Lisbon School of Economics & Management
Universidade de Lisboa

MASTER OF SCIENCE IN
FINANCE

MASTERS FINAL WORK
PROJECT

INVESTMENT POLICY STATEMENT:
MR. HENRIQUE SANTOS

PEDRO GALAMBA

JUNE 2026

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Abstract

This Investment Policy Statement (IPS) outlines the strategic wealth management plan presented to Mr. Henrique Santos, a 30-year-old professional working in the technology sector currently residing in France. To achieve his personal goal of returning to his home country in a comfortable financial position, he aims to achieve a nominal compounded return of 8.78% per year, with a moderately aggressive risk tolerance and a long-term time horizon of fifteen years, with no significant liquidity constraints and a preference against speculative strategies. A long-term investing approach is adopted, in a buy-and-hold strategy to achieve wealth accumulation and compounding of all gains, while diversified across asset classes and global markets. The approach will be implemented via Exchange-Traded Funds (ETFs). The proposed Strategic Asset Allocation (SAA) was tailored to the client's risk tolerance function, with optimization resulting in an optimal allocation of 65% in growth assets, such as equities and commodities, and 35% in defensive assets, including fixed-income and cash. The final optimized portfolio meets and exceeds Mr. Santos's return objectives while respecting his risk tolerance. It is subject to further extensive analysis regarding its robustness, risk profile, and forward-looking performance estimates to ensure Mr. Santos is appropriately compensated for the risk he will be taking with this investment strategy. This approach intends to use out-of-sample validation and complementary risk assessment methodologies to gauge a more comprehensive view of portfolio behaviour and enhance decision-making to ultimately maximize the likelihood of accomplishing the client's long-term financial objectives.

JEL classification:C6; G11

Keywords: Asset Management; Portfolio Theory; IPS; Individual Investors

Resumo

A presente Declaração de Política de Investimento (Investment Policy Statement – IPS) descreve o plano estratégico de gestão de património apresentado ao Sr. Henrique Santos, um profissional de 30 anos que trabalha no setor tecnológico e reside atualmente em França. Com o objetivo de regressar ao seu país de origem numa situação financeira confortável, pretende alcançar uma rendibilidade nominal composta de 8,78% ao ano. Apresenta uma tolerância ao risco moderadamente agressiva, um horizonte temporal de longo prazo de quinze anos, ausência de restrições significativas de liquidez e uma preferência por evitar estratégias especulativas. Para atingir estes objetivos, é adotada uma abordagem de investimento de longo prazo, assente numa estratégia de *buy-and-hold*, orientada para a acumulação de riqueza e para a capitalização de todos os ganhos, mantendo simultaneamente uma diversificação entre diferentes classes de ativos e mercados globais. Esta abordagem será implementada através de Fundos Cotados em Bolsa (*Exchange-Traded Funds* – ETFs). A Alocação Estratégica de Ativos (*Strategic Asset Allocation* – SAA) proposta foi desenvolvida de acordo com a função de tolerância ao risco do cliente, tendo o processo de otimização resultado numa alocação ótima de 65% em ativos de crescimento, como ações e matérias-primas, e 35% em ativos defensivos, incluindo instrumentos de rendimento fixo e liquidez. A carteira otimizada final cumpre e excede os objetivos de rendibilidade do Sr. Santos, respeitando simultaneamente a sua tolerância ao risco. A mesma será sujeita a uma análise aprofundada da sua robustez, perfil de risco e estimativas prospetivas de desempenho, de forma a garantir que o Sr. Santos é adequadamente compensado pelo risco assumido através desta estratégia de investimento. Esta abordagem prevê ainda a utilização de validação *out-of-sample* e de metodologias complementares de avaliação de risco, permitindo obter uma visão mais abrangente do comportamento da carteira e apoiar um processo de tomada de decisão mais informado, com o objetivo último de maximizar a probabilidade de concretização dos objetivos financeiros de longo prazo do cliente.

Classificação JEL: C6; G11

Palavras-Chave: Gestão de Ativos; Teoria da Carteira; IPS; Investidores Individuais

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Abbreviations

ACC – Accumulating
ACWI – All Country World Index
AUM– Assets Under Management
CFA – Chartered Financial Analyst
CIRS – Portuguese Personal Income Tax Code (Código do Imposto sobre o Rendimento das Pessoas Singulares)
CVaR – Conditional Value at Risk
ECB – European Central Bank
EPS – Earnings per Share
ESG – Environmental, Social and Governance
ESTR – Euro Short-Term Rate
ETF – Exchange-Traded Fund
EUR – Euro
GDP – Gross Domestic Product
GICS – Global Industry Classification Standard
IMF – International Monetary Fund
IPS – Investment Policy Statement
IT – Information Technology
MSCI – Morgan Stanley Capital International
MVO **–** Mean-Variance Optimization
NAV – Net Asset Value
P/B – Price-to-Book
P/E – Price-to-Earnings
PFU – Prélèvement Forfaitaire Unique
RRA – Relative Risk Aversion
SAA – Strategic Asset Allocation
SFDR – Sustainable Finance Disclosure Regulation
TER – Total Expense Ratio
UCITS – Undertakings for Collective Investment in Transferable Securities
VaR – Value at Risk

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The Advisory Process & IPS Proposal

This document represents the final form IPS proposed to Mr. Henrique Santos, as a result of an extensive wealth management assessment of his investor profile, risk and return requirements, relevant constraints and preferences, to extract a tailored investment strategy.

This process is conducted by the advisory team and held across five phases: The first is Discovery, where the team aims to identify relevant aspects of Mr. Santos' life. This covers his professional life. It also includes an assessment of his financial situation. Mr. Santos has been able to save a significant amount over the years, with no relevant investments yet. And lastly it also covers his personal life, in which it's concluded that Mr. Santos has some knowledge of financial markets. This is also the stage where the client's expectations are discussed such as his goals and aspirations, attitude towards risk and relevant constraints, where Mr. Santos states his desire to return to his home county in 15 years in a comfortable financial position. This assessment is made with resource to a tailored questionnaire.

The second phase is Analysis, where his financial situation is translated into risk capacity, where the client shows high capacity to bear risk due to his stable income job, and risk tolerance, where he also shows moderate to high willingness to bear risk, demonstrated through his answers. The risk profile is then determined by the answers in the questionnaire, the client's professional situation, financial situation, and the investment time horizon, leading to the evaluation of a moderately aggressive risk profile.

The third phase is Strategy Formulation, in which all previous work must be materialized into an implementable strategy. For this Mr. Santos objectives are quantified into the target return of 8.78% nominal compounded return per year, and a target volatility of 25% per year. The investment philosophy is long-term investing in a buy-and-hold strategy, allowing all returns to compound for the whole investment horizon. The SAA is determined based in the client's risk tolerance, a multi-layered security selection process is employed, the strategy is validated via backtesting, and then the final portfolio is designed by optimization subject to constraints.

The fourth phase is Implementation and Documentation. Implementation ensures the strategy is actually feasible. For this purpose, the adoption of ETFs assets is the most suitable, due to cost minimization, and diversification. Documentation is the formal record of the strategy, with the formulation of the IPS also as a governing framework that guides all decisions, ensuring consistency.

The fifth phase is monitoring of the implemented strategy and final portfolio where multiple monitoring procedures are be in place. Rebalancing is also key as it impacts portfolio performance therefore an annual rebalancing approach is adopted based on empirical testing.

The core result of the IPS is a SAA of a 65% allocation in growth assets namely equities and commodities and a 35% allocation in defensive assets such as fixed-income and cash. This allocation is designed to achieve Mr. Santos return objective of 8.78% which will allow him to accumulate enough capital to feel financially comfortable when returning to his home country, improving his work-life balance as well.

1 Scope and Purpose

This IPS serves as a guiding document for the whole investment process, from return objectives, risk requirements and constraints to the overall strategy, final portfolio, monitoring and performance reporting, proposed by the advisory team to the client.

This framework provides orientation for investment decisions, avoiding distortions to the intended approach by succumbing to emotional or arbitrary actions. It determines the investment strategy, how it will be implemented and maintained throughout the investment horizon, and performance benchmarks for relative evaluation. It ensures the necessary planning for the strategy is strictly followed, but also promptly rectified if necessary. It also defines roles and responsibilities for all involved parties, ensuring clear fiduciary duties of all advisors involved in managing Mr. Santos capital. Having such guidelines in place provides clarity that allows for better decision-making and ensures consistent alignment with the client's goals.

The ultimate goal is to build a tailored investment strategy for Mr. Santos that will enable him to allocate his capital efficiently and achieve his long-term aspirations. These aspirations revolve around the ambitious goal of accumulating enough wealth to return to his home country of Portugal in a financial situation that will ensure his overall stability. To achieve this the advisory team must formulate a strategy and build a portfolio that is able to meet Mr. Santos long-term return objectives while being in line with his risk profile and respecting his imposed constraints and preferences.

This document is the final output of an extensive advisory process between the advisory team and the client. The process was carefully conducted, taking into consideration all relevant aspects inherent to this client, in order to derive a custom-built approach strictly from his financial objectives, the explicit level of risk he was willing to bear provided by himself, and any constraints, preferences or other specific conditions expressed during the advisory process. The advisory team examines all information provided by the client in detail and reflects on the best approach to embed that in portfolio construction. After rigorous analysis, the advisory team is able to translate his specific financial situation and personal traits into a material strategy that is the most suitable to him.

2 Governance

This section outlines the main responsibilities inherent to this IPS. It provides a clear framework to determine all parties involved and their respective duties, which allows for greater transparency, efficiency, and accountability regarding decision-making.

Starting with the decision-making roles, Mr. Henrique Santos is responsible for the information provided for the design of this IPS and for the decision to approve or not approve this policy and any future changes. The advisory team is responsible for creating and proposing the policy, its implementation, monitoring, and any suggested changes.

The review process will be performed annually by the advisory team. It ensures that the investment strategy and the overall portfolio are aligned with the SAA, the client's long-term objectives, risk tolerance and constraints throughout the whole investment time horizon. This review will assess the continued suitability of the investment strategy, showcasing if any changes become appropriate. In case the advisory team finds any changes to the policy appropriate, they must be communicated to Mr. Santos in detail, and his approval is required for its eventual implementation. Mr. Santos may also request a review of the policy in case of any changes to his objectives, risk tolerance, constraints, or other significant circumstances.

The use of external advisors is also accounted for in this section, as the advisory team may hire or dismiss external parties. The simple tax structure does not foresee tax experts to be required at any stage. Other external advisors may also be considered if appropriate. All relative fees, conflicts of interest and arrangements are disclosed in writing beforehand. Transparency will be indispensable in this matter as full ethical compliance will be a priority.

The Asset Allocation and Portfolio Construction are the core of the investment strategy. The advisory team is responsible for defining and eventually updating the SAA and making portfolio decisions. This allocation and decisions will be subject to review quarterly in the quarterly formal performance review, and require Mr. Santos explicit approval for any changes.

Regarding the performance reporting, the advisory team is responsible for informing the client on the progress of his investment portfolio on a periodic basis. A quarterly meeting will be held to formally report on performance, as per Mr. Santos preference. This report will be conducted by the advisory team to provide a comprehensive overview of the investment strategy progress to the client. It will assess the overall portfolio and allocation, its performance in absolute, relative, and risk-adjusted terms, risk metrics and volatility, current macroeconomic conditions, and the suitability of the strategy over time. Asset classes will be evaluated according to their strategic role in the portfolio. In case of persistent underperformance or abnormal risk levels, further analysis and strategic adjustments may take place. Mr. Santos also holds the right to request any additional formal report or meeting apart from the quarterly ones if he requires further clarifications.

3 Risk Profiling

3.1 Investment Objectives

The underlying objective of this IPS is to guide decisions and define the approach required for Mr. Santos to achieve his long-term financial goals of wealth accumulation. These goals revolve around Mr. Santos' intention to return to his home country of Portugal in around 15 years' time in a comfortable financial situation that ensures his stability. This would provide him with greater flexibility around his career and retirement, and to maintain a lifestyle that would preserve his wellbeing.

3.2 Return and risk requirements

To achieve the goals mentioned in the previous section the portfolio value must grow from 180,000 EUR to 500,000 EUR net of French capital tax gains over 15 years, what amount to roughly 637,000 EUR gross. The portfolio aims to generate a compounded nominal return of 8.78% per year for 15 years, assuming all earnings are reinvested, which would represent a real return of 6.78% accounting for a 2% inflation rate.

To arrive at these figures, the effect of French investment taxation is considered. Under the Prélèvement Forfaitaire Unique (PFU) a flat 30% rate applies to capital gains (Direction Générale des Finances Publiques, n.d.), leading to the final wealth amount being obtained by the Future Value of a Lump Sum formula.[1]

The inflation rate is assumed in accordance with the European Central Bank forecast for the second half of the 2020's decade, with a slight decrease to 1.8% until 2027, before rising once more to 2% in 2028 (European Central Bank, 2026).

Mr. Santos has also specifically mentioned the maximum level of risk to be indulged, measured by the standard deviation of the portfolio, which was set 25%.

3.3 Risk Tolerance

The IPS defines and accommodates the client's risk profile in all portfolio decisions, guiding the strategy to reflect his attitude towards risk. All investments carry risk, therefore this is crucial to ensure the structure is the most suitable to achieve his long-term goals.

Mr. Santos is a 30-year-old Portuguese emigrant living in France. He completed a Bachelor's degree in Management aged 21 and moved abroad by himself at 23. Over seven years he has managed to build a stable career in the technology sector, currently earning around 60,000 EUR per year. He currently sits on around 20,000 EUR per year of expenses including housing, bills, food and transport due to the moderate lifestyle he has adopted. He developed a conservative

[1] 500,000 = FV − 0.30 × (FV − 180,000), which equals 637,143 EUR, and the compounded nominal return being obtained by the After-Tax Future Value formula: 637,143 = 180,000 × (1 + r) ^15, which equals 8.78%.

savings habit, maintained throughout the beginning of his professional life until present time, and currently holds approximately €180,000 of investable assets.

