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Hybrid Investment Portfolio Management Strategies

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Resumo

Esta tese realiza uma análise comparativa entre o desempenho de uma Estratégia de Gestão de Portfólio Híbrida e dois portfólios geridos de forma tradicional – um Portfólio de Gestão Ativa e um Portfólio de Gestão Passiva. A análise é realizada ao longo de três horizontes de investimento distintos de 2, 5 e 10 anos, com foco nos seus perfis de risco-retorno, capacidade de resposta às condições de mercado e eficácia geral. A investigação procura abordar uma lacuna significativa na literatura, que estudou amplamente os méritos das estratégias ativas e passivas, individualmente, mas não explorou ainda com profundidade o potencial das Estratégias de Gestão Híbrida de Portfólio que combinam elementos de ambas as abordagens.

O estudo avalia estas estratégias através do uso de métricas de desempenho e risco, como Receita Cumulativa Total, Desvio Padrão, Sharpe-Ratio, *1-year rolling Alpha e Beta*, entre outras, para cada um dos horizontes de investimento. Através de uma análise empírica detalhada, a tese procura demonstrar que a Estratégia de Gestão Híbrida – composta por ativos ativos (outperforming) e ativos passivos – oferece um equilíbrio entre o desempenho das estratégias de gestão ativa e a estabilidade das estratégias de gestão passiva.

Enquanto que a estratégia ativa mostrou um ótimo desempenho no curto prazo (2 anos), impulsionada por maior assunção de risco, as estratégias passivas demonstraram consistência notável e baixa volatilidade, particularmente no longo prazo (10 anos). A estratégia híbrida superou consistentemente a estratégia passiva em retornos ajustados ao risco, conforme esperado, mas a verdadeira contribuição do estudo reside em revelar que, mesmo no cenário onde o portfólio ativo é composto totalmente por ativos líderes de setor com desempenho superior, a estratégia híbrida oferece um desempenho superior nos horizontes de médio a longo prazo. Isto sugere que os portfólios híbridos podem proporcionar maior resiliência e benefícios de diversificação, especialmente em condições de mercado menos favoráveis.

As descobertas têm amplas implicações para investidores que procuram uma estratégia de portfólio ideal que equilibre risco e retorno ao longo de vários horizontes temporais. No entanto, o estudo também reconhece várias limitações, incluindo o potencial de viés de sobrevivência e a suposição de que os portfólios ativos incluirão sempre ativos de alto desempenho. Estas limitações abrem caminhos para futuras investigações, particularmente na exploração do desempenho das estratégias híbridas em diferentes cenários de mercado e com diferentes graus de inclusão de ativos ativos.

Embora as descobertas do estudo ofereçam conclusões valiosas para investidores que procuram uma estratégia de portfólio ótima que procure um equilíbrio entre risco e receita ao longo dos horizontes temporais, esta também reconhece algumas limitações, incluindo o potencial para viés de sobrevivência e a suposição de que o portfólio ativo é composto apenas por ativos de alto desempenho. Este estudo convida os investigadores a aprofundar o estudo nesta limitação, de forma a testar a hipótese de que, em condições menos favoráveis para a estratégia ativa, a estratégia híbrida se destacaria ainda mais como uma solução superior para horizontes de investimento de médio a longo prazo.

Abstract

This thesis dives into a comparative a comparative analysis between the performance of a Hybrid Portfolio Management Strategy against two traditionally managed portfolio – one Active Management Portfolio and one Passive Management Portfolio. The analysis is conducted over the course of three distinct investment time horizons of 2, 5, and 10 years, focusing on their risk-return profiles, responsiveness to market conditions and overall effectiveness. The research seeks to address a significant gap in the literature, which has extensively studied the merits of both active and passive strategies, individually, but is yet to explore the potential of Hybrid Management Portfolio Strategies that combines elements from both approaches.

The study evaluates these strategies through the use of key performance and risk metrics such as Total Cumulative Return, Standard Deviation, Sharpe Ratio, 1 year rolling Alpha and Beta, among others, for each of the investment horizons. Through a detailed empirical analysis, the thesis demonstrates that the Hybrid Management Strategy – made of both active (outperforming) assets and passive assets – offers a compelling balance between the performance of active management strategies and stability of passive management strategies.

While active strategy showed great performance in the short term (2 years), driven by higher risk-taking and market responsiveness, passive strategies showcased remarkable consistency and low volatility, particularly in the long term (10 years). The hybrid strategy consistently outperformed the passive strategy in terms of risk-adjusted returns, as expected, but the study's true contribution lies in revealing that, even in scenarios where the active portfolio is fully composed of sector-leading outperforming assets, the Hybrid Strategy delivers superior performance in the medium to long-term horizons. This suggests that hybrid portfolios may offer enhanced resilience and diversification benefits, especially in less favorable market conditions.

The findings have broad implications for investors seeking an optimal portfolio strategy that balances risk and reward across various time horizons. However, the study also acknowledges several limitations, including the potential for survivorship bias and the assumption that active portfolios will always include top-performing assets. These limitations open avenues for future research, particularly in exploring the performance of hybrid strategies under different market scenarios and with varying degrees of active asset inclusion.

Although the study’s findings have bring valuable insights for investors seeking the optimal portfolio strategy that seeks a risk-return balanced approach across time horizons, it also acknowledges some limitations, including the potential for survivorship bias and the

assumption that the active portfolio is made out of only top-performing assets. This study invites researchers to dive deeper into this limitation in order to test the hypothesis that under less favourable conditions for the active strategy, the hybrid strategy would come forward as an even greater solution for the medium to long term investment horizons.

Keywords: Hybrid Portfolio Management; Active Investment Strategies; Passive Investment Strategies; Risk-Adjusted Returns; Investment Horizons

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Introduction

The development of portfolio management theory has been characterized by important milestones that have shaped the landscape of contemporary finance. From Harry Markowitz's breakthrough work on Portfolio Selection in 1952 a theory that, for many investors and academics, sets the baseline for portfolio management. It elaborated on not only diversification benefits but also the concept of a risk-return trade-off. These views served as the base on which additional theories build on to aid in explaining more of how investors make investment choices.

In 1964, William F. Sharpe developed the Capital Asset Pricing Model (CAPM), a pioneering framework that explained risk-return relationship and provided the portfolio management landscape with a tool to measure this relationship by conveniently allowing investors to balance and quantify risk and return aspects of investment decision making, providing a rational evaluation on that basis under various market circumstances through a tool known as the Sharpe Ratio.

Later, a breakthrough that allowed for a considerable advance over prior work came – in 1987 by Robert C. Merton, entitled "A Simple Model for Capital Market Equilibrium with Incomplete Information". To some degree Merton acknowledged that investors face uncertainty when he described the role of unpredictable events, while his work on imperfect information in financial markets cemented of a base for evolution.

Literature is far from complete when it comes to Portfolio Management, much remains to be studied and we are now at a point where contemporary finance is diverging from historical financial theory. Active investors are now using new methods such as Factor Investing or Smart Beta methods, investors now have a set of tools that allow to incorporate risk factors (size, momentum, value, and investment, etc.) in the design of an optimal portfolio. Simultaneously, there is a big surge in the use of Passive Management Strategies as investors are becoming aware of this strategy's risk-return trade-off and time consistency.

Behavioural Finance has arisen as a critical perspective to understand how cognitive and emotional biases could influence investors, including human psychology which is at odds with conventional models that assume rationality. Furthermore, the investment landscape has been evolving to include environmental, social and governance (ESG), so as to capture wider societal benefit from investments in biodiversity through sustainability. Sustainability and ethical business practice, a strong trend contributing to the rise of more responsible investing practices. Concurrently the use of emerging technologies in portfolio management and optimization has arrived through Artificial Intelligence (AI) and its potential of leveraging computing power into

advanced predicting tools - this works on the basis of applying machine learning algorithms with a great amount of data that enhances decision-making with accurate pattern discovery. AI holds the promise of revolutionizing active portfolio construction, risk management and asset allocation — a prospect that is driving exploration into new areas innovation and efficiency in this domain.

With all these historical theories and recent trends, the Hybrid Management approach aims to understand if a combination of the concepts of both passive and active investing, may emerge as an alternative that captures the benefits of cost efficiency from passive investing with the potential for Alpha generation through active management. Aiming to study performance patterns over time, the study examines and compares Hybrid strategies to Active and Passive management strategies across different horizons – 2-year, 5-year, and 10-year horizon through multiple performance and risk metrics. This methodology seeks to evaluate how the Hybrid Strategy has performed with respect to traditional strategies by taking a look at performance and risk metrics on various time horizons, providing some insights as to whether this strategy could outperform the traditional approaches in short, medium, and long-term horizons.

Literature is yet very short on studying the potential benefits of this approach. Active or Passive investors struggle with whether the other side of this ever-present debate can be better, but a Hybrid evolution could potentially bridge that gap.

This thesis is expected to benefit mostly individual and small institutional investors who are interested in both a high-level understanding of the Hybrid Management Strategy, as well as an appraise for its potential. However, it can also be used by scholars and researchers looking to add value in academia to the portfolio management landscape, as well as to institutional investors, as it offers insights into hybrid management from a practical point of view.

1. Literature Review

The literature review unfolds further into portfolio management strategies, breaking them down into three main areas of focus: active investment strategies, passive investment strategies, and then a comparison between both approaches. This review attempts to summarize the most important discoveries, discussions, and developments influencing the ever-evolving subject of portfolio management theory through a methodical examination of each component.

1.1. Active Portfolio Management Strategies

1.1.1. Historical Development of the Concept

Active investment strategies represent a dynamic and engaging approach within the realm of portfolio management, where the overarching goal is to outperform the reference market of the managed portfolio. As succinctly described by Azouagh and Daoui (2023), "Active management aims to outperform the reference market of the managed portfolio. The manager, using various analytical tools, will select in a discretionary way the products, securities, or sectors most likely to grow faster than the market." This definition underscores the proactive nature of active management, emphasizing the manager's role in employing analytical tools for selective decision-making.

The effectiveness of active management has been a subject of debate for decades. While some studies have shown that active managers can outperform passive benchmarks, others have indicated that the majority of managers fail to consistently beat the market. The Efficient Market Hypothesis (EMH) suggests that markets are efficient, making it difficult to consistently outperform the market, as stated by Samuelson and Fama (1965)

Kahn and Grinold (1999) provide further insight into the essence of active management, defining it as an approach were investment decisions hinge upon analyses and forecasts of financial markets and individual assets. This definition encapsulates the intellectual rigor inherent in active portfolio management, highlighting the reliance on analytical prowess and forward-looking assessments to drive investment choices.

John Bogle (2017) aptly characterizes active portfolio management as a pursuit aimed at beating the market through the utilization of active trading strategies and market forecasts. Bogle's perspective emphasizes the competitive nature of active strategies, contrasting them with the passive approach of merely tracking the market.

The diverse landscape of active portfolio management encompasses various methods, with Gregory-Allen (2009) noting common approaches such as fundamental analysis, technical analysis, and quantitative management. These methodologies serve as the analytical toolkit for active managers, offering a spectrum of tools to discern investment opportunities, evaluate securities, and strategically position portfolios in anticipation of market movements.

In summary, the state of the art in active investment strategies revolves around a proactive and analytical approach. The quotes from Azouagh and Daoui, Kahn and Grinold, and Bogle elucidate the objectives and methods of active management, shedding light on its dynamic nature and the tools employed to navigate the ever-changing landscape of financial markets.

