

# Stages of a speculative bubble in the asset class Cryptocurrencies

von

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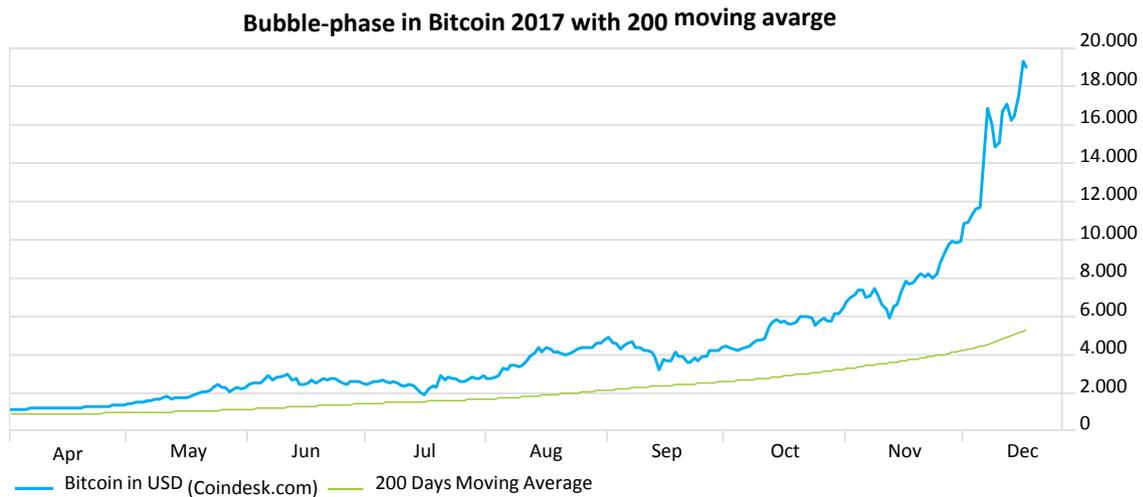
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## 1. Introduction: Speculative Bubble in Distress – Cryptos Quo Vadis?

At the beginning of 2017 the price of one Bitcoin, one of the most popular Cryptocurrencies, was at barely 1.000 USD. By mid-December 2017 the price not only surged 20x to an all-time high (ATH) but the number of other Cryptocurrencies offered to the public increased to more than 1.500<sup>1</sup> raising 6.5 billion USD via initial coin offerings alone in 2017, according to Token Report.

