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Are cryptocurrencies and digital assets in a bubble?

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ABSTRACT

This paper aims to try to conclusively figure out whether cryptocurrencies and digital assets, which some investors call "assets of the future" are in a financial bubble, and using past data aim to find out what will happen if this bubble bursts, and what will be the future of this asset class. This paper hypothesises that cryptocurrencies are in fact in a bubble, but due to the utility and use cases of this technology, some elements of this asset class may survive and may be able to fulfil the purpose of cryptocurrencies. Through the research conducted in this paper, it is concluded that cryptocurrencies were in an economic bubble, and the bubble burst in 2022, causing massive losses. The paper, however, also concludes that some parts of cryptocurrency may survive and like the hypothesis states may be able to be the future of finance as a whole, and fulfil the initial purpose of why cryptocurrencies were created.

Keywords: *Cryptocurrency, Defi, Banking, Bitcoin, NFT, Ethereum, Bubble, Burst, Decentralized, Blockchain*

1. INTRODUCTION

In the past few years, individuals and companies alike have taken initiative to create, develop and invest in cryptocurrencies and digital assets, calling them the assets of the future. The market capitalization for cryptocurrency hit an all-time high, of roughly 3 trillion USD on the 11th of November 2021[1] , showing peak interest for the asset class, and a promising future. However, in recent times the valuation of key cryptocurrencies, as well as digital assets such as NFTs, have plummeted, falling to a market cap of roughly 928.89 billion USD on the 24th of October 2022[2], leading many investors to speculate if the success of these currencies was attributed to the technology and assets itself, or solely because of speculation and the publicity surrounding these assets.

Cryptocurrencies and digital assets are a massive part of the economy in many different countries and are a large part of many individuals investing portfolios. A burst of the "crypto bubble" could be moredetrimental to the world economy than the dot com bubble crash of 2001, solely because the total losses of the dot com bubble were capped at 1.7 trillion USD[3], which has already been dwarfed by themassive 2.25 trillion USD loss in crypto, in only 9 months[4]. Many bullish investors in crypto believe this sudden crash of the asset class is solely due to a correction in the market, or due to the ongoing Russia-Ukraine war causing instability and a rise in inflation. However, the investors who are bearish about the cryptocurrency market say it is nothing but an economic bubble, and that it is not a sound asset class to invest in due to the fact that all the price derived is artificial and is only inflating due to the media "hype" that surrounds this asset class. This research paper aims to conclusively find out whether the cryptocurrency and digital assets market has reached a market bubble and to figure outthe consequences of this bubble burst, with reference to past market bubbles. It explores the different stages of economic bubbles and the correlation between the lifecycle of a bubble and the price of various cryptocurrencies as well as the cryptocurrency market as a whole, to definitively answer the given question with appropriate evidence as well as give an objective point of view on the matter at hand.

2. METHODOLOGY

To find out whether or not cryptocurrencies and digital assets are in a bubble, I researched the internet, scholarly articles, interviews with experts in the field, and many different reports to analyse the topic. The way I ensured my research was accurate, is by researching different sub-questions, to help draw aconclusion. The main sub-questions that I shortlisted to help me draw a conclusion were the following:

Introductory questions:

1. What is a market bubble, and why is it caused?
2. What are the different characteristics of a bubble that has not burst yet, and what are the characteristics of a bubble

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that is on the verge of bursting?
3. What is the lifecycle of a bubble?

Analysis questions:
4. What are cryptocurrency and digital assets, and why are so many people invested in them?
5. What are the current stages of evolution of cryptocurrencies?
6. Do the stages of evolution of cryptocurrencies align with the lifecycle of a bubble?

Concluding question:
7. Are cryptocurrencies in a bubble?

Future scenario:
8. Can there be a future for cryptocurrency?

All these questions will be answered in order, using appropriate data and information to reach the answer in a conclusive, and logical manner.

Using the findings from these questions, this paper will aim to answer whether the recent crash of the cryptocurrency market was a bursting of a bubble, and will aim to try to figure out whether the marketwill recover, or if the price of cryptocurrency and the market itself will tumble further. Using past instances and also looking at the use case of cryptocurrency from a non-statistic as well as statistical angle, this paper will also aim to conclude what type of cryptocurrencies might be able to survive the cryptocurrency crash and will try to find out if cryptocurrency is actually the future of currency.

3. INTRODUCTORY QUESTIONS

What is a market bubble, and why is it caused?

A bubble is defined as an economic cycle, which starts off with a rapid escalation of market value, specifically the price of assets. This quick rise of value is then followed by a quick decrease in value, or contraction of the market, which is referred to as a crash or a bubble bursting[5].

There are three different reasons why an asset bubble is mainly caused:

1. Low-Interest Rates:

a. A low level of interest rates makes it very easy to borrow money, which will mean the money people have for investments will increase too. However, since the interestrates are low, typical investments will not give a high yield because of these rates of interest, so investors look at more high-risk asset classes, which have a chance of providing them with a higher yield. This will spike the prices of the assets in that asset class.

2. Demand-pull inflation:

a. Demand-pull inflation is when the demand for a particular product is much higher than the supply for the product. This warrants a sharp increase in the price of the assetfor the asset class.

