UNIVERSIDADE CATÓLICA PORTUGUESA

The profitability of momentum strategies in the S&P 500 Financials between 2020 and 2023

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Abstract

This study investigates the profitability of momentum strategies in the S&P 500 Financials sector between 2020 and 2023, a period characterized by unique macroeconomic events such as the COVID-19 pandemic, its recovery, interest rate hikes, and increased market volatility. Using a dataset of 72 financial stocks, a total of 16 momentum strategies were tested across varying formation and holding periods, incorporating overlapping periods to enhance robustness. The momentum strategies (active strategy) were then compared against a benchmark (passive strategy) – S&P 500 Financials – for the same period.

The results revealed mixed profitability: while some Winner-Minus-Loser (WML) portfolios delivered positive and statistically significant returns in shorter formation periods, others produced negative or non-significant results, particularly for longer periods. Naturally, the positive returns of some loser portfolios, aligned with the financial sector's structural stability and reduced idiosyncratic risk, undermined the effectiveness of momentum strategies.

The findings provide valuable insights for investors by demonstrating the limitations and potential of momentum within the financial sector, particularly in the long and short-term, accounting for sector-specific characteristics like macroeconomic sensitivities and regulatory safeguards. From an academic perspective, it brings more empirical evidence about a heavily studied topic, expanding the knowledge on momentum trading, in a specific sector and period.

Keywords: S&P 500 Financials, Momentum, Financial Sector, Behavioural Finance

Resumo

Este estudo investiga a rentabilidade das estratégias de momentum no setor S&P500 Financials entre 2020 e 2023, um período caracterizado por eventos macroeconómicos únicos, como a pandemia da COVID-19, a sua recuperação, o aumento das taxas de juro e o aumento da volatilidade do mercado. Utilizando um conjunto de dados de 72 ações, foi testado um total de 16 estratégias de momentum em diferentes períodos de formação e de retenção, incorporando períodos de sobreposição para aumentar a robustez dos dados. As estratégias de momentum (estratégia ativa) foram depois comparadas com um elemento de referência (estratégia passiva) - S&P 500 Financials - para o mesmo período.

Os resultados revelaram uma rentabilidade mista: enquanto alguns portfólios Winner-Minus-Loser (WML) apresentaram rentabilidades positivas e estatisticamente significativas em períodos de formação mais curtos, a maioria produziu resultados negativos ou não significativos, particularmente em períodos mais longos. Naturalmente, as rentabilidades positivas de portfólios perdedores perdedoras, alinhadas com a estabilidade estrutural do sector financeiro e com o reduzido risco idiossincrático, prejudicaram a eficácia das estratégias de momentum. As conclusões fornecem informações valiosas para os investidores, demonstrando as limitações e o potencial do momentum no setor financeiro, nomeadamente no longo e curto-prazo, assim como as sensibilidades macroeconómicas e as salvaguardas regulamentares. Do ponto de vista académico, este estudo fornece mais dados empíricos sobre um tema muito estudado, expandindo o conhecimento sobre o momentum trading num setor e período específicos.

Palavras-chave: S&P 500 Financials, Momentum, Setor Financeiro, Finanças Comportamentais

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1. Introduction

1.1 General Background

The Efficient Market Hypothesis (EMH), a foundation of modern financial theory, states that financial markets incorporate and reflect all available information . According to this theory, it´s nearly impossible to regularly generate returns above average by analyzing historical price movements or information asymmetry because all relevant information is immediately reflected in asset prices working in three different forms: weak, semi-strong, and strong forms of efficiency .

However, real-world financial markets do not entirely align with traditional financial theories, leading to the emergence of behavioural finance. This theory challenged the assumptions of the Efficient Market Hypothesis, stating that investors are influenced by various cognitive biases and emotional factors, leading to irrational financial decisions. Instead of assuming markets are solely populated by rational investors, behavioural finance acknowledges the presence of both rational and irrational agents Due to limited rationality, investors are swayed by emotions, biases, and heuristics.

These biases and heuristics can contribute to Momentum, a theory whose main authors are and corresponds to an asset price movement event. More exactly, the momentum effect denotes a price drift that isn't supported by fundamental changes, which causes a discrepancy between price and intrinsic value, creating opportunities for investors trying to capitalize on these trends . This phenomenon is mainly driven by market inefficiencies , Risk-Return Trade-Off and investor psychology , contributing to short-term price trends .

The field of momentum is constantly evolving and, nowadays, recent research is trying to relate momentum with machine learning for high-frequency momentum strategies , while still gaining a deeper knowledge about the behavioural aspects that influence momentum . In particular, the application of artificial intelligence to detect patterns in price movements and investor sentiment has become a promising avenue for improving predictive accuracy in momentum trading, mixing computational power with behavioural finance insights .

The chosen market for this research is the S&P 500 Financials sector, a sub-index of the S&P 500, that tracks the performance of 500 leading publicly traded companies in the United States. The S&P 500 Financials is a capitalization-weighted index, which specifically focuses on companies within the financial services industry listed on US stock exchanges, serving as a benchmark for the performance of the US financial sector. On July 10th, 2024, the index had a market capitalization of $23.7 trillion, and the trading volume for that day was 223,303,000 shares which demonstrates the liquidity of this sector. This is a compelling choice for this research due to the amount of historical data and the role of momentum on the index, influencing stock prices and overall index performance.

1.2 Research Gaps

Momentum in financial markets holds several gaps and areas for further investigation, offering opportunities for advancing our understanding of this phenomenon. The fact that the long-term observation of momentum, and its connection to the efficient market hypothesis, remain somewhat questionable, makes it unclear if momentum techniques will continue to be profitable as more traders and investors enter the market, or if the market will become more efficient as it develops . Although momentum as a concept is well-established, the performance of various styles—combinations of technical indicators and holding periods—in the unique environment of the financial industry may not have been thoroughly examined in previous studies , and much of the early momentum literature focused on market-wide or index-based momentum effects frequently ignores characteristics unique to a certain sector . Lastly, recent studies regarding momentum mainly focus on the period ending before or immediately following the 2008 financial crisis and there aren´t many studies regarding the COVID time, being important re-evaluating traditional momentum strategies in light of the unprecedented market conditions brought by the pandemic .

1.3 Research Question

Concerning the research question, "Does momentum trading provide significant above-average gains on the S&P 500 from 2020 to 2023?", it can, firstly, contribute with valuable insights to this field by investigating the profitability of momentum strategies within a specific sector during a particular period. Regarding the research gaps, we go straight to the ones pointed out before, being that most of the existing studies focus mainly on the period shortly after and before the 2008 financial crisis , this research question aims to study a more recent period characterized by instability and volatility, since the beginning of the COVID pandemic, also focusing on the gap highlighted by . Therefore, it seems important to compare active and passive strategies during this period marked by significant economic events, which have created a unique environment for financial markets.

