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Bitcoin Pricing and Analysis

Devansh Reddy

Student, Oakridge International School

Abstract:
This research paper delves into the intricacies of Bitcoin pricing and analysis, exploring its economic implications, market behavior, and future potential. It examines the fundamental aspects of Bitcoin as a cryptocurrency, including its decentralized nature, blockchain technology, and factors influencing its value. By comparing Bitcoin's compounded annual growth rate (CAGR) with traditional assets like gold and the S&P 500 (SPY), the study highlights Bitcoin's volatility and high return potential. The paper employs a multivariate regression model to predict Bitcoin prices based on technical parameters such as transaction volume, block size, and network difficulty. Additionally, it analyzes the impact of media attention and market sentiment on Bitcoin's price fluctuations. The study concludes by forecasting Bitcoin prices for the next decade, emphasizing its viability as an investment and the need for increased institutional and retail participation in the cryptocurrency market.

Keywords: Bitcoin; Cryptocurrency; Blockchain; Bitcoin pricing; Bitcoin analysis; Bitcoin volatility; Bitcoin growth rate; Bitcoin mining; Bitcoin transactions; Bitcoin network; Bitcoin valuation; Bitcoin market; Cryptocurrency adoption; Cryptocurrency investment; Digital currency; Bitcoin returns; Bitcoin stability; Bitcoin speculative demand; Bitcoin equilibrium; Bitcoin marginal cost; Bitcoin marginal product; Bitcoin transaction costs; Bitcoin supply; Bitcoin demand; Bitcoin regulatory challenges; Bitcoin market efficiency; Bitcoin attention drivers; Bitcoin future predictions; Bitcoin technical analysis; Bitcoin economic impact.

INTRODUCTION

What is cryptocurrency?

Cryptocurrency which is a medium of exchange is created and stored electronically in the blockchain. This is done using encryption techniques to control the creation of monetary units and to able to verify the transfer of funds. Bitcoin is the most well-known example of cryptocurrency.

Important features to understand for the same are:

- It does not have any intrinsic value - it is not redeemable for another commodity, such as gold.
- It is an intangible asset and exists only in the network i.e., it has no physical form.
- The network of a cryptocurrency is completely decentralized, and its supply is not determined by a central bank.

How blockchain works – fundamental understanding for beginners? \

1. A transaction is required by someone.
2. The requested transaction is then broadcasted to a P2P (peer to peer) network, consisting of computers known as nodes.
3. The network of nodes validates the transaction and the user’s status using known algorithms.
4. A verified transaction can involve cryptocurrency, contracts, records, or other information.

5. Once verified, the transaction is combined with other transactions to create a new block of data for the ledger.
6. The new block is then added to the existing blockchain, in a way that is permanent and unalterable.
7. The transaction is completed.

Known benefits include the following:

- Increased transparency
- Accurate tracking
- Permanent ledger
- Cost reduction

Uncertainties in the blockchain environment:

- Complex technology
- Regulatory implication
- Implementation challenges
- Competing platforms

The recent buzz about bitcoin started with an Elon Musk tweet indicating bitcoin is a "good thing." This sparked speculative demand for this medium of exchange and popularized it among the common folk. The major demand for bitcoin remains speculative which causes daily fluctuations which increases the volatility and reduces user confidence.

In the recent times, we notice an increase in transaction demand which indicates a positive trend in the cryptocurrency acceptance by the masses. There is still negligible Precaution demand as people still can't entrust their wealth in this asset class as a safe haven.

A transformative change in people's attitudes about cryptocurrency is important to increase acceptance, reliability, and stability in the prices. The sooner people grow out of their misconception of bitcoin being a "bubble" ought to crash in the foreseeable future, can there finally be stability in the crypto industry.

Marginal cost and product of Bitcoin:

Marginal cost of production for bitcoin

Marginal cost of production for bitcoin equals the electricity costs along with the amortised hardware costs of solving a new block of transactions. This is because each new block contains a mining award(new coins) for the peer whose hashing finds a solution to the system's hash problem.

Marginal product creation w.r.t Bitcoin

To compensate for the costs of doing this costly hashing work, the miner is awarded a certain number of new coins each time he solves the hash problem on a block. The new coins are the marginal product created during the mining process.

How is equilibrium maintained?

Miners will work on new blocks only when the cost of electricity required to run the hashing hardware is lesser than the expected value of the mining award.

Since there are no barriers of entry to the mining process and the protocol's hashing difficulty serves as the equilibrating mechanism.

If Bitcoin's exchange value increases mining will be more profitable at current level of difficulty, more miners will choose to enter the hashing process and because of this the protocol will adjust the difficulty upward . This will make the expected value of returns on mining = costs of mining again.

If Bitcoin's exchange value decreases mining will be less profitable at current level of difficulty, miners

will choose to exit the hashing process and because of this the protocol will adjust the difficulty downward. This will make the expected value of returns on mining = costs of mining again.
Hence the model of MC=MP remains consistent .
This shows that the marginal cost of production is equal to the exchange rate at any given point in time. The exchange rate determines the marginal cost instead of it being the other way around.

