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Integrating Fintech-Driven Technical Analysis into Value Investing: A Study of Moving Averages in Cryptocurrency Market Dynamics

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Abstract:

This research explores the application of fintech-driven technical analysis, specifically focusing on moving averages within value investing. Using Coinbase as a case study, the study examines the effectiveness of moving averages in volatile market conditions where traditional metrics are less applicable. Historical stock data was exported from Yahoo Finance and analyzed using Excel, emphasizing the 30 vs. 10 moving average combination. This combination was chosen to balance short-term and long-term market perspectives. The analysis revealed that while moving averages effectively highlight trends and momentum shifts, they are lagging indicators and require supplementary analysis to account for external factors such as news and regulatory changes. Despite not being a precise predictive tool, moving averages provided valuable insights into market behavior, supporting the argument that fintech tools can complement traditional value investing strategies by offering real-time analysis and dynamic approaches to market assessment.

Keywords: Fintech-Driven Technical, Moving Averages. Cryptocurrency Market, Coinbase, market assessment

1. Introduction

Fintech has been reshaping the investment landscape, blending finance with technology to introduce new market analysis methods. Traditional investing often relied on fundamental analysis, such as earnings, revenues, or company news. However, fintech brings a different game, using data-driven approaches that can adjust quickly to market changes. This has significantly impacted technical analysis, where tools like moving averages help make sense of market movements that do not always follow predictable paths. This paper dives into fintech analysis, using Coinbase as a practical example to show how these tools can bring some order to the chaos of volatile markets.

Coinbase is a great case study because it sits right at the center of the cryptocurrency world, reflecting all the significant rises and sudden drops that come with it. Unlike traditional stocks, where prices usually move based on stable factors, Coinbase's prices react to market sentiment, hype, and speculation. Analyzing its data offers a chance to see how fintech methods can cut through the noise and highlight actual trends, especially moving averages. The focus is not on Coinbase itself but on using its price data to explore how fintech can apply to fast-moving markets.

This research looks specifically at moving averages—a crucial part of traders' technical analysis to smooth out price data and identify trends. This study explores how these averages behave over time by comparing different moving averages, like the 30-day vs. 10-day and the 90-day vs. 30-day. It is not about finding a magic trading formula but understanding how these tools work in markets known for their big moves. The goal is to see how fintech analysis can help investors navigate the ups and downs of unpredictable markets.

***The following is the extracted data for Coin base's historical stock trends, used to perform the algorithms with the Moving Average in a separate column:
https://docs.google.com/spreadsheets/d/1wyb3KPPRbPij-F2rkiXRsS6W5rJeftoD1qgPeghP_BBw/edit?usp=sharing
Maximum gain is $27.46;
Maximum Loss is $24.53;

$$\sigma = \sqrt{\frac{\sum(x_i - \mu)^2}{N}}$$

***Standard Deviation Formula
Mean Earning with standard deviation: $-0.05826 ± $4.6
In the long run, if investors were to use the MA(30) and MA(10) for the stock investment strategy for Coinbase, they expect to earn $4.54 or lose $4.66 daily.

2. Why This Approach

Moving averages were chosen because they are simple and effective at capturing what is happening in the market over different periods. In fintech-driven markets, especially with assets like cryptocurrencies, traditional metrics like earnings reports do not apply. Moving averages, however, cut straight to the price action, filtering out the daily ups and downs to give a clearer picture of the trend. The basic idea here is that if a long-term average, like the 90-day, stays relatively flat. In contrast, shorter-term averages, like the 10-day or 30-day, show more movement, suggesting the market is settling—a potential signal that it might be a good time to invest.
To explore this, historical price data from Coinbase was pulled from Yahoo Finance(Yahoo 2024), and different algorithms were set up to compare the moving averages. The 30 vs. 10-day averages were primarily focused because they capture recent movements without getting too caught up in every little market blip. However, as the analysis went on, it became clear that even when the short-term average crossed above the longer one, usually seen as a buy signal, things like sudden news or regulatory changes could still mess with the patterns. This showed that while moving averages are helpful, they are not the whole picture.
The most important takeaway was not about crafting a winning trading strategy but learning how these averages interact in actual market conditions. The 30 vs. 10-day pair often lined up with market trends but did not always lead to easy trading decisions. This highlighted that while fintech tools like moving averages can spot trends, they are just part of a giant puzzle. They add valuable context but need to be considered alongside broader market factors, especially in markets as unpredictable as crypto.
This approach offers a closer look at how fintech analysis can be applied to value investing, specifically moving averages. By focusing on how these averages behave, the study provides insights into how they can guide investment decisions, even if they cannot capture every market twist. The emphasis is on understanding what these numbers reveal, especially in fast-moving, sometimes confusing markets.