This research on S&P500 Financials is interesting, given that interest rates have been continuously increasing worldwide since 2022. In the USA, the Federal Reserve started increasing interest rates to cool inflation, raising its benchmark eleven times between March 2022 and July 2023, which certainly affected the results of banks and companies in the sector.

1.4 Originality

To the best of my knowledge, the factors that bring originality to this work are: the fact that it studies only the financial sector instead of studying momentum in different market sectors ; it studies a more recent and current timeframe, unlike the majority of studies related to this topic that focus on the period ending before or immediately following the 2008 financial crisis ; it studies 16 momentum strategies, instead of studying some or only one of them as is the case with and .

1.5 Contribution to knowledge

Regarding the contribution to this work, academically, its main contribution is to bring more empirical evidence about a heavily studied topic, expanding the knowledge on momentum trading, especially in a specific sector and still poorly researched period, testing if momentum trading can provide above-average returns.

It can also be important for stakeholders such as investors, contributing to an improvement of momentum trading strategies in moments of crisis; securities regulators, who can get some insights to improve their market/regulation policies; and firms who can get a better understanding of the short-term price fluctuations related with momentum. Finally, it can also contribute to firms (especially the ones present in the index) by offering valuable insights into investor behaviour, market dynamics, and strategies for optimizing their performance in the financial markets.

1.6 Presentation of the next chapters

The following chapters of this study are chapter two, which includes a literature review that expands and develops the ideas that were briefly discussed previously. Chapter 3 will address all the data and the methodology. In the 4th chapter, there will the analysed results. Chapter 5 will address the key limitations of this study as well as the work's primary conclusions and contributions.

2. Literature Review

2.1 Main Concept

The search for superior returns in financial markets has fueled the exploration of different investment strategies and, regarding momentum trading, defined it as the strategy of buying stocks that have performed well in the past and selling those that have performed poorly, based on the assumption that past winners will continue to outperform past losers. On the other hand, state that momentum refers to the tendency of stocks that have performed well in the past to continue performing well in the short term and vice-versa. Finally, define momentum as the phenomenon where securities with high past returns continue to generate high returns in the future, which suggests a persistence in stock price movements not fully explained by other market factors.

As it is possible to see, these 3 studies and their writers interpreted momentum in a very similar way. However, the main difference is in their approaches, since each study addresses momentum with unique methodologies and scopes. pioneered the classic winner-loser portfolio approach at the individual stock level, focusing on medium-term horizons (3 to 12 months) and equal-weighted portfolios to directly test momentum as a systematic trading strategy, providing better results for general stock-level momentum strategies. In contrast, incorporated momentum as one of several factors in a multi-factor model to explain mutual fund performance rather than testing momentum independently, suggesting that momentum is a persistent driver alongside other risk factors, being ideal for explaining returns in asset pricing models. Lastly, extended momentum research to the industry level, demonstrating that sector-based momentum significantly impacts stock returns, which provides a broader lens on momentum's impact across entire sectors rather than individual stocks alone, delivering better results in environments where industries move collectively due to common economic drivers.

Nevertheless, the approach of is the best suited for this work because it provides a direct and systematic method for analyzing momentum through the formation of winner-loser portfolios. This approach allows for a focused examination of how stocks in the S&P 500 Financials sector exhibit momentum over specific formation (J) and holding (K) periods, making it ideal for testing all the strategies within a defined time frame. Unlike the model by , which integrates momentum alongside other market factors, the method offers a clear and isolated analysis of momentum by concentrating solely on past performance rankings and subsequent returns offering a robust framework to isolate the momentum effect. Additionally, compared to , which focus more on industry-wide momentum, the Jegadeesh and Titman approach is more applicable to studying momentum at the individual stock level within a sector, providing a better understanding of how specific stocks contribute to overall momentum effects.

2.2 Main Theories

2.2.1 Efficient Market Hypothesis

The efficient market hypothesis is a foundational theory in finance that was first introduced in the early 20th century being developed by Eugene Fama, Paul Samuelson, and Burton Malkiel amongst others. The theory has changed to better fit what happens in the financial markets , proposing an equilibrium between prices that reflect the information of informed individuals, with the ones who expend resources to obtain information receiving compensation.

However, it initially proposed that financial markets are efficient because all relevant information is immediately reflected in asset prices, working in three different efficiency forms: weak, semi-strong, and strong . In the weak form, asset prices fully reflect all past market trading information, including historical prices, trading volumes, and some other market data . Concerning the semi-strong form, it assumes that asset prices fully reflect all publicly available information, including not only historical data but also financial statements, earning reports, etc. Finally, the strong form assumes that asset prices fully reflect all available information, both public and private, meaning that in this form no one can consistently earn abnormal returns by trading on private information . This theory is based on a set of assumptions that state that there are no transaction costs, information is costless, investors have homogeneous expectations, and are rational.

According to the EMH, the relationship between risk and return is driven by systematic risk, as markets quickly incorporate all available information into the asset prices, meaning that investors who seek higher returns have to accept higher risk, as is reflected in models like CAPM. However, the EMH also questions the underlying assumptions and practical applicability of this model, arguing that markets already incorporate available information into prices, which leads to the development of other models like the Fama and French's Three-Factor Model (FF3M) which includes size (SMB) and value (HML) factors for better return predictions .

Concerning its advantages, according to , the EMH encourages investment in financial markets, promoting efficiency and liquidity because it provides confidence to investors that market prices are fair and reflect all available information. In practice, even while using different prediction models, once the methods are widely used, their information gets incorporated into prices and they won´t be successful anymore .

Concerning its major critiques, anomalies such as momentum effect, value effect, and even the day of the week , contradict the EMH, suggesting that past price movements can influence future returns. Additionally, episodes of market bubbles and crashes imply that despite EMH forecasts, markets may experience phases of excessive excitement and fear or "irrational exuberance" . Finally, this theory still couldn´t explain momentum phenomena, which invited behavioural finance explanations.

2.2.2 Behavioural Finance

Behavioral Finance originated as a response to the limitations of traditional financial theories (EMH), emerging in a context of anomalies and patterns (speculative bubbles, market crashes, etc.) which revealed that psychological factors were affecting financial decisions. Nobel laureates Kahneman (1974) and Thaler (1985) challenged the assumptions made by the EMH, stating that individuals are subject to various cognitive biases and emotional influences that can lead to irrational financial decisions, abandoning the assumption of competitive financial markets used only by rational investors, adding others who may not make so rational decisions . The ability of behavioural finance to provide answers for a variety of financial phenomena is due to the acknowledgment of the human factor in the decision-making process which is driven by cognitive biases and mental shortcuts (heuristics).

Biases, for instance, are systematic deviations from logical judgement or decision-making, frequently caused by emotional and cognitive variables. In turn, heuristics are mental shortcuts that people use to make decisions/judgements quickly and with minimal effort, leading to possible biases or errors .

