

Sefirot

Financial Research

Adaptive Asset Allocation (2)

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1 Introduction

The portfolio management team conducted an analysis titled “Adaptive Asset Allocation” to examine and analyze the results achieved by the main asset allocation strategies. The analysis was carried out on the returns of ten assets over the period from January 1, 2012, to December 31, 2025. The thirteen-year time horizon allows for the evaluation of the behavior of different investment strategies across various market phases, as well as their ability to adapt in the presence of exogenous shocks and periods of significant financial instability. During the period under study, numerous episodes of high volatility and significant market downturns occurred, followed by recovery phases characterized by varying speed and intensity. Among these, the 2020 crisis linked to the COVID-19 pandemic represents the most critical event, during which the strategies analyzed suffered the greatest impact in terms of performance. However, the subsequent market recovery was relatively rapid, in contrast to what was observed in previous crisis periods, such as those triggered by the oil shock and the gradual increase in interest rates, which were characterized by longer recovery times. The objective of this analysis is therefore to examine the response of strategies to market shocks, in order to verify whether they are able to maintain their distinctive characteristics even in contexts of economic crisis. To this end, a database was constructed containing the closing prices of ten assets, selected to ensure adequate diversification both geographically and by sector:

- iShares Europe (Ticker: IEV)
- iShares Latin America 40 (Ticker: ILF)
- iShares Core S&P 500 (Ticker: CSPX)
- Amundi MSCI Emerging Asia (Ticker: AASI)
- iShares Core MSCI World (Ticker: IWDA)
- iShares Physical Gold (Ticker: IGLN)
- iShares Global Materials ETF (Ticker: MXI)
- Vanguard Health Care Index Fund (Ticker: VHT)
- iShares MSCI Emerging Markets (Ticker: EEM)
- VanEck Semiconductor (Ticker: SMH)

To eliminate the impact of the currency in which each asset is traded, all quotations were collected in U.S. dollars (USD) to neutralize this effect. However, not all selected assets are listed on the same exchanges, so the data sources were diversified. The primary reference market for the closing prices was the New York Stock Exchange (NYSE). Since different financial markets have slightly different trading calendars, with variations in opening and closing days, only trading days on which all assets were simultaneously traded were considered to ensure data consistency and comparability. The strategies analyzed are relatively simple and widely used in financial practice; however, they represent a valid starting point for the development and evaluation of more complex investment approaches. In particular, the strategies considered in this study are as follows:

- Equally Weighted Strategy (Benchmark)
- Risk Parity Strategy
- Momentum Strategy
- Minimum Variance Strategy

The results of the different strategies are compared using the Equally Weighted Strategy as a reference point, in order to highlight the circumstances in which a different asset allocation produces an improvement in performance in terms of returns.

2 Strategies

2.1 Strategy: Equally Weighted

The Equally Weighted portfolio strategy represents one of the most interesting and intuitive alternatives to the classic market capitalization-based management (Market-Cap Weighted). In a traditional index such as the S&P 500, the largest companies have a greater weight; in an Equally Weighted portfolio, each security receives the same share of capital, regardless of its market value. This process automatically leads to selling part of the assets that have outperformed and buying those that have underperformed. In practice, the strategy incorporates a systematic form of “buy low, sell high,” which can improve the risk-return profile over the long term, especially in markets characterized by mean-reverting returns. Conceptually, equal weighting offers a solid and rational alternative to traditional strategies, emphasizing diversification, discipline, and risk control. For these reasons, it is often used as a benchmark or as a starting point for more advanced portfolio strategies. The portfolio based on the Equally Weighted methodology generated a total return of 230.01%. The growth path was not linear, as it had to face two mirrored crisis phases that were fundamentally different in their macroeconomic nature. The maximum drawdown of the historical series occurred during the global spread of COVID-19. At that time, the complete shutdown of productive activities triggered indiscriminate selling across all markets. Despite the severity of the crash, the market response was characterized by extraordinary resilience: thanks to massive interventions by monetary authorities, the portfolio was able to recover pre-crisis levels in an extremely short time, resulting in what is technically referred to as a “V-shaped recovery.” A different dynamic characterized the more recent instability. Unlike the pandemic shock, the crisis triggered by rising energy costs and the subsequent inflationary wave presented much more structural challenges. In this scenario, we did not witness an immediate rebound; on the contrary, the market had to adjust to a new context of high interest rates and downward revisions of growth prospects. While in 2020 central bank support acted as a parachute, in 2022 and subsequent periods these institutions were forced to adopt restrictive policies to curb prices, preventing the rapid recovery investors had become accustomed to in the previous decade. In summary, while COVID-19 was an acute but transitory shock, inflation represented a deterioration of fundamentals that required much more complex volatility management and considerably longer recovery times.



