Lisbon School of Economics & Management
Universidade de Lisboa

# MASTER OF SCIENCE IN

FINANCE

# MASTERS FINAL WORK

PROJECT

## INVESTMENT POLICY STATEMENT:

## MR. HASSINI YASSINE

YASMINE ELKARKRI

JUNE 2025

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# Abstract

This Investment Policy Statement (IPS) has been developed for Mr. Hassini, a moderately conservative investor with long-term financial goals. His primary objectives include securing retirement savings and funding his child's future education. He seeks a strategy aligned with his risk tolerance and interest in ethical investing.

The investment philosophy blends Shariah principles with ESG criteria, applying dual screening exclusively to equities. The portfolio construction follows a Value-Growth blend, and targets developed markets primarily in Europe and in the United States, where regulatory and sustainability frameworks are more robust.

Strategic asset allocation was determined using Mean-Variance Optimization (MVO), resulting in a static portfolio with a 45% allocation to Shariah- and ESG-compliant equities, 45% to sovereign fixed income, and 10% to cash investment for liquidity and sequencing risk coverage.

The final portfolio offers an expected annual return of 8.46% with a volatility of 11.91%, and a Sharpe ratio of 0.46. A dynamic optimization strategy using a 36-month rolling window was also analyzed for comparative purposes but was deemed unsuitable due to excess volatility.

Risk analysis combines Monte Carlo simulations, risk metrics (e.g. Sortino Ratio, VaR and CVaR), and a forward-looking qualitative risk matrix addressing structural risks over the full horizon. These assessments confirm that the strategy remains within the client's constraints while providing robust capital preservation under both normal and stressed conditions.



JEL classification: C61; G11.

Keywords: IPS; Shariah-Compliant Investing; ESG Integration; MVO; Dynamic Optimization.

# Resumo

Este IPS foi elaborado para o Sr. Hassini, um investidor moderadamente conservador com objectivos financeiros a longo prazo. Os seus principais objectivos incluem assegurar a poupança para a reforma e financiar a educação futura do seu filho. Ele procura uma estratégia alinhada com a sua tolerância ao risco e interesse em investimento ético.

A filosofia de investimento combina princípios Sharia com critérios ESG, com uma filtragem dupla exclusivamente a ações. A construção da carteira segue uma abordagem mista entre Valor e Crescimento, com foco em mercados desenvolvidos, principalmente na Europa e nos Estados Unidos, onde os quadros regulatórios e de sustentabilidade são mais robustos.

A alocação estratégica de ativos foi determinada através de um processo MVO, resultando numa portefólio estático com uma alocação de 45% em acções, em linha com princípios Sharia e critérios ESG, 45% em dívida pública e 10% em numerário para assegurar a liquidez e a cobertura de risco de sequência.

O portefólio final oferece um retorno anual esperado de 8,46%, com uma volatilidade de 11,91% e um rácio de Sharpe de 0,46. Uma estratégia de otimização dinâmica, utilizando uma janela de 36 meses, foi igualmente analisada, para efeitos comparativos, mas foi considerada inadequada devido ao excesso de volatilidade.

A análise de risco combina simulações de Monte Carlo, métricas de risco (ex. Sortino Ratio, VaR e CVaR), bem como uma matriz de risco qualitativa e prospetiva, centrada na identificação de riscos estruturais ao longo de todo o horizonte temporal. Estas avaliações confirmam que a estratégia se mantém dentro das restrições do cliente, garantindo simultaneamente uma preservação robusta do capital em condições normais e de stress.

Classificação JEL: C61; G11.

Palavras-Chave: IPS; Investimento em Conformidade com a Shariah; Integração ESG; Finanças Éticas; MVO; Otimização Dinâmica.

# Acknowledgements

Completing this Masters has been one of the most demanding experiences of my life, a path shaped by hard work, setbacks, and determination. There were moments when continuing felt overwhelming, but I am proud to have stayed the course and reached the end.

I am especially grateful to my sister, who stood by me through every difficult phase. Her presence reminded me that I wasn't alone, and her support gave me the strength to keep going. I also thank my father for his constant support throughout this journey.

A heartfelt thank you goes to my academic supervisor, Professor Bruno Fernandes, for his guidance, patience, and constructive feedback. His support was instrumental in helping me shape and complete this project with clarity and purpose.

Along the way, I had the chance to meet many kind and inspiring people at ISEG: classmates, friends, and professors, whose presence made this experience more enriching.

To all the professors of the Masters in Finance program: thank you for your dedication and high standards. Your commitment to teaching has left a meaningful mark on my academic path.

This achievement is not mine alone, it reflects the support, patience, and encouragement I received from those around me. For that, I am truly thankful.

This milestone is not just an academic achievement; it is a personal triumph. I look forward to carrying these lessons into the next chapter of my life.

# *Abbreviations*

**IPS** – Investment Policy Statement

**ESG** – Environmental, Social, and Governance

**EU** – European Union

**U.S.** – United States

**ECB** – European Central Bank

**GIPS**–Global Investment Performance Standards

**VaR** – Value at Risk

**CVaR** – Conditional Value at Risk

**MVO** – Mean-Variance Optimization

**MPT** – Modern Portfolio Theory

**GDP** – Gross Domestic Product

**OECD** – Organization for Economic Co-operation and Development

**HICP** – Harmonized Index of Consumer Prices

**HICPX** – Harmonized Index of Consumer Prices Excluding food and energy.

**FRED** – Federal Reserve Economic Data

**CPI** – Consumer Price Index

**SAA** – Strategic Asset Allocation

**EQS –** Equity Screener

**P/E** – Price-to-Earnings ratio

**P/B** – Price-to-Book ratio

**EV/EBITDA** – Enterprise Value to Earnings Before Interest, Taxes, Depreciation, and Amortization

**EPS –** Earnings Per Share

**YoY –** Year on Year

**YTM** – Yield to Maturity

**LQA** – Liquidity Assessment

**CML** – Capital Market Line

**MVP** – Minimum Variance Portfolio

**CAL** – Capital Allocation Line

**AVG** – Average

# Table of Contents

# List of Figures

# List of Tables

# 1. Executive summary

## 1.1. Scope of purpose

This Investment Policy Statement (IPS) sets out the guiding principles for managing Mr. Hassini's portfolio. It introduces the investment approach and overall strategy aimed at building long-term financial stability and growth. The IPS also acts as a shared reference to support open communication between the client and advisor and to help keep the client focused on his financial goals.

## 1.2. Governance

As Mr. Hassini's investment advisor, ensuring that this IPS remains aligned with any changes in his financial situation or market conditions is a core responsibility. Each year, the advisor reviews the portfolio's asset allocation and risk exposure and suggests updates if needed. These adjustments will be based on professional judgment and only applied after discussing them with the client.

## 1.3. Investment Return and Risk

This IPS is shaped around the client's long-term objectives, which include planning for retirement and setting aside funds for his child's education. The portfolio is designed with a balanced risk profile and targets a return of 8.3% per year, as recommended by Charles Schwab's questionnaire. The final portfolio delivers an expected annual return of 8.46% and an estimated annual volatility of 11.91%, resulting in a Sharpe Ratio of 0.46. These risk-return characteristics fit the client's 25-year investment horizon and overall comfort with risk.

## 1.4. Risk management

The portfolio will be managed in accordance with Mr. Hassini's low to moderate risk tolerance, emphasizing capital preservation alongside gradual growth. The advisor will monitor the portfolio regularly and take corrective measures, such as rebalancing or reallocating assets, if needed to ensure continued alignment with the client's risk profile.

# 2. Investment Policy Statement

## 2.1. Scope of purpose

### 2.1.1. Context and Investor

Mr. Hassini, a 37-year-old software engineer, lives in France with his wife, Ikram, a 35 years old stay-at-home mother, and their 6 years old daughter, Sofia.. He has managed to save €70,000 and earns a steady income, with no current debts, as detailed in **Table 9.** His finances are stable, thanks to a regular salary and an emergency fund. While he doesn't have much hands-on experience in investing, he picked up some basic financial knowledge while working at the headquarters of a bank.

Mr. Hassini's top priorities are saving for retirement and covering future education costs for his child. He plans to invest over a 25-year horizon with a focus on long-term growth, while anticipating annual withdrawals of €15,000 between years 12 and 16 to support his daughter's education. Mr. Hassini expressed a clear interest for ethical investing aligned with Islamic finance and ESG values, which means avoiding sectors like alcohol, gambling, pork, and interest-based financial firms. He aims to remain within a risk level he feels comfortable with, somewhere between low and moderate.

### 2.1.2. Structure

This IPS explains how Mr. Hassini and the advisor will handle investment decisions together. It outlines the approach for setting return goals, managing risk, choosing ethical investments, building the portfolio, and reporting. Each topic is explained in the following sections.

In the role of financial advisor to Mr. Hassini, responsibility will be taken for adjusting the portfolio within the agreed parameters, regularly monitoring its performance, and evaluating whether the risk level remains appropriate. The client will receive updates and reports on portfolio activity, along with any relevant changes in market conditions.

In this role, the advisor will act with care, sound judgment, and professional integrity, following financial regulations in France and the European Union. For U.S.-listed securities, relevant U.S. financial rules will also be followed. The client is responsible for reviewing and approving this IPS, including any future updates, to ensure it remains aligned with his financial objectives.

## 2.2. Governance

The advisor holds primary responsibility for implementing and maintaining this IPS, performing ongoing portfolio management, and updating the policy as needed. In addition to these responsibilities, portfolio performance is monitored regularly, asset allocation is reviewed against Mr. Hassini's objectives, and performance reports are provided along with recommendations for adjustments when necessary.

The advisor's key duties include:

- Preparing and maintaining the IPS, making recommendations for amendments based on changes in Mr. Hassini's financial situation, investment objectives, or market conditions.
- Selecting appropriate asset classes with distinct risk/return profiles to support a diversified portfolio aligned with the client's risk tolerance and investment goals.
- Monitoring and helping control costs related to investing, such as advisory fees, admin charges, and custody expenses.
- Providing quarterly reports that outline investment performance, including asset values, transactions, cash flows, and risk position variances. Reports will be detailed and provided in a format that is transparent and accessible for review by Mr. Hassini.

This IPS will be reviewed at least once every year and will be revised if major life or financial changes occur. Final approval for any amendment rests with Mr. Hassini. The advisor will also monitor risk exposure and ensure that the client investments remain within the acceptable risk parameters established in the IPS.

## 2.3. Investment, Return, and Risk Objectives

### 2.3.1. Investment Objective

The objective of Mr. Hassini's portfolio is to build long-term capital over a 25-year horizon while staying within a low to moderate risk level. Starting with €70,000, the aim is to accumulate approximately €500,000 by retirement to help cover living expenses and his child's future education.

The strategy reflects his commitment to responsible investing, combining Shariah-compliant and ESG-screened equities with a mix of conventional fixed income and cash investment

instruments. It is designed to deliver long-term growth while respecting his ethical values and preserving financial stability.

### 2.3.2. Expected return, risk tolerance and asset allocation

Based on Charles Schwab's investor profile questionnaire (**Figure 13**) Mr. Hassini has been identified as a moderately conservative investor. He is prepared to accept some short-term volatility, particularly in the early stages of the investment, while prioritizing capital preservation and long-term growth. Although his direct market experience is limited, his stable income, emergency fund, and professional background allow him to commit capital without compromising short-term financial needs.

To reflect this profile, the advisor will implement a balanced allocation emphasizing fixed income and cash for stability, complemented by a responsible equity component. The portfolio targets a nominal return of approximately 8.3%; after adjusting for a projected inflation rate of 2% (ECB 2025), the expected real return is around 6.3%. This structure supports low volatility, ethical compliance, and long-term financial resilience.

