

**MASTER OF SCIENCE IN  
FINANCE**

**MASTERS FINAL WORK  
PROJECT**

INVESTMENT POLICY STATEMENT FOR INDIVIDUAL INVESTORS:

MEDIUM-LOW RISK AVERSION CLIENT

MULTI-ASSET BALANCED PORTFOLIO

HENRIQUE CRESPO CORREIA

OCTOBER 2023

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**SUPERVISOR: PEDRO RINO VIEIRA**

**OCTOBER 2023**

## Abstract

This Investment Policy Statement (IPS) presents a comprehensive investment plan customized for Mr. Bing, with the primary objective of funding his retirement within a 25-year investment horizon. The plan combines principles of value investing with a growth focus while accounting for investor behavior with a balanced asset allocation approach, drawing on Modern Portfolio Management principles, the investment philosophies of Charlie Munger, Warren Buffet, Mohnish Pabrai, Benjamin Graham and Peter Lynch while also taking into consideration other finance scholars' comments on Investor Behavior such as Hersh Shefrin, Gregory Curtis, Fernando Braga de Matos, Robert A. Nagy and Robert W. Obenberger to optimally align with the client's moderate-aggressive risk tolerance to mitigate risk exposure. The portfolio will be structured to invest partially in undervalued equities according to future growth potential and Fixed-Income ETFs to promote capital appreciation, alongside with other inflation hedges, such as gold and government bonds to ensure capital preservation. To maintain a well-rounded approach, the IPS includes various policies encompassing client evaluation, risk analysis, portfolio construction, and performance measurement, all in accordance with the recommended standards by the CFA institute. Furthermore, the IPS delves into investment allocation strategies, expected returns and risk analysis methodologies. Finance methodologies such as the Fama-French Five Factor Model, MVO (Mean-Variance Optimization) of the equity portfolio alongside with the Efficient Frontier and Capital Market Line will be employed to assess expected returns and potential optimal asset allocations. Additionally, the various portfolio risks will be studied using the concept of Correlation between the equity assets chosen, Monte Carlo simulations on Value-at-Risk (VaR), Scenario Analysis including the Black-Swan concept developed by Nassim Nicholas Taleb and finally including with the overall Risk Matrix to properly address the portfolio rebalancing needed to manage Mr. Bing's requirements. In conclusion, this IPS will attain to provide a well-structured and thoroughly considered investment plan tailored to the specific needs of the client, combining a prudent mix of value-based investing and diversified asset allocation to achieve their retirement goals within the designated investment timeframe.

JEL classification: C6; G02; G11; G12; G17

Keywords: Asset Management; Modern Portfolio Theory; IPS; Value Investing; Monte-Carlo Simulation; Balanced Investment Strategy, Fama-French Five Factor Model, Behavioral Finance, Investor Behavior, Minimum-Variance Optimization

## Resumo

Este *Investment Portfolio Statement* (IPS) apresenta um plano de investimento personalizado para o Sr. Bing, com o objetivo principal de financiar a sua reforma num horizonte de investimento de 25 a 30 anos. O plano combina princípios de investimento em valor com foco no crescimento, considerando o comportamento do investidor através de uma abordagem equilibrada de alocação de ativos. Com base nos princípios da Gestão Moderna de Portfólios e nas filosofias de investimento de Charlie Munger, Warren Buffet, Mohnish Pabrai, Benjamin Graham e Peter Lynch assim como considerando comentários de outros académicos de finanças sobre o Comportamento do Investidor, como Hersh Shefrin, Gregory Curtis, Fernando Braga de Matos, Robert A. Nagy e Robert W. Obenberger este IPS pretende alinhar-se otimamente com a tolerância ao risco moderado-agressiva do cliente. O portfólio será estruturado para investir parcialmente em ações subvalorizadas de acordo com o potencial de crescimento futuro e *ETFs* (*Exchange Traded Funds*) de Renda Fixa para promover a valorização sustentável e diversificada do capital, juntamente com outros mecanismos de proteção contra a inflação, como ouro e títulos governamentais, garantindo a preservação do capital. Para manter uma abordagem completa, o *IPS* inclui várias políticas que englobam avaliação do cliente, análise de risco, construção de portfólio e medição de desempenho, tudo em conformidade com os padrões recomendados pelo Instituto CFA. Além disso, aprofunda estratégias de alocação de investimentos, retornos esperados e metodologias de análise de risco. Metodologias financeiras como o *Fama-French Five Factor Model*, *MVO* (*Mean-Variance Optimization*) do portfólio de ações juntamente com a *Efficient Frontier* e a *CAL* (*Capital Allocation Line*) serão empregues para avaliar retornos esperados e potenciais alocações de ativos ideais. Adicionalmente, os vários riscos do portfólio serão estudados utilizando o conceito de Correlação entre os ativos de ações escolhidos, simulações de Monte Carlo sobre o Valor-em-Risco (*VaR*), Análise de Cenário incluindo o conceito de *Black Swan* desenvolvido por Nassim Nicholas Taleb e, finalmente, incluindo a Matriz de Risco global para devidamente abordar o reequilíbrio do portfólio necessário para gerir os requisitos do Sr. Bing. Em conclusão, este *IPS* pretende fornecer um plano de investimento bem estruturado e cuidadosamente considerado, adaptado às necessidades específicas dos clientes, combinando uma mistura prudente de investimento baseado em valor e alocação diversificada de ativos para alcançar seus objetivos de reforma dentro do prazo de investimento designado.

Classificação JEL: C6; G02; G11; G12; G17

Palavras-Chave: Asset Management; Modern Portfolio Theory; IPS; Value Investing; Monte-Carlo Simulation; Balanced Investment Strategy, Fama-French Five Factor Model, Behavioral Finance, Investor Behavior, Minimum-Variance Optimization

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## 1. Executive Summary

This Investment Policy Statement (IPS) serves as a comprehensive investment strategy tailored for Mr. Bing, with a primary objective of securing his retirement over a 25-year investment horizon. The plan integrates principles of value investing, considering investor behavior, and employs a balanced asset allocation approach.

It draws inspiration from the Modern Portfolio Management principles, incorporating the investment philosophies of renowned figures like Charlie Munger, Warren Buffet, Mohnish Pabrai, Benjamin Graham, and Peter Lynch. "To us, investing is the equivalent of going out and betting against the pari-mutuel system. We look for the horse with one chance in two of winning which pays you three to one. The objective is to look for a mispriced gamble." (Charlie Munger, 1990) Furthermore, the team also takes into consideration other finance scholars' comments on Investor Behavior such as Hersh Shefrin, Gregory Curtis, Fernando Braga de Matos, Robert A. Nagy, and Robert W. Obenberger. By combining MPT (Modern Portfolio Theory), Value Investing and Behavioral Finance models in our work, we stand the best chance of designing, implementing, and maintaining portfolios that will prove acceptable to our clients and that will prove productive to our clients' wealth. (Gregory Curtis, 2004)

Our IPS adheres to various policies encompassing client evaluation, risk analysis, portfolio construction, and performance measurement, all in accordance with the esteemed standards set by the CFA Institute. Furthermore, to cater to the client's moderate-aggressive risk profile, we've established general allocation strategies, categorized based on the assessed risk tolerance level. This assessment is conducted through a comprehensive financial investing questionnaire in consultation with the client.

To achieve the client's expectations of at least 9% yoy over a 25-year investment time-horizon without losing 30% in a 252 trading days time span, and having a budget of 100.000\$, the portfolio will be structured to invest mainly (65%) in undervalued equities and partially in a Fixed-Income Long-Term Corporate Bond ETF (20%) to foster capital appreciation. Additionally, to hedge from inflation and increased interest rates, it will include assets such as gold (5%) and 13-week U.S Treasury Bills (10%) (yielded to maturity to ensure risk-free capital preservation). The IPS provides a detailed outline of our selected investment allocation, security selection with a Bottom-Up Approach including a Macro-Economic Analysis on the Investment Landscape and Fundamental Screening on equity, and portfolio composition.

The Expected Returns, Volatility and Betas of the Equity Portfolio were computed using the Fama French Five-Factor Model with the usage of the covariance-variance matrix derived from the Betas obtained from the linear regression between the securities returns and the Fama-French Factors' historical data totalizing roughly a 18% E(R) and 14% volatility after Minimum Variance Optimization (maximization of the Sharpe Ratio) outperforming the established benchmark (S&P 500).

On the other hand, to obtain the Returns and Volatility of the remaining securities the investment team used the average and standard deviation of the historical returns, respectively. Averaging 4,7% E(R) and 10,8% Volatility in the Fixed Income category, 9% with 16% std deviation in the gold category and 3,1% with no risk associated in the 13 Week U.S T-Bills as the latest will be yielded to maturity.

Finally, we constructed an overall portfolio encompassing the various asset classes, in our computations to develop the MVO weights on the total portfolio, the calculation of the variance-covariance matrix between the risky assets was limited to historical return data from 2015 forward due to the lack of the adjusted close share price from PayPal (Ticker: PYPL) which had its IPO that same year, therefore, to keep- the efficient portfolio estimations granted by the usage of the Fama French Five-Factor Model on the equity portfolio the investment team decided to use insights provided by Novo Banco and Vanguard using the Efficient Frontier portfolio with the Capital Market Line for comparison matters only. With the asset allocations of 65% in equity, 20% in Fixed Income, 5% in Gold and 10 % in US T-Bills the investment team obtained a final Expected Return of 13,8% with a standard deviation of 12,41% with a Weighted Average Market-Rf Beta on the Equity Portfolio of 0,91. In order to further

devolve on the return of the total portfolio during the 25 year investment time horizon, we employ a Monte Carlo Simulation to project expected returns: with a 99.9% Confidence Level the team can state that a final portfolio value of 354.409,71\$ will be attained totalizing a 5,19% Year-on-Year Return and with a 95% Confidence Level we can confirm that the investor's expectation of achieving 9% yoy return will be met.

Additionally, to comprehensively assess risk, we conducted a thorough analysis firstly giving insights on the portfolio Volatility, Average Mkt-Rf Beta and Sharpe Ratio and how each asset class compares to the equivalent benchmark then recognizing how different assets move in relation to one another to guide optimal rebalancing being the correlation matrix simply used as a risk analysis tool and not to obtain mean-correlation optimization as the mean-correlation portfolio is not efficient simply due to the fact that a mean-variance portfolio offers lower variance and this strategy may deform the risk-structure in a nonlinear manner. (Manuel Tarrazo, 2013). Furthermore, we employed a portfolio sectorial concentration analysis to ensure that there is not an excessive exposure to a respective economic sector being the largest exposure to Consumer Cyclical equities totalizing 32,5% of the portfolio, hedged by the Fixed-Income ETF position, gold, and T-Bills. Afterwards, the team assessed Value-at-Risk (VaR) and CVaR probabilities over 252 trading days using the Monte Carlo Simulation Method obtaining with a 0,1% Significance Level a value of 23,29% of maximum loss over a 1-year time span, aligned with the client objective of maximum loss of 30% during the considered time period and a slightly increased Expected Shortfall (CVaR) of 31,54%.

In order to completely understand the portfolio risk associated with market conditions, the team conducted a scenario analysis comparing the base scenario with a bull market scenario, a bear market scenario and a black-swan market scenario, a concept developed by Nassim Nicholas Taleb representing an event that it's unexpected and beyond the realm of regular predictions, by stressing the variables of Expected Return and Volatility to obtain the 25-year portfolio value estimations and VaR/CVaR estimations using the Monte Carlo Simulation Method: With a 5% Significance Level the investment team obtained a 11,29% YoY Return with a 1-year VaR and CVaR of 1,95% and 18,31%, respectively, for the Bull scenario. A 0.39% YoY Return with a 1-year VaR of -15,94% and an Expected Shortfall of 25,12% for the Bear scenario and a -8.69% YoY Return with a 1-year VaR of -28,79% for the Black-Swan scenario.

To finish our portfolio risk assessment the team developed a Risk Matrix. By plotting the likelihood of an event against its severity, the matrix provides clarity on the prioritization of risks, ensuring that focus and resources are channeled towards managing the most impactful ones. The highest impacting risks are: Climate Change/ESG, Economic deceleration (Recession), Political Instability, Shifts in Global Trading directly impacting the Portfolio's Companies, Market Crash (Bear Market / Black-Swan Event) and Global Financial System Instability. Finally, our IPS delves into the portfolio rebalancing needs arising from weight deviations from each asset class on the total portfolio and increased Expected Annual Standard Deviation.

In conclusion, this IPS was meticulously crafted to provide a well-structured investment plan tailored to meet the unique needs of the client. It combines the principles of value-based investing with diversified asset allocation to help them achieve their retirement objectives within the designated investment timeframe.

It's important to note that this IPS underscores that the desired long-term investment strategy may differ from short-term expected performance and that past performance does not guarantee future returns.

## 2. Investment Policy Statement

### 2.1 Scope and Purpose

The purpose of this investment policy statement is to guide the management of Mr. Bing's investment portfolio in alignment with our company's established investment processes (referred to as the "client" hereafter). This document serves to enhance customer transparency by outlining how our wealth management firm develops personalized investment portfolios and implements various risk management techniques. By offering insights into our recommended allocation strategy, this report aims to provide clients with a deeper understanding of our decision-making process and instill confidence in the assessments made by our investment team.

#### Investor Information:

- Name: Mr. Chandler Bing
- Current Marital Status: Single
- Date of Birth (Age): 23<sup>rd</sup> of May 1991 (32 years old)
- Occupation: Mr. Bing is employed as a marketing manager of a Japanese enterprise in the US, working 100% from home.
- Total annual gross income: \$125.000.000
- Savings: \$100.000. Intending to invest such amount.
- Housing Status: Apartment renting in Las Vegas, Nevada.
- Financial Endeavors: No Debt, student loans paid.
- Investment Horizon: 25 years.
- Investment knowledge and experience: Moderate
- Risk tolerance: Moderate-Aggressive
- Leverage Usage: Accepts the use of leverage, but, has an increasing degree of relative risk aversion (the higher the wealth, the lower the proportion one is willing to invest in risky assets).
- Tax Resident Country and Nationality: Holds US citizenship and are subject to US income tax.

### 2.2 Governance

A suitable amount of risk and diversification should be considered while making the investment, which is why the risks associated with the assets should be quantified and monitored. As the primary investment advisor for Mr. Bing, it is our responsibility to meticulously manage and oversee all stages of the investment policy development and implementation process, thus including monitoring, evaluating, rebalancing, and re-evaluating the client's personal investment portfolio on a regular basis.

To ensure that the client is fully informed and has a comprehensive understanding of his investments, we will provide updates to the Investment Policy Statement (IPS) as necessary. This will include any changes that may occur as a result of feedback from Mr. Bing or any issues that may arise when reviewing the document.

In addition to this, we will conduct a formal meeting with the client on a quarterly basis to ensure that all procedures are meeting their requirements and expectations. The IPS will also be evaluated at least once every year, on a date determined by the supervisor.

Furthermore, we will be responsible for making changes to the portfolio over the time horizon of the investment, as per the asset allocation framework. This will include analyzing the fundamental guidance for the companies in the portfolio and making recommendations for adjustments as needed, due to market changes or changes in the investor's characteristics or financial situation, promptly informing our clients to ensure open communication and well-informed decision-making.

As investment advisors, our primary focus is on providing expertise and guidance specifically related to investment matters integrating ESG considerations into the investment process, ensuring that his portfolio not only meets financial objectives but also resonates with his ethical standards. Our focus is to provide clients with the comprehensive investment advice that aligns with their financial goals and objectives while adhering to relevant tax laws and regulations. However, while we take tax implications into consideration as part of our investment strategies, it's essential to clarify that we do not offer tax expertise beyond providing the required annual tax report on the clients' investment activities. We strongly recommend investors to seek assistance from qualified tax professionals as they can ensure that tax obligations are effectively managed and optimized. If needed the investment team may advise on tax professionals with reduced cost-to-benefit ratio.

### 2.2.1 Client-Advisor Relationship

The foundation of our wealth management approach is based on nurturing a strong, trust-based relationship between the client, Mr. Bing, and our advisory team. Recognizing that each investor's journey is unique, we prioritize understanding Mr. Bing's individual financial goals, risk appetite, and long-term aspirations. This involves comprehensive and frequent discussions that facilitate a two-way flow of information. Open communication forms the bedrock of our association. We commit to keeping Mr. Bing informed of any market trends, potential investment opportunities, and relevant changes that might affect his portfolio. Conversely, we also encourage Mr. Bing to actively communicate any changes in his personal or financial circumstances, ensuring our strategies remain aligned with his evolving needs. Additionally, our team recognizes that confidentiality is paramount and therefore ensures that all personal and financial information shared by Mr. Bing is safeguarded with the utmost care, never compromised, and used exclusively for tailoring investment strategies.

Lastly, our emphasis on client feedback is unwavering. We consistently seek Mr. Bing's feedback on our services, portfolio performance, and communication quality. By incorporating his insights and concerns into our strategies, we create a truly collaborative and adaptive investment journey that not only aims for financial growth but also ensures peace of mind and satisfaction for our esteemed client.

In essence, our client-advisor relationship transcends mere transactional interactions. It's a partnership built on mutual respect, trust, and a shared vision for Mr. Bing's financial future.

### 2.2.2 Portfolio Composition

The asset allocation strategy is jointly determined with the client to properly align with their moderately aggressive risk tolerance and the objective to ensure capital appreciation. As such, the investment of the client's wealth adheres to a balanced asset allocation plan, distributing investments across 3 categories with a clear focus on equities: 65% US Equity, 20% Fixed Income ETF focusing on U.S Corporate Debt, and 15% in Government Bonds and Gold.

The equity portfolio's asset weights are subject to the Minimum Variance Optimization (MVO) and Sharpe Ratio Maximization portfolio construction approach, with constraints in place according to Modern Portfolio Theory developed by Harry Markowitz and enhanced by William Sharpe. The constraints include position weights of maximum 10% without short selling while utilizing 100% of available funds.

The constructing of the overall portfolio encompassing the various asset classes discards the MVO weights as the calculation of the variance-covariance matrix between the risky assets was limited to historical return data from 2015 forward due to the lack data from PayPal (Ticker: PYPL) which had its IPO that same year, therefore, to keep the efficient expected return estimations granted by the usage of the Fama French Five-Factor Model on the equity portfolio the investment team decided to use insights provided by Novo Banco using the Efficient Frontier tangent portfolio with the Capital Market Line for comparison purposes. (See 3.4.4. Final Portfolio Composition)

Cash equivalent allocation maintains a risk weighted distribution between gold and government debt investments, with a position size kept within limits aligned with the client to ensure inflation and high interest rates hedging while keeping 5% in a liquid commodity.

### 2.2.3 Responsibilities - Review and Monitoring

Inherent to our portfolio management approach and a key responsibility as the investment advisors of Mr. Bing is a thorough review and monitoring process to attain our client's objectives and aspirations, therefore, quarterly, and annual reviews of asset allocations are conducted to uphold optimal performance. Additionally, any measures pertaining to asset allocation or portfolio adjustments are communicated transparently to the client encouraging active information-based involvement in the investment process.

In sync with our dedication to offer tailored portfolio management service, we prioritize continuous market research and macroeconomic analysis. In today's rapidly shifting financial landscape, characterized by both transient opportunities and unexpected challenges, proactive monitoring provides the dual advantage of risk mitigation and value maximization. Thus, our responsibility is twofold. Firstly, to arm Mr. Bing's investments against unexpected market headwinds, and secondly, to seize burgeoning opportunities, turning them into profitable investments.

In essence, our monitoring process stands as a vigilant guardian – ever-watchful, adaptive, and dedicated to securing and enhancing Mr. Bing's wealth reliant on the client's risk appetite and investment objectives to recalibrate our strategies, making them as dynamic as Mr. Bing's evolving needs.

## 2.3 Investment, Return and Risk Objectives

### 2.3.1 Investor's Risk Tolerance

Mr. Bing's moderate-aggressive risk tolerance was attained from the questionnaire made when initially assessing the client's risk aversion and objectives. Given that Mr. Bing's investment goals and risk appetite are relatively riskier than the average investor, his asset allocation strategy is more dynamic and growth oriented. Mr. Bing's focus is more on long-term capital growth and achieving a substantial return being its portfolio more heavily weighted in equities.

Given that equities can experience significant price movements, they pose a risk but also offer the possibility of higher returns. This aligns with Mr. Bing's willingness to accept moderate to high volatility in the pursuit of his target 9% annual return, provided the portfolio does not suffer a drawdown exceeding 30% in any given year.

Additionally, investment team intends to diversify into a Fixed Income U.S Corporate Bond ETF with various ratings, not limiting to AA-rated bonds or above, as higher yields often accompany higher risk.

Interest rate risk remains a concern, impacting both the price and yields of fixed-income securities in Mr. Bing's portfolio. Therefore, the investment team suggests an allocation to Gold and U.S 3-month T-Bills yielded to maturity, while being cognizant of market conditions and central bank policies as these will affect prices and the interest income he can expect to receive.

