



ENHANCING RISK-ADJUSTED RETURNS FOR RETAIL INVESTORS: AN EXPLORATION OF DUAL MOMENTUM STRATEGIES IN GLOBAL SECTOR ETF INVESTING¹

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Abstract:

Investment performance evaluation is essential in determining the effectiveness of investment strategies, as it enables investors to assess risk-adjusted returns and benchmark performance against traditional indices. The rapid development of financial products has significantly expanded the range of investment opportunities, allowing investors to achieve their objectives in ways that were previously not possible. However, the sheer volume of available alternatives introduces considerable complexity to the decision-making process. While institutional investors can mitigate these challenges by developing specialized expertise, such resources are often inaccessible to retail investors. In response, market index ETFs (exchange-traded funds) have become a widely adopted, cost- and time-efficient investment vehicle, offering broad market exposure, diversification, and simplicity, typically without the need for advanced analysis. While this approach may suffice for many investors, there is potential for retail investors to enhance risk-adjusted returns through more refined strategies. This study investigates the application of dual-momentum strategies, which involve leveraging the performance of global sector ETFs and incorporating a “flight-to-safety” mechanism when market conditions dictate. The findings suggest that such strategies can deliver superior risk-adjusted performance relative to traditional index investing via ETFs.

Keywords:

investment performance evaluation, global ETFs, dual-momentum strategies, sector investing, retail investors.

JEL Classification:

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INTRODUCTION

Investment performance evaluation is a crucial process for any investor, as it involves assessing the returns and risks associated with investments, as well as understanding the overall performance of a portfolio. For retail investors, this means not only measuring returns but also determining whether the investment choices align with personal financial goals and risk tolerance. Investment performance encompasses

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ex-ante and ex-post evaluations, considering the projected risks and returns before an investment is made and reviewing actual performance after the fact. Without this evaluation, retail investors would struggle to assess whether their investments are meeting expectations and if they are on track to achieve their financial objectives.

For retail investors, the absence of a formal performance evaluation system would make it challenging to understand if the investment strategy they are following is achieving satisfactory results. This evaluation process helps investors, both individual and institutional, to address various internal and external factors that affect their financial well-being. Key stakeholders in this process include the investor, financial advisors, portfolio managers, and in some cases, regulators. Each group relies on clear, reliable performance data to make informed decisions.

An investment policy statement marks the first step in an investor's journey. For retail investors, this document reflects personal financial goals, constraints, risk tolerance, and liquidity needs, which form the basis for choosing an appropriate investment strategy. Since every retail investor has unique circumstances, there is no single approach that works universally. Factors such as time horizon, tax implications, and specific financial goals influence the level of risk an investor is willing to take on.

Retail investors must assess their risk tolerance, which can be broken down into two components: capacity and willingness to take risks. The former refers to the ability to absorb risk based on factors like income, assets, and financial goals, while the latter concerns the psychological comfort with volatility in investments. Together, these two aspects shape the risk profile and expected return, which ultimately guide the selection of investments. However, this process is not isolated, it requires consideration of broader market trends, macroeconomic conditions, and even geopolitical developments that can impact investment performance. Understanding these dynamics helps retail investors to manage expectations regarding returns, volatility, and correlation among their assets.

Creating a portfolio that aligns with an investor's goals is an ongoing, dynamic process. Retail investors must constantly monitor and adjust their portfolios to ensure they are meeting their objectives. This involves regular rebalancing and fine-tuning based on changes in market conditions and personal circumstances. Evaluating investment performance is essential to ensure that investments are on track and achieving the desired outcomes. Without a clear framework to measure returns and risks at both the individual investment and portfolio levels, retail investors would have no reliable way to track their progress. By decomposing returns and risks, retail investors can determine the factors that contributed to the success or underperformance of their investments. Establishing a cause-and-effect relationship between decisions made and performance outcomes helps investors better understand the impact of their strategies. Additionally, reviewing whether investments are staying within the guidelines of the original strategy is crucial. If deviations are detected, it may signal the need for adjustments to stay aligned with the investor's goals.