1.1.2. Key characteristics of Active Portfolio Management

Active portfolio management is characterized by a hands-on approach in which investors actively make investment decisions to select securities. Below the key characteristics associated to this Portfolio Management Strategy:

i) Rigorous security analysis: Active portfolio managers conduct a comprehensive analysis of assets to evaluate their potential return and risk using multiple performance tools, as well as forecasting models (e.g., Alpha, Beta, Sharpe Ratio, Multi-Factor Models, Risk Parity optimization model, Black-Litterman Model, etc.)

ii) Frequent portfolio composition adjustments: Active portfolio managers may frequently adjust the composition of their portfolio based on micro-opportunities, performance of the assets, and macro-economic context.

iii) Fundamental-based investment decisions: Active portfolio management may focus on company fundamentals to make investment decisions, as well as based short-term market movements with the so called “Trading” strategies.

iv) Active market monitoring: Active portfolio managers actively monitor market conditions to identify potential opportunities and risks.

v) Use of specific investment strategies: Portfolio managers may use specific investment strategies such as overweighting certain sectors or selecting undervalued securities to maximize potential portfolio returns, and even change this allocation over time based on macro-economic context (e.g., Sector Rotation Strategy).

1.1.3. Popular contemporary Active Portfolio Management Strategies

Popular contemporary active management strategies focus on leveraging market inefficiencies and macroeconomic trends through techniques. Bellow some of the most popular contemporary Active Portfolio Management Strategies

i) Factor investing: This approach identifies and exploits market factors that have historically been associated with superior returns, through econometric models. Popular factors usually include value, momentum, quality, and size. Factor investing has gained widespread adoption in recent decades due to its relatively consistent outperformance relative to traditional benchmarks.

ii) Fundamental analysis: This approach involves actively analysing a company's financial statements, industry trends, and competitive dynamics to identify undervalued or overvalued securities. Fundamental analysis is a traditional approach to active portfolio management that has been used for decades by some of the most famous and successful investors.

iii) Relative value: This approach involves identifying mispriced assets by comparing them to similar assets (usually within the same industry, or category) or to a benchmark index. Relative value investors often use technical analysis to identify patterns and trends in price movements.

iv) Quantitative investing: This approach uses computer algorithms, mathematical and/or econometric forecasting models, and lately even AI-optimized models to identify trading opportunities. Quantitative investors often use complex algorithms and proprietary data to make investment decisions.

v) ESG investing: Environmental, social, and governance (ESG) considerations are integrated into the investment process through this method. ESG investors look to place their capital in businesses that are dedicated to sustainability and ethical business practices, as well as to match their portfolios with their values.

1.2. Passive Portfolio Management Strategies

1.2.1. Historical development of the concept

The landscape of passive investment strategies has witnessed a transformative evolution, marked by a fundamental shift in philosophy and approach. As Azouagh and Daoui (2023)

eloquently assert, "passive or index management aims to faithfully replicate the performance of a benchmark market," underscoring the core principle of passive investing in mirroring the market dynamics.

This sentiment is further echoed by Cox (2017), who elucidates that this style of management involves the strategic acquisition and retention of exchange-traded funds (ETF's) or analogous financial instruments, all with the singular objective of closely replicating the returns of the underlying index.

In line with this commitment to replication, Azouagh and Daoui (2023) emphasize that "passive portfolio managers seek to replicate the performance of the index without seeking to outperform, as they adopt a long-term investment strategy." This explicit acknowledgment of adopting a long-term perspective aligns with Graham's timeless perspective from as early as 1934, where he regarded passive portfolio management as "a simple and effective way to invest for the long term. "This sentiment underscores the enduring appeal of passive strategies in providing investors with a straightforward and resilient approach to navigating financial markets over extended time horizons.

Malkiel (2003) further contributes to the discourse, asserting that passive management offers a more efficient avenue for investors to engage with financial markets. He contends that by simply tracking market returns rather than attempting to outperform them, passive strategies present a pragmatic and resource-efficient means for investors to participate in the broader financial landscape. This stance, which favors a disciplined and inexpensive approach to market involvement in direct contrast to the more active and occasionally more expensive alternatives, is consistent with the general philosophy of passive investment. These fundamental ideas outline the current state of the art when we examine the literature on passive investing methods, demonstrating the effectiveness and continued relevance of passive portfolio management in modern financial environments.

1.2.2. Key characteristics of Passive Portfolio Management Strategies

Passive management refers to an investment approach that seeks to replicate the performance of a specific market index or benchmark, focusing on long-term growth by maintaining a diversified portfolio with minimal intervention. Bellow the core characteristics of Passive Portfolio Management Strategies:

i) Index tracking: Passive portfolio managers invest in a portfolio of securities that aims to mirror the composition of a given benchmarked index.

ii) Low costs: Passive portfolio management is typically less expensive than active management, as there is trading costs, and tax events involved.

iii) Buy-and-hold behaviour: Passive portfolio managers typically employ a buy-and-hold strategy, meaning they hold securities for the medium or long term and make less frequent portfolio adjustments.

iv) Diversification: This strategy provides exposure to the broad market by holding a vast array of assets leveraging on the benefits of diversification, thus reducing exposure to idiosyncratic risk.

v) Reduced risk of human error: This strategy relies only on tracking market performance, having little decision-making involved in managing the portfolio, thus reducing the risk of poor timing or market misjudgement.

1.2.3. Popular Contemporary Passive Portfolio Management Strategies

Passive Portfolio Management strategies have been gaining popularity for its time consistency throughout the years. These typically orbit around the core characteristic of its main goal – To closely mirror the benchmarked index performance. The following are some of the most relevant contemporary Passive Portfolio Management Strategies:

i) Index funds: Index funds passively track a specific market index (benchmark), organically adjusting their holdings as the index composition changes. These, usually, offer low fees and transparent performance making them a cost-effective option for investors seeking market-like returns.

ii) Exchange-Traded Funds (ETFs): ETFs are like the above-mentioned index funds but trade on exchanges, similar to stocks, offering greater liquidity and flexibility compared to traditional index funds.

iii) Factor-Based Investing: This strategy focuses on investing in passively managed securities based on specific factors, such as value, growth, and/or low volatility. These factors have historically exhibited higher returns than the broader market, providing an enhanced risk-adjusted return profile.

1.3. Core differences between investment strategies

The literature reveals a substantial discourse on the core distinctions between passive and active investment strategies, embodying a core debate within the realm of portfolio management. As Christine Brentani (2004) succinctly points out, the essence of the active approach lies in the extensive involvement of portfolio managers, in contrast to the minimal managerial intervention characterizing the passive approach. This divergence is critical to understanding the varying degrees of engagement and decision-making autonomy that define these strategies.

Engstrom (2004) contributes valuable insights by characterizing active portfolio management as a more intensive approach, often entailing a higher tolerance for risk. This heightened risk tolerance is attributed to the inherent nature of active management, where investment decisions are grounded in forecasts and analyses that, at times, can be uncertain or inaccurate, as well as to a traditionally less diversified portfolio in comparison to the most common passively management strategies. This acknowledgment underscores the dynamic and inherently speculative nature of actively managed portfolios.

The dichotomy between active and passive strategies extends to performance comparisons, where some authors come to suggest that passive management can achieve similar, or even superior returns, when compared against active management strategies. This observation is particularly meaningful as it aligns with the growing trend favoring passive strategies, emphasizing reduced costs and simplicity in security selection. However, others contribute with a note of caution into this discourse, highlighting that passive management may introduce systematic biases in portfolios, potentially resulting in underperformance when contrasted with well-executed active management strategies.

The bellow table analyses the key differences between Active Management, Passive Management and Hybrid Management. The table is based of the work of Inssaf AZOUAGH & Driss DAOUI in “Comparative analysis of active and passive portfolio management: A theoretical approach”, where the authors shed light onto the core differences between Active and Passive Portfolio Management. This thesis contributes to the realm of portfolio management strategies by adding a layer focused on Hybrid Portfolio Management Strategies and clearly distinguishing it from the traditional approaches.

Table 1.

Table 1 – Comparison between Portfolio Management Strategies

Topic	Active Management	Passive Management	Hybrid Management
Research	Practical approach where investors rely on themselves to analyze securities, the market, and the macroeconomic context, seeking to identify investment opportunities. This approach requires investing significant an amount of time into the market assessment exercise, as well as considerable knowledge, thus being unadvisable for uninformed investors	Less practical approach where investors need to perform limited analysis, thus requiring little knowledge background	Combines both active and passive research. Investors analyze macroeconomic trends and sector performance but reduce the need for extensive individual security analysis. The goal is to balance effort and efficiency
Strategy	Aims to outperform the market's performance	Aims to track, as closely as possible, the performance of the market or a given benchmarked index	Seeks to combine the strengths of both strategies, aiming for moderate outperformance with lower risk.
Theoretical Background	Based on the theory of market inefficiency - the market is not efficient on reflecting the true value of securities into their respective prices	Fundamentally based on the theory of efficient markets	Integrates aspects of both market inefficiency and efficiency theories. Active allocation may exploit inefficiencies, while the passive portion assumes market efficiency for stable returns
Investment Horizon	Suitable for any time horizon	Suitable for mid- and long-term investments	Suitable for medium to long-term investments
Return	Actively managed investments tend to achieve higher returns	Passively managed investments tend to have smaller, but consistent returns over time	Targets moderate returns by balancing active strategies' potential for higher returns with passive strategies' stability
Risk	Additional to market risk, this strategy also involves idiosyncratic risk	Market risk	Involves both idiosyncratic and market risk, but risk is diversified across active and passive investments, reducing exposure, and achieving a lesser risk and traditional active strategies
Cost	This strategy tends to have higher associated costs due to trading costs related to the high frequency of stock trading	This strategy tends to have low costs	Costs fall between active and passive strategies

2. Methodology

This chapter describes in detail how this thesis approach to tackle the research problem, research objectives, and hypothesis formulated to assess the comparative performance between the Hybrid Strategy and the traditional approaches.

2.1. Research Problem

In the realm of portfolio management there are countless possibilities when the time comes for investors to choose which approach fits them best in terms of invested time for security analysis, risk preference, knowledge background, investment time horizon, liquidity preferences, tax considerations, income needs/expectations, regulatory environment, etc. “Investors may take a passive or active approach, a sector-oriented approach, or a fundamental or quantitative approach” (Bulkley & Hashim, 2019).

Considering literature is non-consensual when appointing the best strategy for a given profile of investor and/or investment, and even if it was for a brief moment, the market would quickly make it so that this given strategy wouldn’t be effective as result of a mass use of it. This way, it is important for an investor to understand and acknowledge the possibilities of portfolio management strategies that lie in the horizon as well as the respective performance expectations each strategy may have for the portfolio.

Existing literature lacks a comprehensive analysis of the performance of a combined approach between active and passive management strategies. This thesis will cover the topic of Hybrid Management Investment Portfolios Strategies, where Hybrid Management Portfolios Strategies represent a strategy mixing both active and passive-style management to, perhaps, combine the best of both strategies.

2.2. Problem Significance

Over the past 20 years, the financial landscape has seen a clear trend where investors are increasingly embracing Passive Management Portfolio strategies, driven by the desire for low-cost, diversified investments that can match market returns. However, with the evolution of market dynamics, there is growing interest in exploring strategies that blend Active and Passive management styles to capture both outperformance potential and risk mitigation. This makes it

crucial to investigate Hybrid Management Portfolios, which aim to balance the benefits of both approaches.

This thesis addresses this gap by providing current insights into Hybrid Management strategies and comparing them against pure Active and Passive strategies across different time horizons. By analyzing risk-adjusted performance, volatility, and return persistence, this study offers a nuanced perspective that can guide investors in navigating a competitive and ever-changing market. Ultimately, understanding how Hybrid strategies perform relative to traditional approaches will help investors make more informed decisions, particularly in a landscape where market conditions can be unpredictable, and the optimal strategy may vary depending on time horizon and risk tolerance.