Figure 1: Portfolio Equally Weighted

Table 1: Results of the Equally Weighted Portfolio

Strategy	Return	Variance	Max Drawdown	Final Capital
Equally Weighted	230,01%	9,36	-31%	\$3.300,08

2.2 Strategy: Risk Parity

To implement the Risk Parity investment strategy, it is necessary to balance the weights of each asset in the portfolio so that every asset contributes the same level of risk. Portfolio weights can be predetermined and fixed, or calculated based on the historical volatility of each asset over the observation period. For this strategy, as with the others, rebalancing is performed twice a year, specifically at the beginning and mid-year. As expected, the results at the end of the simulation show a final capital lower than the reference benchmark, i.e., the Equally Weighted strategy. This difference in performance is attributable to the weights assigned to each asset. During the simulation, the Risk Parity strategy underperformed the benchmark at almost all times, except in 2018 and 2019, when returns were higher. Following the crisis triggered by the COVID-19 outbreak, the portfolio allocation was not optimal, as it only initially captured the market recovery due to slight differences in composition. However, the values of the portfolios created according to the two strategies never differ significantly, as the weights are quite similar. In fact, when applying the Equally Weighted strategy, the weight assigned to a single asset is at most 10%, whereas the maximum weight assigned to a single asset within the Risk Parity portfolio is 13%. This difference, although minor, results in some assets having an 8% weight, which negatively impacts long-term performance. That said, excluding five assets from the simulation leads to an improvement in returns. In the simulation results, the Latin America ETF is excluded and included only once, while the World ETF is included more frequently within the asset allocation. This difference in assets, combined with slight overexposure, generates higher returns compared to the previous allocation, allowing the portfolio to slightly outperform the benchmark.



Figure 2: Portfolio Risk Parity

Table 2: Results of the Risk Parity Portfolio

Strategy	Return	Variance	Max Drawdown	Final Capital
Equally Weighted	230,01%	9,36	-31%	\$3.300,08
Risk Parity	222,81%	8,16	-30%	\$3.228,12
Risk Parity (top 5)	231,37%	6,11	-26%	\$3.313,80

2.3 Strategy: Momentum

The momentum strategy is probably the most well-known approach for defining a portfolio's asset allocation. This strategy is based on the idea that securities that have performed well in the recent past tend, on average, to continue outperforming in the near future, while those that have underperformed tend to continue underperforming. In other words, markets often exhibit trend persistence, which the momentum strategy seeks to exploit systematically. For our strategy, we decided to select the five best-performing assets, assign them equal weights, and rebalance the portfolio every six months. The results obtained from this strategy are superior to the benchmark, albeit with slightly higher variance. Despite the positive overall result, the chart shows that the momentum portfolio often underperformed the benchmark, and it was only in the most recent rebalancing periods that it managed to outperform. This occurs because the strategy relies on favorable market conditions to generate higher returns; that is, asset growth must be distributed over a period long enough to form a sustained positive trend. The last five rebalancing periods included sector ETFs, such as those tracking gold and semiconductors, which achieved returns of 108% and 113%, respectively, during the reference period. If the rebalancing period is shortened, performance becomes significantly negative. This is because the trends the strategy seeks to exploit form over longer time horizons, so more frequent rebalancing reduces its effectiveness. The chart also shows that increasing rebalancing frequency delays the portfolio's decline relative to the compared portfolios. Analyzing the asset allocation established in the first half of 2022, SP500, commodities, and Health Care ETFs predominated, which were less affected by the rise in interest rates. Nevertheless, performance remained negative, and it would have been even worse if transaction costs from more frequent rebalancing had been included, which are not accounted for in this analysis.