Equally important is how investment performance is presented. Retail investors rely on transparent, accessible reports that clearly convey returns, risks, and any adjustments to the investment strategy. Transparency is key to maintaining trust in the financial system and ensuring that retail investors are equipped with the information they need to make informed decisions. The presentation of investment performance must also consider the level of financial knowledge of the audience, as not all retail investors possess the same degree of sophistication when interpreting complex financial data.



For retail investors, investment performance evaluation can be conducted through various channels. Some may rely on internal systems or tools provided by their investment firm, while others may seek advice from financial advisors or external consulting firms. Regardless of the method, the evaluation process serves as a vital tool in guiding investment decisions, ensuring alignment with long-term financial goals, and fostering confidence in the investor's financial journey. This research paper explores the role of performance evaluation from a retail investor's perspective, highlighting its importance in achieving sustained investment success.

The introduction of ETFs (exchange-traded funds) has provided investors with an opportunity to invest in a simple manner that does not require performing complex analyses while retaining the diversification benefits. This is especially true for market index ETFs which allow investors to invest in the market as a whole. Investors have noticed the advantages of these financial products, which has led to the migration of cash flows from their previous choices, with those being individual stocks (direct investment) or mutual funds (indirect investment), to ETFs (Korenak, Stakić, and Vesić, 2023).

While passive investing through market index ETFs has advantages and remains a popular choice among investors, there may be easy ways to improve investment performance. The appeal of simple approaches is that they can be universally applied, *i.e.* they do not require special equipment, excessive knowledge and time, or other resources, and can be undertaken by everyone. That means that not only institutional investors could benefit from them, but retail investors as well. Previous research has shown that one possible method of improving investment performance is to use sector momentum (Korenak and Pavlovic, 2023). This study outlines that the strategies based on sector momentum outperformed the alternatives of holding a benchmark index ETF and applying the mean-variance optimization over the observed period. Further research may examine whether there is a possibility of modifying momentum strategies to improve their performance. The study aims to analyze only those strategies that are simple enough to be used by every investor.

The sector momentum strategies that were previously studied were based on investing in a certain number of best-performing sectors through sector ETFs (Korenak and Pavlovic, 2023). One limitation of this approach is that it assumes positive stock market exposure, as every strategy requires investing in at least one sector ETF at any time, and the portfolios are term exclusively. That means that even during the market (or sector) downturn, the strategies do not allow "fleeing to safety", which might have detrimental effects on the investment performance. To avoid this limitation, we have proposed strategies for investing in risk-free assets when performance surpasses the sectors' performance. The intention is to investigate whether this approach could help avoid some of the losses, which would improve the performance of the momentum strategies and help investors attain even better results.

The paper is organized as follows: first, the related previous research is outlined in the literature review section; second, the methodology is explained, and the used data are stated; third, the results are presented; and finally, key findings are highlighted in the conclusion.

LITERATURE REVIEW

The rise of the ETF fund industry largely rests on its business fundamentals, based on the application of Fama's Efficient Market Theory (Fama, 1970) and Markowitz's Modern Portfolio Theory (Markowitz, 1952, 1959), through the use of passive investment strategies such as indexing (Pavlović, Korenak, and Stakić, 2024). On the other hand, ETF's market versatility has provided a plethora of options when it comes to the implementation of different investment strategies, trying to exploit market inefficiencies and



generate alpha. The academic body of literature has shown significant interest in those strategies, among which momentum has one of the most recognizable research outputs. The momentum effect is one of the strongest and most pervasive financial phenomena (Jegadeesh and Titman, 1993). Although not a journal article, the book of Antonacci (2014) is seminal in a detailed explanation of a dual-momentum strategy, which combines absolute momentum (trend following) and relative momentum (cross-sectional performance) to enhance portfolio returns and reduce risk. In addition to cross-sectional or relative strength momentum, momentum also works well on an absolute, or time series basis, in which an asset's own past return indicates its future performance (Moskowitz, Ooi, and Pedersen, 2012).

