0.205	2087
Bond	GROUPAMA CR.ER.CT I ASST.MAN.	-0.373	-15.453	0.000	0.203	16.755	0.000	-0.137	-3.762	0.000	0.251	2087
Bond	ALLIANZ EURO HIGH YIELD R D EUR	-0.378	-14.942	0.000	0.306	24.056	0.000	-0.054	-1.415	0.157	0.357	2087
Bond	ALM CREDIT EURO ISR IC	-0.382	-15.200	0.000	0.220	17.411	0.000	-0.108	-2.852	0.004	0.251	2087
Bond	FONDO BNPP SEICEDOLE B	-0.375	-15.301	0.000	0.223	18.080	0.000	-0.123	-3.325	0.001	0.270	2087
Bond	EDMOND DE ROTH.SICAV ER.SUST CRED B EUR	-0.385	-15.475	0.000	0.245	19.627	0.000	-0.091	-2.425	0.015	0.287	2087
Bond	LA FRANCAISE EURO INFLATION B	-0.338	-12.813	0.000	0.239	18.062	0.000	-0.145	-3.633	0.000	0.275	2087
Bond	OCTO CREDIT COURT TERME B	-0.373	-15.555	0.000	0.205	17.055	0.000	-0.135	-3.730	0.000	0.257	2087
Bond	ALLIANZ EURO HIGH YIELD I C/D EUR	-0.370	-15.399	0.000	0.302	25.032	0.000	-0.047	-1.298	0.194	0.373	2087
Bond	ANAXIS SHORT DURATION K (EUR)	-0.322	-9.716	0.000	0.176	10.576	0.000	-0.226	-4.526	0.000	0.148	2087
Bond	TIKEHAU CREDIT PLUS K- ACC-EUR	-0.373	-15.592	0.000	0.259	21.613	0.000	-0.085	-2.364	0.018	0.324	2087
Bond	EXANE ELLIPSIS CONVS FD J CHF (EUR)	-0.312	-10.707	0.000	0.225	15.416	0.000	-0.196	-4.449	0.000	0.236	2087
Bond	REGARD CONVERTIBLES EURO H	-0.290	-13.754	0.000	0.379	35.824	0.000	-0.109	-3.422	0.001	0.564	2087
Bond	DANONE COMMUNITIES D ISR PRUDENT (C/D)	-0.367	-15.105	0.000	0.207	16.984	0.000	-0.145	-3.966	0.000	0.259	2087
Bond	ARC FLEXIBOND D SUSP - UNSUPPORTED	-0.377	-15.591	0.000	0.217	17.813	0.000	-0.131	-3.595	0.000	0.269	2087
Bond	CD ALPHA BONDS D	-0.371	-15.388	0.000	0.248	20.431	0.000	-0.101	-2.771	0.006	0.307	2087
Bond	CONFIANCE SOLIDAIRE D CREDIT COOPERATIF	-0.376	-15.477	0.000	0.200	16.442	0.000	-0.138	-3.764	0.000	0.245	2087
Bond	ALLIANZ OBLIGATIONS INTERNATIONALES D EUR	-0.386	-14.295	0.000	0.173	12.776	0.000	-0.150	-3.689	0.000	0.175	2087
Bond	AXA EURO CREDIT (D) AXA INVESTMENT PARIS	-0.379	-14.970	0.000	0.218	17.156	0.000	-0.120	-3.144	0.002	0.250	2087
Bond	BRONGNIART VARIFONDS D	-0.372	-14.473	0.000	0.193	14.911	0.000	-0.162	-4.179	0.000	0.223	2087
Bond	BSO CONVERTIBLE D	-0.301	-14.239	0.000	0.345	32.503	0.000	-0.129	-4.034	0.000	0.525	2087
Bond	CAPITOP REVENUS (D)	-0.377	-15.415	0.000	0.226	18.367	0.000	-0.128	-3.472	0.001	0.278	2087
Bond	COVEA EURO SOUVERAIN (D) FINANCE	-0.379	-13.866	0.000	0.209	15.222	0.000	-0.138	-3.347	0.001	0.216	2087

Table 50: Henriksson and Merton Market Timing Ability Japan

Types	Fund	α	t-test	p-value	B	t-test	p-value	γ	t-test	p-value	Adjusted R2	Obs.