To make a personalized assessment of Mr. Santos risk tolerance, a questionnaire is taken by the client. The answers and overall score in the questionnaire provide an understanding of the client's risk profile, preferences, objectives and experience in the investment field, liquidity needs, and time horizon.

It is concluded the client has a high ability to bear risk, due to the objective of long-term capital growth over a 15 year time horizon, a stable financial situation, with a well-paid senior job in a technology firm, a significant amount in savings, and little to no liquidity needs in the short or medium term. It also adds to the fact that Mr. Santos maintains an emergency fund separate from this portfolio. The client showcases a decent willingness to bear risk as well, as he accepts risk relative to investing in global capital markets. He would also tolerate significant short-term drawdowns, up to 25% in a single year, considering losses beyond that level unacceptable. Overall the client's high ability to bear risk along with his moderate-to-high willingness to bear risk, concluded through the findings in the proprietary questionnaire in Appendix B (Figure B.1), classify Mr. Santos as Moderately Aggressive with a final normalized score of 76/100. This is a level of risk that tends to have a greater allocation in growth assets over defensive assets. To further enhance and determine Mr. Santos' willingness to accept risk, his risk tolerance function is calibrated in terms of:

$$U = E(R) - 0.5A\,\sigma^2$$

Where U represents the utility of the portfolio, E(R) the expected return of the portfolio, A the risk aversion coefficient, and σ^2 the variance of the portfolio returns. The resulting relative risk aversion coefficient is A = 3.5 derived from the risk profile mapping to RRA coefficient in Appendix A (Figure A1), in accordance with the moderately aggressive risk profile.

3.4 Constraints

The constraints section covers the practical limits imposed by Mr. Santos. The time horizon is fixed over 15 years which supports the long-term growth prospects, with low to none liquidity needs, as the client is not expected to withdraw any significant cash amount, however a 5% cash allocation is included in the portfolio for the case of unforeseen circumstances. In addition the client also prohibits the use of leverage, short-selling strategies, unregulated assets, and assets with low liquidity.

The client also expresses his mean-variance preference, meaning he seeks to have considered risk, measured by volatility, and return, measured by nominal and real return. The portfolio is designed using exclusively Exchange Traded Funds (ETFs) for all the asset classes due to lower costs generally associated and diversification benefits. These low costs may still be carefully considered. In that sense, the Total Expense Ratio (TER) of the equity ETF sleeve of the portfolio is set to not exceed 0, 5%, and the remaining asset classes ETFs were also determined in a way that minimizes TER, an approach that will be discussed further in later sections. Transaction costs are also considered, and these are assumed around 0, 04% to 0, 05% per trade,

making it around 0, 08% to 0, 10% round trip (Khomyn, Putniņš & Zoican 2024). All assets in the portfolio must also be EUR denominated or EUR hedged in order to mitigate currency risk.

In regard of tax considerations, as a resident in France, the Prélèvement Forfaitaire Unique (PFU) applies a flat rate of 30% to capital gains which is assumed in all calculations. The client is expected to return to his home country of Portugal only after liquidating the portfolio, realizing all gains, and pay all inherent taxes to the French tax authorities. This avoids any issue regarding double taxation as no income is earned as a resident in Portugal, or in Portuguese territory (CIRS, Art. 15.º). Additionally, all ETFs included in the portfolio are accumulative regarding payment type. This portfolio design must comply with all applicable Portuguese, French, and European Union laws.

The follow-up on the portfolio is an area of great interest by the client in order to evaluate how the portfolio is performing, which shall be ensured by a sharp monitoring and reporting framework, with quarterly summaries in line with the client´s wishes where portfolio metrics and overall performance will be presented and discussed with the client and an annual formal review of the strategy's suitability. Mr. Santos also expresses his preference to have ESG factors considered in portfolio design, displaying an environmental consciousness and the desire to have his investment accounts to have responsible investment decisions considered, to accommodate this preference, ESG considerations were included in the security selection criteria to be discussed in later sections. To ensure diversification and avoid concentration in a single security, it is also mandated by the client that no single security has a greater weight than 20% of the full portfolio, a preference promptly reflected in portfolio design from its inception.

Rules violation regarding preferences and constraints are a responsibility of the advisory team. The procedure in such cases is as follows: monitoring will detect any breaches in the portfolio, an immediate disclosure shall be made to the compliance officer and to the client within 2 business days. This disclosure must contain all details of the breach. After the disclosure, corrective action must be taken within 5 days. Repeated breaches lead to an escalation to compliance and the risk committee, and may result in restrictions to the advisory team.

4 Investment Design

4.1 Investment Philosophy

The investment philosophy is the foundation of the investment process, as all decision will have its roots in principles, beliefs and views of how financial markets work. It provides coherence, clarity, and serves as the compass for the uncertainty of financial markets.

Having such guiding framework in place allows for a succinct investment strategy to be built around core values, and then tailored to investor characteristics, such as preferences, requirements, risk profile, constraints, and investment horizon.

Strategizing with integrity to convictions has proven to be the best course to achieve long term objectives, avoiding pitfalls common to investors, and underlying human behaviour, such as inconsistent or emotional decisions. Therefore, the investment philosophy embedded in this IPS is long term investing, in a buy-and-hold strategy. This philosophy follows the assumption that long-term disciplined, consistent and compounded investment in broad market exposures is more effective than short term speculation and trying to select individual recent winners.

We believe financial markets are generally efficient, and difficult to beat consistently, since in liquid enough and well-informed markets, prices are generally efficient, already reflecting all publicly available information (Fama, 1970). Therefore, spending time and resources searching for mispriced securities is proven wasteful. Diversification is another of the pillars of this philosophy, as over long periods of time, is proven to improve portfolio efficiency, by expanding investment across global markets and asset classes, instead of concentrating exposures, due to the imperfect correlation structure between assets (Markowitz, 1952). Lastly the choice of a relatively less active approach is based on principles often disregarded, but very much relevant once carefully examined, which are the impact of trading costs. Multiple findings suggest that costs may be the deciding factor in performance compared to the market. Before costs, active managers can equal the market, but after all costs are accounted for, they must underperform the market (Sharpe, 1991). It can even be considered that before costs, beating the market is a zero-sum game, as for every investor that makes a gain another must bear a loss, and after costs, it's a loser's game, as the intermediaries fees hinder returns to levels below the market return (Bogle, 2007). These findings call for a buy-and-hold strategy, resorting to more transparent investment vehicles that yield lower costs, such as ETFs.

This investment philosophy is aligned with the investor's profile, long-term investment horizon, moderate/aggressive risk tolerance, and preference for discipline over speculation, ensuring an approach that fits his needs.

4.2 Macroeconomic Outlook

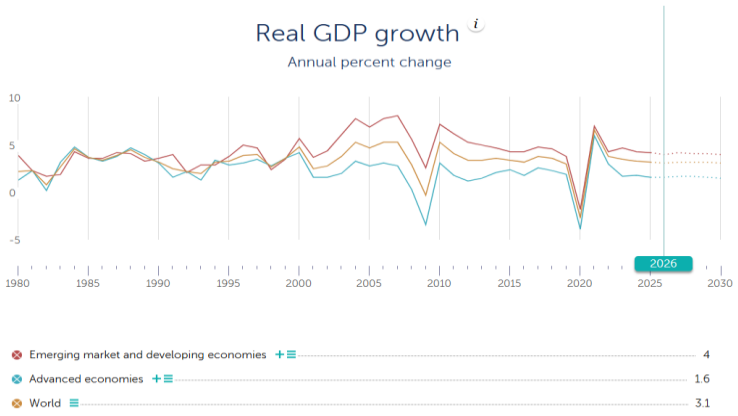
The current macroeconomic context is characterized by uneven economic growth, persistent inflationary pressures, restrictive yet evolving monetary policy, and geopolitical fragmentation. These forces impact portfolio decisions in regard to asset classes, regions, and investment styles

and therefore play a key role in portfolio construction. As the first step of a top-down investment approach, this macroeconomic analysis serves as the groundwork to the strategic asset allocation and guides security selection in order to exploit the areas of structural opportunity and risk that current context presents. More details regarding the material impacts of these macroeconomic views are provided in section 4.5.2 Equity Security Selection Methodology – Macroeconomic Themes.

Economic Growth

Economic growth is expected to remain stable with a slight tilt downwards. According to the International Monetary Fund (IMF), GDP growth will continue to evolve unevenly across regions. The post pandemic period showed promising signs, but forecasts suggest growth slowing down to around 3.2% in 2025 and 3.1% in 2026. Advanced economies are stabilizing, expanding only at very shy 1.6% while emerging markets should grow faster, around 4%, showing unexpected resilience. Growth leadership is not focused into a single growth driver as policy frameworks, fiscal aspects and labor-market dynamics are producing different results in different countries. The IMF points out in their World Economic Outlook report of 2025 that risks are tilted to the downside if protectionism, fiscal stress or labor shocks intensify. For portfolio construction this showcases how a broad regional diversification can be crucial to capture growth, rather than concentrating allocation in a single market (IMF, 2025).

Figure 1 - GDP Growth Forecasts

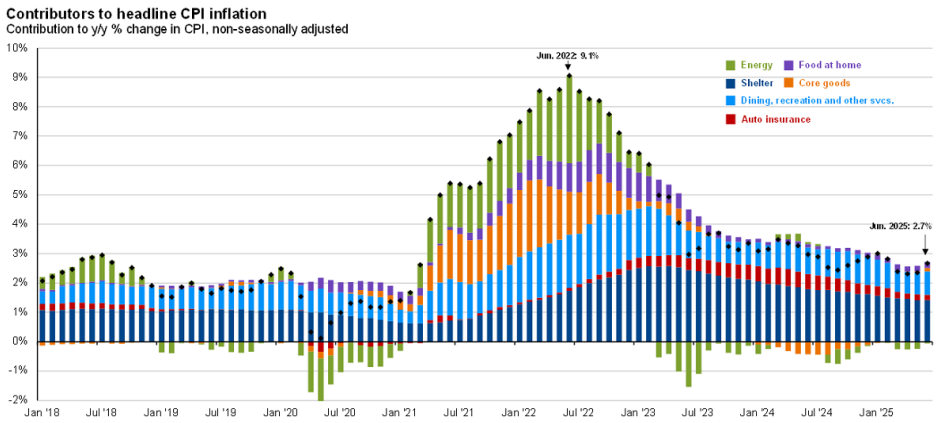


Source: International Monetary Fund (2025)

Inflation Dynamics

Inflation has eased from its post-pandemic peaks, but remains persistent in some economies. Recent reports point to multiple factors with implications in this matter, such as tariff effects, energy dynamics, labor supply shifts and fiscal impulses. These factors can keep inflation higher for longer in pockets even as global averages seem to ease up. As noted in contemporary commentary, tariff pass-through and domestic fiscal choices could produce inflation spikes while energy prices and shelter trends pull in different directions, making it difficult to make forecasts. The main conclusion is that assets considered less sensitive to inflation (or that provide inflation protection) may play a very important role in portfolio construction, such as Inflation-linked bonds, commodities and real assets (J.P. Morgan, 2025).

Figure 2 - Inflation Outlook Trends

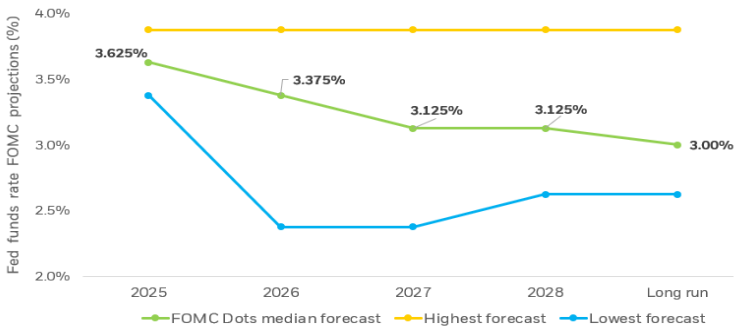


Source: J.P. Morgan Asset Management (2025)

Monetary Policy

Monetary policy is in a transition phase as rates remain persistently restrictive in many advanced economies to anchor inflation, some even signaling the "natural level" of rates may now be higher than in the last decade, but markets still seem expect some easing in the near future. Reports from market analysts highlight the conflict central banks face, as persistent inflation points to maintaining the level of interest rates to keep it under control, but a weakening labor markets suggests a decrease in interest rates could be appropriate to boost the economy. This dilemma makes it difficult to be confident in significant rate decreases, and creates uncertainty around cuts. Regarding portfolio decisions, the environment calls for a greater valuation discipline and quality bias, as short-duration fixed income, high-quality corporates, and cash buffers become useful tactical assets as policy tightness evolves (Forbes, 2026).

Figure 3 - Federal Reserve Interest Rate Forecast



December 2025 FOMC "Dot Plot."