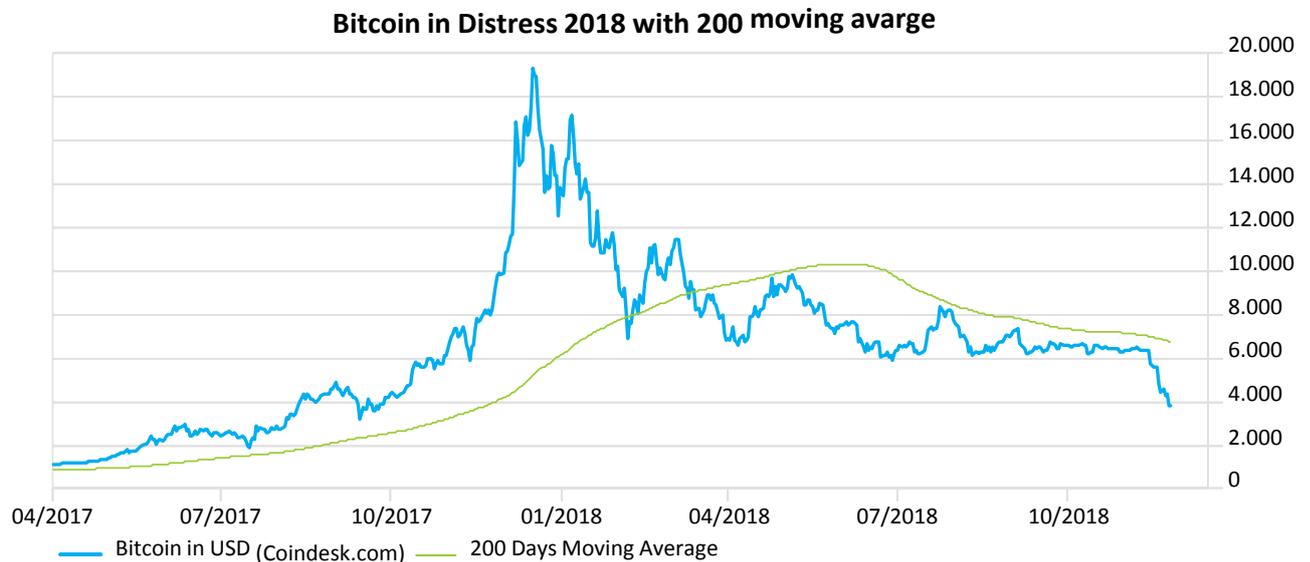


Of course, it would be short sighted to label this as a speculative bubble solely by considering the number of variation of the underlying instrument. Another profane way to identify an asset class as overvalued is the deviation of the price of the object of speculation from its 200 day moving average. In the case of the Cryptocurrencies, Bitcoin was 400 percent from its 200 day moving average away, when it hit its ATH. To put that into perspective, the Nasdaq Composite at the height of the dotcom-Bubble in March 2000 was just 54 percent “overvalued” by that measure. From another perspective, during the dotcom-Bubble it took the Nasdaq 519 day to rise by 278 percent reaching its ATH. Bitcoin prevailed again and rose 248 percent in just 35 days according to Morgan Stanley.<sup>2</sup>

<sup>1</sup> See <https://coinmarketcap.com/all/views/all/>

<sup>2</sup> See <https://www.bloomberg.com/news/articles/2018-03-19/bitcoin-bust-reminds-morgan-stanley-of-nasdaq-crash-but-faster>

One year after the All-Time-Highs, the Bitcoin price not only tumbled about 80 percent from its highs but it also fell below the estimated break-even price needed to make the mining process aka validation of Cryptocurrency transactions profitable.



In this article we would like to link certain developments of the Cryptocurrency price movement to the five characteristic phases speculative bubbles undergo according to US economists Charles Kindleberger and Hyman Minsky, who developed the respective framework in “Manias, Panics and Crashes” (1978). Although every speculative bubble is somewhat different, they tend to follow five phases.<sup>3</sup> In addition, we would like to answer the question how speculative bubbles develop and why they suddenly collapse.

## 2. Phase 1: Displacement

The first stage begins with some sort of shock to the financial system, creating a new opportunity in at least one sector of the economy. In the past, political changes, deregulation, technological/financial innovation or shifts in monetary policies have led to the creation of speculative bubbles in specific asset classes. Technological

<sup>3</sup> See Montier, 2009, S. 730 ff.

innovation, as for the internet-bubble in the late 1990s, as well as diminishing trust in the financial systems during the financial crisis of 2008 are seen as the cause for the development of a speculative bubbles involving Cryptocurrencies.<sup>4</sup>

New Technologies such as the blockchain technology behind the Cryptocurrencies is prone to trigger overvaluation as it does not yet create revenues but creates lots of expectations and hopes for future applications. The technology among other factors is meant to increase security for transactions, to create more transparency and to reduce dependency on government-controlled, centralized money. But is this a wishful thinking or soon to be reality? Since the feasibility of blockchain based transaction are yet to be proven, investors tend to get excited early on and eventually succumb to the fear of missing out.