Momentum has exhibited international presence and across different asset classes (Rouwenhorst, 1998 and 1999; Asness, Liew, and Stevens, 1997; Moskowitz and Grinblatt, 1999; Okunev and White, 2003), with the notion of the idea that financial market momentum offers significant explanatory power as regards future financial market returns. However, momentum has also had the worst crashes, making the strategy unappealing to investors who dislike negative skewness and kurtosis, with the risk of momentum being highly variable over time and predictable (Barroso and Santa-Clara, 2014).

Regarding dual-momentum (or relative strength) investing strategies, different findings imply return outperformance over passive index investing. Antonacci (2017) showed significant performance improvements in four areas - equities, credit risk, real estate, and economic stress, as well as with an equally weighted composite portfolio of all the modules. A dual-momentum approach bears the market risk when it makes the most sense, *i.e.*, when there is positive absolute, as well as relative, momentum. Furthermore, Seokkeun and Fabozzi (2022) found that the dual-momentum strategy at the asset allocation level outperforms the benchmark for a historical simulation, with the limitation that the statistical significance of outperformance is not strong in all formation periods.

Momentum could be defined in different ways, depending on the type of asset that is studied, but also on other factors (*e.g.* the length of the lookback period). In this paper, we will focus on the sector momentum. Breloer, Scholz, and Wilkens (2014) noticed that the sector momentum could be a source of superior returns. The introduction of sector ETFs allows investors to benefit from their features and create simple strategies that exploit this phenomenon. Later studies supported (Korenak and Pavlović, 2023, Korenak, Balaban, and Pavlović, 2024) the possibility of outperforming the benchmark through such strategies. This study will use a similar approach but will also incorporate the “flight-to-safety” mechanism to accommodate for the risk concerns some investors may have.

To compare the performance of the strategies, we will be using different criteria. We decided to use measures that are widely accepted in the industry, such as the Sharpe ratio (Sharpe, 1966, 1975, 1994), Sortino ratio (Sortino and Price, 1994), Treynor ratio (Treynor, 1966), and Calmar ratio (Young, 1991).

METHODOLOGY

In this study, we used 13 different assets as our investment opportunity set. Eleven of them are iShares sector ETFs, one is a risk-free asset (we chose PIMCO Global Bond Opportunities Fund), and the last one is a benchmark market index ETF (Vanguard Total World Stock ETF). All of them are presented in Table 1.

Based on these assets, we created 13 portfolios. Eleven of them follow our dual-momentum strategy and one is an equally weighted portfolio with an embedded “flight-to-safety” mechanism (further explained below). These portfolios were rebalanced monthly. The final portfolio is actually a buy-and-hold investment in the Vanguard Total World Stock ETF, *i.e.* it represents a passive index investing alternative. The research assumes that the investment process started in January 2009 and ended in September 2024.



The dual-momentum strategies are based on a different number of best-performing sectors (winners). There are 11 sectors, and therefore there can be up to 11 winners, which leads to 11 different sub-strategies. In order to identify our winners, we ranked the returns that the sector ETFs achieved over the previous three months, and did so every month, as the rebalancing is performed monthly. This approach allows us to capture momentum. Still, one additional step is required to see whether the “flight-to-safety” is also needed (which makes a difference between a standard momentum and a dual-momentum strategy). This step assumes that we compare the return that the winning sectors have earned over the previous three months to the one achieved by our risk-free asset. If they underperformed the risk-free asset, the funds would not be invested in the sector ETFs, but in the risk-free asset over the next month. This would apply to every sector that underperformed. In other words, if the strategy is based on 5 winners and 2 of them were outperformed by our risk-free asset, that portfolio would invest in 3 sector ETFs and the risk-free asset (with the amount that would have been dedicated to the remaining 2 sector ETFs) over the next month. We used geometrically decreasing weights for these portfolios.

