Comparing Patterns in Blue Chip Cryptocurrencies and Meme Coin Cryptocurrencies

true

Abstract

TBD

Libraries

The below lines of code open the libraries that are necessary for the analysis of this data.

```
library(tidyverse)
```

```
## -- Attaching packages --------------------------------------- tidyverse 1.3.2 --
## v ggplot2 3.3.5     v purrr   1.0.1
## v tibble  3.1.8     v dplyr   1.1.0
## v tidyr   1.3.0     v stringr 1.5.0
## v readr   2.1.3     v forcats 0.5.2
## -- Conflicts ------------------------------------------ tidyverse_conflicts() --
## x dplyr::filter() masks stats::filter()
## x dplyr::lag()    masks stats::lag()
```

```
library(gridExtra)
```

```
##
## Attaching package: 'gridExtra'
##
## The following object is masked from 'package:dplyr':
##
##     combine
```

```
library(knitr)
library(tinylabels)
```

```
## Warning: package 'tinylabels' was built under R version 4.0.5
```

```
library(papaja)
library(apaTables)
```

Bitcoin Data Refinement

The following code checks if a refined version of the Bitcoin data exists in a CSV file. If it doesn't exist, the original Bitcoin data is read in and then refined by removing unnecessary columns, creating a new column called "Trading Days since ICO", dropping any rows with missing data, and renaming columns. The refined data is then written to a new CSV file called "Bitcoin_refined.csv". If the refined data already exists in the CSV file, it is simply read in from the file.

```
if (!file.exists("archive/Bitcoin_refined.csv")) {
  # read in original data
  Bitcoin <- read.csv("archive/Bitcoin.csv")

  # refine data
  Bitcoin_refined <- Bitcoin %>%
    select(-Open, -High, -Low, -Close) %>%
    mutate(`Trading Days since ICO` = row_number()) %>%
    drop_na() %>%
    rename(Date = 1,
           `Trading Volume` = 2,
           `Market Cap` = 3,
           `Trading Days since ICO` = 4)

  # write refined data to CSV
  write_csv(Bitcoin_refined, "archive/Bitcoin_refined.csv")

} else {
  # read in refined data from CSV
  Bitcoin_refined <- read_csv("archive/Bitcoin_refined.csv", show_col_types = FALSE)
}
```

Below is a sample of the first 10 rows of the Bitcoin_refined.csv dataset that was to be used in the analysis:

```
kable(head(Bitcoin_refined, 10))
```

Date	Trading Volume	Market Cap	Trading Days since ICO
27-06-2021	35511640894	649461677014	1
26-06-2021	38585385521	603276028309	2
25-06-2021	40230904226	592978211189	3
24-06-2021	33123368116	649643997441	4
23-06-2021	46317108925	632011278436	5
22-06-2021	58964353058	609180639390	6
21-06-2021	52809038594	593627575887	7
20-06-2021	36664034054	668968868770	8
19-06-2021	31207279718	667400859261	9
18-06-2021	36200887275	670589444851	10

Bitcoin Graphs

The following code creates two graphs using the refined Bitcoin data: one displaying the Bitcoin trading volume by day and the other displaying the Bitcoin market cap by day. The grid.arrange() function arranges the two graphs side by side.

```
#Bitcoin Graphs:
p1 <- ggplot(Bitcoin_refined, aes(`Trading Days since ICO`, `Trading Volume`)) +
  geom_path() + ggtitle("Bitcoin Trading Volume by Day") +
  labs(caption = "Figure 1: Movement of Bitcoin Trading Volume since ICO")

p2 <- ggplot(Bitcoin_refined, aes(`Trading Days since ICO`, `Market Cap`)) +
  geom_path() + ggtitle("Bitcoin Market Cap by Day") +
  labs(caption = "Figure 2: Movement of Bitcoin Market Capitalization since ICO")

grid.arrange(p1, p2, ncol = 2)
```

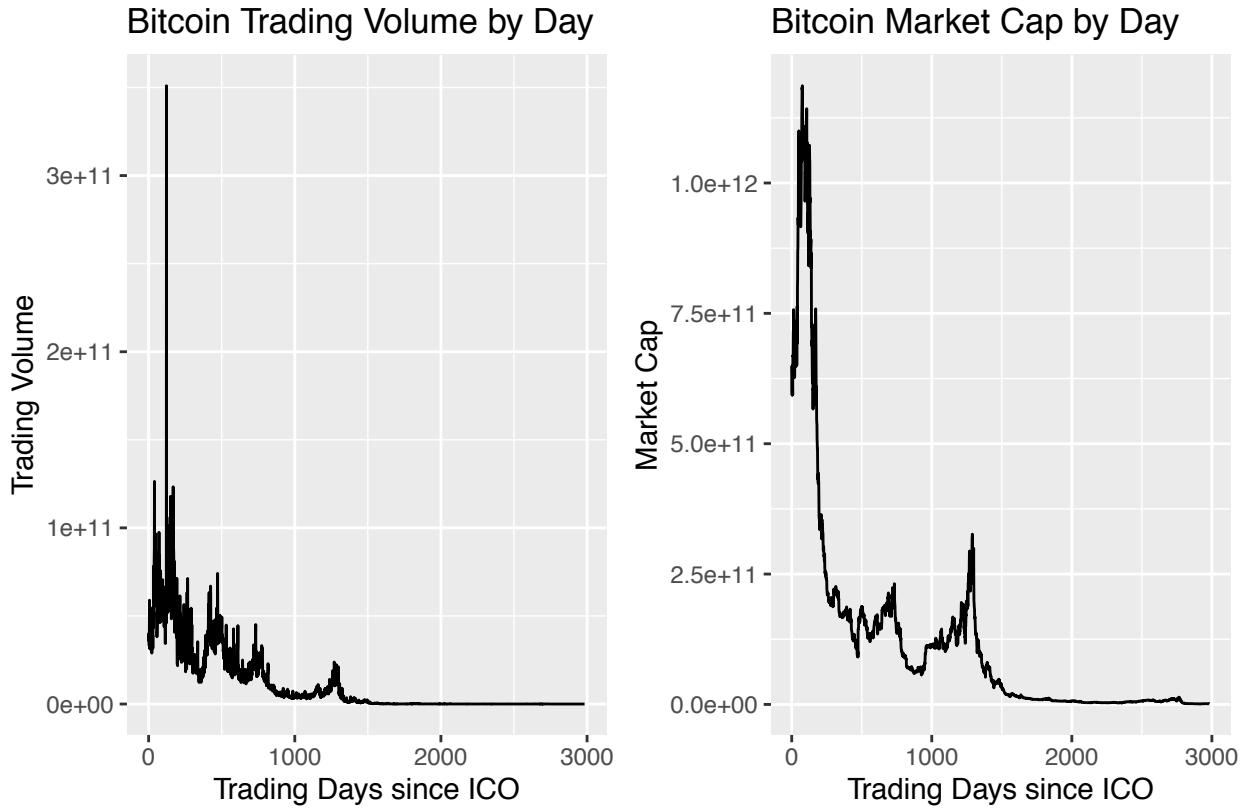


Figure 1: Movement of Bitcoin Trading Volume since ICO Figure 2: Movement of Bitcoin Market Capitalization since ICO