3. Asset shortage:

a. Asset shortage occurs when some investors believe that there are not enough assets for everyone, therefore it causes an imbalance between the supply and demand of the product, causing the prices for the asset class to skyrocket. This makes asset bubbles more likely.[6]

What are the different characteristics of a bubble that has not burst yet, and what are thecharacteristics of a bubble that is on the verge of bursting?[7]

There are many different characteristics that are widely used across economics and financial literacy to identify an asset bubble. To completely understand these characteristics, an asset bubble's life cyclehas to be assessed first, looking at a newly developed bubble, a bubble in its middle stages and a bubble that is close to bursting.

Beginning stages of a bubble: These are the stages where we see that the value of the assets starts to go up, and gain momentum. This momentum is termed as *upward inertia* which increases the price of the assets exponentially and generates some attention for the particular asset class. This newfound interest from investors and this upward inertia creates an expectation that the asset's price will rise further or an *expectation of asset inflation*. This expectation will cause some *major changes in economic behaviour* which will again cause an increase in the asset prices, as more and more people start investing in these assets. All these changes will increase the demand for the particular assets. Thedemand for these assets will increase due to the fact that new and original investors believe that this surge in the price of an asset will continue to occur and that the prices of these assets will continue to increase. With an increase in the demand for a particular asset, the price of the asset will increase too, creating an upward spiral. There will also be monetary support for this increase in demand for the assets, as the behaviour towards investing money in this asset class will further increase too. This will once again speed up the upward spiral of the asset price.

Middle stages of a bubble: A bubble will reach its middle stages typically when the rise in the prices of the assets has made a change in the economic behaviours and changed people's thoughts. In this stage, the upward spirals will have an enormous push, and drastically increase the price of the products creating a vicious cycle between different products of the same asset class. For example in the case of digital assets, a rise in the price of NFTs might create demand for the cryptocurrency used to purchase these NFTs, which causes an increase in the price of both of the assets creating a vicious cycle. The upward spirals will continue to pull up prices, and more money will be pushed into the ecosystem with the pulled-up price. Along with the upward spiral and vicious

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cycles, the increased use of the built-in leverages in the market will also cause the prices of the assets to increase. Financialleverage is when previously borrowed capital is used as investments[8]. Since the market is increasing exponentially, and there is a lot of expectation of asset inflation, investors might use their previously borrowed capital to invest in the bubbled market, in hopes of turning around profit.

A bubble that is close to bursting: In this stage, the massive rise in the price of the assets in a bubblewill cause a lot of herd behaviour. This stage will not change the economic behaviour of many individuals, as people will invest in assets within the bubble simply because of the herd mentality, even though they might believe the assets are heavily overvalued, even though they may not have faith in these assets themselves. As the herd grows bigger, the amount of money invested into the ecosystem will drastically increase too, which will increase the amount of money invested in the ecosystem. All the investors, new and old in this economy are buying the asset in hopes of selling it off in the near future to someone who is willing to pay more, which creates a delicate balance. Since these assets are being bought to be sold, and since there is an immense herd mentality around them assets, this is a stage where the asset class hits a tipping point, right before the burst. This is due to the fact that most of the 'investors' of the asset do not believe that the asset class has a bright future, and are only investing in it in a hope of short and quick returns.

<u>What is the lifecycle of a bubble?</u>[9] -

The lifecycle of a bubble is broken down into 5 different stages. There is a lot of different literature dictating what these stages are. These 5 stages of a bubble are widely accepted by economics as a whole. These 5 stages are[10]:

9. Displacement:

a. Displacement is the first stage in the life cycle of a bubble. This stage occurs when investors find a new paradigm, which means a new innovation that will revolutionise or change the way of doing things[11]. This creates a sense of excitement for the investors, and a lot of money is put into the economy thinking that this 'new paradigm' will completely revamp the economic structure of the society and that it will generate a lot of money for the early adopters. This is very often also a stage where there are very big changes in the economy and economic behaviour as a whole.

10. Boom:

a. As compared to the displacement phase, the prices skyrocket exponentially. This is the phrase where mainstream media looks more into this asset class, and more and more people get into the ecosystem and start gaining interest in these assets. In this stage the fear of missing out, or FOMO makes people want to invest in the asset class, instead of reasoning into why the asset class might go up. The boom phase mainly occurs due to the fact that the demand for an asset class exponentially increases, while the supply stays the same.

11. Euphoria:

a. In this stage the asset prices are at an all-time high, and so is the confidence based on the asset. This is the stage where everyone comes to know and talks about the asset class. This is the part where the "greater fool theory" completely plays out. The greater fool theory is the belief that no matter how overpriced a particular security or asset is, there will always be someone to buy it at that price. Since investors in this asset have made a lot of money, they will continue to invest as they believe that the asset prices will continue to go up as they have been. During this phase, the investors of the asset are only buying it in hopes to sell it to someone else for a greater price, and not because they trust the asset itself.

12. Profit-taking:

a. In the profit-taking stage, institutional investors will start to sell off some of their assets, and start booking their profits. This is due to the fact that they realise the current increase in prices is not sustainable, and they predict that the market might come crashing down. It may be difficult for people to predict when exactly the bubbleis going to collapse, however. An economist, John Maynard Keynes[12], stated that "themarkets can stay irrational longer than you can stay solvent".