### 2.3.2 Investment Objectives

The investment strategy controlled by this IPS has been specifically designed for Mr. Bing, who plans to invest a total of \$100,000 of savings in assets with no need for cash withdrawals. The primary objective of this investment approach is to help the client accumulate wealth so he can comfortably retire. While capital development is the

main goal, a residual part of the strategy also emphasizes capital preservation to generate steady income and diminish the overall portfolio risk. Mr. Bing has stated that he requires a minimum annual return of 9%. Therefore, our portfolio objective encompasses a dual purpose:

1. Primary Purpose - Income Generation Through Equity Investments: The attainment of consistent, long-term capital appreciation while simultaneously emphasizing stability in growth through strategic investments in well-established, profitable enterprises in disruptive growing industries. These enterprises not only exhibit current strength but also demonstrate a forward-looking vision for sustained market presence. We meticulously select such investments based on robust fundamental metrics, integrating Environmental, Social, and Governance (ESG) considerations and considering strategic asset placement to minimize tax liabilities and assuring the potential for optimal returns.

2. Secondary Purpose – Diversification & Capital Preservation Through Fixed-Income ETF, Gold & T-Bills: Allocating a portion of the portfolio to premier fixed-income securities, gold and government bonds acts as a protective buffer during market downturns, reinforcing overall portfolio diversification while ensuring adequate hedging to inflation.

Through this dual-purpose methodology our team aims for ensuring diversification and stability as the blending of fixed-income instruments harmoniously enhances. This synergy balances equities' growth potential with the steadiness inherent in fixed income assets, aligning our approach with the clients' unique risk tolerance and investment objectives.

Furthermore, our team is focused on the educational dimension of our clients. Empowering clients with insights into the rationale behind the portfolio strategy fosters engagement and confidence in their financial journey.

### 2.3.3 Investment Horizon

The investment strategy is established with a long-term investment horizon of 25 years. Over the following 6 months to 1 year, 10% of capital, due to the current economic environment, will be applied to short duration government bonds to maximize safe returns at the 5% rate. Additionally, to support potential liquidity needs (not initially stated by the client), up to 5% of the portfolio weight will be set for a gold position.

The client acknowledges the inherent financial risk in investments and recognize the pivotal role of time in investment endeavors. Consequently, he is prepared to embrace a heightened risk-return tradeoff. The client is resolved to adhere to his investment strategy, conditional upon prevailing market circumstances, understanding that such adherence is crucial for achieving his goals. This determination remains unwavering even in the face of extreme economic volatility.

### 2.3.4 Return, Distribution and Risk requirements

The clients expect an average yearly pre-expenses ROI of around 9%. In our client's particular case living in Nevada, there is not a state-level tax imposed on capital gains earned by individuals, businesses, or other legal entities. (Nevada Secretary of State, 2023). Therefore, no other costs besides the 2,0% annual management fees and the 3,7% inflation rate (as of August 2023) should be applied in the computation of Portfolio Return. (OECD, 2023) Therefore, our team should aim to yield a net return of at least 10%, which will provide the necessary income to exceed the desired investment objectives.

To achieve long-term capital appreciation and growth, the portfolio will be allocated with 65% in equities, with a focus on companies with strong well-established business models in rising industries to additionally focus on growth and 20% in Fixed-Income ETFs, to provide some level of diversification and stability. Also, a percentage of the total portfolio net worth will be allocated in cash equivalent securities such as gold and US short-term

Treasuries for capital preservation ensuring security and liquidity to the client's portfolio, aiming for a net yield of around 15%.

Additionally, the portfolio will be actively managed, with a focus on risk management to minimize downside risk and protect against significant losses. Regular reviews and adjustments to the portfolio will be made to ensure that the portfolio aligns with the investment objective and continues to meet the investor's risk tolerance over the 25-year time horizon.

It is important to note that the client stated that a loss of more than 30% over any 12-month investment period shall be intolerable. Still, they understand the risky ROI intended as well as the market characteristics of uncertainty and fluctuations. The investment objective may change as the market conditions, investor's circumstances, and the general economic environment change. Therefore, each quarterly and annual report by the investment manager to the trustee shall confirm actual asset allocations as of the end of the quarter/year and shall also confirm that allocations during the period were within allowable ranges.

### 2.3.5 Investment Constraints

We regularly assess our clients' risk tolerance and objectives to ensure that their portfolio remains in line with their evolving needs. If any shifts occur in their financial circumstances or risk preferences, we strongly advise clients to notify the portfolio manager promptly. Necessary adjustments to the strategy and allocations will then be made in response.

Every quarter, clients are provided with a detailed performance summary of their investments across all asset classes. While these quarterly insights offer valuable snapshots, genuine success in achieving investment goals is better attained over a longer horizon, spanning four to eight quarters. However, we stand prepared to evaluate performance more frequently, depending on the client's preference.

To ensure hedging on increased interest rates and inflation while mitigating the risk of possible liquidity requirements (even though primarily the client stated that no liquidity from the position would be needed), we have strategically allocated up to 5% of the total investment into gold and 10% into 3-month T-Bills. Such proactive planning ensures clients can access funds the 5.000 \$ gold position swiftly, typically within a five-day trading window, without being adversely impacted by unfavorable market conditions. We revisit the cash-equivalent allocation quarterly, ensuring it remains aligned with the client's objectives.

Additionally, tax considerations are integral to our portfolio management approach, particularly given the quantity of state tax regulations in the US. The portfolio's location and the corresponding tax regulations significantly influence our investment choices. For instance, investing in Fixed-Income ETFs might offer better tax efficiency than individual stocks. Dividends, coupons, and capital gains/interest income are taxable in the US context. When contemplating transactions in similar sectors or industries, our team might explore tax-loss harvesting opportunities for existing high-basis holdings, albeit this remains secondary to the primary intent of the purchase/sale decision.

#### 2.3.5.1 *Investor Specific Constraints*

Furthermore, our client is looking at a 25-year horizon. With a longer-term horizon, a higher allocation to equities, historically known to offer robust long-term returns, is often favored. This long view allows the portfolio to harness the growth potential of equities and to benefit from compounded returns. However, as the years progress and the client near significant life events or milestones, it may be prudent to realign the portfolio's focus towards more conservative investments, ensuring it remains synchronized with evolving goals and risk appetites. In essence, the time horizon is a fundamental anchor in investment decisions to ensure alignment with the investor's goals and risk tolerance.



Our client has set clear boundaries. Mr. Bing has strictly prohibited short selling for short-term hedging. Moreover, reflecting his values, investments in the tobacco industry or in any other directly detrimental for the environment are not desired, not including games of luck. The client has stated that he wants to invest most capital assets in US equities (including ADRs) and high yield bonds, with the remaining held as cash reserves. He also has a relatively high-risk tolerance, as he wishes to increase his wealth by, at least, 30%, while avoiding 50% of his money. The invested capital is not crucial for his daily life. Mr. Bing has non-professional knowledge of the financial markets. The client in the risk tolerance questionnaire stated that he strongly disagrees with the statement that “making money in stocks and bonds is based on luck” and that “in terms of investing, safety is more important than returns.” Mr. Bing expects that most of his savings will be used to fund his retirement, which he hopes to start at age 57.

The portfolio manager has the fiduciary responsibility to ensure complete adherence to all pertinent laws and regulations. These might impact available investment choices and determine the level of acceptable risk. Key regulatory frameworks like the Securities and Exchange Commission (SEC), the Investment Company Act of 1940, and the Investment Advisers Act of 1940 are imperative for a US-centric portfolio.



### 3. Investment Design: Tailoring the ‘Buy and Hold’ Strategy

“To triumph in the stock market is to harmonize the dance of risk and reward, it’s the meticulous orchestration of knowledge, patience, and disciplined strategy, rooted in a clear and unwavering investment philosophy.”  
(Fernando Braga de Matos, 2015)

#### 3.1 Investment Philosophy

Our team’s investment philosophy combines the principles of Charlie Munger, Warren Buffet, Mohnish Pabrai and Benjamin Graham’s value investing while also taking into consideration other finance scholars’ comments on investor behavior such as Fernando Braga de Matos and Robert A. Nagy and Robert W. Obenberger still considering macro-economic and industry growth potential factors to properly deploy a balanced asset allocation approach drawn on Modern Portfolio Management principles to optimally align with the client’s moderate-aggressive risk tolerance to mitigate risk exposure.

In summary, our investment mindset is based 3 cornerstones: 1. Value Investing w/Growth Focus; 2. Modern Portfolio Theory; 3. Investor Behavior.

##### 3.1.1 Cornerstone 1 - Value Investing w/ Growth Focus

Invest in undervalued companies with strong fundamentals. This is the core principle of value investing, and it is supported by the investment philosophies of Charlie Munger, Warren Buffett, Mohnish Pabrai, and Benjamin Graham. These investors believe that it is possible to find companies that are trading for less than their intrinsic value, and that these companies will eventually rise in price to reflect their true worth.

Additionally, our investment team perceives to Invest in companies where the price paid for growth seems to be the core Value of that growth as the company’s superior revenue and earnings growth should drive a market correction on share price. (Damodaran, 2019)

Integrating the principles of value investing with a focus on growth, particularly within a context of a long-term investment horizon, entails a balanced approach. The long-term investment perspective amplifies the chances of achieving excess returns while aligning well with the principles of value investing, allowing for the realization of intrinsic value over time.

“Never count on making a good sale. Have the purchase price be so attractive that even a mediocre sale gives good results.”

—Warren Buffett

“If you buy an asset at a steep discount to its underlying value, even if the future unfolds worse than expected the odds of a permanent loss of capital are low.”

—Monish Pabrai

“To us, investing is the equivalent of going out and betting against the pari-mutuel system. We look for the horse with one chance in two of winning which pays you three to one. You’re looking for a mispriced gamble. That’s what investing is. And you have to know enough to know whether the gamble is mispriced. That’s value investing.”

—Charlie Munger

All the above historically proven investors, proponents of value investing, stress the necessity of pursuing opportunities where assets are undervalued and encourage maintaining a long-term viewpoint. Their doctrines highlight the crucial roles of self-control, endurance, and profound knowledge of the intrinsic value of an investment. By staying true to these doctrines and integrating them with contemporary portfolio theory, we aim to pinpoint enterprises that boast strong fundamentals, enduring competitive edges, and substantial prospects for long-term growth. Utilizing principles of accounting, we assess investments through a valuation method to ascertain their present and potential market value.

The investing framework is mainly based on the following core principles: Invest in existing businesses with durable MOATs (company's ability to maintain the competitive advantages that are expected to help it fend off competition and maintain profitability into the future). Place few, big and infrequent bets. Invest in low-risk, high uncertainty businesses with Margin of Safety. (Monish Pabrai, 2011)

When combining value and growth strategies, a meticulous and informed method of stock screening is crucial. The focus should be on identifying companies that showcase promising fundamentals while some are poised for strong growth, scrutinizing future earnings growth is crucial, despite its inherent volatility and the prevalent phenomenon of mean reversion, where growth rates tend to move towards the average. Conversely, prioritizing stocks with high expected growth rates doesn't invariably translate to high returns due to the frequent overpricing of growth. (Damodaran, 2019).

The investment team main objective is therefore to invest in stocks that are:

- Large-Caps with a Beta < 1, perceived as "Defensive" undervalued opportunities with strong Solvency and Liquidity Ratios to ensure sustainable long-term gains.
- Dominant Large-Capitalization Tech with Acceptable Growth Potential and strong profitability that will keep thriving in the next decades. Price fluctuations caused by market fear will pose a great factor in driving above average returns.
- Possible turn-around plays to maximize returns, i.e, stocks that despite their competitive advantages and strong fundamentals fell, due to business, market, or management vicissitudes, to lower quotation levels and loss status and caliber. (Fernando Braga de Matos, 2015).

The traditional delineations between sectors, particularly tech as a hallmark of growth and energy representing value, are undergoing a shift. Brian Frank's emphasis on PayPal Holdings Inc.'s importance within his Frank Value Fund underscores this transformation, cautioning against value investors dismissing the significance of growth. Additionally, Hamish Preston's, Head of U.S. Equities at S&P Dow Jones Indices, observations support this perspective, highlighting the tech sector's growing presence in the value area, exemplified by the 6-percentage point surge to 16.8%. The emblematic transition of Amazon, which while retaining its spot in the S&P growth index, now boasts a stronger position in the value metric after its December 2022 inclusion, encapsulates this blurring of traditional boundaries.

As the lines between growth and value become ever more nuanced, a harmonized investment approach emerges. This strategy, rooted deeply in value investing's core tenets, concurrently appreciates the nuanced tapestry of growth. It champions a long-term investment vista, optimizing the potential for superior returns while staying true to the timeless philosophy of discerning the intrinsic value within market complexities. (Bloomberg, 2022)

The dedication of our portfolio managers to these principles guarantees that we place our clients' long-term prosperity and wealth accumulation at the forefront, concentrating on prudent investment choices that are in harmony with individual goals and the corresponding risk acceptance.

### 3.1.2 Cornerstone 2 – Modern Portfolio Theory

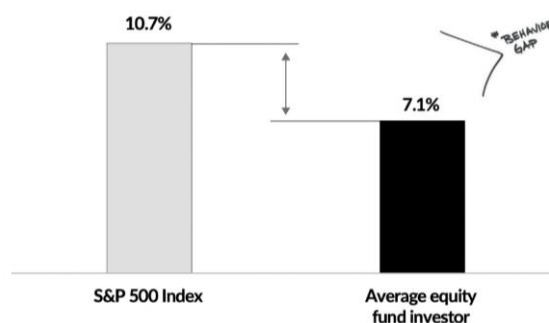
MPT accentuates the crucial role of diversification and the strategic allocation of assets in crafting investment portfolios, with a focus on maximizing returns while mitigating risks. Our strategy centers on diversification and regards the idea of correlation, and minimum-variance optimization through maximization of the sharpe ratio as essential in developing our comprehensive investment approaches, with the goal of achieving optimal risk-adjusted returns for Mr. Bing. By allocating investments across diverse asset classes and concentrating on enduring themes, we reduce the vulnerabilities associated with singular positions and strive for uniform, reliable returns, yielding a harmonious and robust portfolio.

### 3.1.3 Cornerstone 3 - Investor Behaviour

Behavioral finance is everywhere that people make financial decisions. Psychology is hard to escape; it touches every corner of the financial landscape, and it's important. Financial practitioners need to understand the impact that psychology has on them and on those around them. Both heuristic-driven bias and frame dependence predispose practitioners to commit specific errors. Recognizing behavior is the first step towards modifying behavior. (Hersh Shefrin, 2002)

Behavioral finance scholars such as Hersh Shefrin, Gregory Curtis, Fernando Braga de Matos, Robert A. Nagy, and Robert W. Obenberger have shown that investors often make irrational decisions, which can lead to market bubbles and crashes. By understanding investor behavior, we can better position ourselves to profit from market cycles and avoid making costly mistakes. As shown by the data below, the average equity fund investor returns returned, between December 31, 1991, and December 31, 2021, less 3,6% yoy than the S&P500 index such maybe attributed to the irrational behavior gap.

Figure 1 - Average Investor vs. Index Returns



Source: (Cymbria, Wealth Management, 2022)

For example, investors tend to be overly optimistic during bull markets and overly pessimistic during bear markets. This can lead to overpaying for stocks during bull markets and selling them for too little during bear markets. By understanding these behavioral biases, we can avoid making the same mistakes and make more informed investment decisions.

“I will tell you how to become rich. Close the doors. Be fearful when others are greedy. Be greedy when others are fearful.”

—Warren Buffett

“The world is full of foolish gamblers, and they will not do as well as the patient investor.”

— Charlie Munger

Patience and discipline are virtues in the long-term investing game. It takes time for stocks to reach their full potential, and we need to be patient to reap the rewards and disciplined to avoid making emotional decisions, as this can lead to costly mistakes. Making informed, enduring decisions, and refraining from impulsive actions based on flawed or insufficient information are key to maneuvering through the inherent uncertainties and fluctuations of the financial markets. It is paramount to prioritize robust market intelligence, credible trends, and validated insights from reputable sources, to enhance the decision-making process. This thoughtful and deliberate approach should harmonize with one's financial aspirations, demographic characteristics such as age and profession, and predominantly, one's level of comfort with risk, all while aligning with the overarching investment objectives. By doing so, the potential for realizing optimal outcomes and mitigating unnecessary losses is substantially heightened.

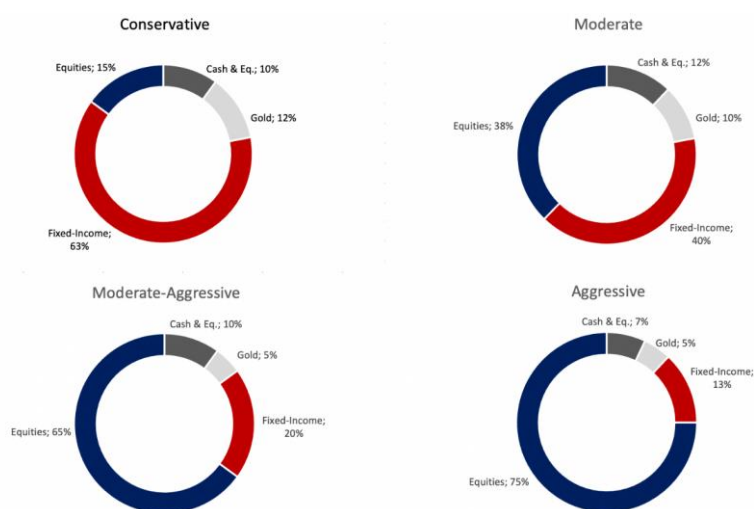
Daniel Kahneman, Amos Tversky, and their followers have demonstrated beyond doubt that we all harbor idiosyncratic ideas and that we tend to act on them, regardless of the costs to our economic welfare. By combining both MPT and behavioral finance models in our work with family investors, we stand the best chance of designing, implementing, and maintaining portfolios that will prove acceptable to our clients and that will prove productive to our clients' wealth. (Gregory Curtis, 2004).

The dedication of our portfolio managers to these principles guarantees that we place our clients' long-term prosperity and wealth accumulation at the forefront, concentrating on investment choices that ensure harmony with individual goals whilst managing the clients' and our own irrational emotions towards the market. Our team includes the put-to-call ratio on the assets and the CNN Greed/Fear Index, to make informed decisions and efficiently correspond to the investment's risk and objectives. This comprehensive approach allows us to navigate market dynamics and strive for optimal outcomes in line with our commitment to our clients' financial success.

## 3.2 Strategic Asset Allocation

Asset allocation is the foundational blueprint of our firm's wealth management strategy. An astute asset allocation across Equities, Corporate Bonds, Gold, and U.S treasuries maximizes potential long-term returns while attaining to efficiently manage risk. Hence, making informed and conscient decisions about asset allocation is crucial, as suboptimal selections can defect portfolio returns and cause the client's investments to lag the market average. Our mission is to ensure an asset allocation that grants sustainable wealth growth while mitigating the portfolio overall risk. Using the investor's questionnaire, we can classify the client based on his risk-tolerance score into predefined investor risk categories. These classifications range from conservative, indicating risk aversion; to aggressive, which suggests a readiness to assume high-risk. Below, you can find our asset allocations in accordance to the risk profiles attained by the questionnaire.

*Figure 2 - Strategic Asset Allocation according to the Investor's Risk Profile*



*Source: (Novo Banco, 2022)*

Our strategies intend to balance the investor's ability to bear risk with their return objectives ensuring that the investor's financial aspirations are achieved without compromising their peace of mind. This equilibrium is a continual pursuit, an interplay between ambition and circumspection, ensuring every stride is a progressive step towards the investor's final financial goal, all while safeguarding their tranquility.

Therefore, our endeavor is to guide the client through a financial odyssey that is secure, fruitful, and in sync with their unique profiles, avoiding typical investment missteps and ensuring their portfolio stands efficiently resilient to market fluctuations while ensuring the desired level wealth growth.

### 3.2.1 Moderate-Aggressive Strategy

Every client has unique financial needs, risk tolerance, investment aspirations, and economic condition. Therefore, by assembling the information provided by Mr. Bing we developed the tailored asset allocations that resonate the distinctive financial profile, aligning each financial move with his specific risk acceptance and objectives.

Given the client's 25-year investment horizon leading up to potential retirement and their basic understanding and moderate familiarity with financial markets, we deduced that the client likely has a higher risk tolerance. Coupled with his stable financial position as inferred from the data collected, and the annual return target of roughly 9% we are positioned to recommend a strategy that emphasizes a higher allocation to Equities with an undervalued value proposition as this allocation leverages the prospect of long-term investment growth. Long-Term investment performance, in large part, is primarily a function of asset class mix. Historically while interest-generating investments, such as bonds, have the advantage of the relative stability of principal value, they provide little opportunity for real long-term capital growth due to their susceptibility to inflation. On the other hand, equity investments, such as common stocks, clearly have a significantly higher expected return but have the disadvantage of much greater year-by-year variability of return. From an investment decision-making point of view, this year-by-year variability is worth accepting given the client's long-time horizon.

Of course, the asset allocation of the Portfolio should reflect the proper balance for eventual liquidity needs (not stated initially by the client), preservation of purchasing power, net of distributions, and risk tolerance, so the idea is not to neglect diversification as we aim to reduce risk through Fixed-Income ETFs and government bonds,

however, without a slightly more aggressive profile averaging a return like the S&P500 past average will be an impossible task.