Above we see Figures 1 and 2, depicting the movement of trade volume and market capitalization of Bitcoin since ICO. Though we see similar patterns in the trends, we don't necessarily see the two exactly matching one another. To further investigate the movement of these numbers, I chose to see what the derivative graphs for the Bitcoin's Trading Volume and Market Capitalization would look like.

```
# Calculation of the first derivative of Trading Volume
Bitcoin_refined <- Bitcoin_refined %>%
  mutate(dV = c(NA, diff(`Trading Volume`)) / diff(`Trading Days since ICO`))
```

```
## Warning: There was 1 warning in `mutate()`.
## i In argument: `dV = c(NA, diff(`Trading Volume`)) / ...`.
## Caused by warning in `` c(NA, diff(`Trading Volume`)) / diff(`Trading Days since ICO`) ``:
## ! longer object length is not a multiple of shorter object length
```

```r
# Calculation of the first derivative of Market Cap
Bitcoin_refined <- Bitcoin_refined %>%
  mutate(dMC = c(NA, diff(`Market Cap`)) / diff(`Trading Days since ICO`))
```

```
## Warning: There was 1 warning in ‘mutate()‘.
## i In argument: ‘dMC = c(NA, diff(‘Market Cap‘))/diff(‘Trading Days since
##   ICO‘)‘.
## Caused by warning in ‘‘ c(NA, diff(‘Market Cap‘)) / diff(‘Trading Days since ICO‘) ‘‘:
## ! longer object length is not a multiple of shorter object length
```

```r
# Bitcoin Derivative Graphs
p3 <- ggplot(Bitcoin_refined, aes(`Trading Days since ICO`, dV)) +
  geom_path() +
  ggtitle("Derivative of Bitcoin Trading Volume by Day") +
  ylab("")
  labs(caption = "Figure 3: Movement of First Derivative of Bitcoin Trading Volume since ICO")
```

```
## $caption
## [1] "Figure 3: Movement of First Derivative of Bitcoin Trading Volume since ICO"
##
## attr(,"class")
## [1] "labels"
```

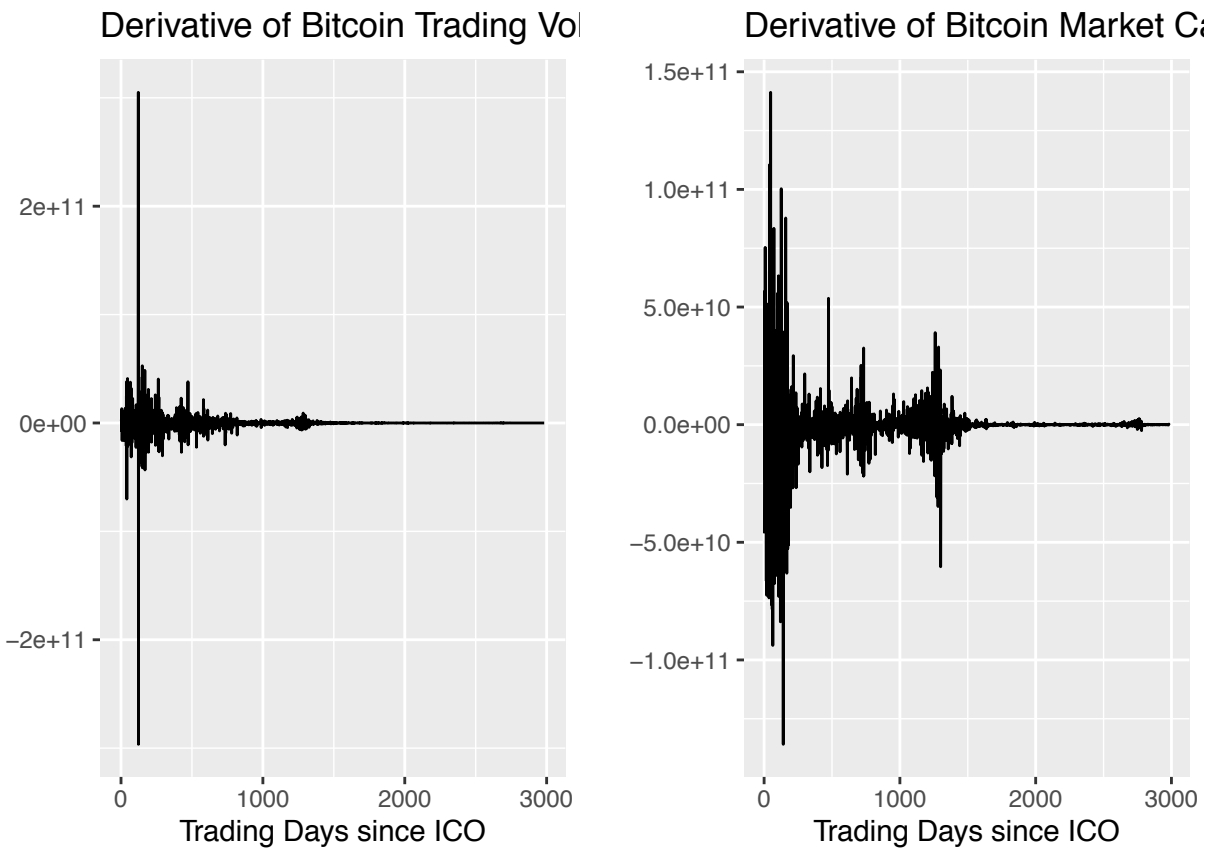
```r
p4 <- ggplot(Bitcoin_refined, aes(`Trading Days since ICO`, dMC)) +
  geom_path() +
  ggtitle("Derivative of Bitcoin Market Cap by Day") +
  ylab("")
  labs(caption = "Figure 4: Movement of First Derivative of Bitcoin Market Capitalization since ICO")
```

```
## $caption
## [1] "Figure 4: Movement of First Derivative of Bitcoin Market Capitalization since ICO"
##
## attr(,"class")
## [1] "labels"
```

```r
# Arrange the two plots in a grid
grid.arrange(p3, p4, ncol = 2)
```

```
## Warning: Removed 1 row(s) containing missing values (geom_path).
```

```
## Warning: Removed 1 row(s) containing missing values (geom_path).
```