5. Panic:

a. Once a bubble has burst and reached a panic space, the bubble cannot be reversed again. This is the stage where the prices crash faster than they rose. Investors and speculators are faced with margin calls[13], and since their holdings are plunged in value, they will be looking to sell off any of the assets they can, to liquidate their holdings. As the demand for the assets is at an all-time low, and now the supply has increased since everyone is trying to sell, the prices turn to a downward spiral and crash even further.

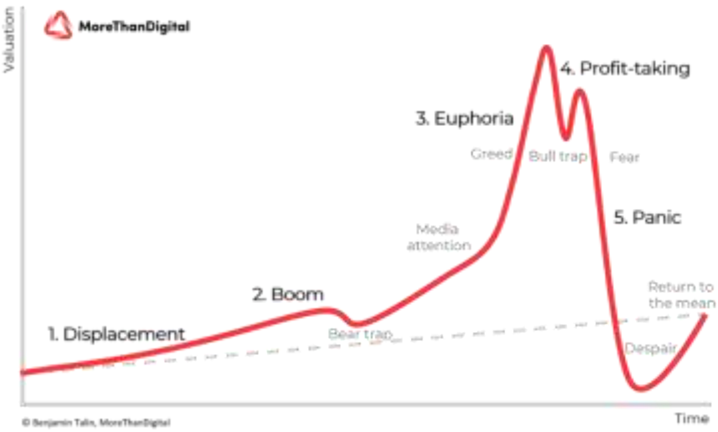

Fig 1.1, graph that represents the 5 stages of a bubble[14]

4. ANALYSIS QUESTIONS

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What are cryptocurrency and digital assets, and why are so many people invested in them?

Cryptocurrency, as defined by Investopedia[15] is a digital or virtual currency secured by cryptography. It is usually decentralised and works on blockchain technology, where there is not one central authority that is governing, issuing or handling it. In theory, this seems like an amazing concept, wherein there is no governmental body that can influence the price of the currency and regulate it. With the global trust in the government declining at a rapid rate, from an average percentage of trust in the government falling from 46% in 2006 to about 36% in 2019, and USA in specific falling from an average trust level of 73% in 1958 to 24% in 2021[16], it is very apparent why people might want to store their money in a currency where the government has no control, and might want to transact in it too. This may look like the primary reason and may seem like the obvious reason why these currencies should be used, but this may not completely be the case. For the sake of this research paper, the investors will be broken down into three major categories, the Belief Investor, the Hype Investor, and the Flipping investor.

- The Belief Investor:

As previously mentioned in this paper, this type of investor has a belief in cryptocurrency and believes it is the future of money. Due to the fact that a lot of people believe in the idea of decentralisation, or having control over their own assets, they feel like cryptocurrency is the future, and prefer it over government-issued currency. A lot of investors in cryptocurrency also believe that the technology thatruns it, primarily blockchain, has a very strong future in banking, finance and money in general and are looking to be early adopters for investing in such technologies. A blockchain is defined as a "digitally distributed, decentralised, public ledger that exists across a network[17]". The main use case for blockchain technology is recording transactions that are occurring in a public network so that every transaction can be tracked. Due to the fact that a blockchain is a decentralised ledger, this meansit can allow transactions between any two people in the world, wherever they are, in a matter of seconds. This is one part of blockchain technology which has attracted banks and other financial institutions, as the idea of making large-scale transactions seamlessly in seconds, with no additional costs is very attractive to these institutions, and can help in making them more efficient. This, however, will not result in an increase in the price of cryptocurrencies such as Ethereum and Bitcoin like investors think, as these institutions are using the concept of a stablecoin, which is a cryptocurrency whose value is pegged(linked) to a real-life currency such as the dollar. They are mainly using this technology to ensure that there is no fluctuation in price during a transaction, which will make the transactions safer as well as more efficient. One more main reason for people believing in cryptocurrency is believing that it may be able to replace money in general. On 8th February 2021[18]Tesla, the biggest transportation company, and one of the biggest companies in the world, announced that it would start accepting Bitcoin as a mode of payment. The price of Bitcoin rose from 38,886.83$ on the 8th of February 2021 to 46,184.99$ on the 9th of February 2021[19], clearly proving the fact that more people decided to invest in Bitcoin due to the increased prospects that it may be widely used as amode of payment in the future. The Belief Investor may also be the ones who invest in digital assets, such as NFTs thinking they are the future of art and media. Many people have invested in digital art pieces on the blockchain, wanting to own them as they believe the world and one's assets will be completely digitalised in the future. This want for these NFTs fuel the demand for cryptocurrency, as NFTs are purchased using cryptocurrency, which will show the fact that when there is a new use case for NFTs, the price of the cryptocurrencies used to trade NFTs(usually Ethereum or Solana) is more likely to increase in the future too.