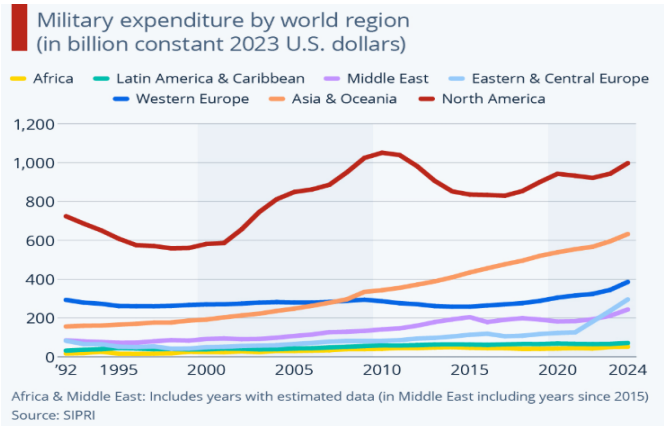
Note. From Fed Outlook 2026: Interest Rate Forecast, *iShares (BlackRock), 2025. Data source: U.S. Federal Reserve,* Summary of Economic Projections *(December 2025).*

Source: Stephen Moore (2026), Forbes

Geopolitical Risk

Geopolitical fragmentation and a greater focus in international security and defense are now main themes in the political agenda. Analysts highlight that great-power competition, the increasing armed conflicts and industrial policy pushes are reshaping trade, supply chains and sector winners, with a greater policy support for defense, semiconductors, critical minerals and national security technologies. This context suggests the differing geopolitical strategies of the world's greatest superpowers could increase market volatility, with the appropriate portfolio response being to diversify by region and include thematic exposures that benefit policy pushes while keeping liquidity for any unexpected policy shifts (Wellington Management, 2026).

Figure 4 - Military Spending by Region



Source: Katharina Buchholz (2025), Statista

4.3 Strategic Asset Allocation

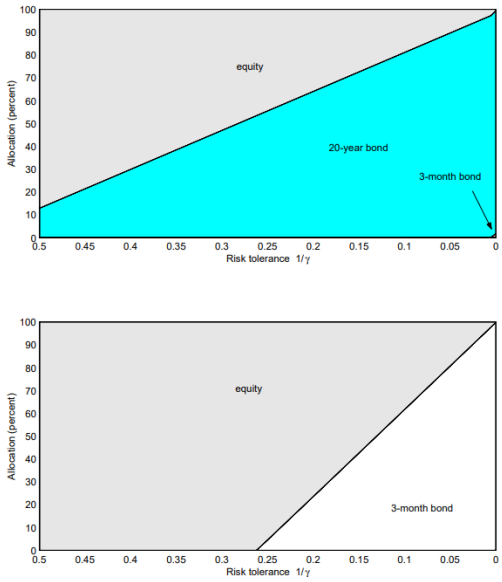
4.3.1 Strategic Asset Allocation Framework

The SAA is the bedrock of the investment strategy in this IPS, as it determines target allocations for the asset classes in the portfolio, and later shapes the rebalancing policy to maintain that allocation throughout the investment time horizon, after it naturally drifts. An appropriate SAA is indispensable to the success of the investment strategy over the long-term and to the performance of the portfolio, as it reflects the investor's risk tolerance, time horizon, constraints, and long-term financial objectives. Embedding the investor's characteristics into core strategy provides a suitable framework to achieve results. Moreover, in a buy-and-hold strategy, a disciplined strategic positioning followed strictly over the investment time horizon, is proven to enhance the risk-return trade-off represented by the Sharpe ratio, as observed during Mean-Variance Optimization (MVO).

To guide an appropriate Strategic Asset Allocation, the framework proposed in *Strategic Asset Allocation: Portfolio Choice for Long-Term Investors* is considered, as its grounded in principles we firmly believe in: that the optimal portfolio allocation between growth assets and defensive assets should be determined based on the investor's risk aversion. According to this calibration, investors with a low level of risk aversion should hold an allocation tilted towards

growth assets, showcasing how the allocation is set as a function of the investor's risk tolerance (Campbell & Viceira, 2002).

Figure 5 - Optimal Asset Class Allocation as a Function of Risk Tolerance



Source: Strategic Asset Allocation: Portfolio Choice for Long-Term Investors, Figure 3.3

Based in the client's moderately aggressive profile, and the calibration of the risk tolerance function in section 3.3 that leads to the result of A (or γ) = 3.5, Mr. Santos Risk Tolerance 1/ γ equals to approximately 0.25 to 0.3. In terms of the applicable framework, this corresponds to an approximate allocation to equities varying from 55% to 65%, and an approximate allocation to long-term bonds and 3 month bonds (or simply cash) varying from 35% to 45%. These findings are embedded in MVO, with equities serving as a proxy for growth assets, and long-term bonds and cash serving as a proxy for defensive assets. Therefore, the following Strategic Asset Allocation is adopted:

4.3.2 Target Strategic Asset Allocation

Table 1 - Strategic Asset Allocation

Asset Class	**Allocation**
Growth Assets	65%
Equities	64.9%
Commodities	0.1%
Defensive Assets	35%
Government Bonds	30%
Cash	5%

This Strategic Asset Allocation holds a majority allocation to Growth Assets that yield higher risk and return such as equities and commodities, while also maintaining a significant defensive stake in the portfolio allocated to Defensive Assets such as government bonds and cash that yield lower risk and return and also diversify away unsystematic risk. It's aligned with Mr. Santos long-term growth prospects and return objectives, holding equities as the greatest exposure, positioning it as the main return generator in the portfolio, in order to gauge sufficient capital appreciation and compounding benefits to ensure success. Lastly the allocation also respects the constraints relevant to asset class selection. These include low liquidity needs, therefore requiring only a small cash buffer, limited at 5%, the prohibition of short selling, which mandates positive positions, and the long-term time horizon, which allows for a greater exposure to higher risk assets given the extended recovery period for potential short-term losses.

4.4 Management Structure

The objective of this section is to specify how the SAA will be implemented in practice. With the strategy defined, it must be actually feasible, therefore allocation must be translated into investable vehicles. In this case, ETFs are the most suitable, as they grant necessary liquidity, transparency and cost-efficiency for smooth implementation. It also grants diversification, ensuring performance is driven mainly by asset class exposure rather than individual securities.

This IPS determines a benchmark for the overall portfolio, and a benchmark for each asset class. The purpose of the benchmark is to serve as an alternative, meaning an investable representation of an overall market or asset class. Having such alternatives in place allows to observe the alpha generated or not by strategy.

The overall portfolio benchmark is set as the iShares Core MSCI Europe UCITS ETF EUR (Acc) as a European equity-focused portfolio, the obvious alternative for the client to allocate his capital to, would be the broad European equity market. The equity asset-class benchmark is set as the Amundi Core MSCI World UCITS ETF Acc, as it captures the global equity markets, and serves as a comparison when measuring performance of the portfolio's equity sleeve. The fixed-income asset-class benchmark is set as the Amundi Core EUR Corporate Bond UCITS ETF EUR Acc, as it represents the performance of the overall euro bond market, and helps to measure the performance of the fixed-income component. The commodity asset-class benchmark is set as the iShares Diversified Commodity Swap UCITS ETF, serving the purpose of relative performance measurement, and providing relevant insight on the portfolio's ability to generate performance as a whole. The cash asset-class benchmark is set as the BNP Paribas Easy EUR Overnight UCITS ETF Acc as this asset class poses as a stability buffer, in place for safety in unforeseen situations, performance measurement may not be as relevant as performance is not expected from this asset.

The management style embedded in this IPS follows a strategic buy-and-hold management approach, implemented through passive investment vehicles. This approach adds value by combining strategic exposures with a security selection process implemented via ETFs. Once established, positions are intended to be held over the long term, with a rebalancing framework used to correct deviations.

4.5 Security Selection

4.5.1 Security Selection Framework

To achieve the desired strategic exposures through the best individual securities, it's crucial to have in place security selection criteria that's aligned with the client's return objectives, risk tolerance, and constraints. This process fulfils the SAA and provides the portfolio tools to achieve the desired long-term performance and overall success of the investment strategy. The security screening is conducted using the Bloomberg terminal, widely regarded in the financial industry for its functionalities and valuable market data.

In this framework, different asset classes serve different purposes within the portfolio and therefore require distinct security selection criteria to fully capture the value each asset class can provide to both the portfolio and the investment strategy.

In this sense, the equity sleeve is considered the main return generator in the portfolio and therefore it is provided a more complex, multi-layered funnel-like framework for security selection, as its purpose is to enhance returns.

After the inclusion of all selected securities in the portfolio, an assessment of each security's Sharpe ratio and correlation with the remaining securities is made to ensure suitability in the portfolio. Securities that do not provided either an attractive Sharpe ratio or diversification benefits (in the form of low correlation with remaining assets) are not considered in the final portfolio.

4.5.2 Equity Security Selection Methodology

The equity screening criteria employ a top-down approach, starting with a macroeconomic analysis to determine the key macroeconomic themes currently attractive. Within each theme, implementation filters are applied to ensure the securities are investable. A scoring model is then put in place where each security is ranked based on factors including Growth, Valuation, Quality & Stability, Momentum and ESG integration. Finally the securities with the highest score are included in the portfolio. In case of multiple securities having properties considered too similar, such as capturing the same exposure or an exposure from the same region, only the one with the highest score is included. In case of securities having the same score, the 5 year Sharpe ratio NAV is used as the tie breaking criterion.

Macroeconomic Themes

The macroeconomic analysis showcased in section 4.2 of this IPS provides a greater understanding of the current global context, which seems more important than ever. This analysis tilts our convictions toward Global Diversification, due to uneven global growth that is forecasted for the future, with significant discrepancies between advanced economies and emerging markets. A diversified allocation across regions and trade blocks seems the most suitable, providing a balanced exposure that gauges the differing growth dynamics forecasted for each. This theme is of great importance as such diversified exposure enhances the portfolio's return generating capacities, extracting performance from dissimilar assets, in order to meet the performance requirements necessary to reach the determined objectives. This forecast also brings

to light how maintaining such flexibility can help to reenter cyclical investments when signs of local recoveries present themselves (International Monetary Fund, 2025).

Another theme deemed crucial is Inflation Protection and Real Assets, as not only are the client's goals very sensitive to purchasing power, but inflation risk has been very persistent (J.P. Morgan, 2025). This also showcases the current attractiveness of real assets, such as utilities, which provide defensive characteristics, and the need for assets with inflation hedging properties, such as energy, as evidence shows that energy markets hold a positive relationship with energy-driven inflation, which is one of the main components of overall inflation (Fehrle, 2026). Exposures in line with the characteristics mentioned above now look more attractive in portfolio design to ensure stability if inflation surges again. Incorporating such assets is also key since, as mentioned previously, the client's objectives are influenced by changes in purchasing power, therefore this theme is carefully considered in portfolio design to ensure this area is properly protected.

The restrictive monetary policy context most central banks face currently, also showcases the present relevance of another theme: Quality and Stability. The uncertainty regarding interest rates fluctuation calls for a tilt towards quality assured securities (Forbes, 2026). This leads our convictions to go towards the defensive side of equities again, with industries such as healthcare, consumer staples, and utilities, the latter having a second helpful use, not only serving the theme of real assets and inflation protection, but also stability and defensive traits under restrictive monetary policy. Long-duration growth exposures are more rate sensitive, therefore as they are the main portfolio allocation, the inclusion of this theme can balance the portfolio.

The last theme considered crucial in present context and perhaps the most publicized is Geopolitical & Policy Driven Growth. As the great-power competition among superpowers increases, armed conflicts threaten global stability and policy shifts seem more abrupt than in previous years (Wellington Management, 2026). Therefore this shift calls for a regionally diversified approach, focused in the industrials and technology sectors. In a context where superpowers seek to increase sovereignty and reduce dependencies, it's crucial to take advantage of hikes in investment and industry development, by including exposures in key sectors of several superpowers seeking to enhance independency from one another.

After this extensive analysis, it is concluded that the portfolio should seek equity exposure to the themes of Global Regional Diversification; Inflation Protection & Real Assets; Quality & Stability and Geopolitical & Policy-Driven Growth.

Implementation Filters

After that, ensuring the securities are actually investable is the next step. For that, implementation filters are adopted for a smooth and cost efficient position management. Those filters consist in the choice of EURO denominated assets, UCITS-compliant ETFs, physical replication, accumulating share class, a value of assets under management (AUM) greater than €100 million, a Total Expense Ratio (TER) lower than 0.50%, and monthly total return data available for a period greater than 10 years. These filters also mitigate implementation risks.

Scoring Model

Once at this stage, a scoring model is deployed to rank all available securities, providing flexibility to rank a wide range of ETFs according to relevant criteria for the portfolio design, and then deciding inside that range, according to the final score.[2] The criteria to rank the investable securities within the themes are the factors of Growth, Valuation, Quality & Stability, Momentum and ESG integration as briefly mentioned previously.This choice is made due to it being an extensive industry practice and due to the diverse empirical support behind each.

Regarding growth, this factor seeks to identify firms with high expected earnings and revenue growth, with these specific characteristics reflecting a firm's potential to expand cash-flows and increase its value over time. Research suggests that expected Earnings-Per-Share (EPS) growth is predictable, and even a crucial component of equity valuation, as the value of a stock can be seen as a function of both its current EPS and its expected future EPS growth rate, suggesting this information can be highly relevant for security selection (Sloan & Wang, 2025).

In light of the quality factor, it can seek to identify companies with strong profitability, earnings stability and overall financial strength (Bloomberg, 2021)[3]. This factor is relevant for portfolio construction, as findings suggest more profitable firms tend to outperform less profitable firms over the long-term, indicating profitability contains relevant information regarding the strength of a firm's overall business model and their ability to generate sustainable earnings (Novy-Marx, 2013). The factors of growth and quality can often be seen as closely related, however the growth factor is considered separately since it captures the expectation of future increases in earnings and revenues, while the quality factor focuses on current profitability, financial strength and earnings stability, therefore considering both allows for a complementary analysis.

The valuation factor is one of the most studied across literature as well. It tries to capture whether a security is misvalued compared to its "true value" which is assessed by its fundamentals. This assessment is based in the firm's valuation multiples, such as its price-to-earnings ratio (P/E) and its price-to-book ratio (P/B). Research in this matter suggests firms with lower P/E and P/B ratios tend to yield higher returns (Fama & French, 1992).

In the sense of the momentum of a security, it relates to capitalizing on the current market sentiment, with the belief that recent strong performances may continue in the short-term and medium-term. By adopting this approach, one can capitalize of market trends, especially if they stay persistent across equity markets (Jegadeesh & Titman, 1993).