Table 1 – Biases and Heuristics

The biases and heuristics in Table 1 are the ones with the most influence on investors' decisions. However, the most important and the most recurrent are the following ones:

Overconfidence and anchoring, both lead to potentially poor decision-making, however, they differ in their source and effect: overconfidence is an internal bias rooted in self-perception, pushing investors toward active choices like excessive trading . Anchoring, in contrast, is tied to an external reference point and often causes inaction—such as holding onto a poor investment due to an initial fixation .

Loss aversion and prospect theory, however, are complementary instead of opposing, with loss aversion serving as a core element within the larger framework of prospect theory. Loss aversion captures the immediate emotional impact of potential losses, while prospect theory explains a wider range of investor behaviors under risk . Together, they deepen the understanding of risk preferences, reinforcing each other to describe a coherent picture of loss-driven decisions.

Finally, herding behavior and the availability heuristic both affect investors' perception of risk but differ fundamentally in origin and effect. Herding is driven by peer influence, leading to group-driven market volatility as investors copy others' actions, creating trends . The availability heuristic, by contrast, is an individual mental shortcut that affects risk perception based on prominent events, often distorting risk assessment without any group influence .

When emotional responses take control over rational thought, cognitive biases can accumulate, resulting in suboptimal market timing, heightened risk exposure, and substandard portfolio management. These last emotional responses are all related to the psychological part of the investor. The amygdala, for example, and other brain regions play a crucial role in shaping behavioral biases and heuristics by influencing decision-making. The amygdala, often associated with processing emotional reactions such as fear and stress, contributes significantly to biases like loss aversion and herding behavior. Additionally, the prefrontal cortex, which is responsible for rational thinking, interacts with the amygdala to regulate impulsive decisions influenced by heuristics like the availability heuristic.

Understanding these conducts through Behavioural Finance, turns out to be crucial for all participants in the financial markets because it offers insights into market anomalies that can´t be explained by traditional theories, improving investment strategies; it is also important to better understand how cognitive biases and emotions affect decision-making and risk perception, helping investors to develop more rational decisions.

Nevertheless, there are also some shortcomings such as the difficulty in measuring psychological factors, making it less quantifiable and harder to model ; the lack of predictive power and consistency of traditional financial models, since they rely on a range of psychological biases that can differ across individuals ; and it sometimes struggles to account for large-scale market dynamics due to its complexity .

2.2.3 Momentum

In finance, momentum is a well-established phenomenon documented by numerous academic studies and is defined differently among them. Momentum in financial markets is often seen as one of the phenomena related to behavioral finance and is driven by systematic biases that influence investor decision-making. The fact that investors underreact to new information allows momentum trends to persist, while their overreaction to the following price changes fuels contrarian .

A momentum strategy (Price Momentum) is the short-term purchase of financial instruments with a high rate of return and the sale of financial instruments with a low rate of return. Using NYSE and AMEX data from 1965 to 1988, Jegadeesh and Titman (1993) concluded that momentum strategy relies on the notion that the short-term financial asset price series exhibits autocorrelation, suggesting that the current rate of return will influence the rate of return shortly, either positively or negatively.

There are, however, other types of momentum such as Industry momentum, which corresponds to focusing on the trend within a specific sector, with the underlying assumption that a sector's strong growth might act as a tailwind for certain businesses operating inside it , being influenced by several market and industry indicators . Earnings momentum, in turn, goes beyond just price movements and considers companies' recent earnings reports, stating that companies that report unexpectedly high earnings outperform those who disclose surprisingly low earnings , being the price reaction out of proportion to the actual change in value (contradicts the EMH).

2.2.3.1 Underreaction and Overreaction

argued that momentum can be caused by underreaction to firm-specific factors in the short-term, creating opportunities for strategies to explore price inefficiencies due to the market's slow reaction, but also reported that between 2 to 5 years after portfolio formation these results tended to mean-revert, which was justified as an overreaction to long-term firm-specific prospects. , in turn, try to explain momentum through underreaction, stating that the market is composed of two groups of rational agents: "news-watchers" that have access to private information but are unable to obtain information from prices, and "momentum traders" which can profit from the initial underreaction by the "news-watchers", who drove the ongoing price fluctuation. The theory suggests that momentum strategies can benefit from short-term underreaction by exploiting price inefficiencies before the market fully reacts to new information but are susceptible to overreaction in the long run. On a different perspective, associated momentum with an underreaction to price information, particularly in response to previous earnings reports, relating this phenomenon with the underreaction responsible for post-Earnings Announcement. From the previous studies, it is possible to see that underreaction is at the center of psychological biases and heuristics, having as a result information delays and fails to fully price in news, which ends up sustaining momentum. In terms of risk, underreaction-driven momentum strategies are more consistent and predictable, than other strategies, however, are still exposed to systematic risk as broader market or sectoral trends impact performance.

On the other side, overreaction occurs as a consequence of underreaction, when the market overestimates the impact of new information creating false momentum signals and leading to an excessive price movement (up or down) which is not sustainable in the long run, resulting in losses for momentum strategies if they fail to identify the underlying causes of this fluctuation . These cognitive biases, together, highlight another inefficiency of the EMH, this time on the weak form: momentum is an anomaly that cannot be accounted for by market risk, but for behavioral biases that make investors too focused on recent events . Regarding risk, momentum-driven profits tend to be riskier than the previous ones because investors face the risk of abrupt corrections if the market normalizes faster than anticipated, turning them into non-sustainable strategies.

Overreaction and momentum are often connected, as investors increasingly chase momentum and underreaction trends, fuel the overreaction that leads to contrarian. Contrarian strategies identify assets that are undervalued or overvalued – due to excessive pessimism or overenthusiasm - and position against the prevailing market sentiment, anticipating a reversion of the market as prices correct over time . As it happens with momentum, this approach leverages behavioral inefficiencies for excess returns.

2.2.3.2 Advantages and Disadvantages

Finally, regarding momentum advantages, the fact that it can be effective across different asset classes and markets makes it a comprehensive strategy . Furthermore, momentum can also serve as a complement to other investment approaches, such as value investing, improving risk-adjusted returns when combined, and enhancing portfolio performance .

Yet, there are also practical issues, since while momentum strategies can be profitable, in practice high transaction costs, related to frequent trading, may erode returns and short-term profitability may not persist in all market conditions Goyal & Jegadeesh, 2017) making momentum trends more likely to reverse due to the increased volatility of the markets. While momentum can be profitable in the short to medium term, it carries the risk of sudden reversals where trends break down, often resulting in significant losses . More specifically in earnings momentum, the fact that it depends on the accuracy of earnings forecasts, which have a high level of uncertainty, requiring instant access to earnings information leads to information asymmetry .

2.3 Empirical Evidence

Momentum has been widely studied in financial literature, and while many studies document significant profitability, others report non-significant or negative returns.