Ethereum Data Refinement

The following code checks if a refined version of the Ethereum data exists in a CSV file. If it doesn't exist, the original Ethereum data is read in and then refined by removing unnecessary columns, creating a new column called "Trading Days since ICO", dropping any rows with missing data, and renaming columns. The refined data is then written to a new CSV file called "Ethereum_refined.csv". If the refined data already exists in the CSV file, it is simply read in from the file.

```
if (!file.exists("archive/Ethereum_refined.csv")) {
  # read in original data
  Ethereum <- read.csv("archive/Ethereum.csv")

  # refine data
  Ethereum_refined <- Ethereum %>%
    select(-Open, -High, -Low, -Close) %>%
    mutate(`Trading Days since ICO` = row_number()) %>%
    drop_na() %>%
    rename(Date = 1,
           `Trading Volume` = 2,
           `Market Cap` = 3,
           `Trading Days since ICO` = 4)


  # write refined data to CSV
```

```
  write_csv(Ethereum_refined, "archive/Ethereum_refined.csv")

} else {
  # read in refined data from CSV
  Ethereum_refined <- read_csv("archive/Ethereum_refined.csv", show_col_types = FALSE)
}
```

Below is a sample of the first 10 rows of the Ethereum_refined.csv dataset that was to be used in the analysis:

```
kable(head(Ethereum_refined, 10))
```

Date	Trading Volume	Market Cap	Trading Days since ICO
27-06-2021	19885474742	230473556118	1
26-06-2021	20637542361	213021180909	2
25-06-2021	22774334998	211131091602	3
24-06-2021	20272845769	231509317649	4
23-06-2021	28408659206	231625292667	5
22-06-2021	35547251725	218244605870	6
21-06-2021	33745173825	219790202020	7
20-06-2021	22535930423	261416943134	8
19-06-2021	18765854896	253490067194	9
18-06-2021	22752818388	259654503060	10

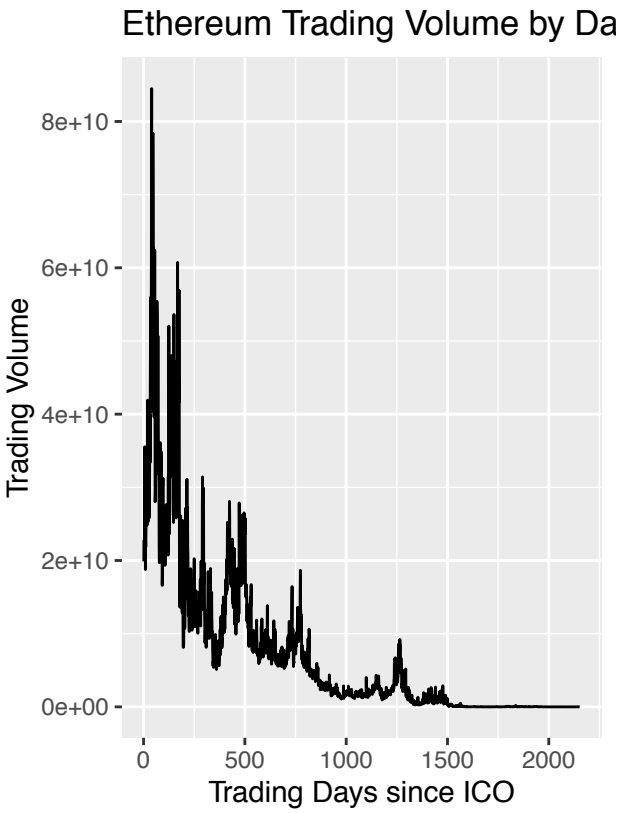
Ethereum Graphs

The following code creates two graphs using the refined Ethereum data: one displaying the Ethereum trading volume by day and the other displaying the Ethereum market cap by day. The grid.arrange() function arranges the two graphs side by side.

```
#Ethereum Graphs:
p1 <- ggplot(Ethereum_refined, aes(`Trading Days since ICO`, `Trading Volume`)) +
  geom_path() + ggtitle("Ethereum Trading Volume by Day") +
  labs(caption = "Figure 5: Movement of Ethereum Trading Volume since ICO")

p2 <- ggplot(Ethereum_refined, aes(`Trading Days since ICO`, `Market Cap`)) +
  geom_path() + ggtitle("Ethereum Market Cap by Day") +
  labs(caption = "Figure 6: Movement of Ethereum Market Capitalization since ICO")

grid.arrange(p1, p2, ncol = 2)
```



