Lisbon School of Economics & Management
Universidade de Lisboa

MASTER OF SCIENCE IN
FINANCE

MASTERS FINAL WORK
PROJECT

INVESTMENT POLICY STATEMENT:
JOSÉ MADEIRA

TIAGO ROSA MARCOS ANSELMO

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PROFESSOR PEDRO RINO VIEIRA

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Abstract

This Investment Policy Statement (IPS) defines the investment strategy for José, aligning his financial objectives with his risk profile and long-term horizon. It serves as both a planning document and a communication framework between advisor and client, guiding decisions on asset allocation, risk management, performance monitoring and compliance with CFA rules.

José's investment goal is to grow an initial capital of €400,000 over a 10-year period to reach a target value of €640,000 in today's terms. Adjusting for an estimated annual inflation rate of 2%, the inflation-adjusted goal amounts to €780,156.43. When accounting for a 28% capital gains tax, the portfolio must grow to approximately €927,995.04 in nominal terms. To meet this objective, the portfolio must deliver a minimum annualized return of 8.78%, adjusted for both inflation and taxation. José's financial stability allows for moderate risk exposure, though his limited experience in financial markets calls for a diversified and disciplined approach. His investment profile is defined as moderate-to-value oriented.

The investment strategy is built around value investing principles, using a diversified mix of Exchange-Traded Funds (ETFs) and a risk-free asset. Constraints include a strict avoidance of leverage and short selling for speculative purposes. Currency hedging through forward contracts may be employed strictly for risk management. ESG factors are not considered in any aspect of the investment strategy defined in this IPS.

Strategic asset allocation was determined using macroeconomic analysis and Mean-Variance Theory (MVT). The proposed portfolio is expected to yield an average annual return of 10.43%, with an annualized standard deviation (volatility) of 7.63%, resulting in a Sharpe Ratio of 1.08. To evaluate and manage potential risks, quantitative tools such as Value-at-Risk (VaR), Expected Shortfall, and a risk matrix were employed.

The advisor is responsible for quarterly performance tracking, quarterly risk reviews, and annual rebalancing proposals to ensure the portfolio remains aligned with José's goals and risk tolerance. This IPS reflects a structured yet flexible framework for managing long-term capital growth in a transparent and informed manner.

JEL classification:C6; G11.

Keywords: Portfolio Theory; IPS; Individual Investors; Value Investing; ETF; MVT; Sharpe Ratio; Value at Risk; Expected Shortfall; Risk Matrix.

Resumo

Este IPS define a estratégia de investimento do José, alinhando os seus objetivos financeiros com o seu perfil de risco e horizonte de longo prazo. Serve como guia de planeamento e comunicação entre o consultor e o cliente, orientando a afetação de ativos, a gestão do risco, a monitorização do desempenho e o cumprimento das diretrizes do CFA.

O objetivo de José é fazer crescer um capital inicial de 400 000 euros ao longo de 10 anos, atingindo um valor real de 640 000 euros. Considerando uma inflação anual de 2%, o objetivo ajustado é de 780 156,43 euros. Com um imposto de 28% sobre mais-valias, será necessário atingir cerca de 927 995,04 euros em termos nominais. Para isso, a carteira deve gerar um retorno anual mínimo de 8.78%, ajustado à inflação e impostos. José apresenta estabilidade financeira e um perfil de risco moderado, mas com experiência limitada em mercados financeiros. Assim, a estratégia deve ser diversificada, disciplinada e orientada para investimento em valor.

A estratégia de investimento assenta em princípios de investimento em valor, combinando ETFs diversificados com ativos sem risco. Estão proibidas a alavancagem e vendas a descoberto com fins especulativos. A cobertura cambial através de contratos a prazo é permitida apenas para fins de gestão de risco. Os fatores ESG não são considerados em nenhum aspeto da estratégia de investimento definida neste IPS.

A alocação estratégica de ativos foi definida com base em análise macroeconómica e na teoria da Média-Variância (MVT). A carteira proposta prevê um retorno médio anual de 10,43%, com uma volatilidade (desvio padrão) de 7,63%, resultando num rácio de Sharpe de 1,08. A gestão de risco recorre a ferramentas quantitativas como o Value-at-Risk (VaR), o Expected Shortfall e uma matriz de risco.

O consultor é responsável pelo acompanhamento quadrimestral do desempenho, revisão dos riscos e propostas anuais de reequilíbrio. O objetivo é manter a carteira alinhada com os objetivos e a tolerância ao risco do José. Este IPS proporciona um enquadramento estruturado, mas flexível, para gerir o crescimento de capital a longo prazo de forma transparente e informada.

Classificação JEL: C6; G11.

Palavras-Chave:Teoria da Carteira; IPS; Investidores Individuais; Investimento em valor; ETF; MVT; Rácio de Sharpe; Value at Risk; Expected Shortfall; Matriz de risco.

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To my parents—thank you for your constant support, encouragement, and unconditional love. Your belief in me has been essential to every step of this journey.

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A special word of appreciation goes to Professor Tiago Gonçalves, for giving me the opportunity to be part of this institution, and to Professor Pedro Rino Vieira, my supervisor, for your valuable guidance, insightful feedback, and steady support throughout the development of this work.

Thank you all!

Abbreviations

ACC – Accumulative

AI – Artificial Intelligence

AP – Authorized Participants

CAL – Capital Allocation Line

CISS - Composite Indicator of Systemic Stress

CMVM - Comissão do Mercado de Valores Mobiliários

ECB – European Central Bank

EF – Efficient Frontier

ESG – Environmental Social Governance

ETC – Exchange Traded Commodity

ETF – Exchange Traded Fund

EU – European Union

EUR – Euro

FED – Federal Reserve

FX – Foreign Exchange

GDP – Gross Domestic Product

HICP - Harmonised Index of Consumer Prices

IG – Investment Grade

MPT – Modern Portfolio Theory

MV – Minimum Variance

MVT – Mean Variance Theory

NAV – Net Asset Value

NFCI - Chicago Fed National Financial Conditions Index

NSS – Non-Short Selling

PCE – Personal Consumption Expenditure

SR – Sharpe Ratio

TER – Total Expense Ratio

U.S. – United States

USD – United States Dollar

VaR – Value at Risk

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1 Introduction

This Investment Policy Statement (IPS) establishes a comprehensive framework for managing José Madeira's investment portfolio. It is designed to align with his financial goals while incorporating individual constraints and preferences. The primary objective is to grow the initial capital of €400,000 to €927,995.04 over a 10-year horizon. This target incorporates a 2% annual inflation rate and a 28% capital gains tax, ensuring a realistic path to long-term financial security.

To achieve this, the IPS adopts a passive investment strategy focused on Exchange-Traded Funds (ETFs), leveraging their cost efficiency, broad diversification, and long-term suitability. The strategy reflects a disciplined, evidence-based approach to investing, aimed at delivering sustainable growth.

The IPS also defines a clear governance structure, outlining the responsibilities of both the financial advisor and José Madeira. It includes protocols for regular performance reviews, risk management, and precise asset allocation guidelines. A key component of the strategy is the use of Excel Solver to construct an optimized portfolio, maximizing key metrics such as the Sharpe Ratio within defined constraints on asset weights, risk tolerance, and personal preferences.

By fostering ongoing collaboration between the advisor and José Madeira, this IPS ensures a transparent and structured approach to portfolio management, effectively balancing risk and return to support the achievement of long-term financial goals.

2 Executive Summary

2.1 Scope and Purpose

The Investment Policy Statement (IPS) serves as a vital framework for fostering transparent and effective communication between José and his financial advisor, Tiago Anselmo. As the advisor, Tiago ensures the IPS remains current by incorporating updates related to tax laws and regulatory requirements. He also tailors the portfolio to align with José's shifting financial objectives. Dedicated to maintaining the highest professional standards, Tiago provides honest, impartial guidance, openly discloses any potential conflicts of interest, and adheres strictly to the ethical principles outlined by the Chartered Financial Analyst (CFA) Institute.

2.2 Governance

To meet the client's return objectives while honoring their unique constraints, the financial advisor is tasked with developing an Investment Policy Statement (IPS) and periodically rebalancing the portfolio to maintain alignment with the client's goals. José will review detailed quarterly reports and offer feedback as necessary to ensure ongoing collaboration and effective portfolio management.

2.3 Investment Return and Risk

This Investment Policy Statement (IPS) is structured to achieve an average annual return of 10.43% over the next 10 years while adhering to the constraint of investing exclusively in ETFs and the risk-free rate. The portfolio is designed to maximize returns while effectively managing risk. Markowitz's Mean-Variance Theory guided the determination of the optimal asset allocation, resulting in a portfolio with a standard deviation of 7.63%.

2.4 Risk Management

The financial advisor will deliver quarterly reports detailing the portfolio's risk and return metrics. Rebalancing will be conducted only when required to preserve the target return while minimizing variance, ensuring the portfolio remains aligned with the client's objectives.

3 Investment Policy Statement

3.1 Scope and Purpose

3.1.1 Context and Investor

José Madeira is a 28-year-old entrepreneur recognized for his success in the technology sector. He began his career in this field at the age of 18 and, by 20, had founded his own company. Over the past eight years, his business has experienced significant growth, providing him with a strong financial foundation and a stable income. As a result, he has accumulated €400,000, which he now intends to invest with a long-term horizon of 10 years and a target cumulative return of 60%.

Currently single, José plans to start a family in the coming years and views his investment strategy as a means to ensure financial security for himself and his future family. His goal is to generate sufficient returns to support a comfortable lifestyle, travel aspirations, and long-term financial stability. Residing in Lisbon, Portugal, he has a strong understanding of the technology sector and closely follows its evolution, particularly the rapid growth of technology and artificial intelligence (AI) companies. The investment policy statement (IPS) adopts a value investing philosophy, with a strategic focus on tech-driven opportunities.

José follows a disciplined wealth accumulation strategy, keeping his expenses low while reinvesting profits—either back into his company or into new investment opportunities. Despite his frugal approach, he values quality travel experiences, taking an annual trip to carefully selected destinations that offer the best value without excessive spending.

This Investment Policy Statement (IPS) serves as a structured guide for José Madeira's investment strategy, objectives, and risk management parameters. It establishes a clear framework to ensure a disciplined and strategic investment process, aligning his portfolio with his long-term financial goals and aspirations.

3.1.2 Structure

José's financial advisor, Tiago Anselmo, is responsible for drafting and updating the IPS. The updates will reflect José's evolving financial goals and incorporate input from his legal and tax advisors. Tiago is committed to informing José of all portfolio adjustments made during the investment period. José, in turn, is responsible for approving the initial IPS and any subsequent revisions.

Tiago Anselmo, in his capacity as a trusted advisor, places José's best interests at the forefront of all advisory and investment decisions. He demonstrates his dedication to

ethical financial practices by strictly following the principles set forth in the CFA Institute Asset Manager Code of Professional Conduct.

Tiago has full authority to manage the portfolio on behalf of José, who has entrusted him with this responsibility. As part of his commitment to risk management and performance monitoring, Tiago will provide José with quarterly reports detailing portfolio performance and any relevant updates.

Tiago will strictly follow the CFA Institute Asset Manager Code of Professional Conduct to ensure ethical and professional financial advisory services.

3.2 Governance

To establish an efficient and transparent investment process, the advisor must clearly define both their responsibilities and duties, as well as the client's role in managing the IPS. Establishing well-defined responsibilities enhances communication, decision-making, and alignment with investment objectives.

The financial advisor is responsible for the creation, implementation, and ongoing maintenance of the IPS. This includes monitoring investment performance and providing quarterly updates to the client. If the portfolio deviates from its intended course, the advisor will propose and discuss corrective actions to realign with the investment objectives. A quarterly review of the IPS will assess its effectiveness, with recommendations for adjustments if needed. The client will also periodically review the IPS to ensure it remains in line with their financial goals and preferences.

The client grants the advisor full authority to appoint and remove individuals and/or entities responsible for managing investment assets, ensuring a structured and professional oversight process.

Pertaining to asset allocation, the advisor will recommend the strategic asset allocation, tailored to the client’s investment goals. An annual portfolio rebalancing will be conducted to maintain the strategic asset allocation, with any proposed changes requiring the client’s final approval. Transparency is a key principle, and the advisor will provide detailed disclosures on investment allocations, expected returns, volatility levels, macroeconomic considerations, tax implications, and relevant performance benchmarks for return and risk assessment.

This ETF-structured portfolio is designed with a value-oriented approach, aiming to identify undervalued assets with strong long-term potential. The asset allocation across equities, fixed income, and alternative investments will be carefully structured to ensure diversification and effective risk management.

Risk management is a critical pillar of investment governance. The advisor is responsible for the ongoing assessment and oversight of investment-related risks, ensuring continuous monitoring and proactive mitigation strategies. Quarterly financial reports will serve as the official record of the IPS's performance, providing transparency and accountability. The advisor will also identify any deviations in risk exposure, periodically reassess the client's risk classification and profile, and implement necessary adjustments to ensure adherence to the established risk tolerance parameters.

This governance framework upholds a disciplined and adaptive investment strategy, ensuring alignment with the client's long-term financial objectives while maintaining a structured, professional, and transparent approach.

3.3 Investment, Return and Risk Objectives

3.3.1 Investment Objective

The primary objective of this investment is to achieve a total portfolio value of €640,000 over the next 10 years, by 2035, generating an absolute return of €240,000 from an initial capital of €400,000, with a target cumulative return of 60%. This capital growth is intended to ensure José Madeira's long-term financial stability and provide the necessary funds to cover key future expenses, including €345,000 for the purchase of a house in Lisbon, €210,000 for family-related expenses, primarily for the education of his future children, €55,000 for the purchase of a car, and €30,000 for travel expenses.

3.3.2 Return, Distribution and Risk Requirements

The decision to incorporate a 2% annual inflation rate aligns with the European Central Bank's (ECB) objective of maintaining economic stability. To ensure that José Madeira's financial goals are met, the investment portfolio must generate a minimum annual return of 8.78% over the next 10 years.

Considering the impact of inflation, the target of €640,000 in today's terms is adjusted to €780,156.43 by 2035. Additionally, accounting for Portugal's 28% tax rate on investment gains, the portfolio must reach a pre-tax value of €927,995.04 to achieve the required net amount.

To meet these financial objectives while managing risk exposure, the portfolio manager will conduct a comprehensive risk assessment. This assessment will be guided by the objective of maximizing risk-adjusted returns, optimizing the portfolio's Sharpe ratio to ensure an efficient balance between return generation and risk management.

3.3.3 Portfolio Policy

The asset allocation strategy outlined in this IPS is designed to establish a diversified and well-balanced portfolio, ensuring that investment decisions remain aligned with José Madeira's financial objectives, risk tolerance, and market dynamics. The allocation plan, detailed in Appendix – Table A4, will be reviewed regularly by both the advisor and the client to assess its continued suitability.

Using Mean-Variance Theory (MVT) as the foundation, the advisor will determine the optimal allocation for each asset class, considering factors such as José's investment horizon, risk preferences, and prevailing macroeconomic conditions. To provide flexibility while maintaining control, each asset class will have predefined maximum and minimum allocation limits, allowing for necessary adjustments within approved parameters.

The advisor must strictly adhere to the asset allocation plan, ensuring that investments remain within the designated ranges. Any reallocation that exceeds these predefined limits will require prior consultation and approval from the client. To maintain transparency, the client will receive quarterly reports detailing the current asset allocation and confirming compliance with the investment strategy. This continuous monitoring and reporting process ensures that the portfolio remains strategically aligned with José's evolving financial needs and market conditions.

3.3.4 Investor`s Risk Tolerance

The IPS establishes the investor's approach to risk, recognizing that market fluctuations and external factors will impact portfolio performance over time. It is essential to define an acceptable level of risk that aligns with the investor's financial objectives, investment philosophy, and ability to tolerate volatility.