2.3.1 Significant Price Momentum

Table 2 – Studies with Significant Price Momentum

From the previous table, it is possible to see the persistence of momentum returns across different markets, as is the case with studies of Jegadeesh and Titman (1993,2001) and Rouwenhorst (1998), whose studies provided persistent returns across both U.S. and European markets over intermediate/longer horizons. These markets are characterized by higher liquidity, and better access to reliable data, making them more prone to momentum effects.

It is also possible to see that significant returns are not confined to a single asset type, since the studies from and prove that momentum can also be found in industries and currencies, respectively. provide historical robustness, showing that momentum strategies have been profitable for more than 2 centuries, providing evidence of the enduring nature of momentum in financial markets.

Another key factor seems to be the studied period since some of these studies analyse data from an older period in which delayed price adjustments were more prevalent, allowing investors to exploit momentum opportunities.

Finally, found that momentum can provide significant returns in post-crisis periods on the US market, while found the same but for the Jordanian banking sector, highlighting the fact that momentum strategies can still be profitable for specific sectors in modern day.

2.3.2. Non-Significant Momentum

Study	**Time Period**	**Object of study**	**Methods**	**Results**
Chordia et al. (2014)	1963-2012	US Stock Market	Portfolio-based approach (winner and loser) over periods of 3 to 12 months and regression analysis to link momentum with liquidity.	Non-significant returns due to increased market liquidity and advances in information flow.
Zaremba et al. (2020)	2000-2018	Emerging Markets	Portfolio-based approach and assessed momentum profitability by liquidity levels; focused essentially on short-term (3 month) formation and holding periods.	Non-significant profits, especially in low-liquidity markets.
Berggrun et al. (2020)	2004-2018	Latin American Markets	Portfolio-based approach and assessed momentum and contrarian strategies; focused essentially on short-term formation and holding periods.	Weak or non-significant momentum over different market conditions.
Liu & Lee (2001)	1988-1998	Japanese Stock Market	Portfolio-based approach and assessed momentum and contrarian strategies; Focused essentially on medium-term (6 month) formation and holding periods.	Non-significant momentum profits found, which was attributed to local market characteristics.

Korajczyk & Sadka (2004)	1983-2001	US Stock Market	Portfolio-based approach adjusted for costs, analysing momentum with transaction costs adjustments.	After accounting for transaction costs, momentum profits are non-significant.

Table 3 – Studies with non-significant Price Momentum

Despite historically delivering above-average returns, recent studies suggest a decline in the profitability of momentum investing. As it is possible to see from the studies above, all of them use the same methodology to assess the profitability of momentum, only changing the holding and formation periods, usually short to medium-term, which are the ones frequently used to capture momentum in both liquid and less-liquid markets. For instance, and highlight that factors like liquidity and transaction cost can erode momentum profits, especially in efficient and developed markets like the U.S. where price adjustments usually occur swiftly. On the other hand, and revealed that unique local market conditions and lower liquidity contribute to weaker momentum returns in emerging markets since these are more prone to fluctuations in liquidity over time, particularly during crises, which erode the profitability of momentum strategies, making significant returns harder to achieve. Finally, got the same results as the previous authors, but because their results were influenced by the Japanese regional market characteristics, confirming the lower probability of getting momentum returns in the Asian markets.

2.3.3 Conclusions

It is possible to see that the studies with significant returns, such as the ones from and , highlight the profitability of momentum strategies in developed markets where liquidity is high, price trends are more stable and behavioural biases (ex.: underreaction) are more noticeable.

Conversely, studies like the ones from and show non-significant returns. Especially in emerging markets, where transaction costs, volatility, and transaction costs affect price continuity, making momentum trends harder to capitalize on.

Furthermore, the evolution of markets over time seems to have contributed to the shrinking profitability of momentum returns, as greater awareness, competition and the development of technologies may have reduced opportunities for abnormal returns, according to the previous tables. This suggests that market context, data quality, and liquidity have great importance in determining momentum profitability, proposing that while momentum remains a strong strategy in environments, it depends heavily on underlying market conditions and dynamics. This evolution reflects a combination of increased market efficiency, regulatory advancements (SEC), and the stabilizing influence of central banks (Federal Reserve) that can help to eliminate inefficiencies that momentum exploits through excessive regulation or intervention in the markets, leaving little scope for irrational behaviour. Despite trying to eliminate extreme behavioural biases, these market players can´t fully eliminate them due to inherent market characteristics which could mean that although momentum fades in time, it can still be found in short time.

2.4 Research Context

2.4.1 Macroeconomic Context

Between 2020 and December 2023, the global economy, particularly in the United States, experienced a turbulent path marked by an initial sharp contraction due to the pandemic, followed by a slow recovery and new inflationary pressures. In terms of global GDP, despite the steep decline in 2020 due to COVID-19 shutdowns, the world saw recovery and growth returning in 2021, being that in 2022, global GDP grew by approximately 3.2%, reflecting continued recovery. The U.S. economy followed the world trend with GDP recovering, reaching an estimated $23.48 trillion in 2022 (2.1% growth). Still, as inflation hiked to levels not seen in decades, the economic outlook became mixed, influenced by factors like rising interest rates, fluctuating consumer demand, and labor market shifts.

In response to persistent inflation, the Federal Reserve shifted from its 2020 politics of low rates and asset purchases to aggressive rate hikes starting in early 2022, aiming to reduce inflation, which had risen substantially. These actions directly impacted the financial sector, with interest rates creating both challenges and opportunities for companies.

The financial markets responded to these shifts with significant volatility, as investors adjusted their portfolios to account for higher rates, inflationary pressures, and potential risks of a recession. The housing market also felt these effects, with higher rates decreasing affordability and impacting institutions with real estate loan exposures, while other sectors showed mixed performance as technology continued to grow, fueled by demand for digital and remote solutions.

By December 2023, the U.S. economy reflected a complex interplay of growth, inflation control, and rising costs in a climate of regulatory oversight focused on ensuring stability among economic pressures. Banking policies were affected by the increased costs and shifts in credit demand, considering that the Federal Reserve persisted in raising interest rates as a means of containing inflation.

2.4.2 Characterization of S&P 500 Financials

The chosen object of study for this TFM is the USA's benchmark financial index, the S&P 500 Financials, which is a crucial component of the country's financial system and a vital indicator of corporate finance, market sentiment, and the state of the economy. The index specifically tracks the performance of the financial sector, including banking, investment, insurance, and real estate companies.

The S&P 500 Financials supports the trading of various financial instruments including some of the largest and most actively traded financial firms in the United States. The composition of the index is reviewed quarterly and annually, with a focus on maintaining a representative and liquid set of companies. The sector composition includes a diverse range of financial institutions such as banks, insurance companies, investment firms, and real estate businesses, being made up of companies such as JP Morgan Chase, Bank of America (Banks); Berkshire Hathaway, and AIG (Insurance); Goldman Sachs and Morgan Stanley (Investment Services); American Express and Discover Financial Services (Consumer Finance), among others.