gure 5: Movement of Ethereum Trading Volume since ICO

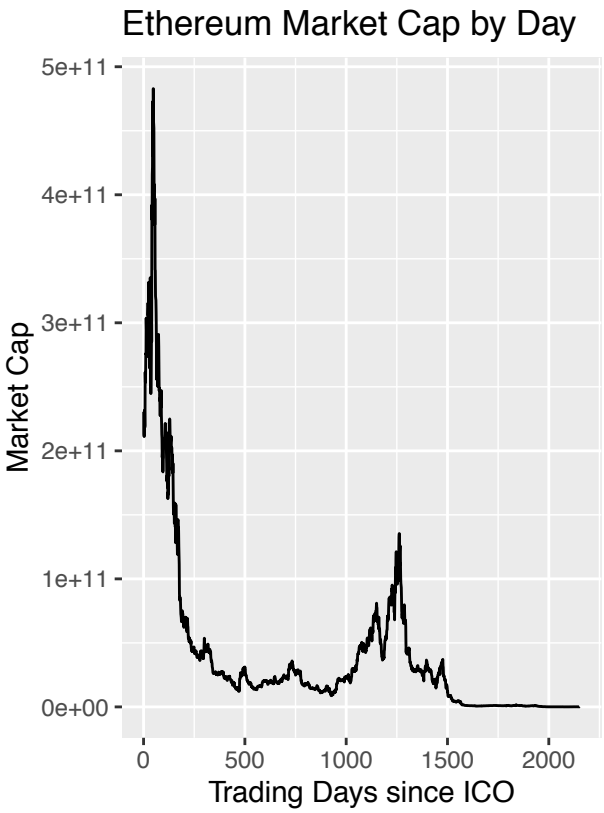


Figure 6: Movement of Ethereum Market Capitalization since ICO

Above we see Figures 1 and 2, depicting the movement of trade volume and market capitalization of Ethereum since ICO. Though we see similar patterns in the trends, we don't necessarily see the two exactly matching one another. To further investigate the movement of these numbers, I chose to see what the derivative graphs for the Ethereum's Trading Volume and Market Capitalization would look like.

```
# Calculation of the first derivative of Trading Volume
Ethereum_refined <- Ethereum_refined %>%
  mutate(dV = c(NA, diff(`Trading Volume`)) / diff(`Trading Days since ICO`))
```

```
## Warning: There was 1 warning in ‘mutate()‘.
## i In argument: ‘dV = c(NA, diff(‘Trading Volume‘)) / ...‘.
## Caused by warning in ‘‘ c(NA, diff(‘Trading Volume‘)) / diff(‘Trading Days since ICO‘) ‘‘:
## ! longer object length is not a multiple of shorter object length
```

```
# Calculation of the first derivative of Market Cap
Ethereum_refined <- Ethereum_refined %>%
  mutate(dMC = c(NA, diff(`Market Cap`)) / diff(`Trading Days since ICO`))
```

```
## Warning: There was 1 warning in ‘mutate()‘.
## i In argument: ‘dMC = c(NA, diff(‘Market Cap‘))/diff(‘Trading Days since
##   ICO‘)‘.
## Caused by warning in ‘‘ c(NA, diff(‘Market Cap‘)) / diff(‘Trading Days since ICO‘) ‘‘:
## ! longer object length is not a multiple of shorter object length
```

```r
# Ethereum Derivative Graphs
p3 <- ggplot(Ethereum_refined, aes(`Trading Days since ICO`, dV)) +
  geom_path() +
  ggtitle("Derivative of Ethereum Trading Volume by Day") +
  ylab("")
  labs(caption = "Figure 7: Movement of First Derivative of Ethereum Trading Volume since ICO")
```

```
## $caption
## [1] "Figure 7: Movement of First Derivative of Ethereum Trading Volume since ICO"
##
## attr(,"class")
## [1] "labels"
```

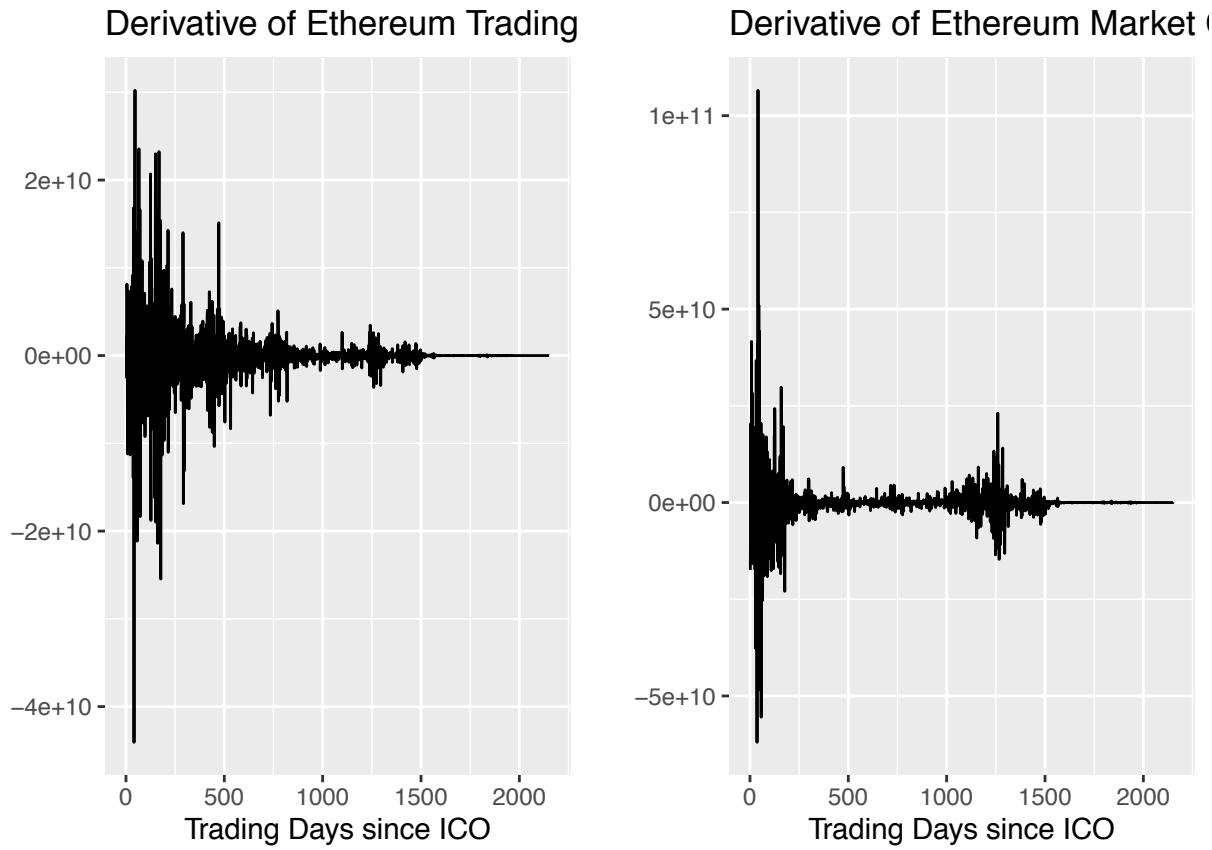
```r
p4 <- ggplot(Ethereum_refined, aes(`Trading Days since ICO`, dMC)) +
  geom_path() +
  ggtitle("Derivative of Ethereum Market Cap by Day") +
  ylab("")
  labs(caption = "Figure 8: Movement of First Derivative of Ethereum Market Capitalization since ICO")
```

```
## $caption
## [1] "Figure 8: Movement of First Derivative of Ethereum Market Capitalization since ICO"
##
## attr(,"class")
## [1] "labels"
```

```r
# Arrange the two plots in a grid
grid.arrange(p3, p4, ncol = 2)
```

```
## Warning: Removed 1 row(s) containing missing values (geom_path).
```

```
## Warning: Removed 1 row(s) containing missing values (geom_path).
```