To manage risk while supporting these return objectives, the advisor will aim for:

- **Geographic diversification** within equities to minimize the impact of downturns in specific regions.
- **Annual rebalancing** to maintain the equity focus without excessive exposure to any single sector, asset class, or geographic region within the constraints of available Shariah-compliant and ESG-aligned investments.
- **Ongoing risk assessments** to ensure alignment with Mr. Hassini's moderate risk tolerance, with adjustments as needed to adapt to changing market conditions.

### 2.3.3. Relevant Constraints

This IPS takes into consideration the client's ethical preferences, specifically in the equity selection that must meet the following dual screening criteria:

- Shariah compliance: companies involved in prohibited activities such as gambling and conventional interest-based finance are excluded. Additional financial filters ensure that selected firms maintain conservative debt levels,

derive income from permissible sources, and operate on asset-backed models, in line with Shariah standards.

- ESG alignment: selected equities must demonstrate solid environmental, social, and governance practices, reflecting the client's preference for responsible and sustainable investing.

These constraints will be applied exclusively to the equity allocation. While the fixed-income and cash components, used for stability and liquidity, will consist of conventional instruments, due to product availability constraints and the client's flexible ethical considerations.

The investments will follow the strategic asset allocation determined by the client's risk profile following Charles Schwab's questionnaire. The portfolio will be denominated in Euros. Compliance with the ethical guidelines and the performance objectives will be monitored regularly with annual reviews.

## 2.4. Risk Management

The risk management framework for this portfolio is structured to ensure alignment with the client's moderate risk tolerance as well as his long-term financial objectives. The strategy is intended to use quantitative tools, ethical screening protocols, and structured reporting mechanisms to manage, monitor and mitigate investment risks.

- **Annual Reporting**: Each year, the advisor will provide a comprehensive financial report adhering to Global Investment Performance Standards (GIPS). This includes portfolio performance, asset allocation, risk assessment, and Shariah compliance updates. The report guides strategic adjustments for the upcoming year.
- **Performance Monitoring**: Portfolio performance is evaluated annually, targeting an expected nominal return of 8.3%, using metrics such as Value at Risk (VaR) and Conditional Value at Risk (CVaR), and stress testing to manage and mitigate potential risks.
- **Risk Mitigation**: Deviations in the allocation percentages are corrected through strategic rebalancing, ensuring alignment with risk tolerance and ethical guidelines. Diversification across asset classes and geographies minimizes exposure to market volatility.

- **Shariah Compliance**: Regular reviews ensure equities adhere to Islamic principles. Non-compliant ones will be promptly replaced with suitable alternatives.
- **ESG Integration**: regular review of ESG scores and criteria, such as environmental impact, social responsibility, and governance practices, to ensure that all investments not only comply with Shariah principles but also support sustainable development.

This proactive and structured approach ensures the portfolio's stability, ethical integrity, and alignment with long-term objectives**.**

# 3. Investment Design

## 3.1. Investment Philosophy

The aim of an investment philosophy is to guide portfolio construction, the asset allocation and the long-term strategy. As Damodaran (2003) explains, a coherent investment philosophy helps investors understand how markets function, identify behavioral biases, and avoid frequent portfolio restructuring that leads to excessive costs. In this IPS, the investment philosophy integrates both faith-based Shariah principles and modern ESG frameworks, reflecting the client's interest in ethical investing and financial objectives.

This dual framework, applied exclusively to equities, ensures the inclusion of companies that inherently contribute positively to society while maintaining financial resilience. It applies negative screening to exclude activities prohibited under Islamic law such as *Riba* (interest), *Maysir* (speculation), and *Haram* (prohibited) sectors, while also integrating ESG metrics related to environmental sustainability, social responsibility, and governance practices. As emphasized by LSEG (2023), Islamic finance and ESG investing share conceptual overlap, with Shariah compliance naturally complementing the goals of ethical finance. According to the same article, sustainable Shariah investing creates a "win-win" outcome, allowing investors to meet religious obligations while satisfying modern standards for sustainability.

The synergy between Shariah screening and ESG integration has been supported by empirical evidence. On the Shariah side, Alahouel and Loukil (2021) found that Islamic screening mitigates speculative risk and enhances portfolio stability. While Al-Khazali, Lean, and Samet (2014) concluded that Shariah-compliant portfolios exhibit lower volatility and greater resilience during financial downturns. On the ESG side, Friede, Busch, and Bassen (2015) conducted a meta-analysis of over 2,000 studies and confirmed a positive correlation between strong ESG performance and superior financial returns. Combining both perspectives, Hassan et al. (2021) further reinforced that combining ESG with Shariah screening improves sustainability and reduces exposure to high-risk assets.

As a result, a dual filter model is employed to select the equities for this portfolio:

- **Shariah criteria** work as a safeguard against destabilizing financial practices.
- **ESG standards** identify companies with strong long-term fundamentals.

This combination enhances portfolio diversification, mitigates downside risk, and supports the client's goal of long-term wealth preservation.

While traditional frameworks like Markowitz's (1952) Mean-Variance Optimization work as the foundation for the overall portfolio construction, this IPS incorporates ethical constraints through a dual screening process, exclusively applied to the equity component, thereby adapting modern portfolio theory (MPT) to the client's specific values and objectives.

The investment style follows a blended Value-Growth orientation. Value investing identifies undervalued companies with strong fundamentals that meet Shariah and ESG thresholds, while growth investing targets companies aligned with long-term sustainable trends ensuring both capital appreciation and positive social impact. This combination improves risk-adjusted performance, balancing stability and opportunity across market cycles.

In terms of geography, this portfolio focuses on developed markets (Europe and U.S.**)** where regulatory environments, ESG disclosure standards, and financial instruments are more transparent, which is supported by Elfakhani (2024), who show that Shariah portfolios perform more consistently in politically stable and institutionally mature regions.

This investment philosophy reflects a conviction that financial markets, while often efficient, contain pockets of inefficiency, particularly in niche spaces like Islamic ESG investing. These inefficiencies offer a strategic advantage to informed investors who apply rigorous screening and long-term principles. The strategy is designed to ensure ethical integrity, financial prudence, and resilience through changing market conditions.

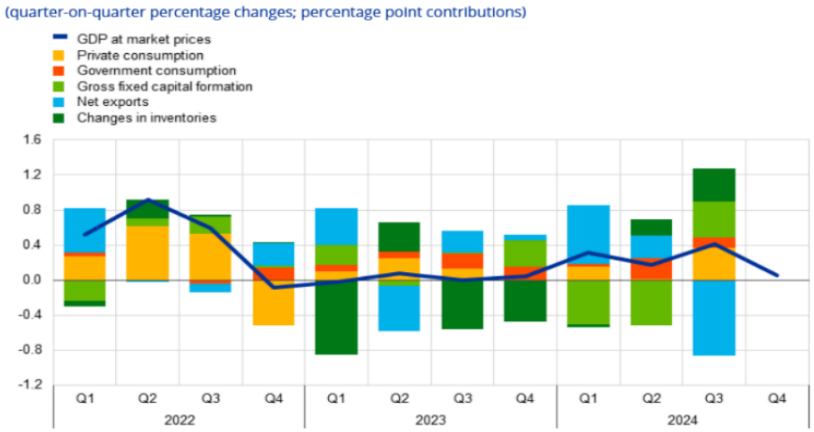
## 3.2. Macroeconomic outlook

### 3.2.1. Eurozone Macroeconomic Outlook

The macroeconomic environment of the eurozone has been showing in early 2025 signs of gradual recovery from the stagnation that has marked much of 2023-2024. According to the European Central Bank's (ECB) Economic Bulletin (February 2025), real GDP growth is forecasted at 0.9% in 2025, with expected improvement to 1.2% in 2026, which is mainly driven by a rebound in private consumption and rising real wages. This moderate recovery could be explained by the easing inflationary pressures and a cautious normalization of financial conditions.

These projections are supported by the OECD's March 2025 Interim Economic Outlook, which reinforces this cautious optimism. It expects Eurozone GDP to grow by 1.0% in 2025, while also noting that easing financial conditions are offset by persistent geopolitical uncertainties and global trade tensions, particularly for investment and exports.

**Figure 1: Euro area real GDP and its components**

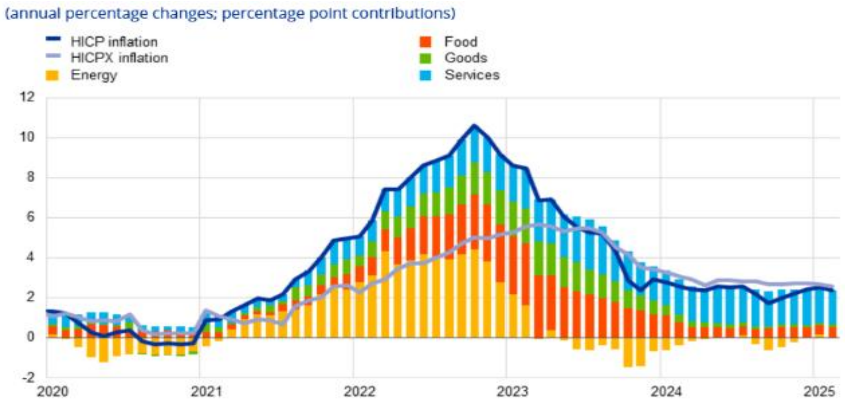



Source: Eurostat and ECB calculations

In terms of inflation, the euro area continues to exhibit a disinflationary trend. According to the ECB HICP index, annual inflation has declined substantially from the peak of over 10% in late 2022 to 2.2% in March 2025. This decline reflects easing energy base effects and falling input costs, as shown in **Figure 2**.

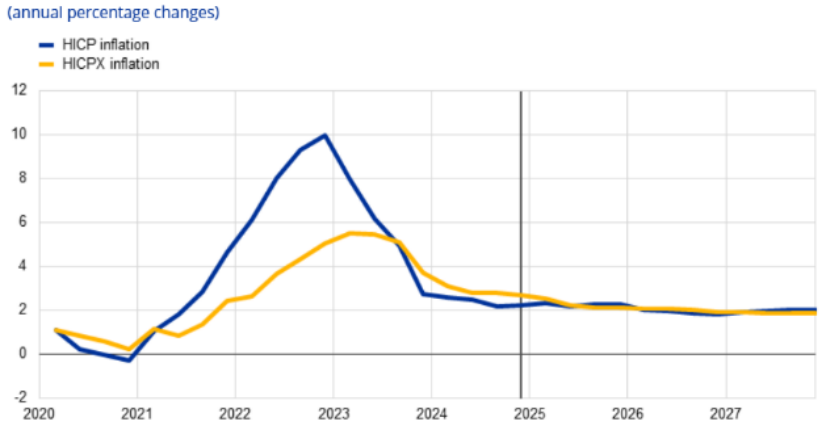
Based on this trend the ECB staff project average inflation of 2.3% in 2025, falling further to 1.9% in 2026 **(Figure 3)** ringing price growth closer to the ECB's 2% target. Core inflation, particularly in services, remains more persistent but is expected to moderate as wage growth stabilizes.

**Figure 2: Headline inflation and its main components**




Source: Eurostat and ECB calculations

**Figure 3 : Euro area HICP and HICPX inflation**




Source: Eurostat and ECB staff macroeconomic projections for the euro area, March 2025

In response to easing price pressures and subdued growth, the ECB cut its deposit facility rate to 2.75% in January 2025, initiating a gradual monetary easing cycle (Monetary Policy Statement – Jan 2025). The March 2025 statement reaffirmed this direction, noting that "data-dependent policy calibration" would guide further steps (Monetary Policy Statement – Mar 2025). Market participants anticipate at least two more rate cuts during the year, depending on the inflation trajectory.

Despite the sluggish economy, the Labor market conditions continue to show strength. Data from the ECB Consumer Expectations Survey (Feb 2025) indicates that household sentiment around employment remains stable, which is supported by historically low unemployment levels. This ongoing resilience is helping to sustain consumer spending, even in the face of broader economic softness.

