*Please delete all the cursive text before submission. It is here just for your reference*.

*Further: data set – DS, research question – RQ*

*The mark (****x words****) after each subchapter states the word count limit. This indicates the expected amount of information which you can exceed by 10% without losing the mark.*

7COM1079-0901-2024 - Team Research and Development Project

Final report title: (*the topic of your research.)*

Group ID: A226

Dataset number:

Prepared by: *[Name and ID of submitting student first],*

*[Name and ID of other group members]*

***Please make sure*** *the document spelled correctly (including image labels, section headings, and table of contents). Please use correct punctuation.*

*Make sure your report is grammatically correct.*

University of Hertfordshire

Hatfield, 2024

Contents Page Goes here

**TODO LIST FROM PREVIOUS FEEDBACK**

Research Question

Hypotheses

Graphs

Statistical test

1. Introduction (Abdul)

1.1. Problem statement and research motivation

Investor behavior in financial markets is often shaped by different market conditions, and one of the significant factors is the time of year. By analysing the trading volume patterns each month, we can spot trends that show how investor activity changes throughout the year. This study investigates the potential correlation between specific months and average trading volume, aiming to provide insights into market behavior and investor psychology.

Understanding seasonal patterns in trading volume is crucial for several reasons, including market liquidity, price movements, investment strategies, and market efficiency (Bryman, 2008). As Campbell and Shiller (1988) note, changes in trading volume can significantly impact stock prices and returns.

This research motivation is to find patterns that could help improve trading strategies, manage risks better, and give us a clearer understanding of how the market works.

1.2. The data set

The dataset comprises trading volume data collected over a specified period, including:

* Date (Month): The independent variable, representing each month of the year, classified as interval data.
* Volume: The dependent variable, representing the trading volume for each corresponding month, is also classified as interval data.

This dataset is useful for understanding how investors behave by looking at how trading volume changes over different months. It could reveal patterns in the market that happen at certain times of the year and show how these patterns affect trading strategies and market trends.

1.3. Research question

Is there a correlation between months and average trading volume?

The research question aims to explore the seasonal patterns in trading activity and their implications on investor behavior and market trends.

To answer this question, we will conduct a statistical analysis of the dataset, examining the relationship between months and trading volumes. We will use correlation techniques to determine if there are significant patterns or trends in trading volume across different months.

1.4. Null hypothesis and alternative hypothesis (H0/H1)

Null hypothesis (H0): There is no correlation between Average Trading Volume and Months in a year.

This hypothesis suggests that average trading volume does not significantly differ across months, and any observed variations are due to random chance rather than consistent seasonal patterns.

Alternative hypothesis (H1): There is a correlation between Average Trading Volume and Months in a year.

This hypothesis proposes a statistically significant relationship between months and average trading volume, indicating the presence of seasonal patterns in trading activity. By testing these hypotheses using appropriate statistical methods, we aim to determine whether there is sufficient evidence to reject the null hypothesis in favor of the alternative hypothesis, suggesting a meaningful correlation between months and average trading volume.

2. Background research (Lewis)  
2.1. Research papers (at least 3 relevant to your topic / DS) (200 Words)

The Geeq coin is the native cryptocurrency that is used on the GEEQ platform. It serves as a transactional cryptocurrency with a main use case being able to pay validation networks on the GEEQ platform for their services (Conley, 2019). There are three main roles that the coin plays in the platform:

* Compensation for validators for providing provably accurate data services
* For micropayment technology
* As fees for ledger rental

(Geeq, 2024)

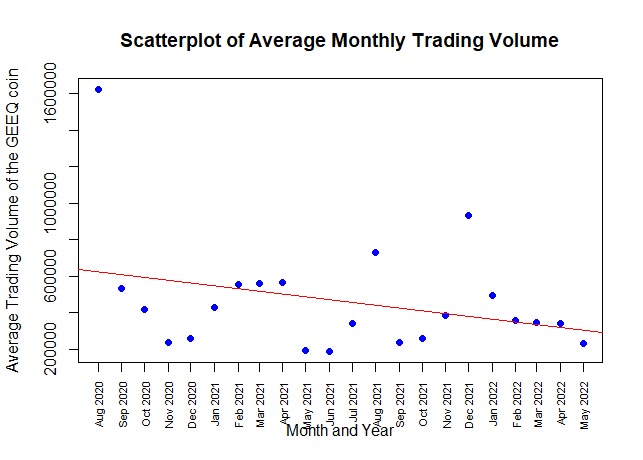
The 2018 whitepaper for the GEEQ project (Conley) highlights additional use cases. These include enabling payments for smart city for services such as parking or paying a toll to auctions on sites such as eBay or Craig’s List. These use cases are suitable due to the low transactional cost making highly scalable as well.