Bellow a graph that illustrates the increasing relevance of Passive Management strategies over the course of 20 years (from 1998 up until mid-2019). This graph shows that, although active managed funds have historically had higher representativity in the landscape of Equity Funds, there is a clear shift in the trend into Passive Managed funds.

Graph 1.

Graph 1 – Evolution over a 20-year period of the capital allocation between Active Management Equity funds VS Passive Management Equity funds (Morningstar, 2021)

2.3. Research Objectives

The purpose of this thesis is to address the complexities faced by investors in the realm of portfolio management, where a great number of factors influence the choice of an approach. Given the lack of consensus in the literature on the optimal strategy and the dynamic nature of the market, the thesis aims to explore the possibilities and performance expectations of portfolio management strategies. Specifically, it focuses on Hybrid Management Investment

Portfolios Strategies, representing a blending of active and passive management, with the overarching aim of assessing their performance through risk-return trade-offs, and analyse their effectiveness over three distinct time horizons – 2 years, 5 years, and 10 years. This way, this thesis' objectives are:

i) Understand and Differentiate the Characteristics of the Investment Strategies - define and differentiate the key characteristics of Active, Passive, and Hybrid portfolio management strategies, analysing their performance, risk profiles, and suitability for various market conditions and investment horizons.

ii) Evaluate the Comparative Risk-Adjusted Performance - assess the risk-adjusted performance of Active, Passive, and Hybrid portfolio strategies over short-term (2-year), mid-term (5-year), and long-term (10-year) investment horizons.

iii) Determine the optimal portfolio strategy for different time horizons - identify the most suitable portfolio management strategy (Active, Passive, or Hybrid) for each time horizon and investor characteristics, considering the trade-offs between risk and return.

2.4. Hypothesis

To lay a strong basis for critical scholarly investigation, this thesis will present a single general hypothesis that is then broken down into three hypotheses, each challenging one of the Research Objectives. These hypotheses' precision and clarity not only provide a foundation for methodical inquiry, but they also highlight the value of well-crafted research questions in shedding light on the complex relationships that exist within the domain of hybrid management portfolios. The study's credibility is strengthened by its accuracy, which facilitates a targeted investigation that makes a significant contribution to the scholarly conversation about portfolio management strategies. The Hypothesis are as follows:

General Hypothesis:

H0: The overall performance of Hybrid Management Portfolios does not consistently outperform traditional strategies in terms of risk adjusted.

H1: Hybrid Management Portfolios consistently outperform the traditional strategies in terms of risk-adjusted returns.

Hypothesis per time horizon:

a. Performance against the traditional strategies in a 2-year period

H0: The overall performance of Hybrid Management Portfolios does not outperform traditional strategies in a 2-year period.

H1: Hybrid Management Portfolios outperform the traditional strategies in terms of risk-adjusted returns in a 2-year period.

b. Performance against the traditional strategies in a 5-year period

H0: The overall performance of Hybrid Management Portfolios does not outperform the traditional strategies in a 5-year period.

H1: Hybrid Management Portfolios outperform the traditional strategies in terms of risk-adjusted returns in a 5-year period.

c. Performance against the traditional strategies in a 10-year period

H0: The overall performance of Hybrid Management Portfolios does not outperform the traditional strategies in a 10-year period.

H1: Hybrid Management Portfolios outperform the traditional strategies in terms of risk-adjusted returns in a 10-year period.

2.5. Analytical approach

This thesis' analytical approach seeks to evaluate and compare the performance of Hybrid, Active, and Passive managed portfolios over the three distinct time horizons: 2 years, 5 years, and 10 years. The analysis is designed to provide a comprehensive understanding of how each portfolio strategy performs under varying market conditions and time frames, offering insights into their risk-adjusted returns, volatility, resilience, and comparative performance.

2.5.1. Portfolio Composition and Allocation

The study focuses on three portfolio strategies:

a. Hybrid Management Portfolio: Combining elements of both active and passive management, with a diversified allocation across different asset classes and management styles.

b. Active Management Portfolio: Managed with the goal of outperforming the market benchmark through selective asset allocation and timing.

c. Passive Management Portfolio: Follows a passive management approach, mirroring the performance of a benchmark index.

Each portfolio was constructed based on specific allocation matrices, which were designed to reflect the strategic objectives of the respective management style, being the foundation for the subsequent performance analysis.

The used stocks were the following:

- S&P 500 Benchmark ETF
- Apple Inc. (AAPL)
- Microsoft Corporation (MSFT)
- Visa Inc. (V)
- Mastercard Inc. (MA)
- S&P Global Inc. (SPGI)
- Stellantis N.V. (STLA)

Hybrid Management Portfolio allocation matrix:

Table 2.

Table 2 – Hybrid Management Portfolio allocation matrix

S&P500	AAPL	MSFT	V	MA	SPGI	STLA
50%	8%	8%	8%	8%	8%	8%

Active Management Portfolio allocation matrix:

Table 3.

Table 3 – Active Management Portfolio allocation matrix

S&P500	AAPL	MSFT	V	MA	SPGI	STLA
0%	17%	17%	17%	17%	17%	17%

Passive Management Portfolio allocation matrix:

Table 4.

Table 4 – Passive Management Portfolio allocation matrix

S&P500	AAPL	MSFT	V	MA	SPGI	STLA
100%	0%	0%	0%	0%	0%	0%

2.5.2. Time Horizons

The analysis was conducted over three time horizons:

- **2-Year Period**: Aims to reflect short-term performance, capturing recent market trends.

- **5-Year Period**: Aims to capture medium-term performance, offering insights into the consistency of the portfolios and some information on performance through different market conditions.
- **10-Year Period**: Aims to capture long-term performance, assessing the sustainability and effectiveness of the portfolio strategies over an extended period.

These time horizons were chosen to evaluate how each portfolio adapts to different market cycles, from short-term fluctuations to long-term trends.

2.5.3. Data Collection

The data used for this study was gathered from reliable financial databases, focusing on historical returns for each of the portfolios' assets. This dataset served as foundation to calculate the various performance and risk metrics used, ensuring the analysis is based in reliable and updated information.

The risk-free rate was derived from government bond yields, reflecting the "minimal risk asset".

2.5.4. Performance and Risk Metrics

A wide range of performance and risk financial metrics were utilized to evaluate the three portfolios' performances and conduct a complete analysis. This allowed for a full examination of the portfolios' potential to create returns relative to the risk they took on, even under varying market situations and time horizons.

Performance Metrics used:

1) **Total Cumulative Return**: Measures the overall return generated by the portfolio including both capital gains and income generated.

$$Total\ Cumulative\ Return = \left(\frac{Ending\ Values}{Beginning\ Value} - 1\right) \times 100$$

2) **1-Year Rolling Alpha**: Alpha measures the portfolio's ability to outperform relative to the benchmark, adjusting for risk – the rolling alpha captures how this performance evolves over time.

$$Alpha_t = \left(R_{p,t} - R_f\right) - \beta t(R_{m,t} - R_f)$$

Where:

- $R_{p,t}$ = Portfolio Return at time *t*

- R_f = Risk-free rate
- β_t = Rolling beta at time *t*
- $R_{m,t}$ = Market return at time *t*

3) **1-Year Rolling Sharpe Ratio**: Offers a dynamic view of the portfolio's risk-adjusted performance over time.

$$Rolling\ Sharpe\ Ratio_t = \frac{R_{p,t} - R_f}{\sigma_{p,t}}$$

Where:

- $R_{p,t}$ = Portfolio Return at time *t*
- R_f = Risk-free rate
- $\sigma_{p,t}$ = Portfolio rolling standard deviation at time *t*

Risk Metrics used:

4) **Variance and Standard Deviation**: These metrics assess the risk associated with each portfolio, indicating the volatility of returns, namely, the Standard Deviation serves as a major indication of portfolio risk by quantifying the dispersion of returns around the mean.

$$Variance = \frac{1}{N-1}\sum_{i=1}^{N}(R_i - \overline{R})^2$$

Where:

- R_i = Return in period *i*
- R = Average return over *N* periods
- N = Number of periods

$$Standard\ Deviation = \sqrt{Variance}$$

5) **Sharpe Ratio**: Key measure of risk-adjusted return, this metric helps in understanding how much return is generated per unit of risk.

$$Sharpe\ Ratio_t = \frac{R_p - R_f}{\sigma_p}$$

Where:

- R_p = Portfolio Return (at the end of the period)
- R_f = Risk-free rate

- σ_p = Portfolio standard deviation (at the end of the period)

6) **1-Year Rolling Beta**: Beta measures the sensitivity of the portfolio's returns to the returns of the market - the rolling beta analysis allows us to observe how the portfolio's market exposure changes over time.

$$Beta_t = \frac{Cov(R_{p,t}, R_{m,t})}{Var(R_{m,t})}$$

Where:
- $Cov(R_{p,t}, R_{m,t})$ = Covariance of portfolio and market returns at time *t*
- $Var(R_{m,t})$ = Variance of market returns at time

7) **Maximum Drawdown and Recovery Time**: Maximum Drawdown represents the largest peak-to-trough decline in the portfolio's value, while recovery time measures how long it takes for the portfolio to return to its previous peak. These metrics are crucial for understanding the portfolio's resilience in adverse market conditions.

$$Max\ Drawdown = \frac{Through\ Value - Peak\ Value}{Peak\ Value}$$

Where:
- Trough Value = Lowest portfolio value during a period
- Peak Value = Highest portfolio value before the trough
- Recovery time = nº of periods it takes for the portfolio to recover from the maximum drawdown back to its previous peak value.

8) **Autocorrelation**: Autocorrelation measures the relationship between the portfolio's past returns and future returns, providing insights into the persistence of returns over time.

$$Autocorrelation = \frac{Cov(R_t, R_{t-k})}{Var(R_t)}$$

Where:
- R_t = Return at time *t*
- R_{t-k} = Return at lag *k*
- $Cov(R_t, R_{t-k})$ = Covariance of the returns
- $Var(R_t)$ = Variance of the returns

Rolling Metrics were computed by using a rolling window approach, which calculates each metric over a moving 12-month (trailing) period, providing a time series of values that reflect changing market conditions – enabling a comparative analysis at every point in time.

The calculated metrics were used to compare the three portfolios across the three time horizons. Charts, graphs, and tables were employed to visualize the data and facilitate a comparative analysis. The results were interpreted in the context of the overall market environment, allowing for a nuanced understanding of the performance of each portfolio strategy.

2.5.5. Performance and Risk Metrics

While the methodology provides a comprehensive analysis, it is important to note certain limitations:

- Historical Data Limitation: The analysis relies on historical return data, which may not fully capture future market conditions.
- Assumption of Constant Risk-Free Rate: The risk-free rate was assumed to be constant at 1%, which may not reflect actual market conditions over time.
- Market Conditions: The analysis may be influenced by specific market events that occurred during the selected time periods.

3. Analysis and Results

3.1. 2-Year Horizon Analysis

This section of the study will present the results for the 2-year time horizon for all three types of portfolios - Active, Hybrid, and Passive, according to the set of chosen performance and risk metrics.

Total Cumulative Return

Table 5

Table 5 – Total Cumulative Return for the 2-year investment horizon

Portfolio	Total Return
Active Management Portfolio	23.65%
Hybrid Management Portfolio	16.65%
Passive Management Portfolio	10.78%

Over the studied 2-year period, the Active portfolio outperformed both Hybrid and Passive portfolios in terms of total return, reflecting stronger performance with 23.65% total return, while the Hybrid portfolio showed moderate performance and the Passive portfolio showed the lowest return, highlighting the nature of its more conservative strategy.

