Table of Contents

Table of Figures

Comparative Analysis of Cryptocurrencies and Traditional Financial Assets

Abstract:

We need to explores and understand that how cryptocurrencies like Bitcoin, Dogecoin and Ethereum can interact and relate with traditional financial assets such as stocks, bonds, commodities, and regular or fiat money. In today world, many people start using cryptocurrency, it's important for us to understand that how these digital currencies relate to other financial assets. In this work, we looks at these currencies relationships can change over time, especially when the market is going through some tough times or when things are very uncertain or unusual. It also checks how things like inflation rates, interest rates, and the economy affect the prices of cryptocurrencies compared to regular assets. By studying events that happening in this world like new rules or big changes in modern technology, we also see that how cryptocurrencies can handle different challenges and get top in position in every time. We also looks that how having cryptocurrencies in a regular investment plan can help us to spread out the risks. Finally, we see that how people invest in both cryptocurrencies and regular assets.

Introduction:

Cryptocurrencies are very popular in this modern era. People want to know that how they use them like stocks, bonds, and other money. As digital currencies get more common, it's important to know that they're related to regular money. This study looks at how cryptocurrencies and regular money are connected and how this changes over time, especially when markets have big problems or things are uncertain.

We're trying to understand how things like inflation rates, interest rates, and economic growth affect cryptocurrency prices compared to other regular money. For example, while the S&P 500, which shows how American stocks are doing, stayed stable, Bitcoin's transactions changed a lot. We also look that how big events and new rules affect the value of cryptocurrencies and other money. Additionally, we want to see if it's smart to include cryptocurrencies in investment plans to reduce risks and have a more balanced plan when market conditions change. At last, we want to know how people's feelings affect their decisions about buying and selling cryptocurrencies and regular money. We also use information from social media and news to understand this in better way.

Dynamic Correlation Analysis:

We use a method called dynamic correlation analysis to see how cryptocurrencies can relate with regular financial stuff such as stocks, bonds, and money over time. This helps us to understand how these relationships change over time and giving us important information about how these assets are connected with each other.

Dynamic correlation analysis helps us understand the relationship between cryptocurrencies and traditional assets better than just looking at fixed correlations. By calculating correlation numbers over time, we can see that how these relationships are strong and which way they're going, especially during tough times in the market like economic problems or when things are very uncertain. For example, recent research shows that the connection between big cryptocurrencies and the US Dollar (USD) can change a lot, which shows why it's important to understand these changes.

We also look at how correlations act when the market is under pressure because this can tell us if cryptocurrencies can help spread out risks. For instance, studies suggest that the connection between Bitcoin and the S&P 500 gets weaker when the market is down, which means Bitcoin might be a good way to protect against ups and downs in regular assets. With these methods, we want to give a good understanding of how cryptocurrencies and regular assets interact, which can help investors, policymakers, and anyone dealing with money matters.