Previous studies on cryptocurrencies have examined calendar effects, including time-of-day, day-of-week, and month impacts on volatility, returns, and trading volume. Kaiser (2019) looked at the Monday and weekend effect, the January effect, and the Halloween effect, finding no consistent effects in the trading activity of cryptocurrencies, but there are some reoccurring trading behaviours. In another paper (Baur, 2019) it was determined that there were no patterns in trading activity over time with some consistent trading occurring on certain days of the week.

2.2. Why RQ is of interest (research gap and future directions according to the literature) (100 Words)

The research question is of interest because whilst similar papers have concluded that there are not many regular patterns in cryptocurrencies in terms of trading volume and returns it might be different for the GEEQ coin. There are however research gaps when it comes to coins that have low transactional costs and can be used regularly for micropayments. Researching the monthly volume of the GEEQ coin might show regular trading behaviours across certain months or it might be like other papers where there was no regular pattern when it comes to trading.

3. Visualisation (Arshad)  
3.1. Appropriate plot for the RQ output of an R script (NOT a screenshot) (50 Words)

Scatterplot is used to visualise the correlation between the two variables. Here, the X-axis represents the independent variable (Month and Year) and the Y-axis represents the dependent variable (Average Trading Volume of GEEQ coin). A regression line is also added to identify the correlation of the variables, which turns out to be a negative correlation.  
3.2. Additional information relating to understanding the data (optional) (50 Words)

The regression line helps to identify the density and trend of the correlation between the two variables which confirms a negative correlation. Additionally, histogram is also used to visualise the distribution of frequency of the dependent variable. By adding a normal bell curve, a right skewed distribution was identified.

3.3. Useful information for the data understanding (50 Words)

The scatterplot represents that there is a downward trend from August 2020 to May 2022 in the average monthly trading volume of GEEQ coin, which implies a negative correlation. While most of the data point follows the downward trend, few months shows high trading volume which might be due to some other external factors like decrease in price or market hype etc.

4. Analysis (Hariharan)  
4.1. Statistical test used to test the hypotheses and output (75 Words)

The Anderson-Darling and Shapiro-Wilk tests were used to check the normality of the Average monthly trading volume data. where the result of the tests which is, the p-value was less than 0.05 (p < 0.05) meaning the data does not follow normal distribution. Therefore the Spearman's rank correlation test was used to evaluate the relationship between time and trading volume, which produced a value of rho = -0.2343 suggesting that it is a weak negative correlation.

4.2. The null hypothesis is rejected /not rejected based on the p-value (100 Words)

The Spearman correlation test resulted in ρ value of -0.2343(rho), suggesting a weak negative correlation between time and average trading volume. However the p-value of 0.2925 is greater than the significance threshold of 0.05, meaning the result is not statistically significant.

Thus, we fail to reject the null hypothesis, which assumes no correlation. This indicates that the weak negative trend observed in the data could be due to some random variation or noise. Therefore, there is no strong evidence to support a meaningful relationship between time(month and year) and the average trading volume in the data.

5. Evaluation – group’s experience at 7COM1079 (Vishua)  
5.1. What went well (75 Words)  
5.2. Points for improvement (75 Words)  
5.3. Group’s time management (50 Words)  
5.4. Project’s overall judgement (50 Words)  
5.5. Comment on GitHub log output (50 Words)

6. Conclusions (Abdul)  
6.1. Results explained. (75 Words)  
6.2. Interpretation of the results (75 Words)  
6.3. Reasons and/or implications for future work, limitations of your stud (50 Words)

# 7.0 References

Bryman, A. (2008) Social research methods. 3rd edn. Oxford: Oxford University Press.

Campbell, J.Y. and Shiller, R.J. (1988a) 'The dividend-price ratio and expectations of future dividends and discount factors', Review of Financial Studies, 1(3), pp. 195-228.

Campbell, J.Y. and Shiller, R.J. (1988b) 'Stock prices, earnings, and expected dividends', The Journal of Finance, 43(3), pp. 661-76.

Conley, J. P., 2018. *The Geeq Project White paper Version 2.0.* [Online]   
Available at: https://geeq.io/wp-content/uploads/2018/08/White-paper.pdf  
[Accessed 31 12 2024].

Conley, J. P., 2019. *The Geeq™ White Paper.* [Online]   
Available at: https://geeq.io/geeq-white-paper-2/  
[Accessed 31 12 2024].

Drik G. Baur, D. C. K. G. Z. (. L., 2019. Bitcoin time-of-day, day-of-week and month-of-year effects in returns and trading volume. *Finance Research Letters ,* Volume 31, pp. 78-92.

Geeq, 2024. *Powered by Geeq.* [Online]   
Available at: https://geeq.io/tokenomics-update-as-of-testnet-v1/  
[Accessed 31 12 2024].

Kaiser, L., 2019. Seasonality in cryptocurrencies. *Finance Research Letters,* Volume 31, pp. 232-238.

8. Appendices  
A. R code used for analysis and visualisation.  
B. GitHub log output.