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**Introduction**

The GameStop stock was a really undervalued stock, which was highly sold in short position by many hedge funds. During the time prior of the short squeeze, the total positions that were hold short were about 110% of the total number of shares outstanding. This means that there were more shares sold short than the actually total number of shares available. This was the occasion for many retail traders who bought shares of GME, causing the price to raise and expecting the Hedge fund to cover their position, letting the price of the stock to increase even more. GME was in fact the protagonist of a massive short squeeze in January 2021, which brought the price of the stock from $ 10-15 to an high of $483 for each stock in just few weeks. For this reason, GME is defined a “meme stock”, which is driven by sympathy and momentum, rather than fundamental analysis. Similar to that, many marijuana stocks are defined as “meme stocks” and for this reason, the project analyze data from the Cannabis ETF (THCX), along with data from 10 Years Treasury Yield (TNX) to predict the price movements in GME and determine if GameStop could possibly go “to the moon”, as many traders claimed.

**Literature review**

The article “GameStop Capitalism. Wall Street vs. The Reddit Rally” by Muzio Tim, describes in depth the reasons and the consequences of the GameStop stock (GME) short squeeze, that happened between the end of January and the beginning of February 2021. Before the short squeeze, GME was trading at a price of less than $20 per share, and with a short interest peak of 140%, meaning that 140% of the total number of shares were sold short. Most of these short positions were hold by Hedge Fund. For these reasons many members of r/WallStreetBets community, decide to buy a lot of shares and call option, creating a massive short squeeze, that causes many Hedge Funds to lose billions of dollars, while many traders profited from it. Despite all this, the GameStop stock is not “going to the moon” as many retail traders thought, for the simple reason that most of the short positions were covered and many traders sold their long position.

In the article “The Equity Premium: Stock and Bond Returns Since 1802” by Jeremy J. Siegel explains how stock returns dominate bond returns, with an average of 6.4% per year against the 0.5% per year. This return on stock in excess of the return of bonds is called equity premium. It is easy to see how GameStop has probably outperformed the 10 years Treasury Yield. The cannabis index also has outperformed the S&P 500, as Ajaz ul Islam shows in his research paper “The Stock that outperforms not only Minds but also Markets: The Marijuana Stock”. From the time when Marijuana was legalized in Colorado and Washington on January 1, 2014, S&P 500 is experiencing a hike of 0.4% paralleled to 10.6% hike in the Marijuana index. Similarly, from January 1, 2013, the S&P 500 has experienced a hike of about 20% on the other hand the golden Marijuana index has is up by 385%.

**Data Section**

The ultimate source of my data is Yahoo Finance. I downloaded the historical data from the Yahoo Finance website. There are 551 total observations for GME data, TNX data and THCX data. The total number of observations is 551 because they align correctly.

My data is times series because observations are observed over multiple time periods. The three different entities are GME, TNX and THCX, and the time periods goes from 7/10/2019 to 9/20/2021.

In my data set are examined the Open price, High price, Low price, Close price Adjusted Close price and Volume of GameStop Stock (GME), Treasury Yield 10 Years (TNX) and The Cannabis ETF (THCX). My data covers the time period from 7/10/2019 to 9/20/2021, for all three entities.

Some observations of the Treasury Yield 10 Years (TNX) were delated because they showed the result “null”.

The data range starts from the 7/10/2019 because the Cannabis ETF(THCX) did not have any previous data, so I decided to only use overlapping data, starting from the 7/10/2019 for all the observations.

Summary GME



Summary TNX



Summary THCX



**Methodology**

In this paper I attempted to use the price of the 10 years Treasury Yield (TNX) and the price of the cannabis ETF (THCX) to predict the changes in price of the Game Stop stock (GME), to see if there is a correlation, and to predict if GME “is going to the moon?”, relative to these other tickers. I have taken the logs of the of TNX, GME and THCX, and used them to calculate their percentage change to get better predictions of the data I used. Because I am working with time series data, I decided to create a time trend and used it in my regression, to better understand how the prices can be affected over time.

Below is the regression I am attempting to create:

I believe the following to be true:

Game Stop trends upward over time, and for this reason the time trend’ s coefficient is positive and significantly different than zero.

I expected meme stocks to go up at the same time, so I predict that the Cannabis ETF (THCX) and GME to trend up together. For this reason, I expected the coefficient to be positive and significantly different than zero

The Gauss-Markov condition that is violated in my estimation process is linearity because from the graphs appear that there is not line of best fit.

**Results**

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In this scatter plot above we can see the correlation between the price of GME and the price of THCX. From the scatter plot we can see that there is no linearity because the line of best fit is not straight,

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In this scatter plot above we can see the correlation between the price of GME and the price of TNX. From the scatter plot we can see that there is no linearity because the line of best fit is not straight.