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[2] The score methodology is as follows: Each metric is ranked cross-sectionally within the investable universe and then normalized to a 0 to 1 scale where 0 represents the least favorable outcomes and 1 represents the most favorable outcomes. For factors composed by multiple metrics, equal weights are applied to each metric to compute the factor score. The final score is then calculated as an equal weighted average of all factors, all of which holding equal weights for simplicity and factor diversification purposes, as in the following formula: Score = 0.2 x Growth + 0.2 x Valuation + 0.2 x Quality + 0.2 x Momentum + 0.2 x ESG integration

[3] For the purpose of this IPS, quality is defined following the Bloomberg definition, focusing on Variability, Profitability, and Leverage (Bloomberg, 2021), instead of other relevant literature definitions, for instance, the Quality Minus Junk Framework, that defines quality characteristics as profitability, growth, and safety (Asness, Frazzini, & Pedersen, 2013).

The ESG component of this model is a result of both the client's preferences and our own beliefs regarding responsible investment. In addition firms with strong ESG performance do tend to yield higher risk-adjusted returns, and aligning the portfolio with government policy pushes towards sustainable investing goals and long-term resilience (Friede, Busch, & Bassen, 2015). This suggests ESG related investing may be evolving from ensuring sustainability at the expense of lower returns, to an investment style that can even yield higher returns that other more destructive investments.

For this factor integration, the exposure metrics in Bloomberg's ETF search are used. By retrieving factor metrics relative to each constituent, Bloomberg provides a score in standardized units ranging from -1 - lowest exposure, through 0- neutral exposure, until 1 -highest exposure (Bloomberg, 2026). Other separate metrics were also used, and are detailed in the appendix.

4.5.3 Non-Equity Asset Classes Security Selection Methodology

The remaining asset classes, fixed income, commodities, real estate, and cash, are considered complementary, providing diversification benefits, avoiding concentration and excess volatility. They hold a simpler framework, as their purpose is representation and not enhancing returns, therefore the criteria are focused on implementation viability and cost-minimization.

The Fixed Income security selection criteria are in place to ensure a clean implementation.[4] For Commodities, it proves to be a greater burden, as this asset class bears specific characteristics that require a slightly looser criterion to maintain the investment universe large enough.[5] As for Real Estate, the objective is to represent a global picture of the market while maintaining an easy implementation[6] (however as previously mentioned, this asset-class was not considered in the portfolio as it didn't provide an attractive Sharpe ratio or any diversification benefits). And lastly the cash asset class ensures a slight allocation to cast in place for unpredictable shifts, hence why the importance of a quick and simple implementation process. [7]

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[4] The criteria includes implementation filters such as EURO denominated assets, investment grade securities, meaning securities holding a rating of BBB or higher, UCITS-compliant ETFs, physical replication, accumulating share class, a value of assets under management greater than €100 million, and monthly total return data available for a period greater than 10 years. The decision criteria is then the lowest Total Expense Ratio (TER).

[5] The criteria includes implementation filters that considered only EURO denominated assets, a broad commodity exposure, meaning that the fund's holdings shall not be fully concentrated and must be greater than 1, UCITS-compliant ETFs, physically backed where possible, otherwise, derivatives and swap based exposures may exceptionally be allowed, accumulating share class, no inclusion of leveraged funds, and value of assets under management greater than €100 million, and monthly total return data available for a period greater than 10 years. The decision criteria is then the lowest Total Expense Ratio (TER).

[6] The criteria for this asset class includes only EURO denominated assets, a UCITS-compliant ETFs, physical replication, a broad geographic exposure, accumulating share class, and value of assets under management greater than €100 million, and monthly total return data available for a period greater than 10 years. The decision criteria is then the lowest Total Expense Ratio (TER).

[7] The criteria enforces implementation filters such as EURO denominated assets, a UCITS-compliant ETFs, a high level of liquidity to ensure stability, through a value of the 3-month average volume that must be greater than 20,000, and value of assets under management greater than €100 million, and monthly total return data available for a period greater than 10 years. The decision criteria is then the lowest Total Expense Ratio (TER).

4.5.4 Final Security Selection

Table 2 - Selected Securities List

Equity ETFS		Ticker	Expected Return	Standard Deviation	Sharpe Ratio
Global Diversification	XACT OMXS30 ESG UCITS ETF	X3A1 GR	8,84%	16,17%	0,37
	Amundi MSCI Semiconductors UCITS ETF	CHIP FP	18,15%	15,61%	0,98
	SPDR MSCI Emerging Markets UCITS ETF	SPYM GR	11,55%	14,57%	0,59
Inflation Protection And Real Assets	SPDR MSCI Europe Utilities UCITS ETF	STUX IM	8,80%	15,40%	0,38
	Amundi Global Hydrogen UCITS ETF	ANRJ FP	1,69%	23,20%	-0,05
	SPDR MSCI Europe Energy UCITS ETF	STNX IM	1,67%	23,26%	-0,05
Quality And Stability	Xtrackers MSCI Europe Health Care Screened UCITS ETF	DXSE GR	5,44%	12,53%	0,20
Geopolitical And Policy-Driven Growth	SPDR MSCI Europe Industrials UCITS ETF	NDUS LN	9,72%	17,93%	0,38
	iShares S&P 500 Information Technology Sector UCITS ETF	QDVE GR	22,55%	17,36%	1,13
	SPDR MSCI Europe Technology UCITS ETF	ITEC LN	13,17%	18,10%	0,57
Government Bond ETFS		**Ticker**	**Expected Return**	**Standard Deviation**	**Sharpe Ratio**
Xtrackers II Eurozone Government Bond UCITS ETF		XGLE GR	2,46%	3,76%	-0,12
Amundi Euro Government Inflation-Linked Bond UCITS ETF		LYQ7 GR	2,40%	4,96%	-0,10
Commodity ETF		**Ticker**	**Expected Return**	**Standard Deviation**	**Sharpe Ratio**
Xtrackers Bloomberg Commodity ex-Agriculture & Livestock Swap UCITS ETF		XSVT GR	1,79%	12,84%	-0,09
Cash ETF		**Ticker**	**Expected Return**	**Standard Deviation**	**Sharpe Ratio**
Xtrackers II EUR Overnight Rate Swap UCITS ETF		XEOD GR	-1,07%	1,25%	-3,18

The final selection list reflects the highest-ranked securities resulting from the multi-layered model described above, after unsuitable securities are removed. It serves as an implementation vehicle of the SAA, with each security targeting specific asset-classes exposures derived from strategy, ensuring the alignment of the portfolio with the client's risk and return requirements.

4.6 Portfolio Construction

This section is divided into two distinct phases. The first phase serves the purpose of model development by Mean-Variance Optimization and validation of its robustness out-of-sample by a rigorous backtesting framework using historical data. The second phase serves the purpose of final portfolio construction using the most recent data, to obtain the ultimate portfolio to be recommended to the client. This approach allows to evaluate if the process is capable of generating portfolios that behave well in real conditions or not. Only after that validation can we proceed to the implementation of a final portfolio. The sample of historical monthly return data is collected for a ten-year period, from January 2016 to January 2026. The first phase, Model Development and Validation makes use of this full sample, while the second phase, Final Portfolio Construction, makes use of the most recent part of that sample to obtain a final portfolio in line with the current market regime, as detailed in the next sub-sections.

4.6.1 Model Development and Validation

Starting with the first phase, this section seeks to formulate the model to build the portfolio, and later validate it, before actually implementing it to build the final portfolio. As mentioned previously, this phase uses a ten-year sample of monthly return data, from January 2016 to January 2026. The sample is split in half, with the first half, from January 2016 to January 2021 being used for Model Development and Formulation, and the second half, from January 2021 to January 2026 being used for Out-Of-Sample Validation.

Model Development and Formulation

At this stage the initial target weight for each security is determined, starting with the methodology chosen, then the optimization procedure, arriving at the initial model results. The weight of each security structures the portfolio in line with the client's long-term objectives, risk tolerance, and constraints. The approach chosen to determine the target weights is Mean-Variance Optimization, an approach derived from Portfolio Selection by Harry Markowitz. This framework has been widely regarded and is still central to modern portfolio design. It states portfolios must be considered as a whole, as asset correlation is extremely important to the overall return and to mitigate inherent risk. In this sense, one seeks to construct a portfolio that maximized expected return a given level of risk, or equivalently minimizes risk for a given level of return (Markowitz, 1952).

The client´s mean-variance preference implies that the portfolio shall be designed through mean-variance utility maximization. In standard mean-variance terms, optimization is formally expressed through the maximization of the quadratic utility function, which considers both expected return, variance and the client' relative risk aversion coefficient (Kirby & Ostdiek, 2012). However, the direct maximization of the quadratic utility function bears some limitations, as it's difficult to perform in practice and requires considerably accurate calibration of the relative risk aversion coefficient. Therefore, to obtain a practical portfolio construction, we adopt the maximization of the Sharpe ratio subject to constraints[8] as an approximation to achieve an optimal allocation with an efficient risk-return trade-off.

This optimization approach allows the portfolio to optimize risk and return obtaining a diversified allocation. Or though this theory bears limitations, such as a significant input sensitivity, we still consider it the most appropriate given the intended portfolio framework. To address that model risk as extensively as possible, robustness of the strategy is made a priority through a backtesting framework to validate or invalidate estimation accuracy, detailed in the next phase. The initial optimized portfolio refers to the first portfolio generated, having as its inputs the first half of the ten-year monthly returns data sample collected (from January 2016 to January 2021) and being designed through the procedure described above, before any robustness testing takes place. The purpose behind this initial optimized portfolio is not actual implementation, but to serve as a preliminary portfolio that allows the strategy to be tested and validated. It provides a baseline for testing the robustness, stability and overall suitability of the model through the subsequent out-of-sample validation procedure (detailed later on), before the final portfolio allocation. The initial optimization results were as follows:

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[8] To implement this methodology, the Microsoft Excel Solver add-in is used and the maximization of the Sharpe ratio takes place, in order to find the best risk-adjusted portfolio in line with client's moderately aggressive risk profile, following the formula: Sharpe ratio = (Rp-Rf) / σp

Where Rp represents the portfolio´s return, Rf the risk-free rate of return, and σp the standard deviation of the portfolio's return. The risk-free rate considered was a euro area 10-year government bond yield, published by the European Central Bank. For the initial optimization and backtesting (first phase of portfolio construction), it is retrieved from February 1th, 2021, trading at the time at approximately -0,5% per year, for the final optimization (second phase of portfolio construction), it was retrieved at February 9th, 2026, trading at the time at approximately 2,9% per year. (ECB, 2026).

Table 3 - Initial Optimized Security Weights

Security	Asset Class	Weight
XACT OMXS30 ESG UCITS ETF	Equities	0.1%
Amundi MSCI Semiconductors UCITS ETF	Equities	20.0%
SPDR MSCI Emerging Markets UCITS ETF	Equities	0.1%
SPDR MSCI Europe Utilities UCITS ETF	Equities	2.3%
Amundi Global Hydrogen UCITS ETF	Equities	0.1%
SPDR MSCI Europe Energy UCITS ETF	Equities	0.1%
Xtrackers MSCI Europe Health Care Screened UCITS ETF	Equities	6.9%
SPDR MSCI Europe Industrials UCITS ETF	Equities	0.1%
iShares S&P 500 Information Technology Sector UCITS ETF	Equities	18.2%
SPDR MSCI Europe Technology UCITS ETF	Equities	0.1%
Xtrackers II Eurozone Government Bond UCITS ETF	Fixed Income	20.0%
Amundi Euro Government Inflation-Linked Bond UCITS ETF	Fixed Income	20.0%
Xtrackers Bloomberg Commodity ex-Agriculture & Livestock Swap UCITS ETF	Commodities	7.0%
Xtrackers II EUR Overnight Rate Swap UCITS ETF	Cash	5.0%

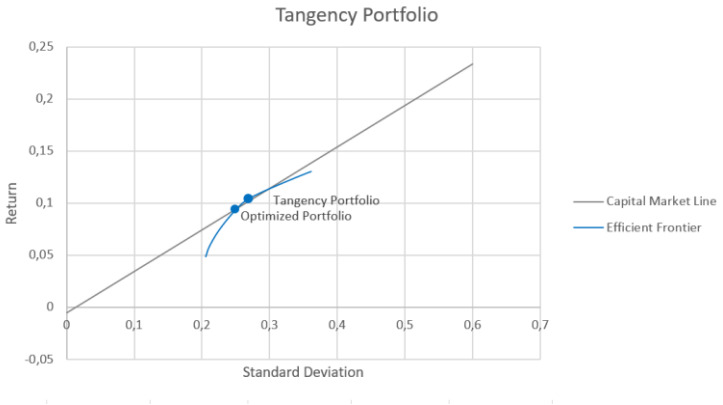
The expected performance results for the initial optimized portfolio are detailed below:

Table 4 - Initial Optimized Portfolio Characteristics

Portfolio Characteristics	
Expected Return	9.40%
Standard Deviation	25.00%
Sharpe Ratio	1.37

These results for the initial optimized portfolio are promising, with an appropriate return for the level of risk and a strong Sharpe ratio, suggesting a process aligned with the client's requirements so far.

Figure 6 - Capital Market Line, Efficient Frontier and Relevant Portfolios



The figure showcases the optimized portfolio's location within the efficient frontier, and very close to the tangency portfolio, suggesting it is the optimal feasible portfolio compliant with the client's risk tolerance. The slight deviation from the tangency portfolio reflects the cost of real world constraints that go beyond theory.

Out-of-sample Validation

To validate the model and strategy before the final implementation, a backtesting framework is put in place to assess the portfolio's robustness out-of-sample. Mean-variance optimization depends on the historical data used in its inputs, therefore judging results based only in optimization doesn't ensure a meaningful analysis. Hence why the second half of the ten-year monthly return data sample (from January 2021 to January 2026) is employed for backtesting the portfolio.