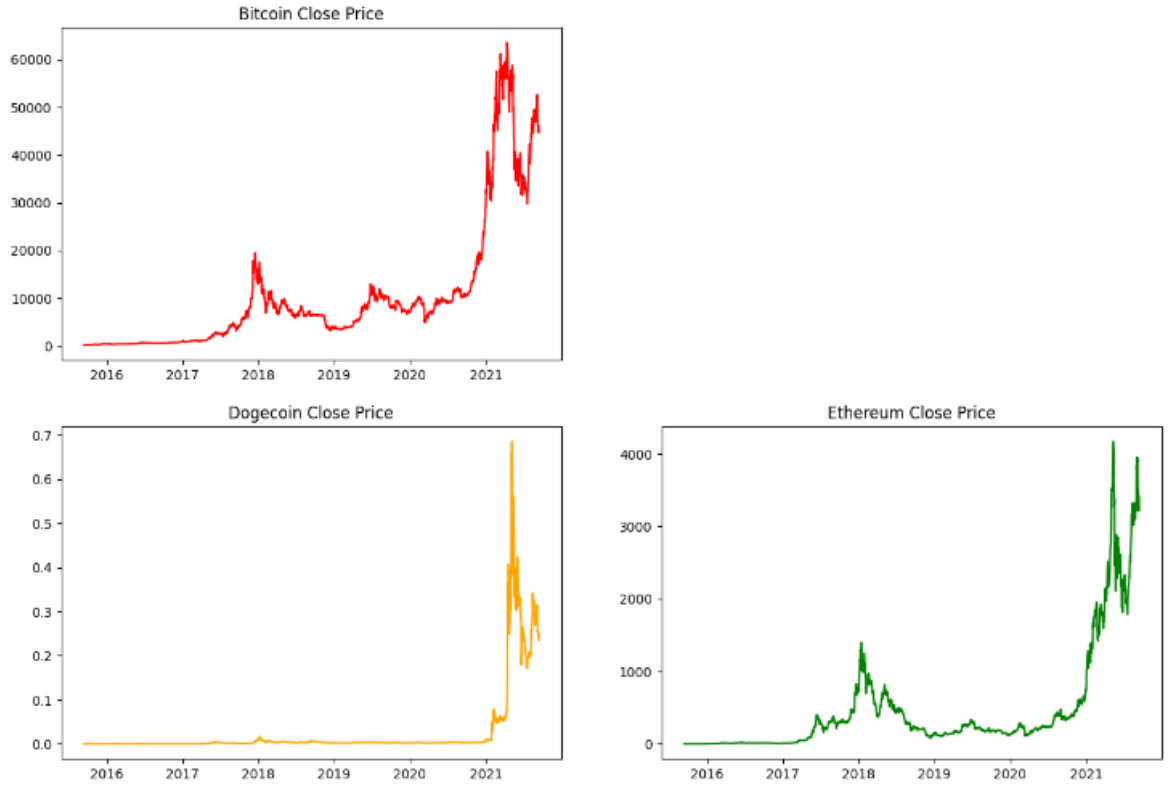

Figure 1Crypto Coins closing prices over time

This line graph shows the prices of cryptocurrencies like Bitcoin, Dogecoin, and Ethereum from 2016 to 2021. It shows that the prices went up a lot during this time. This means that cryptocurrencies became more popular and more people started using them. The prices of these digital assets went up because more investors were interested in them, big financial companies and stores started accepting them, the technology behind them got better, and more people started using this digital money. Some factors like limited supply, events that cut the supply of Bitcoin and people guessing about the market also made cryptocurrency prices go up. In summary, the graph shows that cryptocurrencies became more important and valuable in the modern financial world

