

**MSc Dissertation Proposal**

**Bitcoin Investment Indices: Evaluating Current Approaches and Developing a Consumer-Focused Index for Optimal Return on Investment.**

**Samuel Jordan (10611160)**

**University of Plymouth**

[**Samuel.Jordan-3@students.plymouth.ac.uk**](mailto:Samuel.Jordan-3@students.plymouth.ac.uk)

**Supervised by: Dr Marco Palomino**

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# Introduction

With the ever-increasing popularity of cryptocurrencies, more and more people are looking into ways to use them and maximize their returns on investments. Currently, 6.2% of the British public own at least one form of cryptocurrency (TripleA, 2023) which is only going to increase in the coming years with more governments and businesses entering the space. Within the UK, even the Bank of England is proposing their own cryptocurrency in the form of the “Digital Pound” (Bank of England, 2023). Whilst Bitcoin was not the first cryptocurrency to be created, with it being pre-dated by others such as eCash and E-Gold (Reiff, 2022), it has become the poster child of cryptocurrency with over 190 million users and 250,000 daily transactions (Howarth, 2023). Having been released in 2009 as an open-source software project, the overall market value now exceeds £368B with a peak of £1.06T in November 2021 (GlobalData, 2023).

With so much money now pouring into the Bitcoin market through businesses, they are increasingly looking to further their profits in the space. However, it’s not just businesses looking to make a profit. With the introduction of cryptocurrencies came ease of access to investments and the ability for anyone in the general public to invest and hold these. Because of this, more people, especially younger adults aged 18-40 who make up 94% of cryptocurrency holders, are looking at ways to automate their investments (Gogol, 2022).

Financial indices are one of such ways to automate their investments. Financial indices look at the soundness, stability and performance of a specific economy and have traditionally been used in stock markets (Statistics Canada, 2018). The most popular stock market index is the S&P 500 which is a compound capitalization-weighted index, meaning that companies with a higher market capitalization have a bigger effect on the index (Miller et al., 2022). This covers the 500 largest publicly traded companies in the USA and gives an overall picture of the market at the current point in time (Miller et al., 2022). Another example is the Stock Fear & Greed Index made by CNN, which shows more of a qualitative display based on stock market price, breadth and volatility and a number of other indicators (CNN, 2023).

Whilst most financial indices are stock market based, there are some immerging indicators surrounding cryptocurrencies. One such index is the Crypto Fear/Greed Index (CFGI) created by Alternative’s internal cryptocurrency division. This culminates a number of factors including social media sentiment, market volatility, search trends, market dominance and volume (Alternative, 2023). This can be used to see the overall status of the market at a given time, which in the case of this research is Bitcoin.

As the popularity of cryptocurrencies continues to increase, people are looking to answer the question if these stock-market based indices can be adapted to apply to cryptocurrencies instead. This project will look at the profitability of these indicators and whether the return on investment (ROI) can be improved through the development of my own.

# Aims and Objectives

* Understand the range of indices that businesses currently use for Bitcoin investment.
  + Research the current means that business uses for Bitcoin investment.
  + Understand where the CFGI and other indicators could help and fit into this.
  + This may involve contacting the creator of CFGI for any further input
* Measure the correlation between the CFGI and the overarching price of Bitcoin.
  + Data will be obtained regarding using the Alternative.me Fear & Greed Index API based on a daily timeframe.
  + Data will be obtained regarding the price of Bitcoin through an API on a daily timeframe.
  + Both sets of data will be normalised and cleaned if necessary.
  + CFGI data will be evaluated to see if there is any correlation between itself and the price of bitcoin.
* Create an alternative Bitcoin financial index.
  + Research what data should be used to create my own financial index such as:
    - Twitter Sentiment
    - Google Trends
    - Market Cap
    - Market Trends
  + Obtain any data necessary to create the financial index through APIs and other means.
  + Evaluate the index using the same methods as CFGI.
* Measure whether indices should be used for bitcoin investment strategies.
  + Evaluate the two indices together using their correlation to the price of Bitcoin.
  + Understand whether they are of any use for Bitcoin investment in the current climate.
  + Compare both methods to current investment strategies and evaluate their effectiveness.
* Some optional additional aims include:
  + The indicator’s value could be displayed on a webpage.
    - GitHub Pages
      * https://pages.github.com/
  + The indicator could be used for an automated python trading bot.