Equity	GS NET WIN GS TECH EQTY FD B (NON HGD)	0.029	0.636	0.525	0.676	26.728	0.000	-0.084	-1.339	0.181	0.255	2087
Equity	ALLIANCE US GROWTH EQUITY B	0.043	1.152	0.250	0.610	29.211	0.000	-0.079	-1.523	0.128	0.291	2087
Equity	SMDS CHINA A & H SHARES OPEN	-0.034	-0.751	0.453	0.221	8.639	0.000	-0.009	-0.150	0.881	1.446	2087
Equity	PICTET GLBL INC EQTY (MTHLY DIST)	-0.082	-2.395	0.017	0.125	6.549	0.000	-0.045	-0.945	0.345	0.020	2087
Equity	UBS NEXT GENERATION TECHNOLOGY FUND	0.014	0.275	0.784	0.751	27.006	0.000	-0.090	-1.311	0.190	0.259	2087
Equity	ABRDN ABERDEEN JAPAN OPEN	-0.008	-0.591	0.554	0.891	114.144	0.000	-0.008	-0.422	0.673	0.862	2087
Equity	ALLIANCE GLOBAL GROWTH OPPORTUNITIES (2Y)	0.028	0.895	0.371	0.581	33.407	0.000	-0.075	-1.745	0.081	0.349	2087
Equity	AMUNDI TARGET JAPAN FUND	-0.008	-0.431	0.666	0.759	69.050	0.000	-0.018	-0.660	0.509	0.696	2087
Equity	BARINGS ASIA FUTURE GROWTH EQUITY FUND	-0.003	-0.092	0.927	0.255	12.053	0.000	-0.082	-1.570	0.117	0.065	2087
Equity	BNYMELLON US MNFG INDUSTRY EQUITY FUND	0.046	1.161	0.246	0.643	29.337	0.000	-0.070	-1.283	0.200	0.292	2087
Equity	BRJ BLACKROCK NATURAL RESOURCES EQUITY FUND	0.039	0.794	0.427	0.344	12.397	0.000	-0.122	-1.770	0.077	0.069	2087
Equity	CLOVER KODOMO FUND	-0.040	-1.504	0.133	0.090	6.071	0.000	-0.021	-0.573	0.567	0.017	2087
Equity	DAIWA ACTIVE NIPPON (MUSASHI)	-0.011	-0.685	0.493	0.876	96.526	0.000	-0.011	-0.498	0.618	0.817	2087
Equity	DAIWA JAPAN OPEN	-0.008	-0.427	0.670	0.933	87.682	0.000	0.003	0.095	0.924	0.787	2087
Equity	DWS DEUTSCHE JAPAN GROWTH OPEN	-0.041	-1.572	0.116	0.861	58.459	0.000	0.046	1.261	0.208	0.621	2087
Equity	EAST SPRING GROWING ASIA EQUITY OPEN	-0.018	-0.555	0.579	0.255	14.137	0.000	-0.079	-1.765	0.078	0.088	2087
Equity	FIDELITY ASIA EQUITY FUND	-0.005	-0.150	0.881	0.284	13.885	0.000	-0.057	-1.124	0.261	0.084	2087
Equity	GS JAPAN EQUITY INDEX PLUS	-0.016	-1.146	0.252	0.872	108.768	0.000	-0.009	-0.459	0.646	0.850	2087
Equity	HSBC ASIA PLUS	-0.006	-0.166	0.868	0.256	11.680	0.000	-0.088	-1.620	0.105	0.062	2087
Equity	INVESCO GT GLOBAL (INVESTMENT OPEN)	-0.017	-0.711	0.477	0.426	31.109	0.000	-0.043	-1.277	0.202	0.317	2087
Equity	INVESCO JAPAN GROWTH FUND	-0.017	-0.799	0.424	0.858	70.595	0.000	0.006	0.186	0.853	0.705	2087
Equity	INVESCO MSCI KOKUSAI PORTFOLIO	0.016	0.484	0.628	0.574	31.644	0.000	-0.055	-1.223	0.221	0.324	2087
Equity	JPM GLOBAL HEALTH CARE RELATED EQ FUND	-0.057	-1.319	0.187	0.254	10.437	0.000	-0.019	-0.322	0.748	0.049	2087
Equity	JPM JAPAN MEISTER	0.001	0.054	0.957	0.899	114.913	0.000	0.002	0.119	0.905	0.864	2087
Equity	JPM THE JAPAN	-0.017	-0.707	0.480	0.922	68.780	0.000	0.031	0.948	0.343	0.694	2087
Bond	ALLIANCE HIGH YIELD OPEN	-0.027	-1.509	0.131	0.234	22.994	0.000	-0.088	-3.481	0.001	0.206	2087
Bond	NOMURA HIGH YIELD BOND OPEN A COURSE	-0.056	-4.534	0.000	0.085	12.202	0.000	-0.054	-3.153	0.002	0.070	2087
Bond	FIDELITY US HIGH YIELD	-0.054	-2.631	0.009	0.257	22.391	0.000	-0.077	-2.721	0.007	0.196	2087
Bond	SMDS SB JAPAN BOND FUND	-0.053	-7.474	0.000	0.000	-0.084	0.933	-0.056	-5.725	0.000	0.015	2087
Bond	INVESCO MONTHLY INCOME FUND	-0.041	-2.202	0.028	0.228	21.894	0.000	-0.068	-2.637	0.008	0.189	2087
Bond	GS VARIETY OPEN FUND	-0.055	-4.945	0.000	0.108	17.393	0.000	-0.061	-3.985	0.000	0.132	2087
Bond	NOCHU US BOND OPEN	-0.029	-1.819	0.069	0.163	17.927	0.000	-0.074	-3.278	0.001	0.137	2087
Bond	SOMPO JAPAN BOND FUND	-0.052	-7.871	0.000	0.000	-0.113	0.910	-0.057	-6.260	0.000	0.018	2087
Bond	SMDS DC FOREIGN BOND FUND	-0.035	-2.479	0.013	0.176	22.051	0.000	-0.070	-3.559	0.000	0.193	2087