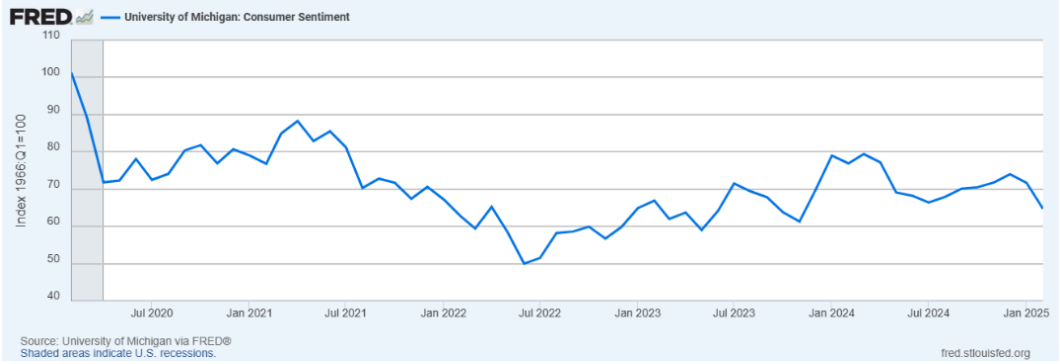
The Sentiment indicators are suggesting a cautious recovery in confidence. The ECB's Survey of Professional Forecasters (Q1 2025) shows upward revisions to GDP growth expectations, alongside signs of inflation stabilizing and a decline in forecast uncertainty. Meanwhile, Reuters market coverage underscores a more positive sentiment in European equity markets, with indexes like DAX and STOXX Europe 600 posting gains in early Q2 2025, reflecting better-than-expected macroeconomic data and loosening of financial conditions.

In terms of fiscal policy, the ECB reports that public investment is expected to contribute to the recovery, while governments gradually reduce deficits after prolonged crisis-related expenditure. However, fiscal space varies significantly across member states, with higher-debt countries facing tighter constraints.

### 3.2.2. U.S Macroeconomic Outlook

As of early 2025, the U.S. economy appears to be transitioning from post-pandemic recovery to a phase of a slower and more fragile growth. By March 2025, the macroeconomic outlook became increasingly mixed, with several indicators pointing to a potential deceleration. For instance, while EY's U.S. Economic Outlook (March 2025) projects real GDP growth of 1.7%, Deloitte's United States Economic Forecast (March 2025) anticipates a stronger expansion of 2.6%. However, leading indicators such as the Consumer Confidence Index, which fell sharply to 65.2 in March, its lowest level in four months, signal rising recession risks and raise doubts about the sustainability of these growth projections.

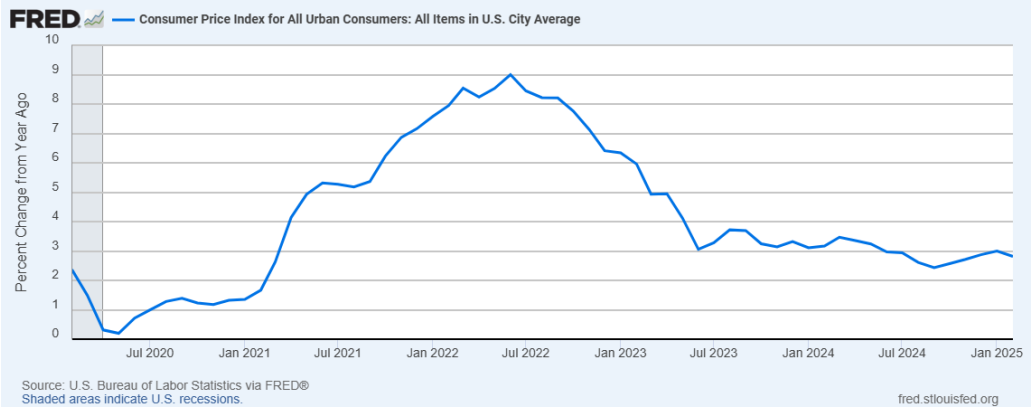
**Figure 4: U.S. consumer sentiments graph**




Source: University of Michigan via FRED

On the other hand, the inflation is expected to remain elevated with CPI inflation potentially rising in the second half of 2025 due to rising tariffs impact. This outlook is reinforced by February's inflation reading of 2.8%, which surpasses the Central Bank's 2% target, thereby limiting the Federal Reserve's flexibility to lower interest rates.

**Figure 5: Consumer price index for all urban consumers**




Source: U.S. Bureau of Labor Statistics via FRED

Moving on to the labor market, unemployment remains relatively low at 4.1%, reflecting continued resilience in employment conditions, however rising jobless claims and softening corporate investment are indicating emerging signs of weakening demand. Furthermore, consumer spending, supported by rising real wages and solid household finances, remains a key contributor to economic growth, however its impact is predicted to decline as excess savings are used, and debt levels are stabilizing.

## 3.3.Strategic asset allocation

The portfolio's strategic asset allocation (SAA) is structured to align with the client's moderately conservative risk profile, long-term investment horizon, and ethical investment mandate. The allocation was derived using a Mean-Variance Optimization (MVO) approach grounded in modern portfolio theory, further detailed in the Portfolio Composition section. Asset-specific estimates of expected return, volatility, and correlation were incorporated to construct an efficient allocation that aims to maximize risk-adjusted returns while respecting the investor's constraints.

As demonstrated by the seminal work of Brinson, Hood, and Beebower (1986) and further validated by Ibbotson and Kaplan (2000), asset allocation decisions account for over 90% of the variability in long-term portfolio returns, emphasizing the critical role of strategic allocation over tactical adjustments or individual security selection. Likewise, Vanguard (2022) finds that portfolios following a disciplined strategic allocation consistently outperform tactically managed portfolios in terms of both median returns and volatility control. Considering this evidence, the IPS adopts a long-term, rules-based allocation approach, supported by periodic rebalancing.

### 3.3.1. Allocation Ranges and Constraints

This IPS follows the asset mix recommended by Charles Schwab questionnaire for a moderately conservative profile, prioritizing capital preservation, income generation, and moderate growth. Allocation bands were defined around Schwab's target weights, with a ±5% flexibility margin applied during the optimization process to maintain both practical feasibility and allocation discipline.

Ethical screening is applied exclusively to the equity allocation, using a dual framework of Shariah compliance and ESG performance criteria. In contrast, fixed income and cash

instruments are selected based on conventional investment standards, with a focus on capital stability, liquidity, and creditworthiness.

**Table 1: Allocation ranges**

| Asset Class | Min (%) | Target Weight (%) | Max (%) | Ethical Screening |
|---|---|---|---|---|
| Equities | 35% | 40% | 45% | Shariah + (ESG ≥ 6) [1] |
| Fixed Income (Conventional) | 45% | 50% | 55% | Not screened (conventional) |
| Cash & Money Market | 5% | 10% | 15% | Not screened (conventional) |

Source: Author

### 3.3.2. Dynamic portfolio optimization

In addition to the strategic asset allocation derived from MVO, this IPS integrates a Dynamic Optimization framework to model and assess portfolio evolution over time. A 36-month Rolling Window Optimization is employed to adjust asset weights over time by recalibrating the Efficient Frontier using a rolling sample of historical returns, capturing shifts in market dynamics and improving responsiveness to volatility regimes. In parallel, Monte Carlo simulations are conducted to model thousands of potential market paths for both static and dynamic portfolios. This forward-looking analysis estimates the likelihood of meeting long-term goals including planned withdrawals from year 12 to 16, while evaluating downside risk across varying economic scenarios.

### 3.3.3. Asset Allocation

The final strategic allocation reflects the outcome of the mean-variance optimization model applied within the defined allocation bands. The portfolio is composed of 45% equities, 45% fixed income, and 10% cash, representing a balanced structure designed to capture long-term growth while maintaining income stability and liquidity. All asset class weights respect the minimum and maximum thresholds specified in the SAA Section, with no leverage or short selling applied.

[1] Bloomberg ESG scores range from 0 (lowest) to 10 (highest). Only stocks with ESG > 6 were included.

While the equity allocation sits at the upper bound of the defined range for a moderately conservative profile, it was retained because it yielded the highest Sharpe ratio achievable within the portfolio's optimization constraints and the client's risk tolerance.

The equity sleeve was constructed from a universe of individual stocks screened for Shariah compliance and ESG scores ≥ 6, and further segmented by region, style, and market cap. European equities are overweighted considering macroeconomic recovery expectations and the client's domestic exposure, while U.S. large-cap stocks provide global diversification.

The fixed income allocation includes long-duration sovereign bonds from Germany, France, and Spain, selected for credit quality and duration control. While these instruments do not adhere to Islamic investment filters, their inclusion supports the client's capital preservation and income requirements.

The 10% cash allocation, implemented through BNP Paribas Cash Management Instruments, ensures liquidity for planned withdrawals beginning in year 12 and serves as a stabilizing component under stressed scenarios. The optimized allocation is summarized below:

**Table 2: Final Strategic Allocation after Optimization**

| Asset Class | Weight | Rationale |
|---|---|---|
| Equities | 45% | Long-term growth, ethically filtered |
| Fixed Income | 45% | Capital stability, yield, diversification |
| Cash & Money Market | 10% | Liquidity and downside risk management |

*Source: Author*

## 3.4.Security Selection

The portfolio's security selection process was grounded in a two-step methodology combining ethical screening with fundamental analysis. For equities, screening was performed via Bloomberg's Equity Screener (EQS) using dual criteria: Shariah compliance (IDB Ratings) and ESG score ≥ 6. Region-specific screens were conducted separately for Europe and the U.S., followed by segmentation into value and growth styles based on fundamental filters. Value stocks were selected using constraints such as P/E < 15, P/B < 1.5, EV/EBITDA < 10, and Free Cash Flow Yield > 3%, while growth stocks were filtered using P/E > 20, P/B > 3, EV/EBITDA > 15, and EPS Growth > 10% YoY. Additionally, a minimum market capitalization

requirement of €2 billion was applied to all selected equities to ensure institutional liquidity and tradability.

To estimate equity returns, monthly log returns were computed using historical price data from 2015 to 2025, and then annualized via the formula:

$$\overline{R}_{\text{annual}} = e^{12 \cdot r_{\log}} - 1 \quad (1)$$

Where $r_{\log}$ is the average monthly log return. This approach assumes returns follow a lognormal distribution and captures compounding effects over time.

For fixed income instruments, calculating returns directly from price data was considered unsuitable due to structural shifts in the interest rate environment and inflationary pressures that characterized the 2015–2025 period. The European bond market experienced elevated volatility, largely driven by the ECB's implementation of unconventional monetary policies, including negative interest rates and large-scale asset purchases. These interventions caused significant distortions in bond pricing, making traditional price-based return estimation unreliable. To address this, Yield to Maturity (YTM) was employed as a proxy for expected bond returns. YTM represents the internal rate of return of a bond under three key assumptions: the bond is held until maturity, all coupon payments are reinvested at the same rate, and the issuer makes all payments without default. This approach is widely accepted in fixed income analysis, especially for long-term investment horizons. Bonds were selected exclusively from euro-denominated sovereign issuers with prime or high-grade credit ratings, corresponding to the top rating tiers as defined by Moody's, S&P, and Fitch. Screening criteria included fixed-rate coupon structures, liquidity scores (LQA) above 90, issue sizes greater than €500 million, and maturities close to or beyond 2047 to align with the 25-year investment horizon. YTMs ranged between 2.4% and 4.0%, appropriate for their credit profiles, while modified durations were constrained between 14 and 19 years to balance interest rate exposure and capital stability. One shorter-term Spanish sovereign bond (SPGB 5.15% 10/31/2028) was added to reduce average portfolio duration and support liquidity needs ahead of planned withdrawals in year 12.