One may think, the existence of a decentralized currency started with the creation of Bitcoin based on the paper “Bitcoin – A Peer to Peer Electronic Cash System”<sup>5</sup> published under the pseudonym of Satoshi Nakamoto in 2008. However, decentralized currencies existed already in the past – way back in the past! The Micronesia island of Yap as one example still has a parallel currency to the official US-Dollar, which are Rai limestone discs, some of which weigh up to 7 tones. The Yapese mined the stones on the Island of Palau in the time period 1.000 -1.400 AD and brought it to the Island of Yap. There are still about 13.000 stones left ranging from 30 centimeters (11 inches) to 3.50 meters (140 inches) in diameter. Just as property rights are transferred in the Cryptocurrency world by recording a transaction on a public ledger, the Yapese informed island inhabitants about a property transfer without moving the heavy stones. As a matter of fact, even though there are no written records to whom a stone belongs to, everyone on the island knows whose name is on it. Tribe elders from around 150 villages pass down the information of relationship and transaction dates. They act as a reminder of the past and help to reinforce relationships dating back as many as 200 years. Oral history articulated by the tribe elders is factored into the value of the stones, making them more valuable the older & the more historical events are associated with a stone.<sup>6</sup>

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<sup>4</sup> See Daxhammer/Facsar (2017) Spekulationsblasen p.32

<sup>5</sup> <https://Bitcoin.org/Bitcoin.pdf>

<sup>6</sup> <http://www.bbc.com/travel/story/20180502-the-tiny-island-with-human-sized-money>

### 3. Phase 2: Boom

The second phase is usually characterized by endogenous factors, such as the expansion of available liquidity, which facilitate the investment in the speculative object. Worldwide, central banks lowered key interest rates in the wake of the financial and economic crisis from 2008 onwards, thereby providing access to seemingly limitless liquidity. This liquidity will also have significantly benefited the further development of blockchain technology.

Rising prices within the asset class in question are gradually attracting more attention - a positive feedback loop is developing that reinforces belief in the emergence and continuation of the boom. This leads to the **social contagion of boom thinking** as one of the two main drivers of a bubble.<sup>7</sup>

Crypto currencies experienced this moment in 2013 when Bitcoin reached the 1,000 USD mark. The expectation of further rising quotations increased further investment in the speculative object at hand being the adjustment of the original open-source code of Bitcoin to develop new alternative currencies such as Litecoin, Namecoin, etc. These alternative currencies are therefore Bitcoin-chain derived blockchains. Litecoin for example was introduced 2011 by former Google employee Charles Lee. Charles changed the underlying code in order to speed up mining time for a block on the blockchain (e.g. 2.5 min for Litecoins vs. 10 min for Bitcoins). Institutional Investors call this rush to the gates by the herd as a modern version of the tulip mania in the 17<sup>th</sup> century. This reference however is harshly rejected by true crypto believers, saying that the number of Bitcoins is limited to 21 Mio currencies.

Is Bitcoin really limited to 21 Mio coins? Yes and No. As Bitcoin itself is indeed limited to 21 Mio coins, unless the underlying algorithm is changed and where about 17 Mio have been mined, there is a huge and growing number of other crypto-coins and -tokens shouting for the attention of investors.

As the price of Cryptocurrencies started to rise dramatically in 2017, the efforts to create new currencies and tokens resulted in an almost confusing amount of

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<sup>7</sup> See Shiller, 2008, S. 56 ff.

different currencies to choose from. End of 2018, the number of different crypto currencies and currency-based tokens, interested public could choose from, increased to 2.000. In total, Bitcoins, being the currency with the highest market value, were valued at more than 325bn USD at the peak in Mid-December 2017, exceeding the market capitalization of Wal-Mart Stores Inc. The entire Cryptocurrency market reached a peak valuation at USD 830bn.