Literature Review

Topic: **Some simple bitcoin economics Objective**:

In the above research paper, we see a model of an endowment economy with two competing, but intrinsically worthless currencies, i.e., Dollar and Bitcoin. While the former is supplied by the central bank to achieve its inflation target, the latter's supply grows deterministically. Through the fundamental pricing equation employed, we notice that the Bitcoin prices form a martingale. In the paper, the author aims to discuss the following:

1. Monetary policy implications
2. Bitcoin production process and intricacies
3. Taxation
4. Welfare and entry
5. Characteristics of the range of equilibria

Research methodology:

The authors have listed several propositions in the paper, each accompanied with disparate assumptions, and performs detailed analysis to draw the conclusions. The model used for estimation is fundamentally based on the transaction costs approach. Furthermore, each individual proposition employs an individualistic approach:

a) Proposition 1: Fundamental pricing equation
- standard asset pricing perspective

b) Proposition 2: Speculative price bound
- Stochastic model

c) Proposition 3: Real Bitcoin Disappearance
- Fundamental pricing model

d) Proposition 4: Bitcoin production condition
- Effort formulation model

e) Proposition 5: Irrelevance of Mining Taxation
- Linear tax vs proportional tax model

Conclusion:

Based on the different research methodologies used in the paper, many intriguing results came to light. Both currencies can be used as a medium of exchange. A fundamental pricing equation is derived when both the currencies are simultaneously being used. The block rewards are not a tax on the Bitcoin holders, rather they are financed by the taxes imposed by the Central bank. Price volatility does not invalidate the function of Bitcoin as a medium of exchange. This has further been proved in our speculative bound model. Under both conventional and unconventional circumstances, we realize that bitcoin price might appreciate or depreciate. Nonetheless, it is fit to be used as a medium of exchange and store of money.

Topic: The inefficiency of bitcoin revisited: A dynamic approach Objective:

In the above paper, the authors highlight the international efficiency of the Bitcoin market. More specifically, the authors analyze the time-varying behavior of long memory of returns on Bitcoin and its volatility from 2011 to 2017, employing the Hurst exponent. The research paper is divided into sections, with the purpose of covering 3 aspects:

a) It proposes the use of Detrended Fluctuation Analysis method, instead of commonly used R/S method.
b) It works with sliding windows, in order to dynamically assess the efficiency across time.
c) It considers the long-range memory in the daily volatility of returns, which can proxy the risk of the unstable market.

Research methodology:

The paper uses the daily prices of Bitcoin, retrieved from DataStream with period of examination from 18/08/2011 to 15/02/2017, with a total of 1435 observations. The study of long-range dependence can be traced back to seminal paper by Hurst (1951), whose original methodology to detect long memory in hydrologic time series. This method was later used in the study of economic time series by Mandelbrot (1972). This method uses the range of the partial sums of deviations of a time series from its mean, rescaled by its standard deviations.

Conclusion:

On the basis of the comprehensive analysis, the authors find that the daily returns from 2011 to 2014 were essentially persistent, whereas after the year, the behavior seems to be compatible with a white noise. The daily volatility exhibits a persistent behavior during all the periods under study. The authors also notice that the long memory content of daily volatility is stronger in daily returns. In conclusion, the volatility clustering is a key feature of the Bitcoin market.

Topic: What is Bitcoin?

Objective:

In the above research paper, the author aims to educate the misinformed segment about the basic and overview of Bitcoin, a leading cryptocurrency in simple terms. The paper explains what a virtual currency essentially means and the fundamental working of Bitcoin, with respect to the decentralized blockchain system. Bitcoin usage in Sweden is described with great detail. Moving forward the future of Bitcoin and other Altcoins is discussed, bearing in mind all the plausible ramifications and barriers in the way of adoption of this virtual currency. The government's regulatory frameworks have been briefly discussed to put the adoption process into geopolitical context.

Research Methodology:

The author has used a qualitative approach, wherein he analyzes the various factors based on intuitive and psychological reasoning. Very rarely does the author back his arguments with relevant statistics. Nonetheless, the author seems to crisply explain the following subtopics:

a) How bitcoin works
b) How the transactions are verified by the block
c) The mining reward process and real-time payment process
d) Quantitative data about the bitcoin usage, global breakup of countries, and adoption stages
e) Cost-benefit analysis of Bitcoin for users

Conclusion:

The main factor that will probably make it difficult for Bitcoin to grow as a means of payment is the

absence of consumer protection and supervision by public authorities. Another major barrier for bitcoin adoption is that it does not work for all types of payments. The sad payments do not occur in real-time, and are verified every 10 minutes. Bitcoin functionality is based on the incentives of the miners to verify the blocks of transactions. If these incentives were undermined, the virtual currency would collapse. Despite these aforementioned barriers to Bitcoin being globally adopted, the scope for growth is always there. With time we shall see if this new technology gets adopted or if it was just a fad.

Topic: What Causes the Attention of Bitcoin?

Objective:

In this paper, the author strives to understand why bitcoin has received enormous attention both by media and investors. The author through this paper aims to answer the aforementioned question by examining the relationship between investor attention and Bitcoin fundamentals. The surge in Bitcoin's attention is attributed to the following:

a) Innovative features
b) Simplicity
c) Transparency
d) Increasing popularity

Research Methodology:

The attention data is obtained from Google Trends for the keyword "Bitcoin" from the period 1st August 2010 to 31st July 2017. The volume measure is limited to the number of searches from within the USA. The author follows the Dimpfl and Jank (2016) and standardize the search queries such that the average search frequency over the sample period equals one. The focus is mainly on Bitstamp exchange as it is the most liquid and popular Bitcoin exchange in the USA. The relevant tick data is downloaded from www.bitcoincharts.com where we aggregate the data to a 5-minute level to construct a time series of daily realized volatility. The paper utilizes Google Trends search queries to examine what drives the attention of Bitcoin.

Conclusion:

In this paper, we find that the previous day volatility and volume are significant drivers of attention of Bitcoin, as well as two days previous returns. However, after splitting our data into two subsamples, we find that this is only the case from October 2013 and therefore our results indicate that investors are attracted to Bitcoin after large increases in volatility and trading volume of Bitcoin.

Topic: The economics of Cryptocurrency- Bitcoin and Beyond Objective:

In this paper, the author studies optimal design of cryptocurrencies and assess quantitatively how well such currencies can support bilateral trade. The paper discusses the whether these new currencies can support payments without the need to designate a third-party that controls the currency or payment instrument possibly for its own profit. In this discussion, the author develops a general equilibrium model of a cryptocurrency that uses a blockchain as a record-keeping device for payments. The focus is primarily on understanding how the design of a cryptocurrency influences the interactions among participants and their incentives to cheat.