A Vanguard questionnaire was completed by José to determine his risk profile; it was composed of 11 questions, and conclusions were drawn accordingly.

José's long-term investment horizon, as determined by Questions 1, 2, and 4, indicates that he has the capacity to withstand short-term market fluctuations in pursuit of his financial goals. His stable income and strong financial foundation, confirmed in Question 5, further support his ability to maintain a long-term perspective without the need for immediate liquidity. However, Question 3 highlights that he is somewhat inexperienced in investment markets, reinforcing the need for structured risk management and diversification to control excessive volatility.

José's investment philosophy follows a value-oriented approach, which prioritizes assets with strong fundamentals over speculative opportunities. His responses to Questions 6, 7, and 8 demonstrate a moderate tolerance for volatility, indicating a willingness to accept market fluctuations in exchange for long-term capital appreciation. His preference for maximizing returns over capital preservation, as seen in Questions 9 and 11, further supports an investment strategy that seeks undervalued opportunities with sustainable growth potential. Additionally, his response to Question 10 ("Strongly Disagree") confirms that he does not prioritize low-volatility investments, reinforcing his comfort with moderate risk exposure.

Based on the risk assessment, a 70% allocation to risky assets and 30% to risk-free asset was recommended. This allocation reflects José's value-investing strategy while ensuring appropriate risk control.

In summary, José's risk profile is classified as moderate-to-value oriented, supporting a value-driven investment strategy while maintaining a balanced risk-reward approach. While his stable financial position allows him to assume risk, his limited direct market experience necessitates a well-diversified portfolio with controlled volatility. The underlying questionnaire responses that informed this assessment are provided in Appendix – Figure A1.

3.3.5 Relevant Constraints

This IPS establishes specific constraints to ensure that José Madeira's investment strategy remains aligned with his financial objectives, risk tolerance, and external regulatory and market conditions. These constraints serve as guiding principles in portfolio management while maintaining flexibility to adapt when necessary.

José has no immediate liquidity needs, allowing the portfolio to remain fully invested without requiring frequent withdrawals. However, adjustments may be implemented in response to market conditions or portfolio rebalancing requirements. The portfolio is structured to maintain sufficient liquidity while prioritizing long-term capital appreciation.

Tax considerations play a crucial role in investment decisions. In Portugal, capital gains are taxed at a flat rate of 28%, alongside taxation on dividends and interest income. To enhance tax efficiency, the portfolio will be invested exclusively in accumulating (ACC) ETFs, ensuring that dividends are automatically reinvested, maximizing compounding while simplifying tax reporting.

Given the portfolio's primary exposure to Euros (EUR) and US Dollars (USD), currency risk management is essential. A euro-hedging strategy will be applied exclusively to USD exposure to mitigate the impact of exchange rate fluctuations. Additionally, there is minor exposure to non-Euro European currencies, which will not be actively hedged,

as these positions represent a small portion of the portfolio and are indirectly included through Euro-focused ETFs. To ensure stability in lower-risk assets, bonds and other risk-free holdings will be EUR-denominated.

The portfolio will be entirely composed of ETFs, selected for their liquidity, diversification, and cost-effectiveness. Leverage, hedge funds, speculative derivatives, options, or futures will not be utilized. However, derivatives may be employed strictly for currency hedging purposes, specifically to manage EUR/USD exposure, ensuring risk remains controlled without introducing speculative elements.

Environmental, Social, and Governance (ESG) factors are not considered in the investment selection or portfolio construction process under this IPS. José does not prioritize or express interest in ESG-related criteria. Further details are available in Appendix – Table A.

All investment activities will be conducted in accordance with Portuguese financial regulations, including compliance with the Portuguese Tax Authority (Autoridade Tributária e Aduaneira) and the Portuguese Securities Market Commission (CMVM - Comissão do Mercado de Valores Mobiliários). The investment advisor will ensure that all transactions and portfolio management decisions adhere to these regulatory frameworks.

3.4 Risk Management

The financial advisor, Tiago Anselmo, is responsible for continuously monitoring and managing the risks associated with José Madeira's investment portfolio, ensuring alignment with the investment objectives and risk tolerance set forth in this IPS. A structured risk oversight framework will be applied to identify, assess, and control risks, ensuring portfolio stability while allowing for necessary adjustments.

A quarterly report will be prepared in compliance with the Global Investment Performance Standards (GIPS) set by the CFA Institute, providing a comprehensive risk assessment of the portfolio. This evaluation will include Value at Risk (VaR), Sharpe Ratio, Sortino Ratio, and Information Ratio, ensuring that risk exposure remains within acceptable limits.

The advisor will continuously assess market conditions and portfolio fluctuations to detect any deviations from the predefined risk parameters. If risk exposure surpasses the investor's defined tolerance, corrective measures will be proposed to restore the portfolio's alignment with the IPS. Risk assessment will be conducted regularly to ensure proactive risk control rather than reactive adjustments.

At the start of each year, Tiago Anselmo will conduct a comprehensive review of the asset allocation, determining whether modifications are necessary to maintain the

desired risk-return balance. Portfolio rebalancing will be conducted annually to preserve the strategic allocation and mitigate unintended risk shifts. Additionally, the EUR/USD hedging strategy will undergo an annual review, ensuring that currency exposure remains controlled and effectively managed.

This structured risk management approach ensures that risk exposure is consistently monitored, evaluated, and controlled, providing a disciplined framework for investment oversight while maintaining flexibility to respond to market conditions.

3.4.1 Hedging Strategy

International diversification is a key component of the proposed portfolio strategy. However, it introduces currency risk when assets are held in a currency other than the client's base currency. In this case, the client is euro-based, and approximately 48.25% of the proposed allocation—comprising U.S. dollar-denominated equities and commodities—will be exposed to currency fluctuations. As a result, fluctuations in the EUR/USD exchange rate could affect portfolio returns when measured in euros.

To manage this risk, a tactical hedging approach will be employed and reviewed annually. The hedge will only be implemented when the euro is expected to appreciate against the U.S. dollar by an amount that justifies the cost of hedging. This ensures the client is protected from material currency risk while not unnecessarily limiting potential upside.

The policy allows for a partial hedge using one EUR/USD futures contract traded on Eurex, covering approximately 64.76% of the projected U.S. dollar exposure. The decision to hedge will be based on a straightforward cost-benefit analysis.

Hedging Cost Calculation (CFA Framework)

The hedging cost percentage is calculated as follows:

$$Hedging\ Cost(\%) = \frac{\mathrm{F} - \mathrm{S}}{\mathrm{S}}$$

Where F is the futures rate and S is the spot rate. The cost of hedging in euros is:

$$Hedging\ Cost\ (€) = Hedging\ Cost(\%) \times Notional\ Exposure$$

Expected FX Gain from Not Hedging

The expected gain from not hedging, given the anticipated depreciation of the USD, is calculated as:

$$FX\ Gain = \frac{\text{USD Value}}{\text{Expected Spot Rate}} - Notional\ Exposure$$

The USD value of €136,250 is derived from €125,000 multiplied by the spot rate of 1.0900. With an expected spot rate of 1.0800, the FX gain amounts to €1,157.

Considering a futures price of 1.1005, a spot rate of 1.0900, and an expected spot rate of 1.0800, the cost of hedging is calculated to be €1,204.13. Since the cost of hedging (€1,204.13) exceeds the expected FX gain (€1,157), the hedge will not be executed at this time under current conditions.

This approach aligns with the CFA framework and the tactical currency hedging strategies discussed by Campbell et al. (2010). Further support comes from Zai & Mansur (2024), who provide a recent literature review on currency risk management and affirm the effectiveness of futures-based hedging in cross-border portfolios.

Liquidity Requirements

Although hedging will not be implemented initially due to current market conditions, it may be introduced in the future if the criteria outlined above are met. In preparation for that possibility, the liquidity requirements are detailed below.

Futures contracts typically require an initial margin ranging from 2% to 5% of the notional value. For this analysis a 5% margin is assumed as a conservative worst-case scenario. If the decision is made to hedge U.S. exposure, 2.5% of the total portfolio will be allocated to liquid assets to cover margin requirements and prevent forced liquidation during periods of market volatility.

Methodology

The initial margin is calculated using the following formula:

$$Initial\ Margin = Margin\ Required(\%) \times\ Notional\ Value$$

With a 5% margin and a notional value of €125,000, the initial margin comes to €6,250, which represents 1.56% of the total portfolio, within the 2.5% cap previously defined.

This conservative liquidity reserve is supported by Financial Stability Board (2023), which emphasizes the need from cash and highly liquid assets to meet margin calls, especially under market stress.

4 Investment Design

4.1 Investment Philosophy

According to Damodaran (2012), an investment philosophy is a structured and consistent way of understanding how financial markets operate and how investor behavior influences outcomes. It provides a foundation for disciplined decision-making and helps investors maintain clarity during periods of market uncertainty. While a philosophy outlines the beliefs that shape investment thinking, the investment strategy represents the implementation of those beliefs through concrete actions.

This Investment Policy Statement (IPS) is based on a combination of value investing and market timing strategies. The investment portfolio will be composed entirely of Exchange-Traded Funds (ETFs) and a risk-free asset. This approach is aligned with the investor's objectives, which prioritize long-term capital growth and do not require short-term liquidity, allowing for reinvestment and compounding over time. Value investing will serve as the core approach, while market timing will be applied as a complementary tool to adjust asset allocations in response to macroeconomic signals.

Market timing refers to adjusting portfolio positioning according to expected market conditions. Several indicators will guide these decisions, including interest rate forecasts, inflation, liquidity and monetary policy direction of Federal Reserve and European Central Bank (ECB). According to Guido (2023), some of the most effective market timing tools at the macro level include short-term interest rates, the shape of the yield curve, inflation trends, industrial production growth, and consumption. Short-term interest rates are often used as proxies for the prevailing monetary environment.

One of the key indicators used in this IPS will be the shape of the yield curve. According to Afonso (2012), the yield curve reflects the relationship between interest rates and the maturity of government bonds. A typical upward-sloping curve suggests that long-term bonds carry higher yields than short-term bonds, compensating for greater risk and longer time horizons. The curve's structure—defined by its level, slope, and curvature—offers insight into investor expectations about inflation, interest rates, and economic growth.

This IPS incorporates yield curve analysis as part of a broader market timing approach. Specifically, the spread between 10-year and 3-month government bond yields will be monitored as a quantitative indicator of economic conditions and potential recession risk. Further details on this analysis will be presented in the macroeconomic section.

Value investing is the preferred approach in this IPS due to its long-term performance record, favorable risk-return characteristics, and adaptability to changing market

dynamics. According to Park et al. (2022), value stocks—typically purchased at a discount to their intrinsic value—have historically outperformed growth stocks over extended periods, particularly under stable economic conditions. From a risk-return perspective, value investing offers a more consistent premium over time, whereas growth stocks tend to excel only during certain high-volatility or expansionary periods.

Adaptability also plays a key role in value investing. As Hou (2024) notes, effective value strategies involve adjusting to technological and market shifts, while maintaining a disciplined focus on companies with strong fundamentals and long-term potential. This approach aligns well with the investor profile of José Madeira, who favors patience, strategic discipline, and long-term wealth accumulation (Gou, 2024).

The foundation of value investing lies in identifying stocks whose market prices are significantly below their intrinsic value, based on a thorough analysis of a company's financial health, management quality, competitive position, and growth prospects. According to Wang et al. (2013), value stocks—often characterized by high book-to-market ratios—are more sensitive to interest rate changes, and as such, may generate higher excess returns when interest rates rise. This is due to their greater exposure to the opportunity cost of capital, a key element in asset pricing models. By contrast, growth stocks, which typically exhibit lower book-to-market ratios and are valued based on expected future earnings, are less affected by changes in interest rates.

Ultimately, this investment philosophy is shaped by long-term thinking, cost-efficient tools, and a disciplined belief in fundamental value — all guided by macroeconomic awareness and an investor profile centered on patience and consistency.

4.2 Strategic Asset Allocation

Strategic asset allocation is a long-term investment approach that defines how a portfolio is distributed across asset classes, guided by the investor’s risk tolerance, return objectives, and time horizon. Its purpose is to establish a balanced, consistent structure that resists reacting to short-term market fluctuations. As noted by Jagatheeswaran et al. (2024), the strategy emphasizes diversification and effective risk management, aiming to achieve the highest possible return for a given level of risk, often assessed using the Sharpe Ratio. The target allocation acts as a reference point for portfolio decisions and is reviewed periodically to ensure it remains aligned with the investor’s goals.

4.2.1 Macro analysis

This section outlines the macroeconomic framework used to guide tactical investment decisions. Inspired by Ray Dalio’s (2017) principles, the approach emphasizes a structured, rules-based methodology grounded in objective data.

Key economic categories—monetary policy, inflation, liquidity, growth, labor markets, yield curve expectations, and credit risk—are scored using relevant indicators. Each category receives a score of +1 (buy), 0 (hold), or -1 (sell). For categories with multiple indicators, scores are equally weighted. After scoring each category, an average is calculated to produce a macro score for each region.

Given that the portfolio is broadly balanced between U.S. and Eurozone exposures, a 50/50 weight is applied by default when combining the two regional macro scores. However, if the portfolio's actual allocation becomes tilted more heavily toward one region, the weighting is adjusted accordingly to reflect the current exposure.

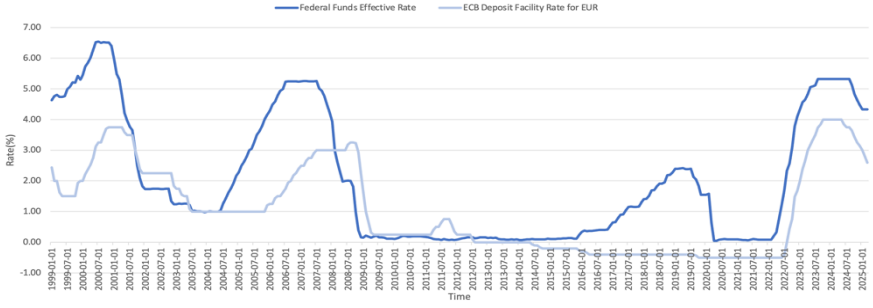
This transparent and repeatable process ensures disciplined, data-driven decision-making aligned with prevailing economic conditions and regional positioning.

Monetary Policy & Interest Rates

The current federal funds rate remains elevated, significantly exceeding the estimated neutral level. Recent research by Holston, Laubach, and Williams (2023) finds that the natural rate of interest has remained structurally low in the post-pandemic period. This suggests that today's policy rate continues to exert a restrictive influence on borrowing, investment, and broader economic activity. Lubik and Matthes (2023) support this view, noting that although estimating the neutral rate is inherently complex, there is strong evidence that current levels remain above it. As a result, even in the absence of further rate hikes, the prevailing stance continues to weigh on economic momentum. This justifies a neutral score of **0** on the macro dashboard, reflecting a restrictive stance without additional tightening.

In contrast, the European Central Bank (ECB) has begun to pivot toward monetary easing. In December 2024, the ECB lowered its deposit facility rate by 25 basis points—an intentional move to stimulate financial conditions. In its official communication, the ECB emphasized the deposit facility's central role in shaping the short end of the yield curve and influencing bank lending behavior. This rate cut is consistent with recent research highlighting how even modest reductions in short-term interest rates can improve liquidity and incentivize credit creation. Given the clear easing signal and its potential to support activity, this indicator earns a score of **+1** in the macro assessment.

Figure 1 - FED Funds Rate vs ECB Deposit Rate



Source: FRED and ECB, Data as of January 4, 2025

Inflation Dynamics

Both the United States and the Euro Area are currently experiencing a broad moderation in inflation. While headline inflation is steadily converging toward central bank targets, core inflation remains somewhat elevated, pointing to lingering underlying price pressures.