- The Hype Investor:

As previously mentioned in this paper, this type of investor is one who only buys into cryptocurrency due to the Fear Of Missing Out or FOMO. This is due to the fact that social media has propelled cryptocurrency into the limelight, where many influencers are talking about, as well as promoting the purchase and usage of these digital assets. This helps in drawing up demand for the product, as many research studies show how influencer marketing causes the followers of the influencers to want to purchase the product more[20]. This is due to the fact that humans feel the obligation to keep up with thesocial activities of their idols, even meaning mimicking their investment style or listening to their financial advice without doing their own due diligence. This may also be due to the fact that influencers portray a seamlessly perfect lifestyle for the people following them, and their followers might want to try to mimic the lifestyle by mimicking their actions, and may feel like investing in projects that the influencer has invested in will mean that they will also gain a similar lifestyle to that of the influencer. A survey from CNBC[21] finds that more than 1/3rd of all investors in cryptocurrency do not know what cryptocurrencies actually are. This is a very detrimental look on cryptocurrency, as it shows that most of the demand for cryptocurrency is just because of the fact that many people are invested in it, or that celebrities and influential people are invested in these assets, and not because people believe that there is a potential for these assets, and not because people believe that this is the future of currency and money, as the intended purpose of it is. The fact that more than 33% of the people who have invested in cryptocurrency have only done so because of its popularity shows that this may mean cryptocurrencies are in the 'euphoria' stage of the life cycle of a bubble, as talked about previously.

- The Flipping Investor:

This type of investor, as the name states, has only invested in cryptocurrencies with hopes of "flipping" it or selling it off to another person who is willing to pay more. This is the type of investor which exploits the Hype Investor, only buying the token with prospects of selling it off, to a greater fool as the 'greater fool' theory states. This means if cryptocurrency is in a bubble, these will be the type of investors who will be looking to take advantage of the Euphoria stage of the bubble and sell off assets for prices which are much more than what they should be worth. To be able to quantify the actual amount of people who are purchasing these assets to flip them off and exit the investment early for a profit, it is important to look at the average length of ownership of these digital assets. Since NFTs are the most prone to such investors, we must look at historical data on the average length of ownership of an NFT in the early stages of its concept, compared to current times. In Q3 of 2022, the average length of ownership for an NFT is approximately 31.1 days[22], compared to the 48 days in 2021, the 156 days in 2020 and the 84 days in 2019[23]. This data shows a clear trend, that people are holding NFTs for less time as compared to previous years, which shows that the number of people purchasing NFTs with the intention to sell them after a short amount of time. Selling a form of asset in a short time after purchasing it shows the fact that the investors are not confident in the performance of the asset, and are mainly purchasing it to eventually sell

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it off to someone who is willing to buy it.

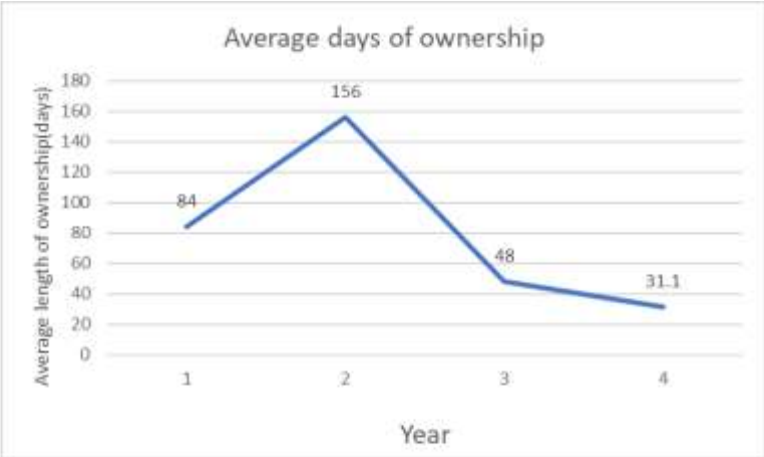

Figure 1.2 shows the average days of ownership of an NFT

For the success of cryptocurrencies in the future, it is essential that more people become Belief Investors as compared to Hype Investors or Flipping Investors, due to the fact that if more people buy cryptocurrencies to sell them off at a higher price, eventually there will be no one who will be willing to buy the assets at a higher price, which may cause a spiral down in price, causing a market crash, as spoken about in the 'panic stage' of a bubble.

What are the current stages of evolution of cryptocurrencies?

With a total market cap of about 395 billion USD on the 27th of October 2022, Bitcoin comprises about 39.6% of the total cryptocurrency market cap as of the date. Ethereum is second on the list of cryptocurrencies by market cap. With a total market cap of 189.4 billion USD, Ethereum comprises about 19% of the total cryptocurrency market cap. [24] To figure out if the stages of cryptocurrency align with the lifecycle of a bubble, this paper will be looking at the chart of these two cryptocurrencies, as well as the evolution of cryptocurrency in general. We would also be looking at the market cap of all the cryptocurrencies, and see if it lines up to charts of an economic bubble.

Evolution of cryptocurrency

1983: This was the year in which cryptocurrency is said to have originated. In this year an American cryptographer, David Chaum created a form of 'cryptographic electronic money' which used blind signatures, a form of digital signature wherein the content being signed upon is disguised before the sign is placed, to ensure the privacy of that message. This electronic money was untraceable, and non-centralised just like the cryptocurrencies of today.[25]

1989: A company called 'DigiCash' was developed by David Chaum, building onto his already pre-existent idea of a decentralised untraceable currency. DigiCash was also the name of the cryptocurrency in which the company dealt. This was an electronic money company, wherein it allowed transactions to remain decentralised and anonymous. Although DigiCash had many groundbreaking inventions, it filed for bankruptcy in 1998 due to a lack of recognition and success of the business model at the time.[26]