Bond	MYAM FOREIGN BOND OPEN	-0.041	-2.813	0.005	0.173	21.051	0.000	-0.075	-3.668	0.000	0.179	2087
Bond	HITACHI DOMESTIC BOND INDEX FUND	-0.052	-7.785	0.000	0.000	-0.068	0.946	-0.056	-6.091	0.000	0.017	2087
Bond	GS DC GALILEO	-0.057	-6.454	0.000	0.016	3.266	0.001	-0.059	-4.815	0.000	0.015	2087
Bond	MYAM DC FOREIGN BOND OPEN	-0.035	-2.464	0.014	0.174	21.997	0.000	-0.072	-3.693	0.000	0.192	2087
Bond	NOMURA DOMESTIC BOND INDEX FUND	-0.053	-8.001	0.000	0.000	-0.085	0.932	-0.056	-6.077	0.000	0.016	2087
Bond	SMT DC FOREIGN BOND INDEX L	-0.033	-2.316	0.021	0.172	21.479	0.000	-0.071	-3.592	0.000	0.185	2087
Bond	EAST SPRING US HIGH YIELD BOND OPEN	-0.026	-1.403	0.161	0.237	22.559	0.000	-0.079	-3.060	0.002	0.199	2087
Bond	DAIWA HIGH GRADE CAD BOND OPEN	-0.078	-4.285	0.000	0.251	24.658	0.000	-0.039	-1.548	0.122	0.226	2087
Bond	UBS AUSTRALIA BOND OPEN (M)	-0.068	-3.057	0.002	0.320	25.822	0.000	-0.048	-1.553	0.121	0.243	2087
Bond	SMT GLOBAL BOND INDEX OPEN	-0.034	-2.406	0.016	0.172	21.457	0.000	-0.071	-3.592	0.000	0.185	2087
Bond	SMT FOREIGN BOND INDEX OPEN(SMA)	-0.035	-2.413	0.016	0.172	21.480	0.000	-0.071	-3.592	0.000	0.185	2087
Bond	BRJ WORLD INCOME STRATEGY	-0.029	-1.689	0.091	0.179	18.757	0.000	-0.082	-3.477	0.001	0.148	2087
Bond	SMDS T ROWE PRICE US INCOME FUND	-0.037	-2.213	0.027	0.180	19.261	0.000	-0.074	-3.221	0.001	0.154	2087
Bond	AM-ONE LOOMIS US INVESTMENT GRADE BOND F	-0.036	-2.373	0.018	0.162	19.144	0.000	-0.073	-3.498	0.000	0.153	2087
Bond	NIKKO INDEX FUND JAPANESE BOND DC	-0.052	-7.921	0.000	0.000	-0.080	0.936	-0.056	-6.121	0.000	0.017	2087
Bond	SHINKIN US SOVEREIGN BOND PORTFOLIO	-0.039	-2.568	0.010	0.140	16.464	0.000	-0.072	-3.439	0.001	0.119	2087

Appendix 8

Table 51: Sharpe and Treynor Ratio United States Exchange-Traded Funds (ETF)

Name	Sharpe Ratio	Treynor Ratio
ADVISORSHARES DORSEY WRIGHT ADR ETF	-0.967	-1.709
ADVISORSHARES FOCUSED EQUITY ETF	-1.177	-1.804
ADVISORSHARES RANGER EQUITY BEAR ETF	-0.921	1.518
ALP.ARCHITECT INTL QNT. MMTM.ETF	-1.044	-1.898
ALPHA ARCHITECT US QUANTITATIVE VALUE ETF	-0.861	-1.346
AMPLIFY CWP ENH. DIV. INC.ETF	-1.310	-1.891
ARK GENOMIC REVOLUTION ETF	-0.519	-1.034
ARK INNOVATION ETF	-0.504	-0.915
ARK NEXT GENERATION INTERNET ETF	-0.525	-0.945
CAMBRIA EMERGING SHAREHOLDER YIELD ETF	-1.104	-3.031
CAMBRIA FOREIGN SHAREHOLDER YIELD ETF	-1.129	-2.081
CAMBRIA GLOBAL VALUE ETF	-1.111	-2.114
CAMBRIA SHAREHOLDER YIELD ETF	-0.839	-1.290
DAVIS SELECT FINANCIAL ETF	-0.882	-1.385
DAVIS SELECT US EQUITY ETF	-1.026	-1.443
DAVIS SELECT WORLDWIDE ETF	-0.971	-1.505
FCF US QUALITY ETF	-1.097	-1.508
FIRST TRUST BUYWRITE INCOME ETF	-1.437	-2.191
FIRST TRUST HORIZON MANAGED VOL DEV INTL ETF	-1.573	-2.653
FRANKLIN US LOW VOLATILITY ETF	-1.215	-1.695
FST.NAE.EN.INFR.	-1.109	-2.077
FST.RIVERFRONT DYM. EU. ETF	-1.142	-2.061
INFRACAP MLP ETF	-0.516	-1.610
INVESCO S&P 500 DOWNSIDE HEDGED ETF	-1.705	-4.166
PRCL.HLTHCR.ITRS. ETF	-0.693	-1.471
PRCL.MILLENNIAL GLB.GW. ETF	-0.903	-1.683
PRINCIPAL US SMALL CAP MULTI FACTOR ETF	-0.875	-1.574
RIVERFRONT DYNAMIC US FLEX-CAP ETF	-1.084	-1.459
VIRTUS REAVES UTILITIES ETF	-1.101	-2.326
WBI BULLBEAR VALUE 3000 ETF	-1.803	-4.001
WISDOMTREE EMERGING MARKETS ESG FUND	-1.067	-1.894
WISDOMTREE EMM.QLT.DIV. GROWTH FUND	-1.076	-1.995
WISDOMTREE US AI ENHANCED VALUE FUND	-1.127	-1.618
WISDOMTREE US ESG FUND	-1.112	-1.464
WISDOMTREE US VALUE FUND	-1.033	-1.497

Table 52: Jensen's Alpha United States Exchange-Traded Funds (ETF)

Fund	Alpha	t-test	pvalue	Adjusted R2	Obs.