Research Methodology:

The author makes use of a quantitative model to develop the equilibrium model of a cryptocurrency. The model will capture precisely this interdependence by explicitly looking at the joint determination of

mining efforts, rewards and cryptocurrency value in general equilibrium. The main features of the model are as follows:

a) A consensus protocol
b) Settlement lags
c) A reward scheme

To focus on the double spending problem, the author develops a partial equilibrium model to study the mining and double-spending decision within one payment cycle.

Conclusion:

The idea of distributed record-keeping with a blockchain based on consensus via PoW is fascinating. Individual incentives to double-spend and the costs associated with reining in these incentives drive the economics of this technology, which underpins most cryptocurrencies. These costs are both private and social, as settlement delays are a private good and mining is a public good. As a result, as a cryptocurrency's size grows, it becomes more effective. This explains why a double-spending proof equilibrium can only occur when the consumer pool is big enough, and why a cryptocurrency works better when the number of transactions is large compared to the size of individual transactions. This perspective seems to be mostly overlooked in the current discussion, but it highlights the scalability of cryptocurrencies as the most pressing technical obstacle to address. Their experiment demonstrates that cryptocurrency systems have the potential to be a viable alternative to traditional retail payment systems once some technical barriers are overcome.

PROPOSITIONS

Proposition 1: Bitcoin yearly(medium term) CAGR comparison vis-a-vis gold, SPY to determine the asset class with the best growth figures, for a period starting from 2010.

Proposition 2: Bitcoin 3-yearly(long term) CAGR comparison vis-a-vis gold, SPY to determine the most stable long term asset class, for a period starting from 2010.

Proposition 3: Bitcoin volatility comparison vis-a-vis gold, SPY(An ETF of the S&P 500 index) through calculation of rolling returns on a monthly basis for a 3 year period (2018-2020).

Proposition 4: Estimation of bitcoin price($\hat{Y}$) based on empirical data- number of transactions per day(x1), average block size(x2), blockchain size(x3), average transactions per block(x4), network difficulty(x5), and miner's revenue(x6)- using a multiple regression model.

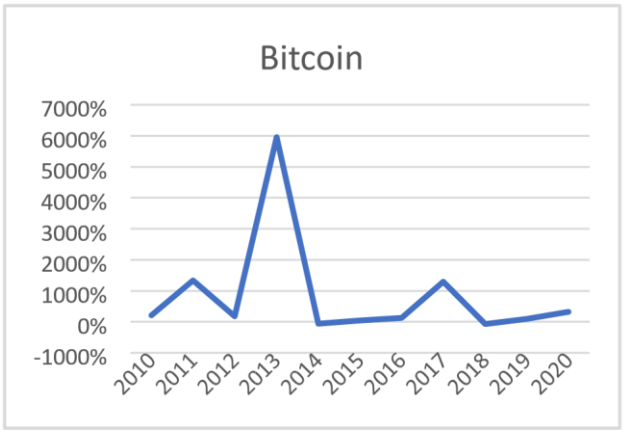
Proposition 5: Determining the relative importance of the predictor variables in the multiple regression model.

ANALYSIS

COMPOUNDED ANNUAL GROWTH RATE(CAGR)

The Compound annual growth rate (CAGR) is the rate of return at which an investment grows from its beginning balance to its ending balance, assuming the profits were reinvested the end of each year of the investment's lifespan.

ANNUALISED CAGR ANALYSIS

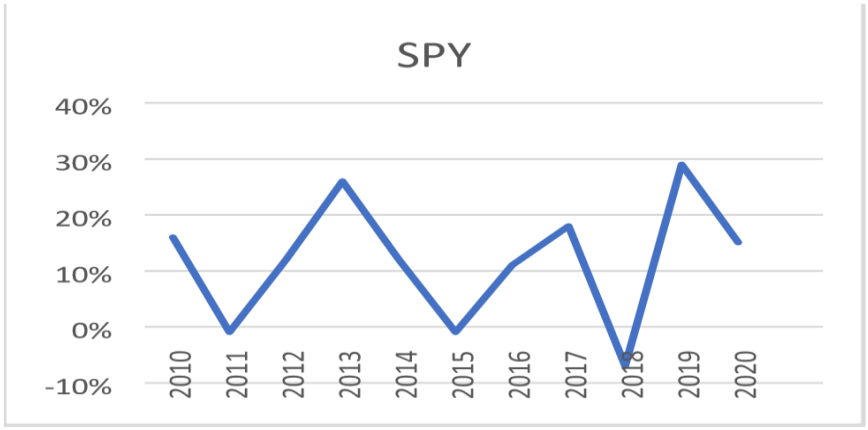


MAXIMUM CAGR: 5959% (2013)

MINIMUM CAGR 75% (2018)