Table 1. Investment opportunity set

Asset	Ticker
iShares Global Communication Services ETF	IXP
iShares Global Consumer Discretionary ETF	RXI
iShares Global Consumer Staples ETF	KXI
iShares Global Energy ETF	IXC
iShares Global Financials ETF	IXG
iShares Global Healthcare ETF	IXJ
iShares Global Industrials ETF	EXI
iShares Global Materials ETF	MXI
iShares Global Tech ETF	IXN
iShares Global Utilities ETF	JXI
iShares International Developed Real Estate ETF ²	IFGL
PIMCO Global Bond Opportunities Fund	PGBIX
Vanguard Total World Stock ETF	VT

The equally weighted portfolio invests the same amount in all 11 sector ETFs. Still, this portfolio also has the “flight-to-safety” mechanism in its strategy. Therefore, it only invests in sector ETFs when they outperform the risk-free asset, otherwise, the means are redirected towards the risk-free asset. In other words, if 4 out of 11 sectors underperformed, 4/11 of the funds would be invested in the risk-free asset, and the remainder would be equally divided among 7 outperforming sectors.

To preserve the legibility of this paper, all the portfolios will be represented by adequate abbreviations based on the investment strategy they are using, as is shown in Table 2.

2 Every sector was represented by a global ETF except for the real estate sector which we chose an ETF that covers only the developed markets.

**Table 2.** Portfolios' investment strategies

Investment strategy	Abbreviation
Dual-momentum with 1 winning sector	DM 1
Dual-momentum with 2 winning sectors	DM 2
Dual-momentum with 3 winning sectors	DM 3
Dual-momentum with 4 winning sectors	DM 4
Dual-momentum with 5 winning sectors	DM 5
Dual-momentum with 6 winning sectors	DM 6
Dual-momentum with 7 winning sectors	DM 7
Dual-momentum with 8 winning sectors	DM 8
Dual-momentum with 9 winning sectors	DM 9
Dual-momentum with 10 winning sectors	DM 10
Dual-momentum with 11 winning sectors	DM 11
Equally weighted with "flight-to-safety" mechanism	EW 11
Benchmark market index	BMI