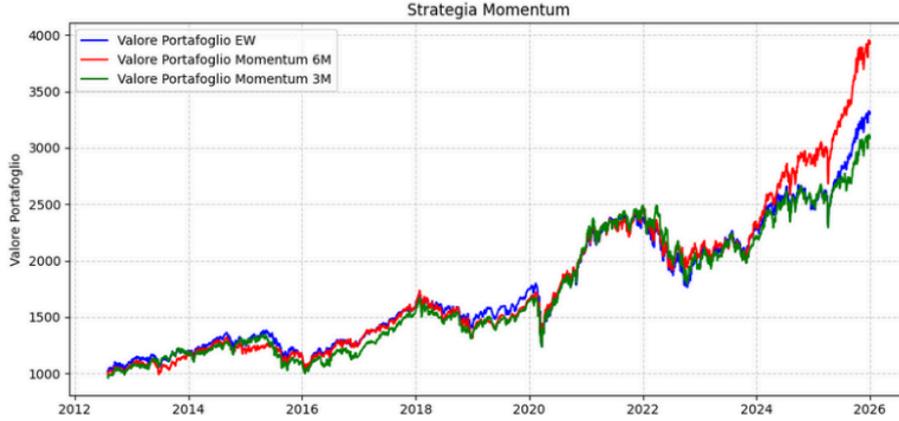


Figure 3: Portfolio Momentum

Table 3: Results of the Momentum Portfolio

Strategy	Return	Variance	Max Drawdown	Final Capital
Equally Weighted	230,01%	9,36	-31%	\$3.300,08
Momentum	292,18%	9,44	-26%	\$3.921,89
Momentum (3 M)	208,60%	9,69	-27%	\$3.084,04

2.4 Strategy: Min Variance

The Minimum Variance strategy is a portfolio construction methodology that aims to minimize overall risk rather than maximize expected returns. The underlying idea is simple but powerful: reduce portfolio volatility by appropriately selecting the weights of the different securities, taking into account their variance. In other words, this strategy leverages the principle of optimal diversification. In practice, a Minimum Variance portfolio selects asset weights in order to achieve the lowest possible total variance. For our simulation, we decided to build a portfolio composed of the five assets that recorded the lowest variance in the six months prior to each rebalancing date. These assets are included in the portfolio with equal weights. The simulation results for the portfolio constructed according to the Minimum Variance asset allocation strategy show underperformance relative to the benchmark. Among the asset classes included in the reference universe, the Minimum Variance strategy tends to allocate more weight to ETFs considered defensive due to their moderate volatility. These frequently include Gold and Health Care ETFs. One of the most frequently selected ETFs during the simulation is the Latin America ETF. This ETF is repeatedly included because it shows very low variance over the simulation period; however, this characteristic is largely attributable to the fact that the ETF exhibits limited growth and remains almost stationary. As a result, it features low variance but also low returns. This phenomenon is important to analyze because it represents a real issue in the selection of assets for portfolio allocation. The simulation highlighted all the typical characteristics of an asset allocation defined through the Minimum Variance strategy: portfolio returns were not sufficient to outperform the benchmark, although the portfolio displayed significantly lower variance. Moreover, the strategy did not provide additional value compared to the Equally Weighted approach because, as also evident from the chart, returns are consistently lower and the performance paths never meaningfully diverge.