Dogecoin Data Refinement

The following code checks if a refined version of the Dogecoin data exists in a CSV file. If it doesn't exist, the original Dogecoin data is read in and then refined by removing unnecessary columns, creating a new column called "Trading Days since ICO", dropping any rows with missing data, and renaming columns. The refined data is then written to a new CSV file called "Dogecoin_refined.csv". If the refined data already exists in the CSV file, it is simply read in from the file.

```
if (!file.exists("archive/Dogecoin_refined.csv")) {
  # read in original data
  Dogecoin <- read.csv("archive/Dogecoin.csv")

  # refine data
  Dogecoin_refined <- Dogecoin %>%
    select(-Open, -High, -Low, -Close) %>%
    mutate(`Trading Days since ICO` = row_number()) %>%
    drop_na() %>%
    rename(Date = 1,
           `Trading Volume` = 2,
           `Market Cap` = 3,
           `Trading Days since ICO` = 4)

  # write refined data to CSV
  write_csv(Dogecoin_refined, "archive/Dogecoin_refined.csv")
```

```
} else {
  # read in refined data from CSV
  Dogecoin_refined <- read_csv("archive/Dogecoin_refined.csv", show_col_types = FALSE)
}
```

Below is a sample of the first 10 rows of the Dogecoin_refined.csv dataset that was to be used in the analysis:

```
kable(head(Dogecoin_refined, 10))
```

Date	Trading Volume	Market Cap	Trading Days since ICO
27-06-2021	2167521670	34431598886	1
26-06-2021	2649457302	31867533719	2
25-06-2021	5542163262	31131171916	3
24-06-2021	3844648059	34205589763	4
23-06-2021	5098674891	30217348680	5
22-06-2021	5992850344	24858743142	6
21-06-2021	5640232166	23250576500	7
20-06-2021	1963503800	36545750822	8
19-06-2021	1003248258	37382435534	9
18-06-2021	1846213589	38174078175	10

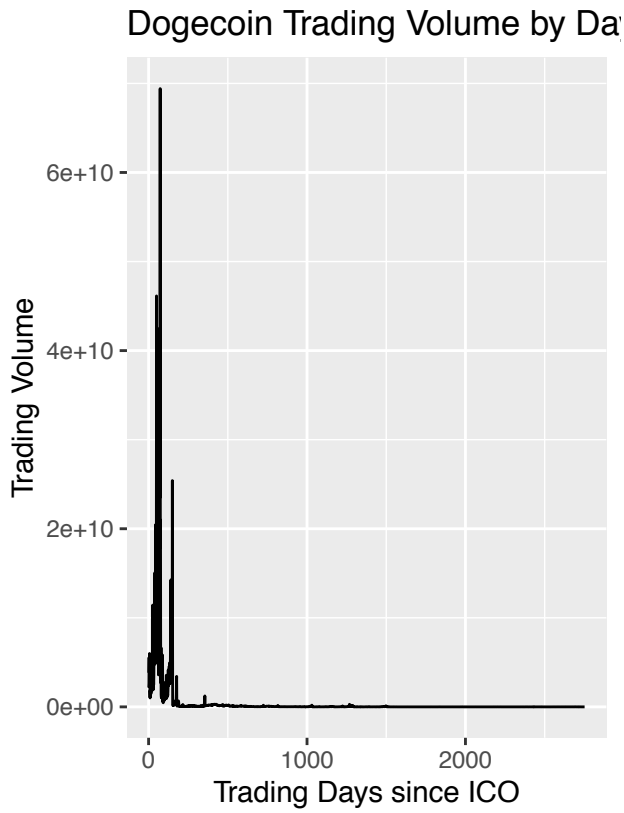
Dogecoin Graphs

The following code creates two graphs using the refined Dogecoin data: one displaying the Dogecoin trading volume by day and the other displaying the Dogecoin market cap by day. The grid.arrange() function arranges the two graphs side by side.

```
#Dogecoin Graphs:
p1 <- ggplot(Dogecoin_refined, aes(`Trading Days since ICO`, `Trading Volume`)) +
  geom_path() + ggtitle("Dogecoin Trading Volume by Day") +
  labs(caption = "Figure 9: Movement of Dogecoin Trading Volume since ICO")

p2 <- ggplot(Dogecoin_refined, aes(`Trading Days since ICO`, `Market Cap`)) +
  geom_path() + ggtitle("Dogecoin Market Cap by Day") +
  labs(caption = "Figure 10: Movement of Dogecoin Market Capitalization since ICO")

grid.arrange(p1, p2, ncol = 2)
```