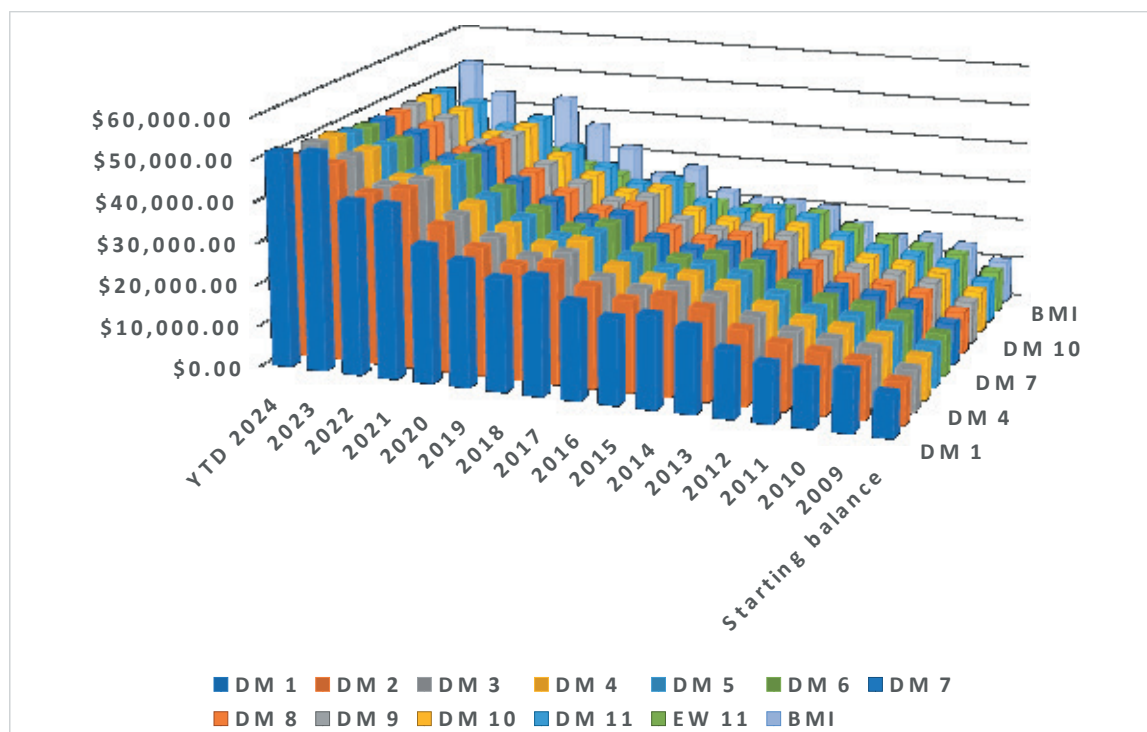
RESULTS AND DISCUSSION

Figure 1 presents the performance of all portfolios. At first glance, only one momentum sub-strategy, targeting a winning sector, marginally outperformed the benchmark ETF (with a compound annual growth rate of 10.98% versus 10.91%). The other momentum sub-strategies delivered slightly lower but comparable returns, ranging from 10.39% to 10.73%, while the equally weighted portfolio lagged significantly, earning just 8.21%.

Positioned alongside the benchmark Vanguard Total World Stock ETF, the equally weighted portfolio across 11 sectors demonstrates cumulative underperformance relative to various momentum-based portfolios. Given that all portfolios maintained long-only exposure, their performance was heavily shaped by broader market dynamics. Notably, momentum-based strategies began to perform exceptionally well in 2020, capitalizing on rapid market recoveries because of the COVID market correction, which resulted from widespread uncertainty and economic disruptions due to the pandemic. The 2022 market correction further highlighted the resilience of these strategies amid rising interest rates, rampant inflation and geopolitical tensions, which contributed to increased market volatility.

Additionally, the dual-momentum strategy demonstrated a strong performance during "in-market" periods, with a portfolio of three winning sectors³ achieving positive excess returns 83,1% of the time, resulting in an average excess return of 0.80%. In contrast, when the strategy was "out of market" 9.5% of the time, it underperformed the benchmark by -10.08%. During the "partially in market" phase, which accounted for 7.4% of the time, the strategy produced the highest excess return of 1.46%. The data are shown in Table 4 and will be discussed later in detail.

³ This portfolio was the best performing among the portfolios based on dual-momentum strategies according to some criteria, though the results were similar for all of them.