In the United States, headline inflation—as measured by the PCE Price Index—declined from 2.5% to 2.3%, while core inflation (Core PCE) eased more notably from 2.9% to 2.2%. According to the Federal Reserve Bank of San Francisco (2024), the 12-month change in the PCE index has fallen by nearly 5 percentage points since its 2022 peak. This decline is attributed to a combination of factors, including the resolution of supply chain disruptions and the delayed impact of prior monetary tightening.

Further insight from Gagnon and Rose (2024) highlights that U.S. disinflation has been shaped by a unique mix of pandemic-era demand shifts, declining global commodity prices, and softening labor market tightness. These drivers, which previously contributed to rapid inflation, are now reversing, leading to more subdued price dynamics.

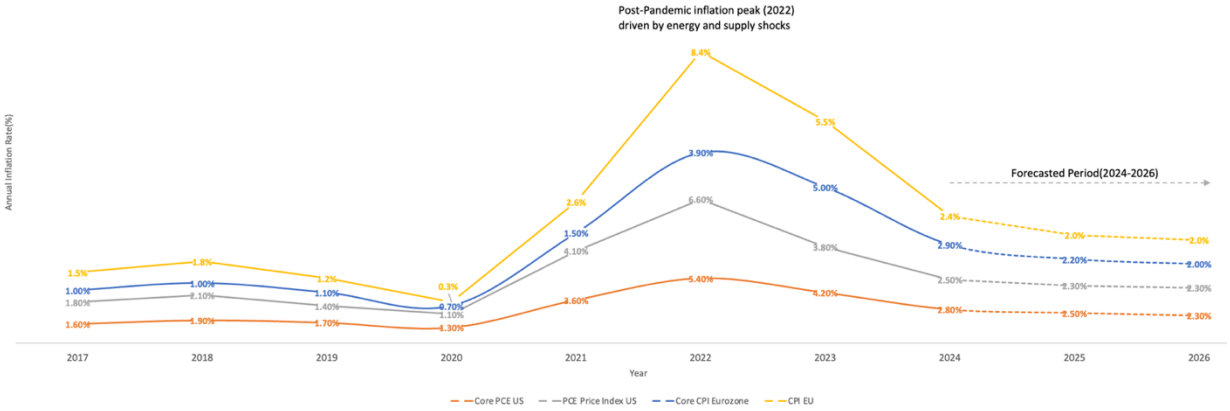
Policy Implication: The alignment of both headline and core inflation with the Federal Reserve's 2% target suggests a more dovish stance is now appropriate, reducing the urgency for further rate hikes. As such, both indicators receive a score of +0.5 on the macro dashboard.

In the Euro Area, headline inflation (HICP) declined from 2.4% to 2.0%, and core inflation (Core HICP) decreased from 3.2% to 2.9%. Research by Banbura et al. (2023) attributes this moderation in core inflation primarily to supply-side factors, including energy price normalization and easing supply chain pressures. Their analysis underscores that these factors have had a more pronounced influence on core inflation than in past cycles.

Additionally, the European Central Bank (2024) notes that measures of underlying inflation—excluding volatile items such as energy and food—are beginning to stabilize. However, the continued elevation in core inflation suggests that some price pressures remain embedded, justifying a cautious policy approach.

Policy Implication: The decline in headline inflation toward the ECB's target, coupled with gradual softening in core inflation, supports a neutral-to-easing policy stance. Nonetheless, persistent underlying pressures call for continued monitoring. Accordingly, both headline and core inflation are scored at +0.5 on the dashboard, applying an equal-weight methodology.

Figure 2 - Inflation Trends in US and Eurozone (2016-2026)



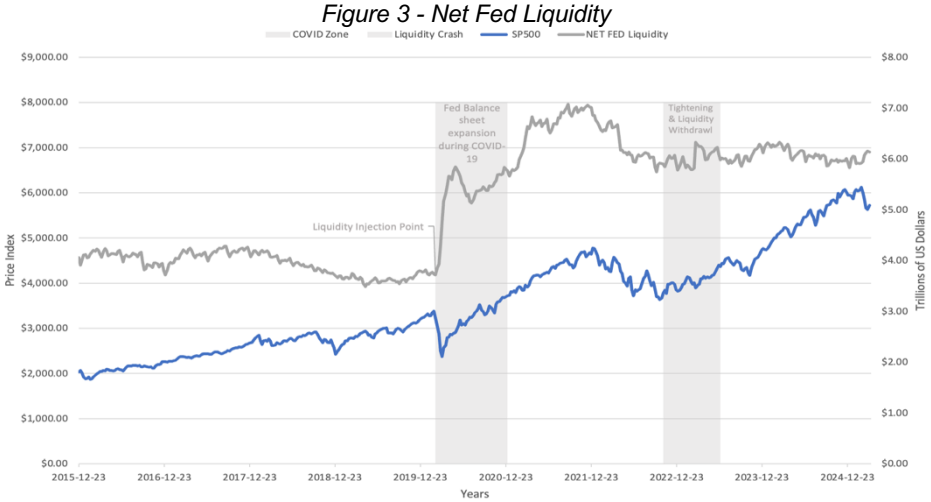
Source: Bloomberg Terminal, Data as of December 20, 2024

Liquidity & Financial Conditions: U.S and Euro Area

Liquidity conditions and financial stress indicators currently paint a nuanced picture in both the United States and the Euro Area. While some measures point to improving liquidity, others signal rising financial strain—underscoring the need for a comprehensive assessment grounded in recent academic research.

In the United States, net Federal Reserve liquidity increased from $5.923 trillion to $6.121 trillion, marking a 3.34% rise. Simultaneously, the Chicago Fed National Financial Conditions Index (NFCI) declined from –0.56 to –0.60, reflecting a 7.09% loosening in financial conditions. The increase in net liquidity aligns with the framework presented by Adrian and Shin (2010), who demonstrate that financial intermediaries adjust their balance sheets procyclical—expanding leverage during upswings and contracting it during downturns. These behaviors have broader implications for aggregate liquidity and financial market functioning.

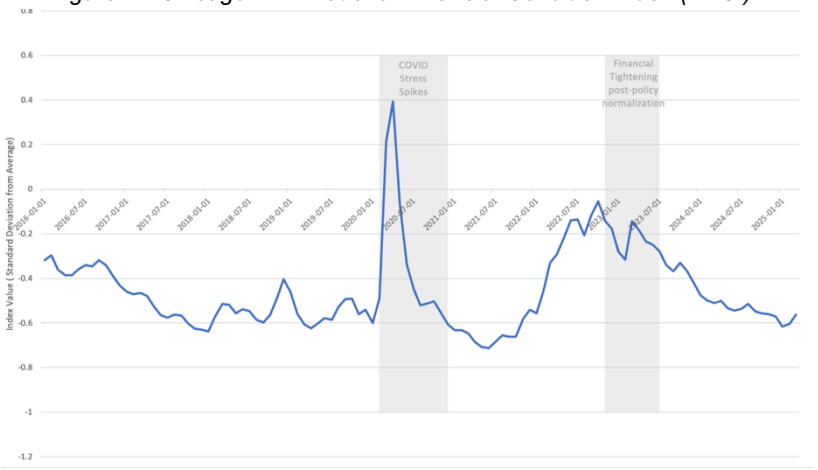
Figure 3 - Net Fed Liquidity



Source: FRED, Data as of December 27, 2024

The continued softening in the NFCI suggests that financial conditions are becoming more accommodative, which typically supports credit expansion and economic activity. Brunnermeier (2016) highlights how the creation of inside money by financial intermediaries, and their role in risk distribution, directly influence monetary policy transmission and systemic stability.

Figure 4 - Chicago FED National Financial Condition Index (NFCI)

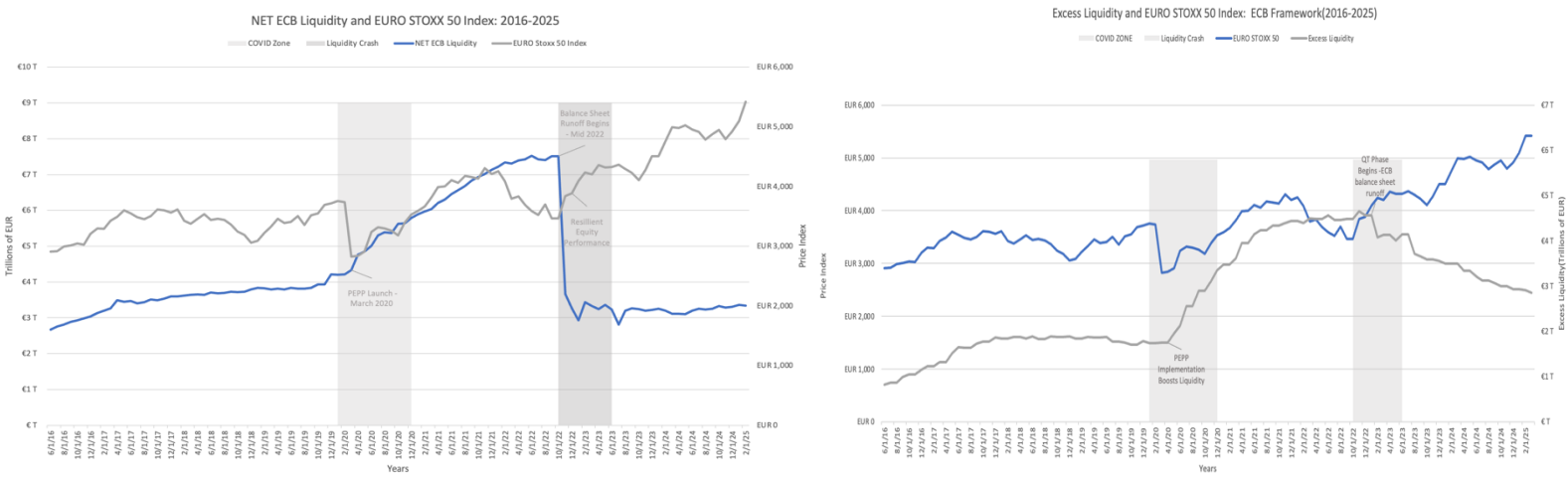


Source: FRED, Data as of January 6, 2025

Policy Implication: The combination of rising net liquidity and looser financial conditions provides a supportive environment for markets, lending activity, and asset valuations. However, academic literature cautions that excessive easing can reintroduce vulnerabilities, particularly through leverage cycles and asset mispricing. Therefore, we assign a score of +0.5 for Net Fed Liquidity and –0.5 for the NFCI, resulting in a net neutral score of 0 on the dashboard.

In the Euro Area, conditions are comparatively more restrictive. Net ECB liquidity declined by 0.66%, from €3,362,853.8 million to €3,340,644.5 million, while excess liquidity dropped 2.02%, from €2,911,299.69 million to €2,852,399.22 million. At the same time, the Composite Indicator of Systemic Stress (CISS) rose sharply from 0.06 to 0.13, a 105.8% increase, signaling a notable uptick in financial stress.

Figure 5 - NET ECB Liquidity, Excess Liquidity and Euro STOXX 50 Index

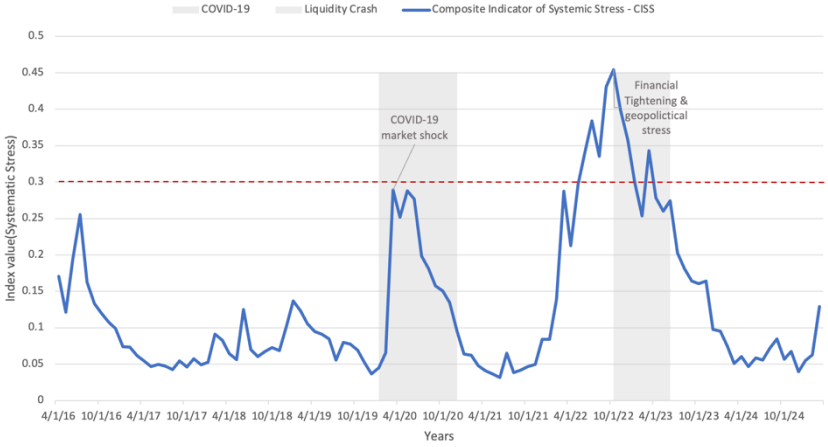


Source: FRED and ECB, Data as of February 5, 2025

The contraction in liquidity reflects the ECB's ongoing balance sheet normalization. As introduced by Kremer et al. (2012), the CISS captures a multidimensional view of systemic financial stress, aggregating indicators across markets and institutions. More recently, Chavleishvili and Kremer (2023) emphasize the indicator's predictive power

in assessing the impact of financial instability on economic growth, reinforcing its relevance in today's macro-financial context.

Figure 6 - Composite Indicator of Systemic Stress (CISS)



Source: ECB, Data as of December 28, 2024

Policy Implication: The simultaneous decline in liquidity and increase in systemic stress presents a macroeconomic headwind. ECB balance sheet tightening appears to be contributing to these developments. As the literature suggests, sustained stress in financial systems can undermine credit provision and dampen growth, warranting close monitoring and policy flexibility to avoid amplifying downside risks. Therefore, we assign a score of -0.33 for Net ECB Liquidity, –0.33 for Excess Liquidity and a 0 for CISS, resulting in a net neutral score of -0.67 on the dashboard.

Economic Activity & Labor Market Condition

Economic growth and labor market performance remain central to assessing overall macroeconomic health. As of early 2025, both the United States and the Euro Area show signs of stability or modest improvement, offering support for a cautiously constructive investment stance.

In the U.S., year-over-year GDP growth moderated from 2.7% to 2.1%, signaling a slowing but still positive economic expansion. At the same time, the unemployment rate improved slightly, from 4.3% to 4.1%, reinforcing the resilience of the labor market.

The slowdown in GDP suggests a maturing cycle rather than a signal of contraction. Research by Maestas et al. (2016) highlights that long-term demographic shifts—particularly aging—are exerting a gradual drag on labor force participation and economic output. Yet, the continued decline in unemployment points to underlying labor market strength, which acts as a stabilizing force in the broader economy.

Tight labor conditions support wage growth and household demand, helping to delay recessionary pressures. This dynamic is consistent with macroeconomic models such as those explored by Ball, Leigh, and Loungani (2013), which confirm a stable inverse

relationship between GDP growth and unemployment. In this context, labor market resilience serves as a reliable signal of economic health, even as growth moderates.

Policy Implication: Given the deceleration in output alongside sustained labor strength, a neutral score (0) is appropriate for GDP, while the labor market earns a +1, reflecting its role in supporting the soft-landing narrative over recession risk.

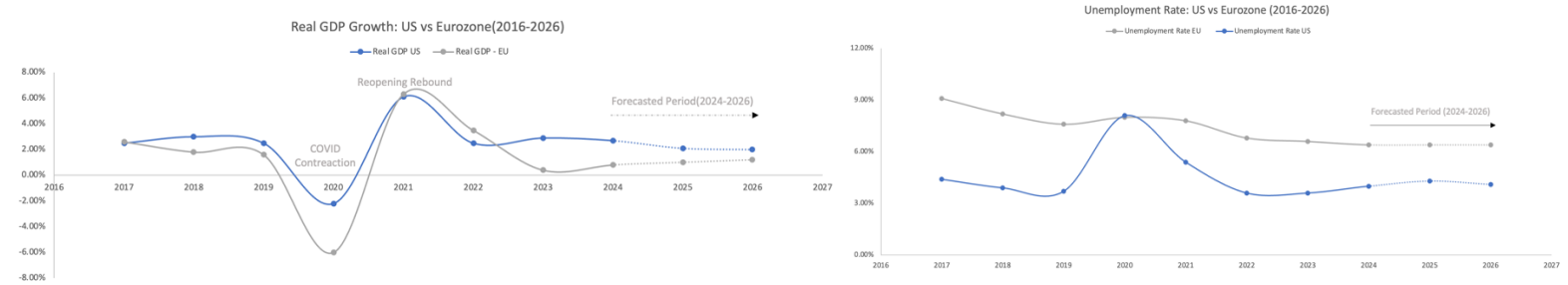
In the Euro Area, annual GDP growth increased modestly from 0.8% to 1.0%, while the unemployment rate remained unchanged at 6.4%. This combination reflects a slow but steady recovery from previous structural and cyclical challenges.