gure 9: Movement of Dogecoin Trading Volume since ICO

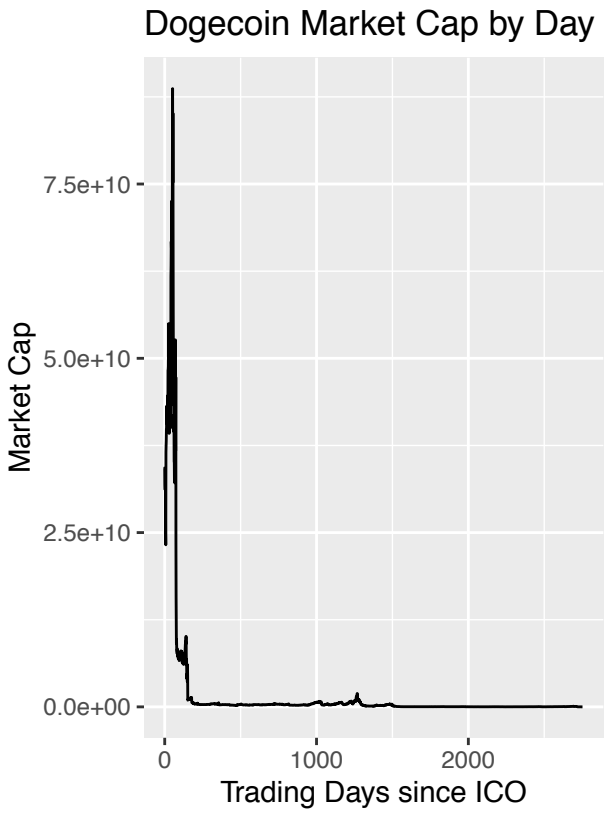


Figure 10: Movement of Dogecoin Market Capitalization since ICO

Above we see Figures 1 and 2, depicting the movement of trade volume and market capitalization of Dogecoin since ICO. Though we see similar patterns in the trends, we don't necessarily see the two exactly matching one another. To further investigate the movement of these numbers, I chose to see what the derivative graphs for the Dogecoin's Trading Volume and Market Capitalization would look like.

```
# Calculation of the first derivative of Trading Volume
Dogecoin_refined <- Dogecoin_refined %>%
  mutate(dV = c(NA, diff(`Trading Volume`)) / diff(`Trading Days since ICO`))
```

```
## Warning: There was 1 warning in ‘mutate()‘.
## i In argument: ‘dV = c(NA, diff(‘Trading Volume‘)) / ...‘.
## Caused by warning in ‘‘ c(NA, diff(‘Trading Volume‘)) / diff(‘Trading Days since ICO‘) ‘‘:
## ! longer object length is not a multiple of shorter object length
```

```
# Calculation of the first derivative of Market Cap
Dogecoin_refined <- Dogecoin_refined %>%
  mutate(dMC = c(NA, diff(`Market Cap`)) / diff(`Trading Days since ICO`))
```

```
## Warning: There was 1 warning in ‘mutate()‘.
## i In argument: ‘dMC = c(NA, diff(‘Market Cap‘))/diff(‘Trading Days since
##   ICO‘)‘.
## Caused by warning in ‘‘ c(NA, diff(‘Market Cap‘)) / diff(‘Trading Days since ICO‘) ‘‘:
## ! longer object length is not a multiple of shorter object length
```

```r
# Ethereum Derivative Graphs
p3 <- ggplot(Dogecoin_refined, aes(`Trading Days since ICO`, dV)) +
  geom_path() +
  ggtitle("Derivative of Dogecoin Trading Volume by Day") +
  ylab("")
  labs(caption = "Figure 11: Movement of First Derivative of Dogecoin Trading Volume since ICO")
```

```
## $caption
## [1] "Figure 11: Movement of First Derivative of Dogecoin Trading Volume since ICO"
##
## attr(,"class")
## [1] "labels"
```

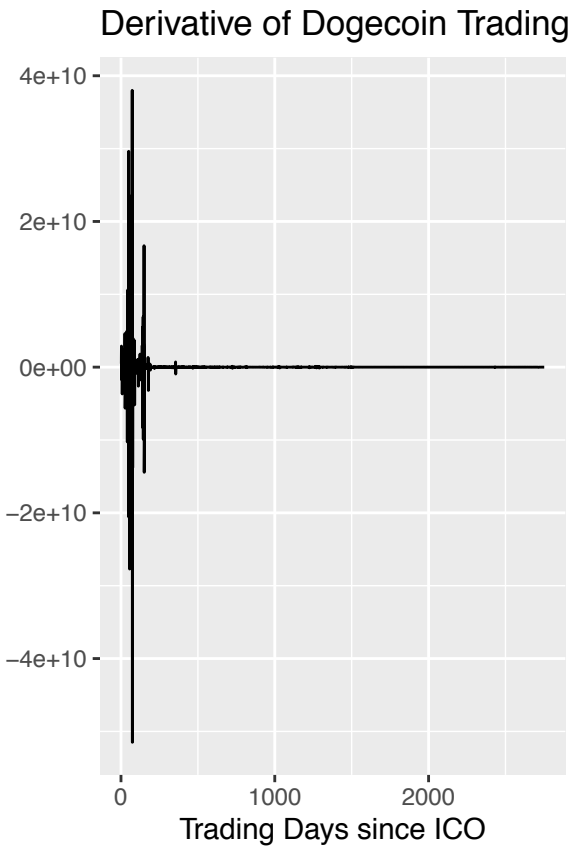
```r
p4 <- ggplot(Dogecoin_refined, aes(`Trading Days since ICO`, dMC)) +
  geom_path() +
  ggtitle("Derivative of Dogecoin Market Cap by Day") +
  ylab("")
  labs(caption = "Figure 12: Movement of First Derivative of Dogecoin Market Capitalization since ICO")
```

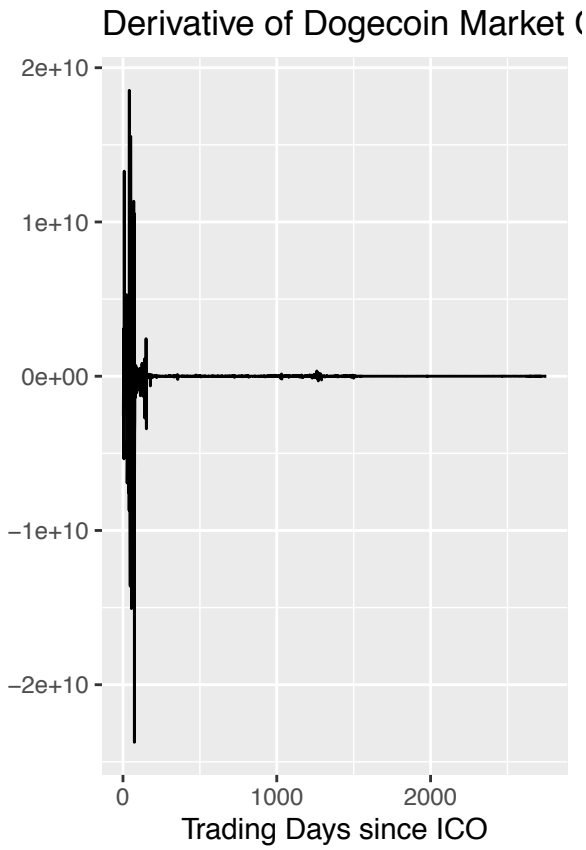
```
## $caption
## [1] "Figure 12: Movement of First Derivative of Dogecoin Market Capitalization since ICO"
##
## attr(,"class")
## [1] "labels"
```

```r
# Arrange the two plots in a grid
grid.arrange(p3, p4, ncol = 2)
```

```
## Warning: Removed 1 row(s) containing missing values (geom_path).
```

```
## Warning: Removed 1 row(s) containing missing values (geom_path).
```