The cash component of the portfolio was allocated to the BNP Paribas Euro Money Market institutional fund, a cash-equivalent instrument used for capital preservation and liquidity management. While the fund's historical 3-year annualized return stood at 1.47% as of May 2024, a forward-looking expected return of 2.25%, aligned with the ECB deposit facility rate as of April 2025, was used as a proxy to reflect the current interest rate environment. This

approach is consistent with standard portfolio modeling practices and provides a conservative yet realistic benchmark for estimating short-term euro-denominated returns.

## 3.5. Portfolio Composition

### 3.5.1. Modern Portfolio Theory and Mean-Variance Theory

The construction of the portfolio in this IPS is grounded in MPT, first introduced by Harry Markowitz (1952). MPT posits that investors are rational and risk-averse, aiming to maximize the expected return for a given level of risk. Within this framework, the Efficient Frontier represents the set of portfolios that achieve the highest possible return for each unit of risk, measured by portfolio standard deviation. Portfolios lying below this frontier are considered sub-efficient, as they either entail excess risk or fail to deliver sufficient return.

Central to MPT is MVO, a quantitative technique used to determine the efficient allocation of assets by evaluating their expected returns, volatility, and covariances. In this IPS, MVO was applied using historical return data and the variance-covariance matrix of asset returns to derive the set of weights that satisfy the client's return objectives and moderate risk tolerance, while respecting asset class constraints. The outcome of this process is the tangency point between the Capital Market Line (CML) and the Efficient Frontier, representing the highest Sharp Ratio attainable among all risky asset combinations, which is computed using the following formula:

$$\text{Sharpe Ratio}_{\max} = \frac{\overline{R}_p - R_f}{\sigma_p} \quad (2)$$

Where $\bar{R}_p$ is the expected return of the portfolio, $R_f$ is the risk-free rate and $\sigma_p$ is the portfolio's standard deviation. The tangency portfolio theoretically forms the basis for strategic asset allocation, providing a disciplined balance between long-term capital appreciation, income generation, and capital preservation, particularly for portfolios aiming to maximize risk-adjusted returns.

### 3.5.2. Methodology

The asset allocation process employed in this IPS is grounded in MVO, applying the foundational framework of MPT (Markowitz, 1952). Monthly adjusted prices for each security were collected from Bloomberg, covering the period from January 2015 to March 2025. From these prices, logarithmic returns were computed and then annualized using the following formula:

$$\bar{R}_{annual} = e^{12*r\,log} - 1 \quad (3)$$

Volatility was calculated as the standard deviation of monthly log returns, scaled to an annual basis using the square root of 12. A variance-covariance matrix was constructed in Excel from the full set of log returns to model the relationship between asset returns. These inputs were used to estimate the expected return and risk profile of the portfolio.

$$\sigma_p^2 = w^\top \Sigma w \quad (4)$$

where $w$ is the vector of portfolio weights and $\Sigma$ is the variance-covariance matrix of asset returns.

For fixed income securities, historical returns were not used due to significant price distortions caused by the interest rate regime changes and inflation fluctuations between 2015 and 2025. Instead, the YTM as of March 31, 2025, was employed as a proxy for expected bond returns, aligning with standard fixed income modeling practices under a hold-to-maturity assumption.

Cash instruments were modeled using a 2.25% expected return, matching the ECB deposit facility rate as of April 2025. This proxy is consistent with professional practice for estimating near risk-free short-term euro-denominated returns and aligns with the capital preservation role of the cash allocation.

The optimization was conducted via a numerical solver using Excel, which maximized the Sharpe Ratio subject to allocation constraints aligned with the investor's profile. The following limits were imposed: equities between 35% and 45%, bonds between 45% and 55%, and cash between 5% and 15%. Each security was constrained to a minimum weight of 4% and a maximum of 15%, with full investment and no short selling permitted. The resulting portfolio lies just below the Efficient Frontier, reflecting the trade-offs imposed by the investor's specific allocation constraints. Despite this, it remains the most efficient option available within the defined investment framework.

The Efficient Frontier was constructed by simulating a series of portfolios, varying asset weights to identify the minimum-volatility combination for each target return level. The Minimum Variance Portfolio (MVP), identified by minimizing portfolio variance under full-investment and non-negativity constraints, represents the point of lowest achievable risk on the frontier.

$$\text{Minimize:} \quad w^{\top}\Sigma w \tag{5}$$

$$\text{Subject to:} \quad \sum w_i = 1, \quad w_i \geq 0$$

Portfolios positioned below the Efficient Frontier, though still potentially above the MVP, are considered sub-efficient in mean-variance terms, as they do not offer the maximum return for a given level of risk.

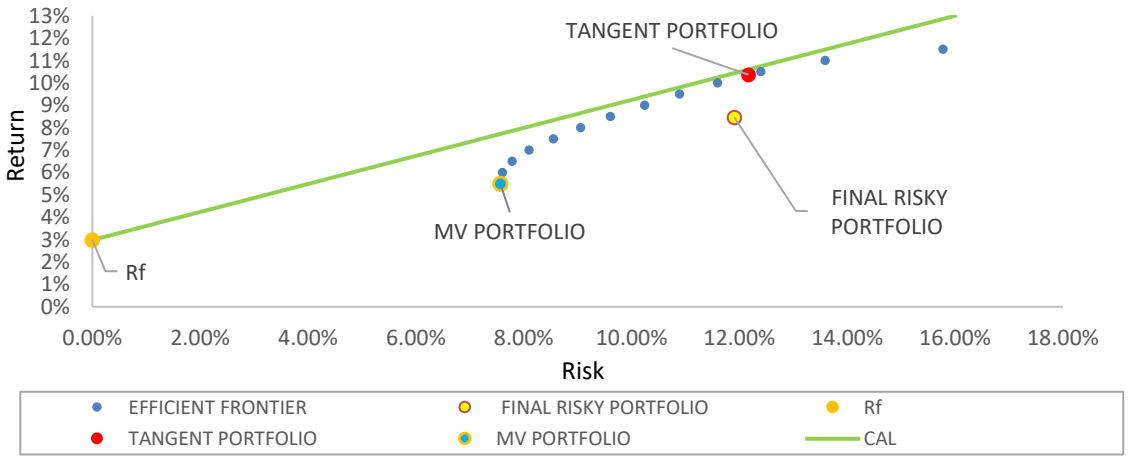
### 3.5.3. Portfolio Composition

The final asset allocation, shown in **Table 11**, reflects the investor's profile, and his interest in ethical investing and strategic objectives, while **Figure 6** illustrates the portfolio's position relative to the Efficient Frontier.

The constructed portfolio comprises a 10% allocation to a euro-denominated institutional money market fund (BNP Paribas Cash Invest), representing the risk-free asset, and a 90% allocation to a diversified mix of Shariah-compliant ESG equities and eurozone government bonds. The portfolio is expected to generate an annualized return of 8.46%, with an annualized volatility of 11.91%, and a Sharpe ratio of 0.46, based on a risk-free rate of 2.98%.

Although it lies slightly below the Efficient Frontier, the portfolio is considered sub-efficient within the feasible set defined by the investment policy constraints. The allocation to risky assets reflects the investor's preference for ethical, ESG-screened, and regionally diversified investments, consistent with the portfolio's long-term objectives and constraints. The CAL was plotted based on the computed tangent portfolio and the risk-free rate of 2.98%; its slope reflects the Sharpe Ratio of the tangency portfolio.

**Figure 6: Efficient Frontier and Final risky portfolio**




Source: Author

## 3.6.Expected Performance

The final investment strategy was constructed using an MVO model to produce a static portfolio aligned with a moderately conservative risk profile and the client's constraints. This portfolio delivers an expected annual return of 8.46%, with volatility at 11.91% and a Sharpe Ratio of 0.46, all within the client's risk tolerance (see **Table *3***).

For comparison, a dynamic portfolio was also evaluated, based on a 36-month rolling optimization window. It achieved a higher expected return of 10.66%, but also significantly higher volatility at 16.54%, exceeding the acceptable risk threshold. Despite having the same Sharpe Ratio as the static portfolio, the dynamic approach introduces excess volatility and is therefore less suitable for the client's current objectives.

**Table 3: Portfolio Metrics Overview**

| Portfolio Type | Expected Return | Volatility | Sharpe Ratio | Risk Level vs. Client Tolerance |
|---|---|---|---|---|
| Static (final portfolio) | 8.46% | 11.91% | 0.46 | Within acceptable limits |
| Dynamic (rolling) | 10.66% | 16.54% | 0.46 | Exceeds risk tolerance |

*Source: Author*

### Comparative Performance Analysis

To assess asset allocation effectiveness, the static and dynamic portfolios were benchmarked across key performance metrics (**Figure 15**).

- **Sharpe Ratio**: Between 2020 and early 2022, the dynamic strategy outperformed, peaking at 1.43. However, post-2022, macroeconomic challenges reduced performance across both portfolios, with the static portfolio modestly outperforming due to lower turnover and exposure to resilient assets.
- **Volatility**: The dynamic strategy maintained lower volatility during the COVID-19 and interest rate hike periods. By mid-2023, both portfolios converged at ~16% annualized volatility, reflecting broader market stabilization.

- **Cumulative Return**: Both portfolios tracked closely until 2022. The static portfolio led during the initial rebound, while dynamic reallocation helped close the gap in 2024, highlighting its adaptability to shifting conditions.

**Table 4 : Summary Comparison of Performance**

| Metric | Dynamic Portfolio | Static Portfolio |
|---|---|---|
| Peak Sharpe Ratio | 1.43 | 0.77 |
| Avg Rolling Volatility (2021–24) | 14.9% | 18.3% |
| Final Cumulative Return (Indexed) | 1.58 | 1.64 |

Source: Author

These results show that while the dynamic strategy does not always outperform in return, it offers adaptive risk management, particularly in volatile markets, making it more resilient to drawdowns. Subject to the client's evolving objectives and risk appetite, this approach may be reconsidered in future rebalancing decisions as part of a disciplined asset management process.

### Monte Carlo Simulations: Long-Term Robustness

To test long-term portfolio viability, four Monte Carlo simulations were conducted, combining both strategies under two market conditions:

1. Idealized: Assumes perfect markets.[2]
2. Realistic: Includes fees, inflation, and capital gains tax (based on a French taxable investor profile).

Each scenario included annual withdrawals of €15,000 from years 12 to 16.

In perfect market conditions, the dynamic portfolio showed the highest upside (median value: €667,951), while the static portfolio still achieved a solid median of €374,471 and a higher survival rate of 99.85%, offering strong downside protection for conservative investors.

[2] Assuming no taxes, no inflation, no transaction costs or fees, full reinvestment of returns, and continuous portfolio liquidity. Monthly returns follow a normal distribution with parameters calibrated from historical performance.

Under realistic conditions, including 1% annual investment fees[3], 2% inflation[4], and 30% capital gains tax[5], both portfolios experienced reduced outcomes. Nevertheless, they remained resilient. The static portfolio ended with a median real value of €97,270, and the dynamic portfolio with €184,230 (**Table 5**).

These findings confirm that even after accounting for market frictions, the selected portfolio is capable of meeting both mid-term funding needs and long-term capital growth goals.