3. Literature Review

a. Overview of Traditional Value Investing Approaches
Traditional value investing, championed by investors like Benjamin Graham and Warren Buffett, focuses on identifying stocks trading below their intrinsic value based on fundamentals. This strategy emphasizes buying companies with solid financials, stable earnings, and sound management, then holding them until the market corrects its undervaluation. Metrics like P/E ratios, book value, and cash flow are critical in this approach, which values patience

and a long-term outlook. However, the rise of short-term trading and technological disruption has challenged the conventional value investing model.

b. Previous Studies on Moving Averages and Their Application

Moving averages are central to technical analysis and are used to smooth price data and highlight trends. They come in forms like the simple moving average (SMA), which averages prices over time, and the exponential moving average (EMA), which weighs recent prices more heavily, making it more responsive to new data ("Moving Average (MA): Purpose, Uses, Formula, and Examples"). These tools help mitigate short-term noise and provide a clearer view of market movements. Studies indicate that crossovers, where a short-term moving average moves above or below a long-term one, can signal momentum shifts—upward for bullish and downward for bearish trends.

Moving averages are particularly valuable for navigating rapid price swings in volatile markets like cryptocurrencies. However, they still need to catch up on indicators reflecting past price actions rather than forecasting future ones. As such, they are most effective when used alongside other analytical tools to offer a more holistic market view (Fernando, 2024).

c. Analysis of Fintech's Impact on Investment Strategies

Fintech has reshaped investment strategies by introducing technologies that allow real-time market analysis and swift decision-making. Algorithmic trading, robo-advisors, and advanced data analytics have democratized access to sophisticated investment techniques, empowering institutional and individual investors. These tools contrast sharply with the slower pace of traditional value investing, favoring data-driven strategies that can adapt quickly to market conditions.

The rise of fintech has enabled investors to blend technical analysis, like moving averages, with broader strategies, creating a more agile and responsive approach to investing. This shift has redefined the landscape, encouraging investors to incorporate fintech-driven insights while navigating complex and fast-moving markets. As fintech continues to evolve, its role in shaping investment decisions grows, merging traditional and modern approaches to meet the challenges of today's dynamic financial environment.

4. Methodology

a. Data Collection

The data used in this analysis was sourced from Yahoo Finance, which provides comprehensive historical price data for various assets, including stocks traded on Coinbase. The entire stock market data was exported into an Excel sheet, ensuring a complete and accurate dataset for analysis. The data included daily closing prices, allowing for detailed calculations of moving averages over specified time frames. By using Yahoo Finance's extensive data, the research aimed to capture the full spectrum of price movements, providing a reliable foundation for evaluating the impact of moving averages on investment decisions.

b. Algorithm Development

$$SMA = \frac{A_1 + A_2 + \ldots + A_n}{n}$$

where:

$A =$ Average in period n

$n =$ Number of time periods

*The mathematical formula for computing $MA_{30} V. MA_{10}$

The core of the analysis focused on the 30 vs. 10 moving average combination, chosen for its balance between reflecting recent market movements and providing a broader view of trends. The 30-day moving average was selected to represent a longer-term perspective, offering a smoother trend line that mitigates the impact of short-term volatility. In contrast, the 10-day moving average captures more immediate price action, responding quickly to market changes. This specific combination is considered the "sweet spot," as it effectively distinguishes between short-term momentum and long-term trends. It is beneficial for identifying potential entry and exit points in volatile markets.

Using Excel, formulas were developed to calculate the moving averages for each data point, allowing for direct comparisons between the 30-day and 10-day averages. The algorithms were designed to track crossovers—points where the short-term average crosses above or below the long-term average—as these moments often signal shifts in market momentum. The calculations were automated within Excel, enabling a streamlined analysis of how these moving averages interacted over time.

c. Parameters and Comparisons

The primary parameters involved in this analysis were the 30-day and 10-day moving averages. The 30-day moving average was used to smooth out the noise of daily price fluctuations, providing a clearer view of the overall market direction. Meanwhile, the 10-day average offered a quicker response to recent price movements, making it sensitive to changes in market sentiment. By comparing these two averages, the study aimed to identify critical moments of momentum shifts, such as bullish or bearish crossovers, that could inform investment decisions.