Backtesting enables a realistic evaluation of performance and serves as a validation tool for the robustness and applicability of the overall strategy. It also allows for performance comparisons

between the initial optimized portfolio and the overall portfolio benchmark, reinforcing the reliability of the results. These results are part of the decision-making process, as negative outcomes lead to changes to the strategy and allocation, while positive outcomes validate the process and strengthen the conclusions. The rebalancing policy is also crucial to preserve the intended strategy throughout the investment time horizon, and therefore it is incorporated in the backtesting framework as well. Empirical testing of multiple rebalancing frequencies is performed to assess which was the most efficient. After examining the results, annual rebalancing is chosen as the base case.

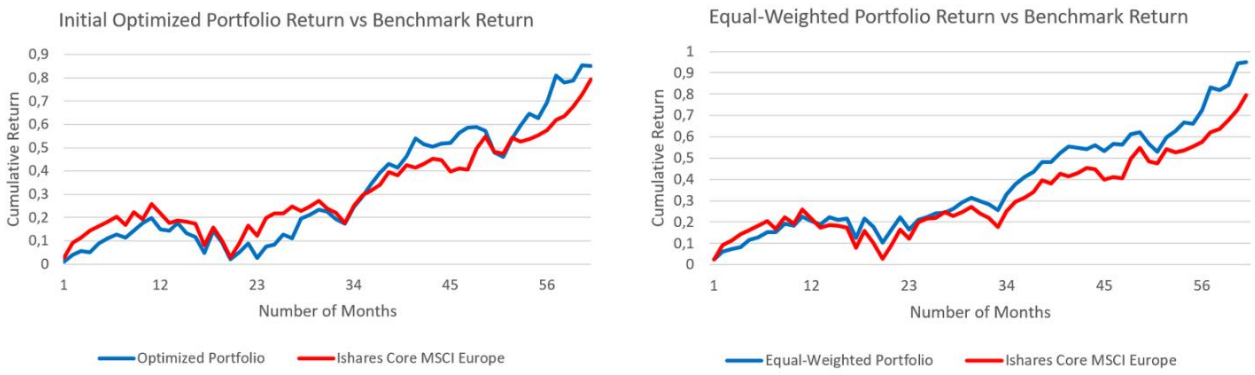
As an alternative method, an equal weighted portfolio is also considered for backtesting. As mentioned before, in-sample Mean-Variance Optimization bears multiple limitations, such as sensitivity to inputs and estimation errors. These limitations often erode most if not all gains from the theoretical optimal portfolio, hence why naïve diversification across equal-weighted portfolios often performs comparably and even out-perform optimized portfolios out-of-sample in terms of Sharpe ratio. These findings suggest this analysis would be incomplete without the inclusion of an equal weighted portfolio as a first benchmark (DeMiguel, Garlappi, & Uppal, 2009). For consistency purposes, the equal weighted portfolio is also rebalanced annually. The results were in line with the literature's findings regarding this matter, with an even more attractive Sharpe ratio relative to the other tested portfolios. These findings also suggest the success of the Strategic Asset Allocation and Security Selection Criteria, as a strong Sharpe ratio is obtained even with no weight derivations from optimization. The table and figures below represent results of the backtesting analysis along with visual comparisons of the attractive portfolios against the overall portfolio benchmark.

Table 5 - Backtesting Results

Portfolio	Expected Return	Standard Deviation	Sharpe Ratio
Optimized With No Rebalancing	10.04%	40.63%	0.90
Optimized With Annual Rebalancing	12.86%	40.53%	1.14
Equal-Weighted	13.71%	34.74%	1.42

This table showcases the portfolio performance relative for each approach, and make evident the efficiency of the rebalancing frequency chosen. These results validate both the initial optimized and the equal-weighted portfolios.

Figure 7 - Initial Optimized Portfolio and Equal-Weighted Portfolio with Annual Rebalancing vs Ishares Core MSCI Europe



This figure demonstrates that the initial optimized portfolio tends to underperform the benchmark in periods of economic contraction and outperform the benchmark in periods of economic expansion, while the equal-weighted portfolio has a very

similar performance to the benchmark in periods of economic contraction and also outperforms the benchmark in periods of economic expansion.

The robust out-of-sample performance of the initial optimized portfolio and the equal-weighted portfolio indicates that on the long-term, both portfolios exceed the benchmark and are able to generate value. Given the positive results consistent with the client's ambitions, the model is considered sufficiently validated, allowing for its application using the most recent data to derive the final recommended allocation.

4.6.2 Final Portfolio Construction

The second phase of this section can now take place, after having the strategy and model validated, the final portfolio weights are obtained using the most recent portion of the ten-year monthly return data sample collected, from January 2023 to January 2026, in order to ensure a forward-looking portfolio design that reflects the most recent macroeconomic market conditions. The methodology remains unchanged to ensure consistency with the validated model.

The following allocation constitutes the final portfolio to be recommended to the client:

Table 6 - Final Security Weights

Security	Asset Class	Weight
XACT OMXS30 ESG UCITS ETF	Equities	0.1%
Amundi MSCI Semiconductors UCITS ETF	Equities	14.9%
SPDR MSCI Emerging Markets UCITS ETF	Equities	0.1%
SPDR MSCI Europe Utilities UCITS ETF	Equities	20.0%
Amundi Global Hydrogen UCITS ETF	Equities	7.4%
SPDR MSCI Europe Energy UCITS ETF	Equities	12.3%
Xtrackers MSCI Europe Health Care Screened UCITS ETF	Equities	0.1%
SPDR MSCI Europe Industrials UCITS ETF	Equities	5.1%
iShares S&P 500 Information Technology Sector UCITS ETF	Equities	4.8%
SPDR MSCI Europe Technology UCITS ETF	Equities	0.1%
Xtrackers II Eurozone Government Bond UCITS ETF	Fixed Income	20.0%
Amundi Euro Government Inflation-Linked Bond UCITS ETF	Fixed Income	10.0%
Xtrackers Bloomberg Commodity ex-Agriculture & Livestock Swap UCITS ETF	Commodities	0.1%
Xtrackers II EUR Overnight Rate Swap UCITS ETF	Cash	5.0%

Figure 8 - Final Asset Class Weights

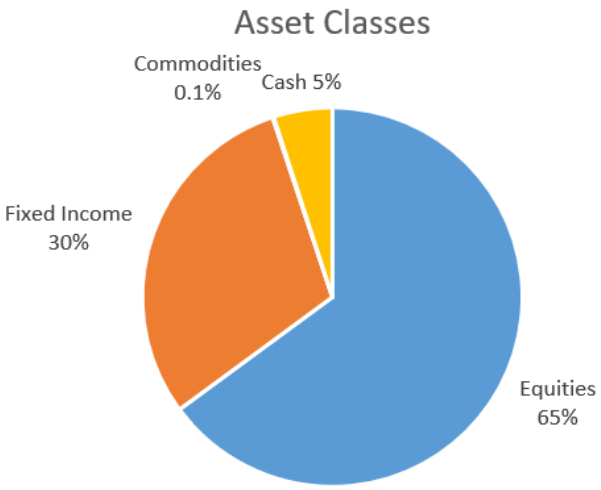
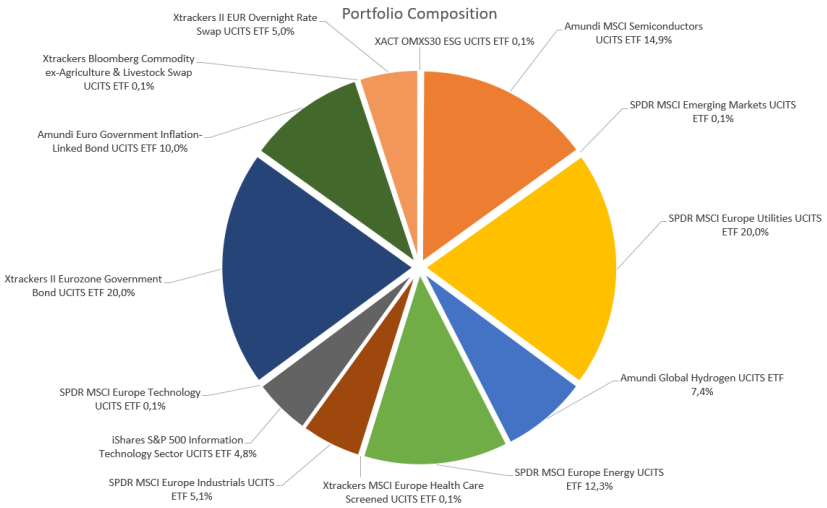


Figure 9 - Final Individual Security Weights



The allocation of the final portfolio is more diversified than the one observed in the initial optimized portfolio, suggesting a more balanced portfolio that is able to gauge performance from varying assets, observed within the equity sleeve, with the technology, energy and utilities sectors all contributing meaningfully to the overall exposure. Therefore, in comparison with the initial optimized portfolio, this suggests a lower concentration risk and dependency on a single sector's performance, improving the overall allocation.

The weight allocation reflects the final optimization outcome, ensuring alignment with current market conditions and diversification among asset classes, industries and sectors. Each asset class serves a strategic purpose, equities serving as the main growth generator, fixed income providing stability, commodities diversifying the growth exposure, and cash accounting for unpredicted events.

It also allows for conclusions regarding the sustainability profile of the portfolio, an aspect the client also wished to be considered.[9] The portfolio is approximately classified as Article 8, meaning that Environmental, Sustainability and Governance characteristics are promoted, or though not the sole investment objective. This outcome is also a result of the security selection criteria, with the sustainability factor in the scoring model, which introduced a tilt towards stronger ESG characteristics and therefore a higher SFDR classification. This allocation showcases a balanced approach, integrating sustainability without sacrificing returns, and contributing to responsible investment.

Based in this allocation, the final portfolios expected performance, characteristics and final optimization results are detailed below:

[9] Since the investment vehicles determined to implement the strategy are exclusively ETFs, this profile was evaluated through the Sustainable Finance Disclosure Regulation (SFDR) framework, as funds report SFDR metrics. The Portfolio approximate SFDR class was assessed through a weighted average of the individual security weights, resulting in a portfolio that is aligned with Article 8 characteristics.

Table 7 - Final Portfolio Characteristics

Portfolio Characteristics	
Expected Return	15.01%
Standard Deviation	25.00%
Sharpe Ratio	1.68

As evidenced, the portfolios expected return exceeds the client's required return fixed at 8.78% annualized return, providing a safety margin that increases the likelihood of meeting the long-term financial objective. This is also positive to counter market uncertainty or estimation errors. The volatility, measured by the portfolios standard deviation is fixed at the client's specific tolerance level of 25%, consistent with the client's moderately aggressive profile, and making full use of the client's risk appetite to generate returns, showcasing an efficient trade-off between risk and return as the portfolio lays on the efficient frontier. The portfolio also exhibits a very attractive Sharpe ratio at 1.68, which should be regarded as an In-Sample result often unrealistic. However, the backtesting results indicate that performance should still be robust Out-Of-Sample, and sufficient to achieve the client's long-term objectives, ensuring an appropriate compensation for the level of risk that he is taking.

Additionally, an equal-weighted portfolio is once again assessed using the same methodology employed now for the final portfolio optimization. As the equal-weighted portfolio did not meet the client's requirements in this final optimization, its implementation was disregarded.

4.7 Monitoring

This section outlines the rules for maintaining the strategic course determined by previously. A concise monitoring framework with clear rules must be in place to provide guidance in decision-making and to enforce discipline across changing market environments and impactful events. This ensures continuous alignment with the client's long-term return objectives, risk tolerance, and constraints. It will also avoid excessive allocation drift and any impulsive or arbitrary decision-making by the advisors. The Final Optimized Portfolio is considered the overall portfolio to be implemented going forward.

The overall portfolio will be monitored monthly to assess if its behaviour is in line with intended. This will take place in terms of return, volatility and allocation drift. These metrics will be analysed to evaluate if the portfolio's risk and return remain on course to achieve targets, in line with the SAA, by enforcing that the weight deviations from target weights are still within the strategic intent. Additionally, the global economic context will also be assessed to assure the suitability of the strategy over time. Market conditions and macro shifts will be monitored to validate the current strategy or make adjustments if context suggests changes.

4.7.1 Rebalancing Policy

Rebalancing of the overall portfolio to its target allocations will take place annually as stated previously. In line with the results detailed in previous sections, this frequency is the one that enables the portfolio to achieve the greatest level of performance. Besides that, this frequency also reduces portfolio turnover, improves cost efficiency and controls allocation drift. In the backtesting framework, the initial optimized portfolio with annual rebalancing had a maximum allocation drift level of 6.42% with such deviations usually reverting in the following periods.

This suggests such drift level is feasible and consistent with strong performance, however drift levels beyond this threshold are unaccounted for, and will be closely monitored. Therefore annual rebalancing serves as the main rebalancing criteria while deviations beyond the historically observed drift level, if persistent for multiple months, serve as additional rebalancing criteria. In this case if the threshold is exceeded for a sustained period, the portfolio will be reviewed and may be rebalanced outside the scheduled date, as this could change the portfolio's risk profile and lead to misalignment with the client's risk tolerance.

4.7.2 Performance Measurement

Performance evaluation is a crucial dimension of monitoring as it assesses if the strategy in place is proving successful. Performance showcases the validity of the strategic process, SAA, Security Selection, Implementation and Portfolio Construction, and underlying issues that must be reworked. Performance will be evaluated quarterly, in line with the client's preference and long-term goals.