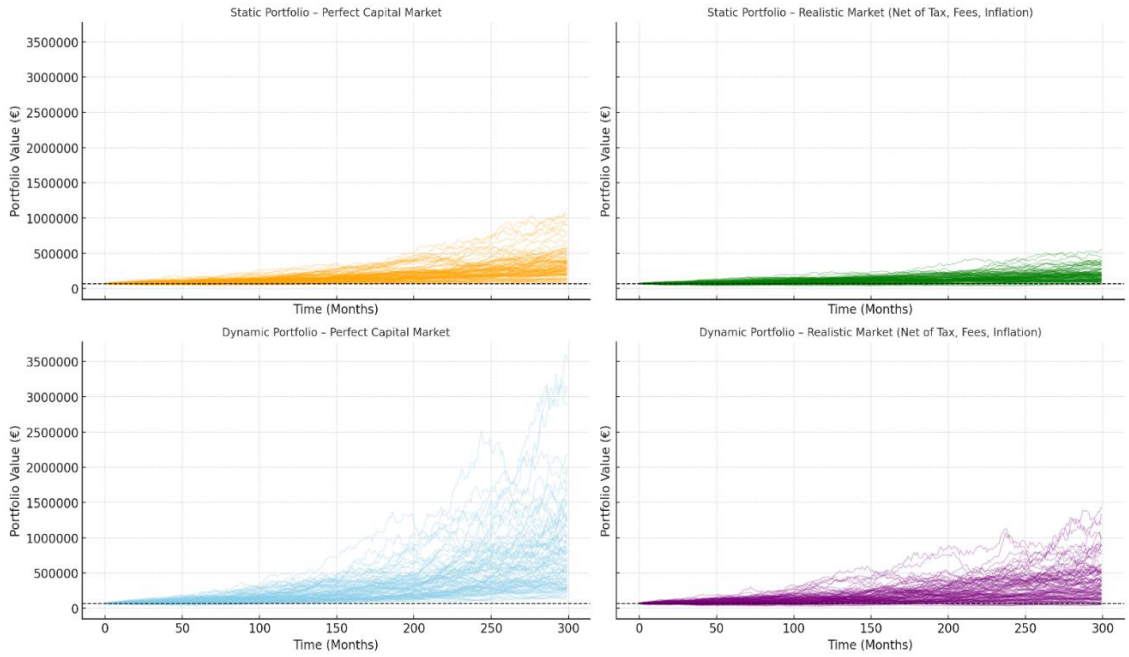
**Table 5: Results of the 4 Monte Carlo simulations**

| Scenarios | Mean Value (€) | Median Value (€) | 10th Percentile (€) | 5th Percentile (€) | Survival Rate (%) |
|---|---|---|---|---|---|
| Static – Perfect Market | 468,707 | 374,471 | 130,283 | 92,116 | 99.85 |
| Static – Realistic Market | 128,068 | 97,270 | 23,518 | 4,158 | 95.74 |
| Dynamic – Perfect Market | 1,000,709 | 667,951 | 167,487 | 102,731 | 99.32 |
| Dynamic – Realistic Market | 291,388 | 184,230 | 30,486 | 3,810 | 95.46 |

*Source: Author*

[3] Consistent with typical management costs for professionally advised portfolios.
[4] Based on the ECB's inflation target.
[5] Applicable to investment income for French resident investors. This tax was applied during the scheduled withdrawal period and on unrealized gains at the end of the investment horizon, in accordance with standard French tax treatment of portfolio gains.

**Figure 7:Monte Carlo simulations for static and dynamic portfolios**




*Source: Author*

## 3.7.Risk Analysis

This section evaluates the portfolio's exposure to downside risk and uncertainty using simulation-based metrics such as the Sortino Ratio, Value at Risk (VaR), Conditional Value at Risk (CVaR), and stress testing.

### 3.7.1. Monte Carlo Simulation (Base Case)

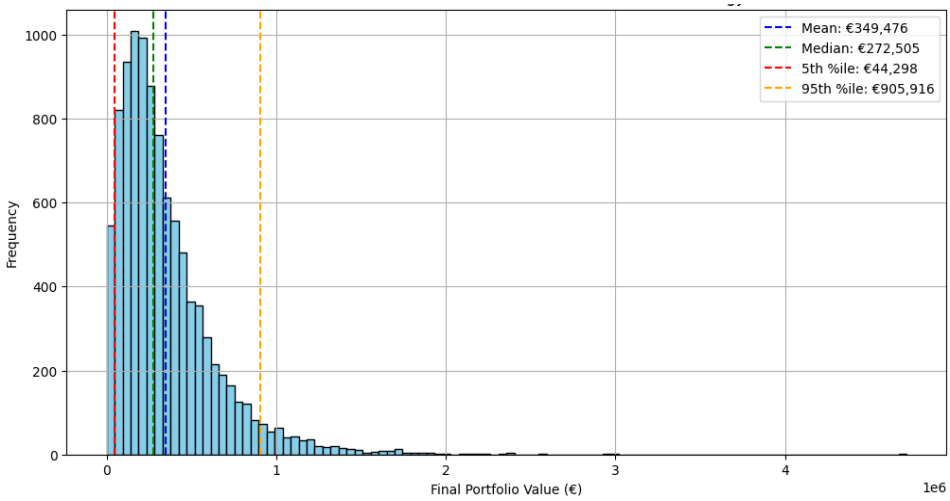
To quantify long-term uncertainty and capital resilience, a Monte Carlo simulation was conducted over a 25-year investment horizon. The simulation modeled 10,000 possible portfolio trajectories under monthly compounding assumptions, using a log-normal return distribution that reflects the statistical nature of long-term equity and bond returns. Inputs included an expected annual return of 8.46% and an annualized volatility of 11.91%, calibrated from historical performance of the portfolio's components.

A static asset allocation was maintained across all simulation paths, with programmed annual withdrawals of €15,000 evenly distributed from years 12 to 16. The base case assumes a frictionless market excluding taxes, inflation, or transaction costs to isolate the effect of asset return variability on wealth accumulation.

The distribution of outcomes is positively skewed (**Figure *8***), illustrating the portfolio's asymmetric exposure to upside opportunities over long time horizons. Notably, 98.6% of

simulations resulted in positive terminal capital after 25 years, underscoring the allocation's resilience. The 5th percentile value (€44,298) represents a lower-bound outcome, reflecting severe market drawdowns that nonetheless avoid full capital depletion. Meanwhile, the 95th percentile exceeds €900,000 (**Table *6***), reflecting strong upside potential in favorable market cycles. Collectively, these results support the conclusion that the portfolio achieves an attractive balance between growth orientation and downside protection under base case assumptions.

**Figure 8: Monte Carlo simulation- Final Value (Static Strategy)**




*Source: Author*

### 3.7.2. Downside Risk Analysis (Sortino Ratio)

To assess risk-adjusted performance with an explicit focus on capital preservation, the Sortino Ratio was calculated using monthly portfolio returns generated during the Monte Carlo simulation. Unlike the Sharpe Ratio, which penalizes all volatility, the Sortino Ratio isolates downside deviation measuring the return earned per unit of negative volatility, which is especially relevant for a moderately conservative investor profile.

The ratio is expressed as:

$$\text{Sortino Ratio} = \frac{\overline{R_p} - R_f}{\sigma_d} \quad (3)$$

Where:

- $\overline{R_p}$: is the average monthly simulated portfolio return
- $R_f$: is the risk-free rate, set at 2.98% annualized (converted to a monthly equivalent)

- $\sigma_d$: represents the standard deviation of negative portfolio returns

Based on the simulation results, the portfolio produced a monthly Sortino Ratio of 0.132 (≈0.46 on an annualized basis). This value is closely aligned with the Sharpe Ratio, indicating that downside deviations account for most of the portfolio's volatility, a signal that return fluctuations are driven by negative performance rather than high positive spikes. Rather than relying on outsized upside to compensate for high risk, the portfolio delivers stable returns with controlled downside exposure, which aligns well with the objectives of a moderately conservative investor. This confirms that the chosen strategy offers a disciplined risk–return profile, effectively balancing return potential with capital protection, in accordance with the ESG and Shariah-compliant mandate.

### 3.7.3. Stress Testing Scenarios

To assess the portfolio's resilience under adverse market conditions, two stress-test scenarios were implemented. These simulations deviate from the base case by introducing economically plausible but unfavorable developments that could materially impact long-term wealth accumulation. Instead of relying on backward-looking historical shocks, the scenarios apply forward-looking adjustments to expected returns and volatility assumptions, allowing for a focused exploration of structural risks that may compromise portfolio survival and performance.

Each scenario targets a different dimension of market stress: the first models a prolonged environment of economic stagnation and weak asset performance, while the second introduces a sudden, severe drawdown mimicking a systemic crisis. These tests aim to evaluate whether the portfolio structure anchored in a static allocation of equities, fixed income, and cash can sustain investor objectives under conditions that deviate meaningfully from historical norms.

- **Scenario 1: Prolonged Market Stagnation**

This scenario simulates a secular decline in market performance, where equity returns fall short of long-term expectations over an extended horizon. A stylized reduction in the portfolio's expected return from 8.46% to 6.00% annually was applied, alongside an increased volatility estimate of 14%. These parameters reflect the compounded impact of a 1% annual underperformance in equities (which constitute 45% of the portfolio), as well as broader effects such as diminished investor sentiment and risk premium expansion.

The scenario does not adjust fixed income or cash assumptions but instead models the compounded macroeconomic drag as a top-down shift in total portfolio expectations. This approach maintains internal consistency across simulations while capturing the essence of a slow-growth, high-uncertainty regime.

A sustained compression in returns significantly reduces both average and median outcomes. Most notably, the 5th percentile result reaches zero, highlighting increased exposure to capital depletion in extreme paths. Nonetheless, the 95% survival rate and the fact that over half of the simulated outcomes exceed the initial €70,000 investment demonstrate the continued protective value of fixed income and liquidity reserves. The results (**Figure *9***) affirm that the portfolio, while vulnerable to long-term stagnation, retains a meaningful degree of resilience in the face of protracted economic weakness.

- **Scenario 2: Market Crash in Year 10**

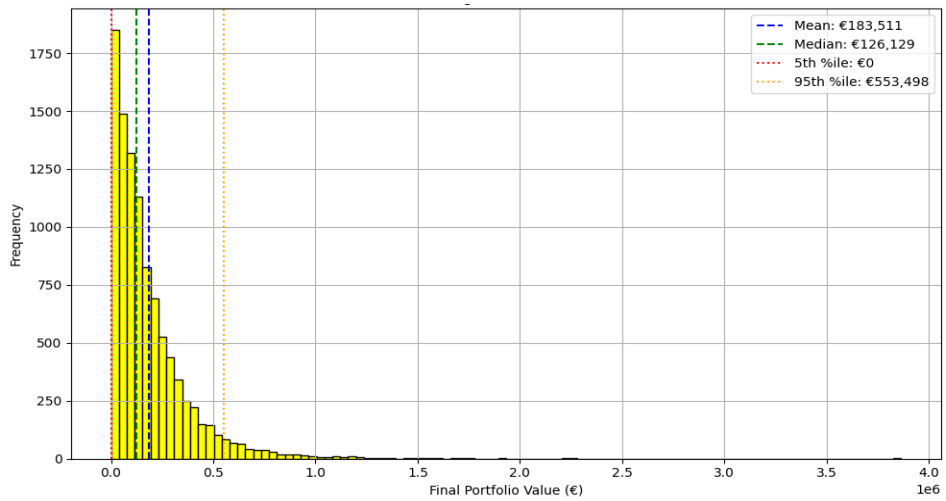
This scenario simulates a severe but isolated market shock specifically, a 35% equity drawdown occurring in year 10, just prior to the programmed withdrawal phase (years 12 to 16). All other periods follow the base case assumptions for returns and volatility. This setup is designed to evaluate the portfolio's sensitivity to sequence-of-returns risk a critical dynamic where early negative returns, combined with withdrawal demands, can significantly accelerate capital erosion. By triggering asset liquidations shortly after a major loss, the portfolio is forced to realize losses at depressed valuations, reducing its recovery potential and undermining long-term financial sustainability.