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These three line-graphs above show the correlation between GME and time trend, THCX and time trend, TNX and time trend, respectively. We can see that, as predicted, the Game Stop stock and the cannabis ETF (THCX), have a big spike around the same time (approximately 400 time period on the chart), and this may be due to their nature, because there are both meme-stocks, and for this reason market sentiment can have a big impact on both of them. We can see another correlation between THCX and TNX because, as shown in the graphs, they tend to go down and trend up at the same time. An important characteristic that I noticed also, is that GME tend to trend up over time, showing sign of a bullish trend. We can clearly see on the chart a big spike, followed by a pull back, then another smaller spike followed by a smaller pull back, and once again another spike followed by a pull back, suggesting that the trend will continue to go higher.

After taken the logs of GME, THCX and TNX, I created new variables for those, and used them to calculate the percentage change in those three stocks. Doing so, allows me to have better estimations of my data. I decide to plot the correlation between percentage change in GME and THCX.



The graph above suggests that there is not obvious pattern in the data.

Then I run my regression as follows:



The results does not support my first hypothesis, because although is positive and different than zero, it not significantly different than zero at 1%, 5% or 10% level, and for this reason it is not a significant predictor. The marginal effect of one period of time is equal to 0.000198% in GME. The results supports my second hypothesis, as I expected meme stocks to go up at the same time, so I predict that the Cannabis ETF (THCX) and GME to trend up together. And in the regression above, the coefficient is positive and significantly different than zero at 10% and 5% level. The coefficient is approximately 0.322, suggesting that the marginal effect of 1% THCX, results in the increase of 0.32% in GME. The coefficient of TNX is positive and approximately 0.167, suggesting that an increase of one percentage unit of TNX, result in increasing the price of GME of about 0.17 %. This coefficient is not significant at 1%, 5% or 10% level. From the regression appears that my thesis is unsupported by the data, and the R-squared which is about 1.83% shows the relationship between Game Stop stock and the other variables is very weak.

In order to make a forecast near the mean, I run a summary table of the new variables created previously



= 0.005334

The percentage change of GME, plotting the coefficients near the mean in the eequation, is 0.005334%. This means that GME tend to increase 0.005334% when the other stocks percentage change are near the mean. This test pass the sanity check.

**Test**

I decide to run a Durbin-Watson statistic test, because will determine if there are any serial correlation due to time trend. The result of the Durbin-Watson test are shown below.



The Durbin-Watson test is used to test for autocorrelation between the residuals od the regression. A value of 2 indicates that there is no autocorrelation, while a value from 0 to 2 indicates positive correlation, and a value from 2 to 4 indicates negative correlation. The result of the test shown above is 4, 551, with 551 indicating the number of observations and 4 indiccating the result if the test. The result reject the null hypothesis, showing that there is a negative serial correllation between THCX and TNX and the price of GME.

**Conclusion**

In this paper I attempted to analyze the data of the price from 2019 to 2021 of the 10 years Treasury Yield (TNX) and the price of the cannabis ETF (THCX) to predict the changes in price of the Game Stop stock (GME), to see if there is a correlation, and to predict if GME “is going to the moon?”, relative to these other tickers. The results of the regression does not support my first hypothesis, because although is positive and different than zero, it not significantly different than zero at 1%, 5% or 10% level, and for this reason time trend is not a significant predictor of the change in price of GameStop. The marginal effect of one period of time is equal to 0.000198% in GME. The results supports my second hypothesis, as I expected meme stocks to go up at the same time, so I predict that the Cannabis ETF (THCX) and GME to trend up together. And in the regression, the coefficient is positive and significantly different than zero at 10% and 5% level. The coefficient is approximately 0.322, suggesting that the marginal effect of 1% THCX, results in the increase of 0.32% in GME. The coefficient of TNX is positive and approximately 0.167, suggesting that an increase of one percentage unit of TNX, result in increasing the price of GME of about 0.17 %. This coefficient is not significant at 1%, 5% or 10% level. From the regression appears that my thesis is unsupported by the data, and the R-squared which is about 1.83% shows the relationship between Game Stop stock and the other variables is very weak. After the Durbin-Watson test, showing that there is a negative serial correllation between THCX and TNX and the price of GME, we can claim that from the results of this project is very unlikely that GME could possibly go “to the moon”, as it is not very esay to predict its price change, but it was proven that “meme stocks”, such as marijuana stocks and other sympathy momentum stocks like GME tend to trend up together. Researchers could take in consideration other “meme stocks” to see for any correaltion between them and with GME, and also taking in cconsideration the overall stock market price, such as the S&P 500 to see if those stocks trend up with the overall markets, or have a negativee relationship with them. A statistical analysis is said to have internal validity if the statistical inferences about causal effects are valid for the population being studied. The analysis is said to have external validity if conclusions can be generalized to other populations and settings. In this case the results are internally valid because the inferences about causal effect are only valid for the population that has been analyzed.

Works Cited

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