1998: Bit Gold, a cryptocurrency that is said to be the predecessor of bitcoin, was created by Nick Szabo in 1998. This form of cryptocurrency used the PoW(Proof of Work) model, wherein computer nodes or miners were given a complex cryptographic algorithm to decode, and the miner who crackedthe problem first was rewarded with a Bit Gold currency. This PoW system that Szabo created, was said to be able to be "securely stored, transferred and assayed with minimal trust", which made it an appealing framework. Although this currency was never completely implemented, its protocols were so similar it is widely known as the predecessor of Bitcoin, and many people even speculated that Nick Szabo is also "Satoshi Nakamoto", the anonymous creator of bitcoin, which is something that hehas denied.[27]

2008: On the 31st of October 2008, Satoshi Nakamoto, an anonymous programmer, published the 'bitcoin whitepaper'. This paper described the usage of bitcoin, as well as described how the currency will work, along with its protocols. Bitcoin would be the first cryptocurrency to have its project officially operational, using the blockchain, P2P technology. It used a PoW system, wherein mining was required similar to Bit Gold.

2009: The first block, the 'genesis block', was mined on the 3rd of January 2009 by Satoshi Nakamoto. This block had a headline from the Times newspaper embedded onto this block, which referred to the current economic system at the time wherein the world economy had crashed due to centralised banking, which was something that Bitcoin was created as a reaction against. This block also contained 50 Bitcoin, which was essentially worthless at the time.[28]

2010: The value of Bitcoin was about 14 cents in April of this year. It then rose to 36 cents in November and then settled at around 29 cents in December.

2011: At the start of February of this year, Bitcoin first rose to a price above the dollar, which was about $1.06. Although it fell again to about 87 cents, a Forbes article published on 20th April 2011[29] talking about the cryptocurrency made its price rise to about $8.89. Gawker published an article on the 1st of June[30] talking about the potential uses of Bitcoin in drug dealing, which made the

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prices spike to $27. This made the market cap of Bitcoin hit a staggering 170 million USD on the 11th of June, butthe value of cryptocurrency fell to $4.77 by September, ending the year off with a market cap of only 30 million USD by December 28 2011. In October of 2011 however, a new currency called 'Litecoin'[31] was created, making it the second biggest cryptocurrency as per market cap at the time, and the second actually recognised cryptocurrency.

2012: In this year the price of Bitcoin steadily grew, and so did the market cap of cryptocurrencies as a whole. In September, the Bitcoin Foundation was established, a foundation to help the development and widespread use of Bitcoin as a whole. Ripple was also founded this year and was originally known as 'OpenCoin'. The cryptocurrency market cap ended at 140 million USD on the 26th of December 2012, which was the highest it had been that year but still not the highest ever.

2013: This was a year in which cryptocurrency faced a lot of volatility, both due to regulatory issues where governments, such as the Indian government, released warnings about using cryptocurrency.[32] The price of Bitcoin rose to $755 on the 19th of November and fell to $378 on the same day. On the 30th of November, the price of Bitcoin rose to $1,163, which was a turning point as the price of the currency, as well as the crypto market cap, would fall all the way till 2015. The market cap of cryptocurrency rose from 5.05 billion USD on the 13th of November 2013, to a market cap of 15.37 billion USD on the 4th of December 2013. The market cap for cryptocurrency ended up falling to 10.63 billion USD by the end of the year, on January 1st 2014. This was also the first year when Bitcoins market cap exceeded 1 billion USD, and was a year which saw the birth of Dogecoin, a 'meme coin' which would be infamous in the future.

2014: This year was one of the worst years for cryptocurrency ever since its inception. In January, Mt.Gox, which was the worst biggest cryptocurrency swap exchange, filed for bankruptcy having lost its clients about 850,000 Bitcoin without any reason given. It is said that the heads of this company embezzled money away from it, selling the clients Bitcoin on other platforms, and the CEO of the company, Mark Karpeles, was also charged with embezzlement in 2017 and acquitted in 2019. The market cap for cryptocurrency plummeted from a start of 10.63 billion USD to an end of 5.54 billion USD by the 31st of December of that year, causing a drop of the market cap of around 47.88% in one year alone.

2015: In this year, cryptocurrency lost a lot of value till March, reaching a market cap of only 3.73 billion USD by the 20th of March 2015, and then recovered steadily to reach a market cap of 7.01 billion USD by the 30th of December 2015. There were not any massive changes in the structure or landscape of the cryptocurrency space at that time, but 2015 was one of the biggest years for cryptocurrency in retrospect, as it saw the birth of Ethereum on the 30th of July 2015, which was an advanced cryptocurrency still running on the PoW system, but will eventually take over as one of the leading cryptocurrencies in the market.

2016: This was the year which triggered a massive bear run in cryptocurrency, which would last all the way till the 8th of January 2018. The total market cap of cryptocurrencies went from 7.12 billion USD on the 6th of January, to a staggering all-time high of 17.93 billion USD by the 28th of December 2016. This was also the year that Ethereum launched a new system which was called "smart contracts"[33]. A smart contract is essentially an agreement which is written into a block of code,posted as a node on the blockchain. If the terms written in the agreement are met, the desired output will be self-executed. This output cannot be reversed or changed once written in the block of code, making it a very safe and trustworthy process, which made Ethereum a serious rival to Bitcoin. The price of Bitcoin, however, rose from about $434 in January 2016 to a price of 998$ in January 2017, which meant a rise of about 130% in that year alone.