Despite being a one-time event, the market crash scenario produces weaker results across most key indicators than the prolonged stagnation scenario. The median final value declines to €116,147, and the 5th percentile once again falls to zero, reducing the survival rate to 89.7%. This outcome underscores the disproportionate impact of drawdowns occurring during distribution phases. Losses realized during withdrawal years are compounded by the need to liquidate assets at depressed values, accelerating portfolio depletion.

These results (**Figure *10***) highlight the potential value of incorporating liquidity buffers, short-duration fixed income tranches, or, in future revisions of the investment strategy, dynamic withdrawal mechanisms. For instance, implementing a flexible withdrawal policy such as temporarily reducing or pausing distributions following significant drawdowns could strengthen capital preservation during adverse market sequences. While the current portfolio maintains a static allocation in line with the client's risk tolerance, such enhancements could be

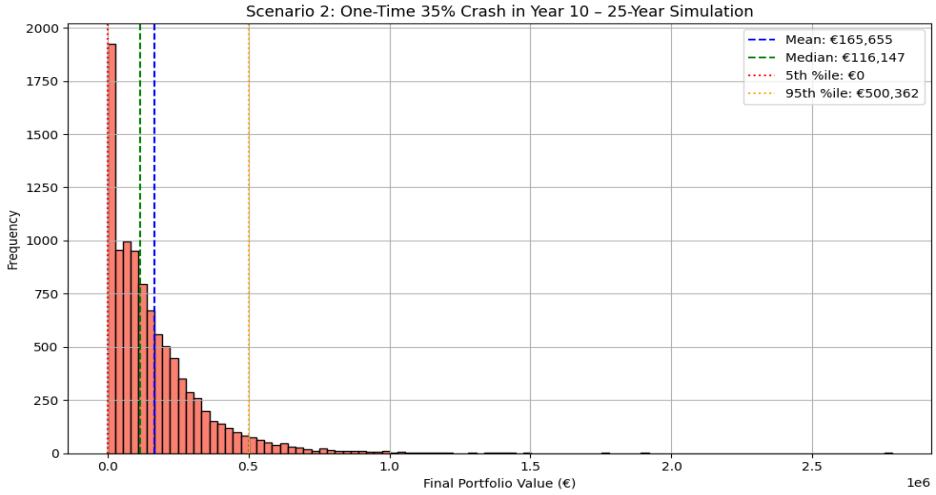
considered in the future should market conditions change or the client's preferences evolve. This is particularly relevant for long-horizon investors with scheduled outflows, where solvency risks are amplified by poorly timed market shocks.

**Figure 9: Monte Carlo Simulation – Mild economic stagnation**




*Source: Author*

**Figure 10: Monte Carlo – one time 35% crash in year 10**



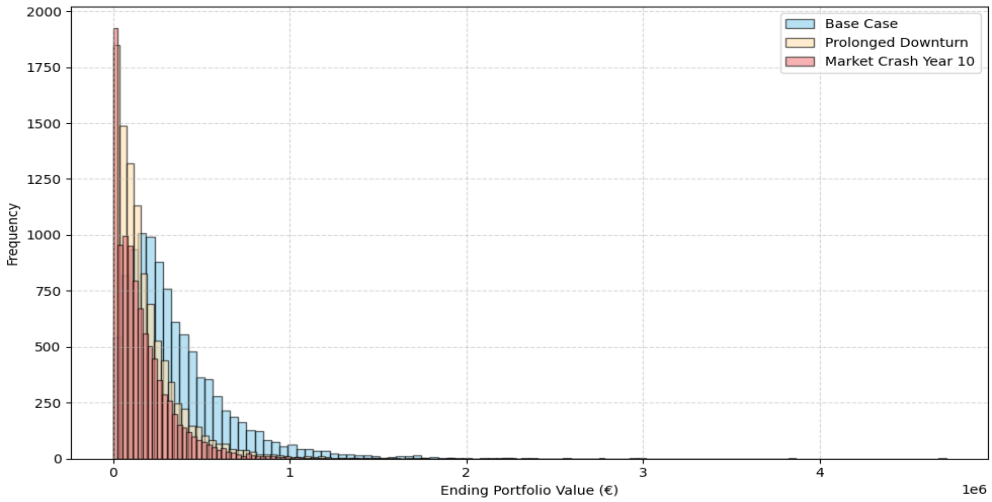

*Source: Author*

**Table 6: Comparative Summary**

| Scenario | Mean Value (€) | Median (€) | 5th % (€) | 95th % (€) | Survival Rate (%) |
|---|---|---|---|---|---|
| Base Case | 349,476 | 272,505 | 44,298 | 905,916 | 98.59 |
| Prolonged Market Stagnation | 183,511 | 126,129 | 0 | 553,498 | 94.59 |
| Market Crash in Year 10 | 165,655 | 116,147 | 0 | 500,362 | 89.69 |

*Source: Author*

**Figure 11: Monte Carlo distribution Results**




*Source: Author*

**Key Implications:**

- **Capital Preservation:** Even under severe stress, survival rates remain above 89%, aligning with the client's objective of minimizing the risk of ruin.
- **Withdrawal Sustainability:** Median terminal values exceed the initial capital by over 75% in all scenarios, supporting the feasibility of the prescribed €15,000 annual withdrawal schedule.
- **Ethical and Risk Alignment:** The downside performance profile including a base-case Sortino Ratio of 0.46 and consistently high survival rates demonstrates a conservative risk posture in line with the client's Shariah and ESG preferences.

### 3.7.4. Value-at-Risk and Conditional VaR – 1-Year Horizon

To complement the long-term Monte Carlo simulations and structural stress scenarios, a short-term risk assessment was conducted using Value-at-Risk (VaR) and Conditional Value-at-Risk (CVaR) methodologies. These measures estimate the potential loss over a 12-month horizon, providing a snapshot of the portfolio's vulnerability to adverse outcomes in the near term.

The analysis was based on 10,000 simulations using the base-case portfolio assumptions: an expected annual return of 8.46% and annualized volatility of 11.91%. The results at three standard confidence levels are summarized below.

**Table 7: VaR and CvaR (1-Year horizon):**

| Confidence Level | VaR Estimate (€) | % of Initial Capital (70,000 €) | CVaR Estimate (€) | % of Initial Capital (70,000 €) |
|---|---|---|---|---|
| 90% | 5,174 | 7.39% | 8,536 | 12.19% |
| 95% | 7,795 | 11.14% | 10,744 | 15.35% |
| 99% | 12,497 | 17.85% | 14,818 | 21.17% |

*Source: Author*

The VaR and CVaR results confirm that even under severe short-term stress, projected losses remain moderate and proportionate relative to the client's capital base and investment objectives. At the 95% confidence level, there is a 5% probability that the portfolio will lose more than €7,795 over a one-year period (approximately 11% of capital). Within that tail, the average loss (CVaR) is estimated at €10,744 (~15% of the capital).

In extreme tail scenarios (99% confidence), there is a 1% chance that annual losses will exceed €12,497, with an average loss of €14,818 in those scenarios equivalent to 17.9% to 21.2% of capital respectively. These levels, while non-negligible, are unlikely to trigger solvency or liquidity concerns, particularly given that:

- The client faces no short-term cash requirements.
- The investment horizon is 25 years.
- Withdrawals only begin in year 12, well beyond the one-year stress period.

Taken together, the analysis supports the conclusion that the portfolio is both growth-oriented and resilient, with a risk profile consistent with a moderately conservative investor. The ability to withstand short-term shocks without compromising long-term objectives reinforces the appropriateness of the proposed allocation.

### 3.7.5. Risk Matrix

The risk matrix presented below categorizes the most relevant threats to portfolio performance, capital preservation, and ethical alignment, based on their probability of occurrence and potential impact. This forward-looking framework is tailored to the portfolio's specific features.

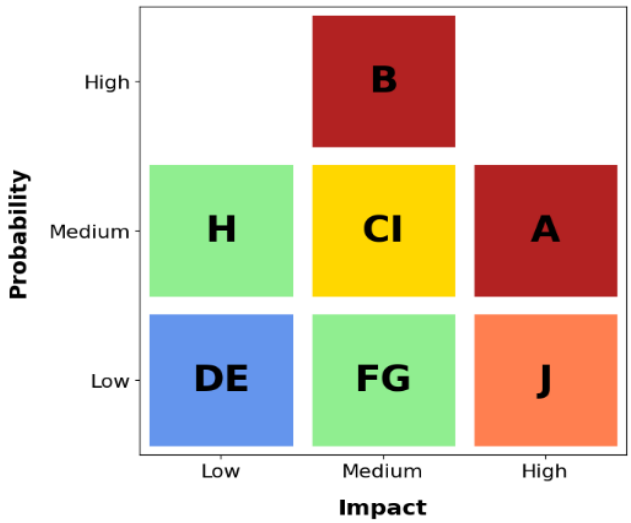
This matrix supports a comprehensive understanding of the portfolio's vulnerabilities and reinforces the robustness of the chosen strategy under a range of plausible adverse conditions.

**Table 8: 25-Year Horizon Risk Matrix**

| Risk Type | Impact | Mitigation Strategy |
|---|---|---|
| A. Market Risk | Risk of overall portfolio decline due to equity and bond market volatility driven by macroeconomic shocks or geopolitical events. | Diversification across asset classes and regions; long-term horizon reduces the impact of short-term fluctuations. |
| B. Inflation Risk | Risk of reduced real purchasing power due to sustained inflation exceeding nominal portfolio returns. | Allocation to long-duration sovereign bonds; withdrawal schedule delayed until inflation is projected to stabilize. |
| C. Interest Rate Risk | Risk of capital loss in fixed income holdings due to rising interest rates, which lower bond prices. | Emphasis on fixed-rate, high-credit-quality bonds; cash buffer absorbs short-term liquidity needs. |
| D. Liquidity Risk | Risk of being unable to liquidate assets quickly or without incurring significant losses. | Portfolio composed of highly liquid instruments, including sovereign bonds and institutional money market funds. |
| E. Credit Risk | Risk of issuer default or downgrade affecting bond value and income reliability. | No exposure to corporate debt; sovereign issuers restricted to AA/AAA ratings. |
| F. ESG/Shariah Compliance Risk | Risk of holding assets that later breach ESG or Shariah guidelines due to changes in scoring or classification. | ESG and Shariah screening for equity positions; regular monitoring of compliance via Bloomberg. |
| G. Currency Risk | Risk of currency mismatch between portfolio holdings and client liabilities. | Limited non-euro exposure: returns converted to EUR to reduce currency mismatch. |
| H. Regulatory/Tax Risk | Risk of adverse changes in taxation or regulation impacting portfolio returns or withdrawal plans. | French capital gains tax integrated in portfolio-level Monte Carlo modeling under realistic long-term conditions. |
| I. Withdrawal Sequence Risk | Risk that poor market performance during withdrawal years accelerates capital depletion. | 10% cash buffer and conservative bond allocation support scheduled withdrawals (Years 12–16). |
| J. Tail Risk (Extreme Events) | Risk of rare, severe market shocks (e.g., systemic crisis, black swan events) causing extreme capital losses. | Monte Carlo simulations and stress tests confirm >95% capital preservation under adverse scenarios. |

*Source: Author*

**Figure 12: Risk Matrix**




*Source: Author*

Taken together, the matrix and its visual representation confirm that the portfolio's most significant vulnerabilities are concentrated around market risk, inflation uncertainty, and sequence-of-return effects during the withdrawal phase. These risks are addressed through strategic asset class diversification, a long investment horizon, and a liquidity buffer designed to support near-term outflows. Conversely, risks such as credit defaults, liquidity constraints, and currency mismatches are effectively mitigated through careful instrument selection and portfolio design. Overall, the risk matrix reinforces that the proposed allocation is well-aligned with the client's moderately conservative risk profile, ethical constraints, and long-term objectives. Ongoing risk monitoring will be conducted to ensure continued suitability as economic conditions or client circumstances evolve.