**Figure 1.** Hypothetical performance of a \$10,000 portfolio across different investment strategies

Source: Authors' research

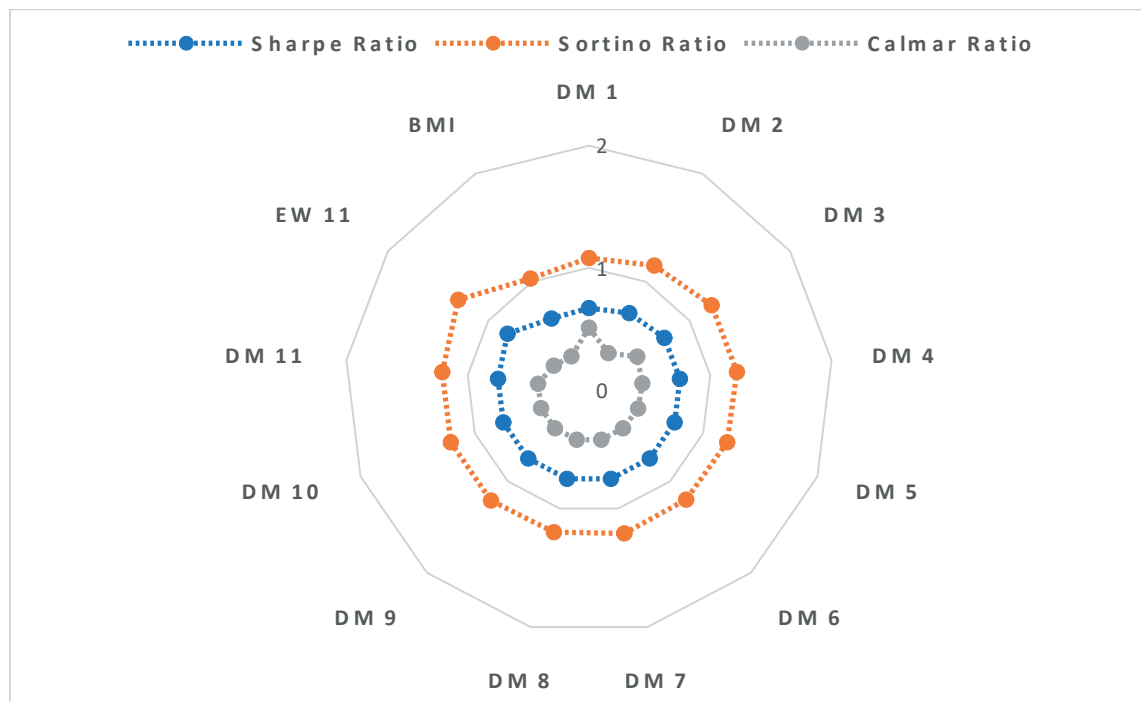
However, the analysis of the performance on a risk-adjusted basis gives a different impression. Every single momentum portfolio outperformed the benchmark portfolio when it comes to the Sharpe, Sortino, Treynor, and Calmar ratios (Figure 2 and Table 3). Moreover, the equally weighted portfolio with “flight-to-safety” mechanism achieved the highest values of the Sharpe, Sortino, and Treynor ratios. Still, its Calmar ratio was among the lowest, as only the dual-momentum strategy with 2 winners and the benchmark portfolio attained lower scores.

On the other hand, the equally weighted portfolio exhibited better Sharpe and Sortino ratios, primarily due to its substantially lower standard deviation. However, it faced a significant relative drawdown, resulting in the lowest Calmar ratio among all observed momentum strategies.

Overall, while the dual-momentum strategy delivered a slightly lower compound annual growth rate, for the previously mentioned example of the portfolio with three winners, of 10.73% compared to the benchmark's 10.91%, it achieved this with a lower standard deviation of 13.44% versus 16.04%. This resulted in superior performance metrics, including the Sharpe, Sortino, Treynor, and Calmar ratios.



Figure 2. Investment performance appraisal metrics for different investment strategies



Source: Authors' research

When total risk was replaced with systematic risk, the outperformance on a risk-adjusted basis became more pronounced, as evidenced by the Treynor ratio (Table 3, which shows results only for every other dual-momentum strategy to preserve legibility). The Treynor ratio is an important measure to consider when evaluating the investment unit of a fund managed by these strategies for inclusion in a well-diversified global portfolio. It offers valuable insights into the fund's performance relative to systematic risk, highlighting its potential contribution to overall portfolio efficiency.

Table 3. The Treynor ratio calculated for different investment strategies (%)