The different Asset Classes weights of our Balanced Strategy to our Moderate-Aggressive Investor are:

- Cash & Gold: 15% (Allowable range: 10% - 20%),
- Equities: 65% (Allowable range: 60% - 70%)
- Fixed-Income ETFs: 20% (Allowable range: 20% - 40%)

The specific allowable ranges were computed from the Asset Strategic Allocations provided by Novo Banco and the Vanguard Group Inc. Investor questionnaire. See appendix 3.

*Figure 3 - Balanced Strategy to Moderate-Aggressive Risk Profile*



*Source: Author's Illustration*

### 3.3 Security Selection Criteria

#### 3.3.1 Equity Selection Criteria – Bottom-Up Approach

The Bottom-Up Approach to equity selection stands in contrast to the Top-Down Approach. Rather than beginning with macroeconomic factors and narrowing down, this method starts with individual companies and works its way upwards. Here's how we implement the Bottom-Up Approach for Mr. Bing's portfolio:

1. **Company Analysis:** At the heart of the Bottom-Up Approach is a comprehensive study of individual companies, irrespective of their sector or the broader economic environment. Key aspects of this analysis include Financial Health, Management Quality Ratios, Business Model Efficiency and Valuation
2. **Industry Dynamics:** Even though the primary focus is on individual companies, it's essential to understand the industry dynamics. This helps in gauging the company's standing in its sector, potential competitive threats, and growth opportunities within the industry.
3. **Integration with Macroeconomic Insights:** While the Bottom-Up Approach emphasizes individual companies, it doesn't entirely dismiss broader economic factors. After portfolio construction, macroeconomic indicators are reviewed to ensure that the portfolio isn't inadvertently concentrated in areas vulnerable to prevailing economic conditions.
4. **Portfolio Construction:** Drawing from the pool of scrutinized companies, a diversified portfolio is assembled. The focus is on including stocks that, based on individual merits, present the best opportunities for growth, and align with Mr. Bing's risk tolerance and return objectives.

### **3.3.1.1 Company Analysis – Fundamental Ratio Evaluation & Screening**

Our equity assets can be divided into two categories: 1. Value stocks; 2. Growth stocks.

With this asset categorization, the investment team should be able to reflect the proper balance for preservation of purchasing power, and risk tolerance respecting the investor's constraints. With a diversification approach, the chosen equity assets will be from the U.S. allowing for the optimal portfolio mix.

Undervalued value stocks are in theory trading at levels that are perceived to be below their fundamental value (intrinsic value higher than market value).

Investing in this type of equities will enable higher returns while ensuring that the portfolio's exposure to risk maintains according to the investor's profile and restrictions. With this argument, the main reasoning behind our value common shares choice is stable long-term capital gains. So, these equities were picked based on undervaluation and stable long-term growth of cash flows.

However, as an aggressive portfolio we also chose stocks that although are undervalued, more in the category of growth stocks. These are not companies in the initial growth stages, so they are profitable with a large market capitalization but still have long-term growth prospects, making them perfect candidates for increased capital gains, surpassing the S& P500. This makes market outperformance a likely possibility.

Despite the focus on growth, both categories must hold strong fundamentals regarding profitability, solvency, liquidity, and efficiency. The Fundamental Ratio Evaluation and Screening may be found in the Appendixes.

### **3.3.1.2 Industry Dynamics**

For Mr. Bing's portfolio, constructing a sound equity selection isn't just about analyzing the individual companies in isolation. It's about a comprehensive understanding of the broader environment they operate within. Such understanding can reveal a lot about the company's current position and its future growth trajectory.

Evaluating the market structure is a primary step. The dynamics of an oligopoly, where a sector is governed by a few dominant entities, differ vastly from those of a fragmented market teeming with competitors. An oligopolistic setting might provide companies with more pricing power due to limited competition, whereas a fragmented market might pressurize companies to be more agile and innovative. The essence here is to discern how a company maneuvers within its market structure, which can provide insights into its adaptability and resilience.

As we navigate through the evolving world of business, consolidation trends become ever more crucial. Mergers and acquisitions, often seen as indicators of sectoral health and dynamism, can significantly reshape landscapes. A sector rife with acquisition activities might signal a maturing market, where bigger players are keen on leveraging synergies by absorbing smaller entities. Such movements can create powerhouses with enhanced market shares, but they can also stifle competition, sometimes leading to complacency. By monitoring these trends, we can better ascertain which companies are poised to emerge as leaders and which might struggle in the evolving environment.

One cannot emphasize enough the importance of understanding competitive rivalry. The intensity of competition within a sector directly correlates with a company's strategic moves. If companies are constantly undercutting each other on prices, it could mean slimmer profit margins. Conversely, sectors where companies compete on innovation or service differentiation might witness higher margins but also demand continuous R&D investments. Deciphering this underlying competitive ethos helps in predicting a company's future moves and its potential to sustain or increase profitability.

Lastly, while it might seem peripheral to some, the regulatory landscape is often the unseen hand guiding sectoral evolution. Regulatory conditions, be it stringent entry barriers or favorable tax regimes, can either promote or deter business growth. A stringent regulatory framework can protect existing players from an influx of new entrants, while a more relaxed one can foster competition. By gauging the regulatory pulse, we can forecast potential challenges or windfalls companies might face.

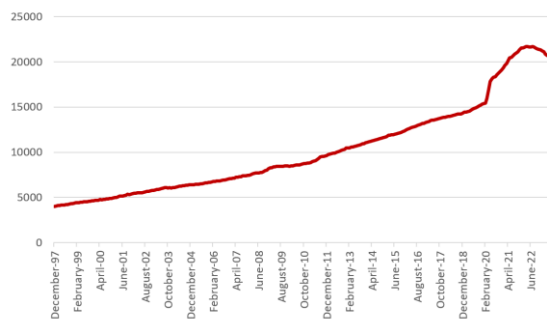
### 3.3.1.3 Macro-Economic Analysis

When assessing investment, return, and risk objectives, it is pivotal to meticulously analyze both short and long-term market expectations considering macroeconomic effects. This enables the discernment of the probable trajectories of assets and the impact of economic environments on different asset classes such as bonds and stock markets. Per example, economic expansions tend to bolster stock markets while usually exerting upward pressure on interest rates, potentially impacting bond prices adversely. Conversely, economic downturns can lead to declining stock markets but might create a favorable environment for bonds due to declining interest rates.

#### *Short-Term Market Expectations in High Inflation and High Interest Rates Environment*

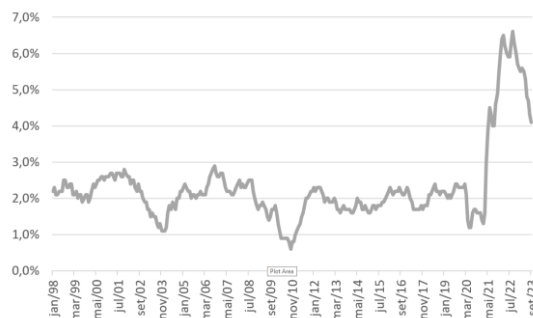
During the 2020 Covid pandemic the Federal Reserve increased money supply in a faster pace than ever in US history, as shown by graph 1. Such monetary policy alongside with the Ukraine War, volatility of energy prices, supply chain issues due to COVID-19 and price changes in the auto-related industries, led to an inflationary peak in 2022, as displayed in graph 2.

*Graph 1 - United States Money Supply (M2) (1997 – 2023)*



Source: (Board of Governors of the Federal Reserve System (US), 2023)

*Graph 2 - United States CPI (1998 - 2023)*



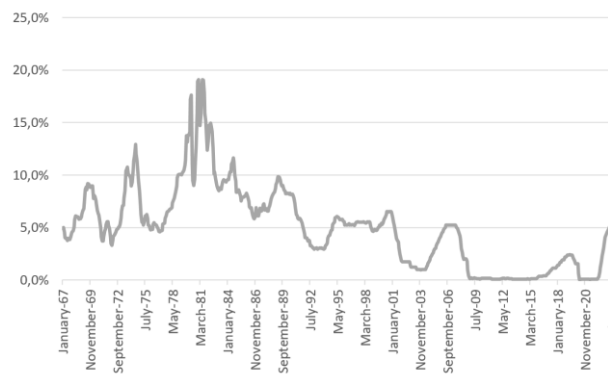
Source: U.S. Bureau Of Labor Statistics

Currently, and to respond to this rise in general prices, the FED has been raising interest rates and as of August 2023, the Federal Funds Effective Rate was 5.33% (represented in graph 3) and the annual inflation rate decelerated to 3,7% from higher values in 2022.

In the short term, markets are highly sensitive to interest rate fluctuations. High interest rates often lead to higher borrowing costs, affecting corporate profitability and, consequently, stock prices. Bonds, particularly those with shorter durations, may experience lower price volatility compared to stocks in such an environment, but their yields would be expected to rise, reflecting the increased rates.

Short-term market expectations might witness a ‘flight to quality,’ with investors seeking refuge in traditionally safer assets such as government bonds and blue-chip stocks, anticipating decreased risk exposure in turbulent market conditions.

*Graph 3 - Federal Funds Effective Rate (1967 – 2023)*



Source: (Board of Governors of the Federal Reserve System (US), 2023)

### Long-Term Market Expectations

Over the long-term, US equities have historically provided strong returns. According to Morningstar, the S&P 500 has had an average annual return of approximately 10% over the last 25 years. However, it is important to keep in mind that past performance does not guarantee future returns and that investing in the stock market carries risk.

*Graph 4 - S&P500 Historical Close Price Evolution (1998 – 2023)*



Source: (Yahoo Finance, 2023)

### 3.3.2 Fixed Income selection criteria

As for the selection of our Fixed Income Asset Class, the main selection criteria were diversification and stabilization of income through coupon-paying investment grade bonds since our investors profile targets an

ambitious average future annual return. We should therefore try to find the optimal point between the highest yield possible at the lowest default risk.

In our bond selection strategy, we derive inspiration from our equity selection approach, with necessary modifications. Our focus shifts from broad industry diversification to the primary objective of attaining consistent income from corporate bonds, which boast a strong backing and security. This leads us to prioritize bonds that have received a rating between AAA and BB from recognized agencies like Moody's and Standard & Poor's. The foundation of our screening process primarily revolves around the financial resilience of the issuing firms, their solvency metrics, and the probability of consistent interest payments. By integrating this strategy, our aim is to optimize our portfolio with the usage of the Vanguard Long-Term Corporate Bond ETF (VCLT), which aligns with our rigorous selection criteria.

Even though higher duration bonds face higher interest rate risk they additionally bear higher return price fluctuation possibilities and, when interest rates start decreasing again in the medium term, the prices of bonds will start increasing, posing very appellative gains while maintaining a reliable source of interest-paying income. Based on the recent forward guidance and minutes from the Federal Open Market Committee (FOMC) meeting, it is evident that the FOMC is navigating a complex economic landscape with a clear long-term policy direction in mind. The Committee's emphasis is on maintaining economic equilibrium, addressing the challenges of elevated inflation, and ensuring sustained growth. With inflation rates still above the Committee's longer-run goal of 2 percent, the FOMC has decided to retain the federal funds rate in the target range of 5-1/4 to 5-1/2 percent until the May 2024 FOMC meeting with a 1-to-3 chance of an interest rate increase of 25-basis points in November according to the Open Market Desk's Survey of Primary Dealers and Survey of Market Participants.

This scenario poses potential for a more accommodative monetary policy in the future which could lead to a reduction in interest rates.

As shown by graph 5, the VCLT close price is currently down 3.93% YTD and roughly 6,0% since its inception in December 2009, being the market a lagging economic factor we may pose that eventually corporate bonds will reach a point that prices start to increase despite the short-term maintenance of high interest.

The historical Adjusted Close Price evolution, on the other hand, which considers interest payments (or distributions) made by the ETF, drastically differs suggesting that the Fund has made substantial distributions with an Average coupon of 4.6%.

*Graph 5 - Vanguard Long-Term Corporate Bond ETF (VCLT), Close and Adjusted Close Price Evolution*



Source: (Yahoo Finance, 2023)

### 3.3.3 Diversifying Assets Selection Criteria – T-Bills and Gold for Hedging Purposes

In the current economic climate, as described by the FOMC, there are clear arguments for diversification to hedge against various risks, including inflation and interest rate fluctuations. Within this context, an allocation towards gold and T-Bills offers a compelling case for inclusion in the client's portfolio.

Drawing from the insights on the VCLT, which indicates the potential for corporate bonds to see price increases in the longer term, it becomes apparent that the strategic allocation to gold and T-Bills complements this position. While corporate bonds offer the allure of price appreciation and interest income, gold provides a hedge against systemic risks, and T-Bills ensure stability. This triad—corporate bonds, gold, and T-Bills—collectively crafts a robust portfolio strategy, designed to navigate the intricate dance of growth, inflation, and interest rates that the economy currently presents.

#### 3.3.3.1 Gold

Traditionally, gold has been regarded as a safe-haven asset, particularly during times of economic uncertainty or elevated inflation. As inflationary pressures persist, gold becomes increasingly attractive. This is because, unlike fiat currencies, gold maintains its intrinsic value. It serves not only as a hedge against inflation but also as a diversifier, especially when equity markets face downward pressures. An investment in gold can offer a counter-cyclical buffer, given its tendency to move inversely to stock markets in the long-term. As portrayed by Antonis A. Michis in his paper “The Systematic Risk of Gold at Different Timescales”, For periods extending beyond 128 months, gold consistently exhibits a negative correlation with stock market returns, as displayed by table 1. This indicates that over extended durations, gold's performance tends to move counter to that of the stock market. Thus, gold serves as a valuable diversifying asset for portfolios in the long run.

*Table 1 - Estimates of Gold's systematic risk by time-scale*

Scale	GER	JAP	UK	US
d1	0.290	0.398	0.379	0.488
d2	-0.042	0.307	0.193	0.322
d3	-0.259	0.193	-0.259	-0.035
d4	-0.038	0.390	-0.175	0.258
d5	0.064	0.257	-0.007	-0.029
d6	0.035	0.014	0.005	0.027
d7	-0.191	-0.013	-0.203	-0.048

*Source: (Antonis A. Michis, 2023)*

#### 3.3.3.2 Short-Term U.S Treasury Bills

T-Bills, while attractive due to the current high rates as communicated by the FOMC, offer benefits that extend far beyond just attractive yields. A 10% allocation to T-Bills adds a foundational layer of stability to the portfolio. Their short-term nature means they are less sensitive to the broader economic fluctuations, providing a counterbalance to more volatile assets in the portfolio. Moreover, T-Bills are backed by the full faith and credit of the U.S. government, reinforcing the portfolio's safety net. This becomes particularly crucial when navigating uncertain economic terrains. As we interpret the FOMC's guidance, which leans towards rate stability at least until May 2024, it becomes clear that T-Bills are not just a yield play, but also a strategic move to leverage the creditworthiness and reliability of the U.S. government.

Additionally, it's crucial to remember the importance of capital preservation. Our investment team's allocation to T-Bills ensures that a portion of the portfolio remains relatively insulated from market downturns, granting a level of safety. It's a thoughtful blend of seizing the moment's yield opportunities while also playing the long game of financial prudence.

### 3.3.4 Portfolio Rebalancing

Portfolio management's effectiveness hinges on persistent monitoring of its components: the assets' weightings and their anticipated performance. The methodology we adopt for rebalancing is anchored within the previously established constraints, relating to asset class weightings and overarching portfolio objectives. Situations that necessitate immediate rebalancing arise when:

- Fixed Income Asset Class Weights deviate from the 0% to 25% range.
- Equities Asset Class Weights swing between 60% to 80%.
- Cash & Equivalents Asset Class Weights fluctuate within the 0% to 20% bracket.
- Expected Annual Standard Deviation breaches the 30.0% cap.
- Cost of Opportunity of holding an Asset as become too costly.
- Price Decrease in a specific position has surpassed the 20% cap.
- Interest Gain Reallocation on a 13-week basis, upon client confirmation of no need of liquidity.

These rebalancing cues can be recognized either by assessing absolute percentage deviations or relative deviations from the target allocation.

Additionally, the recurrent appraisal of our rebalancing procedures, an integral component of our approach, aims to ensure these adjustments are delivering as expected. This encompasses evaluating trigger accuracy, the efficacy of execution, and gauging the cumulative impact on the portfolio's risk and return dynamics. Though typically an annual exercise, these reviews might be conducted more frequently if market conditions, or regulatory changes necessitate. Each month, our team is committed to evaluating and then reporting on the portfolio's performance, focusing specifically on the prior month's return and associated volatility metrics. We ensure all our evaluations are aligned with the stringent Global Investment Performance Standards stipulated by the CFA Institute. As we roll into the end of each quarter, our team endeavors to recommend modifications to the portfolio's structure and constituent weightings. These are rooted in our comprehensive analyses and are aimed at optimizing performance. Every client, like Mr. Bing, will receive these tailored recommendations in the last week of the ongoing quarter. Pending no objections, we will implement these changes in the first week of the subsequent quarter. Furthermore, clients have the latitude at each quarter's end to either set new constraints or abolish existing ones.

It is important to note that, historical performance isn't a guaranteed predictor of future returns and all the estimation of performance do not ensure real results despite the investment's best efforts.

## 3.4 Portfolio Composition

The final process in our asset and security selection is the composition of each asset class underlying positions concluded to an overall portfolio. The following represented assets and securities have been selected only for demonstration purposes to the IPS and may or may not be subject to the client's final portfolio as per the conditional investment agreement. As we had mentioned in the IPS, the demonstrated portfolio's composition of

investment positions, allocation, and selection is based on three major asset classes: US equity, US corporate debt, and cash equivalent assets. The strategy's allocation of the asset classes weights is 65/20/15. This portfolio was put together with the client's investment objectives in mind and includes the following individual investment asset classes: US stocks, US corporate bonds, gold, and 3-month US T-Bills Yielded to Maturity.

### 3.4.1 Equity Assets

#### 3.4.1.1 Five-Factor Model & MVO Equity Portfolio Composition

The recommended technique of Mean-Variance Optimization (MVO), rooted in Modern Portfolio Theory, ascertains the suggested weight of equity investments. In this calculation, we utilize the covariance matrix, the expected return of the assets based on the Fama-French Five Factor Model and specific constraints on equity positions.

The Fama-French Model, unlike its predecessors, offers a nuanced lens by taking into consideration multiple betas. These betas measure the sensitivity of assets not just to overall market movements but also to factors such as company size, book-to-market value, and profitability. This provides a robust assessment of systematic risks, ensuring our analysis captures a broader spectrum of market dynamics. The model's emphasis extends beyond just the overarching market premium, delving into nuances like the risk-free market rate, differences between returns of small and large companies, high versus low book-to-market ratios, and most recently, robustness in profitability and investment patterns. Such an intricate approach, while demanding in computation, grants us invaluable granularity in discerning risk and return dynamics. (Fama French, 2015)

These constraints ensure a minimum of 2.5% and a maximum of 10% allocation to each equity without resorting to short selling. Through MVO, we can diversify across all 12 assets under consideration, adhering to the short-selling restriction, and aiming for the minimal possible portfolio volatility. This MVO approach is tailored to the client's specific desires for capital growth and their moderately aggressive risk profile, to potentially achieve market returns while mitigating portfolio risk.

The entire process of determining these asset weights is composed by two main stages:

1. **Computation of the Expected Return on each asset,  $E(R_i)$**  – We first compute the Five Factor Betas associated to all the equity considered assets by computing the linear regression between the securities and the Five-Factors historic returns, displayed by table 1. Afterwards, applying the 2015 Fama French Model's formula on Expected Return and adding  $\alpha$  (abnormal returns, when statistic relevant) we get the Expected Return on each asset,  $E(R_i)$ . (Fama French, 2015)

*Table 2 - Five Factor  $\beta$  estimations.*

Five-Factor $\beta$	SCHD	PYPL	GOOGL	KO	TSM	AMZN	PFIZER	APPL	TXRH	NKE	DIS	WYNN
Mkt-RF	0,918081081	1,39317224	1,09973073	0,674367521	-0,049141	1,438695	0,746376886	1,24272464	0,746413015	0,97577652	1,134464371	1,76995918
SMB	-0,139386493	-0,3939673	-0,5086379	-0,314776992	0,2899616	-0,4664868	-0,486179603	0,20072931	0,841908482	-0,298493	-0,082861883	0,96656425
HML	0,231422713	-0,2091643	-0,0748142	-0,151766881	0,06840818	-0,8854412	-0,083565578	-0,5854202	0,134681713	0,20229702	0,219374755	0,70897429
RMW	0,17261921	-1,0433201	-0,0005657	0,406185834	-0,291755	-0,4074884	0,2364742	0,17621213	0,398071301	0,80501802	-0,165473681	0,54793889
CMA	0,208136255	-0,3829482	-0,8783939	0,66551867	0,58740656	-0,4832934	0,596129628	-0,5745664	-0,426201061	-0,2019224	0,19013958	-0,6761069

Source: Author's Illustration

Five-Factor formula to determine the expected return of assets:

$$E(R_i) = \alpha + R_f + \beta_{i,Mkt-RF} \cdot (E(R_M) - R_f) + \beta_{i,SMB} \cdot E(SMB) + \beta_{i,HML} \cdot E(HML) + \beta_{i,RMW} \cdot E(RMW) + \beta_{i,CMA} \cdot E(CMA), \alpha = 0 \text{ if } p\text{-value} > 0,05$$

It is important to note that even though in applications where the sole interest is abnormal returns (measured by regression intercepts), the Fama French tests suggest that a four-factor model that drops HML performs as well as the five-factor model, past factor non-statistical relevance does not ensure future irrelevance. Therefore, on the optics of being conservative, our team decided to keep considering the HML factor and other security specific non-statistically significant factors recognizing that it may introduce uncertainty to our expected return estimate. (Fama French, 2015)

Additionally, the team considers abnormal returns ( $\alpha$ ) when statistically relevant at the 5% level. This may pose as an adultery of the model in use, however, as the primary goal is not to analyze how well the Fama-French model explains the returns of the asset but yes to accurately predict asset returns, if a securities' alpha is statistically significant, it implies that there's a portion of the asset's returns that cannot be attributed solely to the systematic risk factors.