Several factors influence the performance and dynamics of the S&P 500 Financials index, such as macroeconomic indicators like inflation rates, GDP growth, interest rates, and unemployment rates. Corporate earnings are also significant, as strong earnings increase a company's stock value, whereas investor psychology, including behavioral biases, can also impact market movements. Other influential factors include geopolitical events, industry performance, market sentiment, global market trends, and the political and regulatory environment in the USA. Finally, financial factors have a strong influence on the performance of the index, as volatility and liquidity can create opportunities or increase risk by allowing financial institutions to facilitate access to credit, increasing their income and profitability, or vice-versa.

The S&P 500 Financials experiences high trading volumes, with an average of 315,390,554, a strong indicative of its liquidity, investor interest, and market activity, explained by the fact that this industry is extremely sensitive to economic data, regulatory news, and interest rate changes. Concerning the index’s market capitalization, Berkshire Hathaway Inc ($894,19 Billion) has the highest one, followed by JPMorgan Chase & Co. ($572,32 Billion), meaning that this index is highly concentrated with a significant portion of its market capitalization dominated by a few large-cap companies.

Regarding the index main investors, these are mainly institutional investors, such as hedge funds, mutual funds, and pension funds which search for exposure to this sector to achieve diversity in their portfolios. However, retail investors also participate in it due to the index´s potential for stable dividends and its responses to macroeconomic trends. Occasionally, but not so frequently, peer companies such as banks and insurers may engage in stock buybacks or cross-investments in periods of strong financial performance.

Between 2020 and 2023, the S&P 500 Financials index included 72 companies with a combined market capitalization of approximately $3.8 trillion. This period saw multiple factors influencing the index's performance, beginning with the initial impact of the COVID-19 pandemic in 2020, which led to unprecedented volatility and economic contraction. In response, the Federal Reserve initially cut interest rates to near-zero levels to stabilize the economy, which benefited the financial sector by boosting borrowing and lending activity. However, by 2022 and 2023, the Fed shifted its stance, implementing aggressive rate hikes to counteract rising inflation, creating concerns about a potential recession or economic slowdown. This uncertainty negatively affected investor sentiment toward financial stocks, as did geopolitical tensions, which increased global risk aversion and market volatility. Within the financial sector itself, there were distinct obstacles, for instance, when the economy grew increasingly unstable, banks had to make larger provisions for loan losses because of worries regarding the quality of the credit. In the same way, when market conditions worsened, asset management companies battled with falling asset values and withdrawals from investment funds.

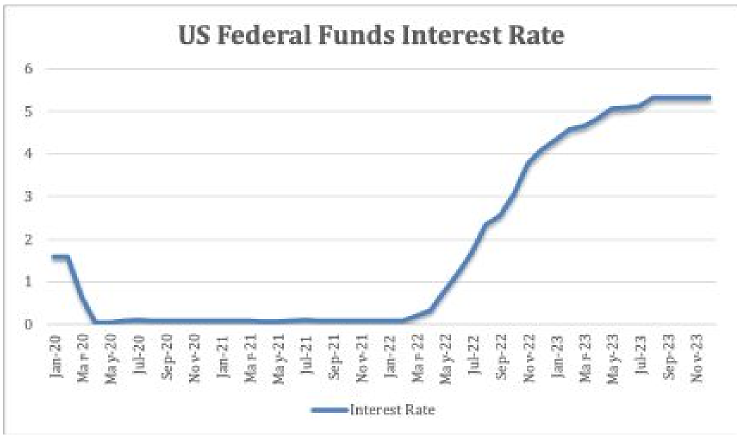

Figure 1 – Evolution of US Federal Funds Interest Rate

In terms of regulation, the financial sector is heavily regulated, due to its role in maintaining economic stability. The Basel III framework is an example of how this regulation is applied, as it requires the banks to hold a higher proportion of their capital relative to the risks they take on; conduct regular stress tests to assess their ability to withstand hypothetical financial shocks; and introduces new liquidity ratios to ensure banks have sufficient liquid assets to meet their short-term funding needs. The Dodd-Frank Act is another regulation tool that appeared after the financial crisis of 2008, aiming to regulate the financing of the market /index and to reform the financial industry preventing similar crises from happening again, promoting greater transparency, accountability, and consumer protection.

2.5 Hypothesis

H1: Momentum trading provides significant above-average gains on the S&P 500 Financials from 2020 to 2023.

This research explores if the momentum strategy will provide higher returns than the benchmark - passive investment in the S&P 500 Financials - specifically over the period 2020-2023, amid the beginning and the post-COVID-19 era, changing economic conditions and monetary policy shifts in America.

According to empirical evidence, momentum has shown to be profitable in different assets , markets, and periods, as happened in the study of , where momentum was profitbale in the American stock markets from 1965 to 1989, but also with and who found significant momentum profits in more recent periods in the US stock market and the banking sector after a crisis, respectively.

Momentum strategies for the S&P 500 Financials index concentrate on changes in stock prices within the financial industry. Sector-specific momentum strategies are influenced by various factors, including interest rate fluctuations, regulatory policies, and changing monetary policies , which in turn affect momentum earnings . If investors or institutions fail to quickly correct these mispricing, these discrepancies may persist or grow, driving momentum profits. Still, despite the macroeconomic factors, psychological issues including herding, underreaction, and overreaction can also fuel momentum effects in this index. Adding to this, the high liquidity of the index makes it easier for momentum strategies to be executed effectively, minimizing the weight of transaction costs .

Considering that the stocks are mainly, but not completely, traded by funds and ETFs, the impact of the behavioural biases may be less notable since investors may be more trained and prepared for the possible adversities of the markets, however, the impact is not absent, as even institutional investors are not immune to biases such as overconfidence, herding behaviour or loss aversion. These biases, while less frequent or impactful than with individual investors, can still shape trading behaviours and contribute to market inefficiencies.

Despite the global economy experiencing varied growth rates, the United States maintained steady but modest growth during 2022 and 2023, with the S&P 500 Financials displaying resilience, influenced by government policies supporting financial institutions and regulatory changes. This environment fosters momentum profitability seeming to be a favourable time to implement momentum strategies in the S&P 500 Financials.

3. Data and Methodology

3.1 Method

Due to its ability to validate the representativeness of a financial hypothesis, it strengthens its academic contribution but also enhances its practical relevance and credibility, providing valuable insights for both theoretical advancements and real-world applications . However, this method also has disadvantages such as inflexibility, and it may not capture the depth and richness of individual experiences and motivations behind investors' decision-making .

The inherent subjectivity of the qualitative method and its limited capacity to generalise findings made it an unsuitable choice for this thesis since it might create biases and fail to properly evaluate the profitability of momentum methods .

3.2 Data

The analysis uses secondary data focusing on end-of-day results of S&P 500 Financials stocks, ensuring that the analysis remains aligned with the stock-specific nature of momentum trading strategies. Accordingly, the study concentrates on capital gains and losses, disregarding dividends, as the primary interest is in price momentum and its potential to generate above-average gains. The period from 01/01/2020 to 31/12/2023 was chosen to capture market conditions from the beginning to post-COVID-19 and through the economic fluctuations related to inflationary pressures and rising interest rates, which are relevant for understanding behavioral patterns in financial markets.