Shiba INU Data Refinement

The following code checks if a refined version of the Shiba INU data exists in a CSV file. If it doesn't exist, the original Shiba INU data is read in and then refined by removing unnecessary columns, creating a new column called "Trading Days since ICO", dropping any rows with missing data, and renaming columns. The refined data is then written to a new CSV file called "Shiba INU_refined.csv". If the refined data already exists in the CSV file, it is simply read in from the file.

```
if (!file.exists("archive/Shiba INU_refined.csv")) {
  # read in original data
  `Shiba INU` <- read.csv("archive/Shiba INU.csv")

  # refine data
  `Shiba INU_refined` <- `Shiba INU` %>%
    select(-Open, -High, -Low, -Close) %>%
    mutate(`Trading Days since ICO` = row_number()) %>%
    drop_na() %>%
    rename(Date = 1,
           `Trading Volume` = 2,
           `Market Cap` = 3,
           `Trading Days since ICO` = 4)

  # write refined data to CSV
  write_csv(`Shiba INU_refined`, "archive/Shiba INU_refined.csv")
```

```
} else {
  # read in refined data from CSV
  `Shiba INU_refined` <- read_csv("archive/Shiba INU_refined.csv",show_col_types = FALSE)
}
```

Below is a sample of the first 10 rows of the Shiba INU_refined.csv dataset that was to be used in the analysis:

```
kable(head(`Shiba INU_refined`, 10))
```

Date	Trading Volume	Market Cap	Trading Days since ICO
27-06-2021	368723897	3101198480	1
26-06-2021	506208122	2952817814	2
25-06-2021	809551822	2787285706	3
24-06-2021	374340895	2846534842	4
23-06-2021	538227669	2698312257	5
22-06-2021	798815195	2497791120	6
21-06-2021	719083156	2456650866	7
20-06-2021	644943959	3078391265	8
19-06-2021	800211655	3009196523	9
18-06-2021	560685269	2863397448	10

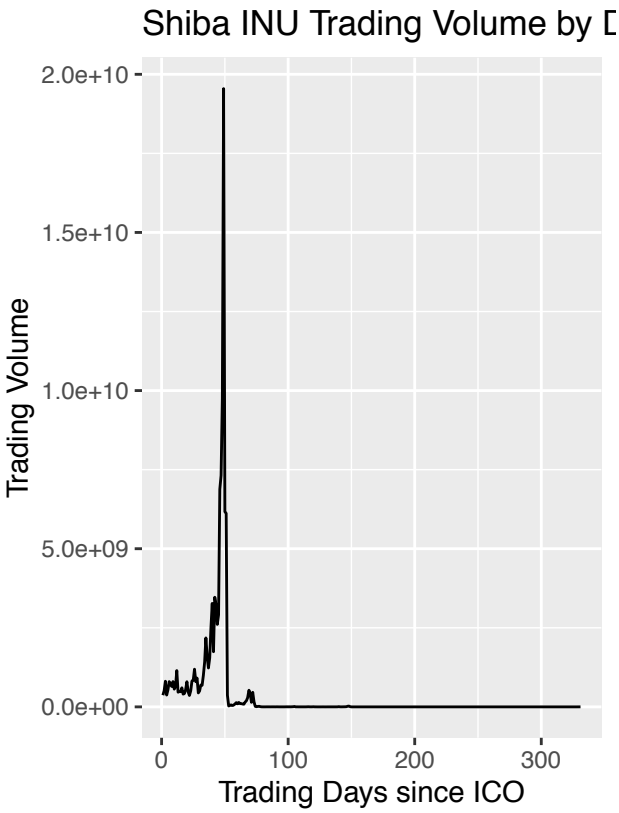
Shiba INU Graphs

The following code creates two graphs using the refined Shiba INU data: one displaying the Shiba INU trading volume by day and the other displaying the Shiba INU market cap by day. The grid.arrange() function arranges the two graphs side by side.

```
#Shiba INU Graphs:
p1 <- ggplot(`Shiba INU_refined`, aes(`Trading Days since ICO`, `Trading Volume`)) +
  geom_path() + ggtitle("Shiba INU Trading Volume by Day") +
  labs(caption = "Figure 13: Movement of Shiba INU Trading Volume since ICO")

p2 <- ggplot(`Shiba INU_refined`, aes(`Trading Days since ICO`, `Market Cap`)) +
  geom_path() + ggtitle("Shiba INU Market Cap by Day") +
  labs(caption = "Figure 14: Movement of Shiba INU Market Capitalization since ICO")

grid.arrange(p1, p2, ncol = 2)
```