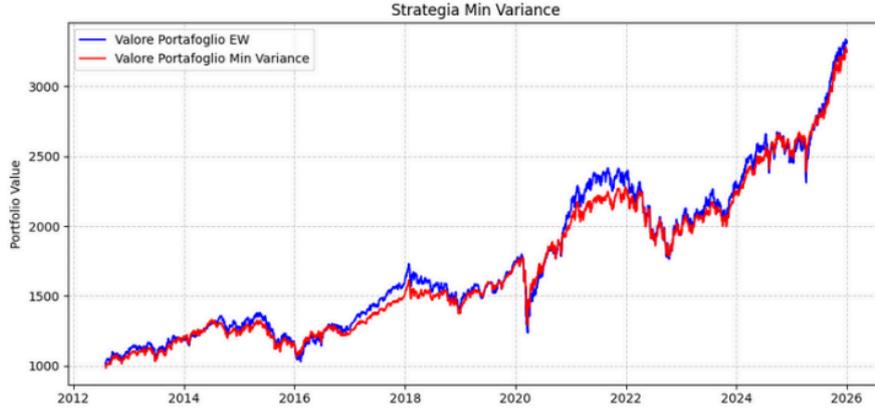


Figure 4: Portfolio Min Variance

Table 4: Results of the Min Variance Portfolio

Strategy	Return	Variance	Max Drawdown	Final Capital
Equally Weighted	230,01%	9,36	-31%	\$3.300,08
Min Variance	223,50%	6,34	-27%	\$3.253,02

3 Conclusions

The results of the analysis show that the six-month Momentum strategy is the best-performing in terms of returns and is also the only strategy able to significantly outperform the benchmark. The other strategies analyzed deliver results broadly aligned with the benchmark, without showing meaningful deviations. This evidence suggests that it is possible to exploit trends that develop within financial markets and that their maturation requires a time horizon of at least six months. This is confirmed by the simulation based on quarterly portfolio rebalancing, which shows that a time window shorter than six months is not sufficient to effectively capture medium-term trend dynamics. An excessively high rebalancing frequency can in fact be influenced by short-term abnormal returns, often linked to the release of relevant information or the occurrence of extraordinary events. In such circumstances, quarterly rebalancing has shown a greater ability to absorb market shocks with mainly temporary effects, allowing the decline in portfolio value during sudden downturns to be delayed. This dynamic can be explained by the fact that, following the release of highly impactful news, panic tends to spread rapidly across markets, leading to a reallocation of capital flows among asset classes rather than a full exit from the market. This process generates, on the one hand, above-average returns for assets that had previously underperformed and, on the other hand, a correction in securities that had delivered exceptionally high returns, as they are perceived as overvalued. The analysis also shows that reducing the number of assets considered could have produced even more favorable results than those reported. However, this extension was not further developed, as an asset allocation composed of fewer than five securities would fall outside the scope of portfolio management and move closer to a trading strategy. The results achieved by the Risk Parity (top 5) and Minimum Variance strategies should nonetheless not be underestimated. Both strategies slightly outperform the benchmark, likely also due in part to random effects, given their significantly lower variance compared to the benchmark. In this context, the final portfolio value has limited relevance, as it is highly sensitive to

Table 5: Comparison of Portfolio Strategy Results

Strategy	Return	Variance	Max Drawdown	Final Capital
Equally Weighted	230,01%	9,36	-31%	\$3.300,08
Risk Parity	222,81%	8,16	-30%	\$3.228,12
Risk Parity (Top 5)	231,37%	6,11	-26%	\$3.313,80
Momentum	292,18%	9,44	-26%	\$3.921,89
Momentum (3M)	208,60%	9,69	-27%	\$3.084,04
Min Variance	223,50%	6,34	-27%	\$3.235,02

the chosen end date of the analysis period, whereas variance is calculated over the entire time horizon considered. Consistently, the drawdowns recorded by both strategies are also lower than those of the benchmark. Risk Parity and Minimum Variance therefore confirm themselves as solid and robust investment approaches from a risk-control perspective, albeit at the cost of more moderate overall returns.