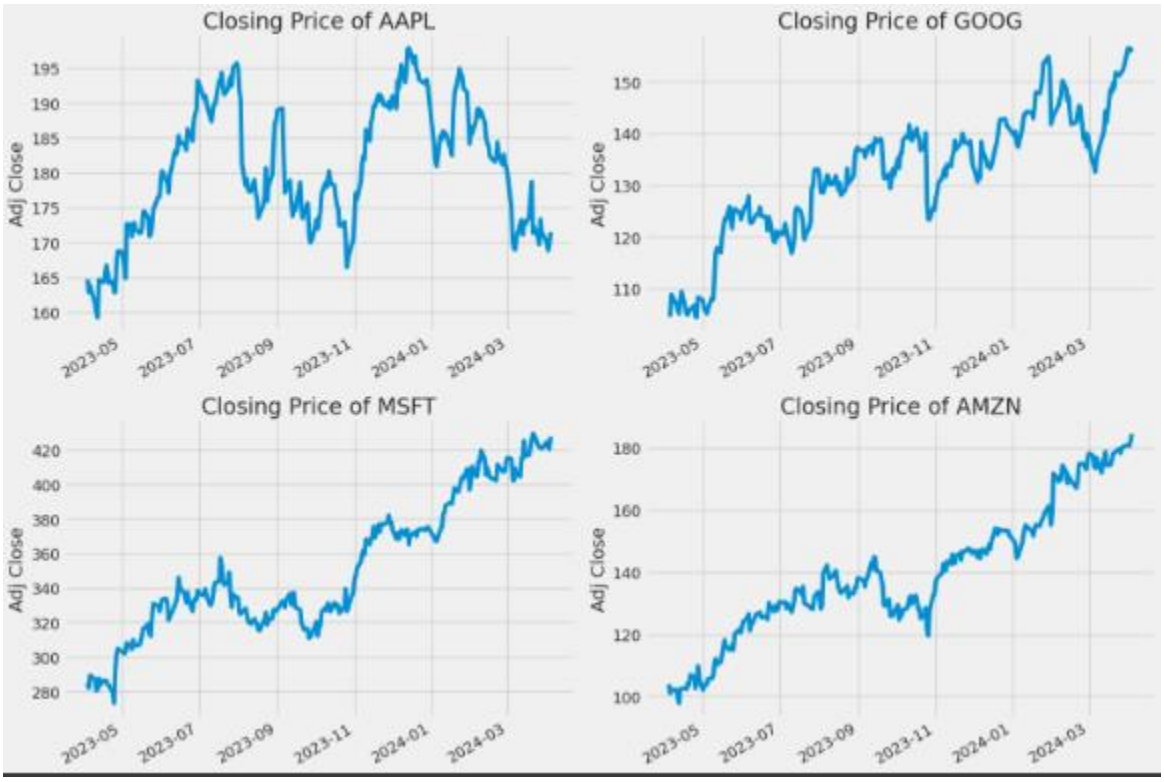

Figure 2Apple, Google, Microsoft, Amazon closing stock values over time

This graph shows how the stocks of big companies like Google, Apple, Microsoft, and Amazon changed over one year, from 2023 to 2024. It shows that generally, their stock prices went up during this time. This means these tech giants did well in the stock market. However, Apple's stock went up at first but then went down towards the end of the year. This might be because of things like changes in how well the company was doing, how people felt about the market, or how some specific events that affected Apple.

When we look at stocks and cryptocurrencies, we see they're different in many ways. Stocks mean you are also be the part of a company, so you get a share of the profits and what the company owns. The value of stocks depends on how much money the company makes, how much people want them, how the economy is doing, and events related to the company.

On the other hand, cryptocurrencies are digital money that works on computer networks called blockchains. They don't mean you are the part of a company; they're like digital money or special tokens for using something like blockchains. The value of cryptocurrencies depends on things like how many people want them, how many people and businessesman or companies use them, new technology and laws know about them, and how people feel about the market.

Both stocks and cryptocurrencies can be good for investing, but they have different risks. Stocks can be risky because of normal market ups and downs, company-specific problems, and how the economy is doing. Cryptocurrencies have extra risks like not knowing what laws will be, problems with technology, and how much prices go up and down. Before investing in either, people should think about how much risk they can handle, what they want to achieve with their investment, and how much they understand about these markets

Impact of Macro-Economic Indicators:

We look that how big economic type things like inflation rates, interest rates, and how much the economy grows,affect the prices of both cryptocurrencies and regular financial stuff. These economic things are really important because they can change how investors feel and how the market works.

To figure out how much these economic things matter on these currencies then we do some complex math methods like regression analysis and econometric models. Regression analysis helps us see how economic stuff connects to prices of things, finding out important connections and how strong they are. Econometric models help us to understand more about how these economic things affect the prices of these coins or financial assets.

Our goal is to understand that how economic indicators affect both digital and regular markets. By figuring out what drives these markets and how they're affected differently, we can understand more about how economic stuff and prices are connected. This helps investors and people who make rules about the economy to come up with better plans that fit both digital and regular finance.

For showing these things which affect the digital and regular markets differently, we need to get useful information for people in the market who want to make good choices. This not only helps us understand why prices of things move but also helps us make smart choices in a changing economy. By looking deeply into how economic indicators affect prices, we add to what we know in both academic and real-life situations, helping people make better choices in the world of digital and regular finance.