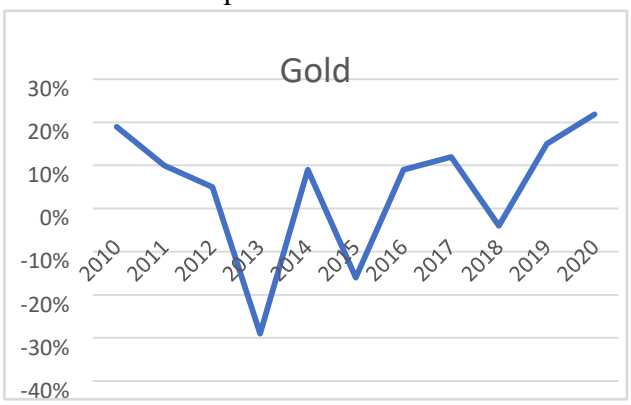
Source : Investing.com

Graph created on excel



MAXIMUM CAGR: 22%
MINIMUM CAGR: 29%
Source: Yahoo Finance

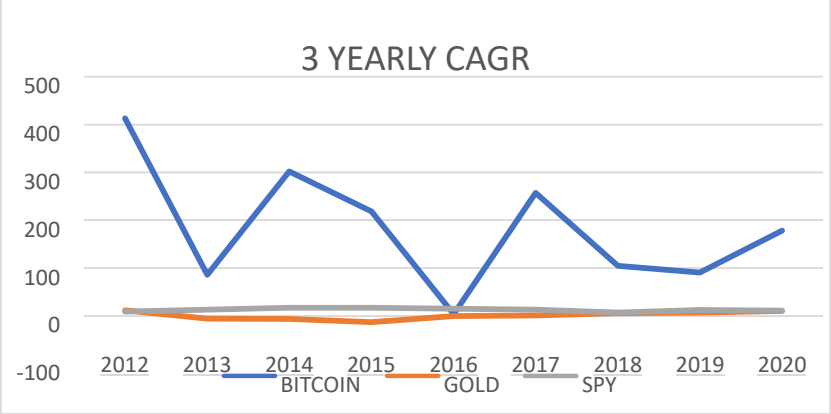
Graph created on excel



MAXIMUM CAGR: 29%
Source: Yahoo Finance
Graphs created on excel

We can analyze that the maximum CAGR of Bitcoin is 271 times that of Gold and 205 times that of SPY. Bitcoin is
the only asset among the three to have a four-digit return. It however also has the most widespread range of
MINIMUM CAGR: 7 % returns among the
three asset classes which show it's price is volatile over a short time span.

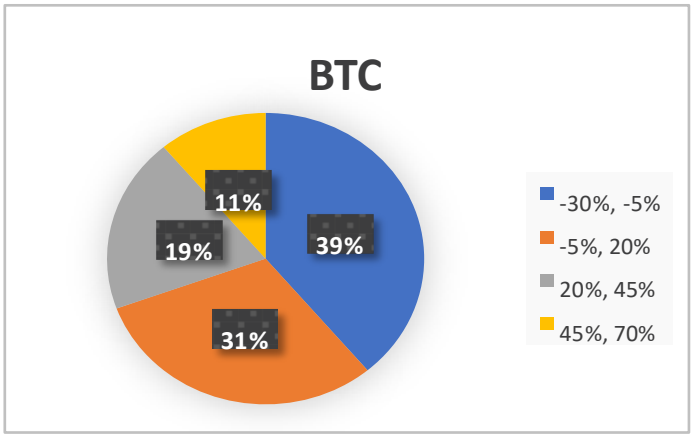
3 YEARLY CAGR FROM 2009-2020



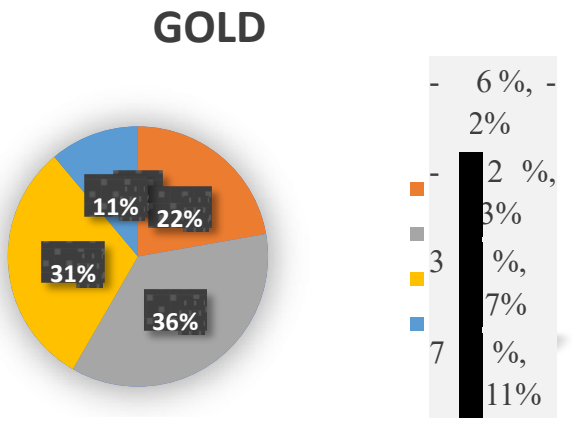
The highest 3 yearly CAGR for Bitcoin was 413% (2010-12), while that of Gold was 12% (2010-12) and that of SPY was 17% (2012-14). The lowest 3 yearly CAGR for Bitcoin was 3.8% (2014-16), while that of Gold was -12.75% (2013-15) and that of SPY was -7.53% (2016-18).
We can infer that in the afore mentioned 3-year period, Gold is the only asset among the three to have a negative 3 yearly compounded annual growth rate (the price at the end of the 3-year period was lower than that at the beginning). The return of Bitcoin over a 3 period is much more than the other asset classes. Contrary to traditional beliefs these high returns over a longer timeframe make it a safer investment than the others asset classes.

ROLLING RETURNS

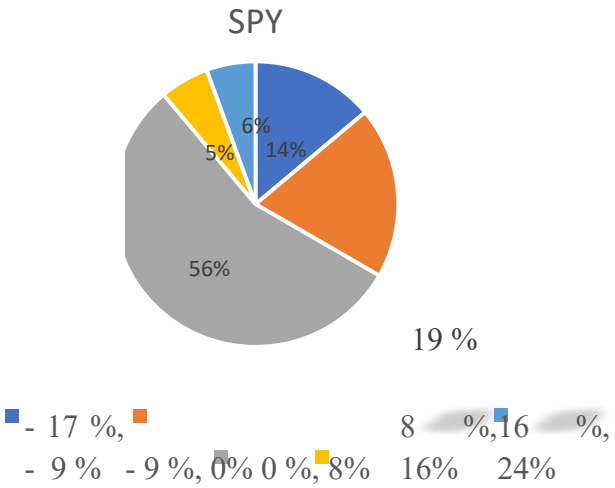
Rolling Returns are the average annualised returns taken for a said timeframe on every day/week/month and recorded till the last day of the duration considered. In our case we have considered monthly returns. We have shown these returns using a Histogram and a pie chart.



The above graphs show that majority of the returns(70%) of Bitcoin are in the range of --30% to 20%
.