Variance & Standard Deviation:

Table 6

Table 6 – Variance & Standard Deviation for the 2-year investment horizon

Portfolio	Variance	Standard Deviation
Active Management Portfolio	0.01287	0.11344
Hybrid Management Portfolio	0.00829	0.09105
Passive Management Portfolio	0.00497	0.07048

As seen in the above table, the Active Portfolio showed the highest Variance and Standard Deviation, thus indicating greater volatility and risk among the three portfolios, while the Passive Portfolio, as expected due to its conservative nature, also showed the lowest volatility and risk. The Hybrid Portfolio provided a middle ground in terms of risk, as expected.

Sharpe Ratio:

Table 7

Table 7 – Sharpe Ratio for the 2-year investment horizon

Portfolio	Sharpe Ratio
Active Management Portfolio	2.30260
Hybrid Management Portfolio	1.71940
Passive Management Portfolio	1.38818

The Sharpe Ratio analysis calculated for the whole period indicates that the Active Portfolio achieved the highest risk-adjusted returns, followed by the Hybrid Portfolio. The Passive Portfolio achieved the smallest Sharpe Ratio, underperforming in risk-adjusted returns.

1-year Rolling Alpha

This analysis concluded that the Active Portfolio consistently outperformed the Hybrid Portfolio, achieving greater alpha values throughout the entire period. The Hybrid Portfolio while underperforming the Active Portfolio, it still was able to generate significant alpha relative to the benchmark.

1-year Rolling Beta

The Active portfolio showed a higher beta than the Hybrid portfolio, indicating greater sensitivity to market movements. The Hybrid portfolio maintained a beta closer to 1, indicating that it moves in accordance with the market but with slightly less sensitivity in comparative terms against the Active strategy.

1-year Rolling Sharpe Ratio

The Passive portfolio outperformed both the Hybrid and Active portfolios in terms of the Sharpe ratio during periods of market downturns, particularly in the earlier part of the 2-year horizon. The Hybrid and Active portfolios gradually improved their Sharpe ratios as market conditions stabilized, catching up with the Passive strategy over time.

Rolling Autocorrelation

The results reflect the inherent characteristics of each strategy: active strategies are more dynamic, with higher autocorrelation suggesting strong momentum and trend-following behavior. Passive strategies are stable and long-term, with the lowest autocorrelation indicating

lower dependency on past returns, while the Hybrid strategy balance both strategies, leading to more moderate performance persistence.

Summary of the 2-year horizon

During the 2-year horizon, the Active portfolio demonstrated the highest total return and risk-adjusted return, albeit with the highest volatility. The Hybrid portfolio provided a balanced approach, delivering competitive returns with moderate risk. The Passive portfolio, while offering the lowest total return, stood out with its stability and low volatility, performing well during periods of market uncertainty. Each strategy exhibited unique strengths that may appeal to different investor preferences and objectives. For this investment horizon, H0 “The overall performance of Hybrid Management Portfolios does not outperform traditional strategies in a 2-year period.” is verified.

3.2. 5-Year Horizon Analysis

This next section of the study will present the results for the 5-year time horizon for all three types of portfolios - Active, Hybrid, and Passive, according to the set of chosen performance and risk metrics.

Total Cumulative Return

Table 8

Table 8 – Total Cumulative Return for the 5-year investment horizon

Portfolio	Total Return
Active Management Portfolio	138.77%
Hybrid Management Portfolio	115.18%
Passive Management Portfolio	74.02%

The Active portfolio presented the highest total return over the 5-year period, reflecting the benefits of this more aggressive strategy. The Hybrid portfolio provided a strong return, significantly higher than the Passive portfolio but still trailing the Active portfolio, while the Passive portfolio's return reflects its conservative nature, offering stability but lower returns compared to the other strategies.

Variance & Standard Deviation

Table 9

Table 9 – Variance & Standard Deviation for the 5-year investment horizon

Portfolio	Variance	Standard Deviation
Active Management Portfolio	0.18096	0,11344
Hybrid Management Portfolio	0.10529	0.42539
Passive Management Portfolio	0.05165	0.22727

The risk analysis shows that the Active portfolio had the highest variance and standard deviation, indicating higher risk. The Hybrid portfolio exhibited moderate risk, balancing between the Active and Passive strategies. The Passive portfolio had the lowest variance and standard deviation, underscoring its low-risk profile.

Sharpe Ratio

Table 10

Table 10 – Sharpe Ratio for the 5-year investment horizon

Portfolio	Sharpe Ratio
Active Management Portfolio	3.23862
Hybrid Management Portfolio	3.51889
Passive Management Portfolio	3.21301

For the 5-year time horizon, the Hybrid portfolio achieved the highest Sharpe ratio, indicating that it delivered the best risk-adjusted returns. The Active portfolio, while delivering strong returns, offered slightly lower risk-adjusted performance compared to the Hybrid portfolio, as result of greater volatility. The Passive portfolio, with the lowest return, nonetheless provided solid risk-adjusted returns, comparable to the Active strategy.

1-year Rolling Alpha

The 1-year rolling alpha chart highlights the consistent outperformance of the Active portfolio relative to the benchmark. The Hybrid portfolio also demonstrated positive alpha, though less pronounced than the Active portfolio, indicating consistent, albeit more conservative, outperformance.

1-year Rolling Beta

Both the Hybrid and Active portfolios show similar trends in their 1-year rolling beta, with the Active portfolio displaying slightly higher beta values, indicating greater sensitivity to market movements. The Hybrid portfolio maintained a beta closer to 1, suggesting that it mirrors market movements with less volatility compared to the Active portfolio.

1-year Rolling Sharpe Ratio

The rolling Sharpe ratio analysis illustrates how the Passive portfolio outperformed during certain periods of market volatility. However, over the long term, both the Hybrid and Active portfolios achieved higher Sharpe ratios, reflecting better risk-adjusted returns as market conditions stabilized.

Rolling Autocorrelation

The autocorrelation analysis indicates that the Passive portfolio exhibited the most consistent returns, followed closely by the Hybrid portfolio. The Active portfolio's lower autocorrelation suggests greater dependency in past returns - consistent with this strategy’s higher risk profile.

Summary of the 5-year horizon

During the 5-year time horizon, the Active portfolio led in total return, confirming its capability to capitalize on market opportunities despite higher volatility. The Hybrid portfolio struck a commendable balance between risk and return, delivering the highest Sharpe ratio and demonstrating its effectiveness as a moderate-risk strategy. The Passive portfolio, while delivering the lowest total return, proved to be a reliable, low-risk option with stable, risk-adjusted returns. Each strategy's performance highlights its suitability for different investor profiles, depending on their risk tolerance and investment goals. For this investment horizon, H1 “Hybrid Management Portfolios outperform the traditional strategies in terms of risk-adjusted returns in a 5-year period.” is verified.

3.3. 10-Year Horizon Analysis

This next section of the study will present the results for the 5-year time horizon for all three types of portfolios - Active, Hybrid, and Passive, according to the set of chosen performance and risk metrics.

Total Cumulative Return

Table 11

Table 11 – Total Cumulative Return for the 10-year investment horizon

Portfolio	Total Return
Active Management Portfolio	538.54%
Hybrid Management Portfolio	360.17%
Passive Management Portfolio	160.60%

The Active Portfolio significantly outperformed both the Hybrid and Passive portfolios over the 10-year period, showcasing its aggressive approach. The Hybrid Portfolio delivered robust returns, serving as a balanced alternative between active and passive strategies. The Passive Portfolio, while delivering the lowest return, offered stability, and aligned with broader market performance.

Variance & Standard Deviation

Table 12

Table 12 – Variance & Standard Deviation for the 10-year investment horizon

Portfolio	Variance	Standard Deviation
Active Management Portfolio	2.93227	0.11344
Hybrid Management Portfolio	1.20913	1.71239
Passive Management Portfolio	0.24009	0.48999

The Active Portfolio exhibited the highest variance and standard deviation, indicating a higher level of volatility and risk. The Passive Portfolio, on the other hand, had the lowest variance and standard deviation, emphasizing its lower risk exposure. The Hybrid Portfolio balanced between the two, offering moderate risk while still achieving significant returns.

Sharpe Ratio

Table 13

Table 13 – Sharpe Ratio for the 10-year investment horizon

Portfolio	Sharpe Ratio
Active Management Portfolio	3.139
Hybrid Management Portfolio	3.266
Passive Management Portfolio	3.257

For the 5-year time horizon, the Hybrid portfolio achieved the highest Sharpe ratio, indicating that it delivered the best risk-adjusted returns. The Active portfolio, while delivering strong returns, offered slightly lower risk-adjusted performance compared to the Hybrid portfolio, as result of greater volatility. The Passive portfolio, with the lowest return, nonetheless provided solid risk-adjusted returns, comparable to the Active strategy.

1-year Rolling Alpha

The rolling alpha analysis shows that the Active Portfolio consistently maintained higher alpha compared to the Hybrid Portfolio. This indicates that the Active strategy was successful in generating excess returns relative to the benchmark, especially during market volatility. The Hybrid Portfolio, while also outperforming the benchmark, exhibited more conservative alpha values.

1-year Rolling Beta

The Active Portfolio demonstrated a higher beta compared to the Hybrid Portfolio, reflecting its greater sensitivity to market movements and volatility. The Hybrid Portfolio displayed a lower beta, indicating a more cautious approach that was less reactive to market fluctuations.

1-year Rolling Sharpe Ratio

The Active Portfolio excelled in risk-adjusted returns during periods of strong market growth, but at the cost of higher volatility. The Hybrid Portfolio provided a balanced approach, delivering competitive risk-adjusted returns with moderate risk, in accordance with the nature of this more balanced strategy, while the Passive Portfolio shined during periods of market uncertainty, offering stability and lower risk.

Rolling Autocorrelation

The autocorrelation analysis reveals that the Passive Portfolio is the most consistent in its returns, as expected from a strategy that closely follows the market index. The Hybrid Portfolio offers a middle ground, with more stability than the Active Portfolio but still exhibiting some variability due to its active component. The Active Portfolio, while capable of generating high returns, showed the most variability in performance, reflecting the dynamic nature of active management.

Summary of the 10-year horizon

Over the 10-year horizon, the Active Portfolio demonstrated the highest total return and risk-adjusted return, although it came with the highest volatility and market sensitivity. The Hybrid Portfolio offered a balanced approach, achieving strong returns with moderate risk. The Passive Portfolio, while delivering the lowest total return, excelled in stability and low volatility, making it a suitable option for more conservative investors. Each strategy exhibited distinct advantages, allowing investors to select an approach that aligns with their risk tolerance and investment goals. For this investment horizon, H1 “Hybrid Management Portfolios outperform the traditional strategies in terms of risk-adjusted returns in a 10-year period.” is verified.

Maximum Drawdown and Recovery Time

As expected, throughout the entire 10 years of historical data analysed, the Passive Management Portfolio exhibited the lowest maximum drawdown at only 24,77%, indicating the smallest peak-to-trough decline among the three strategies. This suggests the Passive strategy more stable in terms of limiting the depth of the losses during adverse market conditions. The Hybrid portfolio followed closely with a maximum drawdown of 24,90% showing slightly higher risk compared to the Passive portfolio, but still showing considerable resilience. As for the Active portfolio, it had the highest maximum drawdown at 27.23%, reflecting its higher exposure to volatility and susceptibility to larger losses. These conclusions follow the respective profiles of all three management strategies.