ARK INNOVATION ETF	0.707	10.238	0.000	0.509	1566
AMPLIFY CWP ENH. DIV. INC.ETF	-0.395	-20.131	0.000	0.749	1566
FST.NAE.EN.INFR.	0.031	-12.055	0.000	0.568	1566
ARK GENOMIC REVOLUTION ETF	0.487	6.680	0.000	0.428	1566
ARK NEXT GENERATION INTERNET ETF	0.635	9.640	0.000	0.515	1566
CAMBRIA SHAREHOLDER YIELD ETF	0.096	2.863	0.004	0.691	1566
WISDOMTREE US AI ENHANCED VALUE FUND	-0.179	-9.379	0.000	0.827	1566
DAVIS SELECT US EQUITY ETF	-0.060	-2.890	0.004	0.824	1566
INFRACAP MLP ETF	0.183	2.093	0.037	0.290	1566
ALPHA ARCHITECT US QUANTITATIVE VALUE ETF	0.057	1.732	0.083	0.690	1566
DAVIS SELECT WORLDWIDE ETF	-0.085	-2.998	0.003	0.712	1566
INVESCO S&P 500 DOWNSIDE HEDGED ETF	-1.091	-38.382	0.000	0.110	1566
PRINCIPAL US SMALL CAP MULTI FACTOR ETF	-0.089	-2.345	0.019	0.574	1566
FCF US QUALITY ETF	-0.094	-6.289	0.000	0.895	1566
DAVIS SELECT FINANCIAL ETF	0.005	0.163	0.870	0.673	1566
CAMBRIA EMERGING SHAREHOLDER YIELD ETF	-0.662	-16.701	0.000	0.287	1566
CAMBRIA FOREIGN SHAREHOLDER YIELD ETF	-0.384	-12.840	0.000	0.572	1566
WISDOMTREE US VALUE FUND	-0.099	-4.365	0.000	0.787	1566
FRANKLIN US LOW VOLATILITY ETF	-0.263	-15.042	0.000	0.825	1566
FIRST TRUST BUYWRITE INCOME ETF	-0.515	-26.301	0.000	0.708	1566
ADVISORSHARES RANGER EQUITY BEAR ETF	-2.827	-78.288	0.000	0.628	1566
ALP.ARCHITECT INTL QNT. MMTM.ETF	-0.337	-9.997	0.000	0.536	1566
CAMBRIA GLOBAL VALUE ETF	-0.380	-12.264	0.000	0.561	1566
WISDOMTREE EMM.QLT.DIV. GROWTH FUND	-0.359	-11.068	0.000	0.547	1566
WISDOMTREE US ESG FUND	-0.085	-7.160	0.000	0.932	1566
PRCL.HLTHCR.ITRS. ETF	-0.036	-0.625	0.532	0.390	1566
VIRTUS REAVES UTILITIES ETF	-0.543	-14.884	0.000	0.378	1566
ADVISORSHARES FOCUSED EQUITY ETF	-0.333	-13.636	0.000	0.676	1566
FIRST TRUST HORIZON MANAGED VOL DEV INTL ETF	-0.616	-32.201	0.000	0.667	1566
WBI BULLBEAR VALUE 3000 ETF	-0.904	-38.821	0.000	0.346	1566
FST.RIVERFRONT DYM. EU. ETF	-0.400	-13.429	0.000	0.568	1566
ADVISORSHARES DORSEY WRIGHT ADR ETF	-0.222	-6.303	0.000	0.566	1566
PRCL.MILLENNIAL GLB.GW. ETF	-0.192	-4.922	0.000	0.516	1566
WISDOMTREE EMERGING MARKETS ESG FUND	-0.302	-9.817	0.000	0.600	1566
RIVERFRONT DYNAMIC US FLEX-CAP ETF	-0.054	-4.357	0.000	0.930	1566

Table 53: Fama-French Three Factor Model United States Exchange-Traded Funds (ETF)

Fund	α	t-test	p-value	Rm-Rf	t-test	p-value	SMB	t-test	p-value	HML	t-test	p-value	Adjusted R2
ARK INNOVATION ETF	-1.335	-19.928	0.000	0.016	0.296	0.767	-0.057	-0.565	0.572	0.140	2.159	0.031	0.001
AMPLIFY CWP ENH. DIV. INC.ETF	-1.378	-51.748	0.000	-0.012	-0.588	0.556	-0.026	-0.649	0.516	0.013	0.492	0.622	-0.001
FST.NAE.EN.INFR.	-1.388	-43.827	0.000	-0.010	-0.390	0.697	0.006	0.128	0.898	0.064	2.090	0.037	0.001
ARK GENOMIC REVOLUTION ETF	-1.343	-20.501	0.000	-0.012	-0.236	0.813	0.023	0.228	0.819	0.137	2.152	0.032	0.001