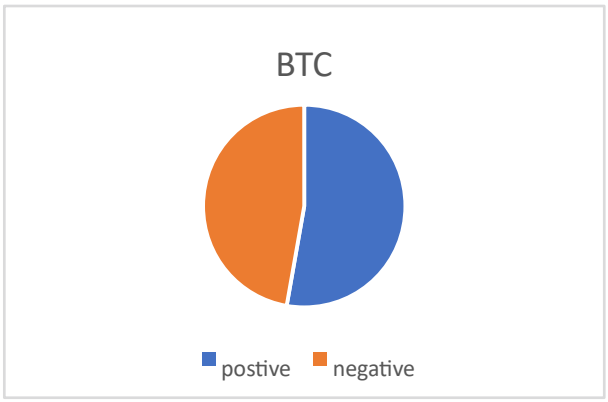


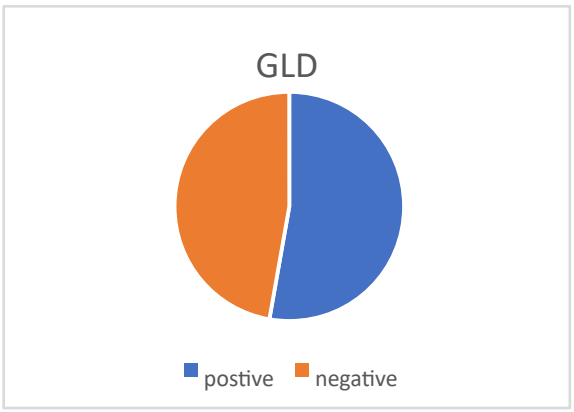
he above graphs show that majority of the returns(67%) of Gold are in the range of -12% to 7%



The above graphs show that majority of the returns(75%) of Bitcoin are in the range of –9% to 8%

The rolling returns of Bitcoin range from -30% to 70% as compared to gold whose range of returns is 17% (-6% to 11%) and SPY's is 41% (-17% to 24%). It can thus be observed that Bitcoin has the most diverse range of returns. Most of the returns are concentered over a particular range which is wide in the case of Bitcoin(-30% to 20%) and very narrow as in the case of Gold and SPY(19% and 17% respectively)





Both BTC and GLD have the same number of positive and negative returns.

STANDARD DEVIATION OF ROLLING RETURNS

BITCOIN – 24%

GOLD – 4%

SPY – 7.6%

From the rolling returns which are calculated over a 3 year period (monthly basis) we can conclude that the standard deviation of bitcoin is 3.16 times the standard deviation of SPY and 6 times the standard deviation of gold. This shows that bitcoin is the most volatile asset.

MULTIVARIATE REGRESSION BASED ON TECHNICAL PARAMETERS:

The fundamental variables associated with the bitcoin mining process are:

1. **Number of transactions per day(x1)** - the total number of transactions on the blockchain network on a given day.
2. **Average block size(x2) -** the average block size over the past 24 hours measured in megabytes (MB).
3. **Blockchain size(x3**) - the total size of the blockchain minus the database indexes measured in megabytes (MB**).**
4. **Average transactions per block(x4)** - the average number of transactions per block in the last 24 hours.
5. **Network Difficulty(x5) -** It is a measure of how difficult it is to mine a Bitcoin block, or in more technical terms, to find a hash below the given target. A higher difficulty requires higher computing power to mine the same number of blocks, making the blockchain network more secured.
6. **Miner's Revenue(x6)**- the total value of the Coinbase rewards and transaction fees paid to the miners

The multivariate regression has provided statistically significant results which has confirmed the validity of our null hypothesis (i.e. dependence of bitcoin valuation on the nature of the forementioned parameters).

Regression Statistics	
Multiple R	0.999355324
R Square	0.998711064
Adjusted R Square	0.997422128
Standard Error	569.8455845
Observations	13

R Square of 0.9987 is extremely high and implies that 99.87% of the variance/variation between the actual average bitcoin price(Y_i) and the predicted average bitcoin price($\hat{Y}$) is explained by the regressor variables- x1, x2, x3, x4, x5, and x6- in the model.

Multiple R value of 0.9993 shows a very high degree of correlation between the actual(Y_i) and predicted values($\hat{Y}$) of average bitcoin prices. The accuracy and aptness of the model in bitcoin valuation is justified by a very high degree of correlation.

The standard error has reduced to nearly one-fourth of the previous model. This result is very encouraging as the a narrowing of the error margin indicates a greater reliability of the model predictions. The 95% prediction interval is +-1139.69 (2 standard errors) from the regression estimations.

The regression equation for the model is as follows:

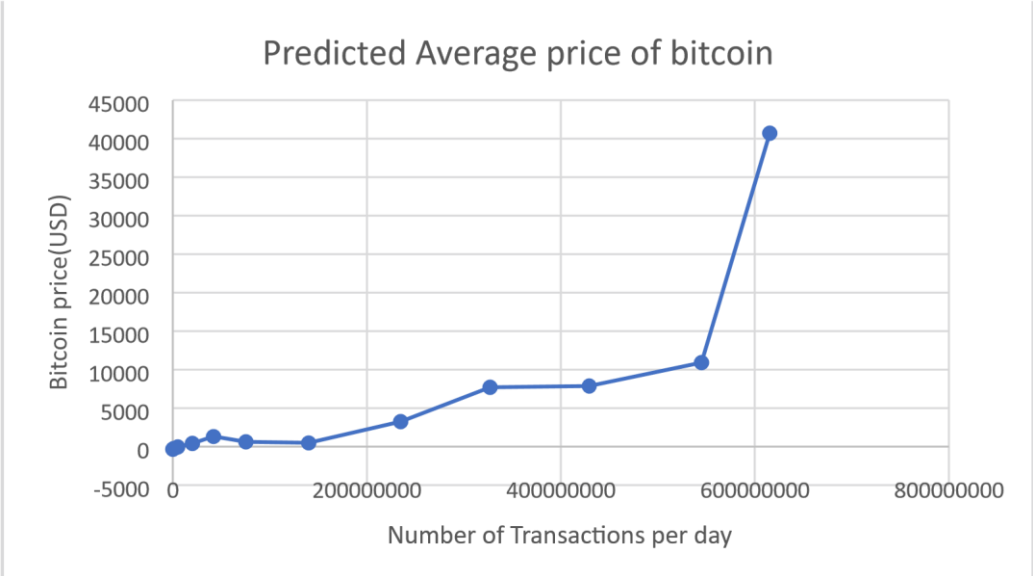
$\hat{Y}$=a +b1*x1+b2*x2+b3*x3+b4*x4+b5*x5+b6*x6