Despite the lower max drawdown, the Passive portfolio had the highest recovery time to recover from the losses, requiring 16 months to return to its previous peak, reflecting the conservative nature of this strategy. The Hybrid strategy followed closely once again with 15 months to recover from its max drawdown, while the active strategy took only 9 months to recover,

demonstrating the Active's strategy ability to capitalize on market opportunities quickly after periods of loss.

3.4. Summary of Key Findings

This chapter provides a consolidated analysis of the performance of the Active, Hybrid, and Passive investment strategies across three distinct time horizons: 2 years, 5 years, and 10 years. Rather than focusing on specific metrics individually, this section synthesizes the overall performance trends, highlighting which strategies are most suitable for different investment horizons based on their risk-return profiles, consistency, and long-term viability.

Summary of Key Findings Between Investment Strategies

Across the different time horizons, performance of Aggressive Active, Hybrid and Passive portfolios vary largely, due to relative approach and risk profile for each strategy.

The analysis showed that the Active strategy consistently outperformed in the short-term (2-year horizon) as expected, but as the investment horizon grew it became less efficient, while the Hybrid strategy provided a balanced middle ground between strategies, particularly in the 5 and 10-year horizons, in accordance with the expectations, while outperforming the traditional strategies for risk-adjusted returns. The Passive strategy, although yielding the lowest returns, it stood out for its ability to generate consistent performance with considerable stability, making it most suitable for conservative, long-term investors, and investors that either don't have the know-how for active management, or simply does not want to invest the time into the active analysis of securities.

As the literature has already established in the past, the suitability of each investment strategy is closely related to the investor's risk tolerance, objectives, time horizons, and know-how - this study reaches that same conclusion, while adding value in the landscape of the comparative analysis between the three strategies. Below are the key conclusions, and recommendations for each strategy across the three time horizons:

1. **Active Management Portfolio Strategy:** The active approach is best suited for shorter time horizons, such as 2 years, where its ability to generate significant short-term gains outweighed the associated risk with higher volatility. However, the downside it that as investment period increases to 5 or 10 years, the efficiency of this strategy has a decreased due to the greater impact of risk and volatility, making the risk-return

tradeoff not as attractive. Therefore, this strategy is most appropriate for aggressive and well-informed investors seeking high returns in the short term, with a high tolerance for risk.

2. **Hybrid Management Portfolio Strategy:** The Hybrid strategy is best suited in longer time horizons, especially in the 5-year and 10-year periods, where its balanced approach to risk and return allows it to compete effectively against both traditional strategies for risk-adjusted returns. For investors with a moderate risk appetite, but still well informed, the Hybrid strategy offers 'the best of both worlds'— bringing strong returns with manageable risk—making it an ideal choice for mid to long-term investments.

3. **Passive Management Portfolio Strategy:** This strategy is best suited for the long-term investments, where it best performed, especially in the 10-year investment horizon, where its consistency and low volatility become major advantages. This makes the passive strategy best suited for more conservative, long-term investors who prioritize steady performance over maximizing returns at the cost of high volatility, as the Passive strategy consistently delivered the lowest returns, but also provided the greatest stability and the lowest risk across all time horizons.

4. Theoretical contributions

This study seeks to make several theoretical contributions to the landscape of Portfolio Management, particularly in the context of Hybrid Portfolio Management strategies, bringing insights through a comprehensive comparative analysis against the traditional active and passive approaches. The theoretical contributions can be categorized as follows.

4.1. Expanding the concept of Hybrid Portfolio Management Strategies

The core theoretical contribution of this study lies in its comprehensive exploration on the theoretical and practical elements of Hybrid Management Portfolio Strategies. Even though literature has extensively covered both active and passive strategies, the study of hybrid approaches – those combining elements of both active and passive approaches – still remains considerably unexplored. This study aims to shed light into the core characteristics of each strategy and distinguish the theoretical and practical implications of each approach, extending the existing framework with insights on the hybrid approach. It provides a deeper understanding of how hybrid portfolios function across different time horizons, adding complexity to the theoretical discourse on portfolio management.

The comprehensive use of performance and risk metrics — including Sharpe Ratio, Maximum Drawdown, Rolling Alpha, and Rolling Beta — contributes to the theoretical field by providing a more intricate evaluation of portfolio performance across strategies and time horizons. This multi-dimensional analysis provides a richer theoretical framework for evaluating portfolio performance.

4.2. Time Horizon and Risk-Return Trade-offs

Understanding how investment strategies perform over varying time horizons was the core goal of the quantitative analysis of the study. Existing literature often examines portfolio performance over short, medium, or long terms, but few studies have directly compared active, passive, and hybrid strategies over distinct investment horizons—2 years, 5 years, and 10 years. By incorporating a detailed time horizon-based analysis, this research sheds light on the risk-return trade-offs that each strategy presents, offering theoretical insights into how different approaches may align with investor preferences depending on the investment duration.

5. Study Limitations

Despite valuable contributions to the landscape of portfolio management, this study also has its limitations. Acknowledging these constraints is critical for understanding the scope of the research and the respective findings, as well as for guiding future investigations into hybrid portfolio strategies.

Limited Market Conditions

One of the primary limitations of this study is its reliance on specific market conditions over the examined time horizons (2, 5, and 10 years). The performance of investment strategies, is influenced by prevailing economic environments, including bull and bear markets, periods of recession, or economic stability. The findings may be biased through the market conditions during the chosen periods, and the results might not fully capture how hybrid strategies perform under different economic cycles, such as extreme volatility or sustained market downturns. Consequently, the reached conclusions about risk-adjusted returns, particularly for hybrid strategies, may not be entirely generalizable to all market conditions.

Time Horizon Constraints

While this study offers an in-depth comparison of portfolio performance across three time horizons (2 years, 5 years, and 10 years), these horizons represent only a fraction of potential investment periods. Investors with different time horizons, such as those looking at 'ultra-short term' (e.g., monthly, or even daily) or very long-term (e.g. 20 years or more) investments, may find the results less applicable to their specific needs. Additionally, as mentioned above, the chosen horizons may not capture all market cycles, which could potentially influence the validity of conclusions about the optimal strategies for different time frames.

Survivorship Bias

The analysis includes a set of stocks from specific sectors that are considered to be some of the best performers during the studied period. This selection introduces a considerable survivorship bias, as the analysis might overstate the performance of active and hybrid portfolios. Since underperforming or delisted stocks are not included in the study, the results should greatly favor active strategies, which capitalize on a portfolio full of outperforming assets. This bias limits the

ability to accurately generalize the findings of the active strategies, particularly in predicting how hybrid or active portfolios might perform in less favorable conditions or when facing poor-performing stocks.

However, the fact that the picked stocks were considerable outperformers in their respective sectors during the studied investment horizons, greatly increasing the performance of active and hybrid strategies, makes it so that the active management portfolio has almost 'optimal results' for the chosen period. This means that if even during the 'best case scenario' of the actively managed portfolio (where all of the portfolio's stocks are great market outperformers during the chosen period), the hybrid management portfolio manages to be competitive in shorter horizons (2 years), and outperform the active portfolio for longer investment horizons – 5 and 10 years – it also should be that the hybrid approach outperforms the active approach in less favorable conditions for the active portfolio, as it is expected that the risk-return tradeoff highly decreases for the active portfolio when incorporating underperforming stocks, and only slightly decrease for the hybrid portfolio, as a consequence of having the passive element into the hybrid approach, reducing the volatility and thus, the risk-return tradeoff maintaining a more stable course.

The study focuses primarily on selected sectors within a particular market, which limits its global applicability. The geographical and sectoral focus represents a limitation, as portfolio management strategies often perform differently in various markets and industries due to differences in economic, regulatory, and competitive environments. Therefore, the findings may not be universally applicable to investors in different regions or sectors outside the ones studied.

Static Allocation Models

While this study analyzes hybrid portfolios, the allocation between active and passive management within the strategies is static. In real-world scenarios, investors might dynamically adjust the allocation between active and passive components based on changing market conditions, risk appetite, or performance. The static nature of the active allocation in this study may not fully capture the risk that active portfolios could offer in practice, thereby limiting the practical relevance of the conclusions regarding hybrid strategy effectiveness.

Disregard of Transaction Costs and Fees

The study does not fully account for transaction costs, management fees, taxes, and other expenses associated with the practical implementation of all investment strategies. These costs can impact the net returns of a portfolio and may potentially affect the risk-adjusted performance, particularly for active management strategies that involve frequent trading. The disregard of these practical factors can limit the accuracy of the conducted performance analysis and the real-world applicability of the study's conclusions.

6. Recommendations for Future Research

The findings and limitations of this study bring forward a set of promising opportunities for future research in the landscape of both portfolio management as a whole, and more precisely, into Hybrid Management Strategies. The complexity and ever-changing nature of the financial markets and investment strategies present themselves as additional reasons why further studying the potentials of hybrid strategies may be relevant. First and foremost, this study recommends that this strategy is studied under a variety of market conditions and compared the traditional approaches, especially in contexts where the active portfolio is not as an outperformer as the one presented in this study, to test the hypothesis that in such context, the hybrid strategy may present itself as an even stronger alternative in terms of risk-adjusted returns. Also, studying the resilience of this strategy under extreme market conditions could provide valuable insights into its ability to maintain competitive performance or even generate alpha in such adverse environments as, while this study analyzed a wide variety of market phases, more comprehensive research could assess the behavior of hybrid strategies during times of economic crises, financial downturns, and high-volatility environments. Exploring how hybrid portfolios perform during disruptive periods, such as the 2008 financial crisis could potentially serve this purpose.

In addition to static hybrid strategies, future research could explore the development of dynamic hybrid models that adjust the allocation throughout the investment horizon in response to changing market conditions. Additionally, evaluating the suitability of an automatic protocol of sector rotation strategies into the hybrid approach could prove itself as an interesting alternative to the current fully active model used to implement this strategy. Such strategies would better mirror real-world portfolio management practices, where investors may often adjust positions based on new information, risk tolerance, or perceived market opportunities.

Furthermore, extending the study to include global markets and sectoral diversification would provide further insights into the effectiveness of hybrid strategies in different economic and regulatory environments. Future research should consider expanding the analysis into incorporating international and emerging markets, as well as sectors like technology, healthcare, or sustainable energy, which are rapidly evolving and present unique investment opportunities.

Further extending the research into longer time horizons would enhance the understanding of hybrid strategies over entire economic cycles. While this study considered 2, 5, and 10-year periods, future research could examine the performance of hybrid strategies over

20 years or more, capturing the complete effects of market booms and busts. This would provide a more holistic view of the long-term sustainability and performance of hybrid strategies relative to the traditional approaches.

Also, the incorporation of behavioral factors and market sentiment could prove useful in adding value into the understanding the strategy. Investors' decisions are often influenced by psychological biases like overconfidence, loss aversion, and herd behavior. Incorporating behavioral finance concepts into hybrid portfolio strategies could provide insights into how these biases affect allocation decisions between active and passive management. By understanding the role of investor psychology, researchers could propose strategies that counteract irrational decision-making, potentially leading to better outcomes in hybrid portfolio management, testing the conclusion that the hybrid strategy is more sustainable in the medium/long term horizons.

Additionally, future research could extend hybrid strategies into alternative asset classes, such as to include real estate, commodities, or private equity as part of the active element of the hybrid portfolio – which were not the focus of this study. These asset classes are often less liquid and more complex, but they also present unique opportunities for active management to generate alpha and balancing the portfolios, achieving greater risk-return tradeoff ratios. By applying hybrid strategies to alternative investments, future studies could explore whether combining active and passive management provides added value in more diverse asset classes.