2017: This was a year in which the bull market of cryptocurrency was further propelled due to a software update to Bitcoin in 2017, which helped it support a Lightning Network.[34] This network is a payment system made on top of the Bitcoin Protocol, which enables seamless transactions to be done in seconds and with very low fees. This made Bitcoin more usable in the everyday world, propelling its prices too. The market cap of cryptocurrencies rose from a market cap of 88.8 billion USD on July 12th to a market cap of 167.36 USD on the 30th of August. Bitcoin was around the price of $2,700 byAugust, which was an all-time high. This price further spiked to just under $20,000 by 17th December2017, making the market cap jump to 629.73 billion USD on the 20th of December 2017. The market cap rose from 15 billion USD on January 11th, to just below 700 billion USD by the end of the year.

2018: In this year, the market cap of cryptocurrencies fell from its all-time high of 773 billion USD onthe 10th of January, to only 128.22 billion USD by the 26th of December 2018. This year saw a massive crash in the prices of Bitcoin, falling from a price of $16,478 on the 8th of January to only $7,755 on the 7th of February, only one month later. The 53% crash in the price of Bitcoin seemed at the time like it meant the end for cryptocurrencies, as even Ethereum fell in price. Bitcoin continued to fall, and hit a low point on the 16th of December, when it reached the price of $3,236, only to end the year at a price of $3,866.

2019: This was a very volatile year for cryptocurrency, wherein the price of Bitcoin, still the market leader in cryptocurrency went from $3,851 on the 5th of January to a yearly high of $13,017 on the 27th of June. In this year, however, 12 major cryptocurrency exchanges were hacked, causing a total loss of about 292 million USD in money for the investors of cryptocurrency.[35] The most significant hack of all the 12 was the Binance hack of May 7th, wherein one of the largest crypto trading platforms saw losses of about 40 million USD worth of digital assets. All these losses made the price of Bitcoin, as well as the market cap of cryptocurrency dip from its peak in June, but this was still a rise from last year's crypto market crash. Bitcoin ended off at the price of $7,289 on the 28th of December 2019, which was an 89% increase in the price of Bitcoin as compared to 2018, but a 44% dip since its yearly high. The market cap of cryptocurrencies rose from a total market cap of 129.34 billion USD on the 2nd of January 2019 to a market cap of 191.41 billion USD on the 1st of January 2020, which is an increase of about 48%, but a decrease from the yearly high of 356.1 billion USD on the 26th of June 2019, by about 46%.

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2020: In this year, due to the pandemic the lending of cryptocurrencies became a very prevalent activity. Due to social media coverage, as well as many news sites reporting on cryptocurrency, 2020 was one of the best years for the asset class. The price of Bitcoin rose from $7,202 on the 2nd of January 2020, to a staggering $29,376 on the 2nd of January 2021, marking a growth of over 307% in one year alone. On the 1st of January 2020, the cryptocurrency market cap was 191.41 billion USD which rose to 751.91 billion USD on the 30th of December 2020. This was a rise of about 293% from the start of the year.

2021: This was the year when NFTs became the most popular, and when the cryptocurrency market exploded. Bitcoin went from a price of $29,376 on the 2nd of January 2021, to a price of $68,789.63, its all-time high on the 10th of November 2021. Ethereum also hit its all-time high of $4,724 on the 12th of November 2021. The reason for such high price increases is that many influencers as well as financial experts started investing more and more in cryptocurrency. Many different hedge funds also started investing heavily in cryptocurrency. The number of buyers for cryptocurrency also increased exponentially due to the boom of NFTs. With a rise in the sale volume of NFTs from $94.9 million USD in 2020 to 24.9 billion USD in 2021, along with a rise in the amount of NFT wallets increasing from about 545,000 in 2020 to 28.6 million in 2021[36], it is very obvious that this was the time where NFTs became a mainstream phenomenon. With influencers on social media creating and purchasing NFTs, this trend reached new heights with NFTs such as the Bored Ape Yacht Club reaching a marketcap of 2.6 Billion USD by the end of the year.[37] The amount of NFT sales between Q2 and Q3 of 2021 increased by about 700%, clearly signalling the time when the NFT craze was at its highest. On the 10th of November 2021, cryptocurrencies hit an all-time market cap of 2.9 trillion USD, which signified the height of cryptocurrency success. It almost looked like cryptocurrency was an asset of the future, and that it would continue to dominate, exceeding market caps of stock markets and exchanges worldwide.