2. **Minimum Variance Optimization,  $\sigma$**  – Secondly, our investment team computes a variance-covariance matrix to properly understand how the several assets' betas correlate and to efficiently measure the exposure to each of the selected securities.

Table 3 - Equity Portfolio Variance-Covariance Matrix

Variance-Cov Matrix	SCHD	PYPL	GOOGL	KO	TSM	AMZN	PFIZER	APPL	TXRH	NKE	DIS	WYNN
SCHD	0,001836878	0,00247377	0,00203065	0,001378747	-8,711E-05	0,00246879	0,001526443	0,00214179	0,00133496	0,00198637	0,00219669	0,00337193
PYPL	0,002473766	0,00489665	0,00348619	0,001688792	-0,0001701	0,00480285	0,002060557	0,00359018	0,001631039	0,00236477	0,003295276	0,0043374
GOOGL	0,002030652	0,00348619	0,00306435	0,001404558	-0,0004811	0,00371218	0,001666116	0,00298671	0,001468038	0,00239834	0,002501479	0,00377683
KO	0,001378747	0,00168879	0,00140456	0,001346485	-5,26966E-05	0,00200373	0,001419304	0,00162119	0,000748806	0,0015404	0,001573983	0,00200298
TSM	-8,71092E-05	-0,0001701	-0,0004811	-5,26966E-05	0,00029362	-0,000381	-8,69479E-05	-0,0003005	-3,79246E-05	-0,0003592	-3,94024E-05	-0,0001638
AMZN	0,002468793	0,00480285	0,00371218	0,002003735	-0,000381	0,00543225	0,002283346	0,00418748	0,001730993	0,00266178	0,003183435	0,00420403
PFIZER	0,001526443	0,00206056	0,00166612	0,001419304	-8,695E-05	0,00228335	0,00155315	0,00173405	0,000713591	0,00166538	0,001780232	0,00213181
APPL	0,002141788	0,00359018	0,00298671	0,001621195	-0,0003005	0,00418748	0,001734054	0,0037162	0,002125365	0,00245434	0,002678054	0,00449802
TXRH	0,00133496	0,00163104	0,00146804	0,000748806	-3,792E-05	0,00173099	0,000713591	0,00212536	0,001962486	0,00153691	0,001626676	0,0037839
NKE	0,001986369	0,00236477	0,00239834	0,0015404	-0,0003592	0,00266178	0,001665384	0,00245434	0,001536909	0,00248911	0,002235834	0,00376597
DIS	0,00219669	0,00329528	0,00250148	0,001573983	-3,94E-05	0,00318344	0,001780232	0,00267805	0,001626676	0,00223583	0,002726027	0,00408768
WYNN	0,003371934	0,0043374	0,00377683	0,002002983	-0,0001638	0,00420403	0,00213181	0,00449802	0,003783902	0,00376597	0,004087678	0,00814095

Source: Author's Illustration

At a first glance, the values on the Equity Portfolio Variance-Covariance Matrix for the TSM asset seem surprising as a negative covariance with all the other stocks is uncommon.

However, after revising the computation process and critically thinking on the value, the team calculated with monthly data from the last 10 years, retrieved from Refinitiv, the correlation between the Taiwan Semiconductor's ADR (in US dollars) and the exchange rate (Taiwan Dollar to USD) obtaining a value of -0.58054 which indicates that when the Taiwan Dollar weakens against the US Dollar, the TSM ADR tends to perform better in US dollars. However, this negative effect outweighs the price change effect of the ADR itself, resulting in an overall negative correlation with other US stocks. Essentially, the ADR's performance is more influenced by currency exchange fluctuations than its inherent stock value changes.

The following table shows the allocation of sample assets according to the client's objectives and risk tolerance and selected following the described criteria and process of investing in large-cap U.S. equities.

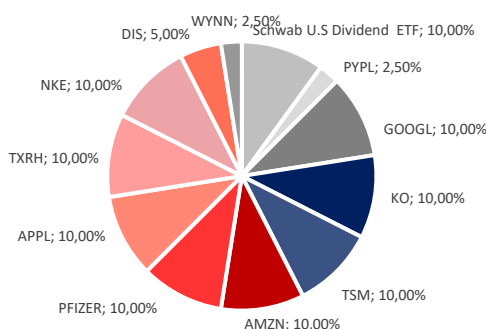
*Table 4 - Equity Portfolio Statistics*

Asset Name	MVO Asset Weights	E(R)	St-Dev	SR
Schwab U.S Dividend ETF	10,00%	10,66%	4,3%	176%
PYPL	2,50%	4,75%	24,9%	7%
GOOGL	10,00%	21,90%	16,3%	115%
KO	10,00%	10,90%	12,2%	64%
TSM	10,00%	26,52%	29,7%	79%
AMZN	10,00%	34,84%	20,0%	158%
PFIZER	10,00%	10,26%	17,9%	40%
APPL	10,00%	38,24%	20,9%	168%
TXRH	10,00%	9,31%	21,4%	29%
NKE	10,00%	12,83%	20,1%	48%
DIS	5,00%	10,29%	19,1%	38%
WYNN	2,50%	17,23%	35,7%	40%
<b>Five Factor MVO Equity Portfolio</b>	<b>100%</b>	<b>18,61%</b>	<b>14,5%</b>	<b>107,2%</b>

*Source: Author's Illustration*

The following graph visually displays the client's equity asset allocation according to MVT.

*Graph 6 - Equity Portfolio MVO Asset Allocation*



*Source: Author's Illustration*

### 3.4.2 Fixed Income Assets

#### ***Vanguard Long-Term Corporate Bond ETF (VCLT)***

Our team has chosen to follow the Bloomberg U.S. 10+ Year Corporate Bond Index, which the Vanguard Long-Term Corporate Bond ETF (VCLT) is designed to track. The decision to follow this index is based on the following considerations:

The Bloomberg U.S. 10+ Year Corporate Bond Index provides a broad representation of the long-term, investment-grade U.S. corporate bond market. This market value-weighted index aims to capture the performance of U.S. dollar-denominated corporate bonds with maturities greater than ten years.

The selection universe for this index is primarily drawn from the wider Bloomberg Corporate Bond Index. Firms with poor credit ratings or those embroiled in significant controversies are typically excluded from the selection pool.

Post exclusions, the methodology ranks and selects bonds based on their creditworthiness and yield potential. Bonds in this index are market value weighted to ensure adequate representation.

The index undergoes periodic reviews and rebalancing to reflect the ever-evolving bond market landscape. Announcements related to changes in the index's constituents are generally communicated a few business days before the effective rebalancing date.

VCLT invests in a diversified basket of corporate bonds, with weights mirroring those of the Bloomberg U.S. 10+ Year Corporate Bond Index. This ensures a broad representation of sectors, industries, and credit quality within the fund.

Considering the inherent nature of long-term corporate bonds, we have focused on a longer investment horizon aligned with Mr. Bing's objectives. Based on historical data, long-term corporate bonds in the 10+ year range have provided annualized returns hovering around 4-6%.

In juxtaposition with the given benchmark, the 10–12-year segment has historically returned around 4.5%-6.5%, while the 12–15 year segment has observed returns between 4%-6%.

*Table 5 - Fixed Income Portfolio Composition & Expected Return*

Asset Name	Total Asset Weight	E(R)	Historical Yearly St-Dev	SR
<b>Vanguard Long-Term Corporate Bond ETF</b>	100,00%	4,76%	10,8%	15,4%

*Source: (Yahoo Finance, 2023)*

### 3.4.3 Diversifying Assets - Gold & U.S Short-Term Treasuries

This Portfolio attends to hedge inflation, interest rate risk and stock market fluctuations by investing in gold and 13-week treasury bills, the 15% allocated towards the assets do not intend to grant liquidity, however, it is possible that ad-hoc (on request by the client) Gold is sold on the secondary-market. On the other hand, the 13-week treasury bills are intended to be yielded to maturity until interest rates and inflation start to go down to ensure that the premium is paid with no additional risk. On that scenario, the investment team will properly allocate the remaining capital + interest gains. (See Portfolio Rebalancing).

The calculation of the Portfolio Expected Return is done on the client given assumption that no liquidity will be needed and therefore no risk is associated with the T-Bills, as shown by table 6.

Table 6 - Hedging Assets Risk Weighted Portfolio Composition & Expected Return

Asset Name	Asset Weight	E(R)	St-Dev	SR
Gold (GC:CMX)	33,33%	9,08%	16,95%	35,27%
13 WEEK TREASURY BILL (^IRX)	66,7%	3,91%	0,00%	-
Hedging Portfolio	100,0%	4,93%	8,47%	21,59%

Sources: (Nasdaq, 2023) & (Yahoo Finance, 2023)

### 3.4.4 Final Portfolio Composition

#### 3.4.4.1 Final Portfolio Assumptions and Considerations

It is important to take into consideration that the usage of the Efficient Frontier method, while invaluable for highlighting the set of optimal portfolios that provide the highest expected return for a given level of risk, discards, in our case, the Fama French Five-Factor Model computation to assess Expected Returns on Equity Assets and solemnly sustains on historical return data from 2015 forward to the elaboration of the Variance-Covariance Matrix due to data availability constraints on PayPal. This decision, though necessary to ensure the calculation, does deviate from the more comprehensive Five-Factor Model approach.

Additionally, it is essential to note that in practical portfolio management constraints are often necessary to ensure alignment with an investor's objectives, guidelines, or risk tolerance. While they might limit the theoretical optimality of a portfolio, they serve real-world purposes and are essential in the portfolio construction process. The adaptation doesn't necessarily imply inferiority; rather, it conveys a balance between ideal optimization and pragmatic decision-making. In essence, while striving for maximum efficiency, it's vital to respect and address the constraints and limitations that real-world data and situations impose on portfolio construction.

Therefore, our team constrains the MVO approach to comply with the allowable ranges specific to our investor's risk profile. In such a constrained scenario, the Capital Allocation Line (CAL) – which represents the risk-return trade-off of a specific portfolio combined with a risk-free asset – may not perfectly touch or be tangent to the Efficient Frontier. This lack of tangency implies that the portfolio represented by the CAL's point of intersection with the Efficient Frontier may not be the absolute optimal portfolio in the theoretical sense. Instead, it would be a more realistic representation given the data and model constraints.

In sum, the investment team only computes the above-mentioned metrics for comparison reasons only on the initially established portfolio weights derived from Novo Banco and Vanguard for a client with Mr. Bing's profile to maintain the efficiency of the Fama-French Five-Factor Model not limiting returns estimation to the average of historical returns from 2015 onwards on the equity portfolio.

Final Note: **This will imply 2 different portfolio computations: 1. Theoretical MVO Portfolio** for comparison reasons only (see 3.4.4.2 Theoretical MVO Portfolio - Efficient Frontier and Capital Allocation Line) and **2. Final Portfolio with initially established portfolio weights** derived from Novo Banco and Vanguard for a client with Mr. Bing's profile to maintain the efficient results given by the Fama-French Five-Factor Model. (See 3.4.4.3 Final Portfolio Composition)

#### 3.4.4.2 Theoretical MVO Portfolio - Efficient Frontier and Capital Allocation Line

In the realm of modern portfolio theory, the Mean-Variance Optimization (MVO) stands as a groundbreaking methodology, developed by the economist Harry Markowitz in the 1950s.

By applying MVO our team seeks to evaluate what the optimal possible portfolio weights would be given the intervals for each asset class considered to be adequate for the client's risk profile. By considering both the expected returns and the associated risks enhancing that our investor's objective is not solely to maximize returns but to do so in conjunction with managing the risks involved.

In the usage of Minimum-Variance-Optimization portfolio management theory, our team meticulously crafted our investor's specific Efficient Frontier.

The Minimum-Variance-Optimization portfolio formula reads:

*Equation 1 - Minimum-Variance Optimization Portfolio Formula*

$$\begin{aligned} \text{Minimize: } & w^T \Sigma w \\ \text{Subject to: } & w^T \mu > r_{\min} \\ & \sum_i w_i = 1 \\ & w_i \geq 0 \quad \forall i \end{aligned}$$

Below we can find the Variance-Covariance Matrix used to assess the portfolio's statistics:

*Table 7 - Variance-Covariance Matrix on the Risky Assets*

Variance-CoV Matrix	Equity	Fixed-Income	Gold
Equity	0,001979	0,000821	0,000320
Fixed-Income	0,000821	0,001183	0,000632
Gold	0,000320	0,000632	0,001637

*Source: Author's Illustration*

Afterwards, we can compute the theoretical MVO Portfolio Invested in 100% Risky Assets, given the investor's specific risk profile.

*Table 8 - Theoretical MVO Portfolio Invested in 100% Risky Assets*

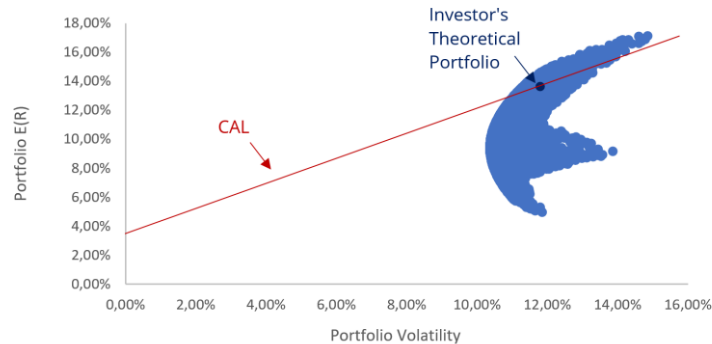
Asset Class	E(R)	Std. Dev	Weight
Equity	17,80%	15,49%	74,40%
Fixed Income	4,76%	10,82%	20,00%
Gold	9,08%	16,95%	5,60%
<b>Total</b>	<b>14,70%</b>	<b>13,11%</b>	<b>100,00%</b>

*Source: Author's Illustration*

By plotting different combinations of assets on a graph, with expected return on the Y-axis and the standard deviation on the X-axis, one can visualize an 'Efficient Frontier'. This frontier depicts portfolios that give the highest possible expected return for a given level of risk. By intercepting the 'Efficient Frontier' with the Capital Allocation Line, the team is able to attain the optimal portfolio.

Therefore, the following graph displays visually:

**Graph 7 - MVO Theoretical Portfolio Given Asset Allocation Constraints EF & CAL**



Source: Author's Illustration

To have the Theoretical MVO portfolio with 90% in risky assets and 10% in Risk-Free, we must add the risk-free values with a ponderation of 10% and multiply the above values by 90%, Resulting in:

**Table 9 - MVO Theoretical Portfolio E(R) and Volatility**

Asset Class	E(R)	Std.dev	Weight	E(R)*weight	Std. Dev * W
Equity	17,80%	15,49%	66,96%	0,119158456	0,103721444
Fixed Income	4,76%	10,82%	18,0%	0,008572909	0,019473167
Gold	9,08%	16,95%	5,04%	0,004575521	0,008542681
13 Week Treasury Bill	3,91%	0,00%	10,0%	0,003905791	0
<b>Total</b>	<b>13,62%</b>	<b>11,86%</b>			

Source: Author's Illustration

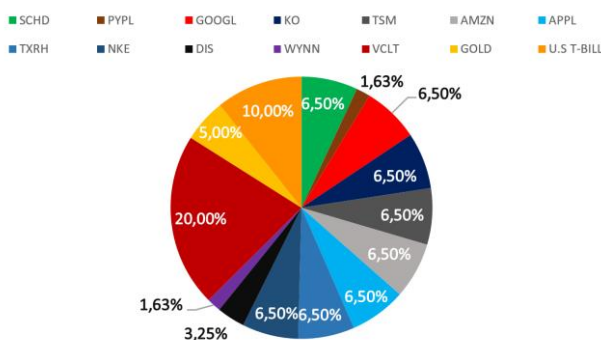
As stated, this portfolio is theoretical and was computed for comparison reasons only.

### 3.4.4.3 Final Portfolio Composition

Considering the MVO Theoretical Portfolio and the Asset Allocation Constraints posed by the evaluation of the questionnaire results of the Our own Investor Questionnaire, the Vanguard Investor Questionnaire and the Strategic Allocations presented by Novo Banco (see appendix 3), the investment team allocated:

- Equities: 65% (Allowable range: 60% - 70%)
- Fixed-Income ETFs: 20% (Allowable range: 20% - 30%)
- 13-week T-bills: 10%; Gold: 5% (Allowable range: 10% - 20%)

Graph 8 - Final Portfolio Asset Allocations



Source: Author's Illustration

### 3.5 Expected Performance

The Modern Portfolio Theory (MPT) underscores the importance of expected performance as a key determinant of portfolio allocation. Thus, we have incorporated the Fama-French Five Factor Model for gauging the expected return of equity assets. When determining the expected return for fixed income ETFs and gold, we leaned on historical returns from their adjusted closing prices, as alluded to in the IPS. As for the 13-week treasury bill returns, we grounded our analysis in the historical average yield to maturity rate.

The overall estimated returns are computed through the individual asset classes as shown in the portfolio composition section previously and assembled to the sample value-balanced portfolio in our table below for the client.

The proposed portfolio offers an average expected return of 13.89%, which is significantly higher than the benchmark's 8.06%. This indicates that the selected assets and their respective allocations are expected to outperform the benchmark by a noteworthy margin.

- Equity: The equity in the portfolio is expected to yield an 18.61% return with a standard deviation of 14,46%.
- Fixed Income ETF: The asset class is projected to provide a 4.76% return associated with a standard deviation of 10,82%
- Gold: Returning on average 9.08% with roughly 17% associated standard deviation.
- 13 Week Treasury Bill: The return for the risk-free asset remains consistent at 3.91%.

Table 10 - Final Portfolio Expected Return and Volatility

Asset Class	E(R)	Std.dev	Weight	E(R)*weight	Std. Dev * W
Equity	18,61%	14,46%	65%	0,121	0,094
Fixed Income	4,76%	10,82%	20%	0,0095	0,022
Gold	9,08%	16,95%	5%	0,0045	0,0084
13 Week Treasury Bill	3,91%	0,00%	10%	0,0039	0

<b>Total</b>	<b>13,89%</b>	<b>12,41%</b>
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Source: Author's Illustration

In addition, we can project the likelihood of expected returns, assuming a steadfast and ongoing investment strategy over the client's specified investment horizon of 25 years, utilizing the Monte Carlo Simulation method. The concluding balance visualized in the chart represents the aggregate value calculated using random returns for each year. This considers the portfolio's historical expected return, the correlation covariance matrix of all assets, and the combined portfolio volatility. By simulating 10,000 of these randomized scenarios, we are equipped to statistically ascertain the potential range of outcomes. Below, we can find the Final Portfolio Estimated Returns using Monte Carlo Simulation over the 25 years investment period.

*Table 11 - Final Portfolio estimated Returns using Monte-Carlo Simulation over 25-year*

Percentile	Final Portfolio Value	YoY E(R)	Portfolio Return
0,1%	354.409,71	5,19%	254%
1%	579.211,09	7,28%	479%
5%	873.062,67	9,05%	773%
25%	1.535.313,41	11,54%	1435%
75%	3.299.002,40	15,01%	3199%
95%	5.466.985,71	17,36%	5367%

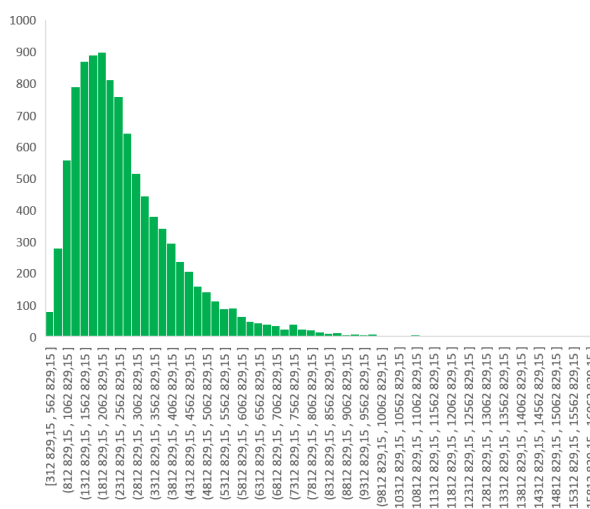
*Source: Author's Illustration*

The values provide a comprehensive insight into the return distribution, which is markedly right skewed, as shown by graph 7. Even in the least favorable 0.1% of scenarios, the investment is expected to more than double its original value with a 5.19% annual return, translating to a 254% compounded return. As we delve deeper, by the 1% percentile, there's a significant rise to a 479% return, which equates to a 7.28% annual return. By the time we reach the median, specifically the 25% mark, the investment is anticipated to grow more than 14 times its initial value over the 25-year duration, offering an 11.54% annual return.