# Research Context

Several Bitcoin investment strategies rely on the long-term investment potential. The most popular strategies include dollar-cost averaging (DCA) and buy-and-hold, which is more colloquially known as HODL or “hold on for dear life” when used in cryptocurrency markets (Waksman, 2022; Yogarajah, 2022). The HODL strategy is based upon its stock market equivalent, whereby an investor buys an asset with the hope that it will increase in the long term, regardless of the market’s highs and lows (Public, 2023). The term HODL originated from a 2013 bitcoin forum post when a user intended to hold his investments due to being a bad trader, but mis-spelt it (Yogarajah, 2022). From here it became a mainstream investing term, overtaking the popularity of the original buy-and-hold strategy. Ben Gagnon, chief mining officer for Bitfarms (BITF), says “To HODL is an acknowledgment that while a lot of money can be made trading short-term volatility, a lot of money can also be easily lost” (Duggan, 2022). Whilst using the HODL strategy has proven to be successful, it does however take a significant amount of mental discipline to execute correctly. Throughout the years, bitcoin has seen horrendous returns in short amounts of time, recent examples include the 60% drop due to COVID-19 in 2020 and a 73% decrease in 2022/23 due to the war in Ukraine and impending economic recession. This massive volatility is what causes unrest when executing the strategy. Regardless of the shortfalls, using this strategy would have yielded 115.28% ROI if investment was made 3 years ago (TradingView, 2023).

DCA or dollar-cost averaging is an investment strategy that is widely used within cryptocurrency due to its ease of use for the average consumer and good profit margins. DCA suggests that a consumer or business contributes a small amount of their money into an investment, in this case bitcoin, to allow them to purchase whilst the market is both high and low (Luci & Bernaschi, 2022). This allows their ROI to average out from market variation. For large institutional investors, DCA can also be a good way to break up stock acquisition to reduce large jumps or drops in price due to a significant stock transaction, however this is much less of an issue for the average consumer (Constantinides, 1979). Furthermore, DCA has proven to be more beneficial to an average consumer due to them having employment, compared to businesses that can have large banks of cash available to them. This allows them to place small amounts of their monthly payments into DCA, which in turn can be automated via a direct debit in the UK. This makes it extremely enticing as it means they never get to see the money, and directly invest money without having to worry about regularly accessing a trading platform and transferring money. They also don’t have to spend their times analysing markets and can instead average out their purchases over a longer term. With the exponentially increasing value of Bitcoin over the past 10 years, this has become quite a popular strategy due to its safety and reliability to create strong long-term profits (Wójcik-Czerniawska, 2020).

Both of these strategies rely on the up-and-coming nature of Bitcoin, with its increasing value scarcity and adoption into the mainstream increasing the price consistently over the last 10 years. They also rely on the increase of Bitcoin’s price based on the “Halving” event whereby the reward for mining is reduced by half (Meynkhard, 2019). This has typically coincided with price increases and underpins the fundamentals of Bitcoin by introducing scarcity, thus driving the price up. Following DCA, if you placed £1 per day into Bitcoin since 01/05/2023, whilst you would have spent £11,800 this would now be worth £372,825 with a 3,059.54% ROI. Similarly, if you had bought £11,800 worth of Bitcoin in 2013 (The same as £1 per day since 01/05/2013) and followed the HODL strategy this would now be worth £2.236 million with a monumental 19,612.82% ROI (BitcoinDollarCostAverage, 2023).

With the maturing of the cryptocurrency space, a number of Cryptocurrency specific indices have become available. The most popular of these is the Crypto Fear & Greed Index (CFGI) created by Alternative.me, however there are alternatives created by companies too, most notably BTCTools and Lookintobitcoin.

