*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

**TODO LIST FROM PREVIOUS FEEDBACK**

Research Question

Hypotheses

Graphs

Statistical test

# 1. Introduction (Abdul)

## 1.1. Problem statement and research motivation

Investor behaviour in the financial markets is usually shaped by several factors. One of the biggest factors is seasonality or, more precisely, the monthly variations. Additional examination of these monthly variations in trading volume can highlight patterns that demonstrate how investors are likely to act in various months throughout the year. In this report, we explore a seasonality of high/low average trading volume in a specific month to understand the market behaviour and investor psychology.

There are several implications of this, though, such as the liquidity of the market, price movements, investment strategies, and market efficiency in general. Understanding this seasonal character of the trading volume, as highlighted by Bryman (2008), is pivotal. Campbell and Shiller (1988) assert that differences in trading volume produce significant effects on price and return.

This research focuses on identifying patterns that can improve trading, manage risk, and explain the mechanisms that determine the operation of the financial markets.

## 1.2. The data set

The dataset contains trading volume data collected over a certain period, including:

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

Such data would be good for understanding investor behavior through fluctuations in trading volumes across months and how they could indicate patterns in the market at specific parts of the year. It will also show the consequence it is drawing on trading strategy 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, looking into the relationship between months and trading volumes. Using techniques of correlation, we hope to find significant trends or patterns in trading activity throughout the year.

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

Null Hypothesis (H₀): There is no correlation between average trading volume and the months of the year.  
  
This hypothesis assumes that any variations in average trading volume across the months are purely random and not attributable to consistent seasonal trends.  
  
Alternative Hypothesis (H₁): There is a correlation between average trading volume and the months of the year.  
  
It is assumed that the following hypothesis will then be tested for a significant statistical relationship between the months and the average volume of trade to accept whether the trend is seasonal or not. Consequently, it becomes meaningful to check through appropriate statistical analyses whether enough evidence can be drawn to reject H0 in support of the alternative hypothesis indicating that the month and the average trading volumes vary.

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

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
* Micropayments
* Fees for ledger rental

(Geeq, 2024)

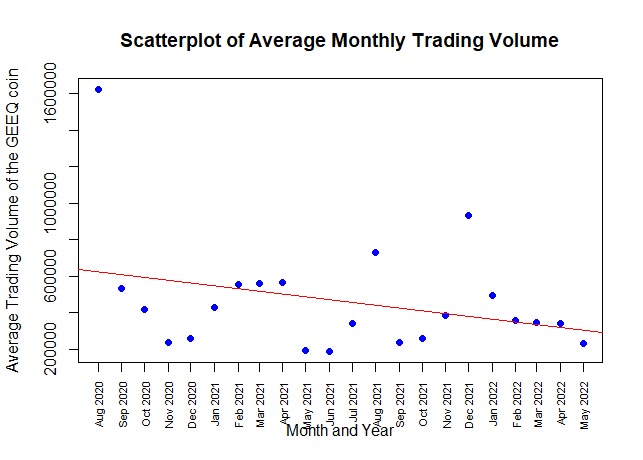
The 2018 whitepaper for the GEEQ project (Conley) highlights additional use cases. These include enabling payments for smart city for services such as parking or paying a toll to auctions on sites such as eBay or Craig’s List. These use cases are suitable due to the low transactional cost making it highly 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 but there was 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 statistical analysis of the average monthly trading volume of the GEEQ coin revealed a weak negative correlation (ρ=−0.2343\rho = -0.2343ρ=−0.2343) between time (month and year) and trading volume. However, the corresponding ppp-value (0.2925) exceeded the 0.05 significance threshold, meaning the result was not statistically significant. Consequently, we failed to reject the null hypothesis of no correlation. These findings align with previous work (e.g. Kaiser, 2019; Baur, 2019) suggesting that some cryptocurrencies exhibit inconsistent or weak seasonal trends in trading volumes.

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)

In this statistical analysis of the average monthly trading volume of the GEEQ coin, the relationship between time (month and year) and trading volume was a weak negative correlation, ρ = -0.2343. However, the associated p-value, 0.2925, was greater than the 0.05 significance level. The result was not statistically significant. We were thus unable to refute the null hypothesis of no correlation. These findings agree with previous works like Kaiser (2019) and Baur (2019), who report inconsistent or weak seasonal trends in trading volumes of some cryptocurrencies.

6.2. Interpretation of the results (75 Words)

The absence of statistical significance suggests that variables other than simple seasonality may influence monthly trading patterns in GEEQ, even though the data indicated a reduction. This is consistent with other studies that show calendar impacts on financial assets are occasionally detectable but are frequently erratic or eclipsed by certain market occurrences. In the case of GEEQ, variables like volatility in prices or market hype may have a greater direct impact on trading volumes.

6.3. Reasons and/or implications for future work, limitations of your stud (50 Words)

To gain a better understanding of seasonal trading behavior, future research could investigate the role of key market events, regulatory updates, or advancements in technology. One limitation of this study is the short time span of the dataset, which might not be sufficient to capture longer-term trends. Adding price data and studying how trading volume and price are connected could offer a more complete picture of GEEQ coin's market activity.

# 7.0 References

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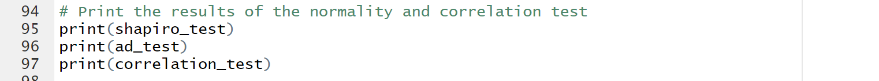
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A screenshot of a computer program

Description automatically generated8. Appendices  
A. R code used for analysis and visualisation

A screenshot of a computer program

Description automatically generated



B. GitHub log output.