Interestingly, the trend doesn't here there. At the higher end, the 75% mark showcases a return that's nearly 32 times the initial investment, reflecting a 15.01% annual growth rate. What's even more intriguing is the projection at the 95% percentile: a staggering 5367% return or an annual rate of 17.36%.

From this data, it's evident that over a 25-year horizon, the risk of seeing negligible or negative returns is exceedingly rare. Most of the distribution leans towards robust gains, pointing to a dominant concentration on substantial growth. Moreover, the data clearly suggests a tangible opportunity, especially in outlier scenarios, to realize investment growth that far exceeds average expectations.

Graph 9 - Monte Carlo 10.000 Iterations' Distribution over the 25-year Expected Return Estimation



Source: Author's Illustration

## 3.6 Risk Analysis

### 3.6.1 Portfolio Summary

Within the investment landscape, comprehending and mitigating risk is essential. As we evaluate our chosen investment strategy and the client's sample investment portfolio, understanding the multifaceted nature of risk is at the forefront.

#### 3.6.1.1 Equity Portfolio & Benchmark - Volatility, Average Mkt-Rf Beta and Sharpe Ratio

One primary tool for assessing variability in portfolio returns is the standard deviation. This metric encapsulates the overall volatility, offering insights into how returns may fluctuate over time. Beta, on the other hand, provides a lens to view the systematic risk of the portfolio, indicating how susceptible it is to broader market fluctuations. Furthermore, the Sharpe Ratio evaluates the portfolio's performance relative to its risk, comparing it to the prevailing risk-free rate (3 Month T-Bill).

These indicator evaluations are mainly focused on the comparison between the Equity Portfolio and the SP500.

Table 12 - Equity Portfolio & S&P500 Volatility, Average Mkt-Rf Beta and Sharpe Ratio

Asset Class	E(R)	Std.dev	Weight	Benchmark	E(R)	Std.dev	Weight
Equity	18,61%	14,46%	65,0%	S&P 500	9,83%	15,25%	65,0%
Equity Weighted Mkt Rf Beta	0,9151			Market Beta	1,0000		
Sharp Ratio	1,0724			Sharp Ratio	0,4413		

Source: (Yahoo Finance, 2023)

The Equity asset class boasts a significantly higher expected return (E(R)) of 18.61% compared to the S&P 500 benchmark, which has an E(R) of 9.83%. Despite this, the equity's standard deviation, a measure of risk, stands at 14.46%, slightly below the benchmark's 15.25%, indicating a tad less volatility. Both have the same portfolio

weight at 65.0%. In terms of market responsiveness, the Equity's weighted market risk (Beta) is 0.9151, which is slightly less than the standard market beta of 1.0000 for the S&P 500. This implies that the Equity is less reactive to market movements than the S&P 500. Lastly, the Sharpe Ratio, which gauges risk-adjusted performance, is notably higher for the Equity at 1.0724 compared to the benchmark's 0.4413. This indicates that the Equity delivers a better return for each unit of risk taken relative to the S&P 500.

### 3.6.1.2 Equity Portfolio Correlation Matrix

In our approach to security selection, the correlation between securities is pivotal. Recognizing how different assets move in relation to one another can guide optimal diversification decisions. Diversification, a foundational strategy in risk management, ensures the portfolio's resilience against negative movements of individual assets. A subsequent quantitative assessment reveals the degree of the portfolio's exposure to distinct industry sectors, shedding light on any inherent vulnerabilities.

A correlation matrix is a critical tool in risk management for portfolio construction. By illustrating the interdependencies between asset returns, it highlights potential vulnerabilities. Assets with high positive correlations could amplify losses during market downturns, while those with negative or low correlations can act as hedges, reducing overall portfolio volatility. Thus, by guiding diversification strategies, a correlation matrix aids in achieving adequate risk adjustments to the client's portfolio.

To develop the portfolio correlation matrix, the investment team used the Pearson Correlation Coefficient:

*Equation 2 - Pearson Correlation Coefficient*

$$\rho_{xy} = \frac{\text{Cov}(x, y)}{\sigma_x \sigma_y}$$

Using the covariance matrix developed for the portfolio MVO process, the team divided the covariance between two assets x and y by the multiplication of the standard deviation of the residuals of each asset obtaining the following matrix:

*Table 13 - Equity Portfolio Correlation Matrix*

Correlation Matrix	SCHD	PYPL	GOOGL	KO	TSM	AMZN	PFIZER	APPL	TXRH	NKE	DIS	WYNN
SCHD	1											
PYPL	0,23122051	1										
GOOGL	0,29008113	0,08583049	1									
KO	0,26271233	0,05545987	0,07049505	1								
TSM	-0,006822	-0,0022966	-0,0099239	-0,00145	1							
AMZN	0,2870088	0,09623134	0,11367439	0,08184377	-0,006397	1						
PFIZER	0,19880812	0,04625354	0,05715864	0,06494773	-0,0016353	0,06374923	1					
APPL	0,23831994	0,06885047	0,08753874	0,06338025	-0,0048284	0,09988175	0,0463382	1				
TXRH	0,14503664	0,03054081	0,04201166	0,02858339	-0,000595	0,04031386	0,0190689	0,04737682	1			
NKE	0,22960226	0,04710982	0,07302148	0,06255828	-0,0059963	0,06595344	0,04622994	0,05820691	0,03558877	1		
DIS	0,26797135	0,06928165	0,08037846	0,06746128	-0,0006941	0,08324635	0,05215415	0,06702886	0,03975294	0,0581319	1	
WYNN	0,21994585	0,04876102	0,06489143	0,04590382	-0,0015433	0,05878308	0,03339473	0,06019785	0,04944531	0,05235633	0,05997525	1

*Source: Author's Illustration*

Correlation values range from -100% (perfect inverse correlation) to +100% (perfect positive correlation), with 0% indicating no correlation. From our Equity Portfolio Correlation Matrix, we may draw an average correlation coefficient of 21,82% meaning there is a mild positive relationship between the returns of the assets on average. In practice, an average correlation of 21% is lower than the 50% "usual market condition" benchmark established by Elton and Gruber suggesting that the assets in the portfolio are less correlated with each other than what might be typically expected in the market. Therefore, negative performance in some assets might be offset by the performance of other assets more effectively than in a higher-correlation environment. (Manuel Tarrazo, 2013)

Simultaneously, the collective response of the asset bundle to market swings is muted and sustained by the defensive Weighted Average Market-Rf Beta of 0,9151 displayed by the equity portfolio according to the Fama French Five Factor Model estimations.

Therefore, piling up companies in the hope of gaining diversification is not needed as we are able to draw efficient portfolios with a low number of assets.

It is important to understand that the correlation matrix is used as a risk analysis tool and that the team does not intend to use mean-correlation optimization as the correlation portfolio is not efficient simply due to the fact that a mean-variance portfolio offers lower variance, and this strategy may deform the risk-structure in a nonlinear manner. (Manuel Tarrazo, 2013)

### 3.6.1.3 Portfolio Sectorial Concentration

The portfolio's sectorial concentration reveals a dominant positioning in Consumer Cyclical, with an exposure of 21.6%. This can be seen as a strategy to capitalize on the ups and downs of the business cycle, especially as consumers' discretionary spending fluctuates.

The considerable diversification allocation to diverse categories provides the portfolio with inherent diversification, reducing the idiosyncratic risks associated with specific sectors: Communication Services and Technology sectors both command substantial weights, at 10% and 13.6% respectively. These sectors are vital in today's digital age and can offer potential growth opportunities. The Consumer Defensive (7.3%) and Healthcare (7.6%) sectors further offer stability. Defensive stocks are less sensitive to economic cycles, and healthcare is consistently in demand, making them more resilient during economic downturns. Financials have a minimal presence due to the MVO allocation on the equity Portfolio, reflecting a strategic turn-around play on Paypal and other stocks included in the Schwab U.S. Dividend Equity ETF. Commodities, which have a 5% allocation, add another layer of diversification, potentially providing inflation protection and a hedge against other stocks. The inclusion of US Government Bonds at 10% provides the portfolio with a safety net. These bonds are considered a low-risk asset and can help cushion the portfolio against potential downturns in more volatile sectors.

Overall, the portfolio seems well-diversified across sectors, with a clear strategy to leverage growth opportunities while ensuring stability and hedging against potential risks.

*Table 14 - Total Portfolio Sectorial Concentration*

Sector	Exposure
Consumer Discretionary	21,6%
Corporate Debt	20,0%
Technology	13,6%
Communication Services	10,0%
US Government Bonds	10,0%
Healthcare	7,6%
Consumer Defensive	7,3%
Commodities	5,0%
Financials	3,5%
Industrials	1,1%
Energy	0,7%
Materials	0,2%
Utilities	0,02%

*Source: (Finviz, 2023)*

### 3.6.2 Portfolio VaR and CVaR – Monte Carlo Simulation

An additional layer of our risk analysis incorporates the Value at Risk (VaR) and Conditional Value at Risk (CVaR) methodology. These predictive tools estimate potential portfolio losses under specific conditions.

To compute the VaR and CVaR, the Monte Carlo Simulation method was employed, like the methodology used for estimating expected returns. Utilizing an initial portfolio investment value, Expected Return and standard deviation as our guiding markers, the goal was to construct 10,000 distinct scenarios reflecting the portfolio's potential trajectory over a given time horizon.

The "base value" for these iterations, commonly referred to as the seed value, was rooted in random variables from a standard normal distribution. This calculation considers the Black-Scholes-Merton model, commonly used for pricing options, as a tool to introduce randomness into the simulation rather than for its traditional option pricing purposes. The Monte Carlo approach allows for the modeling of a wide range of potential outcomes, making it a valuable tool for risk analysis and financial forecasting. The formula reads:

*Equation 3 - Seed Value Equation for Monte Carlo VaR*

$$\text{Seed Value} = e (R_i - 0.5 \times SD^2 + SD \times NORMINV (RAND ()))$$

In this formula, SD denotes the Standard Deviation.

Using the seed value as a starting point, we simulated numerous 1-year gain/loss scenarios for the portfolio. Incorporating the seed iteration into the initial portfolio value, we generated a range of potential outcomes, providing insights into the portfolio's likely path over a year.

To gain a comprehensive understanding of our analysis, we delved into the Value at Risk (VaR) from the 10,000 simulations. At a 99% confidence level, the VaR corresponds to the 100th largest loss, representing 1% of the total simulations (10,000). For a 99.9% confidence level, the Conditional Value at Risk (CVaR) aligns with the 10th most severe loss scenario, equaling 0.1% of 10,000 simulations. The following table presents the results.

*Table 15 - Portfolio VaR using Monte-Carlo Simulation*

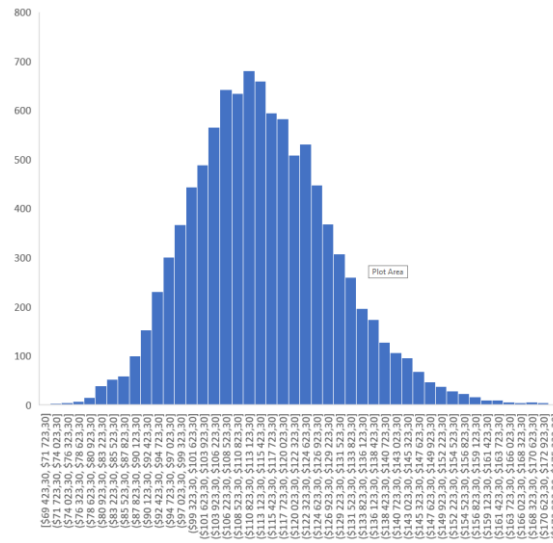
Percentile	VaR (%)	Absolute VaR (252 Trading Days)	CVaR (%)	Absolute CVaR (252 Trading Days)
0,1%	23,29%	\$ 23.291,90	31,54%	\$ 31.536,20
1%	15,31%	\$ 15.305,73	26,77%	\$ 26.772,46
5%	6,76%	\$ 6.762,51	21,61%	\$ 21.607,14

*Source: Author's Illustration*

Monte Carlo methods, while powerful, have a notable drawback: they tend to underestimate the probability of extreme bear events. This limitation is associated from the method's reliance on a normal distribution, which exhibits a bell-shaped curve. In this distribution, the majority of data points cluster around the mean, and the tails are relatively short. Consequently, the model implies a very low probability of encountering extreme events.

As illustrated in Graph 10, the results for Value at Risk (VaR) using the Monte Carlo method confirm this tendency. The graph visually demonstrates how the method may not accurately capture the likelihood of extreme downside events, potentially leading to an underestimation of the portfolio's risk in such scenarios.

**Graph 10 - Portfolio VaR - Monte Carlo 10.000 Iterations' Distribution**



*Source: Author's Illustration*

### 3.6.3 Scenario Analysis

In order to mitigate the low probability of one Monte Carlo Simulation encountering extreme events, the scenario analysis further enriches our risk assessment. By stressing the portfolio's E(R) and standard deviation on the computations of the portfolio expectations over the 25-year investment horizon, VaR and CVaR over 1 year the team aims to efficiently evaluate the portfolio's robustness amidst the ever-changing market dynamics considering the following range of market scenarios:

- The Bull scenario anticipates strong market performance with favorable economic indicators.
- The Bear scenario represents more conservative market conditions, typically observed during economic slowdowns.
- The Black-Swan scenario accounts for rare, unpredictable market events with significant consequences.

#### 3.6.3.1 Bull Scenario Portfolio Value Expectations, VaR and CVaR

*Table 16 - Bull Scenario E(R) and Std. Dev Assumptions*

Scenario	E(R)	Std Dev
Bull Market	15%	10%

*Source: Author's Illustration*

**Robust Economic Growth:** Countries experience a synchronized global economic upswing. This isn't merely a rebound from a recessionary period but a sustained period of above-trend growth. Such prosperity can be attributed to factors like advanced infrastructure development projects, technological integrations into traditional sectors, and a resurgence of consumer confidence. This growth is not isolated to one region but is evident globally, leading to mutual economic benefits and further solidifying the foundation for a prolonged bull run.

**Technological Pioneering:** This scenario sees groundbreaking advancements in fields such as artificial intelligence, green energy solutions, and biotechnologies. These technological leaps don't just promise future potential—they deliver. They redefine industries, making processes more efficient, products more accessible, and open up entirely new markets that were previously inconceivable.

**Harmonious Global Trade Environment:** Nations actively seek collaboration. Bilateral and multilateral trade agreements emerge, not out of necessity, but out of a shared vision for mutual growth. The ease of trade not only boosts global economic sentiments but also encourages cross-border investments, leading to interconnected and interdependent growth stories.

**Revitalized Corporate Health:** Corporations report increased profit margins, efficient capital allocation, and visionary future. They're not growing because of the market—they're a significant reason the market is growing. Healthy balance sheets, coupled with strategic mergers and acquisitions, paint a picture of a corporate landscape that's not only thriving today but is well poised for the challenges and opportunities of tomorrow.

Regarding the bull scenario, the values in table 13 offer a comprehensive insight into the return distribution, which exhibits a notable right skew, as observed in Graph 10. Even in the least favorable 0.1% of bull scenarios, the investment is expected to more than double its original value, achieving a 744% compounded total return or an annual return of 8.91%. By the 1% percentile, there's a significant increase to a 980% total return, equivalent to a 9.99% annual return. This suggests that most scenarios yield robust returns. As we progress further, at the 5% percentile, the investment is anticipated to grow by an impressive 1349% in total or an 11.29% annual return. By the time we reach the median, specifically the 25% mark, the investment is expected to increase by over 21 times its initial value over the 25-year duration, providing an impressive 13.20% annual return.

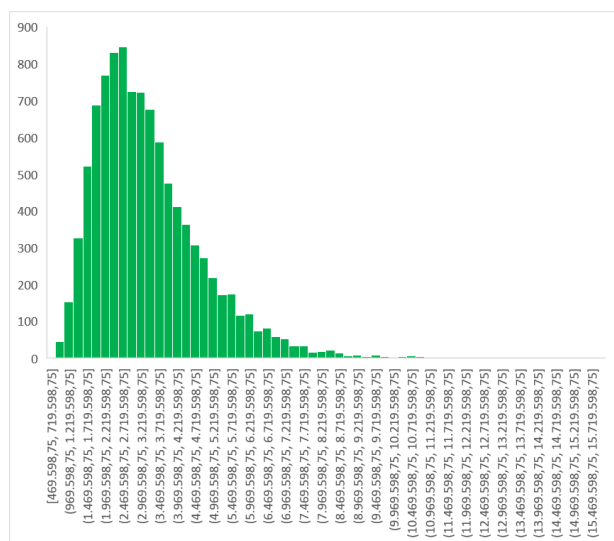
From this data, it's evident that over a 25-year horizon in a bull market scenario, the risk of experiencing negligible or negative returns is exceedingly rare. Instead, the distribution leans strongly toward robust gains, indicating a significant focus on substantial growth. Furthermore, the data clearly highlights a tangible opportunity, especially in outlier scenarios, to achieve investment growth that far exceeds average expectations.

*Table 17 - Bull Market Scenario Portfolio Expected Returns using Monte-Carlo Simulation*

Percentile	Final Portfolio Value	Portfolio YoY Return	Portfolio Total Return
0,1%	844.391,94	8,91%	744%
1%	1.080.398,45	9,99%	980%
5%	1.449.225,10	11,29%	1349%
25%	2.217.477,01	13,20%	2117%
75%	4.044.573,10	15,95%	3945%
95%	6.127.743,42	17,89%	6028%

*Source: Author's Illustration*

Graph 11 - Bull Market Scenario Monte Carlo 10.000 Iterations' Distribution over the 25-year Expected Return Estimation



Source: Author's Illustration

According to table 14, at the 0.1% percentile, VaR is 14.74%, signifying the maximum potential loss in extreme scenarios. The Absolute VaR at this level amounts to \$14,739.32. In contrast, CVaR at 0.1% is notably higher at 24.84%, indicating the expected loss beyond VaR in these extreme scenarios, with an Absolute CVaR of \$24,838.47. Moving to the 1% percentile, VaR decreases to 8.51%, indicating a lower but still manageable potential loss. The Absolute VaR at this level is \$8,510.44. CVaR at 1% is 21.38%, signifying the anticipated loss beyond VaR in scenarios that are less extreme, resulting in an Absolute CVaR of \$21,376.60. At the 5% percentile, VaR stands at a moderate 1.95%, indicating a relatively lower potential loss. The Absolute VaR for this percentile is \$1,945.67. In contrast, the CVaR at the 5% percentile is 18.31%, suggesting the expected loss beyond VaR in scenarios that are less extreme. The Absolute CVaR at this level amounts to \$18,311.58.

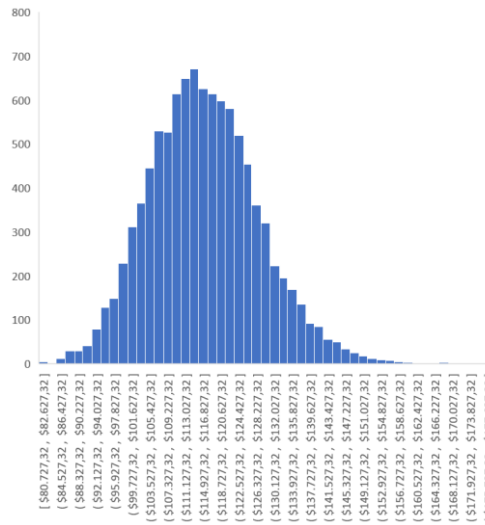
Table 18 - Bull Market Scenario Portfolio VaR using Monte-Carlo Simulation

Percentile	VaR (%)	Absolute VaR (252 Trading Days)	CVaR (%)	Absolute CVaR (252 Trading Days)
0,1%	14,74%	\$14.739,32	24,84%	\$ 24.838,47
1%	8,51%	\$ 8.510,44	21,38%	\$ 21.376,60
5%	1,95%	\$ 1.945,67	18,31%	\$ 18.311,58

Source: Author's Illustration

As illustrated by Graph 11, the distribution for the bull scenario is discernibly right skewed. The more pronounced tail on the right side, compared to the left, signals the presence of rarer but more significant negative losses. On the other hand, while negative losses are more frequent toward the center and left of the distribution, they tend to be less severe. The heightened CVaR values at the extreme percentiles emphasize this potential for significant losses, especially at the tail end of the distribution, reinforcing the right-skewed nature of the graph.

Graph 12 - Bull Scenario Portfolio VaR - Monte Carlo 10.000 Iterations' Distribution



Source: Author's Illustration

### 3.6.3.2 Bear Market Scenario VaR and Portfolio Value Expectations

Table 19 - Bear Market Scenario E(R) and Std. Dev Assumptions

Scenario	E(R)	Std Dev
Bear Market	5%	13%

Source: Author's Illustration

**Economic Stagnation:** Globally, economies experience an extended period of flat or declining growth. This isn't just a short-term downturn but a prolonged phase of below-trend growth. Key factors behind this include high unemployment rates, decreased consumer spending, reduced private sector investment, and burgeoning public debt. This stagnation is widespread, with major economies simultaneously facing headwinds, leading to a lack of growth catalysts and a continued bearish sentiment.