Conclusion

The main goal of this thesis was to study the performance and viability of Hybrid Portfolio Management Strategies, particularly when comparing to active and passive approaches over different time horizons. For this, it dove deep into the unique characteristics of hybrid portfolios, which seek to combine the advantages of both active and passive management in an effort to achieve better risk-adjusted returns, differentiating the concept from the active and passive approaches. Through detailed empirical analysis across a variety of performance and risk metrics—including Total Return, Variance, Standard Deviation, Sharpe Ratio, 1-Year Rolling Alpha, 1-Year Rolling Beta, Maximum Drawdown and Recovery Time, and Autocorrelation—this study provided new insights into the behaviour and efficacy of hybrid strategies over the course 2, 5, and 10-year investment horizons.

The conclusions of this study demonstrated that hybrid portfolios tend to exhibit more stable performance compared to purely active or passive strategies. The balance brought by the hybrid approach, combining the best of both traditional approaches enables hybrid portfolios to achieve favourable risk-adjusted performance under a variety of market conditions, especially when markets experience moderate levels of volatility – where it benefits from the passive element's stability.

Moreover, this study reaches the view that hybrid strategies are particularly well-suited for investors who seek a middle ground between the aggressive pursuit of alpha and the desire for diversification and risk mitigation. The empirical results of this study confirm that such the hybrid approach can result in superior risk-adjusted returns, particularly over longer time horizons.

However, this study also highlighted several limitations, particularly the survivorship bias. Additionally, the analysis focused primarily on traditional equity portfolios, which limits the generalizability of the findings to other asset classes. Future research should address these limitations by incorporating transaction costs and expanding the analysis to include alternative asset classes such as real estate, commodities, and private equity, as suggested by Markowitz (1952) in his portfolio theory, which emphasizes the importance of diversification across a variety of asset classes.

The research also indicated that hybrid strategies might benefit from further refinement, such as the incorporation of dynamic models that adjust allocations between active and passive components in response to changing market conditions, and the use of dynamic sector rotation strategies in the active element of the Hybrid Strategy.

The significance of this thesis extends beyond the anticipated outcome that the hybrid strategy—comprising 50% passive and 50% active (outperforming) assets—outperformed the passive strategy within a given investment horizon. The true contribution lies in demonstrating that even under the "best-case scenario" for the active portfolio, where all assets are top performers within their respective sectors, the hybrid strategy still achieved superior risk-adjusted returns in medium to long-term horizons. This suggests that in a less optimal scenario for the active strategy, where not all assets outperform, the hybrid approach could emerge as an even more compelling alternative by capitalizing on the stability and diversification inherent to its passive component.

In conclusion, this thesis contributes to the current state of the literature on Hybrid Portfolio Management Strategies by providing empirical insights on how such strategies can offer superior risk-adjusted returns compared to the purely active or passive approaches. Hybrid portfolios may represent a compelling option for investors seeking a balanced approach to investment management, particularly in markets with moderate volatility. While this study has provided important insights into the potential benefits of hybrid strategies, it has also highlighted the need for future research to address the limitations and expand the scope of analysis to include transaction costs, alternative asset classes, dynamic models, and behavioural factors. With the ever-changing nature of both financial markets and investment strategies, this study brings forward a view on the potential benefits of a Hybrid Portfolio Management Strategy, particularly in its flexible nature, helping investors navigate the complexities of modern investing.

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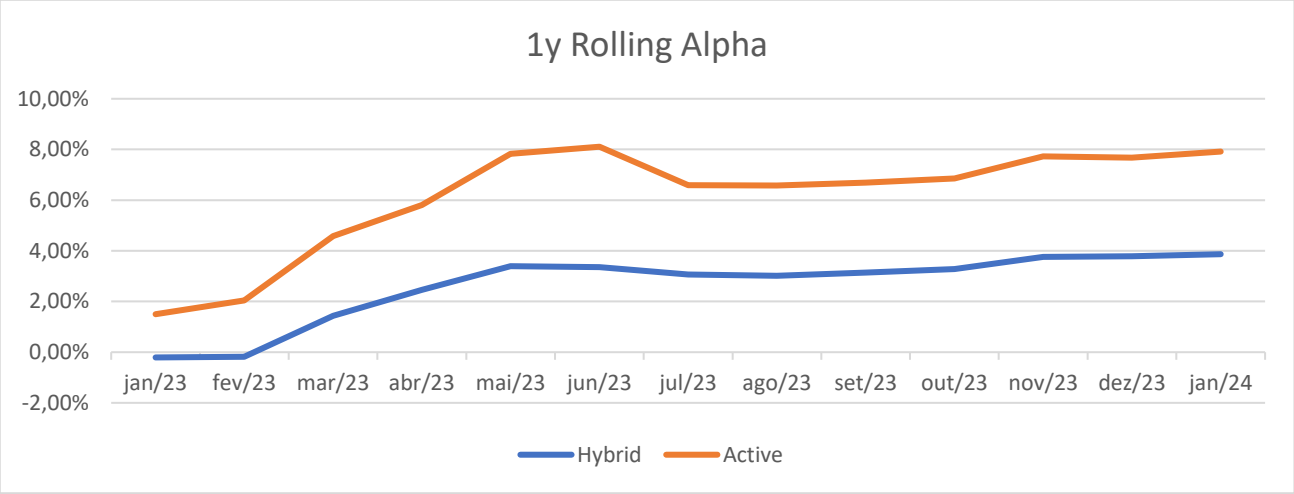
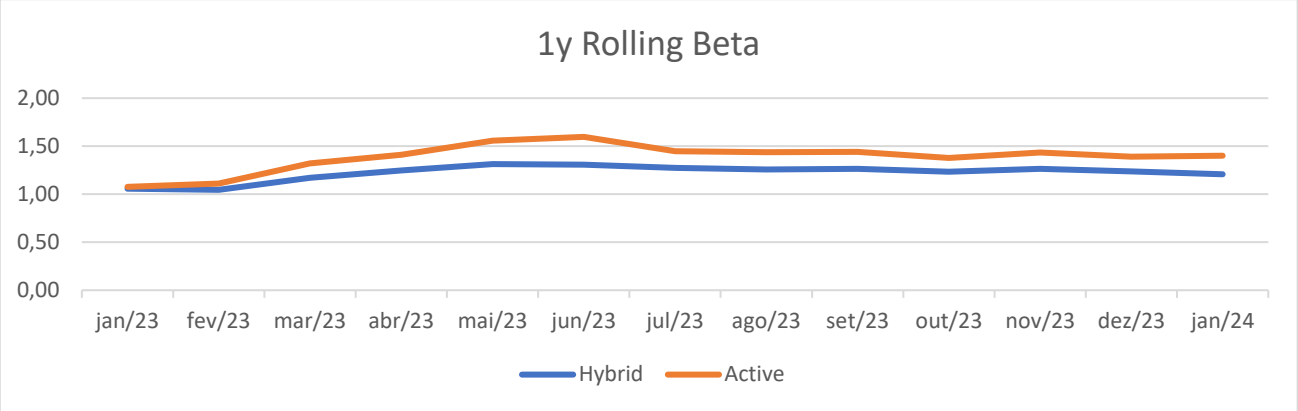
1. Appendix

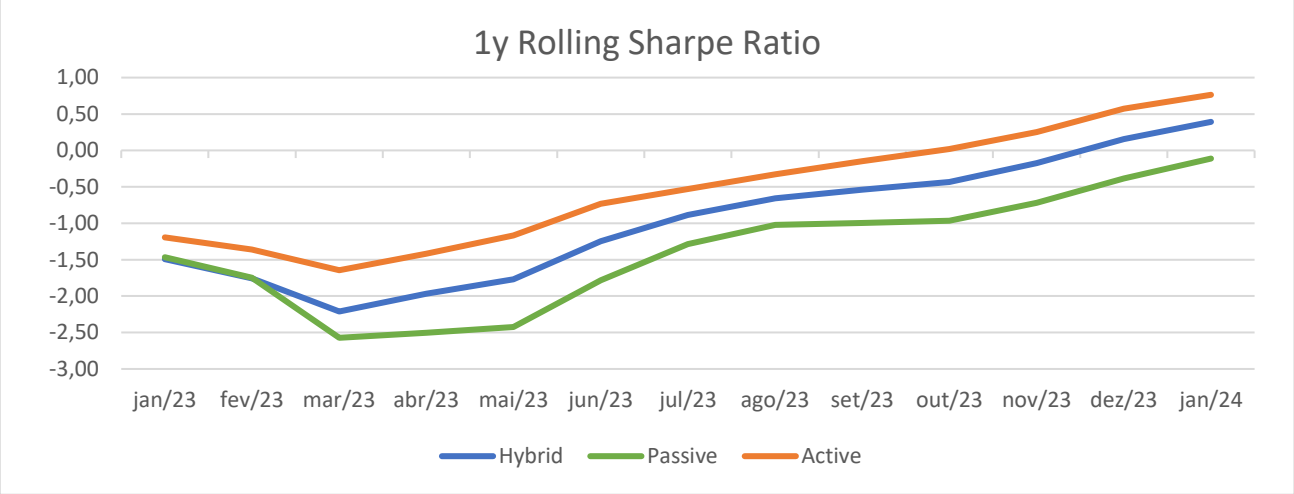
The attached document contains the relevant graphs and tables to support the analysis conducted by this study.

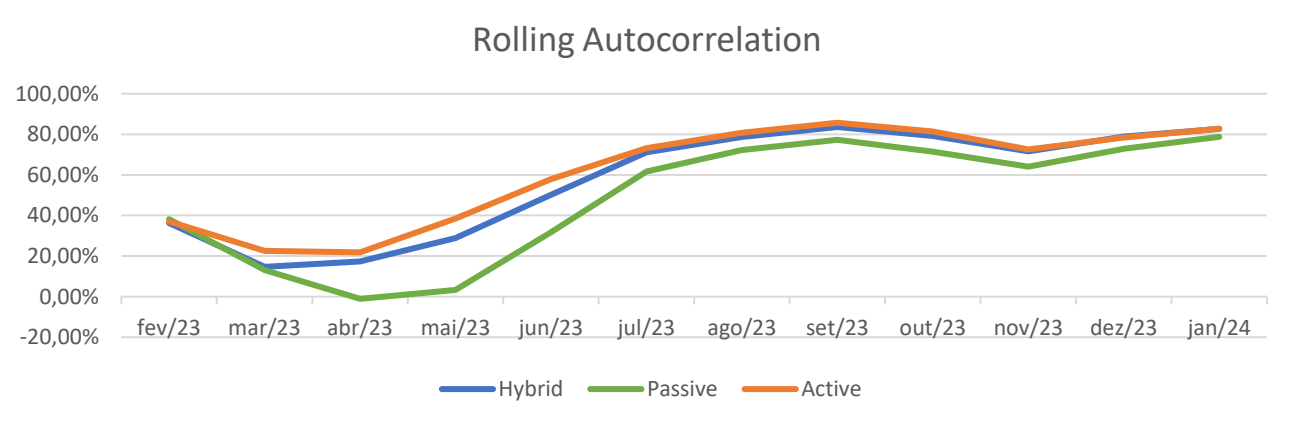
A. 2-Year Horizon Analysis

Portfolio	Total Return	Variance	Standard Deviation	Sharpe Ratio
Active Management Portfolio	23.65%	0,01287	0,11344	2.30260
Hybrid Management Portfolio	16.65%	0,00829	0,09105	1.71940
Passive Management Portfolio	10.78%	0,00497	0,07048	1.38818



