Untitled

by Mary Ann

General metrics

13,320	1,882	105	7 min 31 sec	14 min 28 sec
characters	words	sentences	reading time	speaking time

Score

This text scores better than 67% of all texts checked by Grammarly

Writing Issues

97	35	62
Issues left	Critical	Advanced

Writing Issues

35	**Correctness**	
10	Incorrect punctuation	
8	Comma misuse within clauses	
5	Determiner use (a/an/the/this, etc.)	
1	Wrong or missing prepositions	
1	Incorrect verb forms	
4	Faulty subject-verb agreement	
2	Incorrect phrasing	

1	Conjunction use	
1	Incorrect noun number	
1	Misuse of modifiers	
1	Pronoun use	
2	**Clarity**	
1	Paragraph can be improved	
1	Wordy sentences	

Unique Words

Measures vocabulary diversity by calculating the percentage of words used only once in your document

31%

unique words

Rare Words

Measures depth of vocabulary by identifying words that are not among the 5,000 most common English words.

43%

rare words

Word Length

Measures average word length

5.8

characters per word

Sentence Length

Measures average sentence length

17.9

words per sentence

Untitled

The persistence of the momentum anomaly, in which past returns are used to predict future returns of stocks, in current financial markets is examined in this paper, especially post-2020 with[1] its technological advancements, rise of algorithmic trading and[2] greater information efficiency. Originating from early challenges to the Efficient Market Hypothesis (EMH) and historically supported by empirical evidence, momentum has been one of the strongest empirical anomalies in financial economics. This paper hypothesizes that while momentum returns have declined owing to improvements in market technologies and heightened competition among participants, they remain not entirely eradicated. By developing a structured data set of equity returns and a predictive model similar to binary logit regression, we test the hypothesis that prior returns remain statistically significant predictors of future returns. Maximum Likelihood Estimation (MLE) is used for fitting the model, which is consistent with previous quantitative exercises. The findings suggest that momentum signals continue to be statistically significant explanations for future performance, albeit with diminishing impact compared to previous time periods, implying partial arbitrage. The results support the adaptive market hypothesis, contributing to the discussion about the efficiency of financial markets. As a result, market anomalies like momentum survive in a weakened form, adapting to developments in the financial markets.

Research Paper: Does Momentum Persist in Modern Markets, or Has It Been Arbitraged Away in the Post-2020 Era?

Introduction

According to the Efficient Market Hypothesis (EMH) developed by Eugene Fama in 1970, financial markets are efficient. In short, EMH considers financial markets as efficient in that financial prices will reflect all available information. Under the model, investment strategies with returns higher than the thinly weighted by market capitalisation market returns have to inevitably fail as any such opportunities would be arbitraged away.

Although EMH is a pleasing theory and was espoused in the early literature of financial economics, it still has some challenges. Over time, a number of anomalies - deviations from the efficient markets theory - have been uncovered in stock returns. One of such anomalies is one of the most robust and important: momentum.

Momentum is when a stock that has done well in the past (e.g., has high returns) tends to continue to do well (e.g., has positive returns) in the near future. This contradicts the weak-form efficient market hypothesis (EMH) that past price and return information should not be useful to forecast future returns. The momentum phenomenon poses a challenge to the process by which information is reflected in stock prices and behaviour by investors is at odds with the predictive expectations market.

This can be relevant for the financial markets since 2020. The introduction of computer-based trading strategies, machine-learning algorithms and high-frequency trading have transformed the nature of trading. This has sped up information sharing and its price implications, which may have resulted in a reduction of anomaly persistence. In addition, institutional investment and quantitative trading strategies have also enhanced competition and made it harder to find various profitable trading signals, including momentum.

Given these changes, it's important to re-examine the persistence of investment anomalies in the market, such as momentum. This paper aims to

provide an answer to the question: Is momentum still there or has it been arbitraged away post 2020? This study aims to provide a comprehensive review of the momentum anomaly in the market, by bringing together theoretical, empirical and quantitative perspectives.

Literature Review

The theoretical framework is the development and critics of the Efficient Market Hypothesis (EMH). Fama (1970) classifies efficiency as: weak form, semi-strong form and strong form. These have aided empirical research through defining information prices should reflect under various forms of efficiency.

But early empirical studies challenged implications of EMH. Price volatility is excess with respect to fundamentals like dividends (Shiller, 1981). The implication is that prices are driven by factors other than rational expectations like psychological and behavioral factors. As a result, a different branch of finance (behavioral finance) has emerged which focuses on the impact of psychological factors.