Where $\hat{Y}$= predicted average bitcoin price, x1,x2,x3,x4,x5,x6 have been defined b1,b2,b3,b4,b5,b6 are the regression coefficients for x1,x2,x3,x4,x5, and x6, respectively a=constant term

$\hat{Y}$= -333.1328784+(0.000158998*x1)+(6849.157353*x2)+(0.193819425*x3)+(1.055257473*x4)+(1.25953E-09*x5) +(0.000805746*x6)

Individual analysis of the dependence of average bitcoin price on variables:

Number of transactions per day(x1):

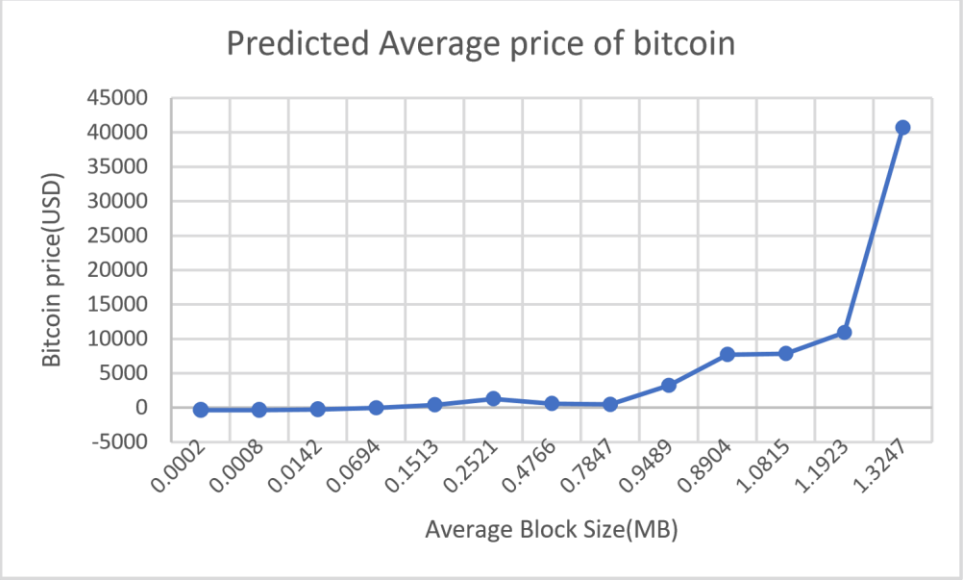


Data Source: https://www.blockchain.com/charts/n-transactions-total

Graph plotted on excel based on regression estimates

A direct relation between the Bitcoin price and the number of daily transactions is evident from the above figure. Intuitively, an increase in the transaction number correlates to a greater acceptance of bitcoin as a medium of exchange. Greater acceptance would increase the price of bitcoin due to increase in frequency of demand of bitcoin for transaction purposes. The intuitive belief is supplemented by the results provided by this model.

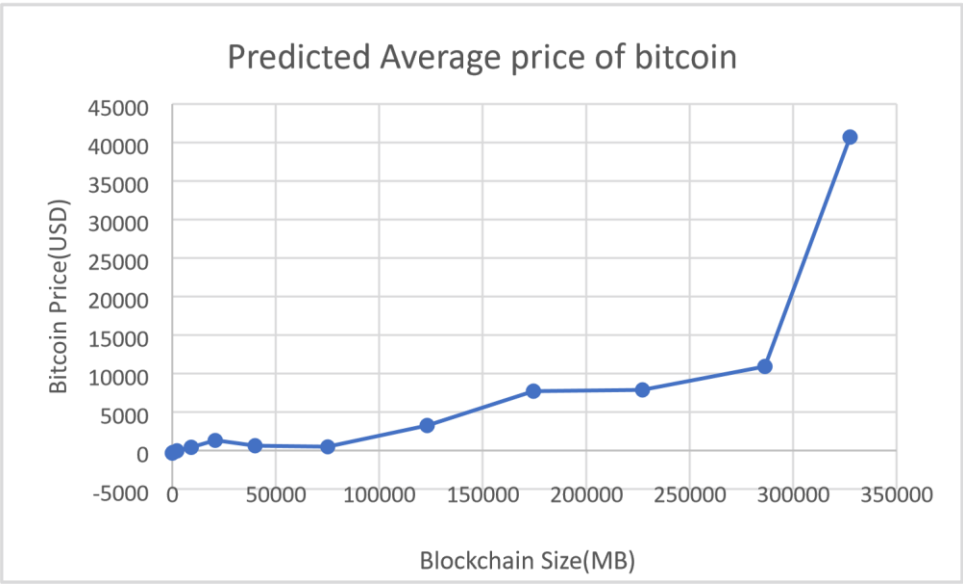
Average block size(x2):



Data Source: https://www.blockchain.com/charts/avg-block-size
Graph plotted on excel based on regression estimates

It is observed that as the number of transactions per block has increased over the period, the average size of each block(measured in MB) has also increased. Although, no direct link between the average block size and bitcoin price can be inferred based on the findings of this model due to the significantly high standard error(3978.414341).
The standard error of the average block size is significantly high(3978.414341), and to further refine the model for better estimations, this variable could be neglected. The Standard error of the other variables is relatively smaller and hence are more suitable for greater accuracy of this model.