**Technological Setbacks:** In this scenario, anticipated advancements in crucial sectors such as artificial intelligence, renewable energy, and biotechnologies either fail to materialize or face significant roadblocks. Such hindrances might result from regulatory challenges, ethical concerns, or technical obstacles. The underperformance in these sectors, previously viewed as the growth engines of the future, dampens market enthusiasm and investor confidence.

**Protectionist Trade Policies:** Nations adopt insular approaches, focusing on domestic industries at the expense of international trade. Tariffs rise, trade wars erupt, and long-standing agreements face dissolution. This environment stifles international commerce, hampers supply chains, and makes cross-border investments riskier and less attractive.

**Corporate Distress:** Many corporations face declining revenues, mounting debts, and shrinking profit margins. Challenges from disrupted supply chains, decreased consumer demand, and increased competition lead to significant layoffs and, in some cases, bankruptcies. Instead of looking at expansionary activities, companies are in survival mode, focusing on cost-cutting and debt management. Strategic mergers and acquisitions decrease, and those that do occur are often out of desperation or to consolidate and reduce competition.

**Macro Instabilities:** Global geopolitical tensions rise, leading to uncertainties in international relationships and alliances. These tensions might result in conflicts, further diverting resources away from productive endeavors. Moreover, mounting public debt in many countries becomes a cause for concern, leading to reduced government

spending on public services, infrastructure, and welfare. Central banks, having already utilized many of their tools during prior crises, find limited room to maneuver, leading to reduced efficacy in monetary interventions.

The bear market scenario portfolio's expected returns over a 25-year span comprehensive breakdown predicted through Monte Carlo simulation is provided by table 20.

At the lowest percentile, 0.1%, the projections are quite grim. The final portfolio value stands at \$47,378.67, marked by a disheartening Year-over-Year return of -2.94% and an overall drop by 53%. This percentile paints a picture of the most adverse outcomes, highlighting the direst trajectories that a portfolio might experience in prolonged bearish conditions. Slightly better, though still under the weight of bearish forces, the 1% percentile points to a final portfolio value of \$69,432.38. The Year-over-Year return here is -1.45%, with the total return dipping to -31%. As we ascend to the 5% percentile, there's a marked shift. This level showcases a portfolio value of \$110,128.62, marking the cusp of positive outcomes with a Year-over-Year return just entering the green at 0.39%, culminating in an overall return of 10%. The median and more optimistic scenarios manifest in the values corresponding to the 25% and 75% percentiles. Here, despite the overarching bear market conditions, the portfolio values notably rise to \$194,213.87 and \$427,972.66 respectively. These scenarios, with Year-over-Year returns of 2.69% and 5.99% and impressive total returns of 94% and 328%, represent instances where the right investment decisions can navigate the stormy seas of a bear market. The 95% percentile crowns the table's projections with a portfolio value soaring to \$729,882.74. The Year-over-Year return here is a robust 8.28%, and the total return reaches a staggering 630%, showcasing the best-case scenarios even within a bearish backdrop.

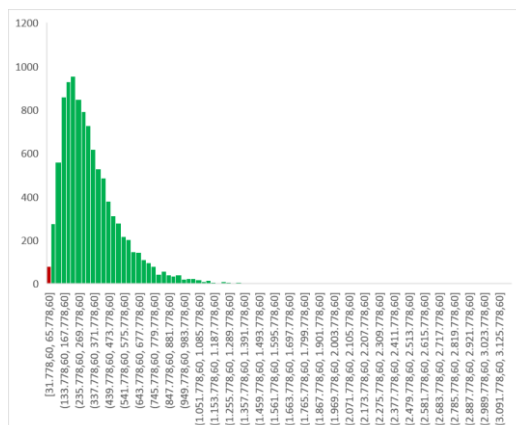
*Table 20 - Bear Market Scenario Portfolio Expected Returns using Monte-Carlo Simulation*

Percentile	Final Portfolio Value	Portfolio YoY Return	Portfolio Total Return
0,1%	47.378,67	-2,94%	-53%
1%	69.432,38	-1,45%	-31%
5%	110.128,62	0,39%	10%
25%	194.213,87	2,69%	94%
75%	427.972,66	5,99%	328%
95%	729.882,74	8,28%	630%

*Source: Author's Illustration*

According to Graph 13, the left tail of the graph represents the pessimistic forecasts of the 0.1% and 1% percentiles, highlighted in red. As we traverse towards the graph's center and right, the upward curve probably mirrors the rising fortunes highlighted by the higher percentiles in the table. The far-right tail captures those rare but possible outcomes of substantial gains of the 95% percentile. Together, Table 16 and Graph 12 provide a detailed panorama of potential outcomes in a bear market scenario. While the table offers quantified insights, the graph paints a visual narrative of risks, average outcomes, and the shimmering possibilities of high returns even in adverse conditions.

**Graph 13 - Bear Market Scenario Monte Carlo 10.000 Iterations' Distribution over the 25-year Expected Return Estimation**



*Source: Author's Illustration*

In the bear scenario, we observe a distinct risk profile based on the provided VaR and CVaR values at different percentiles: At the extreme 0.1% percentile, VaR is significantly higher at 30.07%, signifying the potential for substantial losses in extreme scenarios. The Absolute VaR at this level is \$30,071.40. Similarly, CVaR at 0.1% is notably elevated, standing at 37.16%, indicating the expected loss beyond VaR in these extreme scenarios. The Absolute CVaR at this level is \$37,164.89. Moving to the 1% percentile, VaR remains high at 23.37%, suggesting a considerable potential loss. The Absolute VaR at this level is \$23,371.16. CVaR at 1% is 31.44%, signifying the anticipated loss beyond VaR in scenarios that are less extreme, resulting in an Absolute CVaR of \$31,437.80. Even at the 5% percentile, VaR is relatively elevated at 15.94%, indicating a notable potential loss. The Absolute VaR for this percentile is \$15,937.37. Meanwhile, CVaR at 5% is 25.12%, signifying the expected loss beyond VaR in scenarios that are less extreme. The Absolute CVaR at this level amounts to \$25,124.76.

**Table 21 - Bear Market Scenario Portfolio VaR using Monte-Carlo Simulation**

Percentile	VaR (%)	Absolute VaR (252 Trading Days)	CVaR (%)	Absolute CVaR (252 Trading Days)
0,1%	30,07%	\$30.071,40	37,16%	\$ 37.164,89
1%	23,37%	\$23.371,16	31,44%	\$ 31.437,80
5%	15,94%	\$15.937,37	25,12%	\$ 25.124,76

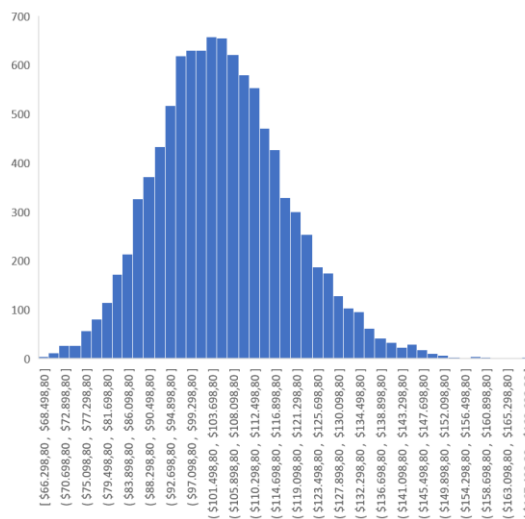
*Source: Author's Illustration*

As depicted by Graph 13 in the bear market scenario, the distribution showcases a slight right-skewed shape. While at first this skewness might subtly manifest, its ramifications are significant when closely observed. This tail's extension symbolizes the potential for rare but extremely severe negative returns, a phenomenon evident when we consider the 0.1% percentile value from the table.

Moving towards the central part of the distribution, where it's denser and peaks, we find that this area represents more typical and frequent outcomes for the bear market scenario. These outcomes align with the values closer to the 5% percentile, painting a picture of frequent, less severe, losses.

The nuances of the distribution become even more insightful when paired with the CVaR values. The graph provides us with a visual representation of the frequency and magnitude of potential losses, but the CVaR values, such as the -37.16% at the 0.1% percentile, anchor this illustration highlighting that more extreme negative outcomes lead to an intensification of anticipated average losses.

Graph 14 - Bear Market Scenario Portfolio VaR - Monte Carlo 10.000 Iterations' Distribution



Source: Author's Illustration

### 3.6.3.3 Black-Swan Scenario VaR and Portfolio Value Expectations

A Black-Swan event is a term coined by Nassim Nicholas Taleb. It describes an event that is unpredictable, carries a massive impact, and after the fact is rationalized by hindsight, as if it could have been expected.

Table 22 - Black-Swan Scenario E(R) and Std. Dev Assumptions

Scenario	E(R)	Std Dev
Black-Swan	0,25%	20%

Source: Author's Illustration

**Global Systemic Shocks:** An unexpected and rare event of massive magnitude, such as a meteor strike, super-volcano eruption, or a powerful solar flare, hits Earth. This event disrupts life as we know it, affecting global infrastructure, communication networks, and energy supplies. The immediate and long-term consequences of this event are far-reaching and cannot be compared to any previous disaster.

**Technological Catastrophe:** A previously unknown vulnerability in widely adopted technologies leads to a massive breakdown. This could be an irreversible flaw in digital encryption, leading to a global financial meltdown or a catastrophic failure in AI systems that many sectors rely upon. The trust in modern technological systems gets severely undermined, leading to a prolonged period of regression and reluctance to adopt new technological advancements.

**Unforeseen Pandemic:** A new and highly contagious disease, for which there's initially no known cure or treatment, spreads globally at an unprecedented rate. This pandemic surpasses any previous ones in terms of its impact, leading to significant loss of life, widespread panic, and a near-complete halt of global economic activities.

**Unpredicted Financial Collapse:** A financial crisis originating from a sector or region previously deemed safe and stable suddenly implodes. This could result from a hidden bubble, a previously undetected fraud on a massive scale, or the unexpected collapse of a major currency. The ripple effect of this collapse sends shockwaves through global markets, causing widespread bankruptcies and economic contractions.

**Global Political Upheaval:** Unexpected political events, such as the sudden dissolution of major political unions, the unexpected collapse of superpowers, or a series of coordinated terrorist attacks on global capitals, lead to a severe disturbance in the world order. Such events result in widespread fear, uncertainty, and the breakdown of long-standing alliances and trade agreements.

While this scenario sound extreme, the nature of a Black Swan event is that it's unexpected and beyond the realm of regular predictions. Its implications are profound, reshaping economies, societies, and sometimes even the world order. (Nassim Nicholas Taleb, 2007)

At the extreme 0.1% percentile, the final portfolio value is 2,074.35, implying a significant loss of approximately 98% from the initial value. This represents a severe scenario that occurs with very low probability. At the 1% percentile, the final portfolio value is 4,812.34, resulting in a loss of around 95% relative to the initial value. This scenario is also highly adverse. As we move to higher percentiles (5%, 25%, 75%, and 95%), the final portfolio values increase, indicating smaller losses or even gains. At the 95% percentile, the portfolio has a substantial gain of approximately 248% relative to its initial value.

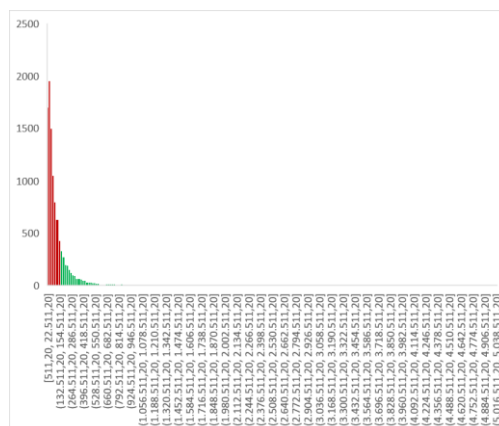
*Table 23 - Black-Swan Scenario Portfolio Expected Returns using Monte-Carlo Simulation*

Percentile	Final Portfolio Value	Portfolio Return	Portfolio Return
0,1%	2.074,35	-14,36%	-98%
1%	4.812,34	-11,43%	-95%
5%	10.303,97	-8,69%	-90%
25%	31.489,28	-4,52%	-69%
75%	128.692,64	1,01%	29%
95%	348.144,25	5,12%	248%

*Source: Author's Illustration*

Graph 15, representing the Black Swan scenario, captures a deeply concerning financial landscape, as indicated by its right-skewed distribution. When juxtaposed with the associated data, the dire potential outcomes in this scenario are palpably discernible. The extended tail on the right side of the distribution is emblematic of substantial, although varied, negative outcomes. For instance, delving into the numbers, at the most extreme 0.1% percentile, the portfolio's value shrinks to a meager \$2,074.35, corresponding to a staggering -98% return. This precipitous descent in portfolio value persists, albeit with diminishing severity, through the 1% and 5% percentiles, where returns stand at -95% and -90%, respectively. However, there's a silver lining as we shift to more favorable scenarios. At the 25th percentile, the loss moderates, with the portfolio showing a -69% return. But it's only once we reach the 75th percentile that we witness a turnaround, with a positive 29% return. And at the 95th percentile, there's a semblance of a financial boon, as the return surges to a robust 248%. Yet, the overarching narrative remains daunting. Even as there's potential for significant gains in some scenarios, the overall tenor of the Black Swan scenario is one of pronounced risk, given the severe losses at lower percentiles. The graph and data combined underscore a world where the potential for deep losses is paramount, and gains, though possible, are relegated to less likely scenarios.

Graph 15 - Black Swan Scenario Monte Carlo 10.000 Iterations' Distribution over the 25-year Expected Return Estimation



Source: Author's Illustration

Regarding the scenario's Value-At-Risk and Conditional Value-At-Risk, graph 15 and table 20 unfold a narrative of potential financial downturns.

The graph with its right-skewed distribution. This skewness, when examined alongside the provided data, tells a story of substantial financial risk. The elongated tail on the right side of the distribution is indicative of the possibility of rare but profoundly severe negative losses. This assertion is empirically anchored by the data. At a mere 0.1% percentile, the VaR is a staggering -47.59%, suggesting that in the most adverse 0.1% of outcomes, losses could plummet to around this value or even worse. The accompanying CVaR at -57.89% further accentuates this scenario, suggesting that when such bleak thresholds are crossed, the average subsequent loss could be even more harrowing.

As we shift focus to the less extreme percentiles, the narrative remains. At the 1% level, the VaR is at -37.67% with its accompanying CVaR at -49.07%. Even broadening the lens to the 5% percentile doesn't offer much respite, with a VaR of -28.79% and a corresponding CVaR of -41.31%.

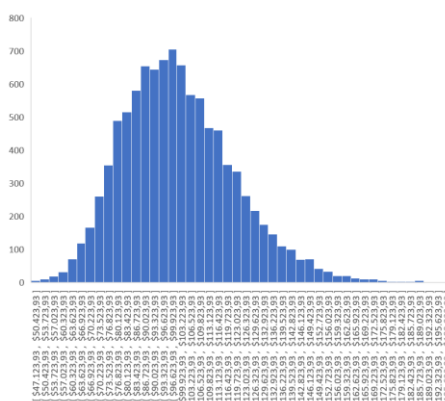
Contrary to expectations, there's no evident relief in the form of positive outcomes. The entirety of the graph, along with the table, casts shadows of potential deep financial setbacks throughout the Black Swan scenario.

Table 24 - Black-Swan Scenario Portfolio VaR using Monte-Carlo Simulation

Percentile	VaR (%)	Absolute VaR (252 Trading Days)	CVaR (%)	Absolute CVaR (252 Trading Days)
0,1%	47,59%	\$47.593,73	-57,89%	\$57.894,75
1%	37,67%	\$37.674,88	-49,07%	\$49.070,69
5%	28,79%	\$28.786,59	-41,31%	\$41.312,91

Source: Author's Illustration

Graph 16 - Black-Swan Scenario Portfolio VaR - Monte Carlo 10.000 Iterations' Distribution



Source: Author's Illustration

Despite these results, it is again important to note that a Black-Swan is an event and not a long-term market trend and therefore the exaggerated results of losses around 90% do not reflect reality.

History has shown us instances such as the 1987 Stock Market Crash, the 2008 financial crisis and the COVID-19 pandemic, which were highly unpredictable and had profound effects on economies and societies. (Nassim Nicholas Taleb, 2007)

Properly managing the downturn caused by these events can in fact lead to major returns. As shown by the figure 4, the S&P500 has, after a black swan, consistently returned above average. In fact, in times of crisis one should invest in the stock market (Fernando Braga de Matos, 2015)

Figure 4 - S&P 500 Returns After a Black-Swan Crash

- +35,44 (14,28%) ↑ 23/10/1987-21/10/1988
- +247,99 (30,03%) ↑ 30/01/2009-29/01/2010
- +1 638,42 (71,08%) ↑ 20/03/2020-12/03/2021

Source: (Google Finance, 2023)

### 3.6.3.4 Scenario Analysis – Results Summary

Table 25 - Scenario Analysis VaR, CVaR and Portfolio Value Expectations w/ 99% Confidence

99% C.I	E(R)	Std Dev	VaR 1 year (%)	CVaR 1 year (%)	Portfolio YoY Return
Bull	15%	10%	8,51%	21,38%	9,99%
Base Scenario	13,89%	12,41%	15,31%	26,77%	7,28%
Bear	5%	13%	23,37%	31,44%	-1,45%
Black-Swan	0,25%	20%	37,67%	49,07%	-11,43%

Source: Author's Illustration

*Table 26 - Scenario Analysis VaR, CVaR and Portfolio Value Expectations w/ 95% Confidence*

95% C.I	E(R)	Std Dev	VaR 1 year (%)	CVaR 1 year (%)	Portfolio YoY Return
Bull	15%	10%	1,95%	18,31%	11.29%
Base Scenario	13,89%	12,41%	6,76%	21,61%	9,05%
Bear	5%	13%	15,94%	25,12%	0.39%
Black-Swan	0,25%	20%	28,79%	41,31%	-8.69%

*Source: Author's Illustration*

The scenario analysis conducted in this research provides a comprehensive understanding of portfolio performance under different market conditions. From the optimistic Bull Scenario to the catastrophic Black Swan Scenario, we observe a spectrum of outcomes based on varied assumptions:

- **Bull Scenario:** Representing the most optimistic outlook, this scenario predicts an expected return of 15% with a 10% standard deviation. At a 1% confidence interval, the portfolio yields close to the desired 10% YoY, with a VaR of -8,51% and a Conditional Value At Risk of 21,38%. However, when viewed through a 5% confidence interval, it outperforms with a return of 11.29% and a more reassuring VaR of -1.95%, despite the 18,31% Expected ShortFall, this showcases the portfolio's strength in favorable conditions.
- **Base Scenario:** Often seen as the "business-as-usual" setting, it offers an expected return slightly below the Bull Scenario. The 1% confidence interval points to a 7.28% YoY return with a VaR of -15.31%, indicating more exposure to downside risks. Yet, at the 5% confidence interval, the scenario maintains its resilience from the 30% maximum loss indicated by Mr. Bing, evident from its 9,05% E(R), 6,76% VaR and 21,61% CVaR.
- **Bear Scenario:** As the name suggests, this presents a more cautious view. With a low return of 5% and a dip in YoY at -1.45% at the 1% confidence interval. Additionally, CVaR slightly undermines the client's objectives with a value of 31,44%, however, the VaR at -23.37% remains within acceptable bounds. At the 5% confidence level, the scenario sees a minimal positive return of 0.39% with VaR at -15.94% and a CVaR of 25,12%, underscoring the portfolio's relative stability even in bearish conditions.
- **Black Swan Scenario:** Represents rare and unexpected events, this scenario presents an almost non-existent expected return paired with a high standard deviation. At a 1% confidence interval, the YoY Return dips to -11.43% and the VaR and CVaR sound alarms at -37.67% and -49,07%, respectively. Additionally, a shift to the 5% confidence interval, poses the return slightly moderating to -8.69% and, eventhough is high at 41,31%, the VaR at -28,7955% aligns exactly with the client's risk threshold,

The above insights amplify the significance of diversification and astute risk management, more so when prepping for market extremities. The nuanced differentiation between the 1% and 5% confidence intervals serves as an indispensable guide for the team to recalibrate their strategies by rebalancing the portfolio. These empirical findings, if properly managed, indicate that the investment team will probably be able satisfy or even surpass the client's objectives.

### 3.6.4 Risk Matrix

A Risk Matrix serves as a pivotal tool in the arsenal of strategic decision-makers, aiming to visually and quantitatively delineate the landscape of potential risks faced by a portfolio. By plotting the likelihood of an event against its severity, the matrix provides clarity on the prioritization of risks, ensuring that focus and resources are channeled towards managing the most impactful ones. The presented matrix categorizes risks ranging from those linked to daily business operations to cataclysmic events that might seem almost surreal. However, in a world characterized by rapid shifts and uncertainty, even the most improbable scenarios deserve deliberation.