The overall portfolio will be evaluated in terms of absolute performance[10], relative performance[11] and relative risk-adjusted performance.[12] Lastly, the overall portfolio will also be evaluated in terms of volatility[13], considering the initial optimization and backtesting range. The In-Sample Final Optimized Portfolio is also designed with respect to the client's risk requirements and remains fully compliant and in line with his risk tolerance, but it is also a before-the-fact estimate. Therefore monitoring ensures the portfolio remains within an acceptable risk level. Lasting deviations beyond the observed backtesting range will be seen as unintended shifts to the portfolio's risk profile, and will lead to analysis that may result in adjustments. For the performance evaluation of each specific asset class, the analysis will be relative for all.[14]

4.8 Risk Analysis

This section provides an assessment of the portfolio's risk across multiple dimensions and methods, with analysis focused in historical data and simulation. For a comprehensive risk analysis, four key risk dimensions were considered: Total risk, market risk, downside risk, and forward-looking risk. This ensures the alignment between the portfolio's characteristics and the client's risk tolerance beforehand, during optimization, and throughout the investment time horizon.

For the purpose of Risk Analysis, its determined that for both risk dimensions, Historical and Forward-Looking, all metrics are computed using the Final Optimized Portfolio weights, as the

[10] Comparison of the portfolio's return against the annualized target return determined specifically in section 3.
[11] Comparison of the portfolio's return against the overall portfolio's benchmark returns.
[12] Comparison of the portfolio's Sharpe ratio against the overall portfolio's benchmark Sharpe Ratio.

[13] Comparison of the portfolio's volatility to the optimization and backtesting volatility range, considering the client's risk tolerance.

[14] Comparison of asset class specific metrics against the asset class specific benchmark. There will be a relative assessment, measured by the absolute return against the respective benchmark, and a risk-adjusted assessment, measured by the Sharpe ratio against the respective benchmark.

portfolio to be implemented, and the full ten-year monthly return data sample collected, ranging from January 2016 to January 2026, with the exception of total risk, which is fixed by design in the final optimization procedure (computed using the final optimization sample ranging from January 2023 to January 2026).

4.8.1 Total Risk

The final optimized portfolio is constructed by MVO, which revolves around maximizing the return for a specific level of risk, an approach that ensures the enhancement of the risk-adjusted return of any given portfolio (Markowitz, 1952). The specific level of risk considered, is determined based on the client's risk profile, engulfing his risk tolerance, and explicit level of volatility he would accept. This risk level was fixed at 25%, measured by the final optimized portfolio's standard deviation, in line with the client's moderately aggressive risk profile. The optimization then derives the greatest possible return for this desired level of risk. This level of volatility is captures by the optimized portfolio's variance and standard deviation, as seen below:

Table 8 - In-Sample Final Optimized Portfolio's Total Risk:

Portfolio Volatility	
Variance	0.52%
Standard Deviation T	25.00%

These final optimization results for the final optimized portfolio volatility are fixed by design, but it's just as important to mention the backtesting framework that the initial optimized portfolio (which also had the same level of volatility fixed by design) is subject to for robustness purposes and the results, which showcase different volatility levels, providing estimates more representative of a real-world context and risk performance. This analysis is undertaken for both the initial optimized portfolio, and the equal-weighted portfolio, both deemed previously as efficient, and also compared to the overall portfolio's benchmark as seen below:

Table 9 - Out-Of-Sample Initial Optimized Portfolio, Equal-Weighted Portfolio and Benchmark's Total Risk

Initial Optimized Portfolio Volatility	
Variance	1.37%
Standard Deviation T	40.53%
Equal-Weighted Portfolio Volatility	
Variance	1.01%
Standard Deviation T	34.74%
Benchmark Volatility	
Variance	1.42%
Standard Deviation T	41.34%

The portfolio's variance and standard deviation capture the uncertainty underlying in the portfolios performance, as they measure the dispersion of returns, and is commonly used as a proxy for total portfolio risk (CFA Institute, 2020). The final optimization result's volatility is set by design In-Sample, showcasing what modelling predicts under typical circumstances, on the other hand the backtesting's results volatility is realized Out-of-Sample, based in real market behaviour, hence why it is expected to be higher.

A key element to better interpret the Out-of-Sample increase in volatility is the behaviour of the benchmark, the Ishares Core MSCI Europe Acc ETF that represents the overall European

market, the client's alternative to the optimized portfolio. As seen in the table, the overall market endured a period of great volatility, led by the macroeconomic context in Europe.

These findings suggest that for the final optimized portfolio, the realized total risk levels may differ from the In-Sample results, with potential temporary losses. This variability leans towards a high risk tolerance and intent to remain invested during drawdown periods, in line with the client's profile.

4.8.2 Market Risk

The final optimized portfolio is compared to the overall market by calculating its Beta. A portfolio's beta measures the sensitivity of its returns to movements in the overall market, indicating how exposed it is to systematic risk (Sharpe, 1964). It is observed at 0.61, which showcases a moderate overall market exposure. This result suggest a considerable ability to produce performance that is not excessively dependent on the overall market.

The Jensen's Alpha for the final optimized portfolio is also calculated. As a risk-adjusted return metric, it measures the excess return of a portfolio in comparison to what would be expected considering its exposure to market risk (Jensen, 1968). This metric is observed at 4.1%, showing a strong outperformance of the overall market (validating the conclusions in the previous paragraph) with these finding being significant at the 99% confidence level.

4.8.3 Downside Risk

For evaluating Downside Risk, multiple methods are employed. The goal is to assess the accuracy of findings by ensuring consistency across all methods. The focus is attributed to Value-at-Risk (VaR). It represents the maximum loss a portfolio can bear in a certain period given a certain confidence level, being interpreted as follows: in the confidence level's corresponding worst cases, the portfolio will not lose more than the Value-at-Risk (Jorion, 2007).The confidence levels considered are 95% and 99% and the time horizon is 1 year.

Value-at-risk: Parametric Approach

This method is used to obtain an analytical solution for the VaR. For a more comprehensive approach, aligned with the reality of financial returns, it was calculated assuming portfolio returns follow a normal distribution, which has thin tails, and a larger center, providing a closed form solution for this metric (Jorion, 2007).

Value-at-risk: Bootstrapping Approach

The next method employed is bootstrapping of 10,000 simulations. This approach allows for sampling with replacement from the full monthly return data sample (January 2016 to January 2026) without assuming any distribution (Efron & Tibshirani, 1993). Once again there are two dimensions considered, bootstrapping the final optimized portfolio returns directly, and bootstrapping asset returns to later rebuild the portfolio. The first dimension allows the preservation of historical volatility, the skewness present in the final optimized portfolio's returns and actual drawdown periods, however it has no regard for the internal structure of the portfolio, meaning the dynamics among assets. Therefore it captures only the historical behavior of the portfolio as a whole, assuming it will continue in the future (Hull, 2018).The second dimension allows

to preserve the asset correlation structure between assets, therefore it can also be useful in terms of accuracy and portfolio mechanics (Jorion, 2007). This methodology assumes monthly re-balancing of the final optimized portfolio weights, therefore in a buy-and-hold framework with annual rebalancing and portfolio weights drifting over time, risk estimates may differ. With this multitude of methods employed to calculate the same metric, we now have an extensive and as accurate as possible set of results at our disposal to interpret, as seen in the table below:

Table 10 - Value-at-Risk across methodologies

VaR Comparison Across Methods		1 Year VaR	Monetary Loss
95% Confidence Level	Parametric	6.7%	12 011 €
	Portfolio Returns Bootstrap	7.4%	13 309 €
	Asset Returns Bootstrap	7.6%	13 673 €
99% Confidence Level	Parametric	13.2%	23 730 €
	Portfolio Returns Bootstrap	14.7%	26 505 €
	Asset Returns Bootstrap	15.1%	27 257 €

According to these results, it is clear that the parametric method seems the most optimistic among all, with lower estimates than the remaining methods, which suggest a strong sensitivity to assumptions, more specifically return and volatility. Both bootstrapping methods provide similar values, within 0.4 percentage points, indicating a stable estimate (and also consistent with both approaches holding the same rebalancing assumption). The bootstrapping estimates are also slightly higher, indicating that when sampling from actual return data without theoretical assumptions, estimates may tend to deteriorate slightly. This may suggest a divergence between model-based and data-based VaR as each approach type provided a different estimate and reached a different consensus on a realistic risk level (Jorion, 2007). However, considering all estimates are still within 1.5 percentage points, this divergence is not considerable enough to be worrying. The range of losses to be expected goes from around 7% to 15%, meaning the downside risk is considerable, but consistent with the portfolio's equity focus and the client's risk profile.

Conditional Value-at-risk: Parametric Approach

To complement the assessment of downside risk, the Parametric Conditional Value-at-Risk under normality assumption is also calculated. Value-at-Risk may provide a threshold for losses within a certain confidence level, it disregards the magnitude of losses beyond that level, while Conditional Value-at-Risk goes further, capturing the average loss in those worst case scenarios (Jorion, 2007).

This metric's results were positive overall, as seen in the table below:

Table 11 - Conditional Value-at-Risk results

Conditional Value-at-risk	1Y CVaR	Monetary Loss
Parametric 95% 1 Year CVaR	10.7%	19 197 €
Parametric 99% 1 Year CVaR	16.4%	29 558 €

The results in this table are relatively close to the Value-at-Risk estimates also obtained by the parametric approach under normality assumption with increases lower than 5%. This demonstrates less severe level of tail-risk, representing cautious estimates for the worst case scenarios.

Both the 95% 1 Year CVaR and the 99% 1 Year CVaR are well inside the client's risk tolerance threshold. This indicates that in the most extreme of scenarios, losses still shouldn't surpass the level deemed acceptable by the client. However it is important to note that potential extreme

events can still not be fully captured by these metrics and lead to losses that exceed these thresholds. In this regard, the fact that these metrics are still well inside the client's risk tolerance indicates a considerable safety margin for such extreme events.

4.8.4 Forward-Looking Risk

The fourth dimension of risk embodied in this analysis forecasts the final optimized portfolio performance to simulate potential future results. To perform this forward-looking assessment of risk and performance of the final portfolio, Montecarlo simulation with 10,000 paths is performed to obtain a realistic forecast of events. This process generates future portfolio value paths, namely ten thousand, based in the final optimized portfolio characteristics, producing a range of outcomes useful for further assessments. It also complements the previous risk analysis, enlarging it to a full distribution (Glasserman, 2004).

Multiple methods are used to ensure consistency of results across different methodologies. With this in mind, the first approach was Montecarlo simulation using bootstrapping. This process has its foundation in the final portfolio's historical returns, resampling them to generate realistic paths. The second approach was Montecarlo simulation using a univariate normal distribution based in the historical returns and standard deviation of the final optimized portfolio, assuming normality in portfolio returns. Both methodologies also implicitly assume the maintenance of the target allocation each month throughout the simulation horizon, therefore in a buy-and-hold framework with annual rebalancing and portfolio weights drifting over time, estimates may differ. The results obtained from both approaches are demonstrated in the following table and figures:

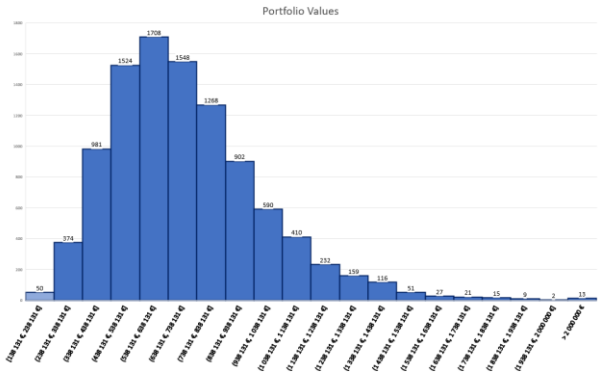
Table 12 - Montecarlo Simulation Results

Portfolio Metrics	Bootstrapping	Univariate Normal Distribution
Mean Final Value	701 300 €	1 437 924 €
Median Final Value	660 286 €	1 000 796 €
Bear Case - 10th Percentile	406 061 €	303 881 €
Bull Case - 90th Percentile	1 049 488 €	2 996 322 €
Standard Deviation of Final Values	266 611 €	1 505 450 €
Probability of Exceeding Target	55%	69%

We can conclude that the bootstrapping approach provides more conservative estimates, with lower values and a smaller range of outcomes, while the Univariate Normal Distribution Approach provides more profitable results, with a much greater range of outcomes, suggesting those higher values may be influenced by outliers. The bootstrapping approach produces a lower value for the mean and median, and holds a slight positive skewness to the right-hand side of portfolio values, while the Univariate Normal Distribution approach exhibits a higher mean and median, consistent with a symmetric distribution as it maintains normality. Uncertainty can also be compared through the standard deviation of final portfolio values and the percentiles representing potential bearish and bullish outcomes. The bootstrapping approach reflects a more realistic range of outcomes, being less affected by outliers, and also having a lower standard deviation of final values. As the Univariate Normal Distribution approach is reliant on theoretical assumptions, it may tend to inflate results, producing unrealistic upwards and downwards paths that impact final values. The probability of exceeding target is also assessed for both approaches, being estimated at 55% for the Bootstrapping approach, and at 69% for the Univariate Normal Distribution approach. These results suggest the Bootstrapping simulation approach provides results more aligned with the observed reality of financial products,

while the Univariate Normal Distribution approach is likely too optimistic. This indicates that the realized final amount could sit in the middle of the two approaches, in line with a moderate final outcome. Overall, both approaches estimate a successful final optimized portfolio that likely meets target.