NOTE: *This project simulates portfolio performance at the aggregate level using historical or expected portfolio return and volatility, rather than modeling individual asset behavior. While asset-level simulations could offer more granular tax precision, this level of complexity was deemed unnecessary for the IPS objectives, which prioritize alignment with client-specific goals, risk tolerance, and practical implementation constraint*

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# *Appendix*

**Table 9: A.1 - Client's Profile (detailed)**

| Summary of | Details |
|---|---|
| **Personal Information** | - **Name:** Yassine Hassini<br>- **Age:** 37<br>- **Occupation:** Software Engineer<br>- **Marital Status:** Married, 1 child<br>- **Dependents:** 1 (age 6) |
| **Financial Situation** | - **Income:** €60,000/year (net: approximately €5,000/month)<br>- **Expenses:** €4000/month<br>- **Assets:** €70,000 in savings<br>- **Liabilities:** None<br>- **Emergency Fund:** €20,000 (covering 5 months of expenses) |
| **Investment Objectives** | - **Primary Goal:** Retirement and future educational support for his child<br>- **Time Horizon:** 25 years (long-term)<br>- **Liquidity Needs:** No immediate need for liquidity |
| **Risk Tolerance** | - **Risk Tolerance Level:** Low/Moderate<br>- **Risk Capacity:** Low/Moderate<br>- **Previous Investment Experience:** Some basic knowledge from working in a bank's headquarters |
| **Investment Knowledge and Experience** | -**Investment Knowledge:** Basic knowledge<br>-**Experience with Investments:** None |
| **Ethical Considerations** | - Interested in Sharia-compliance and ESG practices<br>- Avoids businesses involved in alcohol, gambling, pork, and interest-based financial institutions and assets with low ESG scores.<br>- Seeks to invest in companies and sectors that align with Islamic ethical principles with a good ESG score**.** |
| **Tax Considerations** | - **Country of Tax Residency:** France<br>- **Tax Bracket:** approximately 30%<br>- **Tax-Efficient Vehicles:** Assurance vie, Plan d'Épargne en Actions (PEA), Plan d'Épargne Retraite (PER) |
| **Future Financial Plans** | - **Major Purchases:** Child's college tuition in 12 years<br>- **Planned Retirement Age:** 62<br>- **Inheritance:** None expected |

*Source: Author*

**Figure 13: A.1 - Profiling Questionnaire**

RISK TOLERANCE

**3. I would describe my knowledge of investments as:**

| | |
|---|---|
| None | 0 |
| Limited | 2 |
| Good | 4 |
| Extensive | 6 |

**4. What amount of financial risk are you willing to take when you invest?**

| | |
|---|---|
| Take lower than average risks expecting to earn lower than average returns | 0 |
| Take average risks expecting to earn average returns | 4 |
| Take above average risks expecting to earn above average returns | 8 |

**5. Select the investments you currently own or have owned:**

| | |
|---|---|
| Money market fund or cash investments | 0 |
| Bonds and/or bond funds | 3 |
| Stocks and/or stock funds | 6 |
| International securities and/ or international funds | 8 |

Example: You now own stock funds. In the past, you've purchased international securities. Your point score would be 8.

**6. Consider this scenario:**

Imagine that in the past three months, the overall stock market lost 25% of its value. An individual stock investment you own also lost 25% of its value. What would you do?

| | |
|---|---|
| Sell all of my shares | 0 |
| Sell some of my shares | 2 |
| Do nothing | 5 |
| Buy more shares | 8 |

**7. Review the chart below.**

We've outlined the most likely best-case and worst-case annual returns of five hypothetical investment plans. Which range of possible outcomes is most acceptable to you?

The figures are hypothetical and do not represent the performance of any particular investment.

| Plan | Average annual return | Best-case | Worst-case | Points |
|---|---|---|---|---|
| A | 7.1% | 22.8% | -9.5% | 0 |
| B | 8.3% | 27.0% | -13.3% | 3 |
| C | 9.2% | 30.9% | -20.9% | 6 |
| D | 9.8% | 34.4% | -29.5% | 8 |
| E | 10.2% | 39.9% | -36.0% | 10 |

Enter the total points from questions 3 through 7. **Risk Tolerance Score:** 11

TIME HORIZON

Circle the number of points for each of your answers and note the total for each section.

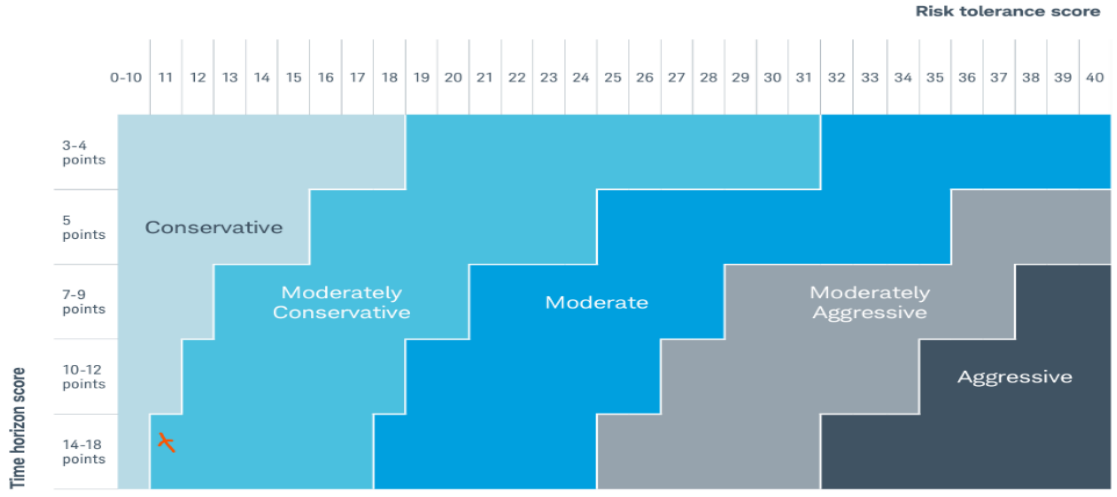
**1. I plan to begin withdrawing money from my investments in:**

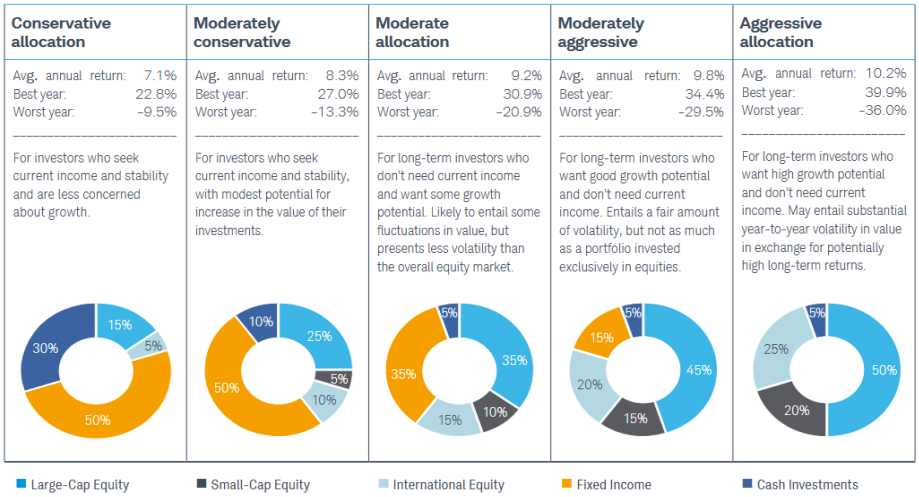
| | |
|---|---|
| Less than 3 years | 1 |
| 3–5 years | 3 |
| 6–10 years | 7 |
| 11 years or more | 10 |

**2. Once I begin withdrawing funds from my investments, I plan to spend all of the funds in:**

| | |
|---|---|
| Less than 2 years | 0 |
| 2–5 years | 1 |
| 6–10 years | 4 |
| 11 years or more | 8 |

Enter the total points from questions 1 and 2. **Time Horizon Score:** 18






*Source: Charles SCWAB Investor profile questionnaire*

**Table 10: A.2 - Portfolio Composition**

| Ticker | Name | Sector/Type | Region | Return (%) | Volatility (%) | ESG Score | Shariah | Notes |
|---|---|---|---|---|---|---|---|---|
| OMV AV Equity | OMV AG | Oil & Gas Supply Chain | EU | 12.96 | 32.2 | 6.39 | YES | |
| TTE FP Equity | TotalEnergies SE | Oil & Gas Supply Chain | EU | 8.8 | 22.61 | 6.81 | YES | |
| ASML NA Equity | ASML Holding NV | Semiconductors | EU | 21.4 | 27.48 | 6.97 | YES | |
| SU FP Equity | Schneider Electric SE | Electrical Equipment | EU | 14.26 | 22.84 | 7.77 | YES | |
| APAM NA Equity | Aperam S.A. | Steel | EU | 7.69 | 39.97 | 6.61 | YES | |
| KBH US Equity | KB Home | Home Construction | US | 18.11 | 39.41 | | YES | |
| EMR US Equity | Emerson Electric Co. | Diversified Industrials | US | 10.14 | 26.45 | 7.37 | YES | |
| DBR 2.5 08/15/2046 Govt | German Bund 2046 | Sovereign Bond | Germany | 3.06 | 15.32 | | – | |
| DBR 2.5 07/04/2044 Govt | German Bund 2044 | Sovereign Bond | Germany | 3.05 | 14.87 | | – | |
| FRTR 4 04/25/2060 Govt | French OAT 2060 | Sovereign Bond | France | 4.09 | 18.3 | | – | |
| SPGB 5.15 10/31/2028 Govt | Spanish Gov Bond 2028 | Sovereign Bond | Spain | 2.44 | 6.97 | | – | Liquidity reserve |
| BNPICMI LX Equity | BNP Paribas MM Fund | Money Market | Eurozone | 2.25 | 0.47 | | – | Institutional cash vehicle |

*Source: Author*

**Table 11: A.3 - Static optimization vs Dynamic optimization**

| | annual return | annual volatility | STATIC optimal weights | DYNAMIC OPTIMAL |
|---|---|---|---|---|
| **OMV AV Equity** | 12.96% | 32.20% | 6.90% | 8.76% |
| **TTE FP Equity** | 8.80% | 22.61% | 4.00% | 15.00% |
| **ASML NA Equity** | 21.40% | 27.48% | 15.00% | 4.00% |
| **SU FP Equity** | 14.26% | 22.84% | 6.90% | 15.00% |
| **APAM NA Equity** | 7.69% | 39.97% | 4.00% | 4.00% |
| **KBH US Equity** | 18.11% | 39.41% | 4.20% | 15.00% |
| **EMR US Equity** | 10.14% | 26.45% | 4.00% | 15.00% |
| **DBR 2.5 08/15/2046 REGS Govt** | 3.06% | 15.32% | 11.00% | 4.00% |
| **DBR 2.5 07/04/2044 REGS Govt** | 3.05% | 14.87% | 15.00% | 4.00% |
| **FRTR 4 04/25/2060 144A Govt** | 4.09% | 18.30% | 4.00% | 4.00% |
| **SPGB 5.15 10/31/2028 144A Govt** | 2.44% | 6.97% | 15.00% | 4.00% |
| **BNPICMI LX Equity** | 2.25% | 0.47% | 10.00% | 7.24% |