The decision to focus on the 30 vs. ten combination was rooted in its ability to capture the dynamic relationship between short-term and long-term price trends. This setup provides a balanced view, effectively bridging the gap be-

tween immediate market reactions and the broader trend, which is crucial for navigating the often unpredictable nature of the market.

d. Limitations of the Methodology

While moving averages offer valuable insights into market trends, they are inherently lagging indicators, reflecting past price movements rather than predicting future changes. This lag can sometimes result in delayed signals, particularly in fast-moving markets where prices change rapidly due to external factors like news or regulatory shifts. Additionally, the analysis was limited to the 30 vs. 10 moving average combination, which, while compelling, needs to capture the full complexity of market behavior.

Another limitation is the reliance on historical data, which assumes that past price patterns will continue in the future—an assumption that does not always hold in volatile markets. External market factors, such as sudden news events or broader economic changes, can also influence the outcomes, making it essential to consider these factors alongside the moving average signals.

5. Data Analysis

a. The results of the algorithm are presented.

The research examined the effectiveness of the 30-day and ten-day moving strategies due to their ability to combine short-term market fluctuations with long-term trends. The methodology involved using Excel to analyze price data from Coinbase to calculate the moving averages and identify crossover points where the short-term average crossed above or below the long-term average. These crossover points were labeled as bearish signals throughout the dataset to indicate shifts in market momentum.

The algorithm's findings revealed patterns aligned with market trends and underscored the importance of utilizing moving averages to proficiently identify buying or selling opportunities. There were occasions when the moving averages could not accurately track market fluctuations – showcasing their role as trend indicators rather than predicting future price shifts.

b. Exploring the Effectiveness of Different Combinations of Moving Averages.

The decision to opt for the 30-day moving average over the ten-day moving average was made considering its balance between term and long-term viewpoints when analyzing market trends instead of just aiming for maximum profit from high returns alone. This method provides an understanding of market trends in fintech-driven analyses by helping to spot price changes without being excessively influenced by minor fluctuations in the market.

When comparing combinations, we used moving averages to the 30 vs. 10 combinations mentioned earlier. These other options often lagged. We reacted too swiftly to minor price fluctuations, leading to more frequent generation of inaccurate signals. The 30 vs. ten setups found a sweet spot in offering insights without being overwhelmed by noise, thus proving its effectiveness despite not being the most lucrative choice for trading activities.

c. Exploring trends and patterns in Coinbases data.

Upon analyzing the information from Coinbase and comparing the 30-day and ten-day moving averages, data revealed patterns that aligned closely with market trends. For example, During instances of crossovers before price rises occurred... Bearish crossovers coincided with trends in the market—indicating market behaviors. This analysis aids in understanding shifts in market sentiment. Highlights the algorithm's ability to pinpoint changes in momentum.

While the algorithm did not consistently generate profits every time, it excelled at identifying valuable market indicators for traders and analysts alike. Substituting 30 data sets against 10 data sets provided insights into the behavior of the market. Highlighted the importance of integrating analysis with other financial technology tools. These findings highlight the effectiveness of utilizing moving averages to understand price fluctuations as a basis for delving into financial analyses.

6. Conclusion

a. Summary of Findings and Insights

This research explored fintech-driven technical analysis, precisely the 30 vs. 10 moving average, to understand market behavior in value investing. While the selected moving average combination did not generate significant profits, it effectively identified vital market trends and momentum shifts, offering valuable insights into price movements in Coinbase's historical data.

b. Implications for Value Investing in Cryptocurrencies

The study highlights how fintech tools, like moving averages, can enhance value investing in volatile cryptocurrency markets where traditional metrics are less applicable. By capturing patterns in price movements, fintech analysis provides a dynamic approach to assessing market conditions, complementing conventional value investing strategies with real-time insights. This modern approach underscores the potential of integrating technical indicators into value investing frameworks for digital assets.

c. Reflection on the Research Objective: Understanding Rather than Profitability

The primary goal was to deepen the understanding of fintech analysis in value investing rather than finding a profitable trading algorithm. The thirty vs. ten moving average offered a clearer view of market dynamics, demonstrating how modern fintech resources can refine investment strategies. The research illustrates that, beyond profitability, the integration of fintech is crucial in adapting to the complexities of today's markets, offering a fresh, data-driven perspective on value investing.

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