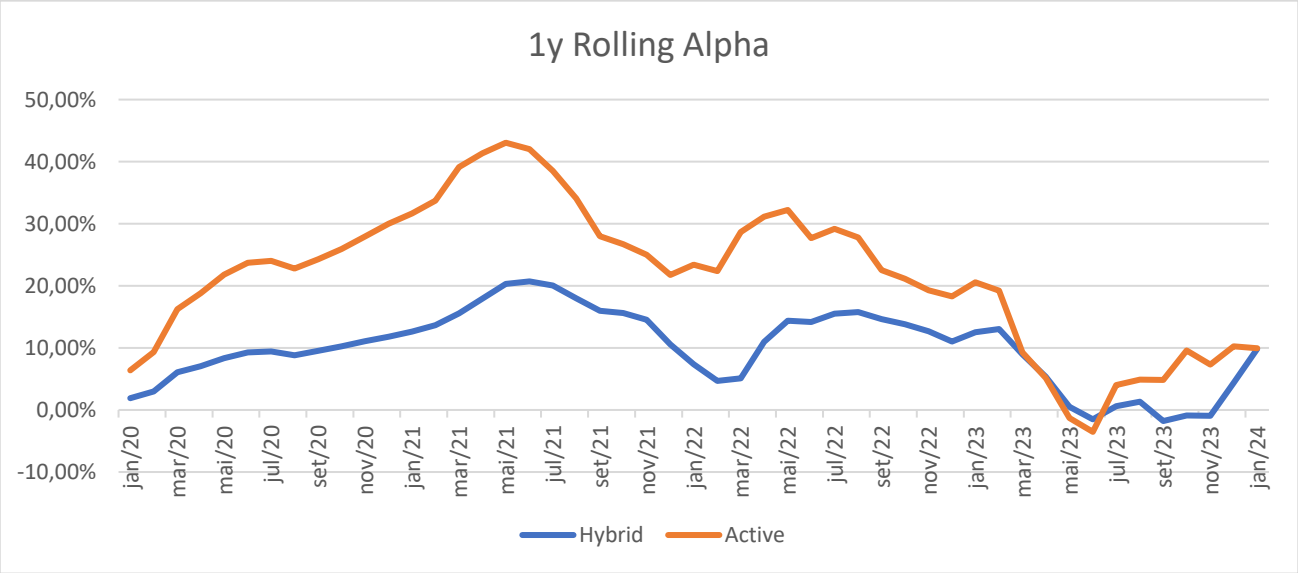

1y Rolling Beta
2,00
1,50
1,00
0,50
0,00
jan/23
fev/23
mar/23
abr/23
mai/23
jun/23
jul/23
ago/23
set/23
out/23
nov/23
dez/23
jan/24
Hybrid
Active

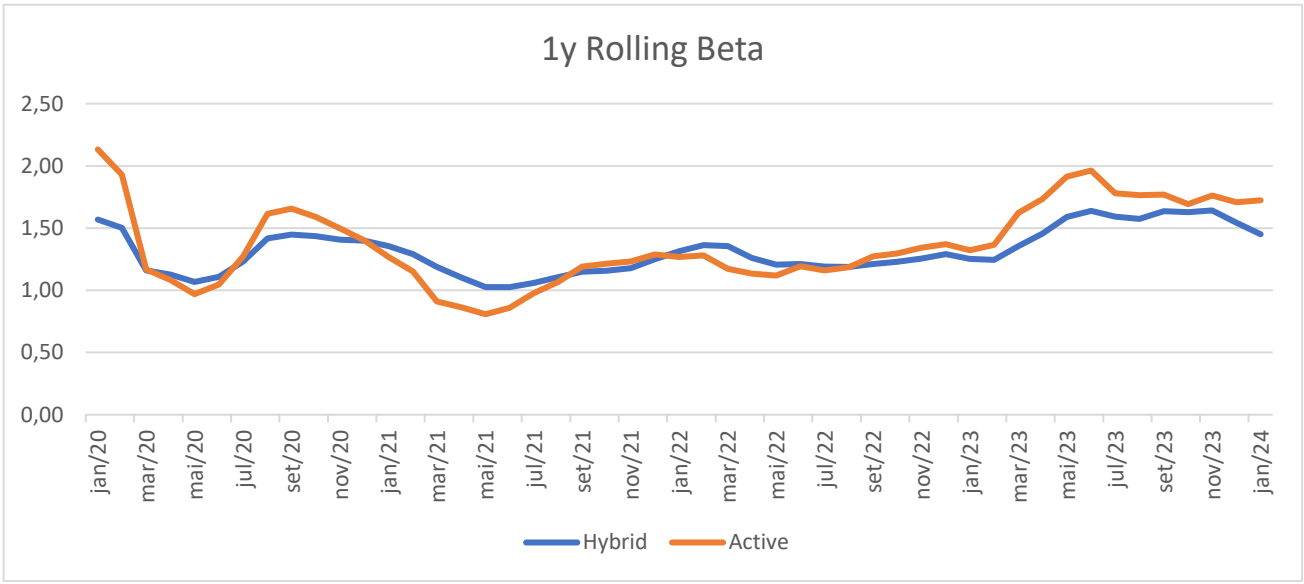

1y Rolling Sharpe Ratio
1,00
0,50
0,00
-0,50
-1,00
-1,50
-2,00
-2,50
-3,00
jan/23
fev/23
mar/23
abr/23
mai/23
jun/23
jul/23
ago/23
set/23
out/23
nov/23
dez/23
jan/24
Hybrid
Passive
Active

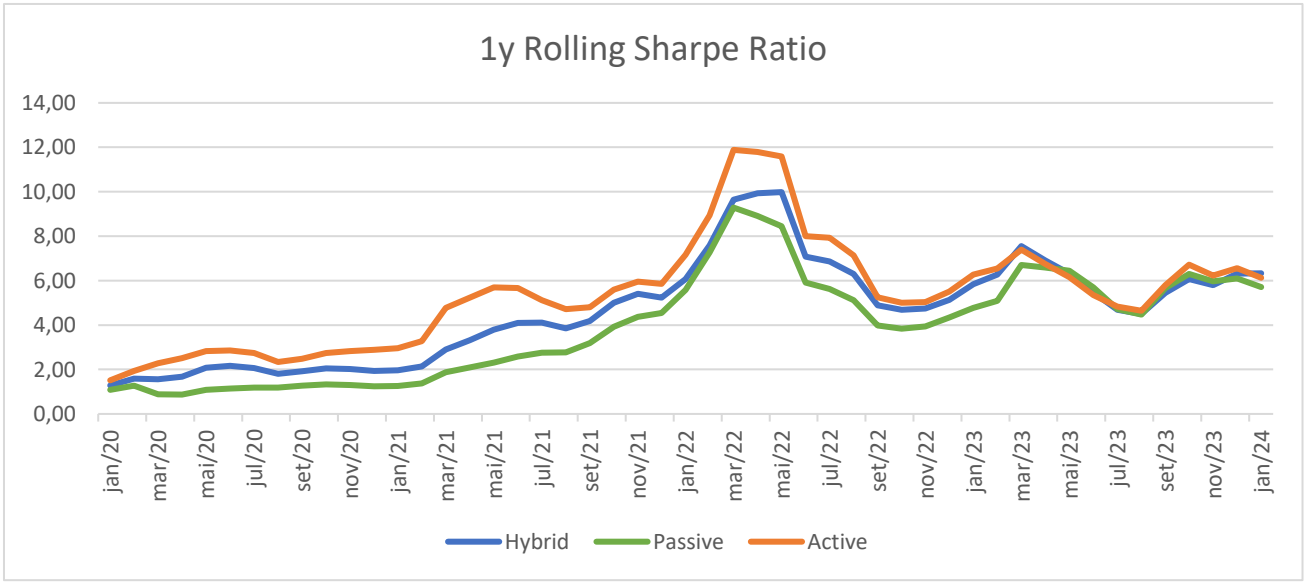

Rolling Autocorrelation
100,00%
80,00%
60,00%
40,00%
20,00%
0,00%
-20,00%
fev/23
mar/23
abr/23
mai/23
jun/23
jul/23
ago/23
set/23
out/23
nov/23
dez/23
jan/24
Hybrid
Passive
Active

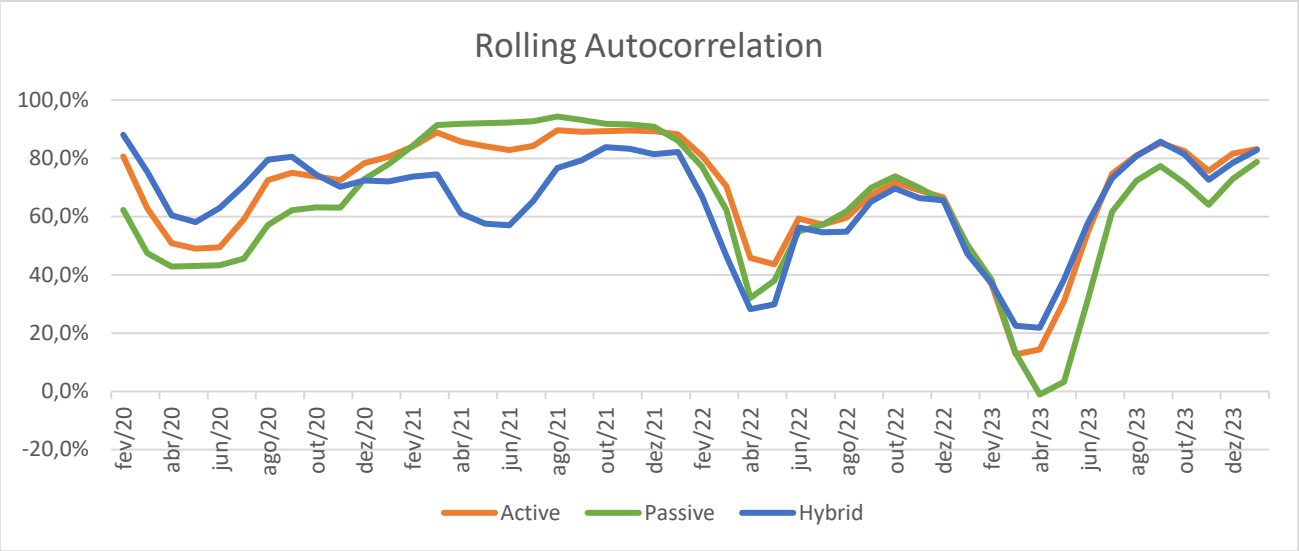
B. 5-Year Horizon Analysis

Portfolio	Total Return	Variance	Standard Deviation	Sharpe Ratio
Active Management Portfolio	138,77%	0,18096	0,42539	3,23862
Hybrid Management Portfolio	115,18%	0,10529	0,32449	3,51889
Passive Management Portfolio	74,02%	0,05165	0,22727	3,21301