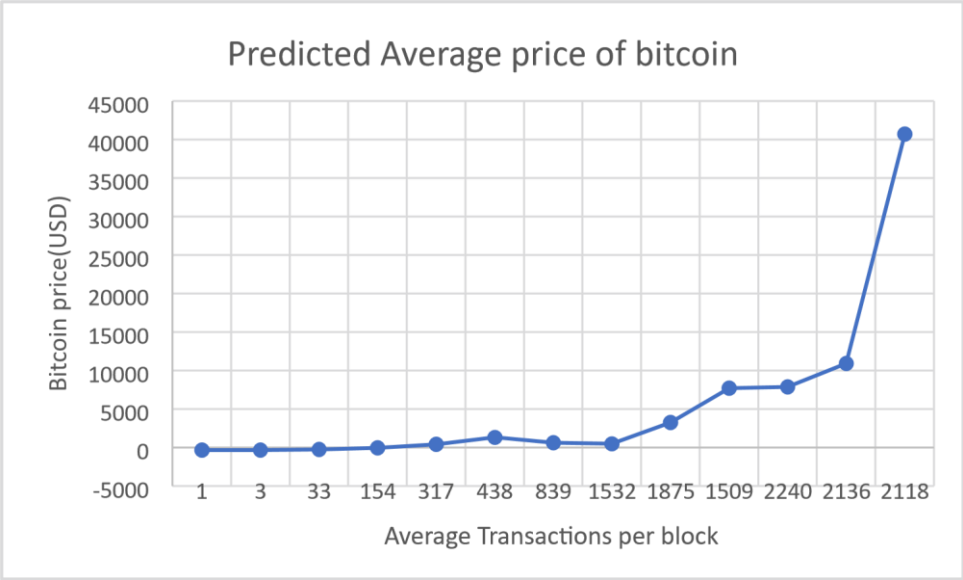
Blockchain size(x3):



Data Source: https://www.blockchain.com/charts/blocks-size
Graph plotted on excel based on regression estimates

The blockchain network is integral to the decentralization of the bitcoin environment. A failure of the same would lead to crashing cryptocurrency prices, and a loss of faith in this advanced medium of exchange. The growth of the blockchain network plays a fundamental role in promoting the trust of the users in the security of their transactions against threats. Validations of the transactions by the large group of miners ensure that no duplicate transactions can occur. Moreover, if any hacker/ group of hackers edits a block to steal bitcoins or divert transactions, the fraud can be immediately spotted upon comparisons with the verifications of the mining community. The valuation of bitcoin is ought to rise with the growth of the blockchain network due to an increase in faith in this medium of exchange, a key psychological factor essential for any transaction medium.

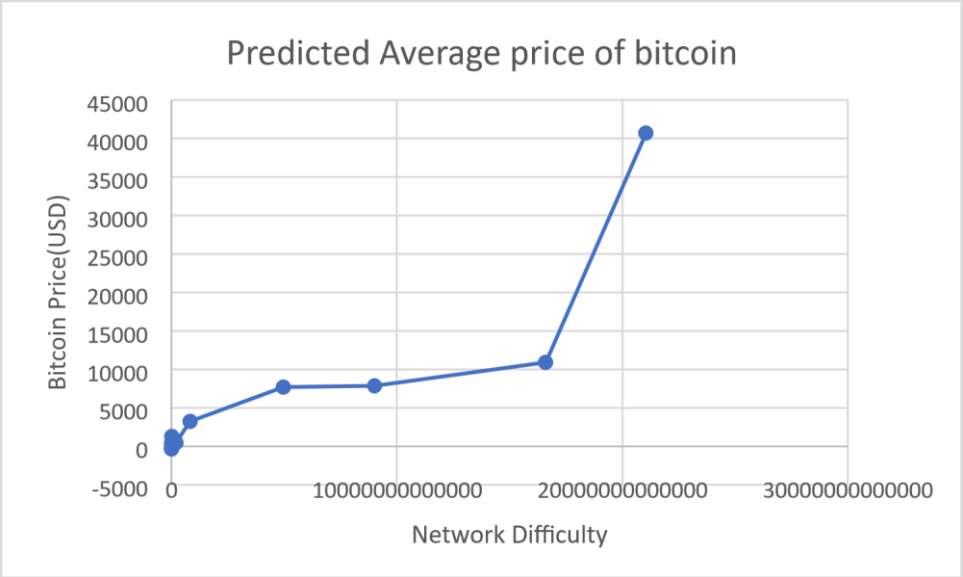
Average transactions per block(x4):



Data Source: https://www.blockchain.com/charts/n-transactions-per-block
Graph plotted on excel based on regression estimates

The increase in average transactions per block is resulting from a greater usage of bitcoin for a multitude transaction/payment needs. The logical presumption would hint towards a price increase due to increase in transactions per block. Statistically, this belief has shown to hold true based on the results provided by the model. Another, line of thinking would justify the same increase based on the following occurrences. At any given time, the bitcoin block reward for miners is fixed. An increase in average number of transactions per block, increases the workload of the miner. To incentive the miners to perform their duty, a price increase is imperative(as number of bitcoins awarded remains constant), otherwise the mining process would not remain lucrative for the miners. Both these chains of thought indicate a price increase following an increase in the average transactions per block.

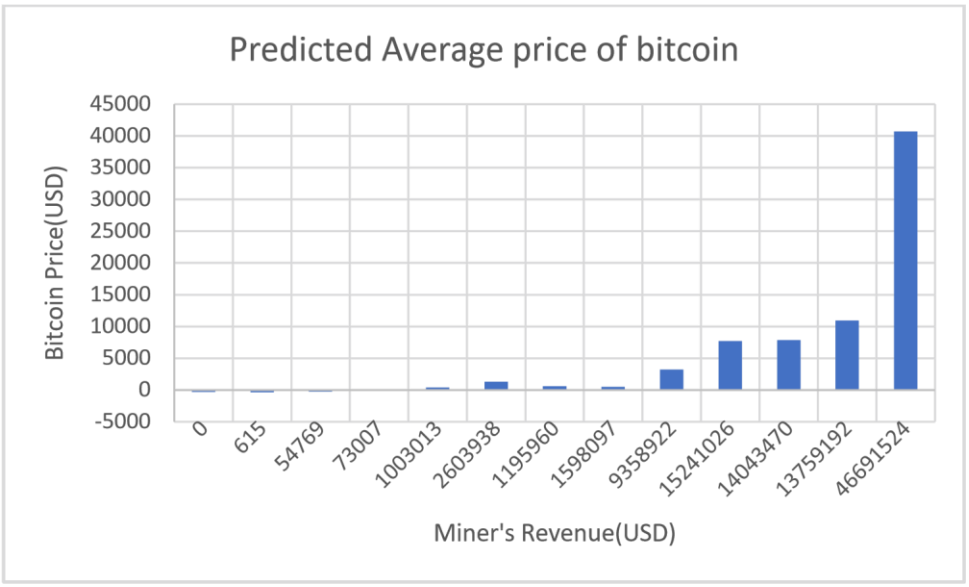
Network Difficulty(x5)-



Data Source: https://www.blockchain.com/charts/difficulty
Graph plotted on excel based on regression estimates