2022: This was the year in which many people say the crypto market burst. From a price of $47,169 dollars on the 31st of December 2021, Bitcoin has now fallen to a price of only $20,191.32 as of the 28th of October 2022. The cryptocurrency market cap also took a massive fall, with the total market cap falling from its high of almost 3 trillion USD to a market cap of 954 billion USD on the 28th of October 2022, it is very apparent as to why people think this year is the beginning of the end of cryptocurrencies. With the Terra Luna crash in May losing 60 billion USD for its investors[38], a lot of institutional investors, as well as regular investors, started liquidating their cryptocurrency, with the fear that it will crash. These massive amounts of sales pushed down all prices of cryptocurrencies even further, causing a massive fall of 70% in the cryptocurrency market cap. This may be attributed to the Panic stage in the lifecycle of a bubble, as it is very obvious that investors started panic selling, making the prices of cryptocurrencies crash further, and with that the trust of cryptocurrencies too. The number of NFT sales dropped by 84.62%, to 730,000 sales monthly. The number of sales has alsodropped by 87.61%, falling to 342 million USD monthly. The number of wallets that are active has also dropped by 76.75%, to 179,000 wallets monthly. The number of unique buyers, as well as uniquesellers, have also dropped by 80.94% and 73.98% respectively, falling to 127,000 buyers and 102,000 sellers monthly.[39] All these statistics lead to show one thing, the crypto bubble may have burst.

Do the stages of evolution of cryptocurrencies align with the lifecycle of a bubble?

To find out if these stages of evolution as mentioned above align with those of a bubble, this paper will be conducting a chart comparison, comparing the charts of the cryptocurrency market cap, Bitcoin and Ethereum to the chart of a bubble, to conclude whether cryptocurrencies are in a bubble.

Chart Comparison Bitcoin Price vs Bubble:

As annotated upon in Figure 1.3, the chart of Bitcoin clearly mimics the pattern of a typical economic bubble. With the displacement period being from the inception of Bitcoin(2008) to 2017, the initial boom period being 2018 wherein the price of Bitcoin surged and fell heavily, the euphoria and the profit taking stage being in 2021, wherein Bitcoin hit its record-breaking peak of $68,789.63, and the panic stage being 2022 when the price of Bitcoin crashed and so did the market. This chart shows the possibility that cryptocurrencies are in a bubble, as the chart of Bitcoin clearly aligns with the chart of an economic bubble.

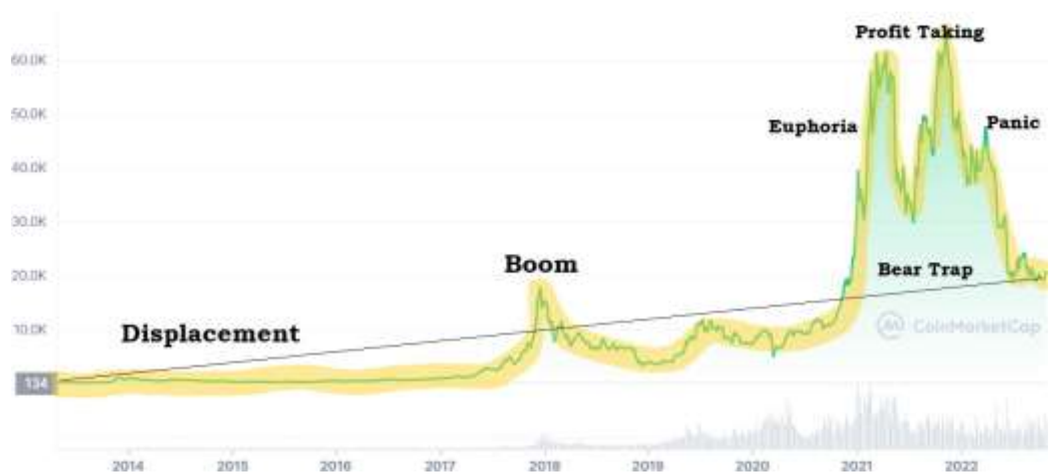

Figure 1.3, An annotated version of the Bitcoin price chart[40]

Ethereum Price Vs Bubble:

As annotated upon in Figure 1.4, the price of Ethereum also mimics the pattern of a financial bubble. With the displacement period being since its inception(2015) to 2017, the initial boom being in 2018, the euphoria, as well as the profit-taking stages being in 2021 and the panic stage being in 2022, the chart of Ethereum, matches up with the previously mentioned Bitcoin chart, also inclined

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to the fact that Ethereum was in a market bubble which burst this year.

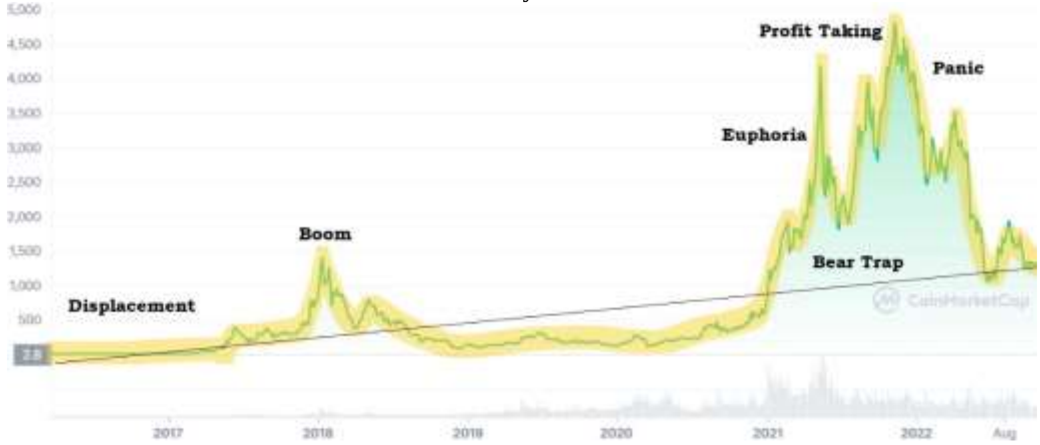

Figure 1.4, An annotated version of the Ethereum price chart[41]

Crypto Market Cap vs Bubble:

As annotated upon in Figure 1.5, it is very obvious that the market cap of cryptocurrency clearly depicts and mimics the chart of a bubble. With the displacement being the early years of cryptocurrency(2008-2017), the initial boom being in 2018, the euphoria and profit-taking stages being 2021 wherein the market spiked the highest, followed by the panic stage of the bubble which has been 2022, clearly indicating towards the argument that cryptocurrencies are in a bubble.

