**Research Project Assignment 1:**

**Research Question and Theoretical Arguments**

**John Hopkins University – Computational Modeling for Policy and Security Analysis**

In the month of January, the market value of GameStop ballooned from a low of $1.4 billion to a high of $33.7 billion, before deflating into the low-single billions in mid-February (DeNapoli, Herbst-Bayliss, Franklin, 2021). The spectacle that was GameStop’s share price, along with the other “stonks” promoted on the WallStreetBets Reddit page (Regnier, 2021), seems to directly contradict the efficient market hypothesis, and the idea of *homo economicus* (the assumption that humans act with perfection rationality, often used in economic models). These ideas underpin much of what we think we know about how markets (particularly securities markets) work, and without them it isn’t clear what drives prices in these markets. If the price of a security isn’t just the expected value based on public information of the security, then what is it? If individuals don’t always make trades that are rational (i.e. maximize future utility), then how do they make trades? How does all of this affect prices in the market? The answer to these questions has implications for large sums of money, as evidenced by the GameStop saga.

The efficient market hypothesis states that a market is efficient if the prices in the market reflect all public information, such that earning a return higher than the expected return is not possible (Fama, 1970). This means that at any given moment the price in the market reflects the expected return of the asset. Since markets are comprised of people buying and selling an asset, this implies that people are buying and selling an asset based on their assessment of the expected return of the asset, and further, that their collective assessment accurately reflects the expected return. If the people in the market buy and sell the asset irrespective of their assessment of the expected return, for example by herding (Bikhchandani & Sharma, 2000), or if their assessment is faulty in some way, for example by displaying irrational exuberance (Shiller, 2000), it is not clear what the price will reflect. My research will attempt to model how the trading strategies of participants in a market affect the price of the market.

In addition to the trading strategy of the participants, there are other factors that affect the price of the market. One such factor is the buying power of participants in the market. If the participants have heterogeneous trading strategies, but a majority of the buying power follows one particular trading strategy, then the market price will most closely resemble that trading strategy. Another factor that influences the price of the market is the liquidity of the market. If it is not easy to buy and sell the asset in the market, then prices may fluctuate more in order to entice another participant to engage in the transaction. My model will attempt to determine how these other factors interact with the trading strategies of participants in the market to affect the prices in the market.

Computational modeling will be used in this research because it is able to account for the heterogeneous strategies and actions of the market participants and determine how those micro strategies and actions affects the market as a whole. This research focuses on the strategies and actions of the individuals in the market, so it is absolutely necessary that the modeling method used is able to capture this. Other modeling methods do not possess the ability to account for a large number of actors with heterogeneous strategies and are thus not suitable for this research.

**References**

Jessica DiNapoli, Svea Herbst-Bayliss, Joshua Franklin. (2021). Exclusive: How GameStop missed out on capitalizing on the reddit rally. Retrieved 2/11/, 2021, from <https://www.reuters.com/article/us-retail-trading-gamestop-capitalraise-idUSKBN2AB14F>

Regnier, P. (2021). Stonks are bonkers, and other lessons from the reddit rebellion. Retrieved 2/11/, 2021, from https://www.bloomberg.com/news/features/2021-02-04/gamestop-gme-how-wallstreetbets-and-robinhood-created-bonkers-stock-market

Fama, E. (1970). Efficient Capital Markets: A Review of Theory and Empirical Work. The Journal of Finance, 25(2), 383-417. doi:10.2307/2325486

Bikhchandani, S., & Sharma, S. (2000). Herd behavior in financial markets. Washington, DC: Internat. Monetary Fund.

Ref

Shiller, R. J. (2000). Irrational exuberance. Princeton [u.a.]: Princeton Univ. Press. ISBN: 1400824362