Businesses and individuals are looking at ways to maximise their profit through automated indices. In a paper by Jing-Zhi Huang et al. (2019) they attempted to predict Bitcoin returns by using a tree-based classification model with 124 individual technical indicators. Their model shows a 0.67% daily mean return and when applied to a year, adds up to 1049.15% which looks successful. However, when comparing this to using the HODL technique which over the same time period had a profit of 2066.25% this is no longer as impressive. After accounting for trading fees on top of this, which would have to be paid every time the model wanted to trade (around 1% per transaction for Bitcoin), this quickly adds up and makes the ROI even lower (Coinbase, 2023; Kim, 2017). The issue with their paper is that they only look at the win to loss ratio of days, regardless of their return values. In the years analysed, they show that the win-to-loss ratio of Bitcoin days is 1.38, to say that for every 1 day that the price goes down, the price goes up 1.38 times. Their model does outperform this with a value of 1.78, however clearly from the annual profit numbers, this doesn’t make it more successful as an investment figure, as the main point is to have the highest ROI. As Bitcoin is known for being extremely volatile, this could be down to unforeseeable and unpredictable jumps in price that the HODL technique takes advantage of. To conclude that their model “outperforms the buy-and-hold strategy” however, is not only cherry-picking information, but also wildly inaccurate on their behalf.

Similar to the CFGI, the “Value Line Ranking System” provides a view of approximately 1,700 stocks via a series of numbers concerning each corner of the stock in question and has been around since 1965. This includes safety, timeliness, technical and financial strength, which are all compound indices built from smaller financial indicators (Value Line, 2023). In the paper by Zhang et al. (2010), they categorise the ranks as: 1-2 bullish, 3 neutral and 4-5 bearish. These recommendations directly allow customers to see the economic state of a company and act upon this. They show that the most impactful change is when a company increases in rank (from 2 to 1), where acting upon this can yield 16.74% cumulative average abnormal return across all markets analysed. Some investors argue however, that this is “merely a manifestation of the post-earnings announcement drift” showing that it might in-fact be a lagging and dated indicator in today’s world (Stickel, 1985). Due to the popularity of this as well, certain investors may lose or gain money whilst using the same indicator due to problems such as early mail arrival or leaking of data days in advance (Peterson, 1987). However due to their shift to a website instead of postal values in 2005, this is currently less of an issue than it used to be (Zhang et al., 2010). Positive increases in the values can also cause abnormal stock market trading, causing the price to artificially raise due to speculation based on the indicator (Peterson, 1995).

Research has been done to look at stock-based indices and their usage within investments, however, much less has been done surrounding Cryptocurrency and their equivalents. I will focus on this section of the market and also emphasise consumer-based investments, rather than businesses. Following on from the research by Jing-Zhi Huang et al. (2019) I will use a ROI approach, as to ensure that the true usefulness of the indices in question are properly evaluated. My paper should help to inform the general public about indices when looking to invest into cryptocurrency, and potentially suggest a new index which could be more effective.

# Research Design

* Data needed to evaluate the fear/greed index.
  + CFGI Values
    - Alternative.me APIs
      * <https://api.alternative.me/fng/?date_format=world&limit=0>
      * <https://alternative.me/crypto/fear-and-greed-index/#api>
  + Bitcoin values by date
    - CoinGecko Cryptocurrency API
      * <https://www.coingecko.com/en/api>
    - CoinMarketCap API
      * <https://coinmarketcap.com/api/>
    - Alternative.me Crypto API
      * <https://alternative.me/crypto/api/>
    - Investing.com historical data
      * <https://uk.investing.com/crypto/bitcoin/btc-usd-historical-data>
    - Look Into Bitcoin data
      * <https://www.lookintobitcoin.com/>
* Data to create own indicator.
  + Twitter Data for sentiment analysis
    - Emotion python package
      * https://pypi.org/project/text2emotion/
    - Kaggle Bitcoin Twitter dataset
      * <https://www.kaggle.com/datasets/kaushiksuresh147/bitcoin-tweets>
      * Covers tweets from 2021 to 2023 with over 4.69M entries which should provide enough data to create my index from.
    - Twitter API
      * <https://developer.twitter.com/en/docs/twitter-api>
      * Can gather additional data from Twitter if Kaggle dataset doesn’t contain the required amount.
  + Market Cap values
    - *Same as Bitcoin values by date*
  + Bitcoin values by date
    - *Same as Bitcoin values by date*
  + Google trends data
    - Python Google Trends package “pytrend”
      * <https://pypi.org/project/pytrends/>