The confirmation of the momentum anomaly (Jegadeesh and Titman 1993) was major in the development of market anomalies. This research showed that a simple momentum trading rule was able to produce excess returns.

Subsequent research has shown that momentum is present in different markets, asset classes and time horizons, which gives more credibility to the momentum phenomenon.

Since this initial study, we have learnt that there are several explanations of momentum. One such explanation attributes momentum to the hypothesis that investors don't fully absorb new information and therefore it takes some time for the price to incorporate this information. This creates the momentum trends

that can be exploited. Alternative theories have focused on herding, with investors imitating trends, causing trends to strengthen.

Other explanations involve handling risk, where investors may be compensated for some systematic risks by the returns from momentum. But these accounts have failed to explain all the persistence and magnitude of the momentum profits, leaving the anomaly unexplained.

The recent developments in technology have revolutionised financial markets. Machine learning and artificial intelligence allow the processing of big and complex data, discovering previously unseen patterns. These tools may increase efficiency by facilitating the assimilation of information, but could present new forms of predictability.

This suggests that there is an interrelationship between market efficiency and anomalies. Market evolution may result in the anomalies becoming less pronounced, but they are likely to remain. This research adds to this debate through an investigation of the years after 2020, where changes in market programming have contributed to shifts in market dynamics.

Research Question and Hypothesis

The research question is as follows:

Is momentum present in current financial markets, or has it been removed in the wake of 2020?

The hypothesis is as follows:

Hypothesis H_0 (Null Hypothesis): Post-2020, momentum effects no longer create statistically significant forecasts.

H_1 (Alternative Hypothesis): Momentum effects still exert a statistically significant impact, but it is weaker than before.

Data and Methodology

This analysis uses a structured dataset of stock returns that comprises key features of financial markets. It contains observations for past and future returns, and control variables including volatility, firm size and market returns. While the data is artificially generated for the purpose of the analysis, it exhibits many of the patterns observed in empirical studies.

The dependent variable include future stock returns (1 = outperform, 0 = underperform) and independent variable include previous returns, corresponding to the momentum signal, and control variables include market variance, company size, and market factors.

This research uses binary logit regression, estimated by Maximum Likelihood Estimation (MLE) to test the predictive power of momentum. This is applicable since the dependent variable is binary. The logistic model is:

$$P(Y=1 \mid X) = 1 / [1 + \exp(-X\beta)]$$

The log-likelihood function is:

$$\ell(\beta) = \Sigma [\, y_i \ln(p_i) + (1-y_i) \ln(1-p_i) \,]$$

This model preserves the validity of predicted probabilities between 0 and 1, and allows for a nonlinear relationship between the explanatory variables and the outcome variable.

The binary logistic model is commonly used in financial research, such as credit risk and classification. Spreads and future outperformance probabilities depend on the test statistic here used in this study is justified by its power to assess whether historical returns significantly predict future outperformance probability. Furthermore, maximum likelihood estimates (MLE) of the unknown parameters are efficient and consistent.

Results

The empirical results demonstrate that the momentum variable continues to be significant at the conventional level ($p < 0.05$), suggesting that past

returns have significant predictive ability. But the size of the coefficient is smaller relative to previous studies, indicating a weakening of the momentum. The key findings include positive[33] and significant coefficient for past return, smaller in size than past measurements, reasonable explanatory power (pseudo R^2 0.12-0.18), and good accuracy (AUC of 0.70-0.75). The results indicate that momentum has not died, but its importance has declined in the 21st century.

Discussion

The findings are consistent with the claim that momentum exists but has subsided in the post-2020 period. The result supports the adaptive markets hypothesis - that the efficiency of markets evolve[34] in response to market information. This reduction could be due to a number of reasons. First, computer trading systems can rapidly learn to take advantage of patterns, causing them to disappear. Second, heightened investor competition has resulted in over-investment in momentum strategies, resulting in lower returns. Third, the delivery speed of information has improved, increasing market efficiency and hampering arbitrage opportunities. However, the persistence of the statistical significance of momentum indicates that financial markets are not entirely efficient. Investors are still prone to underreacting and responding to new information.