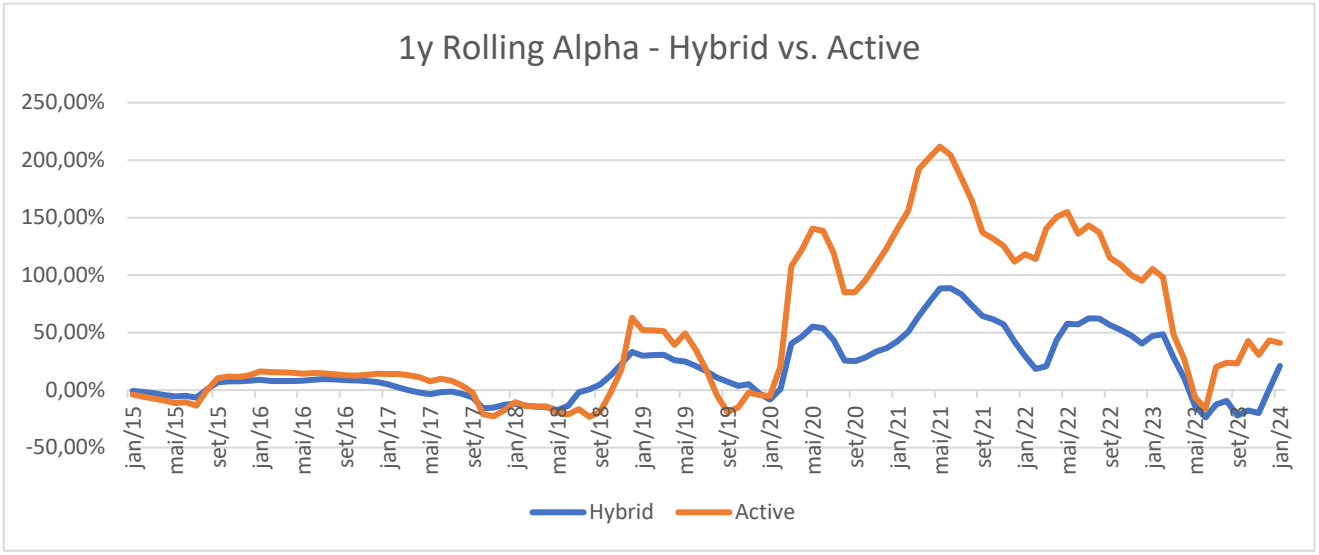

1y Rolling Beta
2,50
2,00
1,50
1,00
0,50
0,00
jan/20
mar/20
mai/20
jul/20
set/20
nov/20
jan/21
mar/21
mai/21
jul/21
set/21
nov/21
jan/22
mar/22
mai/22
jul/22
set/22
nov/22
jan/23
mar/23
mai/23
jul/23
set/23
nov/23
jan/24
Hybrid
Active

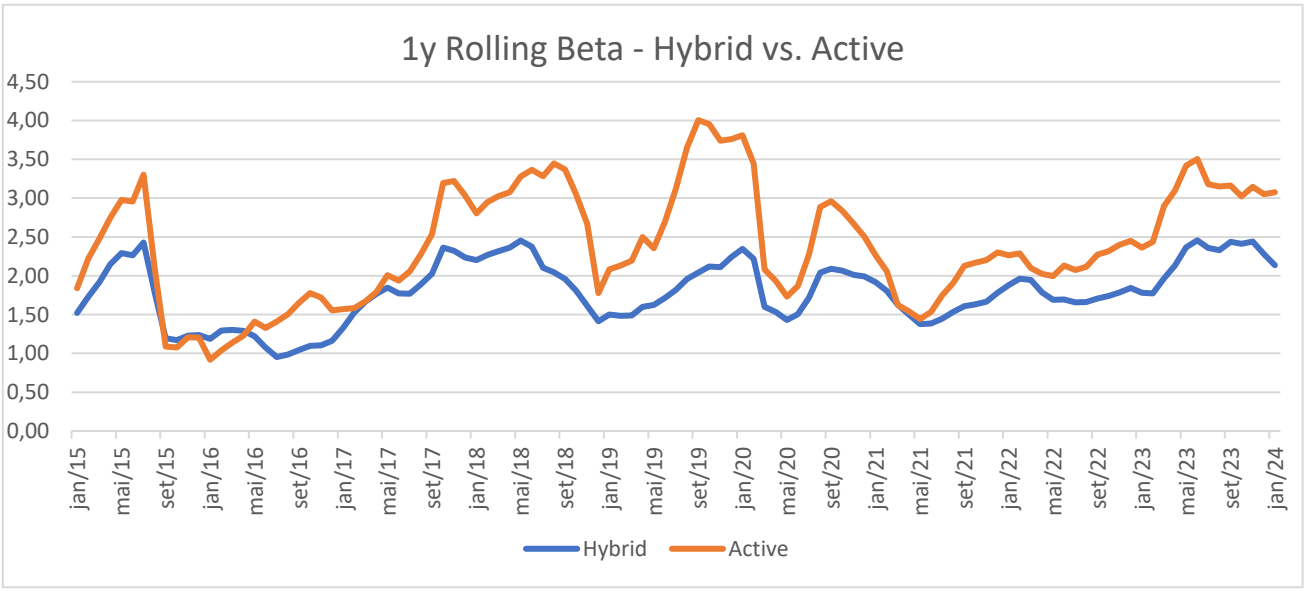

1y Rolling Sharpe Ratio
14,00
12,00
10,00
8,00
6,00
4,00
2,00
0,00
jan/20
mar/20
mai/20
jul/20
set/20
nov/20
jan/21
mar/21
mai/21
jul/21
set/21
nov/21
jan/22
mar/22
mai/22
jul/22
set/22
nov/22
jan/23
mar/23
mai/23
jul/23
set/23
nov/23
jan/24
Hybrid
Passive
Active



C. 10-Year Horizon Analysis

Portfolio	Total Return	Variance	Standard Deviation	Sharpe Ratio
Active Management Portfolio	538,54%	2,93227	1,71239	3,13913
Hybrid Management Portfolio	360,17%	1,20913	1,09960	3,26635
Passive Management Portfolio	160,60%	0,24009	0,48999	3,25710


1y Rolling Alpha - Hybrid vs. Active
250,00%
200,00%
150,00%
100,00%
50,00%
0,00%
-50,00%
jan/15
mai/15
set/15
jan/16
mai/16
set/16
jan/17
mai/17
set/17
jan/18
mai/18
set/18
jan/19
mai/19
set/19
jan/20
mai/20
set/20
jan/21
mai/21
set/21
jan/22
mai/22
set/22
jan/23
mai/23
set/23
jan/24
Hybrid
Active


1y Rolling Beta - Hybrid vs. Active
4,50
4,00
3,50
3,00
2,50
2,00
1,50
1,00
0,50
0,00
jan/15
mai/15
set/15
jan/16
mai/16
set/16
jan/17
mai/17
set/17
jan/18
mai/18
set/18
jan/19
mai/19
set/19
jan/20
mai/20
set/20
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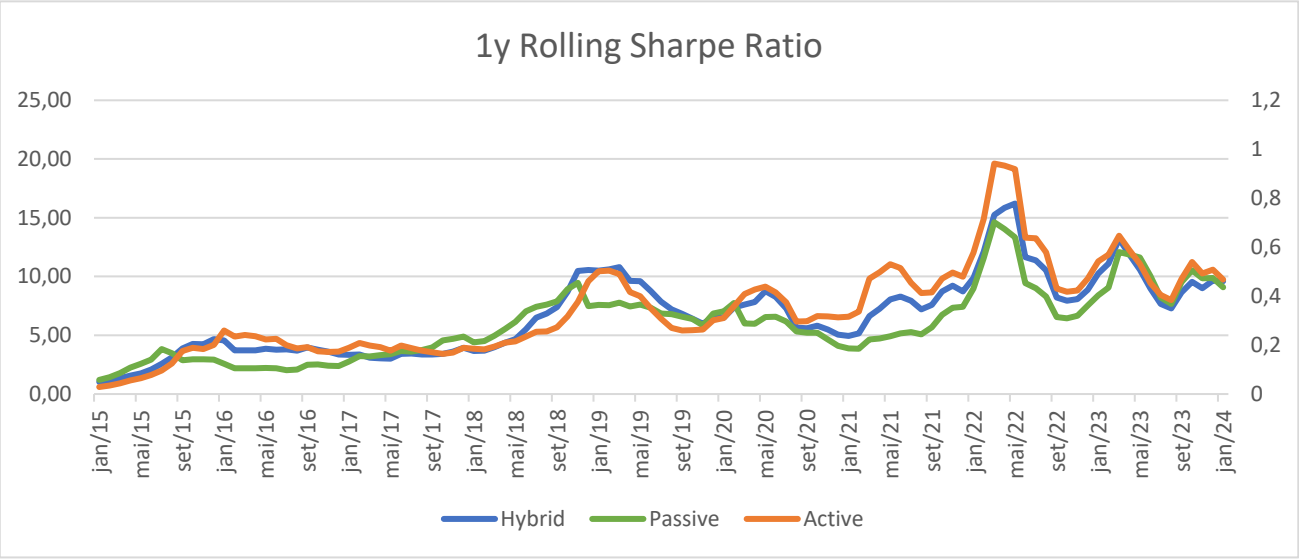
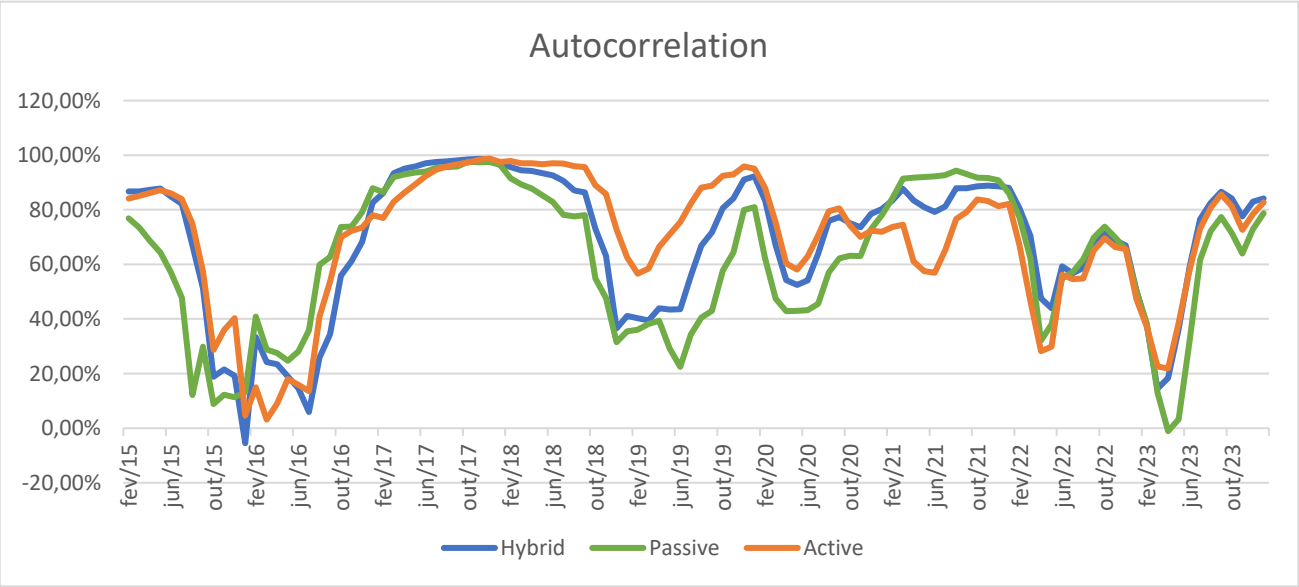
jan/23
mai/23
set/23
jan/24
Hybrid
Active


1y Rolling Sharpe Ratio
25,00
20,00
15,00
10,00
5,00
0,00
1,2
1
0,8
0,6
0,4
0,2
0
jan/15
mai/15
set/15
jan/16
mai/16
set/16
jan/17
mai/17
set/17
jan/18
mai/18
set/18
jan/19
mai/19
set/19
jan/20
mai/20
set/20
jan/21
mai/21
set/21
jan/22
mai/22
set/22
jan/23
mai/23
set/23
jan/24
Hybrid
Passive
Active


Autocorrelation
120,00%
100,00%
80,00%
60,00%
40,00%
20,00%
0,00%
-20,00%
fev/15
jun/15
out/15
fev/16
jun/16
out/16
fev/17
jun/17
out/17
fev/18
jun/18
out/18
fev/19
jun/19
out/19
fev/20
jun/20
out/20
fev/21
jun/21
out/21
fev/22
jun/22
out/22
fev/23
jun/23
out/23
Hybrid
Passive
Active