Heliyon (2024) underscores the role of coordinated fiscal policy and immigration dynamics in supporting job creation across member states, helping to maintain labor market equilibrium. Meanwhile, the framework developed by Brunnermeier and Sannikov (2016) emphasizes the role of financial conditions and macroprudential stability in sustaining employment through economic fluctuations—an important consideration for the Euro Area as it continues to normalize policy.

The current unemployment rate remains well below estimated structural thresholds, providing a foundation for consumer spending and domestic demand.

Policy Implication: Macro momentum in the Euro Area is modestly improving. While GDP growth remains below historical averages, the stability in employment supports confidence in the recovery. Accordingly, both GDP growth and labor market indicators are scored at +1 on the macro dashboard.

Figure 7 - Real GDP Growth and Unemployment Rate: US vs Eurozone



Source: Bloomberg Terminal, Data as of December 20, 2024

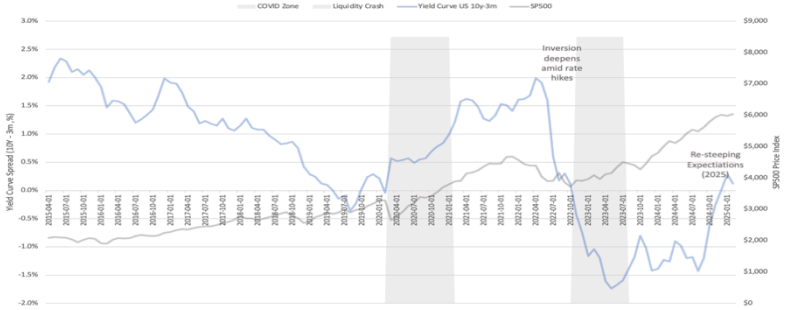
Yield Curve & Interest Rate Expectations

The yield curve—particularly the spread between the 10-year and 3-month government bond yields (10Y–3M)—is a widely observed indicator of market sentiment regarding future economic growth and potential shifts in monetary policy. A narrowing or inverted yield spread often reflects investor concerns about an economic slowdown, while a widening spread typically signals confidence in the outlook and expectations of policy normalization.

In the United States, the 10Y–3M yield spread narrowed from 0.29% to 0.12%, continuing its downward trajectory. This notable flattening of the yield curve brings it closer to inversion, a historically reliable signal of forthcoming recessions. A recent study by James Coe (2025) reaffirmed the predictive power of the yield curve, emphasizing that while the 10Y–3M spread remains a valuable leading indicator, its accuracy is enhanced when combined with other financial variables such as credit spreads and market volatility.

Policy Implication: The approaching inversion of the yield curve suggests increased investor caution and heightened sensitivity to growth risks. While not yet inverted, the signal warrants close monitoring. As such, we assign a neutral score (0) to the U.S. yield spread on the macro dashboard.

Figure 8 - US Yield Curve Spreads (10y - 3m): 2015-2025

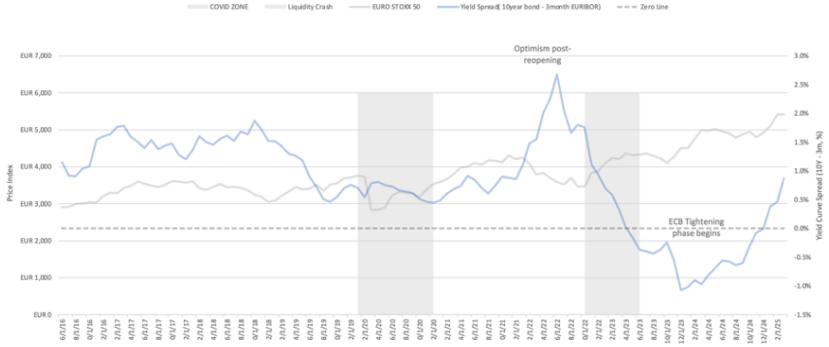


Source: FRED, Data as of February 12, 2025

In the Euro Area, the 10Y–3M yield spread widened from 0.46% to 0.87%, indicating a steepening curve. This upward movement is generally interpreted as a positive signal, reflecting improving macroeconomic expectations and potential monetary tightening in response to firmer growth or inflation dynamics. Vîntu (2025) finds that yield curve steepening in the Euro Area often signals expectations of economic expansion and the normalization of interest rates.

Policy Implication: The steepening of the yield curve in the Euro Area reflects optimism around future growth prospects. This improving signal leads us to assign a +1 score on the macro dashboard for the Euro Area yield spread.

Figure 9 - EU Yield Curve Spreads (10y - 3m): 2015-2025



Source: ECB, Data as of February 12, 2025

Credit & Risk Premium

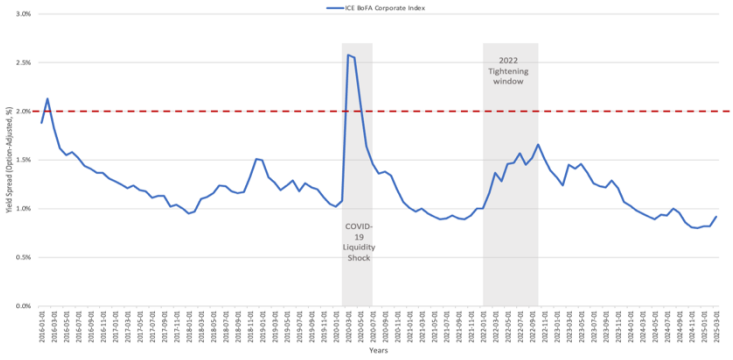
Credit and risk premium indicators offer valuable insight into market sentiment, the pricing of financial risk, and expectations regarding future financial conditions. By analyzing both corporate credit spreads and sovereign bond spreads, we can better understand how investors are responding to monetary policy, macro uncertainty, and perceived systemic risk.

In the U.S., the investment-grade (IG) credit spread, measured by the ICE BofA US Corporate Index Option-Adjusted Spread (OAS), rose from 0.82% to 0.92%, indicating a modest upward trend. This movement results in a neutral score (0) on the macro dashboard.

While spreads remain within historically normal ranges, the slight widening suggests a modest increase in perceived corporate credit risk. Investors appear to be demanding slightly higher compensation for exposure to corporate debt—potentially reflecting tighter financial conditions, macroeconomic uncertainty, or a general recalibration of risk tolerance.

Although their study focuses on the Euro Area, Lo Duca et al. (2023) offer a useful global framework, showing how macroeconomic shocks and monetary tightening can elevate corporate default probabilities, particularly among smaller or more leveraged firms. These mechanisms are not region-specific and help explain why even marginal spread increases can warrant a cautious interpretation. Given the current levels, however, the signal remains neutral.

Figure 10 - ICE BoFa US Corporate Index Option-Adjusted Spread



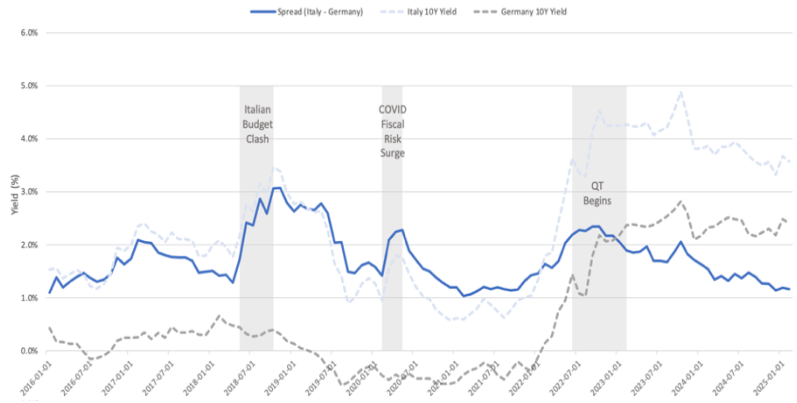
Source: FRED, Data as of March 8, 2025

In the Euro Area, the sovereign bond spread between Italy and Germany (10-year yield) declined slightly from 1.19% to 1.17%, trending downward. This movement also results in a neutral score (0) on the dashboard.

This modest narrowing suggests stable to slightly improving investor confidence in Italy's sovereign credit profile relative to Germany. The spread remains firmly within a range that does not indicate market fragmentation or elevated political or fiscal stress. In other words, markets are not currently pricing in meaningful sovereign risk divergence within the Euro Area.

Corrandin et al. (2021) provides valuable context, having decomposed sovereign bond risk premia across the Eurozone during periods of heightened volatility. His research highlights that movements in spreads often reflect changes in default risk, redenomination risk, and segmentation risk—all of which are highly responsive to ECB policy actions and investor sentiment. The recent decline in the Italy-Germany spread can therefore be seen as a signal of improved stability and subdued systemic concern.

Figure 11 - Yield Spread Between 10 Year Bond Italy and Germany



Source: ECB, Data as of March 8, 2025

Macro Scorecard Analysis – Final Aggregated Score:0.42

The final macro score of +0.42, on a scale from –1 (bearish) to +1 (bullish), reflects a broadly stable environment with a modestly constructive bias. While the current landscape does not warrant aggressive positioning, it equally does not point to significant downside risks. The most supportive signals stem from broad-based disinflation—across both headline and core measures—and resilient labor markets in the United States and the Euro Area. Together, these factors help sustain consumer demand and reduce pressure on central banks, contributing to a more accommodative policy outlook.

However, liquidity conditions remain a constraint, particularly in the Euro Area, where excess reserves and central bank balance sheet metrics continue to contract. In the United States, financial conditions have tightened, and the yield curve remains flat, underscoring persistent caution in forward-looking growth expectations. While growth in the Eurozone shows tentative signs of recovery, U.S. momentum has moderated slightly. Credit and sovereign spreads remain stable, signaling an absence of acute financial stress but not yet offering a clear bullish signal.

Taken together, the current macro environment calls for a balanced and selective approach. The moderately positive score supports a strategy of staying invested, with emphasis on high-quality exposures and portfolio flexibility. A tilt toward resilience is warranted, while maintaining optionality to scale into risk assets if macro conditions continue to improve. Forthcoming policy decisions and growth data will be critical in confirming whether this early stability evolves into sustained recovery.

Table 1 - Macro Dashboard

Region	Category	Indicator	Score	Final Score	Policy Implication
US	Monetary Policy & Interest Rates	FED Funds Rate	0.00	0.00	Still Restrictive but not worsening
	Inflation Dynamics	CPI Y0Y(Feito)/PCE Price Index	0.50	1.00	Dovish implication, macro tailwind
		CORE PCE YoY	0.50		Disinflation trend - Supportive of dovish policy
	Liquidity & Financial Conditions	Net Fed Liquidity(Trillions of US Dollars)	0.50	0.00	Supportive for market , Credit and Valuations
		Financial Conditional Index/Chicago Fed National Financial Index - NFCI	-0.50		Stress rising , Financial drag
	Growth Indicators	GDP Growth YoY	0.00	0.00	Neutral, soft-landing narrative
	Labor Market	Unemployment Rate	1.00	1.00	Labor market strength - Supports consumption & growth
	Yield Curve & Interest Rate Expectations	10Y - 3m Yield Spread	0.00	0.00	Neutral to cautionary - curve could invert
	Credit & Risk Premium	IG Credit Spread / ICE BofA US Corporate Index Option-Adjusted Spread	0.00	0.00	Neutral signal
EU	Monetary Policy & Interest Rates	ECB Deposit Rate	0.50	0.50	Easing -Support liquidity , Lower financial burden
	Inflation Dynamics	CPI YOY(feito)/HICP	0.50	1.00	Eases pressure on ECB , macro tailwind
		CORE CPI YoY	0.50		Disinflation trend - Support easing or neutral stance
	Liquidity & Financial Conditions	NET ECB Liquidity(Millions of EUR)	-0.33	-0.67	Macro headwind, ECB Balance sheet tightening
		Excess Liquidity(ECB)(Millions of EUR)	-0.33		Policy tightening, drains bank reserve
		Financial Conditional Index/CISS - Composite Indicator of Systemic Stress	0.00		Neutral, watch for stress building
	Growth Indicators	GDP Growth YoY	1.00	1.00	Positive signal improving macro momentum
	Labor Market	Unemployment Rate	1.00	1.00	Healthy labor market - macro support
	Yield Curve & Interest Rate Expectations	10Y - 3m Yield Spread	1.00	1.00	Healthy curve - improving macro expectations
	Credit & Risk Premium	Sovereign Spread(10y Bond Italy -10y Bond Germany(Bund))	0.00	0.00	Neutral, no market stress
			Total	0.42	

Source: Author

4.2.2 Asset Selection

To allocate the portfolio, a strategic top-down approach was employed, integrating macroeconomic analysis (via the Macroeconomic Dashboard) with a structure tailored to the investor's risk profile. The foundation of the allocation strategy was based on a 70/30 split between risky and risk-free assets, as recommended by the Vanguard investor questionnaire.

Within the 70% allocation to risky assets, the internal distribution was determined based on guidance from State Street Global Advisors ETF Model Portfolios (2023). Considering the investor's long-term objectives and tolerance for short-term fluctuations, the risky portion was allocated 70% to equities, 10% to bonds, and 20% to alternative investments. This translated into central weights of 49.0% in equities, 7.0% in bonds, and 14.0% in alternatives, by applying each asset class's proportion to the overall 70% risky allocation.

To promote both flexibility and risk control, allocation boundaries were introduced for each asset class. Minimum allocations were set at 30% below their respective central weights, while maximum allocations were set at 10% above. The same logic was applied to the overall split between risky and risk-free assets and ETFs, ensuring a balanced optimization environment that allows dynamic adjustment to evolving market conditions without excessive exposure to any single category.

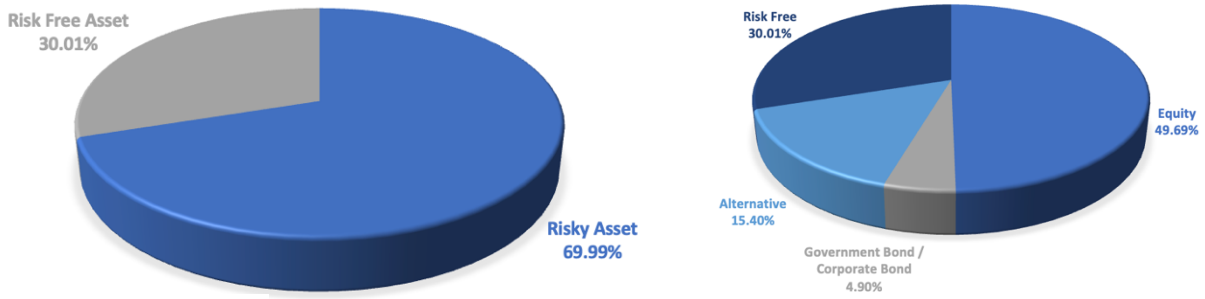
The use of asymmetric allocation bands is supported by recent research in portfolio construction. Sleire et al. (2021) demonstrate that incorporating local, asymmetric correlation structures enhances the precision and responsiveness of allocation strategies under varying market conditions. Hu and Lindquist (2021) further argue that implementing performance-based constraints, including upper and lower allocation limits, improves capital efficiency in real-world investment scenarios. Additionally, Kobayashi et al. (2021) validate the effectiveness of robust optimization techniques within portfolios subject to cardinality and exposure constraints, showing that constrained models often outperform traditional unconstrained approaches under realistic conditions.