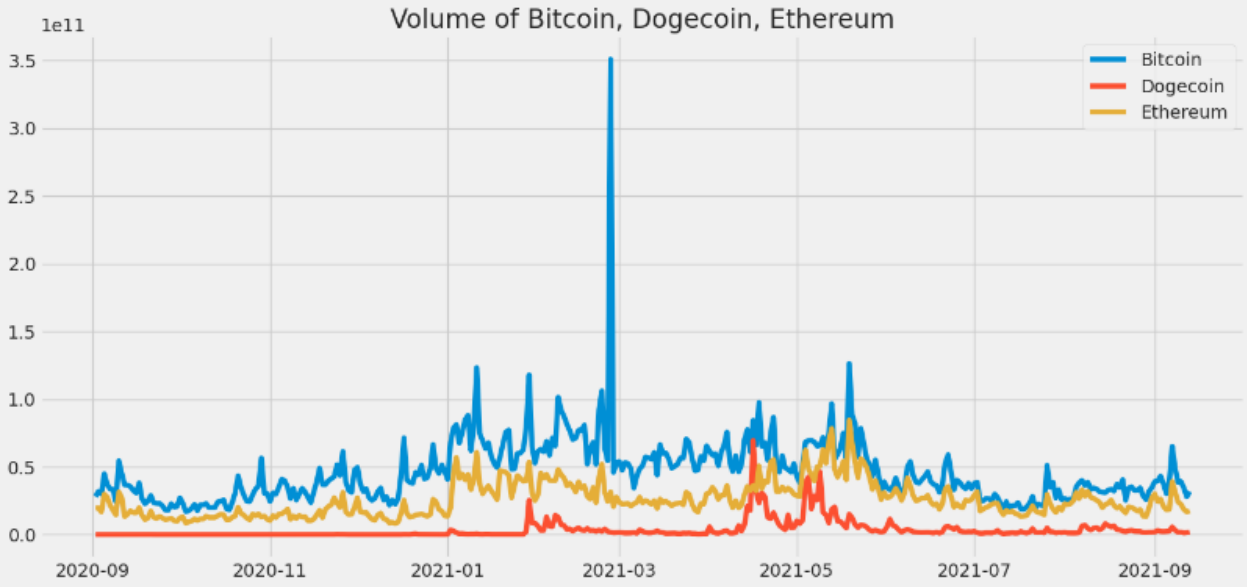

Figure 3 Relationship between different cryptocurrencies over same amount of time

The paragraph shows that how different cryptocurrencies perform, focusing on Bitcoin's role in the market. It shows in a graph that Bitcoin usually does better than other cryptocurrencies like Ethereum and dogecoin, meaning its price goes up more. This shows that people trust Bitcoin more as a place to keep their money safe or as an investment, especially when the economy is not doing well or when prices are going up. This trust in Bitcoin might show that investors believe it will keep being valuable in the long term and can protect against risks in regular finance.

When it comes to know that how Bitcoin affects big economic things, like interest rates, how much the economy grows, and how prices change, its strong performance compared to other cryptocurrencies can have an impact. Bitcoin's strong performance might make investors feel more confident and make them decide to put more money in, which could affect interest rates by changing where money goes. Also, if Bitcoin doing well makes people feel better about the economy or helps to protect against prices going up, it might make people spend more money and invest, which could help the economy grow. But how much Bitcoin affects prices going up can depend on how the economy is doing and what policies are in place. Overall, while Bitcoin's dominance in the cryptocurrency market tells us a lot about how the market works, its effects on big economic things need to be thought about carefully in the context of the whole economy.

Comparison of Cryptocurrency with Traditional Currency Transactions:

Cryptocurrency transactions are different from regular currency transactions because they're digital and decentralized. Cryptocurrencies are made using special codes and only exist online. They don't have a central authority like governments or banks and get their value from what people are willing to pay. On the other hand, regular currencies are made and controlled by governments, and you can touch them like coins and bills.

One big difference between them is how stable and safe these currencies. Cryptocurrencies use digital tokens stored in computers and use special codes to make transactions safe because they're decentralized, they can be targets for hackers and cyber-attacks. Regular currencies, backed by governments, are usually more stable and have rules to protect them. They use physical security and checks to keep transactions safe, but they can also be targets for hackers and fraud.