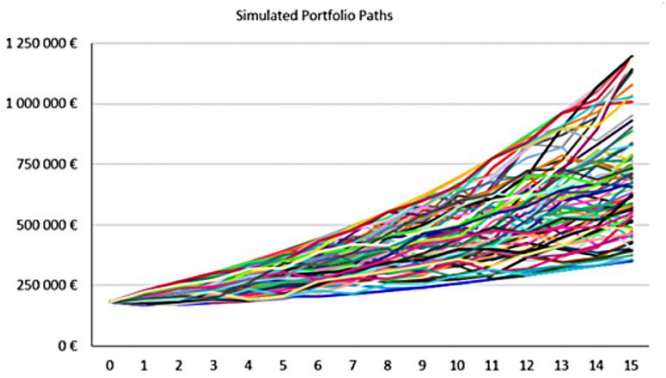
Figure 10 - Montecarlo Bootstrap Distribution of Future Final Portfolio Values



This figure showcases the distribution of future portfolio values, exhibiting a lighter blue color for potential loss outcomes, and a darker blue color for profitable outcomes.

The overall shape shows a concentration in the middle with positive skewness and a long right tail, with most outcomes laying around moderate portfolio growth, around the median value of the simulation. The dispersion in portfolio values also showcases a significant variability in outcomes. Regarding downside risk, its visible in the left-side has a relatively small frequency of lower values, demonstrating there is a chance of underperformance, corresponding to the downside risk analysis previously quantified. Lastly the outcomes visible along the right tail exhibit largely profitable outcomes that extend far beyond target, which suggests the portfolio does hold strong upside potential. In conclusion, most outcomes are reasonable and aligned with the client's long-term financial objectives.

Figure 11 - Montecarlo Bootstrap Simulated Final Portfolio Paths (Winsorized at 5th and 95th percentiles)



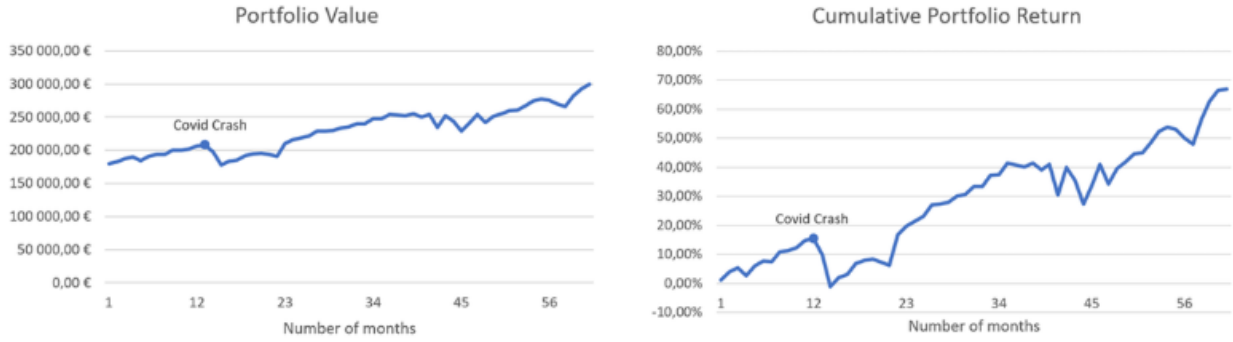
This range of potential future paths allow for valuable conclusions. Within this range, its visible the most density stands around the median from the 460,000 EUR to 790,000 EUR range, showcasing that the typical outcome should be a moderate one. Downside scenarios must also be considered as some paths visibly bear low returns, and some are only able to recover to

values mildly above the 250,000 EUR mark, reinforcing the importance of downside risk assessments and stress-testing. Upside paths also show the portfolio's potential in expansionary contexts, reflecting exponential growth. This is a result of the majority equity exposure of the portfolio and the compounding effect. These results showcase some divergence in outcomes, with a high probability of meeting the client's long-term objectives, but also a significant impact of uncertainty over time that could also include periods of weaker performance.

4.8.5 Stress Testing

In light of the assessed downside risk, stress testing is another crucial component of the risk analysis. The purpose is to simulate a real-world extreme scenario, such as a severe global crash, characterized by increased volatility and significant drawdowns, and respective portfolio behavior. These types of events tend to occur infrequently over decades, however, due to their severity, they must be accounted for. The most recent comparable event is the 2020 Covid-19 crash, which is therefore used as the baseline[15] for this stress-testing framework. With that considered, the final portfolio's value and return were evaluated during the crisis period, producing the results in the figures below:

Figure 12 - Final Portfolio Value and Return during Crisis Period



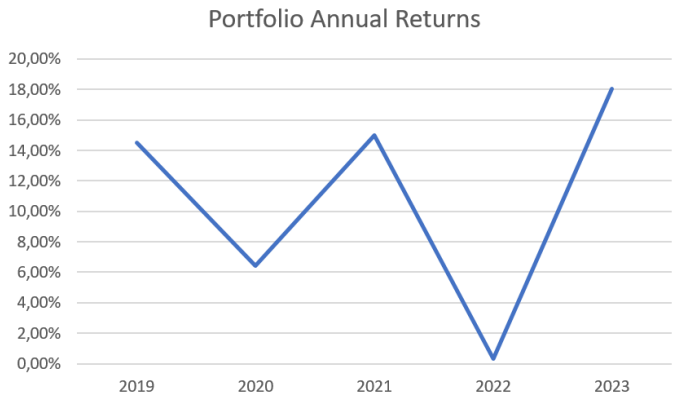
This figure provide a visual representation of this crisis scenario, with the steep descent in both charts around January to March of 2020, when the Covid-19 virus was considered a pandemic.

These results indicate that the crash had a significant impact both in portfolio value and portfolio return, with a significant losses during the outbreak as portfolio value drops to near 178,000 EUR, which amounts to a 1.2% loss from the initial value of 180,000 EUR but a 16.7% loss from all-time highs of 207,000 EUR, eroding all cumulative gains earned to that point in two months. This aggressive decline highlights that the final optimized portfolio can be vulnerable to systemic shocks, enhancing the role of the risk management and monitoring framework defined, especially during periods of intense market stress. To obtain a clearer picture of

[15] The methodology for this analysis is as follows: the final portfolio is constructed and implemented, the asset returns observed during from 2019 to 2023 are used to calculate portfolio metrics, and assess the overall portfolio performance during this phase of global instability, providing an insight on how robust this investment strategy and portfolio are to unexpected events that may trigger periods of lower returns and drawdown.

what a downturn like this could represent to the client, regarding his risk tolerance and maximum accepted loss thresholds, the annual portfolio returns during this period were also estimated, represented by the figure below:

Figure 13 - Final Portfolio Annual Returns during Crisis Period



The figure shows a significant decrease in annual return in the crisis year, and high volatility annual returns in the following years, due to the instability at the macro context during that period.

These results demonstrate that in a major crisis scenario, losses stay within the client's risk tolerance, providing real-crisis validation to the portfolio's robustness. It is also relevant to mention speed and recovery, as the final portfolio endures only a single month of drawdown, returning to profitability the month after the crash. The final portfolio was also able to return to all-time highs in around 9 months, which is still a long period of recovery, but given the context, considered acceptable. Overall, the portfolio does recover and grows higher a couple of years after a global crisis, as demonstrated by the steep ascent in the portfolio value and cumulative portfolio return charts and by the significant returns in the portfolio annual returns chart in the following years, showcasing losses remain short-term and not permanent, suggesting the viability of the portfolio as a long-term strategy.

The risks identified in this section will be continuously monitored by the framework established in Section 4.7, where multiple metrics will be regularly assessed against predetermined benchmarks, ensuring deviations are rapidly identified and corrected if necessary, maintaining the alignment with the client's long-term objectives and risk tolerance.

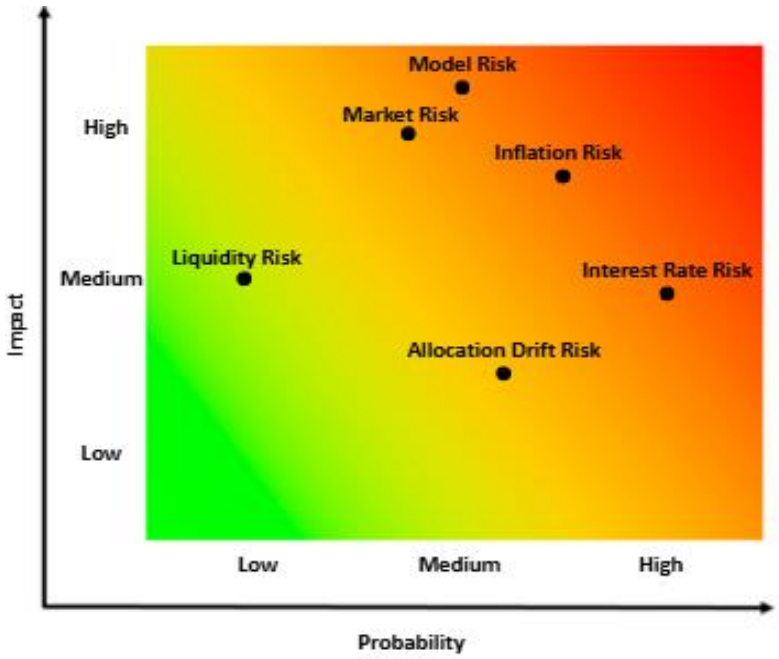
The previous methods emphasize the quantitative side of risk, but alongside that, there is also a set of qualitative risks to consider. For that a risk matrix is produced to provide a better understanding of those qualitative risks and mitigation practices, represented by the table and visual representation below:

Table 13 - Risks, Impact and Mitigation

RISK	DESCRIPTION	PORTFOLIO IMPACT	MITIGATION
MARKET RISK	This is the greatest risk faced by the portfolio. The major exposure to global equity markets means that the portfolio will have a big sensitivity to their inherent volatility, as or though the portfolio's beta is moderate, it's still considerably linked to the overall market.	Increased Volatility, as seen during Backtesting / Significant Drawdown for long periods, as observed during stress-testing / Correlated losses across equities.	Diversification of the portfolio's return capacity across asset classes / Fixed-Income Allocation / Rebalancing and Monitoring / Long-term time horizon provides more time to recover from potential losses.
INTEREST RATE RISK	Changes in the interest rate of the portfolio's government bonds. Decreases can be associated to unexpected crisis or economic downturns, while hikes have been linked to inflation control in the last few years.	Bond price fluctuations / Overall portfolio pressure, as decreases in rates due to economic contraction would most likely mean underperformance of the growth assets, and increases in rates in case of inflationary pressures may stall the portfolio's growth.	Diversification across asset classes / Fixed Income's inverse correlation with equities.
INFLATION RISK	Erosion of real returns due to inflationary pressures reducing purchasing power, which is the most important aspect regarding the client's long-term goals.	Long-term Real return objective not met due to higher than expected inflation	Equities as the main return generator tend to grow higher than inflation / Inflation hedging equity allocation. / Inflation hedging fixed-income allocation. Inflation hedging commodity allocation.
LIQUIDITY RISK	Limitations in trading and order execution of assets / Markets not liquid enough to trade quickly at fair market value without significant price impact.	Higher transaction costs, especially during periods of downturn / Struggles in executing rebalancing orders. / Deviations from target allocation not quickly or easily corrected.	Multitude of implementation filters part of the Security Selection Process / Efficient rebalancing frequency was deemed to be low, at only yearly rebalancing.
MODEL RISK	Another of the greatest risks present in the portfolio, the risk that the models used for portfolio construction produce inaccurate estimates and misleading results.	Under or overestimation of the portfolio's risk and returns, distorting conclusions about the portfolio's properties / Misalignment with the client's long-term returns objectives and risk tolerance, resulting in failure to achieve the target goals / Inefficient SAA, Security Selection, Optimization Process, and Backtesting framework / Inaccurate estimation of risk metrics and stress-testing in risk analysis / Inaccurate estimation of future performance in simulation.	Use of multiple methodologies whenever possible, having portfolio construction validated by Backtesting, and using several methods to assess risk metrics and simulation / Stress-testing of extreme downturn scenarios / Continuous Monitoring framework to allow for quick detection and corrective action in case of deviations.
ALLOCATION DRIFT RISK	Risk that the intended allocation deviates from strategy and cannot be adjusted efficiently	Allocation can drift significantly from the SAA, which leads to a distortion of strategy, performance inefficiencies and an increase in transaction costs to bring the allocation back to its target weights.	Rebalancing framework in place to prevent such deviations, with efficient annual rebalancing or if deviations surpass the level accounted for in Backtesting at 6.42% / Continuous monitoring framework detects such deviations before they become significant.

For a better representation of the most relevant risks, a risk matrix is presented for visual representation:

Figure 14 - Risk Matrix



5 Investment Policy Proposal

This section synthesises the process behind this IPS culminating the analysis into a concrete recommendation. The core of the strategy lays in the SAA with an allocation of 55-65% to growth assets, and 35-45% to defensive assets. This strategy is built upon the framework of John Y. Campbell and Luis M. Viceira (2002) by calibrating a risk tolerance function that provides asset allocation bands that capture Mr. Santos´s, specific profile and long-term return objectives, risk tolerance and constraints.

The final portfolio is able to surpass the 8.78% annual return requirement and maintain volatility within the risk tolerance of 25% while following a disciplined approach respectful of constraints. It appropriately compensates Mr. Santos for the risk he is taking yielding a Sharpe ratio of 1.68 (In-Sample). The long-term time horizon supports risk taking and allows equities to work as the growth engine to enhance returns, fixed-income to provide stability and reduce risk, commodities to diversify growth, and cash to be present for quick action if needed. This strategy's main strengths rely on distinctive aspects. Its robust portfolio design through an initial optimization and extensive Backtesting framework provides out-of-sample results for both the initial optimized portfolio and an equal-weighted portfolio. This validates the methodology before implementation, and only then, after the strategy is verified capable of building optimal portfolios that meet requirements under constraints, a final optimization is performed using the latest market data to construct the final portfolio. Comprehensive risk analysis and simulation approaches, by evaluating risk and future performance simulation using complementary methodologies that produced similar enough results, seen as the most reliable estimate range for risk and future performance measurement, reducing dependency on a single method. The evidence-based rebalancing and monitoring framework that determine the most efficient frequency and drift threshold empirically, ensuring transaction costs are managed effectively and that the risk-return trade-off of the portfolio is maximized. And lastly the multi-layered security selection process including macroeconomic strategic views, implementation filters, factor-based analysis and ESG considerations to produce an allocation that ensures consistency between strategic views and individual securities. Regarding risks, there are significant risks that can have an impact in performance, which will be continuously monitored and contained by risk mitigation measures detailed in monitoring and risk analysis.