ARK NEXT GENERATION INTERNET ETF	-1.335	-20.785	0.000	0.030	0.600	0.549	-0.068	-0.697	0.486	0.133	2.129	0.033	0.001
CAMBRIA SHAREHOLDER YIELD ETF	-1.354	-33.171	0.000	0.028	0.858	0.391	-0.020	-0.324	0.746	0.037	0.923	0.356	-0.001
WISDOMTREE US AI ENHANCED VALUE FUND	-1.390	-44.559	0.000	0.015	0.625	0.532	0.013	0.278	0.781	0.017	0.560	0.575	-0.001
DAVIS SELECT US EQUITY ETF	-1.374	-40.548	0.000	0.016	0.602	0.547	-0.025	-0.479	0.632	0.030	0.925	0.355	-0.001
INFRACAP MLP ETF	-1.435	-20.406	0.000	0.009	0.160	0.873	0.117	1.094	0.274	0.221	3.241	0.001	0.005
ALPHA ARCHITECT US QUANTITATIVE VALUE ETF	-1.371	-34.062	0.000	0.023	0.710	0.478	0.004	0.071	0.944	0.054	1.381	0.168	0.000
DAVIS SELECT WORLDWIDE ETF	-1.379	-38.412	0.000	0.019	0.681	0.496	-0.034	-0.631	0.528	0.049	1.415	0.157	0.000
INVESCO S&P 500 DOWNSIDE HEDGED ETF	-1.384	-67.748	0.000	0.034	2.106	0.035	-0.089	-2.856	0.004	-0.019	-0.981	0.327	0.006
PRINCIPAL US SMALL CAP MULTI FACTOR ETF	-1.367	-34.625	0.000	0.023	0.746	0.456	0.019	0.314	0.753	0.074	1.924	0.055	0.001
FCF US QUALITY ETF	-1.362	-43.390	0.000	0.016	0.628	0.530	0.006	0.134	0.893	0.034	1.113	0.266	-0.001
DAVIS SELECT FINANCIAL ETF	-1.377	-34.878	0.000	0.012	0.391	0.696	-0.021	-0.347	0.728	0.035	0.926	0.355	-0.001
CAMBRIA EMERGING SHAREHOLDER YIELD ETF	-1.394	-43.638	0.000	0.015	0.584	0.560	0.009	0.187	0.852	0.041	1.317	0.188	-0.001
CAMBRIA FOREIGN SHAREHOLDER YIELD ETF	-1.386	-44.685	0.000	0.024	0.963	0.336	-0.038	-0.805	0.421	0.052	1.738	0.082	0.001
WISDOMTREE US VALUE FUND	-1.362	-40.839	0.000	0.012	0.459	0.646	-0.013	-0.259	0.796	0.039	1.205	0.228	-0.001
FRANKLIN US LOW VOLATILITY ETF	-1.361	-47.993	0.000	-0.007	-0.321	0.748	0.005	0.106	0.915	0.016	0.594	0.553	-0.002
FIRST TRUST BUYWRITE INCOME ETF	-1.402	-56.816	0.000	0.006	0.303	0.762	-0.015	-0.388	0.698	0.032	1.324	0.186	-0.001
ADVISORSHARES RANGER EQUITY BEAR ETF	-1.466	-36.440	0.000	-0.029	-0.905	0.365	0.001	0.016	0.987	-0.067	-1.716	0.086	0.000
ALP.ARCHITECT INTL QNT. MMTM.ETF	-1.389	-41.250	0.000	0.004	0.160	0.873	0.017	0.332	0.740	0.037	1.148	0.251	-0.001
CAMBRIA GLOBAL VALUE ETF	-1.398	-43.959	0.000	0.022	0.885	0.376	-0.014	-0.296	0.767	0.040	1.300	0.194	0.000
WISDOMTREE EMM.QLT.DIV. GROWTH FUND	-1.393	-42.518	0.000	-0.008	-0.312	0.755	-0.007	-0.134	0.894	0.048	1.509	0.131	0.000
WISDOMTREE US ESG FUND	-1.370	-43.971	0.000	0.020	0.801	0.423	0.004	0.080	0.936	0.027	0.903	0.366	-0.001
PRCL.HLTHCR.ITRS. ETF	-1.364	-27.365	0.000	-0.040	-1.027	0.305	0.052	0.688	0.491	0.112	2.309	0.021	0.002
VIRTUS REAVES UTILITIES ETF	-1.370	-43.504	0.000	-0.007	-0.266	0.791	-0.030	-0.626	0.532	0.019	0.625	0.532	-0.001
ADVISORSHARES FOCUSED EQUITY ETF	-1.359	-46.519	0.000	0.004	0.184	0.854	-0.007	-0.150	0.881	-0.016	-0.580	0.562	-0.002