Cryptocurrency transactions are usually faster and cheaper because they're decentralized, while regular transactions, especially if they're between different countries, can be slow and expensive because of banking rules and fees. Even with these differences, both kinds of money are accepted worldwide. Regular money is deeply tied to how the economy works, while cryptocurrencies are becoming more popular, especially for buying things online and doing business across borders.

Cryptocurrencies and regular money have their own strengths and weaknesses. Cryptocurrencies offer secure and decentralized transactions, but they face challenges with stability and rules, while regular money offers stability and is widely accepted but has its own vulnerabilities because it's controlled by centralized systems. It's important for people and businesses to understand these differences, especially as digital and regular finance keep changing.

Event Study Analysis:

We take a close look at how different things happening can change how cryptocurrencies and regular money stuff are connected. We use event study analysis to dig into things like government rules, new technology, and big global events affect the connections between different things in the market. This helps us understand how these events affect the market works and how different assets are related, which is useful for both investors and people who make rules about money.

For example:

We study how government rules about cryptocurrencies and new technologies like DeFi platforms using blockchain can affect the market. For example, when DeFi platforms, which

don't need banks, become popular, they attract a lot of attention and money from investors, impacting cryptocurrency prices. While this can benefit investors, there are risks such as smart contract problems and market manipulation. If there are hacks or scams, it can hurt investors and make the market uncertain. So, governments may make new rules to address these issues, which can affect both cryptocurrency and regular money prices. To illustrate our findings, we share examples of how events like the rise of DeFi platforms influence the market and how assets are connected. These examples help us understand how events shape the market and provide guidance for decision-making in the world of digital and regular money. We aim to help people better understand the connection between cryptocurrencies and regular money so they can make informed decisions in a complex market.

Cryptocurrency and Commodity Money:

Commodities and cryptocurrencies also have differences in their value. Commodity money gets its value from things like gold, while cryptocurrencies like Bitcoin get their value from being used as money and stored value. Unlike regular money, which can lose value over time due to inflation and government control, Bitcoin has a fixed supply and is not controlled by any central authority. This makes it resistant to inflation and potentially more valuable over time. Bitcoin's special features, like the halving mechanism that reduces mining rewards, make it even more scarce and valuable in the long run, setting it apart from regular money and commodities.

Portfolio Diversification and Risk Management:

The concept of a portfolio in financial markets is crucial for investors' strategies, allowing them to diversify investments, manage risk, and potentially increase returns. Portfolios comprise various financial assets, like stocks, bonds, and commodities, these selected assets are based on an investor's risk tolerance and goals. This involves analyzing financial situations, objectives, and market trends, requiring periodic review and adjustments to adapt to changing conditions.

If we talk about the weights in a portfolio then every investor says that it represent the percentage of total value allocated to each asset, crucial for determining risk-return characteristics. Techniques like modern portfolio theory aid in optimal weightings. We evaluate portfolio performance using metrics like Cumulative Return and Sharpe Ratio, indicating better risk-adjusted returns compared to benchmarks. However, higher volatility and maximum drawdown suggest increased risk exposure. This analysis leads us to explore portfolio optimization strategies, including varying levels of cryptocurrency exposure, to mitigate risk and enhance returns in the evolving landscape of finance.