In the context of analyzing the momentum trading strategy in the S&P 500 Financials sector, the analysis focuses on all the financial stocks listed in this index. These stocks include diverse sub-industries such as banks, insurance, capital markets, and REITs, capturing the breadth of the financial sector. The data is sourced from Refinitiv Eikon, ensuring accuracy and reliability, particularly for historical price data and financial performance metrics . The sample includes 72 financial stocks, which have been consistently traded over the 2020-2023 period without missing observations.

The empirical analysis is built on this sample to evaluate the profitability of momentum trading strategies compared to the benchmark – passive investment on the S&P500 Financials. The main differences between the benchmark and the momentum portfolios are the fact that the benchmark is diversified across the whole sector while momentum portfolios focus on a smaller subset of stocks (winners and losers); the benchmark is a passive strategy while momentum portfolio is an active portfolio; and while the index uses market-capitalization weighting, momentum strategies use equally weighted portfolios.

3.3 Variables

The raw index prices were retrieved from the database, and daily returns for the sample were computed. There are two primary methods for compounding returns: discrete compounding and logarithmic compounding, each of which can produce empirical differences and, in some cases, biased results. It is essential to use the same compounding method employed in most momentum investigations to ensure unbiased comparisons with their conclusions, and Logarithmic compounding is frequently used in momentum studies

The advantages of logarithmic compounding are crucial when studying momentum in volatile sectors like the S&P 500 Financials index. Firstly, logarithmic returns adjust for large price movements, reducing skewness and avoiding the overinflation of extreme price changes in the average return calculation . Secondly, log returns tend to be more normally distributed, making them more compatible with many statistical models and risk assessments used in financial studies . Finally, because momentum strategies typically rely on cumulative returns over multiple time frames, logarithmic compounding makes the process more straightforward, especially when dealing with long-term performance analysis and the volatility of financial stocks . Thus, to establish a strong relationship between long-horizon returns sub-periods, this approach computes logarithmic returns:

1. $r\ j,t = \ln(\ P\ j,t\ /P\ j,t{-}1)$

Where:

- $r\ j,t$ = returns of security j at time t
- $P\ j,t{-}1$ = price of security j at time t-1
- $P\ j,t$ = price of security j at time t

Cumulative monthly returns:

2. $CRj,t(M)=\sum_{t=1}^{m} r\ j,t$

The portfolio is evenly weighted using the following formula:

3. $CRj,t(M)=\frac{1}{N}\sum_{t=1}^{m} CRj,t(M)$

To compute the profitability of the momentum strategy (Winner minus loser returns) it is necessary to subtract the returns of the loser portfolio from the returns of the winner portfolio:

$$4.\quad CR\ WML,t\ (M) = CR\ W,t\ (M) - CR\ L,t\ (M)$$

Lastly, the average monthly return on the overall profitability must be calculated while taking the holding term into account to evaluate the profitability of the various momentum strategies:

$$5.\quad \overline{CR\ WML,t(M)} = \frac{1}{N}\sum_{t=1}^{m} CRWML,t(M)$$

3.4 Methodology

3.4.1 Formation Period

The formation period is a crucial element in momentum trading strategies, serving as the phase during which stocks are evaluated and ranked based on their past performance, being essential to accurately capture market signals and distinguish between meaningful price trends and short-term fluctuations. The seminal work of laid the foundation for momentum strategies, where stocks are ranked according to their returns over a specific formation period (usually from 3 to 12 months), relying on a relative metric to determine past performance:

$$r_{f,t} = \frac{P_{f,t}}{P_{f,t-1}}$$

Where:

- $P_{f,t}$: price of security f at time t
- $P_{f,t-1}$: price of security f at time t-1

, however, proposed a method that introduces a volatility adjustment, that can be computed in the following way:

$$r_{adjusted,f,t} = \frac{r_{f,t}}{\sigma_{f,t}}$$

Where:

- $r_{adjusted,f,t}$ = volatility-adjusted momentum for stock f at time t
- $r_{f,t}$ = return of stock f over the past J-months
- $\sigma_{f,t}$ = volatility of stock f over J-month period

This method ranks stocks by their volatility-adjusted momentum to take into consideration the risk of each stock. Stocks with higher past returns, but also with high volatility, are ranked lower than those with the same return but lower volatility. The rationale behind this method is that stocks with higher volatility tend to be more prone to mean-reversion, so adjusting to volatility improves the momentum signal.

However, the method is better suited to this work since it captures pure price momentum based on past performance without adjustments, directly aligning with the behavioural finance focus of this research and being a standard benchmark in momentum trading studies validated across various markets (

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3.4.1.1 Skipping and Overlapping Periods

Momentum strategies might consider introducing skipping periods to mitigate the risk of short-term reversals, which can be caused by bid-ask spread pressures and the lagged reaction effects, being problematic in momentum strategies where loser portfolios often exhibit higher volatility and lower liquidity than their winner counterparts . Additionally, highlight that behavioural factors can influence these reversals, making skipping periods a potential tool for minimizing noise.

However, in this work, it was chosen not to implement skipping periods, as the studied index is comprised of highly liquid stocks. Furthermore, suggest that overlapping periods can be more effective for rebalancing portfolios to maintain statistical power while reducing transaction costs.

This study will use overlapping periods as they´re widely adopted in momentum literature enabling a review of the winner and loser portfolios and ensuring that they remain updated with the most recent performance data, continuously reflecting current market conditions

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3.4.1.2 Portfolio Size and Weighting

To construct an effective momentum trading strategy, it is crucial to form portfolios that consist of the stocks with the highest and lowest past returns, aiming to capitalize on the observed price trends. In this context, Jegadeesh and Titman (1993) laid the foundation for zero-cost momentum portfolios by sorting stocks into deciles based on their past returns and focusing on the top and bottom 10% portfolios, discarding middle-performing stocks. Similarly, studies like Hong & Stein (1999) reinforced this method, establishing it as a benchmark in momentum research.

Contrarily, employed a quintile sorting method in global markets, whereas other authors adopted a tercile-based sorting system, dividing stocks into three groups based on past performance. For this analysis, given the S&P 500 Financials sector's liquidity and market depth, this study adopts the decile approach to form portfolios using the top and bottom 10% of stocks.

3.4.1.3 Portfolio Weighting

Two common weighting methods are equal-weighted and value-weighted portfolios. Equal-weighted portfolios assign identical weights to each stock, providing a straightforward and unbiased way of forming portfolios. Studies such as and argue that equal-weighted portfolios are particularly suitable for momentum strategies, as they avoid overexposure to large-cap stocks, preventing potential concentration risks. Conversely, value-weighted portfolios assign weights based on market capitalization or past returns, leading to a higher allocation to large-cap stocks, being used in scenarios where liquidity and transaction costs are a concern, as noted by and .