FIRST TRUST HORIZON MANAGED VOL DEV INTL ETF	-1.402	-62.232	0.000	0.015	0.817	0.414	-0.009	-0.257	0.797	0.037	1.681	0.093	0.000
WBI BULLBEAR VALUE 3000 ETF	-1.397	-71.353	0.000	0.021	1.358	0.175	0.015	0.492	0.623	0.015	0.797	0.426	0.000
FST.RIVERFRONT DYM. EU. ETF	-1.390	-45.160	0.000	0.013	0.529	0.597	0.013	0.277	0.782	0.042	1.406	0.160	0.000
ADVISORSHARES DORSEY WRIGHT ADR ETF	-1.388	-38.255	0.000	0.016	0.564	0.573	-0.036	-0.651	0.515	0.070	1.980	0.048	0.001
PRCL.MILLENNIAL GLB.GW. ETF	-1.364	-35.786	0.000	0.047	1.579	0.114	-0.031	-0.538	0.590	0.084	2.259	0.024	0.003
WISDOMTREE EMERGING MARKETS ESG FUND	-1.394	-42.172	0.000	-0.006	-0.246	0.806	0.004	0.074	0.941	0.047	1.477	0.140	0.000
RIVERFRONT DYNAMIC US FLEX-CAP ETF	-1.372	-42.861	0.000	0.011	0.431	0.666	0.015	0.307	0.759	0.039	1.264	0.206	-0.001

Table 54: Treynor-Mazuy Market Timing Model United States Exchange-Traded Funds (ETF)

Active ETF	α	p-value	t-test	β	p-value	t-test	γ	p-value	t-test	Adjusted R2
INVESCO S&P 500 DOWNSIDE HEDGED ETF	-1.0506	0.0000	-38.2235	0.3318	0.0000	18.6472	0.0350	0.0000	11.8089	0.1821
INFRACAP MLP ETF	0.0805	0.3479	0.9389	0.8934	0.0000	16.1006	-0.0878	0.0000	-9.4952	0.3280
CAMBRIA GLOBAL VALUE ETF	-0.4096	0.0000	-13.3528	0.6612	0.0000	33.3041	-0.0254	0.0000	-7.6930	0.5772
FST.NAE.EN.INFR.	-0.3969	0.0000	-13.0545	0.6694	0.0000	34.0122	-0.0236	0.0000	34.0122	0.5819
FIRST TRUST HORIZON MANAGED VOL DEV INTL	-0.6327	0.0000	-33.3005	0.5284	0.0000	42.9662	-0.0144	0.0000	-7.0111	0.6768
CAMBRIA FOREIGN SHAREHOLDER YIELD ETF	-0.4076	0.0000	-13.7052	0.6658	0.0000	34.5857	-0.0206	0.0000	-6.4366	0.5824
RIVERFRONT DYNAMIC US FLEX-CAP ETF	-0.0637	0.0000	-5.1289	0.9402	0.0000	116.9774	-0.0081	0.0000	-6.0414	0.9316
WISDOMTREE EMERGING MARKETS ESG FUND	-0.3248	0.0000	-10.5784	0.7370	0.0000	37.0807	-0.0195	0.0000	-5.8804	0.6080
CAMBRIA EMERGING SHAREHOLDER YIELD ETF	-0.6888	0.0000	-17.3782	0.4599	0.0000	17.9264	-0.0228	0.0000	-5.3440	0.2998
WISDOMTREE EMM.QLT.DIV. GROWTH FUND	-0.3800	0.0000	-11.7160	0.6992	0.0000	33.3041	-0.0181	0.0000	-5.1771	0.5548
FCF US QUALITY ETF	-0.1035	0.0000	-6.9275	0.9029	0.0000	93.3687	-0.0082	0.0000	-5.0990	0.8969
PRINCIPAL US SMALL CAP MULTI FACTOR ETF	-0.1130	0.0029	-2.9788	0.8687	0.0000	35.3754	-0.0207	0.0000	-5.0507	0.5807
FST.RIVERFRONT DYM. EU. ETF	-0.4179	0.0000	-14.0234	0.6745	0.0000	34.9645	-0.0156	0.0000	-4.8571	0.5739
WISDOMTREE US AI ENHANCED VALUE FUND	-0.1893	0.0000	-9.8899	0.8587	0.0000	69.2947	-0.0088	0.0000	-4.2813	0.8285
PRCL.MILLENNIAL GLB.GW. ETF	-0.2094	0.0000	-5.3345	0.8098	0.0000	31.8724	-0.0147	0.0005	-3.4729	0.5191
ADVISORSHARES DORSEY WRIGHT ADR ETF	-0.2369	0.0000	-6.7002	0.8127	0.0000	35.5112	-0.0130	0.0007	-3.4091	0.5690