# Risk Assessment

|  |  |  |  |
| --- | --- | --- | --- |
| Risk | Probability | Severity | Mitigation Measures |
| Computer usage for long periods of time causing eye strain. | 8 | 8 | * Will take regular breaks to ensure that this doesn’t happen. * Attempt to work in smaller time blocks to mitigate this further. * Ensure that the room is properly lit. |
| Strain Injury from keyboard usage. | 8 | 8 | * Take regular breaks away from the keyboard to do other things to stretch hands and fingers. |
| Extended computer usage causing back pain. | 5 | 7 | * Ensure that the chair used is properly adjustable to be comfortable. * Take regular breaks to stretch. |
| Data loss due to hardware/software issues and failure | 2 | 10 | * Regular backups will be made to both external drives and cloud storage. * Use GitHub to reduce the likelihood of this. * Ensure work is properly saved before closing laptop/computer. |
| Mental health issues from stress | 4 | 7 | * Ensure periods of break are taken away from work. * Utilise the university support network and dissertation advisor if necessary. |
| Project length extended due to issues such as illness or accidents out of my control. | 2 | 7 | * Set regular goals to be met to ensure that the project is on track. * Use Trello and add all points within the project to be able to track progress. (<https://trello.com/b/dXnSv1b8/bitcoin-index-dissertation>) * Plan items with buffers so that the length can be extended if necessary |

# Ethics

I will not need ethical approval for my project due to the scope of the data being used within it. All of the data being utilised within my project are open license, publicly available and not collected first-hand, whether that be Twitter data or Bitcoin market data. For the creation of my own index, I will use a publicly available Kaggle dataset (https://www.kaggle.com/datasets/kaushiksuresh147/bitcoin-tweets) which covers Bitcoin tweets from the 6th of February 2021 onwards, this dataset has a public domain license so is open for usage.

Any Twitter data that is needing to be collected for the use of the project through their API will be kept secure, it will be exclusively data which is publicly available, and it will only be used for the purpose of this project as per their Developer Agreement Policy (Twitter, 2023). I will also follow the Good Research Practice guidelines in this regard, which suggests that all data not be held for anything other than the sole purpose and period of the project (University of Plymouth, 2022).

# Impact

My proposed research paper should provide a definitive conclusion to whether certain cryptocurrency indices can be trusted as an investment tool or not for both businesses and consumers. Following on from the minimal amount of research in the area at the current time, an analysis of the current indices should help to inform the public surrounding their potential use in investment markets. I will reinforce this through the creation of my own index using publicly accessible data, whilst also analysing what sectors of data influences the price of Bitcoin the most within this including Twitter sentiment.

# References

Alternative. (2023) “*Crypto Fear & Greed Index*”. Available at: https://alternative.me/crypto/fear-and-greed-index/ (Accessed 27 February 2023).

Bank of England. (2023) “*The digital pound: A new form of money for households and businesses?*”. Available at: https://www.bankofengland.co.uk/paper/2023/the-digital-pound-consultation-paper (Accessed 27 February 2023).

BitcoinDollarCostAverage (2023) “*Bitcoin Dollar Cost Average*”. Available at: https://www.bitcoindollarcostaverage.com/ (Accessed 27 February 2023).

CNN. (2023) “*Fear & Greed Index*”. Available at: https://edition.cnn.com/markets/fear-and-greed (Accessed 27 February 2023).

Coinbase. (2023) “*Coinbase Commerce Fees*”. Available at: https://help.coinbase.com/en/commerce/getting-started/fees (Accessed 27 February 2023).

Constantinides, G. (1979) “*A Note on the Suboptimality of Dollar-Cost Averaging as an Investment Policy*”, Journal of Financial and Quantitative Analysis, 14(2), pp. 443-450.

Duggan, W. (2022) “*What Does HODL Mean?*”. Available at: https://www.forbes.com/advisor/investing/cryptocurrency/what-does-hodl-mean/ (Accessed 27 February 2023).