In summary, the proposed final optimized portfolio and its SAA of 65% in growth assets and 35% in defensive assets is expected to meet and surpass Mr. Santos long-term financial objectives while being aligned with his moderately aggressive risk tolerance over the 15 year time horizon. The portfolio encompasses a disciplined asset allocation framework, diversification across the globe, and a cost-efficient implementation by resorting to ETFs as the vehicles for implementation. This structure ensures an efficient portfolio that follows a steady course to achieve the objectives, and that unintended deviations are promptly corrected, providing a strong risk-adjusted performance with a high probability of achieving Mr. Santos ambitious goals when compared to other investment alternatives. The advisory team therefore recommends Mr. Santos the implementation of the final optimized portfolio as the main investment strategy.

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Appendix

Table 14 - Appendix A1 - Henrique Santos Client Profile

Field	Value
Client Name	Henrique Santos
Age	30
Nationality	Portuguese
Residence	France
Occupation	IT Professional
Education	B.A. in Management
Current Investable Assets (€)	180 000
Target Capital (Net) (€)	500 000
Time Horizon (Years)	15
Target Return	8,78 % nominal (≈ 6,78 % real assuming 2 % inflation)
Risk Tolerance	Moderately High
Liquidity Needs	Low
Currency	EUR
Constraints	No leverage; No Shorting; Low concentration
ESG	Considered
Investment Goal	Build wealth for repatriation and financial independence
Instruments	Low-cost ETFs
Rebalancing Policy	Annual or exceeding backtesting threshold

Table 15 - Appendix A2 - Henrique Santos Questionnaire

Question	Client Answer
What is your primary investment goal? - (5 pts) Capital preservation - (10 pts) Income - (15 pts) Long-term growth	(15 pts) Long-term growth
When will you access the funds? - (5) < 3 yrs - (10) 3–10 yrs - (15) > 10 yrs	(15) > 10 yrs
What would be your reaction to a 25% loss in a single year? - (5) Sell all - (8) Sell part - (12) Hold - (15) Buy more	(12) Hold
Are you experienced in financial markets? - (5) No - (8) Somewhat - (10) Yes - (12) Very	(8) Somewhat
How important is liquidity for you? - (5) Very - (8) Somewhat - (12) Low - (15) Not important	(12) Low
How would you describe your risk attitude? - (5) Avoids - (10) Accepts some - (15) Comfortable	(10) Accepts some
What annual return would satisfy your expectations? - (5) ≤ 3 % - (10) 3–6 % - (15) 6–9 % - (18) > 9 %	(15) 6–9 %
Do you prefer active management or passive indexing? - (5) Passive/indexing - (10) Both - (15) Active	(5) Passive/indexing
How important are ESG factors in your investment decisions? - (5) Very important - (10) Somewhat considered - (15) Not important	(10) Somewhat considered
How often do you wish to review portfolio performance? - (5) Annually - (8) Quarterly - (10) Monthly	(8) Quarterly

Table 16 - Appendix A3 - Questionnaire Score, Interpretation, Grading and Mapping to RRA

Category	Score
Total Points	110/145 ≈ 76/100
Risk Category	Moderately Aggressive (Growth)

Score 0-100	Risk Profile
0 – 40	Conservative
41 – 60	Moderate
61 – 80	***Moderately Aggressive (Growth)***
81 – 100	Aggressive (Growth)

RRA Coefficient 0-10	**Risk Profile**
6-10	Conservative
4-6	Moderate
3-4	***Moderately Aggressive (Growth)***
1-3	Aggressive (Growth)

Table 17 - Appendix A4 - Factor Scoring Model Metrics

Factor	**Metrics**
Growth	5Y Sales Growth / 5Y Earnings Growth / Next Year Earnings Growth Estimate
Valuation	Price-to-earnings ratio (P/E) / Price-to-book ratio (P/B)
Quality & Stability	Profitability - Return On Equity / Return On Assets / Profit Margin Leverage - Debt to Book Value / Debt to Market Cap / Debt to Assets Variability - Income Variability / Cash Flow Variability / Sales Variability Volatility - Beta / Residual Volatility
Momentum	Long-Term Reversal
ESG Integration	Sustainable Finance Disclosure Regulation (SFDR) sustainable investment minimum %

Figure 15 - Appendix A5 - Individual Asset Statistics

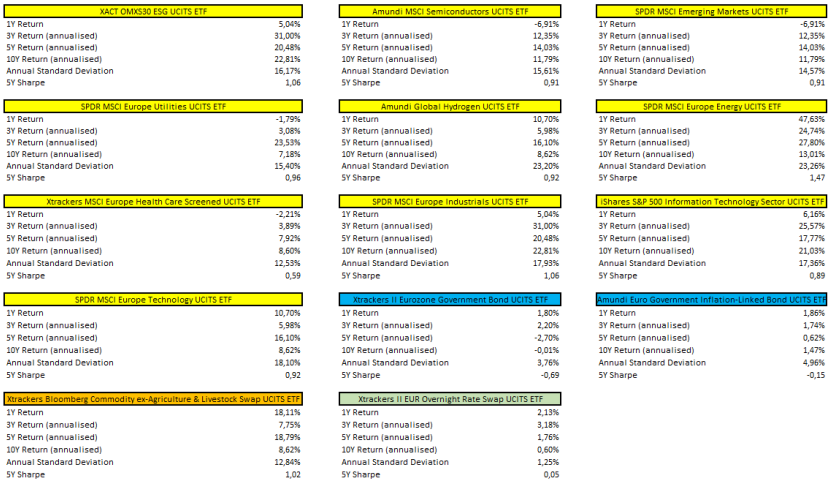

Table 18 - Appendix A6 - Portfolio ETFs Description and Category

Asset	**Ticker**	**Asset Category**	**Description**
XACT OMXS30 ESG UCITS ETF	X3A1 GR	Equity Large Cap	XACT OMXS30 ESG UCITS ETF is a UCITS-compliant exchange-traded fund registered as a "nationell" fund in Sweden. The objective of the Fund is to replicate the OMX Stockholm 30 ESG Responsible Index.
Amundi MSCI Semiconductors UCITS ETF	CHIP FP	Equity Technology	Amundi MSCI Semiconductors UCITS ETF compliant Exchange-traded Fund domiciled in Luxembourg. The Fund's investment objective is to track the performance of MSCI ACWI Semiconductors & Semiconductor Equipment ESG Filtered Net Total Return Index.
SPDR MSCI Emerging Markets UCITS ETF	SPYM GR	Equity Emerging Markets Global	State Street SPDR MSCI Emerging Markets UCITS ETF is an open ended, UCITS compliant exchange-traded fund domiciled in Ireland. The Fund's objective is to track the performance of the emerging equity markets as represented by the MSCI Emerging Markets Index. The Fund invests in physical securities included in the index.
SPDR MSCI Europe Utilities UCITS ETF	STUX IM	Equity Utilities	State Street SPDR MSCI Emerging Markets UCITS ETF is an open ended, UCITS compliant exchange-traded fund domiciled in Ireland. The Fund's objective is to track the performance of the emerging equity markets as represented by the MSCI Emerging Markets Index. The Fund invests in physical securities included in the index.

Amundi Global Hydrogen UCITS ETF	ANRJ FP	Equity Energy	Amundi Global Hydrogen UCITS ETF is an open-end, UCITS compliant exchange-traded fund incorporated in France. The Fund aims to replicate as closely as possible, the performance of the Bloomberg Hydrogen ESG Index.
SPDR MSCI Europe Energy UCITS ETF	STNX IM	Equity Energy	State Street SPDR MSCI Europe Energy UCITS ETF compliant exchange traded fund incorporated in Ireland. The Fund's objective of the Fund is to match the performance of the MSCI Europe Energy 35/20 Capped Index.
Xtrackers MSCI Europe Health Care Screened UCITS ETF	DXSE GR	Equity Health	Xtrackers MSCI Europe Health Care Screened UCITS ETF physically replicates the performance of the MSCI Europe Health Care Screened 20-35 Select Index. The ETF offers direct investment in European equities classified in the health care GICS sector with an ESG screening methodology.
SPDR MSCI Europe Industrials UCITS ETF	NDUS LN	Equity Industrials	State Street SPDR MSCI Europe Industrials UCITS ETF is a UCITS compliant exchange-traded fund incorporated in Ireland. The Fund's objective is to match the performance of the MSCI Europe Industrials 35/20 Capped Index.
iShares S&P 500 Information Technology Sector UCITS ETF	QDVE GR	Equity Technology	iShares S&P 500 Information Technology Sector UCITS ETF is an exchange-traded fund incorporated in Ireland. The Fund aims to track the performances of the S&P 500 Information Technology Index.
SPDR MSCI Europe Technology UCITS ETF	ITEC LN	Equity Technology	SS SPDR MSCI Europe Technology UCITS ETF is an exchange-traded fund incorporated in Ireland. The Fund's objective is to match the performance of the MSCI Europe Technology 35/20 Capped Index.
Xtrackers II Eurozone Government Bond UCITS ETF	XGLE GR	Global Government Bond	Xtrackers II Eurozone Government Bond UCITS ETF physically replicates the performance of the iBoxx® Euro Sovereigns Eurozone Total Return Index. The ETF offers direct investment in Eurozone government bonds. Only Investment grade bonds are included. Diversified across countries and across the yield curve. This is one of the Xtrackers Core funds.
Amundi Euro Government Inflation-Linked Bond UCITS ETF	LYQ7 GR	Global Inflation-Protected Bond	Amundi Euro Government Inflation-Linked Bond is a UCITS compliant Exchange Traded Fund incorporated in Luxembourg. The Fund seeks to track the performance of the Bloomberg Euro Government Inflation-Linked Bond Index.
Xtrackers Bloomberg Commodity ex-Agriculture & Livestock Swap UCITS ETF	XSVT GR	Diversified Commodity	Xtrackers Bloomberg Commodity ex-Agriculture & Livestock Swap UCITS ETF synthetically replicates the Bloomberg ex-Agriculture & Livestock 15/30 Capped 3 Month Forward Index. The ETF offers exposure to a diversified basket of commodities.
Xtrackers II EUR Overnight Rate Swap UCITS ETF	XEOD GR	Government Money Market	Xtrackers II EUR Overnight Rate Swap UCITS ETF synthetically replicates the performance of the Solactive ESTR +8.5 Daily Total Return Index. The ETF reflects the performance of a deposit earning interest at the Euro short term rate (ESTR).

Source: Bloomberg Terminal

Figure 16 - Appendix A7 - Equity ETF investable universe vs Equity Factor ETF investable universe

Elegible Equity ETFs after Implementation Filters	248
Elegible Equity Factor ETFs after Implementation Filters	69 *72% decrese*

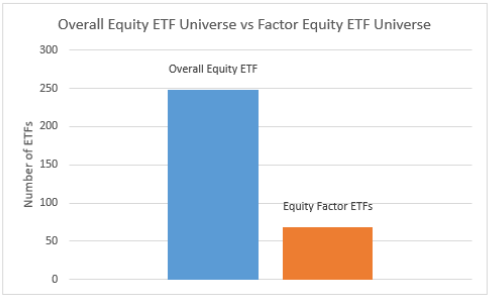

Table 19 - Appendix A8 - Asset Correlations

	X3A1 GR	CHIP FP	SPYM GR	STUX IM	ANRJ FP	STNX IM	DXSE GR	NDUS LN	QDVE GR	ITEC LN	XGLE GR	LYQ7 GR	XSVT GR	XEOD GR
X3A1 GR	1													
CHIP FP	0,594207	1												
SPYM GR	0,707949	0,741882	1											
STUX IM	0,497485	0,287834	0,539416	1										
ANRJ FP	0,582879	0,241337	0,469257	0,470851	1									
STNX IM	0,589933	0,246194	0,483068	0,476495	0,998321	1								
DXSE GR	0,597529	0,29828	0,367971	0,540182	0,39558	0,398807	1							
NDUS LN	0,90777	0,517818	0,705712	0,585683	0,636421	0,643297	0,563226	1						
QDVE GR	0,680851	0,517655	0,511244	0,344734	0,416369	0,426003	0,567771	0,745881	1					
ITEC LN	0,802845	0,518619	0,579931	0,547386	0,542782	0,548039	0,624951	0,855115	0,819837	1				
XGLE GR	-0,08662	0,109278	0,093671	0,500283	-0,07541	-0,06844	0,136728	0,03166	-0,02857	0,014791	1			
LYQ7 GR	0,335588	0,337958	0,469968	0,697719	0,244897	0,246936	0,261242	0,472435	0,289187	0,394478	0,733902	1		
XSVT GR	0,42519	0,278865	0,466407	0,286982	0,658672	0,664528	0,189289	0,491329	0,358015	0,336528	-0,03861	0,234474	1	
XEOD GR	-0,02914	0,257162	0,033628	-0,06658	-0,14913	-0,13488	-0,08547	0,000395	0,215508	0,1112	0,138205	0,03457	-0,22387	1

Table 20 - Appendix A9 - Rebalancing Frequencies Empiric Results

Rebalancing Frequency	Return	Standard Deviation	Sharpe Ratio
Monthly Rebalancing	10.04%	40.63%	0.90
Quarterly Rebalancing	11.99%	40.19%	1.08
Semi-Annual Rebalancing	12.66%	41.15%	1.11
Annual Rebalancing	12.86%	40.53%	1.14

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