DM1	DM 3	DM 5	DM 7	DM 9	DM 11	EW 11	BMI
16.37%	16.22%	16.05%	15.95%	15.96%	15.97%	16.77%	10.61%

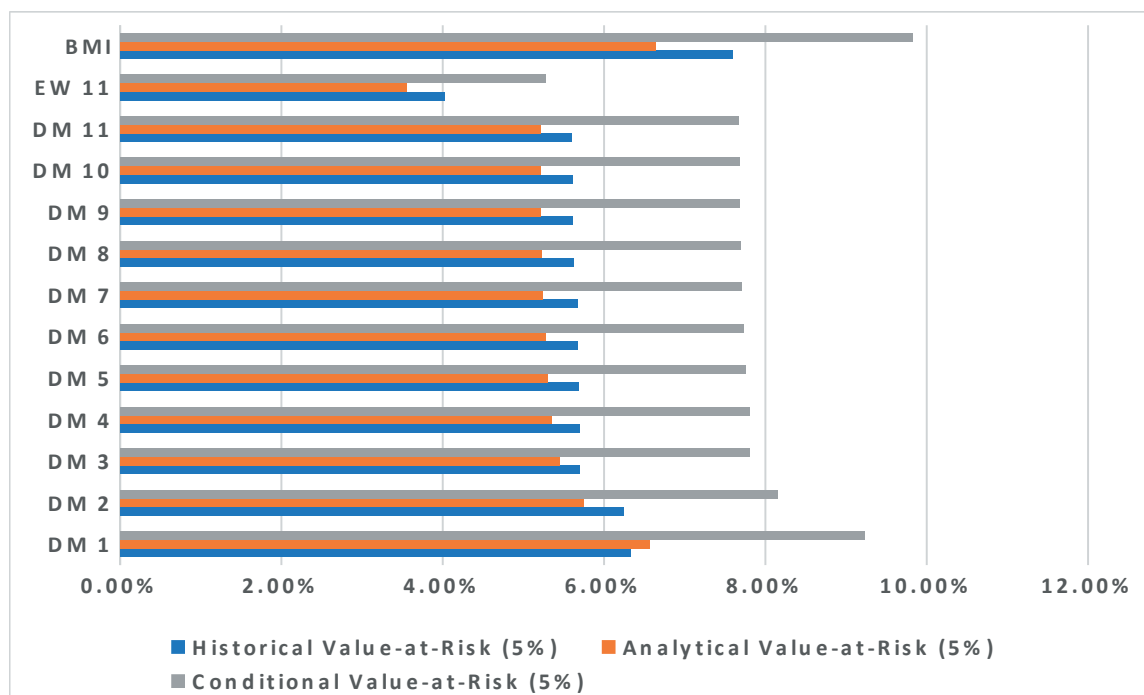
Source: Authors' research

All dual-momentum strategies exhibited lower values for Analytical Value at Risk, Conditional VaR, and historical VaR compared to the benchmark, indicating a reduced level of risk (Figure 3). Among all the strategies, the equally weighted portfolio achieved the lowest measures across all VaR categories. This finding suggests that the equally weighted approach not only mitigates potential losses and strengthens overall risk management but also results in lower returns, which may be less appealing for investors seeking higher performance in volatile markets.



The lower VaR metrics highlight the portfolio's resilience against extreme losses, which is particularly advantageous for those aiming to maintain a well-balanced and robust investment strategy. Given these benefits, dual-momentum strategies emerge as an optimal solution for global equity investors seeking a favorable risk-return profile while effectively addressing market challenges.

Figure 3. Value-at-Risk (VaR) measures for different investment strategies



Source: Authors' research

We have picked the strategy with the three winning sectors as one of the best performing on a risk-adjusted basis to further investigate the influence of the “flight-to-safety” mechanism. Table 4 provides insights into the risk management performance of this strategy. The results highlight the periods when the portfolio was fully in the market (composed solely of the three winning sectors from the previously defined three-month period), out of the market (fully invested in the PIMCO Global Bond Opportunities Fund (PGBIX)), and partially in the market (a combination of winning sectors and the PIMCO Global Bond Opportunities Fund (PGBIX)).

During the longest time horizon, the portfolio remained in the market and outperformed the benchmark. The excess return was accompanied by a higher standard deviation relative to the benchmark. In market periods, the strategy achieved a slightly higher win rate of 50%, with gains exceeding losses by 6%.

The out-of-market period resulted in significantly lower returns relative to the benchmark. However, during this time, the portfolio managed to reduce volatility more than returns, leading to a notable improvement in risk-adjusted performance, as indicated by the Sharpe ratio. The win rate was slightly below 40%, with gains exceeding losses by 15%.



During the partially out-of-market period, the strategy delivered the lowest return and highest volatility, resulting in the lowest Sharpe ratio. However, it is worth emphasizing that this period also marked the benchmark's weakest performance, with its lowest returns and highest volatility. Despite these challenges, the strategy managed to outperform the benchmark, both in terms of absolute returns and on a risk-adjusted basis.