Despite the advantages of value-weighted portfolios, this study implements an equal-weighted approach because of the liquidity characteristics of the S&P 500 Financials, where all stocks are actively traded, and transaction costs are relatively low. Furthermore, found that equal-weighted portfolios often outperform value-weighted portfolios in momentum strategies due to their ability to capture broad market trends more effectively.

3.4.2 Holding Period

After the initial selection, the constructed portfolios are held for a period of K-months, during which the strategy attempts to exploit the continuation of price trends in the securities.

The optimal holding period for momentum strategies is highly dependent on the pricing cycle of the underlying securities and the formation period used, being that, typically, momentum strategies are medium-term in nature, with portfolios being held for several months. Studies such as , and explored various combinations of formation and holding periods to optimize performance examining 16 different strategies with holding periods ranging from 3 to 12 months. This work will explore these same holding period combinations.

3.4.3 Statistical Significance

The t-test will be used to determine if the average returns of the momentum strategy are significantly different from zero, a common approach in momentum research . The t-test will be conducted against three critical values: 10%, 5%, and 1%, which reflect varying levels of confidence, providing a clearer view of the significance and strength of the results. The t-obs are computed using this formula:

$$t = \frac{\overline{R} - \alpha}{\frac{\sigma}{\sqrt{n}}}$$

Where:

- $\overline{R}$ = Average returns of the sample
- α = Hypothesized population mean
- σ = Standard deviation of the returns
- n = Sample size

3.5 Software:

Microsoft Excel will serve as the primary tool for data processing and analysis. Excel is suited for this research due to its ability to handle large volumes of data efficiently (around 100,000 observations) and perform advanced calculations. Its built-in features for organizing data, conducting statistical tests, and visualizing results via charts and graphs make it ideal for examining momentum trading strategies .

4. Results and Discussion

4.1 Descriptive statistics

The data sample wasn´t a typical one because during this period there have been steeper variations, both positive and negative, in the index's value than in prior years—excluding the 2008 financial crisis. Between 2020 and 2023, the S&P 500 Financials index experienced unprecedented volatility, largely influenced by major global and domestic events, which may not fully represent the average performance of the S&P 500 Financials index in previous years. The combination of the pandemic issues, rapid policy responses, and post-pandemic inflationary pressures created a period of atypical conditions, distinct from the more stable economic environments seen during other times. This sample could therefore introduce a bias by overemphasizing extreme market events, highlighting short-term volatility instead of offering a clear picture of long-term trends within the financial sector.

The S&P 500 Financials sector stocks were analyzed across the selected momentum strategies, generating approximately 30 overlapping portfolios per strategy. Comparing the Momentum Sample to the benchmark index, the Momentum Sample exhibited lower average monthly returns compared to the benchmark during this period, reflecting sector-specific challenges such as interest rate volatility, regulatory pressures, and uneven recovery from the economic impacts of the COVID-19 pandemic. The dispersion of returns across the sector revealed significant uniformity, with 98,6% of monthly returns clustering within similar intervals, however, one outlier exhibited significant underperformance - Globe Life Inc displayed significantly lower monthly returns compared to its counterparts, which can be attributed to the fact that between 2020 and 2023, the company suffered with allegations of misconduct and legal investigations that lead to regulatory actions.

	Momentum Sample	S&P 500 Financials
Mean (%)	0,44	0,69
Min (%)	-27,81	-31,08
Max (%)	19,59	11,99
Variance (%)	0,91	0,52
Stand. Dev. (%)	9,28	7,20
Sharpe Ratio	0,04	0,08
Beta	1,36	-

Table 4 – Monthly Comparison Statistics

Interestingly, comparing the monthly returns between the indexes it´s possible to see that the average monthly returns for the Momentum Sample during the timeframe (0.44%) are lower than the S&P 500 Financials (0,69%), despite registering lower minimum and maximum values. This can be attributed to the ability of the benchmark to capture the full extent of the sector´s recovery, while momentum strategies may have been stalled by the sector´s uneven recovery and volatile economic conditions.

The risk analysis provides valuable insights about the data, since the Momentum Sample exhibits a slightly higher variance and standard deviation, meaning that it involved more risk during this period. The fact that momentum strategies may struggle in high volatility conditions and the greater dispersion in returns, with some stocks performing well while others suffered substantial losses, may have led to an overall lower average return.

In line with this, the Sharpe ratio demonstrates a high difference, with the Sample having a Sharpe ratio of only 0.04, while the benchmark doubled it, reflecting a better risk-adjusted return for the broader index, which may be explained by market volatility, sectoral changes, and stock-specific risks, making them vulnerable to reversals or negative shocks. Lastly, the beta of 1.36 for the Sample sector makes it more volatile than the benchmark, with a 36% higher responsiveness to market movements. This difference indicates that momentum strategies amplified both gains and losses relative to the benchmark, contributing to their increased volatility during this period.

4.2 Main Results

In the analysis, 16 strategies were developed based on four different periods (Jegadeesh & Titman, 1993; Rouwenhorst, 1998) – 3,6,9 and 12 months. The results are shown in a single table of average monthly returns that include the winners′, losers′, and Winner-minus-loser portfolios in a matrix of 16 strategies, with the holding periods expressed in the columns and the formation periods in the rows.

Table 5 – Momentum returns of all Portfolios (*** - significance at 1%, 5% and 10%; ** - significance at 5% and 10%; * - significance at 10%)

4.2.1 Winner Portfolios

These portfolios generally exhibited positive mean returns, especially for shorter formation periods, where results were statistically significant at all levels, and where the highest value was registered (10,22%). However, longer formation periods showed mixed and negative returns, suggesting that shorter periods better capture momentum, while longer ones may allow market corrections.

4.2.2 Loser Portfolios

Interestingly, contrary to expectations, the loser portfolios produced positive and statistically significant returns (ex.: J=6; K=6), undermining the profitability of momentum strategies, as losers failed to register the negative returns usually required for momentum success, according to the theory. One aspect that may have contributed to this is the financial sector's resilience and structural safeguards, which may have limited downside risk.

4.2.3 Winners Minus Losers Portfolios

These portfolios presented mixed results. While delivering positive results for the 3-month formation period, the 9-month has only negative returns regardless of the holding period. Additionally, while shorter periods provide strong evidence of momentum, with J=3; K=3 having a way better performance than the market, longer periods suggest diminishing effectiveness, with the lack of significance reinforcing these findings, which may be justified by reduced volatility and structural stability of the sector over time, ending up dispersing momentum effects. When compared to the benchmark returns, which contrarily to the Momentum portfolio increased returns as the holding period increased, the momentum strategies outperformed the market on three occasions but generally underperformed, particularly in the 9-month and 12-month formation periods, where even the winners' portfolios failed to generate returns superior to the benchmark. This underperformance contrasts with the traditional expectation that momentum strategies consistently outperform passive benchmarks. Additionally, the W-L portfolios failed to produce significant positive returns in many cases, with some strategies showing consistently negative returns. Another factor influencing this underperformance is that contrary to what is expected, according to the literature, the returns of the winners' portfolios were negative or lower than the returns of the losers' portfolios in several strategies.