Using these constraint methodologies within the Solver optimization model, the portfolio arrived at optimal allocations of 49.69% to equities, 4.90% to bonds, and 15.40% to alternatives, with the risk-free portion adjusting to 30.01% and the risky allocation to 69.99%. These results reflect the underlying structure of the allocation model as well as the investor's return objectives and risk tolerance over a 10-year investment horizon. Additional details regarding the asset allocation can be found in Appendix – Table A4.

Table 2 - Final Asset Allocation

Asset Class	Final Allocation	Minimum Allocation	Central Allocation	Maximum Allocation
Equity	49.69%	34.30%	49.00%	53.90%
Government Bond / Corporate Bond	4.90%	4.90%	7.00%	7.70%
Alternative	15.40%	9.80%	14.00%	15.40%
Risk Free	30.01%	21.00%	30.00%	33.00%

Figure 12 - Final Asset Allocation



Source: Author

4.3 Security Selection

The security selection process is designed to align with the client's long-term investment objectives, risk tolerance, and macroeconomic outlook outlined in the IPS. A systematic, rule-based approach was employed across all asset classes, using both quantitative and qualitative criteria to identify the most appropriate investment vehicles. Emphasis was placed on maintaining cost-efficiency, liquidity, and transparency while ensuring adherence to the strategic asset allocation.

A top-down macroeconomic analysis informed the broader market trends, while bottom-up sector evaluation ensured that each security was fundamentally sound within prevailing economic conditions.

The portfolio construction prioritizes Exchange-Traded Funds (ETFs) and Exchange-Traded Commodities (ETCs) that offer efficient exposure to market indices, reinvest income to enhance compounding effects, and reflect the investment philosophy's preference for value-oriented assets.

The portfolio will consist exclusively of ETFs, which provide diversified exposure to various asset classes while maintaining high levels of liquidity and cost efficiency. As described by Ajwal (2023), ETFs combine key characteristics of mutual funds and individual stocks: they generally track indices or sectors, are traded throughout the

day on stock exchanges, and typically have lower expense ratios compared to traditional mutual funds.

This Investment Policy Statement (IPS) adopts a passive investment strategy, relying exclusively on passively managed ETFs. According to the Wharton Wealth Management Initiative, passive ETFs tend to outperform actively managed ETFs due to structural advantages such as lower management fees, reduced trading activity, and greater tax efficiency. By tracking predefined indices, passive ETFs reduce the need for frequent portfolio adjustments, providing greater transparency, consistency, and alignment with long-term market trends. In contrast, active ETFs depend on the fund manager's ability to consistently outperform benchmark indices—an outcome that empirical evidence has shown to be difficult to sustain over time. Further information on ETF selection can be found in Appendix – Table A2.

4.3.1 Replication Method

ETF replication strategies are broadly categorized into physical and synthetic methods (Vanguard, 2021). Physical replication includes full replication, sampling, and optimized replication. Full replication involves investing in all, or nearly all, of the securities in a benchmark index, in proportion to their index weights. Sampling uses a subset of the index to match its risk and return profile, while optimized replication applies algorithmic models to construct a representative portfolio when full replication is not feasible.

Synthetic replication, by contrast, seeks to replicate index performance through derivatives, typically swap agreements, with financial counterparties. While synthetic ETFs can offer efficiency in certain cases, they involve greater counterparty risk and reduced transparency compared to physical ETFs.

This Investment Policy Statement (IPS) prioritizes ETFs employing physical replication, with a strong preference for full replication due to its accuracy, transparency, and reduced counterparty risk. When full replication is not feasible, typically due to liquidity constraints or elevated transaction costs, optimized sampling is used as a practical alternative.

Optimized sampling involves constructing a representative subset of the index using quantitative techniques to limit tracking error and manage costs. This method strikes an effective balance between precision and cost-efficiency and is widely recognized in ETF portfolio design (Dyer & Guest, 2022; Glosten, Nallareddy, & Zou, 2016).

4.3.2 Total Expense Ratio (TER)

Cost efficiency is a core principle of the security selection process, with a TER ceiling of 0.40% applied across all asset classes. This constraint aligns with market benchmarks, such as those published by LSEG Lipper (2025), which report average

TERs for equity ETFs at 0.35%, bond ETFs at 0.22%, and alternative ETFs at 0.475%. The selected ETFs within the portfolio maintained average TERs of 0.20% for equities, 0.15% for bonds, and 0.26% for alternatives—consistently below their respective category averages.

By focusing on low-cost ETFs, the portfolio minimizes fees, ensuring higher net returns over time and supporting long-term capital growth and compounding. This disciplined approach helps maintain optimal portfolio performance without the drag of high management fees.

4.3.3 ETF-Specific Risk and Systemic Considerations

While ETFs are widely recognized for their efficiency, transparency, and cost-effectiveness, they are not without potential risks. Understanding these vulnerabilities is essential to building a resilient, long-term portfolio.

Grund (2020) highlights the fragility of the ETF arbitrage mechanism, which depends on authorized participants (APs) to keep ETF prices aligned with their net asset values (NAVs). During periods of market stress, APs may withdraw from this role, resulting in ETFs trading at significant premiums or discounts to NAV. This dislocation undermines price discovery and can weaken overall market stability. Furthermore, ETFs may transmit liquidity shocks between the fund and its underlying assets. In extreme cases, this feedback loop can trigger fire sales, increasing volatility and contributing to systemic risk.

4.3.4 Dividend Reinvestment

ETFs can be classified as distributive or accumulative, depending on how they handle income. Fullmer (2008) explains that distributive ETFs pay dividends and interest directly to investors, potentially leading to double taxation. In contrast, accumulative ETFs reinvest these earnings, supporting compounding and offering more favorable tax treatment.

Given the investor's long-term horizon and lack of income needs, this IPS exclusively selects accumulative ETFs, aligning with the reinvestment benefits outlined by Fullmer (2008). Vanguard (2023) emphasizes that reinvested income expands the capital base, while BlackRock (2023) highlights compounding as a key driver of sustainable portfolio growth.

By minimizing tax drag and keeping earnings invested, this approach reinforces the portfolio's objective of long-term capital appreciation.

4.3.5 Fund Size

To maintain liquidity and minimize transaction inefficiencies, a minimum fund size requirement of €400 million was set. Larger funds tend to exhibit narrower bid-ask spreads, which reduces transaction costs and facilitates smoother trading. Vanguard (2020) notes that larger funds typically correlate with greater liquidity and tighter spreads, enhancing execution efficiency. Additionally, BlackRock (2021) highlights that funds with substantial AUM are better equipped to manage liquidity risks, especially during market volatility.

This ensures the portfolio remains resilient even in challenging economic conditions. While this threshold was consistently applied, an exception was made for the silver ETC. Although smaller in size, the fund provided unique exposure to precious metals, a key diversification tool. This exception reflects the balance between ensuring structural robustness and seizing targeted opportunities that contribute to broader portfolio diversification. This exception will be periodically reevaluated to ensure its continued relevance and alignment with overall portfolio goals.

4.3.6 Currency Flexibility

Currency flexibility was embedded in the ETF selection process, allowing for instruments denominated in either euros or U.S. dollars, which is crucial for a global portfolio. EUR-hedged ETFs and currency futures were employed to manage foreign exchange exposure. Using EUR-hedged ETFs mitigates risks related to currency fluctuations, particularly when allocating to non-eurozone markets.

To further manage currency risk, tactical hedging using EUR/USD futures on Eurex was incorporated selectively. This strategy is employed only when exchange rate movements are expected to materially affect performance, ensuring that portfolio exposures remain aligned with the investor's euro base currency. As BlackRock (2024) explains, strategic currency hedging can reduce volatility and stabilize returns, particularly for euro-based investors exposed to foreign currency assets.

4.3.7 Provider Diversification

To mitigate issuer-specific risks, exposure to any single European ETF provider was capped at 40%. This approach minimizes reliance on any one issuer, ensuring flexibility and reducing the risk associated with operational disruptions or changes within a provider's structure. As Vanguard (2020) states, maintaining diversification across providers is crucial for long-term portfolio stability, enabling access to a wide range of high-quality investment options without taking on excessive risk from a single issuer.

Provider diversification also ensures that the portfolio can capture the best opportunities from different providers, without becoming overly reliant on any single one, thus promoting long-term resilience and flexibility.

4.3.8 Value-Oriented Strategy

The portfolio maintains a strategic tilt toward value-oriented ETFs, focusing on areas of the market with strong fundamentals, stable cash flows, and historically attractive valuations. By emphasizing sectors aligned with value investing principles, the strategy seeks to capture long-term opportunities in segments that may be undervalued relative to their intrinsic strength. This disciplined sector allocation is designed to support the portfolio's objective of achieving sustainable, risk-adjusted returns over time.

4.3.9 Fixed Income Strategy

The fixed income portion of the portfolio was designed using a macro-driven approach to provide both inflation protection and enhanced return potential. Inflation-linked bond ETFs, particularly those linked to Eurozone sovereign bonds, were selected to preserve real purchasing power during inflationary periods. High-yield bond ETFs were also incorporated to capture additional returns from euro-denominated corporate bonds with higher credit spreads, in line with the investor's acceptable risk tolerance. BlackRock (2023) highlights the importance of inflation-linked bonds in hedging against rising inflation, while the European Central Bank (2023) notes that selective exposure to high-yield bonds can enhance performance without significantly increasing volatility.

4.3.10 Alternatives – Commodities

The alternative assets screening process focused primarily on commodities, particularly precious metals like gold and silver, to enhance portfolio diversification. Vanguard (2020) highlights that commodities, especially precious metals, provide direct exposure to physical assets that act as effective hedges against inflation and currency devaluation.

These commodities historically show low or negative correlation with traditional asset classes, offering diversification benefits during market downturns. Moreover, commodities tend to perform well during periods of unexpected inflation, making them a protective asset within the portfolio and enhancing overall portfolio resilience and risk-adjusted returns.

4.4 Portfolio Composition

4.4.1 Modern Portfolio Theory (MPT)

According to Markowitz (1952), in his foundational paper *"Portfolio Selection,"* Modern Portfolio Theory (MPT) offers a systematic approach to constructing investment portfolios that aim to maximize expected returns for a given level of risk. One of the key principles of MPT is diversification, which allows investors to reduce overall portfolio risk by combining assets with low or negative correlations. This mitigates unsystematic risk, which is specific to individual securities and can be reduced through proper asset allocation.

Diversification's impact is particularly evident when observing how the total risk of a portfolio decreases as the number of holdings increases. While unsystematic risk declines with diversification, systematic risk, related to broader market factors, remains constant regardless of how many assets are held. MPT assumes that investors are risk-averse and will prefer portfolios that offer the most favorable return-to-risk ratio.

Building upon this, Mean-Variance Theory (MVT) simplifies the application of MPT by focusing on two fundamental components: expected return and variance. The aim is to construct portfolios that either minimize risk for a desired return or maximize return for a given level of risk. This framework remains central to asset allocation decisions in both academic research and professional practice.

Further supporting the practical application of MPT, Pedersen (2015) introduces the idea of "efficient inefficiency," suggesting that although markets may not be perfectly efficient, well-informed investors can still apply theoretical models like MPT effectively. Rational portfolio construction, grounded in diversification and risk-return balance, remains a valuable tool for navigating real-world financial markets.

Additionally, Roche and Fries (2020) advocate for a Total Portfolio approach, which emphasizes aligning investment decisions with an investor's complete financial situation. Rather than treating asset classes in isolation, this strategy considers the investor's overall goals, risk tolerance, income needs, and time horizon—enhancing the relevance and sustainability of portfolio design.

4.4.2 Methodology

The portfolio's construction is grounded in the principles of Modern Portfolio Theory (MPT), beginning with the collection of monthly adjusted closing prices for a selection of ETFs. Data was sourced from the Bloomberg Terminal, covering the period from December 31, 2019, to December 31, 2024. To ensure consistency in a Euro-

denominated portfolio, ETFs listed in foreign currencies were automatically converted to Euros.

To standardize the data and facilitate easier comparison across ETFs, lognormal returns were calculated for each security. This involved applying the natural logarithm to the monthly percentage changes in price. This method not only simplifies the analysis but also aligns with MPT's assumptions, establishing a reliable foundation for portfolio evaluation.

$$r_i = ln\left(\frac{P_{i,t}}{P_{i,t-1}}\right) \quad (1)$$

where $P_{i,t}$ represents the closing price of ETF i at time t, measured monthly.

Next, the annualized return for each ETF was determined by averaging the lognormal returns over the period and converting the result into an annual figure. To measure risk, the volatility of each ETF was calculated by determining the square root of the variance of its lognormal returns, adjusted for the specific time period. Additionally, a variance-covariance matrix was generated using the Data Analysis Function, allowing for an analysis of the relationships and interdependencies between assets. This matrix is essential for enhancing risk management, diversifying the portfolio, and constructing a well-rounded investment strategy.

The Efficient Frontier (EF) is a central concept in portfolio theory, illustrating the optimal portfolios that maximize expected returns for a given level of risk or, alternatively, minimize risk for a specified return. Portfolios below the EF are deemed suboptimal, as they could achieve the same return with less risk. Conversely, portfolios to the right of the EF are also considered inefficient, as they carry higher risk for the same return. The point at which the Capital Allocation Line (CAL) intersects the EF represents the optimal risky portfolio.

To optimize the portfolio further, the minimum variance (MV) portfolio was first calculated. The Solver tool was then employed to maximize the Sharpe Ratio (SR), a key measure of risk-adjusted return, ensuring the portfolio lies on the CAL and is tangent to the EF. This optimization process also identified any potential negative asset weights, which would signal the possibility of short selling. Given that short selling is prohibited under this IPS, the Solver was applied again, incorporating constraints to ensure all asset weights stay within the predefined upper and lower limits, as outlined in Appendix – Table A4.

$$Sharpe\ Ratio\ = \frac{R_P - R_f}{\sigma_P} \quad (2)$$

where R_P is the annual return of the portfolio, R_f is the annual return of risk-free asset and σ_P is the volatility of the portfolio.

$$R_{Cal} = R_f + \frac{R_P - R_f}{\sigma_P}\sigma_{Cal} \quad (3)$$

Where σ_{Cal} is the volatility of the combined portfolio (risk free asset and risky asset) and R_{Cal} is the annual return of the CAL.

A simulation was run using Solver to generate the Efficient Frontier, exploring different combinations of portfolio weights between the maximum Sharpe ratio portfolio and the minimum variance portfolio. Each variation produced a unique risk-return profile. By iterating on the weightings, a range of portfolios was constructed, each reflecting a distinct position on the EF. For practical purposes, the financial advisor will focus on identifying portfolios that best align with the investment objectives.

Finally, the allocation between risk-free and risky assets was fine-tuned using the Solver tool, ensuring the portfolio reaches the optimal risk-return profile while maintaining an acceptable level of risk. The resulting optimal portfolio, identified through this methodology, will be positioned on the Capital Allocation Line (CAL), specifically to the left of the Efficient Frontier (Restricted NSS-Non-Short Selling EF). This positioning allows the portfolio to exceed the traditional risk-return trade-off, delivering superior risk-adjusted returns.

4.4.3 Portfolio Composition

The portfolio consists of 18 ETFs, of which 14 are equity ETFs, 2 are bond ETFs, and 2 are alternative ETCs (Exchange-Traded Commodities). A detailed breakdown of the portfolio's composition is provided in Appendix – Figure A2. As shown in Figure 13, the risky portion of the portfolio lies to the right of the Efficient Frontier (EF), making it suboptimal. This is due to the restriction on short selling, while still adhering to the weight ranges established in Appendix - Figure A2.