Table 4. Risk management performance of dual-momentum strategy with three winning sectors

	In market	Out of market	Partially in market
Periods	157 (83.07%)	18 (9.52%)	14 (7.41%)
Model return	11.94%	6.32%	3.27%
Standard deviation (SD)	14.06%	4.09%	15.54%
Sharpe ratio	0.8	1.32	0.19
Excess return	0.80%	-10.08%	1.46%
Benchmark return	11.14%	16.40%	1.81%
Benchmark SD	13.19%	28.04%	24.38%
Win %	50.96%	38.89%	50.00%
Gain /loss	1.06	1.15	0.97

Source: Authors' research

CONCLUSION

The study aimed to demonstrate that there are ways to improve the investment results for retail investors through a simple decision-making process. It analyzed the performance of 12 strategies in comparison to holding a benchmark market index ETF, which is a popular choice for many investors.

The results pointed that the risk-adjusted performance of strategies that include the “flight-to-safety” mechanism can be superior. This pertains both to the momentum sub-strategies, as well as to the equally weighted portfolio. However, the absolute returns were generally lower than those achieved by the benchmark. This result is different from the ones obtained in the previous study (Korenak and Pavlovic, 2023), where the “flight-to-safety” mechanism was not considered. Therefore, it can be concluded that using this additional step might be suitable for investors who value safety and better risk-adjusted performance but should be avoided by those seeking the highest absolute returns.

Although the study provides valuable results, it also shows some limitations. It only considers a specific set of rules, which could be changed to achieve different results (for instance using different time intervals to assess the winning sectors, changing the weighting method or changing the “flight-to-safety” trigger). Additionally, it covers a limited period, and a limited investment opportunity set, and does not consider tax effects and transaction costs. Further studies could be performed to address some of these limitations.



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POBOLJŠANJE PRINOSA PRILAGOĐENOG RIZIKU MALIH INVESTITORA: ISTRAŽIVANJE STRATEGIJA DUALNOG MOMENTUMA U GLOBALNOM SEKTORU ETF ULAGANJA

Rezime:

Procena uspešnosti ulaganja je od suštinskog značaja za određivanje efektivnosti investicionih strategija, jer omogućava investitorima da procene prinose prilagođene riziku i performanse u odnosu na tradicionalne indekse. Brzi razvoj finansijskih proizvoda značajno je proširio spektar mogućnosti ulaganja, omogućavajući investitorima da ostvare svoje ciljeve na načine koji ranije nisu bili mogući. Međutim, sam obim dostupnih alternativa usložnjava proces donošenja odluka. Dok institucionalni investitori mogu da ublaže ove izazove razvijanjem specijalizovane ekspertize, takvi resursi su najčešće nedostupni malim investitorima. Kao odgovor, ETF-ovi sa tržišnim indeksima (fondovi kojima se trguje na berzi) postali su široko prihvaćeno, troškovno i vremenski efikasno sredstvo ulaganja, koje nudi široku izloženost tržištu, diversifikaciju i jednostavnost, obično bez potrebe za naprednom analizom. Iako ovaj pristup može biti dovoljan za mnoge investitore, postoji potencijal za male, individualne investitore da poboljšaju prinose prilagođene riziku kroz prefinjenje strategije. Ova studija istražuje primenu strategija dvostrukog zamaha, koje uključuju korišćenje performansi ETF-ova globalnog sektora i uključivanje mehanizma „od leta do sigurnosti“, kada to nalažu uslovi na tržištu. Nalazi sugerišu da takve strategije mogu pružiti superiorne performanse prilagođene riziku u odnosu na tradicionalno ulaganje u indekse putem ETF-ova.

Ključne reči:

evaluacija investicionih performansi, globalni ETF, strategije dvostrukog momenta, sektorsko ulaganje, mali investitori.

JEL klasifikacija:

G11