The difficulty is directly related to the total estimated mining power estimated by the Total Hash Rate (TH/s). It is adjusted after every 2016 blocks, or 2 weeks, so the average time interval between two blocks is roughly 10 minutes. As the difficulty level increases, to keep the miners motivated, a price increase is necessary (as block reward changes roughly every 4 years). If any task is more difficult, the computing power required to accomplish the task is higher, and a greater revenue is essential to sustain the mining community.

Miner's Revenue(x6):



Data Source: https://www.blockchain.com/charts/miners-revenue
Graph plotted on excel based on regression estimates

The miner's revenue is directly interlinked with the average price of bitcoin. A higher revenue translates into higher bitcoin price, as the bitcoin reward remains stationary for a period of roughly 4 years. The smaller component of the miner's reward is the transaction fee-varies with time-but has does not have much significance in determining the miner's revenue.

Relative importance of independent variables in the model:

Independent Variable	Unique Contribution to the R-square value
Miner's Revenue(USD)	8.99%
Network Difficulty	1.71%
Average Block size(MB)	0.06%
Number of Transactions per day	0.05%
Blockchain Size(MB)	0.02%
Average transactions per block	0.01%

The increase in the R-square value when an independent variable is added to the shows the improvement in the goodness of the fit of the model. From the above table, the Miner's Revenue (8.99%) is most important or statistically significant independent predictor in the model, followed by Network difficulty (1.71%), Average Block Size (0.06%), Number of Transactions per day (0.05%), Blockchain size (0.02%), and lastly Average Transactions per block (0.01%).
Although, our intuitive ranking of the independent predictors might differ from the statistical one, we must strictly adhere to the numerical results as it is primarily a mathematical model. Also, we observe that there isn't much deviation of the expected importance of independent predictors from their mathematical importance. This observation reinforces the concreteness and soundness of the model.

Limitations of the Model:

- **Restrictiveness**: The model restricts the estimation of the average bitcoin price upon 6 independent predictors/variables. One might argue about the inclusion of other significant variables. However, to maintain concreteness of the model, we have identified the six most important variables. The simplicity of the model is one of its limitations.
- **Precision:** The dataset used for the above model does not include data elements for a select few dates. So, this might not be 100% precise in all the figures. However, Bloomberg uses data for its analysis from blockchain.com as well. This validates the authenticity of the data and our analysis of the same.
- **Visualizations:** Due to software limitations, time-constraints, inaccessibility to a design team, the graphs displayed are of moderate quality. For better visualization of the above results, sophisticated software like Matlabs or Python could be employed. Despite of the rudimentary quality of the graphs, the results are insightful.

Extrapolation of data to predict future bitcoin price using trend analysis:
Using a prudent estimate of the growth rate of the independent variables, we have predicted the future values of these independent variables required for prediction of the bitcoin price.

Independent Variable	Estimated growth rate for future years	Basis of estimation
Number of Transactions per day	12.94%	Growth rate for the period FY20 to FY21 is extrapolated
Average Block size(MB)	11.10%	Growth rate for the period FY20 to FY21 is
		extrapolated
Blockchain Size(MB)	14.39%	Growth rate for the period FY20 to FY21 is extrapolated
Average transactions per block	5.78%	Growth rate for a 3 year, 2019 to 2021, has been averaged and extrapolated
Network Difficulty	26.81%	Growth rate for the period FY20 to FY21 is extrapolated
Miner's Revenue(USD)	15%	Growth rate of 15% has been assumed and extrapolated

Reasons for difference in basis of estimation:

For the majority of predictor variables, we have used the previous year's growth rate and extrapolated the same for the following years. An anomaly to this practice occurs in basis of estimation for the average transactions per block and miner's revenue.

In the case of average transactions per block, we have used an average 3-yearly growth rate. This is in account of peculiar trend in the data points over a 1-year period. To maintain a reasonable estimate for the growth rate, a 3-year time frame is considered for higher accuracy.

In the case of Miner's revenue, we have estimated a 15% growth rate. Based on the data points, we had inferred a nearly exponential growth trend. To maintain a reasonably conservative estimate, a 15% growth rate is prudent.

Date	Predicted Average price of bitcoin
2022	**51084.23**
2023	**63992.87**
2024	**80077.11**
2025	**100122.04**
2026	**125110.03**
2027	**156271.23**
2028	**195147.16**
2029	**243670.91**

2030	**304268.18**

CONCLUSION

The returns of Gold are much more concentrated around the mean as compared to Bitcoin, making it much more of a stable asset for cautious investors. However, Bitcoin provides higher returns, but it also has higher volatility (can be inferred from the high standard deviation) which increases the risk making it suitable for risk-taking investors. SPY has greater volatility than Gold but also higher returns, it is more suitable for investors who have lower risk tolerance than those investing in cryptocurrencies but want higher returns than just investing in Gold.

As per our bitcoin valuation model, using conservative estimates we have predicted the bitcoin prices of the next 10 years. We have further correlated our mathematical findings with our economic understanding. This reiterates the credibility of our findings from our dataset. After our thorough analysis, we understand the value and risk attributed to this upcoming asset class. We foresee the potential value of bitcoin in the coming years and strongly encourage institutional and retail investors to allocate a portion of their portfolio to the emerging cryptocurrency market. Traditional beliefs about the uncertainty of a digital medium of exchange should be changed with the recent technological developments. Bitcoin is certainly not the new gold, it is unique in its own way. The finite supply of bitcoin is what makes it invaluable.

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