*Figure 5 - Risk Matrix*

Risk Matrix		Severity				
		Insignificant	Minor	Moderate	Major	Severe
Likelihood	Almost Certain	Short-term Exchange Rate Fluctuations	Market Fluctuations	Climate Change / ESG	Shifts in Global Trade Dynamics Directly Impacting the Portfolio's Companies	Global Financial System Instability (over the extended timeline)
	Likely	Tax Law Changes	Sectorial Downturns / Changes in Consumer Preferences	Company-Specific Events / Technological Disruption	Geopolitical Events / Political Instability	Market Crash
	Possible	Management Turnover in a Company / Alien Mergers & Acquisitions	Adjustment in Credit Ratings / Target Prices	Interest Rate Hikes / Regulatory Changes	Major Data Breaches for Industry Giants	Recession
	Unlikely	Localized Natural Disasters	Minor Data Breaches	Liquidity Risks	Collapse of a Major Financial Institution / Global Pandemic	Biochemical / Nuclear Incident
	Rare	Unexpected Retirement of a Known Industry Figure	Niche Market Bubble Burst	Global Corporate Tax Reforms	Global Internet Outage	Cosmic Incident

*Source: Author's Illustration*

The matrix underscores an imperative: While not all risks can be prevented, understanding their spectrum, and preparing for them can greatly reduce their adverse effects. Therefore, our investment team must be vigilant, adaptive, and ever prepared, given the evolving and often unpredictable nature of global risks.

A more in-depth detail on the Moderate, Major and Severe Risks Impacts, monitoring strategies and Mitigations may be found in the appendices. (See Appendix 4. Multiple Risk Impact, Monitoring and Mitigation Strategies)

## 4. Conclusion

In summary, this Investment Policy Statement (IPS) for Mr. Bing crafts a meticulous investment blueprint tailored for his long-term goal of achieving a comfortable retirement over a span of 25 years. Rooted in the time-tested investing beliefs founded by Warren Buffet, Charlie Munger, Benjamin Graham, Mohnish Pabrai, and Peter Lynch, and complemented by insights on investor behavior from acclaimed researchers like Hersh Shefrin, Gregory Curtis, and others, this strategy integrates a value-growth investment approach while maintaining a balanced asset allocation.

The strategy recognizes the potential of undervalued equities with robust future growth prospects, while also anchoring the portfolio with Fixed-Income ETFs to stimulate capital appreciation. Additionally, to ensure capital preservation, the investment team allocated Gold and government bonds towards inflation and interest rate safeguards while hedging fluctuating stock-market scenarios. This balanced approach intends to ensure a blend of growth and safety, mirroring Mr. Bing's articulated moderate-aggressive risk profile.

Taking guidance from the CFA Institute's standards, this IPS dives deep into essential elements, from client assessment to risk analysis and portfolio creation, ensuring a comprehensive plan. Additionally, the integration of sophisticated financial tools and methodologies like the Fama-French Five Factor Model, Mean-Variance Optimization, the Efficient Frontier, and the Capital Market Line, seeks that Mr. Bing's investments are optimally aligned for prospective returns and ideal asset allocations.

Additionally, the investment team uses tools like the Monte Carlo Simulation to project expected returns and volatility over the investment horizon. Scenario analyses encompassing various market conditions, from bull markets to black-swan events, offer a clearer picture of potential challenges and outcomes. To complement, the developed Risk Matrix prioritizes the highest impacting risks, ensuring that strategies are developed to address and mitigate them. This dynamic approach intends to guarantee that the portfolio remains agile, adapting to market conditions while ensuring the safety and growth of capital. By keeping a close watch on the portfolio we're proactive in managing threats originated from specific investments and broader market shifts, be they systematic or unique to assets. In fact, routine check-ins are a part of our strategy, sticking to the agreed parameters and using Modern Portfolio Theory (MVO) as our guiding methods. We're committed to keeping the client in the loop, regularly updating him on how the portfolio is behaving, market trends, and any suggested changes to the investment approach. While we're confident in our strategy, it's worth noting that all investments come with their ups and downs. Our approach, while geared towards long-term stability, isn't exempt from short-term market swings.

In the end, the IPS for Mr. Bing aspires to deliver a judicious blend of value-driven investing and strategic asset diversification, all aligned towards meeting his retirement aspirations within the set investment horizon. Constant monitoring, evaluations, and open communication channels will ensure that Mr. Bing remains informed, confident, and content with the trajectory of his investments as he progresses towards his retirement vision.



## 5. Appendices

### Appendice 1. Risk Assessment Questionnaire

Figure 6 - Risk Assessment Questionnaire

#### Risk Assessment Questionnaire

##### General Information

Please Provide the information below

**Name:** Chandler Juventus Bing

**Current Marital Status:** Single

**Date of Birth (Age):** 23rd of May 1991 (32 years old)

**Education:** Marketing Management Bachelor's Degree

**Occupation:** employed as a marketing manager of a Japanese enterprise in the US, working 100% from home.

**Total Annual Gross Income:** \$125.000.000

**Savings:** \$100.000. Intending to invest such amount.

**Tax Residency & Country of Birth:** Holds US citizenship and are subject to US income tax.

**Housing Status:** Apartment renting in Las Vegas, Nevada.

**Debt:** No debt. Student Loans Paid Last year.

##### Investment Knowledge & Experience

	0 yrs/ 0trades	Máx 2 Yrs/ 10 Trades	+ 2 Yrs / + 10 Trades	
Equities	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Fixed-Income	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Mutual Investment Funds	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Commodities	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	If Yes, Which ? _____
Forex (Forwards/Swaps)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Structured Products	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Private Equity Funds	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Private Bond Funds	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Options	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Futures	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Other Derivatives	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	If Yes, Which ? _____
Real Estate	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Others	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	If Yes, Which ? <u>Art/ Paintings and Cryptocurrencies</u>

Please state your overall Investment Experience in a Statement: Egor To learn more

##### Financial Situation (\$)

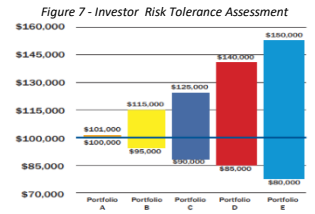
	< 50.000	> 50.000 - 100.000	>100.000
Assets	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Liabilities	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Annual Gross Income	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Planned Annual Spending	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Please state your overall Financial Situation in a Statement: Currently, I have no debt

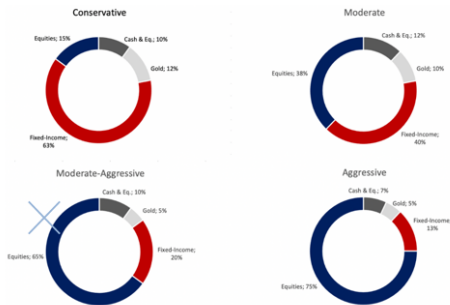


Constraints and Market Perception

1. Given your objectives, when will you expect to begin making withdrawals? After 10, or 15 years
2. Once you begin making withdrawals, how long will the money need to last? For 10 years plus
3. It is important for you to: Keep pace with the Stock Market
4. At the beginning of the year, you have \$100,000 invested. Which portfolio are you most comfortable with? Portfolio D
5. Which statement best describes your tolerance for investment risk with respect to your investment program? Medium Tolerance – I am comfortable with fluctuations in my portfolio, and the possibility of larger declines in value, in order to seek growth in
6. If you had money invested in a diversified portfolio and the stock market took a down turn, when would you sell your riskier investments and put the money in safer asset? I wouldn't sell any of my investments. I would continue to follow a consistent long-term investment strategy. Despite thinking that a 30% decline is a bit too much
7. What is your projected Investment Time-Horizon? 25 years, until retirement.
8. I would describe my riskreturn profile as follows. Please indicate the best match to your investment objective by marking the appropriate allocation Strategy with a cross.



Source: (Heck Capital Advisors)



Source: Author's Illustration

Figure 8 - Vanguard Suggested Portfolio Allocation for Mr. Bing

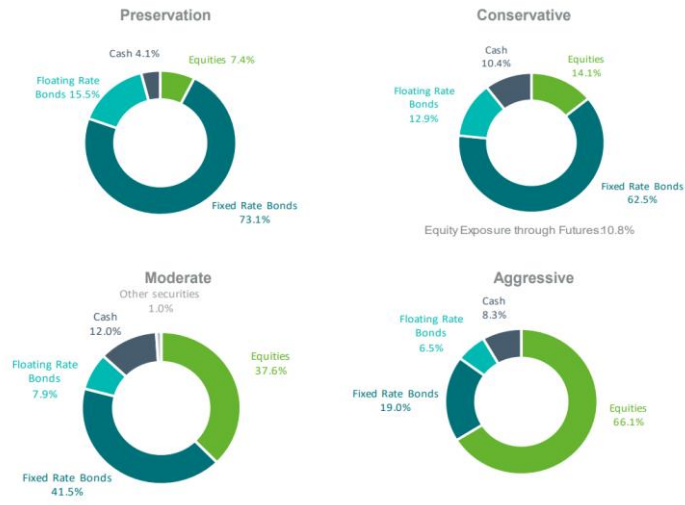
Suggested allocation:



- Stocks: 70%
- Bonds: 30%
- Short-term reserves: 0%

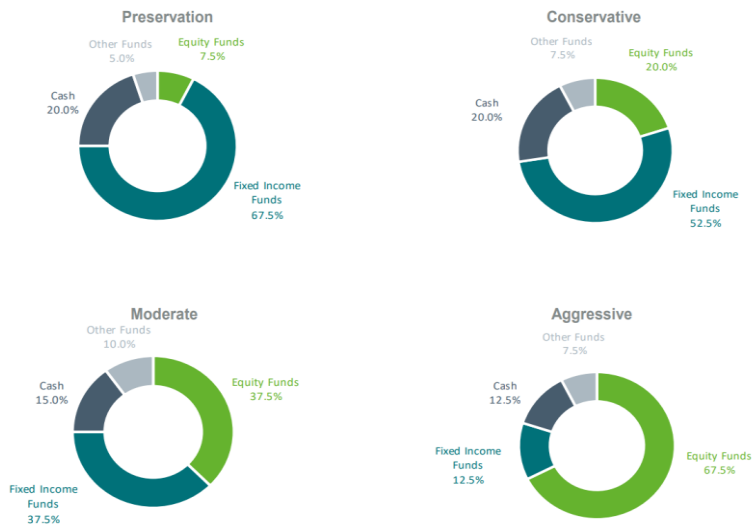
Source: (Vanguard Group, Inc, 2023)

Figure 9 - Novo Banco Direct Asset Allocation for different Risk Profiles



Source: (Novo Banco, 2022)

Figure 10 - Novo Banco Asset Allocation Through Mutual Funds for different Risk Profiles



Source: (Novo Banco, 2022)

## Appendice 2. Client Profile

Figure 11 - Client Profile Determinators



Source: (Canaccord Wealth Management, 2023)

Figure 12 - Mr. Bing's Risk Profile

Based on the Answers Provided by Mr. Bing, we assess the following Risk Measurements

1.	Client Risk Tolerance Level	Moderate-Level
2.	Client Risk Capacity Level	Moderate-High Level
3.	Risk Required To Attain Objectives	Moderate-Aggressive
4.	<b>Mr. Bing's Risk Profile</b>	Moderate- Aggressive Risk Profile

### Final and Important Notes

In accordance with Mr. Bing the perceived client risk profile which determines, on a personal level, the maximum ability to bear uncertainty in the financial markets, aligns with his beliefs, objectives and constraints. Additionally, the moderate-aggressive selected asset allocation is acceptable and agreed upon as suitable for the client. Thus, the clients comprehends and investments are volatile and performance may not be attained as past performance is not a perfect measure to evaluate future returns. By signing the document Mr. Bing confirms that all statements are true, correct, and complete

Advisor's Signature \_\_\_\_\_

Client's Signature \_\_\_\_\_

Source: Author's Illustration

## Appendice 3. Fundamental Snapshot & Screening

Table 27 - WYNN Fundamental Ratio Snapshot

	Industry Median	2022	2021		Industry Median	2022	2021
Hist EV/Revenue, FY	-	4,518254834	4,966085309	Quick Ratio	0.83	2,19	2,18
Hist EV/EBITDA, FY	-	37,93867138	58,15014108	Current Ratio	1.00	2,22	2,23
Hist EV/FCF, FY	-	-	-	Leverage			
Earnings Quality Score	61	42	23	Debt/Equity	0.87	-	-
Gross Margin	49.3%	0,364	0,32	% LT Debt to Total Capital	46.9%	1,102	1,069
EBITDA Margin	17.0%	0,119	0,085	(Total Debt - Cash) / EBITDA	2.67	20,1	29,75
Operating Margin	10.0%	-0,027	-0,105	A/R Turnover	16.8	18,1	18,8
Net Margin	6.6%	-0,189	-0,269	Avg. A/R Days	21.7	20,2	19,4
DuPont/Earning Power				Inv Turnover	31.7	34,1	37,6
Asset Turnover	0.56	0,29	0,29	Avg. Inventory Days	11.5	10,7	9,7
Pretax ROA	4.6%	-0,054	-0,077	Avg. A/P Days	32.0	28,2	22,8
x Leverage (Assets/Equity)	3.72	-	-	Fixed Asset Turnover	1.72	0,42	0,4
ROE	5.1%	-	-	WC / Sales Growth	(2.9%)	0,039	-0,202
Reinvestment Rate	1.3%	-	-	ROIC	-	-0,058	-0,084

Put-Call Ratio (Open Interest) 0,85

Source: (Bloomberg Finance L.P., 2023)

Table 28 - TXRH Fundamental Ratio Snapshot

	Industry Median	2022	2021		Industry Median	2022	2021
Earnings Quality Score	61	88	93	Assets/Equity	3.72	2,49	2,37
Hist EV/Revenue, FY	-	1,54	1,73	Debt/Equity	0.87	0,05	0,09
Hist EV/EBITDA, FY	-	13,50	14,12	% LT Debt to Total Capital	46.9%	0,046	0,085
Hist EV/FCF, FY	-	139,04	62,66	(Total Debt - Cash) / EBITDA	2.67	-	-
Gross Margin	49.3%	0,657	0,666	A/R Turnover	16.8	25,8	26,7
EBITDA Margin	17.0%	0,114	0,123	Avg. A/R Days	21.7	14,1	13,6
Operating Margin	10.0%	0,08	0,086	Inv Turnover	31.7	39,6	42,9
Net Margin	6.6%	0,069	0,073	Avg. Inventory Days	11.5	9,2	8,5
Asset Turnover	0.56	1,59	1,43	Avg. A/P Days	32.0	26,5	25,5
Pretax ROA	4.6%	0,128	0,121	Fixed Asset Turnover	1.72	2,21	2,06
x Leverage (Assets/Equity)	3.72	2,49	2,37	WC / Sales Growth	(2.9%)	-0,032	0,029
ROE	5.1%	0,261	0,247	ROIC	-	0,148	0,137
Quick Ratio	0.83	0,55	0,88				
Current Ratio	1.00	0,61	0,94				

Source: (Bloomberg Finance L.P., 2023)

Table 29 - TSM Fundamental Ratio Snapshot

	Industry Median	2022	2021		Industry Median	2022	2021
Earnings Quality Score	51	92	63	Earnings Quality Score	51	92	63
Hist EV/Revenue, FY	4,836313913	9,76	9,94	Debt/Equity	0.13	0,3	0,35
Hist EV/EBITDA, FY	7,021561849	14,45	14,82	% LT Debt to Total Capital	5.1%	0,226	0,217
Hist EV/FCF, FY	138,079409	-	180,41	(Total Debt - Cash) / EBITDA	(0.85)	-	-
Gross Margin	45.2%	0,596	0,516	A/R Turnover	5.9	10,5	9,2
EBITDA Margin	25.8%	0,689	0,676	Avg. A/R Days	61.7	34,7	39,7
Operating Margin	18.0%	0,495	0,409	Inv Turnover	2.6	4,4	4,6
Net Margin	15.4%	0,449	0,376	Avg. Inventory Days	141.3	82,8	78,8
Asset Turnover	0.53	0,52	0,49	Avg. A/P Days	65.4	21	21,4
Pretax ROA	9.0%	0,263	0,204	Fixed Asset Turnover	2.40	0,95	0,88
ROE	15.3%	0,398	0,297	WC / Sales Growth	1.4%	0,014	0,159
Quick Ratio	1.57	1,94	1,91	ROIC	-	0,291	0,233
Current Ratio	2.31	2,17	2,17				
Assets/Equity	1.64	1,69	1,72				

Put-Call Ratio (Open Interest) 1,0

Source: (Bloomberg Finance L.P., 2023)

**Table 30 - PYPL Fundamental Ratio Snapshot**

	Industry Median	2022	2021
Earnings Quality Score	40	78	78
Hist EV/EBITDA, FY	15,08858795	39,35	58,58
Hist EV/FCF, FY	26,69634323	48,59	59,77
Gross Margin	54.6%	0,42	0,47
EBITDA Margin	30.1%	0,195	0,22
Operating Margin	21.5%	0,139	0,168
Net Margin	9.8%	0,088	0,164
Asset Turnover	0.22	0,36	0,35
Pretax ROA	2.4%	0,044	0,056
ROE	13.2%	0,115	0,2
Quick Ratio	1.51	-	-
Current Ratio	1.42	1,28	1,22
Assets/Equity	3.53	3,88	3,49
Debt/Equity	0.63	0,53	0,42

	Industry Median	2022	2021
Earnings Quality Score	40	78	78
% LT Debt to Total Capital	21.9%	0,335	0,262
(Total Debt - Cash) / EBITDA	2.46	-	-
A/R Turnover	6.9	0,6	0,6
Avg. A/R Days	53.1	574,9	566,6
Inv Turnover	26.0	-	-
Avg. Inventory Days	14.2	-	-
Avg. A/P Days	70.7	913,3	1016,5
Fixed Asset Turnover	12.36	11,3	9,98
WC / Sales Growth	(1.0%)	-0,036	-0,127
ROIC	-	0,073	0,129

Put-Call Ratio (Open Interest) 0,44

Source: (Bloomberg Finance L.P., 2023)

**Table 31 - PFE Fundamental Ratio Snapshot**

	Industry Median	2022	2021
Earnings Quality Score	58	73	98
Hist EV/Revenue, FY	3,001264228	4,18	5,59
Hist EV/EBITDA, FY	7,053238077	10,37	15,31
Hist EV/FCF, FY	12,41923781	20,94	1097,98
Gross Margin	73.0%	0,655	0,622
EBITDA Margin	23.9%	0,426	0,403
Operating Margin	7.2%	0,364	0,291
Net Margin	(2.8%)	0,313	0,276
Asset Turnover	0.36	0,53	0,48
Pretax ROA	(2.0%)	0,183	0,145
ROE	(5.1%)	0,363	0,319
Quick Ratio	1.41	1	1,19
Current Ratio	2.44	1,22	1,4
Assets/Equity	2.18	2,06	2,35

	Industry Median	2022	2021
Earnings Quality Score	58	73	98
Debt/Equity	0.47	0,37	0,5
% LT Debt to Total Capital	28.4%	0,25	0,312
(Total Debt - Cash) / EBITDA	1.54	0,24	0,53
A/R Turnover	5.3	7,7	8,4
Avg. A/R Days	67.0	47,4	43,7
Inv Turnover	2.1	3,8	3,6
Avg. Inventory Days	175.1	95,4	102
Avg. A/P Days	71.2	65,5	59
Fixed Asset Turnover	3.05	5,42	4,92
WC / Sales Growth	(1.5%)	-0,031	0,105
ROIC	-	0,214	0,168

Put-Call Ratio (Open Interest) 0,80

Source: (Bloomberg Finance L.P., 2023)

**Table 32 - NKE Fundamental Ratio Snapshot**

	Industry Median	2023	2022
Earnings Quality Score	48	68	64
Hist EV/Revenue, FY	3,114519007	3,92	4,74
Hist EV/EBITDA, FY	23,54832005	24,37	26,47
Hist EV/FCF, FY	54,11001357	42,68	50,41
Gross Margin	52.8%	0,435	0,46
EBITDA Margin	14.5%	0,132	0,161
Operating Margin	12.0%	0,115	0,143
Net Margin	9.0%	0,099	0,129
Asset Turnover	1.11	1,32	1,2
Pretax ROA	11.0%	0,159	0,17
ROE	21.0%	0,346	0,431
Quick Ratio	1.12	1,81	1,84
Current Ratio	2.23	2,72	2,63
Assets/Equity	2.43	2,68	2,64

	Industry Median	2023	2022
Earnings Quality Score	48	68	64
Debt/Equity	0.46	0,64	0,62
% LT Debt to Total Capital	18.6%	0,389	0,361
(Total Debt - Cash) / EBITDA	0.35	-	-
A/R Turnover	10.6	11,6	10,2
Avg. A/R Days	34.6	31,4	35,8
Inv Turnover	2.3	3,4	3,3
Avg. Inventory Days	159.0	106,8	110,8
Avg. A/P Days	66.2	39,4	44,9
Fixed Asset Turnover	5.08	6,52	5,94
WC / Sales Growth	(2.9%)	-0,039	0,041
ROIC	-	0,175	0,21

Put-Call Ratio (Open Interest) 0,96

Source: (Bloomberg Finance L.P., 2023)