4.3 Hypothesis Validation

The results of the empirical analysis reject H1 since only 3 out of 10 significant portfolios outperformed the benchmark.

A closer examination reveals interesting observations and, as anticipated, the winner portfolios initially displayed positive returns on a single asset type , on a highly liquid market and particularly in medium-term formation periods , aligning with prior findings in the literature, also providing significant returns in post-crisis periods on the US market . J=3; K=3 and J=3; K=6 were the only ones that produced truly above-average returns, with the first one having a return almost ten times higher than the market, which may prove that while underreaction may prove effective in the short term, its impact is quickly diluted by the effects of extensive regulations and frequent central bank interventions reducing momentum influence on long-term returns.

Similarly, the loser portfolios had an unexpected performance, generating positive returns in several instances, sometimes even higher than the winner portfolios, undermining the profitability of momentum strategies. This event may be the result of market support and incentives from central banks to reduce extreme market volatility, which in practice ends up impacting momentum strategies (Liyan &

Haoxiang, 2021). This outcome deviated from traditional theoretical expectations but was in line with the research from which found that winner and loser portfolios generated both positive returns,
which demonstrated that past winners underperformed past losers, and
had negative results during times of crisis.

From a macroeconomic perspective, the financial environment between 2020 and 2023 was full of unique challenges for these stocks. The Federal Reserve's aggressive interest rate hikes to combat inflation, along with the economic recovery that followed the negative impact created by COVID-19, had a significant influence on market volatility. The fact that the index is not only made up of retail/commercial banks and insurers – the ones that profited the most with the interest rate hikes - but also investment banks and REITs – which faced challenges due to the decline of asset values and increased funding costs – may also explain the lack of profitability of these stocks during this time. While financial institutions (higher representation in the index) initially benefited from higher interest rate margins with improved net margins, the broader economic uncertainty and increased provisions for potential loan losses may have impacted their stock performance, contributing to the disrupted momentum patterns observed. The financial market volatility also contributed to the low returns during this period, influenced by supply chain disruptions, due to confinements all over the world, and to geopolitical tensions.

Additionally, the financial sector being inherently less volatile than other sectors, due to its structure and regulatory environment, contributed to the less pronounced momentum effects with this set of stocks, as behavioral biases and anomalies may have been mitigated over time by market structural safeguards.

In conclusion, the partial rejection of the hypothesis underscores the importance of sectoral characteristics and macroeconomic influences on momentum profitability, highlighting the relationship between momentum effects and sector-specific dynamics, particularly in periods of economic uncertainty.

5. Conclusions

5.1 Main Results

This study examined the profitability of momentum strategies within the S&P 500 Financials sector compared to the benchmark, through a sample of 72 financial stocks over four years. The empirical framework applied overlapping formation and holding periods, with monthly overlapping portfolios, enabling an extensive evaluation of momentum strategies, of which the findings revealed negative results, and consequently, the hypothesis that momentum strategies yield above-average profitability in the financial sector was rejected.

From an academic perspective, this study ranks among the non-significant studies because, it failed to obtain consistent positive results from momentum strategies, making them unable to outperform the benchmark. Despite having some similarities with some significant studies such as studying a highly liquid market with better access to reliable data , applying momentum strategies in a post-crisis period in the U.S. market and in the banking sector , this study also had similarities with other non-significant studies, such as having a more recent database, being held in a developed market in which the price adjustments occur swiftly and also studying a period of crisis, which may have helped to erode the profitability of momentum strategies . These weak returns may have been related to the evolution of momentum in financial markets which has been increasingly penalised by the actions of market regulators (Federal Reserve and SEC), who, when trying to regulate and protect the market, make it more difficult for active investment techniques to work by trying to eliminate market biases and irrationalities.

In conclusion, while momentum strategies have proven profitable in various contexts, especially in the shorter formation periods (as happened in this study and with), their effectiveness in the S&P 500 Financials sector appears constrained by sectoral characteristics and macroeconomic conditions.

5.2 Implications for Stakeholders

Considering the results, this work can mainly contribute to two major stakeholders.

For fund managers (the main investors of the index), this thesis provides empirical evidence that momentum seems to work in the short-term (J=3; K=3 and K=6) while passive strategies provide better returns in the long-term, especially during times of high uncertainty and volatility, driven by the volatile behavior of stocks. Investors should diversify their approaches, using passive strategies in the long term and saving active momentum strategies for short-term opportunities in different markets.

For regulatory institutions (SEC), the results of this work conclude that policy frameworks such as the Basel III Framework or the Volcker Rule are effective, especially during a crisis, when the market seemed efficient in eliminating biases in the long term, as noted by the lack of underreaction which led to the non-profitability of this active strategy but brought stability to the index, enhancing investor confidence. However, a balanced regulatory approach is crucial, because excessive intervention could influence innovation or restrict market dynamics.

5.3 Limitations

This study focuses exclusively on the financial sector within the S&P 500, which won´t spread the findings to other sectors that exhibit different characteristics. While the financial sector is characterized by structural stability and lower idiosyncratic risk, other sectors, such as technology or energy, may experience more pronounced momentum effects due to their higher volatility and sensitivity to market trends. Additionally, the analysis is confined to the U.S. market, meaning that the results may not apply to financial sectors in other regions with distinct regulatory frameworks, economic conditions, or investor behaviors . For instance, emerging markets often exhibit higher volatility and less regulatory oversight, which could lead to different momentum outcomes .

Another limitation is the exclusion of transaction costs and liquidity constraints, which are critical considerations for real-world implementation of momentum strategies, ignoring these factors may overestimate the profitability of the strategies studied, as frequent portfolio rebalancing and trading costs can erode returns . Furthermore, the study assumes equally weighted portfolios, which, while common in academic research, does not reflect the value-weighted approach often employed in professional investment management, failing to capture the impact of dominating larger-cap stocks.

5.4 Future Investigation

The unique dynamics of financial stocks have given relevance to this study; however, it would be beneficial to extend it, firstly to financial sectors in other markets (emerging or developed) to examine whether the findings are consistent across different regulatory and economic environments. It would also be relevant to investigate the profitability of momentum strategies in other sectors beyond financials, to compare sector-specific dynamics.

Expanding the period to include the period before COVID-19, would help to observe how momentum effects would have changed when englobing different market conditions, and considering the evolution of IA, employing machine learning algorithms to momentum strategies would also be beneficial to enhance the prediction and implementation of momentum strategies.

During the preparation of this work, the author(s) used CHATGPT to help in the research for the work. After using this tool/service, the author(s) reviewed and edited the content as needed and take(s) full responsibility for the content of the publication.

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