GlobalData. (2023) “*Bitcoin’s Market Capitalization History (2013 – 2023, $ Billion)*”. Available at: https://www.globaldata.com/data-insights/financial-services/bitcoins-market-capitalization-history/ (Accessed 27 February 2023).

Gogol, F. (2022) “*Study: 94% of Crypto Buyers are Gen Z/Millennial, but Gen X is Outspending Them*”. Available at: https://www.stilt.com/blog/2021/03/vast-majority-crypto-buyers-millennials-gen-z/ (Accessed 27 February 2023).

Howarth, J. (2023) “*How Many People Own Bitcoin? Blockchain Statistics (2023)*”. Available at: https://explodingtopics.com/blog/blockchain-stats (Accessed 27 February 2023).

Huang, J.Z., Huang, W. and Ni, J. (2019) “*Predicting bitcoin returns using high-dimensional technical indicators*”, The Journal of Finance and Data Science, 5(3), pp. 140-155.

Kim, T. (2017) “*On the transaction cost of Bitcoin*”, Finance Research Letters 23, pp.300-305

Luci, F. and Bernaschi, M. (2022) “*Algorithmic Trading Systems in Blockchain Era*”, Blockchain and cryptocurrencies, pp. 26.

Meynkhard, A. (2019) “*Fair market value of bitcoin: halving event*”, Investment Management and Financial Innovations.

Miller, M. and Prondzinski, D. (2022) “*Equal Weighted Indices Versus Market Capitalization Weighted Indices: Which Index Provided the Best Risk Adjusted Returns, the S&P 500 Equal Weighted or the S&P 500 Capitalization Weighted Index*”, Journal of Accounting and Finance, 22(1), pp. 133-152.

Peterson, D.R. (1987) “*Security price reactions to initial reviews of common stock by the Value Line Investment Survey*”, Journal of Financial and Quantitative Analysis, 22, pp. 483–494.

Peterson, D.R. (1995) “*The informative role of the Value Line Investment Survey: Evidence from stock highlights*“, Journal of Financial and Quantitative Analysis, 30, pp. 607–618.

Public. (2023) “*HODL: A typo that became a crypto investing strategy*”. Available at: https://public.com/learn/hodl-meaning (Accessed 27 February 2023).

Reiff, N (2022) “*What Was The First Cryptocurrency?*”. Available at: https://www.investopedia.com/tech/were-there-cryptocurrencies-bitcoin/ (Accessed 27 February 2023).

Statistics Canada. (2018) “*Financial indicators from the National Balance Sheet Accounts: Update*”. Available at: https://www150.statcan.gc.ca/n1/pub/13-605-x/2012004/article/11730-eng.htm (Accessed 27 February 2023).

TradingView (2023) “*Bitcoin/British Pound*”. Available at: https://www.tradingview.com/symbols/BTCGBP/ (Accessed 27 February 2023).

TripleA. (2023) “*How many crypto owners are in the United Kingdom?*”. Available at: https://triple-a.io/crypto-ownership-united-kingdom-2022/ (Accessed 27 February 2023).

Twitter. (2023) “Developer Agreement and Policy”. Available at: https://developer.twitter.com/en/developer-terms/agreement-and-policy (Accessed 1 March 2023).

University of Plymouth. (2022) “Code of Good Research Practice”. Available at: https://www.plymouth.ac.uk/research/governance/research-ethics-policy (Accessed 1 March 2023).

Value Line. (2023) “*The Value Line Ranking System*”. Available at: https://www.valuelinepro.com/value-line-ranking-system (Accessed 27 February 2023).

Waksman, A. (2022) “*Antitrust and Crypto Exchanges: Time to HODL*”.

Wójcik-Czerniawska, A (2020) “*Cryptocurrencies as a capital investment during the COVID-19 pandemic*”, The WSB University in Poznan Research Journal, 89(2), pp. 23-31.

Yogarajah, Y. (2022) “*’Hodling’ on” Memetic storytelling and digital folklore within a cryptocurrency world*”, Economy and Society, 51(3), pp. 467-488.

Zhang, Y., Nguyen, G.X. and Steven, L.V. (2010) “*Yes, The Value Line Enigma Is Still Alive: Evidence from Online Timeliness Rank Changes*”, The Financial Review, 45, pp. 255-373.