ıre 13: Movement of Shiba INU Trading Volume since ICO

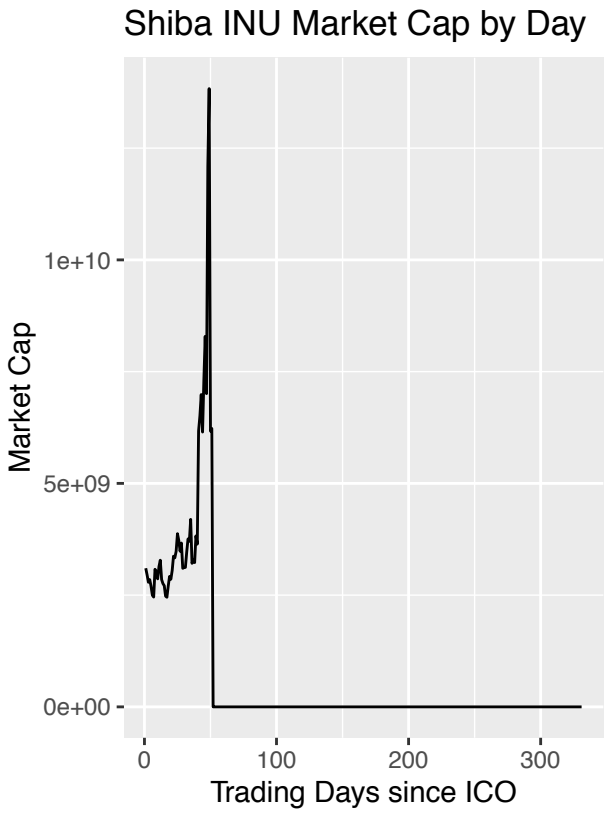


Figure 14: Movement of Shiba INU Market Capitalization since ICO

Above we see Figures 1 and 2, depicting the movement of trade volume and market capitalization of Ethereum since ICO. Though we see similar patterns in the trends, we don't necessarily see the two exactly matching one another. To further investigate the movement of these numbers, I chose to see what the derivative graphs for the Ethereum's Trading Volume and Market Capitalization would look like.

```
# Calculation of the first derivative of Trading Volume
`Shiba INU_refined` <- `Shiba INU_refined` %>%
  mutate(dV = c(NA, diff(`Trading Volume`)) / diff(`Trading Days since ICO`))
```

```
## Warning: There was 1 warning in ‘mutate()‘.
## i In argument: ‘dV = c(NA, diff(‘Trading Volume‘)) / ...‘.
## Caused by warning in ‘‘ c(NA, diff(‘Trading Volume‘)) / diff(‘Trading Days since ICO‘) ‘‘:
## ! longer object length is not a multiple of shorter object length
```

```
# Calculation of the first derivative of Market Cap
`Shiba INU_refined` <- `Shiba INU_refined` %>%
  mutate(dMC = c(NA, diff(`Market Cap`)) / diff(`Trading Days since ICO`))
```

```
## Warning: There was 1 warning in ‘mutate()‘.
## i In argument: ‘dMC = c(NA, diff(‘Market Cap‘))/diff(‘Trading Days since
##   ICO‘)‘.
## Caused by warning in ‘‘ c(NA, diff(‘Market Cap‘)) / diff(‘Trading Days since ICO‘) ‘‘:
## ! longer object length is not a multiple of shorter object length
```

```r
# Ethereum Derivative Graphs
p3 <- ggplot(`Shiba INU_refined`, aes(`Trading Days since ICO`, dV)) +
  geom_path() +
  ggtitle("Derivative of Shiba INU Trading Volume by Day") +
  ylab("")
  labs(caption = "Figure 15: Movement of First Derivative of Shiba INU Trading Volume since ICO")
```

```
## $caption
## [1] "Figure 15: Movement of First Derivative of Shiba INU Trading Volume since ICO"
##
## attr(,"class")
## [1] "labels"
```

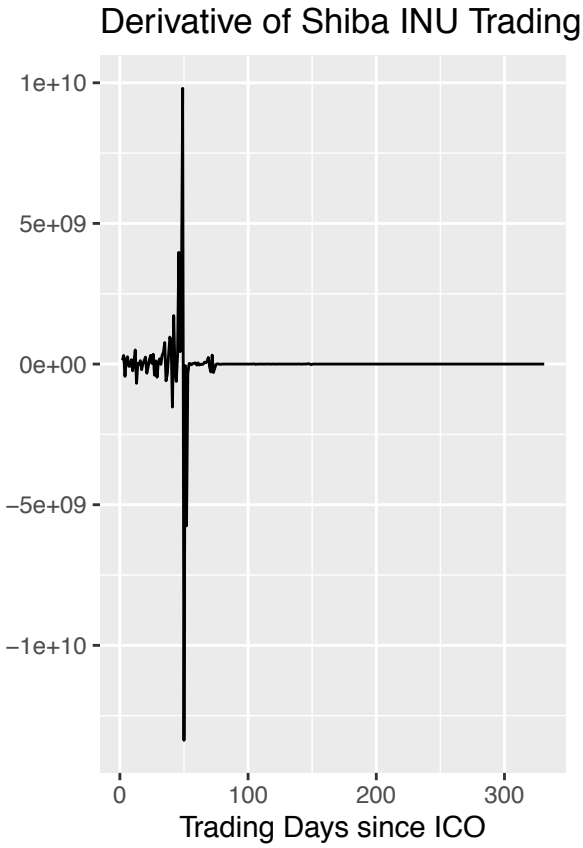
```r
p4 <- ggplot(`Shiba INU_refined`, aes(`Trading Days since ICO`, dMC)) +
  geom_path() +
  ggtitle("Derivative of Ethereum Market Cap by Day") +
  ylab("")
  labs(caption = "Figure 16: Movement of First Derivative of Shiba INU Market Capitalization since ICO")
```

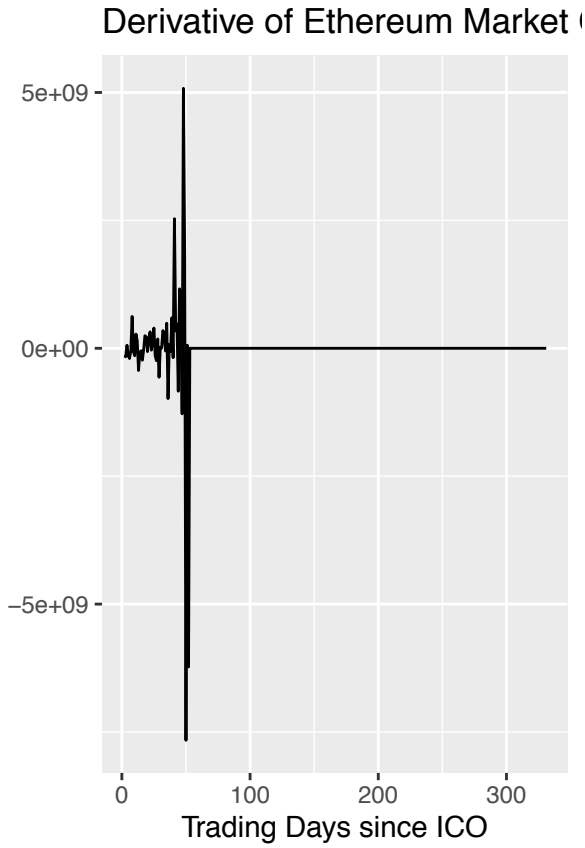
```
## $caption
## [1] "Figure 16: Movement of First Derivative of Shiba INU Market Capitalization since ICO"
##
## attr(,"class")
## [1] "labels"
```

```r
# Arrange the two plots in a grid
grid.arrange(p3, p4, ncol = 2)
```

```
## Warning: Removed 1 row(s) containing missing values (geom_path).
```

```
## Warning: Removed 1 row(s) containing missing values (geom_path).
```


Derivative of Shiba INU Trading
1e+10
5e+09
0e+00
−5e+09
−1e+10
0
100
200
300
Trading Days since ICO


Derivative of Ethereum Market
5e+09
0e+00
−5e+09
0
100
200
300
Trading Days since ICO