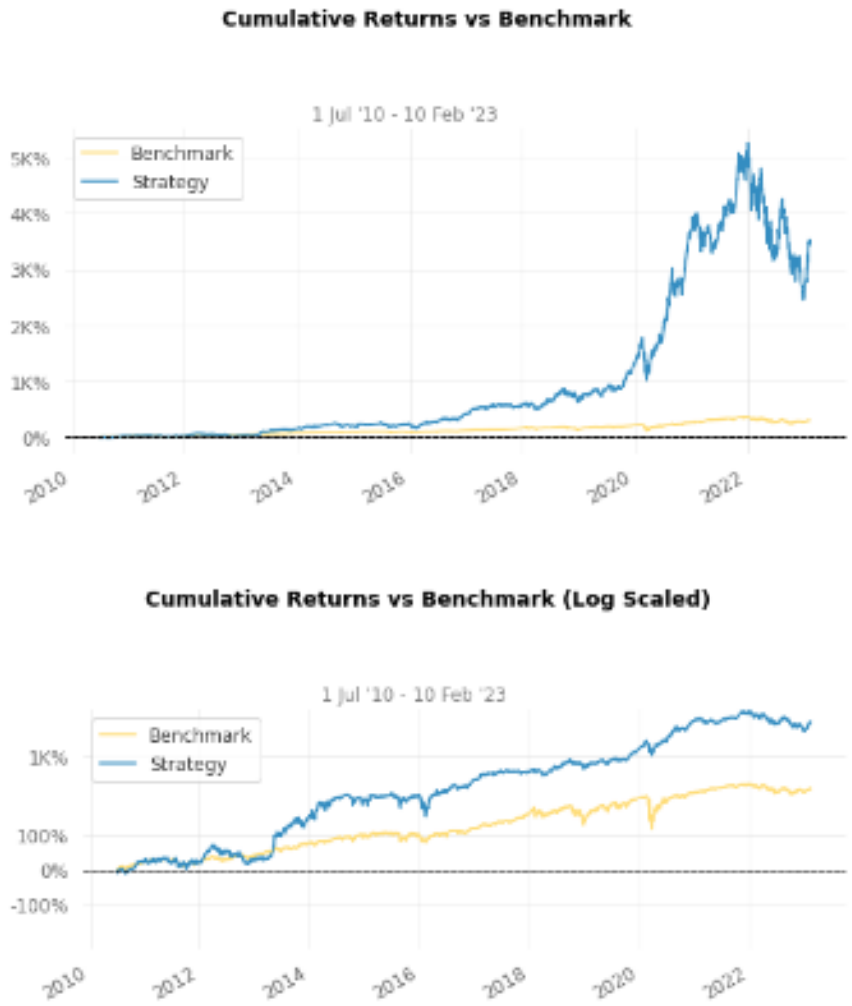

Figure 4 portfolio management over different company stock values

The analysis looked at how well a portfolio made up of Apple, Tesla, Walt Disney Company, and Microsoft Finance Company did over time. It calculated the total percentage change in value, considering both the increase in value and any money earned from dividends or interest. The portfolio's total percentage change was found to be 3,429.90%, showing a big change in increasing the value.

Moreover, the S&P 500 index, which is a standard measure of the stock market's performance, had a total percentage change of 296.86% over the same time. This index helps us see how well the portfolio did compared to the whole market. In this case, the portfolio did much better than the market, suggesting it earned higher returns.

Additionally, the portfolio's risk-adjusted returns, measured by the Sharpe Ratio and Sortino Ratio, were also better than the market's. These ratios tell us how much return investors got for

the amount of risk they took. Higher ratios mean investors got more return for the risk they took.