ALP.ARCHITECT INTL QNT. MMTM.ETF	-0.3513	0.0000	-10.3537	0.7323	0.0000	33.3462	-0.0119	0.0011	-3.2613	0.5384
DAVIS SELECT WORLDWIDE ETF	-0.0966	0.0007	-3.3924	0.9159	0.0000	49.6980	-0.0100	0.0011	-3.2608	0.7139
ADVISORSHARES RANGER EQUITY BEAR ETF	-2.8155	0.0000	-77.4455	-0.9654	0.0000	-41.0279	0.0101	0.0099	2.5810	0.6290
ALPHA ARCHITECT US QUANTITATIVE VALUE ETF	0.0467	0.1590	1.4090	1.0185	0.0000	47.4330	-0.0089	0.0133	-2.4771	0.6912
PRCL.HLTHCR.ITRS. ETF	-0.0523	0.3650	-0.9061	0.9300	0.0000	24.8940	-0.0141	0.0233	-2.2710	0.3919
WISDOMTREE US VALUE FUND	-0.1049	0.0000	-4.6017	0.9100	0.0000	61.6887	-0.0052	0.0333	-2.1304	0.7877
WISDOMTREE US ESG FUND	-0.0879	0.0000	-7.3229	0.9351	0.0000	120.3675	-0.0022	0.0825	-1.7373	0.9325
DAVIS SELECT FINANCIAL ETF	-0.0016	0.9610	-0.0490	0.9944	0.0000	45.9181	-0.0060	0.0938	-1.6768	0.6732
ARK GENOMIC REVOLUTION ETF	0.4718	0.0000	6.4210	1.3018	0.0000	27.3731	-0.0130	0.1002	-1.6447	0.4290
DAVIS SELECT US EQUITY ETF	-0.0645	0.0022	-3.0650	0.9521	0.0000	69.8975	-0.0036	0.1155	-1.5747	0.8245
ARK INNOVATION ETF	0.6932	0.0000	9.9588	1.4602	0.0000	32.4114	-0.0118	0.1156	-1.5746	0.5098
FIRST TRUST BUYWRITE INCOME ETF	-0.5192	0.0000	-26.2847	0.6399	0.0000	50.0524	-0.0033	0.1237	-1.5401	0.7086
WBI BULLBEAR VALUE 3000 ETF	-0.9084	0.0000	-38.6891	0.3490	0.0000	22.9624	-0.0036	0.1504	-1.4387	0.3464
ARK NEXT GENERATION INTERNET ETF	0.6232	0.0000	9.3904	1.4134	0.0000	32.9045	-0.0098	0.1730	-1.3634	0.5153
VIRTUS REAVES UTILITIES ETF	-0.5495	0.0000	-14.9318	0.5894	0.0000	24.7421	-0.0053	0.1784	-1.3462	0.3787
CAMBRIA SHAREHOLDER YIELD ETF	0.0903	0.0073	2.6854	1.0490	0.0000	48.1738	-0.0044	0.2205	-1.2256	0.6912
AMPLIFY CWP ENH. DIV. INC.ETF	-0.3924	0.0000	-19.8432	0.7291	0.0000	56.9647	0.0020	0.3512	0.9326	0.7491
FRANKLIN US LOW VOLATILITY ETF	-0.2639	0.0000	-14.9882	0.8033	0.0000	70.4778	-0.0011	0.5457	-0.6043	0.8246
ADVISORSHARES FOCUSED EQUITY ETF	-0.3330	0.0000	-13.5104	0.7530	0.0000	47.1928	0.0001	0.9561	0.0551	0.6758

Table 55: Henriksson-Merton Market Timing Model United States Exchange-Traded Funds (ETF)

Active ETF	α	t-test	p-value	B	t-test	p-value	γ	t-test	p-value	Adjusted R2
ARK INNOVATION ETF	0.611	7.256	0.000	1.454	33.115	0.000	0.389	1.920	0.055	0.510
AMPLIFY CWP ENH. DIV. INC.ETF	-0.386	-16.107	0.000	0.727	58.189	0.000	-0.045	-0.784	0.433	0.748
FST.NAE.EN.INFR.	-0.307	-8.222	0.000	0.780	40.102	0.000	-0.272	-3.023	0.003	0.570
ARK GENOMIC REVOLUTION ETF	0.398	4.480	0.000	1.303	28.112	0.000	0.360	1.681	0.093	0.429
ARK NEXT GENERATION INTERNET ETF	0.560	6.979	0.000	1.411	33.692	0.000	0.298	1.541	0.123	0.515
CAMBRIA SHAREHOLDER YIELD ETF	0.113	2.770	0.006	1.073	50.484	0.000	-0.084	-0.852	0.394	0.690
WISDOMTREE US AI ENHANCED VALUE FUND	-0.144	-6.176	0.000	0.906	74.591	0.000	-0.157	-2.804	0.005	0.827