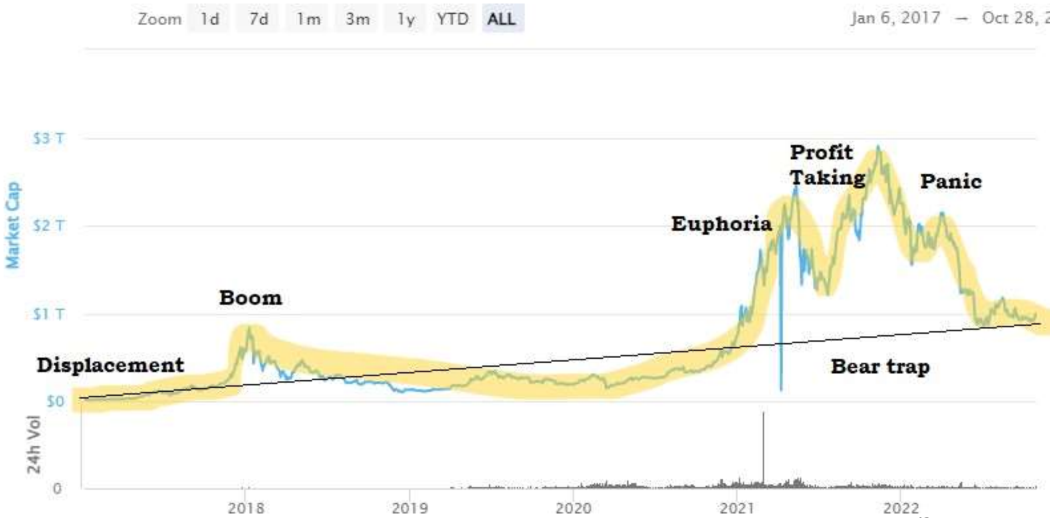

Figure 1.5, An annotated version of the cryptocurrency market cap chart[42]

5. CONCLUDING QUESTION

Are cryptocurrencies in a bubble?

Due to the fact that two of the biggest cryptocurrencies' charts(58.6% of the cryptocurrency market cap) indicate towards the fact that cryptocurrencies may be in a bubble, and the fact that the overall market cap of cryptocurrencies also depicts the same, the logical conclusion from these chart comparisons is that cryptocurrencies were in a bubble, which is currently facing the repercussions of arecent burst. With the fact that the timings of all the stages of an economic bubble align themselves in all charts, the displacement stage being from 2008-2017, the boom stage being in 2018, the euphoria and profit-taking stages being in 2021, and the panic stage being in 2022, these chart analysis clearly match exactly, showing their accuracy.

6. FUTURE SCENARIO

Can there be a future for cryptocurrencies?

Although the cryptocurrency bubble has already burst, there is still potential for cryptocurrencies to beuseful in the future. As seen by many past bubbles, such as the dot com bubble burst in 2001, many companies from that industry who provided consumers with inherent value, such as Amazon and Facebook, have become staples in the financial world today and have become some of the biggest companies in the world. Similar to that situation, the possibility of storing data in a decentralised platform using smart contracts, and executing transactions from one part of the world to another seamlessly seems like an idea that might be able to survive even though the market for cryptocurrencies has crashed. Cryptocurrencies such as USDT(USD Tether) can be used as means of making seamless and chargeless transactions, and can also be used as a way to enable decentralised money that is not run by any governing agency or central authority. Many different fields have already started using Ethereum's smart contract system, such as the technology being used to fight cancer[43], by providing an easy way to share AI model parameters across a team of collaborators around the world without a central agency having to govern it. Furthermore, the possibility of helping bank the unbanked, or providing a means of free and convenient storage to people who do not have a bank account or the facilities to open one worldwide is something that cryptocurrencies can do. DeFi(Decentralised Financing) can help the lower-income population by providing them with freedom over their finances, and easier digital lending through cryptocurrency lending platforms which can give them the opportunity to secure safer loans.[44]

To conclude, similar to other market bubbles only the elements of cryptocurrencies and digital assets that provide inherent value to consumers, along with aid in providing people around the world with financial opportunity as well as a safe investment will survive, which means that this paper concludes that cryptocurrencies that had no essential value and were only increasing in price due to the greater fool theory will fall in price even further, and will lose all value in the coming years, whereas the technology behind cryptocurrencies, as well as the assets that can help provide real-world value, will survive, and just like companies in the dot com era might be able to spark a new technological and financial revolution, which may ironically lead to the actual goal of cryptocurrencies being achieved, creating a financial world in which the people do not need to rely on central authorities to govern financial principals, a decentralised financial world.

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