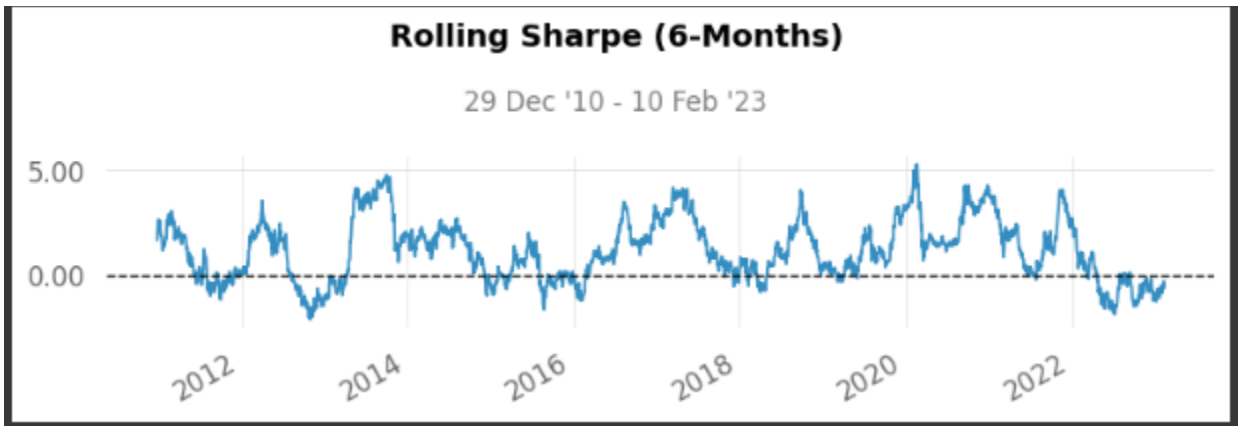

Figure 5 Risk management using rolling sharp method

Figure 6 Risk Management using Rolling Sortino method

These graph shows the rolling Sharpe Ratio and Sortino Ratio from 2012 to 2023. The Sharpe Ratio, which ranges from 0 to 5, tells us about the returns compared to the risk. Higher numbers mean better returns for the risk taken. The Sortino Ratio, ranging from 0 to 10, focuses on downside risk, considering only negative deviations from expected returns. Positive values in both ratios mean good returns for the risk, but negative values show the returns might not be enough to cover the risk. Overall, the graphs help us see how well the portfolio managed risk and made returns over time, which is helpful for investors to know how their investments are doing.

Behavioral Finance Perspectives:

We need to learn about behavioral finance, which mean that how people's feelings and thoughts while affect the financial markets, including both cryptocurrencies and traditional markets. People's emotions and perceptions play a big role in the prices of assets which change in the market over time.

We look closely at investor sentiment, which is how people feel about investing, and how it affects how much prices go up and down. By studying what people say on social media and in the news, we can learn a lot about how investors are feeling and how it impacts the market. Understanding these feelings, we can help investors and policymakers for make better decisions.

Additionally, we study behavioral biases, which are natural tendencies that can make people make bad decisions when they are investing. One of these biases is herd the behavior, where people tend to do what everyone else is doing instead of thinking for themselves. By explaining these biases in simple terms, we hope to show how they affect the market and help investors recognize and avoid making bad decisions.

For example:

A real-world example of behavioral finance in action is seen in market bubbles and crashes, where investors' emotions and biases play a significant role. In the late 1990s, during the dot-com bubble, investors were overly optimistic and followed the crowd, driving up internet-related stock prices unrealistically. Similarly, the mid-2000s housing market bubble was fueled by excessive confidence, leading to a surge in housing demand. However, when reality hit and the bubbles burst, it resulted in severe financial crises. These instances illustrate how understanding behavioral finance can help predict and manage risks associated with market fluctuations, guiding both investors and policymakers to make more informed decisions.

Conclusion:

In our discussion, we covered various parts of finance, including cryptocurrencies, regular money, and how transactions work. We looked that how these assets differ and what benefits they offer to investors. We also talked about managing risks in investment portfolios by spreading investments and checking them regularly. Event study analysis helped us see how certain events affect the market, like rules changing or new technologies coming out. We also talked about behavioral finance, showing how emotions can affect investors and lead to things like market bubbles and crashes. Putting all these insights together, people can understand finance better and make smart decisions to stay strong in uncertain times.

References:

https://www.kaggle.com/code/faressayah/stock-market-analysis-prediction-using-lstm/notebook

https://www.kaggle.com/code/gleblevankov/bitcoin-price-analysis/input

https://www.kaggle.com/code/ysthehurricane/tesla-stock-price-prediction-using-gru-tutorial/notebook

https://www.kaggle.com/code/lusfernandotorres/data-science-for-financial-markets/notebook#building-portfolio

https://www.bitpanda.com/academy/en/lessons/whats-the-difference-between-a-cryptocurrency-like-bitcoin-and-fiat-money/

https://www.alternativeairlines.com/cryptocurrency-vs-traditional-currency

https://www.econstor.eu/bitstream/10419/174222/1/wp_2017_29_kurka.pdf