**Table 33 - KO Fundamental Ratio Snapshot**

	Industry Median	2022	2021
Earnings Quality Score	83	90	90
Hist EV/EBITDA, FY	22,74916561	22,85	23,75
Hist EV/FCF, FY	175,934766	109,25	249,80
EBITDA Margin	17.9%	0,31	0,33
Operating Margin	14.0%	0,255	0,282
Net Margin	8.6%	0,223	0,254
Asset Turnover	0.75	0,46	0,43
Pretax ROA	7.0%	0,125	0,137
ROE	11.1%	0,405	0,462
Quick Ratio	0.95	0,93	0,96
Current Ratio	1.32	1,15	1,13
Assets/Equity	2.30	3,85	4,1
Debt/Equity	0.56	1,62	1,86
% LT Debt to Total Capital	24.8%	0,56	0,564

	Industry Median	2022	2021
Earnings Quality Score	83	90	90
(Total Debt - Cash) / EBITDA	1.67	2,15	2,46
A/R Turnover	9.5	12,3	11,6
Avg. A/R Days	38.5	29,8	31,5
Inv Turnover	5.1	4,7	4,6
Avg. Inventory Days	72.7	77,7	79,6
Avg. A/P Days	78.5	100,7	96,7
Fixed Asset Turnover	3.18	3,81	3,27
WC / Sales Growth	(0.8%)	-0,03	0,123
ROIC	-	0,133	0,137

Put-Call Ratio (Open Interest) 0,86

Source: (Bloomberg Finance L.P., 2023)

**Table 34 - DIS Fundamental Ratio Snapshot**

	Industry Median	2022	2021
Hist EV/Revenue, FY	2,639947414	5,42701964	4,17832859
Hist EV/EBITDA, FY	18,24713653	41,52	29,77
Hist EV/FCF, FY	57,28796695	89,00	-
Gross Margin	57.6%	0,34	0,33
EBITDA Margin	15.6%	0,145	0,131
Operating Margin	6.3%	0,079	0,046
Net Margin	2.5%	0,043	0,038
Asset Turnover	0.54	0,41	0,33
Pretax ROA	2.2%	0,026	0,013
ROE	(2.6%)	0,035	0,024
Quick Ratio	1.08	0,94	1,04
Current Ratio	1.21	1	1,08
Assets/Equity	2.14	2,14	2,3
Debt/Equity	0.42	0,51	0,62

	Industry Median	2022	2021
% LT Debt to Total Capital	22.4%	0,29	0,311
(Total Debt - Cash) / EBITDA	2.00	3,16	4,53
A/R Turnover	8.4	6,4	5,2
Avg. A/R Days	43.3	57,6	70,8
Inv Turnover	36.6	35,4	31
Avg. Inventory Days	10.0	10,3	11,8
Avg. A/P Days	59.1	-	-
Fixed Asset Turnover	7.80	2,21	1,85
WC / Sales Growth	(1.9%)	-0,067	0,042
ROIC	-	0,022	0,016

Put-Call Ratio (Open Interest) 0,647800

Source: (Bloomberg Finance L.P., 2023)

**Table 35 - APPL Fundamental Ratio Snapshot**

	Industry Median	2022	2021
Earnings Quality Score	76	94	86
Hist EV/Revenue, FY	6,266548211	6,77	7,02
Hist EV/EBITDA, FY	18,92949665	20,60	24,93
Hist EV/FCF, FY	28,94954688	30,80	40,96
Gross Margin	40.1%	0,433	0,418
EBITDA Margin	9.4%	0,331	0,329
Operating Margin	7.8%	0,303	0,298
Net Margin	2.7%	0,253	0,259
Asset Turnover	1.04	1,12	1,08
Pretax ROA	2.7%	0,338	0,324
ROE	(2.0%)	1,755	1,474
Quick Ratio	0.92	0,85	1,02
Current Ratio	1.35	0,88	1,07
Assets/Equity	1.58	6,96	5,56

	Industry Median	2022	2021
Earnings Quality Score	76	94	86
Debt/Equity	0.00	2,39	1,99
% LT Debt to Total Capital	24.3%	0,581	0,582
(Total Debt - Cash) / EBITDA	0.94	0,52	0,35
A/R Turnover	5.7	7	8,2
Avg. A/R Days	63.8	51,9	44,3
Inv Turnover	4.5	38,8	40
Avg. Inventory Days	81.9	9,4	9,1
Avg. A/P Days	95.8	96,8	82,9
Fixed Asset Turnover	9.21	7,73	7,71
WC / Sales Growth	(0.7%)	-0,077	-0,109
ROIC	-	0,47	0,426

Put-Call Ratio (Open Interest) 0,86

Source: (Bloomberg Finance L.P., 2023)

**Table 36 - AMZN Fundamental Ratio Snapshot**

	Industry Median	2022	2021		Industry Median	2022	2021
Earnings Quality Score	75	12	9	Earnings Quality Score	75	12	9
Hist EV/EBITDA, FY	23,27831638	34,65	31,40	% LT Debt to Total Capital	18.1%	0,363	0,335
Hist EV/FCF, FY	-	-	-	(Total Debt - Cash) / EBITDA	0,36	-	-
Gross Margin	43.0%	0,44	0,42	A/R Turnover	24,7	13,8	16,5
EBITDA Margin	10.9%	0,073	0,103	Avg. A/R Days	15,4	26,6	22,2
Operating Margin	7.5%	0,024	0,053	Inv Turnover	4,9	8,6	9,7
Net Margin	4.6%	-0,005	0,071	Avg. Inventory Days	73,9	42,5	37,9
Asset Turnover	0.95	1,16	1,27	Avg. A/P Days	62,3	100,3	101,6
Pretax ROA	5.9%	-0,013	0,103	Fixed Asset Turnover	4,62	2,19	2,56
ROE	7.6%	-0,019	0,288	WC / Sales Growth	(0.7%)	-0,017	0,008
Quick Ratio	0.99	0,72	0,91	ROIC	-	-0,009	0,141
Current Ratio	1.30	0,94	1,14				
Assets/Equity	3.49	3,17	3,04				
Debt/Equity	0.45	0,61	0,52				

Put-Call Ratio (Open Interest) 0,86

Source: (Bloomberg Finance L.P., 2023)

**Table 37 - SCHD Performance & Risk Snapshot**

Name	1 Year	3 Years	5 Years	10 Years
Alpha	-0,26	0,14	0,30	0,26
Annualized Standard Deviation	17,33	17,06	18,23	14,45
Beta	0,96	0,94	0,91	0,90
Correlation	0,96	0,97	0,97	0,96
Information Ratio	-0,22	0,07	0,20	0,17
Max Drawdown	-10,32	-15,72	-21,54	-21,54
R/R Ratio	0,19	0,22	0,17	0,23
R-Square	0,93	0,94	0,94	0,92
Sharpe Ratio	0,09	0,17	0,12	0,19
Sortino	0,12	0,20	0,12	0,18
Tracking Error	1,31	1,25	1,34	1,24
Treynor Ratio	0,47	0,86	0,69	0,87
Value at Risk Normal	-7,28	-7,01	-7,75	-5,89
Value at Risk Normal ETL	-9,37	-9,07	-9,95	-7,63
Value at Risk Quantile	-4,19	-7,52	-8,21	-7,36
Variance	25,02	24,25	27,69	17,40

Put-Call Ratio (Open Interest) 0,38

Source: (Bloomberg Finance L.P., 2023)

**Table 38 - VCLT Performance & Risk Snapshot**

Name	1 Year	3 Years	5 Years	10 Years
Alpha	0,004	0,076	-0,035	-0,013
Annualized Standard Deviation	15,94	14,21	13,93	11,08
Beta	1,85	1,80	1,74	1,78
Correlation	0,99	0,99	0,99	0,98
Information Ratio	-0,04	-0,20	-0,05	0,03
Max Drawdown	-9,03	-31,67	-31,67	-31,67
R/R Ratio	0,06	-0,17	0,02	0,09
R-Square	0,99	0,98	0,97	0,96
Sharpe Ratio	-0,04	-0,23	-0,04	0,04
Sortino	-0,05	-0,21	-0,04	0,04
Tracking Error	2,14	1,90	1,83	1,51
Treynor Ratio	-0,10	-0,53	-0,09	0,07
Value at Risk Normal	-7,27	-7,45	-6,55	-4,98
Value at Risk Normal ETL	-9,19	-9,17	-8,23	-6,32
Value at Risk Quantile	-5,51	-8,87	-8,55	-5,26
Variance	21,16	16,82	16,18	10,23

Source: (Bloomberg Finance L.P., 2023)

*Table 39 - Fundamental Screening on Large-Caps with moderate Growth*

Company Name	Ticker	Operating Margin %	Market Cap (mil)	Current Ratio	Quick Ratio	ROI (5 Yr Avg)	Beta	P/E (F1)
Alphabet	GOOG	25,34	1747355,25	2,17	2,34	21,89	1,06	24,4
Meta Platforms	META	22,91	809748,19	2,32	2,2	24,04	1,21	23,51
Taiwan Semiconductor	TSM	43,31	469163	2,42	1,86	24,38	1,07	18,75
Exxon Mobil	XOM	13,85	439830,81	1,48	1,06	10,26	1,05	11,71
JPMorgan Chase & Co,	JPM	32,54	430100,66	0,9	0,84	6,44	1,1	9,2
Broadcom	AVGO	51,09	364519,75	2,5	2,35	18,10	1,13	20,95
Swisscom	SCMWY	14,38	313867,97	0,85	0,89	10,35	0,25	15,82
Chevron	CVX	13,98	306340,25	1,43	1,23	9,10	1,14	11,94
Oracle	ORCL	28,86	296537,47	0,87	0,91	15,81	1,03	19,55
AbbVie	ABBV	40,18	261156,31	0,89	0,84	31,60	0,56	13,41
Toyota Motor	TM	7,7	240723,81	1,11	0,93	6,37	0,65	10,6
ASML Holding	ASML	28,67	236655	1,34	0,88	30,42	1,46	28,41
Coca-Cola	KO	25,53	228714,59	1,14	0,93	17,08	0,56	20,15
Shell	SHEL	9,31	226909,25	1,46	1,1	7,78	0,65	7,98
Cisco Systems	CSCO	28,03	218029,7	1,38	1,27	24,54	0,98	13,28
Alibaba	BABA	17,6	215574,48	1,92	1,81	10,92	0,7	9,35
Novartis	NVS	27,2	206109,91	1,05	1,04	16,14	0,53	14,2
Accenture	ACN	11,67	200610,39	1,3	1,3	31,97	1,22	24,94
Salesforce	CRM	20,63	199066,06	1,02	1,02	5,00	1,2	25,39
Thermo Fisher Scientific	TMO	18,56	186355,84	1,42	1,15	13,29	0,79	21,59
Pfizer	PFE	35,41	181291,77	2,12	1	20,59	0,61	9,65
McDonald's	MCD	33,67	180959,25	1,35	1,41	22,04	0,65	21,56
TotalEnergies	TTE	11,49	163129,2	1,17	0,94	10,45	0,76	6,92
HSBC	HSBC	35,32	159279,64	0,9	0,9	4,11	0,59	5,6
Abbott Laboratories	ABT	18,78	157691,98	1,64	1,23	14,63	0,69	20,65
Netflix	NFLX	13,22	157619,59	1,33	1,17	12,63	1,31	29,8
NIKE	NKE	9,82	152054,05	2,87	1,81	26,49	1,12	26,69
SAP	SAP	15,94	151918,02	1,42	1,06	10,37	1,18	23,44

Source: (Zacks Research, 2023)

*Table 40 - Mega-Cap Fundamental Screening Results & Cut-off Points*

Ticker	Name	Sector	Industry	Country	Market Cap	P/E	Price	Change	Volume
AAPL	Apple Inc	Technology	Consumer Electronics	USA	2796.18B	30.06	178.85	-1.03%	51,325,927
GOOGL	Alphabet Inc	Communication Services	Internet Content & Information	USA	1731.97B	29.06	137.36	-1.16%	23,416,577
AMZN	Amazon.com Inc.	Consumer Cyclical	Internet Retail	USA	1331.70B	103.21	129.79	-1.92%	45,490,503
TSM	Taiwan Semiconductor Manufacturing ADR	Technology	Semiconductors	Taiwan	469.16B	14.94	90.46	-2.12%	7,651,438
ASML	ASML Holding NV	Technology	Semiconductor Equipment & Materials	Netherlands	236.66B	30.47	599.75	-2.76%	1,012,867
AZN	Astrazeneca plc ADR	Healthcare	Drug Manufacturers - General	United Kingdom	208.71B	34.06	67.33	-1.15%	3,857,711

Cut-Off Points	
Market Cap.	> 200 bn\$
Target Price	Above Current Price
P/S	Under 10
EPS growth	Over 5%
Sales growth past 5 yrs	Over 10%
Return on Equity	Over 5%
Return on Investment	> 0%
Current Ratio	> 0,5
Quick Ratio	> 0,5
Gross Margin	> 35%
Net Profit Margin	> 0%

Source: (Finviz, 2023)

**Table 41 - Turn-Around Play Fundamental Screening & Cut-Off Points**

Ticker	Company	Sector	Industry	Country	Market Cap	P/E	Price	Change	Volume
PYPL	PayPal Holdings Inc	Financial	Credit Services	USA	61.22B	15.58	55.75	-1.07%	12,036,069
LTHM	Livent Corp	Basic Materials	Specialty Chemicals	USA	3.21B	10.24	17.86	-3.67%	3,336,341
GHC	Graham Holdings Co.	Consumer Defensive	Education & Training Service	USA	2.73B	13.13	588.08	0.04%	9,295
BOOM	DMC Global Inc	Energy	Oil & Gas Equipment & Service	USA	412.79M	12.53	20.89	-1.23%	165,089
SOL	Emereon Group Ltd ADR	Technology	Solar	USA	174.18M	4.33	2.89	-2.36%	221,749

Cut-Off Points	
Market Cap.	> 50 bn\$
Target Price	Above Current Price
Forward P/E	Under 10
PEG	Under 1
EPS growth this year	Over 20%
EPS growth next year	Over 10%
LT Debt / Equity	Under 1
Debt / Equity	Under 1
Current Ratio	Over 1
Gross Margin	> 25%
Net Profit Margin	> 0%

Source: (Finviz, 2023)

**Table 42 - Defensive Assets Fundamental Screening & Cut-Off Points**

Ticker	Company	Sector	Industry	Country	Market Cap	P/E	Price	Change	Volume
KO	Coca-Cola Co	Consumer Defensive	Beverages - Non-Alcoholic	USA	228.71B	21.86	52.89	0.15%	14,465,681
PFE	Pfizer Inc.	Healthcare	Drug Manufacturers - General	USA	181.29B	8.55	32.11	-2.46%	30,799,393
VALE	Vale S.A. ADR	Basic Materials	Other Industrial Metals & Mining	Brazil	56.86B	5.40	13.09	-0.08%	14,985,965
HSY	Hershey Company	Consumer Defensive	Confectioners	USA	39.03B	21.96	190.86	1.71%	1,761,707
RMD	Resmed Inc.	Healthcare	Medical Instruments & Supplies	USA	20.63B	23.03	140.25	2.90%	1,568,863
GEN	Gen Digital Inc	Technology	Software - Infrastructure	USA	10.95B	8.21	17.12	-1.04%	2,872,357
TTC	Toro Co.	Industrials	Tools & Accessories	USA	8.92B	24.05	85.90	1.48%	562,197
TXRH	Texas Roadhouse Inc	Consumer Cyclical	Restaurants	USA	6.16B	21.32	92.24	0.73%	578,901
ATEN	A10 Networks Inc	Technology	Software - Infrastructure	USA	808.54M	18.13	10.91	0.55%	527,719

Cut-Off Points	
Target Price	30% Above Current Price
52-Week High/Low	15% or More Below
Beta	Under 1
Forward P/E	Under 20
EPS growth next year	Over 0%
ROE	Over 20%
ROI	Over 10%
Operational Margin	Over 5%
Net Profit Margin	Over 5%
Payout Ratio	Over 20%

Source: (Finviz, 2023)

## Appendice 4. Multiple Risk Impact, Monitoring and Mitigation Strategies

Table 43 - Moderate Severity Risks Impact, Monitoring and Mitigation

Moderate	Climate Change / ESG (Environmental, Social, Governance):	Company-Specific Events/Technological Disruption:	Interest Rate Hikes / Regulatory Changes:	Liquidity Risks:
Impact	As environmental concerns become more pressing, companies not adhering to sustainable practices may face regulatory pressures, reputational damage, and potential divestments.	Loss of competitive advantages of Companies Directly Impacting by the Technological advancement.	An increase in interest rates generally makes borrowing more expensive for companies and can decrease discretionary spending for consumers. Regulatory changes can increase operating costs or limit potential revenue streams.	The inability to quickly convert assets to cash at a reasonable price can lead to financial strain, especially in volatile market conditions.
Monitoring	Track regulatory changes in key markets, watch for industry advancements in sustainable practices, and monitor public sentiment towards corporate environmental responsibility.	Stay updated with industry trends, company announcements, patent filings, and technology news.	Track central bank announcements, economic indicators, and proposed regulatory changes in key markets.	Regularly review the liquidity of assets in the portfolio, especially during market downturns.
Mitigation	Focus on investing in companies with strong ESG practices or those actively transitioning towards more sustainable models. Diversify across industries less susceptible to climate-related disruptions.	Diversify across different sectors and maintain a flexible portfolio that can adapt to technological changes. Consider hedging strategies or options for particularly exposed investments.	For interest rates, consider the duration of the bond portfolio and the rate sensitivity of other assets. For regulatory changes, diversify across regions and sectors and stay updated on lobbying efforts and potential legislative modifications.	Ensure a portion of the portfolio is allocated to highly liquid assets. Set up liquidity thresholds to ensure sufficient cash or cash-equivalents are on hand for rebalancing or withdrawal needs.

Source: Author's Illustration

Table 44 - Major Severity Risks Impact, Monitoring and Mitigation

Major	Shifts in Global Trade Dynamics Directly Impacting the Portfolio's Companies:	Geopolitical Events / Political Instability:	Major Data Breaches for Industry Giants:	Collapse of a Major Financial Institution / Global Pandemic:
Impact	Changes in trade policies, tariffs, and international relations can significantly affect companies that rely heavily on global supply chains or international markets.	Political unrest, wars, sanctions, or major policy shifts can disrupt business operations, reduce investor confidence, and create market volatility.	Data breaches can lead to loss of customer trust, significant financial penalties, and potential lawsuits.	The collapse of major financial pillars can send shockwaves through the global economy. Similarly, global pandemics can disrupt global trade, labor markets, and lead to significant societal changes.
Monitoring	Track international trade news, government policies related to trade, and changes in global trade agreements.	Stay updated with industry trends, company announcements, patent filings, and technology news.	Keep an eye on cybersecurity news and reports, especially concerning industries or companies with significant customer data.	Observe the health and credit ratings of major financial institutions. For pandemics, track global health news and updates from organizations like the WHO.
Mitigation	Diversify investments across different geographic regions and sectors. Invest in companies with adaptable supply chains and those that operate in multiple markets to spread the risk.	Limit exposure to high-risk regions and consider investing in "safe-haven" assets during times of heightened geopolitical tension.	Invest in companies with robust cybersecurity practices. Diversify investments across different sectors, reducing exposure to industries particularly prone to cyber-attacks.	Ensure the portfolio is not overly concentrated in any single institution. For pandemic-related risks, invest in industries that can benefit from or adapt to long-term societal changes brought about by global health crises (e.g., telehealth, remote work technologies).

Source: Author's Illustration

Table 45 - Severe Risks Impact, Monitoring and Mitigation

Severe	Global Financial System Instability (over the extended timeline)	Market Crash:	Recession:	Biochemical / Nuclear Incident:
Impact	A major disruption in the global financial system can lead to widespread panic, potentially culminating in a financial crisis with long-term economic implications.	Rapid and significant decline in the stock market can erode a significant portion of the portfolio's value in a short time.	A significant decline in economic activity can reduce corporate profits, increase unemployment, and lower consumer spending.	Such an event can lead to vast humanitarian crises, disrupt global trade, and potentially result in long-term environmental impacts affecting various industries.
Monitoring	Track major global financial indicators, interbank lending rates, and health of major financial institutions.	Keep an eye on market valuations, interest rate changes, and other indicators that might signal overextended market conditions.	Track economic indicators such as GDP growth, unemployment rates, and consumer confidence indices.	Monitor global news for potential threats and track international relations, especially in hotspots known for tensions related to these issues.
Mitigation	Maintain a diverse portfolio, including assets not correlated with the broader financial markets. Consider "safe-haven" assets, such as gold, which historically retain value during financial crises.	Use hedging strategies, such as options, to protect against sharp market declines. Maintain a diversified portfolio and consider reallocating to defensive assets when markets appear overheated.	Diversify the portfolio to include counter-cyclical stocks or assets that traditionally perform well during economic downturns. Consider increasing the allocation to bonds or other defensive assets during economic peaks.	Reduce exposure to regions or industries that could be directly affected by such an incident. Invest in industries that might provide solutions or relief in the aftermath.

Source: Author's Illustration

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