The final allocation is composed of 30.01% in risk-free assets and 69.99% in the risky portfolio. The expected annual return for the portfolio is 10.43%, with an annual volatility of 7.63% and a Sharpe Ratio of 1.08.

The portfolio's risk-free asset is assumed to be an investment in short-term Treasury bills. The expected return on this asset is proxied by the 1-year euro area AAA-rated government bond spot yield published by the European Central Bank. This proxy was chosen based on the client's European base, the liquidity requirements of the strategy, and the fact that all instruments are euro denominated.

Table 3 - Portfolio Composition

Complete Name	ETF Ticker	Final Allocation
Xtrackers Artificial Intelligence & Big Data UCITS ETF	XAIX GY	9.84%
iShares S&P 500 Communication Sector UCITS ETF	IUSC GY	3.08%
iShares S&P 500 Consumer Discretionary Sector UCITS ETF	QDVK GY	1.39%
iShares S&P 500 Consumer Staples Sector UCITS ETF	2B7D GY	3.28%
SPDR S&P U.S. Energy Select Sector UCITS ETF ACC	SXLE IM	0.70%
SPDR MSCI Europe Energy UCITS ETF	STN FP	0.70%
SPDR MSCI Europe Financials UCITS ETF	STZX IM	1.39%
iShares S&P 500 Financials Sector UCITS ETF	QDVH GY	1.39%
iShares S&P 500 Health Care Sector UCITS ETF	QDVG GY	3.28%
SPDR MSCI Europe Health Care UCITS ETF	STWX IM	1.39%
SPDR MSCI Europe Industrials UCITS ETF	STQ FP	1.39%
SPDR MSCI World Technology UCITS ETF	WTCH NA	9.84%
Ishares V PLC-Ishares S&P 500 Utilities Sector Ucits Etf	2B7A GY	2.19%
Xtrackers MSCI Japan UCITS ETF	XMK9 GY	9.84%
Xtrackers II EUR High Yield Corporate Bond UCITS ETF	XHYA GY	3.10%
iShares EUR Inflation Linked Govt Bond UCITS ETF	IBCI NA	1.80%
Amundi Physical Gold ETC	GOLD FP	10.78%
Xtrackers Physical Silver ETC EUR	XAD6 GR	4.62%
European Central Bank 1-Year Euro Area AAA-Rated Government Bond		30.01%

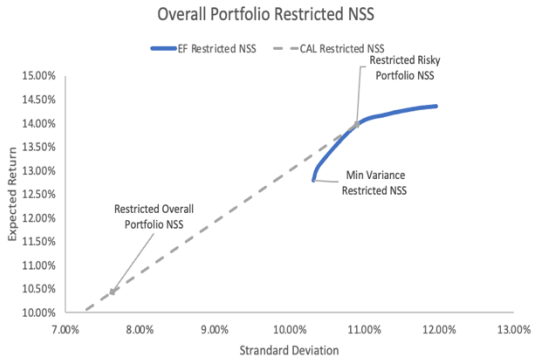
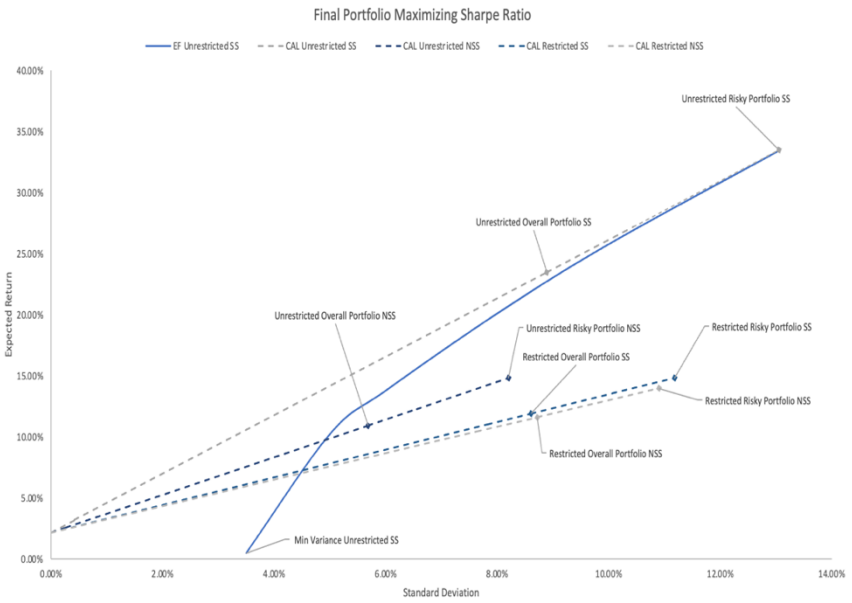


Figure 13 - - Efficient Frontier - Final Portfolio SR Maximization



Source: Author

4.5 Expected Performance

The table below shows the expected annual risk and return metrics for all optimized portfolios—both with and without restrictions and short selling—based on a Sharpe Ratio maximization approach. While multiple portfolios are included for comparison, the portfolio ultimately selected for implementation is the Overall Restricted Non-Short Selling (NSS) portfolio, which best aligns with the investment objectives and constraints of this strategy.

Table 4 - Expected Performance

	Overall Portfolio / Overall Benchmark							
	Unrestricted NSS		Unrestricted SS		Restricted NSS		Restricted SS	
	Overall Portfolio	Overall Benchmark	Overall Portfolio	Overall Benchmark	Overall Portfolio	Overall Benchmark	Overall Portfolio	Overall Benchmark
Expcted Return	10.93%	10.23%	23.50%	21.59%	10.43%	9.86%	11.03%	10.40%
Variance	0.32%	0.32%	0.79%	0.72%	0.58%	0.64%	0.61%	0.68%
Standard Deviation	5.68%	5.67%	8.90%	8.49%	7.63%	8.03%	7.83%	8.23%
Negative Standard Deviation	3.08%	3.17%	5.61%	5.68%	4.12%	4.52%	4.14%	4.53%
Risk free Rate	2.18%	2.36%	2.18%	2.36%	2.18%	2.36%	2.18%	2.36%
Sharpe Ratio	153.96%	138.73%	239.66%	226.47%	108.19%	93.42%	113.06%	97.73%
Sortino Ratio	284.42%	248.28%	379.85%	338.43%	200.17%	165.89%	213.58%	177.37%

Source: Author

The Sharpe Ratio indicates how much excess return the portfolio is expected to generate for each unit of total risk. In this case, a Sharpe Ratio of 108.19% means that for every €1 of volatility, the portfolio should earn roughly €1.0819 in return above the risk-free rate. The Sortino Ratio, which focuses on downside risk rather than overall volatility, is even stronger at 200.17%, meaning that each euro of downside risk is associated with approximately €2.0017 in excess return. Together, these ratios suggest the portfolio offers strong risk-adjusted performance.

To evaluate how closely the portfolio tracks its benchmark, Tracking Error was used. At 3.22%, the selected portfolio's returns deviate only modestly from its benchmark, reflecting a high degree of consistency. Meanwhile, the Information Ratio—which shows how much active return is generated per unit of deviation from the benchmark—is 0.1772. This is a relatively low figure, but it's expected given the ETF-based nature of the portfolio, where the objective is to replicate the index rather than to outperform it significantly.

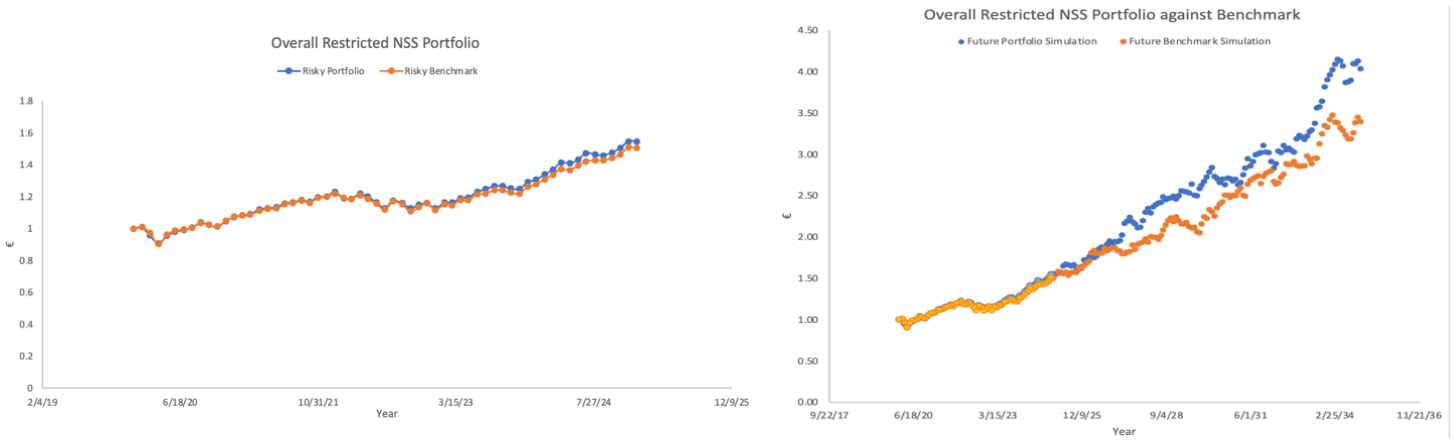
Table 5 - Tracking Error and Information Ratio

		Tracking Error	Information Ratio
Overall Portfolio	Unrestricted NSS	**2.77%**	25.03%
	Unrestricted SS	**4.83%**	39.62%
	Restricted NSS	**3.22%**	17.72%
	Restricted SS	**3.42%**	18.17%

Source: Author

All variations of the overall portfolio outperformed their benchmarks, including the one selected. To ensure consistency, benchmark returns were calculated using the same asset weights. This allowed for a valid and comparable evaluation of relative performance.

Figure 14 - Performance against Benchmark and Simulation of Performance



Source: Author

Over the past five years, the portfolio has delivered stronger absolute growth than its benchmark. An initial investment of €1 would have grown to €1.547 in the portfolio, compared to €1.506 in the benchmark. While this historical outperformance is encouraging, it is important to note that past performance does not guarantee future results. To assess potential future outcomes over the IPS's 10-year investment horizon, a Monte Carlo simulation was conducted. The results project that the portfolio could grow to €4.040, compared to €3.398 for its benchmark.

A second simulation using the Monte Carlo method was run over a 10-year horizon. Using Excel's NORM.INV() function, random annual returns were generated based on a geometric brownian motion and an assumed expected return of 10.43% and a standard deviation of 7.63%. The simulation started with an initial investment of €400,000, and each year's return was applied iteratively to simulate growth over time.

This process was repeated across 10,000 iterations using Excel's What-If Analysis tools.

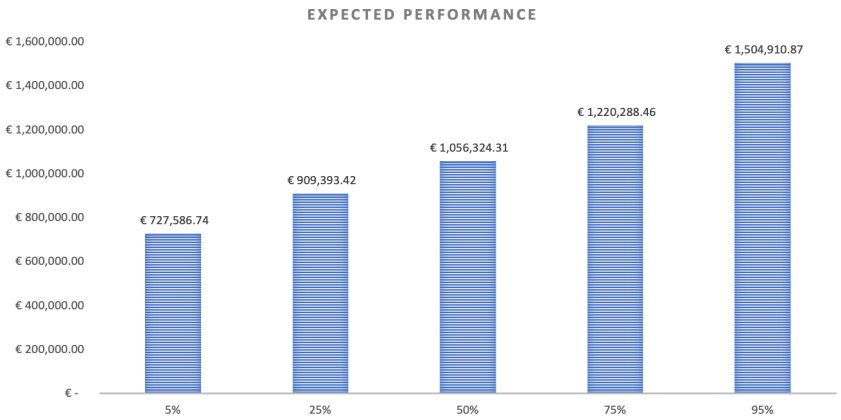
The simulation produced a mean portfolio value of €1,078,122.18, with a standard deviation of €236,888.87. According to the PERCENTILE.INC() function, there is a 5% probability the portfolio will end with a value of €727,586.74 or less, and a 95% probability it will remain under €1,504,910.87. This probabilistic range offers a realistic and data-driven perspective on potential future outcomes and reinforces the alignment between the strategy and its long-term risk and return goals.

Table 6 - Expected Performance With Monte Carlo

Expected Performance (Monte Carlo)		
Median	€	1,056,324.31
Mean	€	1,078,187.00
SD	€	236,914.12

Expected Performance		
Percentile Table		
5%	€	727,586.74
25%	€	909,393.42
50%	€	1,056,324.31
75%	€	1,220,288.46
95%	€	1,504,910.87

Figure 15 - Expected Performance With Monte Carlo



Source: Author

4.6 Risk Analysis

In this section of the Investment Policy Statement (IPS), the financial advisor will perform a comprehensive risk analysis to enable both the client and advisor to effectively monitor the portfolio's risk performance. The analysis will incorporate various methods of Value-at-Risk (VaR), including Parametric VaR, Monte Carlo VaR, Historical VaR and Conditional VaR (also known as Expected Shortfall).

4.6.1 Parametric Method VaR

The Parametric Value at Risk (VaR) method is a widely used risk management tool that estimates potential downside risk by assuming that portfolio returns follow a normal distribution. It uses the expected return, volatility, and a confidence level to calculate the potential loss over a specific time horizon. The formula for VaR, according to Hull (2018) is:

$$VaR = (\mu - Z_{\alpha}\sigma) \times V$$

Where μ is the expected return, $\boldsymbol{\sigma}$ is the standard deviation, $\boldsymbol{Z_\alpha}$ is the z-score for the selected confidence level and $\boldsymbol{V}$ is the initial portfolio value.

In this analysis, the portfolio is valued at €400,000, with an annual expected return of 10.43% and an annualized standard deviation of 7.63%. The results of the VaR calculation are shown below, for various confidence levels:

Table 7 - Parametric Method VaR

Confidence	Z-score	VaR (%)	VaR (€)
99%	2.32635	7.32%	€ 29,269.80
98%	2.05375	5.24%	€ 20,950.06
97%	1.88079	3.92%	€ 15,671.46
96%	1.75069	2.93%	€ 11,700.57
95%	1.64485	2.12%	€ 8,470.56

Source: Author

At the 99% confidence level, the VaR indicates a maximum expected loss of €29,269.80, or 7.32% of the portfolio's value. This means there is a 1% chance that the portfolio will lose more than this amount. As the confidence level decreases, the potential loss decreases as well, reflecting a reduced level of risk tolerance.

It is important to note that while the parametric VaR method offers a quick and analytical estimate of risk, it relies on the assumption that returns follow a normal distribution and that volatility remains constant over the time horizon. These assumptions may not always hold, where extreme events or changes in volatility can lead to more significant risks than the method predicts.

4.6.2 Monte Carlo VaR

Monte Carlo Value at Risk (VaR) is a method used to estimate the potential loss in a portfolio under typical market conditions. For this analysis, 10,000 simulations were run to capture a broad range of possible market scenarios, giving a well-rounded picture of the portfolio's risk.

The analysis was based on an annual expected return of 10.43% and a standard deviation of 7.63%. To calculate the expected return over a 12-month period, we used this formula: $$Expected\ Return = V \times \mu \times \left(\frac{N}{12}\right)$$

Where *N* is the number of periods, μ is the expected return and V is the initial portfolio value.

To simulate the variations in the market, we generated standard normal Z-scores using Excel's NORM.S.INV(RAND()) function. These Z-scores were applied to the Scenario VaR calculation: $$Scenario\ VaR = Expected\ Return - \left(V \times \sigma \times Z_\alpha \times \sqrt{\frac{N}{12}}\right)$$

Where σ is the standard deviation and Z_α is the z-score for the selected confidence level.