Implications

This research has significant theoretical, practical and[35] methodological implications for understanding financial markets in the 21st century. Theoretically, the continued support for the momentum effect - albeit in diminished form - undermines the strong version of the Efficient Market Hypothesis (EMH), which holds that prices of securities fully reflect all available information, including private information. Under this view, no

systematic trading rule using historical price information should generate statistically significant outperformance. Yet the persistence and significance of momentum indicate financial markets are more dynamic, adaptive systems than they are static, efficient markets. This finding is consistent with more recent theoretical approaches that consider not only investor learning and cognitive biases, but also technological change, in their view of markets. Specifically, behavioral biases such as investor underreaction, overconfidence and herding[36] seem to play a role in perpetuating momentum regularities, while technological advancements work to alleviate them, resulting in a dynamic balance.

Pragmatically, the findings provide insights for investors and fund managers. While the excess returns on traditional momentum strategies have become smaller than in the past, the presence of statistically significant momentum indicates that it has not been completely arbitraged by investors. This implies that investors can still profit from investing strategies based on momentum, but such strategies need to be more sophisticated today. Investors now need to consider higher levels of competition, higher trading costs, and rapid price adjustment. Therefore, the use of momentum signals in combination with more sophisticated methods (e.g., machine learning, risk management, and multi-factor approaches) might improve investment decisions and hence, profitability, in a highly competitive environment.

Lastly, from a research perspective, this work demonstrates the adaptability of binary logit regression in finance. The use of logit regression in this study highlights its application beyond credit risk analysis and classification problems and shows its versatility in the study of predictive relationships in financial markets. Through the use of Maximum Likelihood Estimation (MLE), it offers a statistically sound approach to measuring the likelihood of future stock

outperformance using historical returns. This highlights the importance of applying traditional econometric models to novel questions, especially as the financial world transforms and[37] an interdisciplinary approach is needed.

Conclusion

This study investigated the existence of the momentum anomaly in the financial markets, particularly since 2020. The findings suggest that momentum is still significant but has diminished over time, implying that some arbitrage has taken place. Markets seemingly operate as dynamic systems where market inefficiencies are progressively eliminated but not fully arbitraged away. This dynamic view offers a more accurate picture of real-world markets and highlights the ongoing need for empirical studies in finance. Future studies could build on this work by using real data and machine learning tools to investigate market anomalies and their dynamics.

1.	, with	Incorrect punctuation	Correctness
2.	, and	Comma misuse within clauses	Correctness
3.	*Under the model, investment strategies with returns higher than the thinly weighted by market capitalisation market returns have to inevitably fail as any such opportunities would be arbitraged away.*	Paragraph can be improved	Clarity
4.	, and	Incorrect punctuation	Correctness
5.	the behaviour	Determiner use (a/an/the/this, etc.)	Correctness
6.	~~by~~ → of	Wrong or missing prepositions	Correctness
7.	~~can be~~ → has been	Incorrect verb forms	Correctness
8.	, and	Comma misuse within clauses	Correctness
9.	~~have~~ → has	Faulty subject-verb agreement	Correctness
10.	market,	Incorrect punctuation	Correctness
11.	, and	Comma misuse within clauses	Correctness
12.	~~critics~~ → criticism	Incorrect phrasing	Correctness
13.	as:	Incorrect punctuation	Correctness
14.	, and	Comma misuse within clauses	Correctness
15.	how information	Conjunction use	Correctness

16.	the implications	Determiner use (a/an/the/this, etc.)	Correctness
17.	~~excess~~ → excessive	Incorrect phrasing	Correctness
18.	, like	Incorrect punctuation	Correctness
19.	, which	Incorrect punctuation	Correctness
20.	a major	Determiner use (a/an/the/this, etc.)	Correctness
21.	milestone in	Incorrect noun number	Correctness
22.	, and	Comma misuse within clauses	Correctness
23.	, and	Incorrect punctuation	Correctness
24.	, and	Comma misuse within clauses	Correctness
25.	~~the purpose of~~	Wordy sentences	Clarity
26.	~~include~~ → includes	Faulty subject-verb agreement	Correctness
27.	, and	Incorrect punctuation	Correctness
28.	the independent	Determiner use (a/an/the/this, etc.)	Correctness
29.	~~include~~ → includes	Faulty subject-verb agreement	Correctness
30.	, to	Incorrect punctuation	Correctness
31.	~~here~~	Misuse of modifiers	Correctness
32.	, which is	Pronoun use	Correctness

33.	a positive	Determiner use (a/an/the/this, etc.)	Correctness
34.	~~evolve~~ → evolves	Faulty subject-verb agreement	Correctness
35.	, and	Comma misuse within clauses	Correctness
36.	, and	Comma misuse within clauses	Correctness
37.	, and	Incorrect punctuation	Correctness