DAVIS SELECT US EQUITY ETF	-0.062	-2.445	0.015	0.963	72.352	0.000	-0.001	-0.017	0.986	0.823
INFRACAP MLP ETF	0.338	3.174	0.002	1.266	22.806	0.000	-0.663	-2.586	0.010	0.292
ALPHA ARCHITECT US QUANTITATIVE VALUE ETF	0.067	1.668	0.096	1.054	50.204	0.000	-0.053	-0.545	0.586	0.689
DAVIS SELECT WORLDWIDE ETF	-0.088	-2.537	0.011	0.949	52.580	0.000	0.002	0.026	0.979	0.711
INVESCO S&P 500 DOWNSIDE HEDGED ETF	-1.207	-35.161	0.000	0.158	8.803	0.000	0.482	5.828	0.000	0.128
PRINCIPAL US SMALL CAP MULTI FACTOR ETF	-0.070	-1.509	0.132	0.948	39.284	0.000	-0.090	-0.807	0.420	0.573
FCF US QUALITY ETF	-0.084	-4.592	0.000	0.936	98.100	0.000	-0.051	-1.164	0.244	0.894
DAVIS SELECT FINANCIAL ETF	0.037	0.907	0.365	1.030	48.761	0.000	-0.142	-1.455	0.146	0.672
CAMBRIA EMERGING SHAREHOLDER YIELD ETF	-0.589	-12.215	0.000	0.573	22.744	0.000	-0.311	-2.677	0.008	0.290
CAMBRIA FOREIGN SHAREHOLDER YIELD ETF	-0.334	-9.171	0.000	0.760	40.038	0.000	-0.217	-2.475	0.013	0.572
WISDOMTREE US VALUE FUND	-0.066	-2.378	0.018	0.944	65.557	0.000	-0.149	-2.237	0.025	0.787
FRANKLIN US LOW VOLATILITY ETF	-0.263	-12.315	0.000	0.807	72.500	0.000	-0.007	-0.139	0.890	0.824
FIRST TRUST BUYWRITE INCOME ETF	-0.498	-20.844	0.000	0.659	52.849	0.000	-0.078	-1.345	0.179	0.708
ADVISORSHARES RANGER EQUITY BEAR ETF	-2.824	-64.059	0.000	-0.998	-43.412	0.000	-0.003	-0.029	0.977	0.627
ALP.ARCHITECT INTL QNT. MMTM.ETF	-0.304	-7.394	0.000	0.789	36.744	0.000	-0.147	-1.481	0.139	0.535
CAMBRIA GLOBAL VALUE ETF	-0.319	-8.455	0.000	0.777	39.509	0.000	-0.265	-2.911	0.004	0.563
WISDOMTREE EMM.QLT.DIV. GROWTH FUND	-0.317	-8.011	0.000	0.781	37.881	0.000	-0.185	-1.945	0.052	0.548
WISDOMTREE US ESG FUND	-0.085	-5.813	0.000	0.943	123.585	0.000	-0.011	-0.300	0.764	0.931
PRCL.HLTHCR.ITRS. ETF	-0.055	-0.780	0.435	0.969	26.568	0.000	0.069	0.409	0.683	0.390
VIRTUS REAVES UTILITIES ETF	-0.552	-12.394	0.000	0.603	25.974	0.000	0.030	0.281	0.779	0.378
ADVISORSHARES FOCUSED EQUITY ETF	-0.338	-11.341	0.000	0.750	48.200	0.000	0.014	0.194	0.846	0.675
FIRST TRUST HORIZON MANAGED VOL DEV INTL ETF	-0.566	-24.343	0.000	0.601	49.603	0.000	-0.217	-3.870	0.000	0.669
WBI BULLBEAR VALUE 3000 ETF	-0.872	-30.738	0.000	0.377	25.455	0.000	-0.138	-2.014	0.044	0.347
FST.RIVERFRONT DYM. EU. ETF	-0.370	-10.200	0.000	0.742	39.168	0.000	-0.131	-1.500	0.134	0.567
ADVISORSHARES DORSEY WRIGHT ADR ETF	-0.174	-4.049	0.000	0.880	39.350	0.000	-0.211	-2.042	0.041	0.566
PRCL.MILLENNIAL GLB.GW. ETF	-0.159	-3.344	0.001	0.876	35.234	0.000	-0.147	-1.282	0.200	0.515
WISDOMTREE EMERGING MARKETS ESG FUND	-0.254	-6.776	0.000	0.826	42.243	0.000	-0.210	-2.325	0.020	0.600
RIVERFRONT DYNAMIC US FLEX-CAP ETF	-0.044	-2.855	0.004	0.973	122.057	0.000	-0.055	-1.481	0.139	0.929