The simulations were run using Excel's "What-If Analysis" tool, applying different Z-scores for each iteration to create a range of Scenario VaR outcomes. Initially, the simulations covered a 12-month period, and then the analysis was extended to 120 months (or 10 years) to evaluate long-term risk exposure. After running the simulations, we used the PERCENTILE.INC function to calculate the relevant percentiles, forming the basis of the results in the table below.

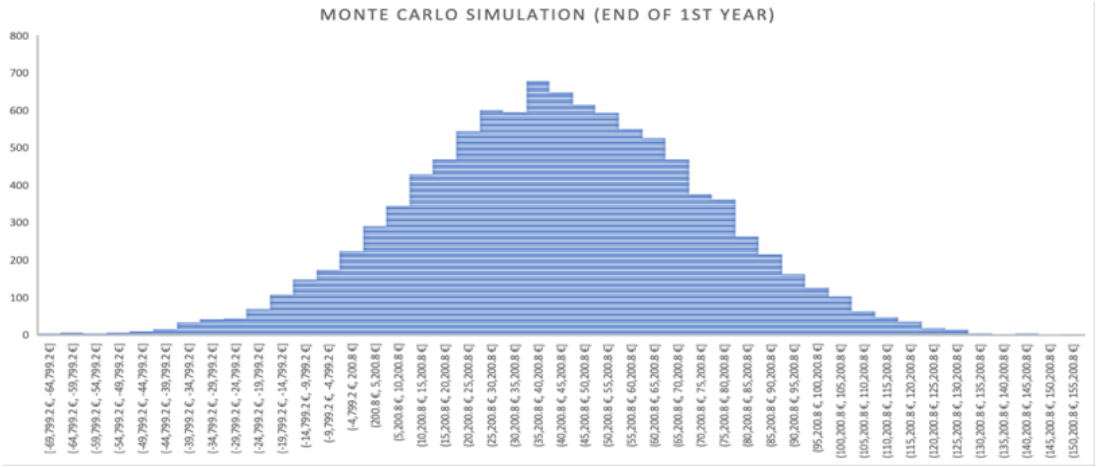
Table 8 - Monte Carlo Method VaR

Confidence	1-year VaR(%)	1-year VaR(€)	10-year VaR(%)	10-year VaR(€)
99%	8.02%	€ 32,063.80	0.00%	€ -
98%	5.44%	€ 21,774.41	0.00%	€ -
97%	3.99%	€ 15,972.26	0.00%	€ -
96%	3.06%	€ 12,227.46	0.00%	€ -
95%	2.24%	€ 8,956.85	0.00%	€ -

Source: Author

For a 1-year horizon, the Monte Carlo simulation estimated a 99% Value at Risk (VaR) of 8.02%, indicating there is a 1% probability that the portfolio could experience a loss exceeding this amount. At the 95% confidence level, the projected loss was 2.24%. When the analysis was extended to a 10-year horizon, the simulated VaR converged toward 0%, suggesting that the portfolio's long-term return distribution was increasingly skewed toward positive outcomes. However, this does not imply the absence of risk; rather, it reflects the compounding effect and assumptions built into the simulation. This longer-term perspective provides valuable insight into potential downside risk over the full investment horizon and supports more informed strategic planning.

Figure 16 - Distribution of VaR



Source: Author

4.6.3 Historical VaR

The Historical VaR estimates the potential loss in a portfolio over a given time period by analyzing past returns, without assuming any specific distribution for those returns. This method operates under the premise that past market behavior is a reliable indicator of potential future losses. By examining how the portfolio has performed historically, we can infer the potential losses for a similar period going forward.

To apply this method, we begin by collecting the historical returns of each asset within the portfolio. We then calculate the portfolio's profit or loss by multiplying the historical returns of each asset by its respective weight in the portfolio. The next step involves computing the Historical VaR using the PERCENTILE.INC function in Excel, applied to the profit/loss data. This function calculates the percentile corresponding to the confidence level, allowing us to estimate the potential losses for various confidence intervals.

The resulting Percentile Table shows the VaR at different confidence levels. For example, at a 99% confidence level, the Historical VaR indicates that the portfolio has a 99% chance of not losing more than €20,341.32, or 5.09% of its value.

Table 9 - Historical Method VaR

Confidence		VaR(€)	VaR(%)
99%	€	20,341.32	5.09%
98%	€	18,664.30	4.67%
97%	€	14,878.95	3.72%
96%	€	13,036.79	3.26%
95%	€	12,436.10	3.11%

Source: Author

While the Historical VaR is simple and effective in estimating potential losses based on real market data, it has notable limitations. The primary drawback is its assumption that future market conditions will mirror historical patterns. In periods of market turmoil or extraordinary events, past performance may not accurately reflect future risks. Therefore, while this method can be a valuable tool, it may not fully account for risks in situations where market conditions deviate significantly from historical trends.

Despite its limitations, Historical VaR provides a clear, data-driven estimate of risk, especially in stable market conditions. However, caution is needed when relying on this model in the face of unprecedented events or rapidly changing market environments.

4.6.4 Conditional VaR

Conditional Value at Risk (CVaR), also known as Expected Shortfall, is a risk measure that captures the average loss in scenarios where losses exceed the Value at Risk (VaR) threshold. While VaR defines the maximum loss expected at a given confidence

level, CVaR goes further by quantifying the average loss within the worst α% of outcomes, providing a more comprehensive view of tail risk.

In this analysis, CVaR is calculated using 10,000 simulated return scenarios generated through Monte Carlo simulation. For each confidence level considered, the corresponding Monte Carlo-based VaR is first determined. CVaR is then computed using Excel's AVERAGEIF() function, which averages all simulated portfolio losses that are less than or equal to the calculated VaR.

$$VaR = AVERAGEIF(ArrayOfScenarioVar, "\leq"\&\text{MonteCarloVaR}, \text{ArrayOfScenarioVaR})$$

This approach provides a detailed evaluation of potential extreme losses. For instance, at the 99% confidence level, while VaR estimates a maximum loss of 8.02%, the CVaR of −10.46% reflects the average loss in the worst 1% of cases. As the confidence level decreases, both VaR and CVaR become less severe, but CVaR remains a critical tool for assessing the severity of losses beyond the VaR threshold.

The use of Monte Carlo simulation for CVaR estimation is supported by Hull (2018), who presents it as a reliable method for modeling risk in portfolio analysis.

Table 10 - Conditional VaR

	Monte Carlo Percentile(1 Year)		Conditional Var (1 year)	
Confidence Interval	VaR(€)	VaR(%)	VaR(%)	VaR(€)
99%	€ 32,063.80	8.02%	10.46%	€ 41,855.40
98%	€ 21,774.41	5.44%	8.32%	€ 33,279.82
97%	€ 15,972.26	3.99%	6.78%	€ 14,299.13
96%	€ 12,227.46	3.06%	6.32%	€ 15,475.60
95%	€ 8,956.85	2.24%	5.58%	€ 14,698.98

Source: Author

4.6.5 Risk Matrix

Looking ahead to the 2025–2035 period, it's important to stay mindful of the risks that could influence how the portfolio performs over time. Table 11 highlights a set of those risks, with a brief description of each and how they might affect the current investment strategy. Based on insights from the World Economic Forum (2025), this final section focuses on the developments most likely to shape the market environment in the years ahead and supports a thoughtful, long-term perspective.

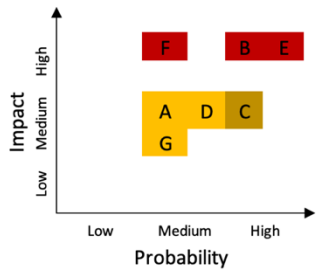
Table 11 - 10 Year Horizon Risk

Risks	Description	Implications	Probability	Impact
Non-weather-related Natural Disasters (A)	Japan's geographical vulnerability to earthquakes and tsunamis threatens key infrastructure and economic centers.	Potential losses in industrials and utilities sectors due to asset damage. Demand for gold and silver may rise as safe havens.	Medium	Medium
Economic Downturn (B)	Slow or negative GDP growth driven by cyclical or structural issues reduces earnings and investment returns.	Equity drawdowns in financials, consumer discretionary, and industrials. Bond yields fall, benefiting high-yield and inflation-linked bonds.	High	High
Extreme Weather Events (C)	Rising frequency of floods, heatwaves, and storms disrupt supply chains, impact productivity, and raise costs.	Cost pressure on consumer staples and industrials sectors. Energy and infrastructure sectors may benefit from investment boosts.	Medium	High
Energy Supply Shortage (D)	Reliance on fossil fuels and geopolitical instability challenge consistent energy access and pricing.	Volatility in European and U.S. energy sectors. Commodities and inflation-linked bonds may gain as hedges.	Medium	Medium
Inflation (E)	Persistent inflation erodes purchasing power, prompts aggressive interest rate hikes, and hurts consumer sentiment.	Financials and consumer sectors may underperform. Inflation-linked bonds, gold, and silver offer protection.	High	High
Adverse AI Outcomes (F)	Improper governance or overuse of AI could lead to ethical breaches, security risks, or mass unemployment.	Regulatory scrutiny and public backlash could pressure AI and tech sectors. Productivity gains may support long-term returns in big data and communication sectors.	High	Medium
Food Supply Shortage (G)	Supply shocks in agriculture from climate or trade issues impact prices and consumer well-being.	Consumer staples and discretionary sectors face margin pressure. Gold and inflation-linked bonds become more attractive.	Medium	Medium

Source: Author

Figure 17 shows a risk matrix that maps seven key risks based on how likely they are to occur and how much they could impact the portfolio between 2025 and 2035. Each one, ranging from economic and environmental issues to technology and supply disruptions, is rated as low, medium, or high across both dimensions. This view helps focus on what matters most over the next decade. For example, while risks like extreme weather events (C) and non-weather-related natural disasters (A) are important globally, their effect within this period is expected to be more limited than broader risks such as inflation (E) or an economic downturn (B).

Figure 17 - Risk Matrix



Source: Author

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Appendix

Table A1 - Client's Profile (detailed)

Name	José Madeira
Age	28 year old
Nationality	Portuguese
Location of Residence	Portugal
Work	Entrepreneur in Technology sector
Net Annual Wage	100 000€
Additional Information	Minimal experience in financial markets Moderante Understanding of market volatility Knowledgeable in technology sector
Investment Constraints	No liquidity requirements during holding period ETF Investing Focus on Value Investing Portfolio currency in euros (€)
Ability to Bear Risks	Moderate
Willingness to take on Risk	Moderate
Risk Profile	Moderate
Capital to Allocate	400 000€
Investment Objective	640 000€ (927 995, 04€ adjusted to Inflation and Capital Gains Tax)
Time Horizon	10 years
Minimum Rate of Return Required	8.78%
Expected Annual Return	10.43%
Standard Deviation	7.63%
ESG Preferences	No