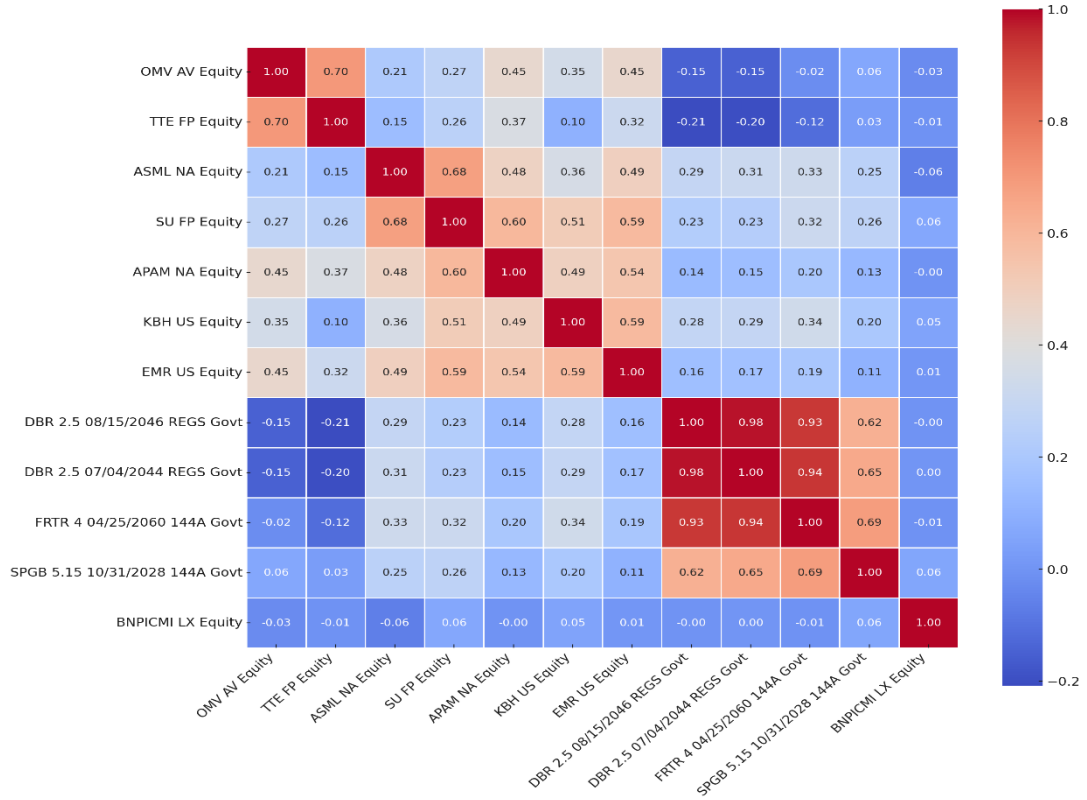
*Source: Author*

**Table 12: A.4 - Equity allocation**

| Region | Cap Size | Style | % of Equity Portfolio | # of Stocks |
|---|---|---|---|---|
| Europe | Large Cap | Value | 15% | 2 |
| Europe | Large Cap | Growth | 10% | 2 |
| Europe | Small Cap | Value | 3% | 1 |
| Europe | Small Cap | Growth | 2% | 0 |
| U.S. | Large Cap | Value | 6% | 1 |
| U.S. | Large Cap | Growth | 4% | 1 |
| **Total** | – | – | **40%** | **7** |

*Source: Author*

**Figure 14: A.5 - Correlation Heatmap**




*Source: Author*

**Table 13: A.6 - Shariah Compliance Framework (Equity Screening)**

| Category | Screening Rule | Threshold / Guideline | Applied in IPS |
|---|---|---|---|
| Business Activity Screens | Company must not derive significant revenue from prohibited (*haram*) sectors:<br>– Conventional finance (e.g., banks, insurance)<br>– Alcohol, gambling, pork, tobacco, adult content, weapons<br>– Music/entertainment (varies by school of thought) | Revenue from haram sources < 5% | Yes |
| Total Debt Ratio | Interest-bearing debt / market capitalization | Must be < 33% | Yes |
| Cash Ratio | Cash + interest-bearing instruments / market capitalization | Must be < 33% | Yes |
| Receivables Ratio | Accounts receivable / market capitalization | Must be < 49% | Yes |
| Non-Compliant Revenue Ratio | Income from haram sources (e.g., interest income, gambling, etc.) / total revenue | Must be < 5% | Yes |
| Dividend Purification | Removal of investor's share of non-compliant income embedded in dividends | Not applied (no dividend uses in IPS) | Not applied[6] |
| Interest-Based Income Purification | If residual *Riba* income is earned in dividends, investor purifies equivalent amount | Not applied (growth strategy) | Not applied[6] |
| Verification Tool Used | Bloomberg Terminal ISLM Screening Model | Based on AAOIFI and major index standards | Yes |

*Source: Author*

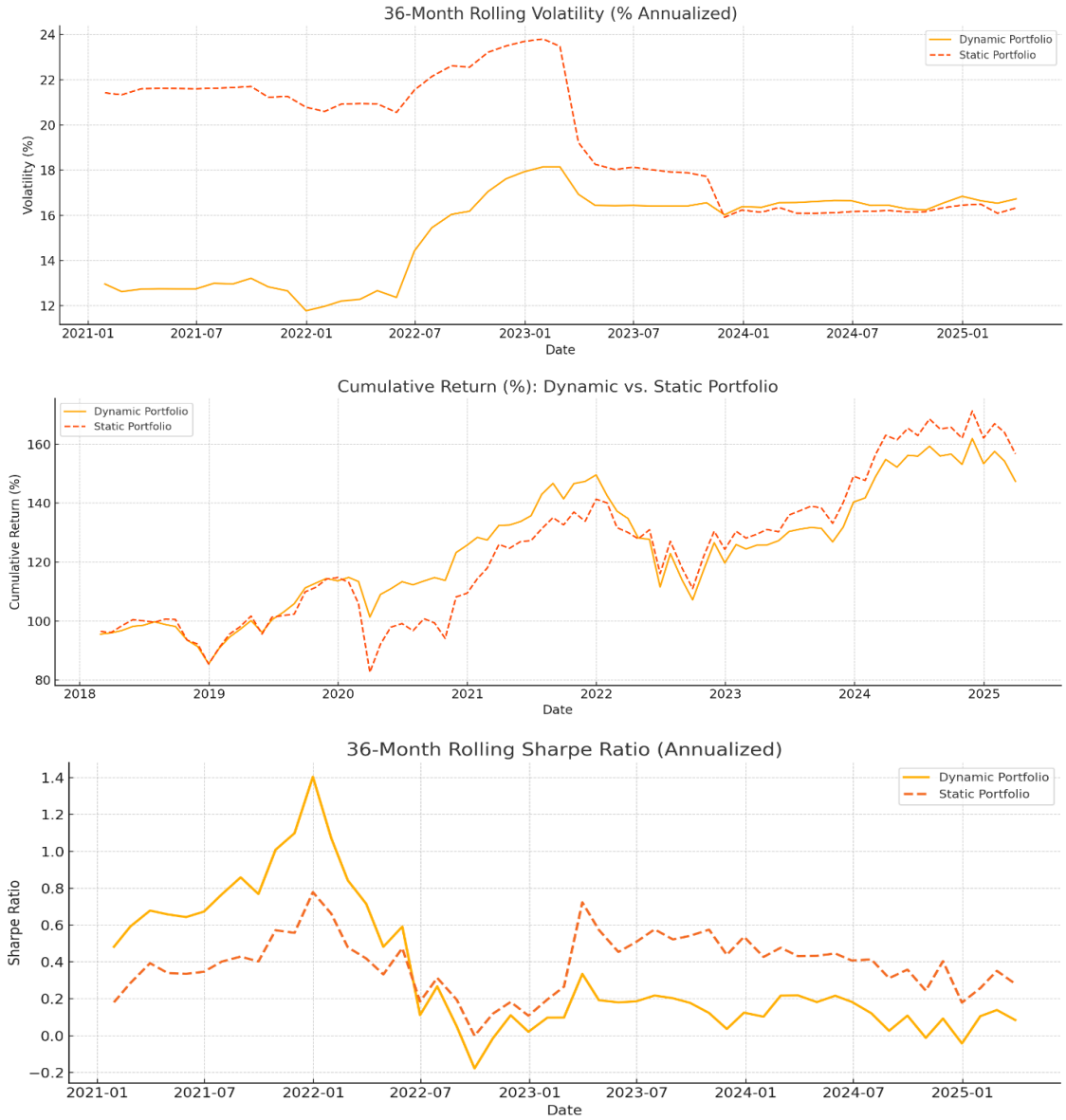
**Table 14: A.7 - Bond Selection Framework**

| Criteria | Looking for | Reason |
|---|---|---|
| **Credit Quality** | S&P/Moody's/Fitch rating: AAA or AA (investment-grade only) | Minimizes default risk, suitable for long-duration holdings |
| **Maturity** | Matures close to or after 2047 (Year 25 of horizon) | Aligns with the client's final cash flow needs; avoids premature reinvestment |
| **Liquidity** | LQA > 90 and issue size > €500 million | Allows flexibility for rebalancing or liquidation in later years |
| **Coupon Type** | Fixed-rate bonds only | Ensures stable, predictable cash flows |
| **Yield to Maturity** | ~2.4–4% (aligned with AAA/AA+ sovereign benchmarks) | Optimizes income while respecting credit risk tolerance |
| **Modified Duration** | 14–19 years | Manages interest rate sensitivity; provides long exposure without excessive risk |
| **Callability** | Non-callable (bullet maturity) | Prevents early redemption and reinvestment risk |
| **Currency** | EUR-denominated | Avoid currency risk; matches investor's liabilities and reporting currency |
| **Issuer Type** | Sovereign, supranational, agencies, AAA-rated regions | Offers reliability, high creditworthiness, and macro stability |
| **Market Type** | EURO MTN or GLOBAL listings | Ensures transparency, tradability, and access to deep secondary markets |

*Source: Author*

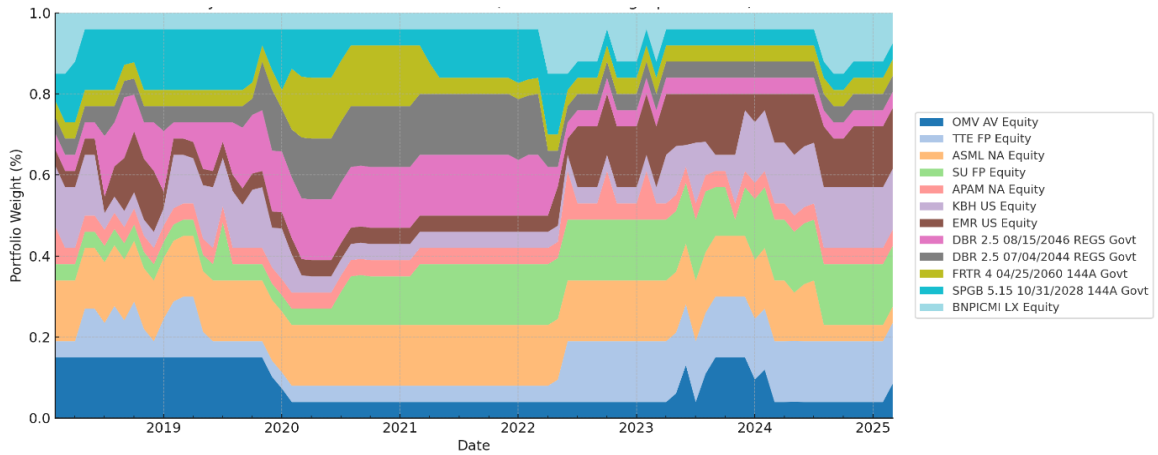
[6] Dividend and interest purification are not applied in this IPS, as the strategy does not involve dividend withdrawals or income distributions. The portfolio is growth-oriented, and all holdings are pre-screened for compliance thresholds using Bloomberg.

**Figure 15: A.8 - Static Portfolio Vs Dynamic Portfolio**




*Source: Author*

**Figure 16: A.9 - Dynamic asset allocation change overtime (36 - M Rolling Window)**




*Source: Author*

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28TH June 2025

Yasmine Elkarkri