Figure A1 - Profiling Questionnarie

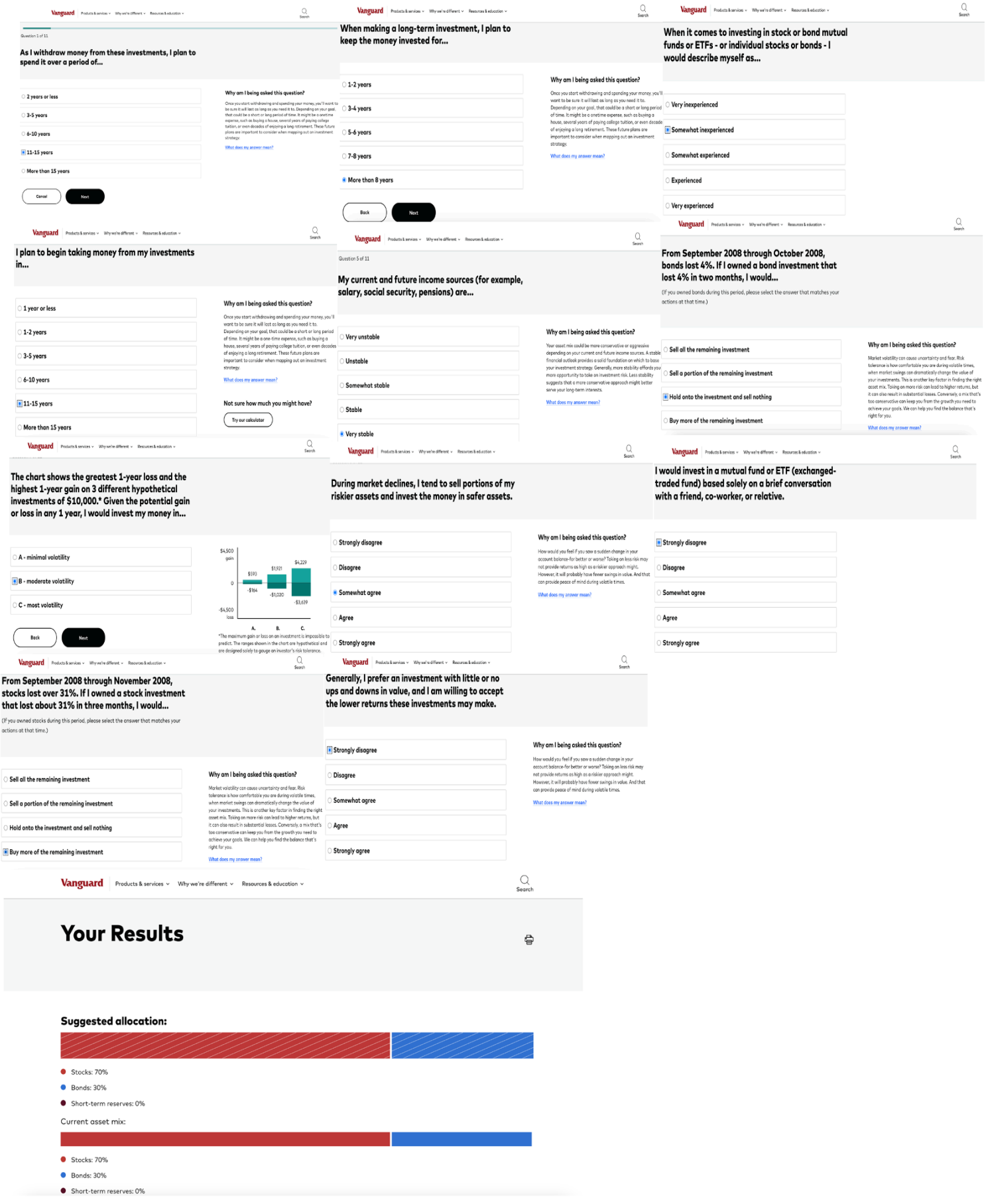


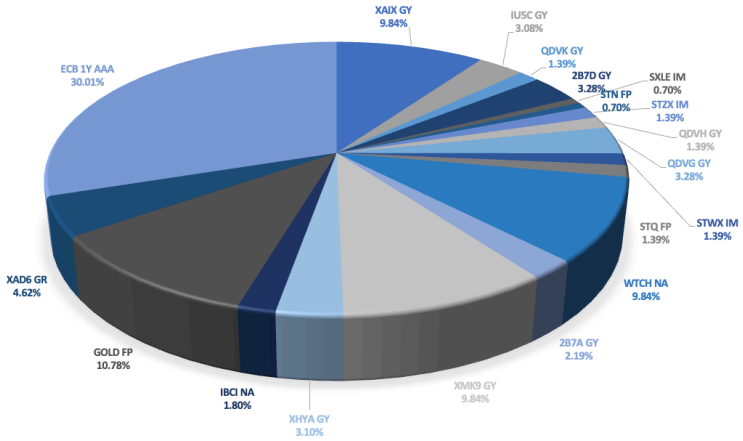
Table A2 - ETF Screener

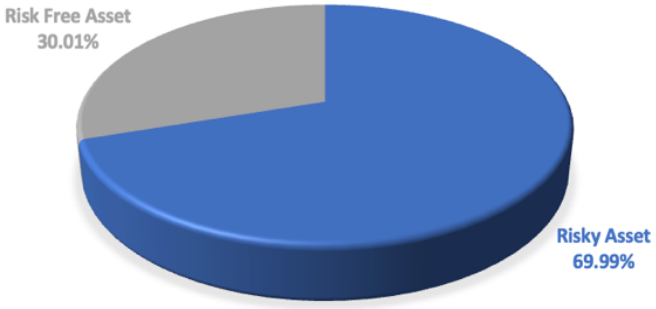
ETF	Ticker	Indice	Ticker	Provider	Use of Profit	Fund Size	Expense Ratio	Replication Method	Asset
Xtrackers Artificial Intelligence & Big Data UCITS ETF	XAIX GY	Nasdaq Global AI and Big Data Index NTR	NYGBIGN Index	Xtrackers	Acc.	4.23B EUR	0.35%	Full	Equity
iShares S&P 500 Communication Sector UCITS ETF	IU5C GY	S&P 500 Capped 35 20 Communication Services Index NTR	SPSVCN Index	iShares	Acc.	427.31M EUR	0.15%	Full	Equity
iShares S&P 500 Consumer Discretionary Sector UCITS ETF	QDVK GY	S&P 500 Consumer Discretionary Sector Index	SPSVCDN Index	iShares	Acc.	860.27M EUR	0.15%	Full	Equity
iShares S&P 500 Consumer Staples Sector UCITS ETF	2B7D GY	S&P 500 Capped 35 20 Consumer Staples Net Total Return Index	SPSVCSN Index	iShares	Acc.	473.48M EUR	0.15%	Full	Equity
SPDR S&P U.S. Energy Select Sector UCITS ETF ACC	SXLE IM	S&P Energy Select Sector Daily Capped 25 20 Index NTR	SPSDEUN Index	SPDR	Acc.	664.87M EUR	0.15%	Full	Equity
SPDR MSCI Europe Energy UCITS ETF	STN FP	MSCI Europe Energy 35/20 Capped Index	NE731543 Index	SPDR	Acc.	758.31M EUR	0.18%	Full	Equity
SPDR MSCI Europe Financials UCITS ETF	STZX IM	MSCI EUROPE FINANCIALS 35 20 CAPPED NET EUR	NE731540 Index	SPDR	Acc.	405.43M EUR	0.18%	Full	Equity
iShares S&P 500 Financials Sector UCITS ETF	QDVH GY	S&P 500 Financial Services Sector Index	SPSVFN Index	iShares	Acc.	2.24B EUR	0.15%	Full	Equity
iShares S&P 500 Health Care Sector UCITS ETF	QDVG GY	S&P 500 Capped 35 20 Health Care Index NTR	SPSVHCN Index	iShares	Acc.	2.21B EUR	0.15%	Full	Equity
SPDR MSCI Europe Health Care UCITS ETF	STWX IM	MSCI EUROPE HEALTH CARE 35 20 CAPPED NET EUR	NE731542 Index	SPDR	Acc.	674.74M EUR	0.18%	Full	Equity
SPDR MSCI Europe Industrials UCITS ETF	STQ FP	MSCI EUROPE INDUSTRIALS 35 20 CAPPED NET EUR	NE731544 Index	SPDR	Acc.	431.12M EUR	0.18%	Full	Equity
SPDR MSCI World Technology UCITS ETF	WTCH NA	MSCI WORLD INFORMATION TECHNOLOGY 35-20 CAP NET USD	NU731552 Index	SPDR	Acc.	799.53m EUR	0.30%	Full	Equity
Ishares V PLC-Ishares S&P 500 Utilities Sector Ucits Etf	2B7A GY	S&P 500 Capped 35 20 Utilities Net Total Return Index	SPSVULN Index	iShares	Acc.	453.72M EUR	0.15%	Full	Equity
Xtrackers MSCI Japan UCITS ETF	XMK9 GY	MSCI Japan Net Total Return USD Index	NDDUJN Index	Xtarckers	Acc.	510M EUR	0.40%	Full	Equity
Xtrackers II EUR High Yield Corporate Bond UCITS ETF	XHYA GY	Markit iBoxx EUR Liquid High Yield Index TRI	IBOXXMJA Index	Xtrackers	Acc.	827.93M EUR	0.20%	Optimized	Bond
iShares EUR Inflation Linked Govt Bond UCITS ETF	IBCI NA	Bloomberg Euro Governement Inflation-Linked Bond Index	BEIG1T Index	iShares	Acc.	1.48B EUR	0.09%	Optimized	Bond
Amundi Physical Gold ETC	GOLD FP	Gold	GOLDLNPM Index	Amundi	Acc.	5.63B EUR	0.12%	Physical Commodity	"----------"
Xtrackers Physical Silver ETC EUR	XAD6 GR	Silver	SLVRLNEU Index	Xtrackers	Acc.	268.26M EUR	0.40%	Physical Commodity	"----------"
European Central Bank 1-Year Euro Area AAA-Rated Government Bond Spot Yield	"----------"	"----------"	"----------"	"----------"	"----------"	"----------"	"----------"	"----------"	"----------"

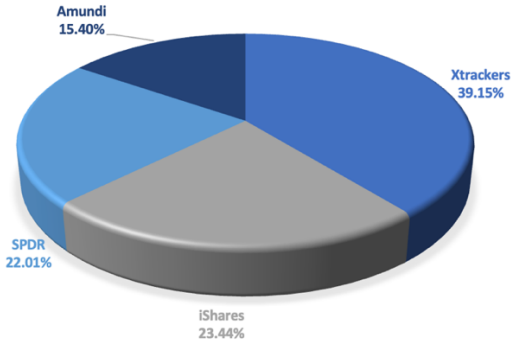
Table A3 - ETF Detailed Information

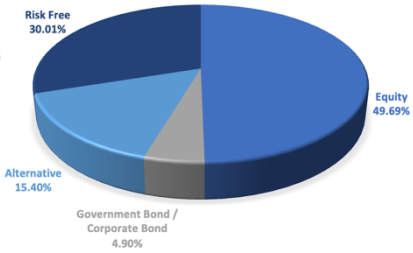
ETF	Ticker	Industry/Theme			Region		
Xtrackers Artificial Intelligence & Big Data UCITS ETF	XAIX GY	Artificial Intelligence/Big Data	Software Computer Internet Semiconductors Telecomunication Banks	32.87% 18.05% 17.08% 14.15% 11.01% 6.36%	Global	US Germany South Korea Ireland	82.99% 4.33% 3.90% 3.66%
iShares S&P 500 Communication Sector UCITS ETF	IU5C GY	Comunication Sector	Internet Media Telecomunication Software	64.49% 15.52% 15.34% 2.32%	US	US	99.41%
iShares S&P 500 Consumer Discretionary Sector UCITS ETF	QDVK GY	Comunication Discretionary	Internet Retail Auto Manufacturers Lodging Apparel Home Builders	36.66% 29.37% 20.64% 3.12% 2.86% 2.54%	US	US	97.62%
iShares S&P 500 Consumer Staples Sector UCITS ETF	2B7D GY	Consumer Stapples	Retail Beverage Cosmetics Food Agriculture Household Products	33.53% 20.41% 18.70% 12.38% 11.35% 3.21%	US	US	99.58%
SPDR S&P U.S. Energy Select Sector UCITS ETF ACC	SXLE IM	Energy	Oil&Gas Pipelines Oil&Gas Service	76.07% 15.04% 8.20%	US	US	99.31%
SPDR MSCI Europe Energy UCITS ETF	STN FP	Energy	Oil&Gas Metal Fabricate	97.64% 2.20%	Europe	U.K France Italy Norway Spain Portugal	52.97% 18.18% 9.16% 7.92% 3.93% 2.25%
SPDR MSCI Europe Financials UCITS ETF	STZX IM	Financials	Banks Insurance Diversidied Finan Serv Venture Capital Investment Companies Commercial Services	54.41% 27.30% 6.72% 4.35% 3.59% 2.38%	Europe	U.K Switzerland Germany Italy France Spain Netherlands	22.78% 14.89% 14.10% 9.35% 8.22% 7.94% 6.41%
iShares S&P 500 Financials Sector UCITS ETF	QDVH GY	Financials	Banks Diversified Finan Serv Insurance Commercial Services Venture Capital	32.41% 28.26% 26.93% 5.49% 3.27%	US	US	97.10%
iShares S&P 500 Health Care Sector UCITS ETF	QDVG GY	Healthcare	Pharmaceuticals Healthcare-Porducts Healthcare-Services Biotechnology	42.01% 30.06% 17.57% 9.45%	US	US Ireland	97.49% 2.13%
SPDR MSCI Europe Health Care UCITS ETF	STWX IM	Healthcare	Pharmaceuticals Healthcare-Porducts Healthcare-Services Biotechnology	75.71% 14.89% 5.03% 3.84%	Europe	Switzerland Denmark U.K France Germany Netherlands Belgium	35.54% 19.49% 18.15% 12.79% 5.60% 4.46% 1.58%
SPDR MSCI Europe Industrials UCITS ETF	STQ FP	Industrials	Aerospace Commercial Services Miscellaneous Manufactur Eletrical Compo&Equip ngenireening&Construction Eletronics Macjinery-Diversified Transportation Building Materials	20.28% 13.90% 10.85% 9.13% 6.38% 6.26% 6.01% 5.84% 4.25%	Europe	France Germany U.K Sweden Switzerland Ireland Netherlands	27.28% 17.34% 14.95% 14.13% 8.75% 4.10% 3.95%
SPDR MSCI World Technology UCITS ETF	WTCH NA	Technology	Semiconductors Software Computers Telecomunication Internet Eletronics	35.17% 31.19% 25.59% 2.97% 2.04% 1.56%	World	U.S Japan Netherlands Germany Ireland	88.77% 2.79% 2.13% 1.80% 1.44%
Ishares V PLC-Ishares S&P 500 Utilities Sector Ucits Etf	2B7A GY	Utilities	Electric Gas Wter	94.32% 3.32% 2.04%	US	US	99.69%
Xtrackers MSCI Japan UCITS ETF	XMK9 GY	MultiSectors	Banks Auto Manufacturers Distribution/Wholesale Machinery-Constr&Mining Pharmaceuticals Semidconductors Telecomunications Insurance Home Furnishing Machinery-Diversified	9.28% 7.57% 5.85% 5.80% 5.06% 4.90% 4.70% 4.61% 4.22% 4.19%	Japan	Japan	99.78%
Xtrackers II EUR High Yield Corporate Bond UCITS ETF	XHYA GY	Corporate	Telecomunication Auto Parts6 Equipment Commercial Services Pharmaceuticals Packaging&Containers Chemicals Retail	10.77% 9.28% 9.23% 5.71% 4.02% 3.96% 3.87%	Europe	France Italy Germany Netherlands Luxembuorg U.K	18.73% 18.16% 10.99% 10.95% 9.47% 7.58%
iShares EUR Inflation Linked Govt Bond UCITS ETF	IBCI NA	Government	Sovereign	99.93%	Europe	France Italy Germany Spain	43.40% 30.50% 13.07% 12.95%
Amundi Physical Gold ETC	GOLD FP	"----------"	"----------"	"----------"	"----------"	"----------"	"----------"
Xtrackers Physical Silver ETC EUR	XAD6 GR	"----------"	"----------"	"----------"	"----------"	"----------"	"----------"
European Central Bank 1-Year Euro Area AAA-Rated Government Bond Spot Yield	"----------"	"----------"	"----------"	"----------"	"----------"	"----------"	"----------"

Figure A2 - Portfolio Composition









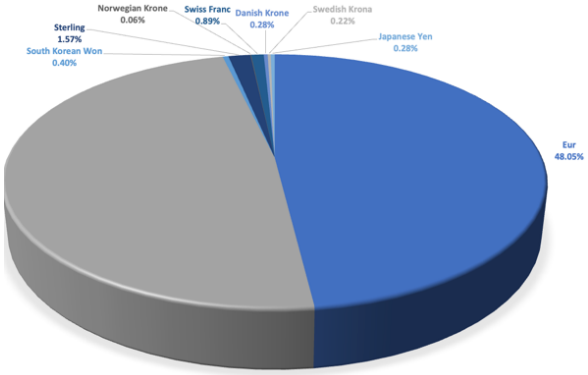


Table A4 - Allocation Weight

	Risky Portfolio																		Risk Free
Initial Weigh	70.00%																		30.00%
Final Weight	69.99%																		30.01%
Min Weight	49.0%																		21.00%
Max Weight	77.0%																		33.00%
Asset Class	Equity														Bond		Alternatives		Short Term Government Bond
Initial Weigh	70%														10%		20%		100.00%
Final Weight	71.00%														7.00%		22.00%		100.00%
Min Weight	49.00%														7.00%		14.00%		100.00%
Max Weight	77.00%														11.00%		22.00%		100.00%
ETF	XAIX GY	IU5C GY	QDVK GY	2B7D GY	SXLE IM	STN FP	STZX IM	QDVH GY	QDVG GY	STWX IM	STQ FP	WTCH NA	2B7A GY	XMK9 GY	XHYA GY	IBCI NA	GOLD FP	XAD6 GR	ECB 1Y AAA
Initial Weight	18.00%	6.00%	4.00%	6.00%	2.00%	2.00%	4.00%	4.00%	6.00%	4.00%	4.00%	18.00%	4.00%	18.00%	50.00%	50.00%	50.00%	50.00%	100.00%
Final Weight	19.80%	6.20%	2.80%	6.60%	1.40%	1.40%	2.80%	2.80%	6.60%	2.80%	2.80%	19.80%	4.40%	19.80%	63.31%	36.69%	70.00%	30.00%	100.00%
Min Weight	12.60%	4.20%	2.80%	4.20%	1.40%	1.40%	2.80%	2.80%	4.20%	2.80%	2.80%	12.60%	2.80%	12.60%	30.00%	30.00%	30.00%	30.00%	
Max Weight	19.80%	6.60%	4.40%	6.60%	2.20%	2.20%	4.40%	4.40%	6.60%	4.40%	4.40%	19.80%	4.40%	19.80%	70.00%	70.00%	70.00%	70.00%	
Final Weight accounting all Categories	9.84%	3.08%	1.39%	3.28%	0.70%	0.70%	1.39%	1.39%	3.28%	1.39%	1.39%	9.84%	2.19%	9.84%	3.10%	1.80%	10.78%	4.62%	30.01%

Asset Class	Final Allocation	Minimum Allocation	Central Allocation	Maximum Allocation
Equity	49.69%	34.30%	49.00%	53.90%
Government Bond / Corporate Bond	4.90%	4.90%	7.00%	7.70%
Alternative	15.40%	9.80%	14.00%	15.40%
Risk Free	30.01%	21.00%	30.00%	33.00%

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This IPS consists of 67,800 characters in the main body and 22,533 characters in the remaining parts.

I disclose that AI tools were employed during the development of this thesis as follows:

-AI-based research tools were used to assist in the literature review and data collection.

-AI-powered software was utilized for data analysis and visualization.

-Generative AI tools were consulted for brainstorming and outlining purposes. However, all final writing, synthesis, and critical analysis are my own work. Instances where AI contributions were significant are clearly cited and acknowledged.

Nonetheless, I have ensured that the use of AI tools did not compromise the originality and integrity of my work. All sources of information, whether traditional or AI-assisted, have been appropriately cited in accordance with academic standards. The ethical use of AI in research and writing has been a guiding principle throughout the preparation of this thesis.

I understand the importance of maintaining academic integrity and take full responsibility for the content and originality of this work.

Tiago Anselmo, 30/06/2025