#### 4. Phase 3: Euphoria

This is the stage when rational expectations morphs into irrational exuberance. More and more euphoric “outsiders” who thought they knew “everything” about crypto currencies, started to invest in an asset class with a risk-/reward footprint hardly assessed by institutional investors. The belief to become wealthy in a short amount of time is characteristic of this phase. Within this phase, the second driver of a speculative bubbles becomes apparent: **herding**: market participants observe other investors and their actions and tend to imitate them as the price of the asset class in questions keeps rising. Robert Shiller (2008) describes the meaning of herd behavior as:

*„The meaning of herd behaviour is that investors tend to do as other investors do. They imitate the behaviour of others and disregard their own information.“*  
(Shiller, zit. nach Redhead, 2008, S. 542)

Most of such crowdfunding initiatives, where new tokens were offered to the interested want-to-be investors happened during this stage of the bubble. These Initial Coin Offerings (ICOs) surged to highest levels, raising 6.5bn USD in 2017 through as many as 700 crowdfunding initiatives. Some ICOs lasted hardly 30 seconds raising 35m USD in the case of alternative Internet Browser *Brave* from former Mozilla co-founder Brendan Eich<sup>8</sup>.

ICOs became popular because they can crowdfund their fundraising campaigns with little or no regulatory requirements or proof of an actual product or company. Within the universe of more than 2.000 currencies or currency-blockchain-based tokens,

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<sup>8</sup> <https://www.coindesk.com/35-million-30-seconds-token-sale-internet-browser-brave-sells/>

some satire tokens such as the UET – Useless Ethereum Token, makes one wonder how low the barriers or unsophisticated the “investors” are, to push the market cap of UET to about 1m USD on January 30<sup>th</sup>, 2018. The ICO was upfront transparent about the crowdfunding project: *“You’re going to give some random person on the internet money, and they’re going to take it and go buy stuff with it. Seriously don’t buy these tokens.”*<sup>9</sup>

Another similarity to the Dot.com bubble emerges. You might recall how companies in the tech-bubble of 1999-2000 changed their names to the ending “.com” such as France Telecom changing its logo to  to highlight “.com” to take advantage of the euphoria among investors leading to sharp rises in their share prices. An academic study by Michael J. Cooper, Orlin Dimitrov and P. Raghavendra Rau from Purdue University in December 2001<sup>10</sup> found that the 95 companies that added the endings “.com”, “.net” or “.internet” to their names benefited of cumulative abnormal returns of 74 percent in the 10 days surrounding the announcement day of the name change. This is hardly different to the time the crypto bubble was at its highs. **Long Island Iced Tea Corp.** produced intraday abnormal returns of close to 500 percent closing the day with a share price increase of 183 percent on the day of the announcement to change their name into **Long Blockchain Corp** on December 21<sup>st</sup>, 2017. The company claimed to focus on opportunities to leverage the benefits of the blockchain technology.

It becomes evident, that market participants are semi rational at most, susceptible to cognitive and emotional biases such as overconfidence, optimism and selective perception during bubble phases. Unsophisticated market participants with limited experience in investing are often blinded by the belief that this time big profits will be made in a short period of time. Professional investors on the other hand may not want to correct the prices by investing against the bubble as they expect it to inflate even further. See further elaboration of the concept of limited arbitrage in DAXHAMMER, R./FACSAR, M (2017) Spekulationsblasen. p. 21 ff München: UVK

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<sup>9</sup> <https://uetoken.com/>

<sup>10</sup> [http://www.andreimonov.com/NES/BF/Cooper\\_A\\_Rosecom.pdf](http://www.andreimonov.com/NES/BF/Cooper_A_Rosecom.pdf)

## 5. Phase 4: Distress

The fourth phase of a speculative bubble is called the critical phase or phase of financial distress. The latter is alluded to the increasingly strained financial situation of companies. Rising interest rates are increasingly reducing liquidity needed for expanding business operations. In the current case, the slightly rising interest rates in the USA do not really play a decisive role in the reduction of liquidity. On the contrary, the environment for crypto mining became more and more uncertain and less profitable. Security risks in the course of numerous crypto thefts on trading platforms had additional negative impact on investor sentiment. The result: **preference for liquidity increased.**

China was the first country to ban Bitcoin mining due to excessive electricity consumption and perceived financial risk. Even before that local Bitcoin exchanges were shut down and ICOs were banned. In addition, platforms that allow investors to trade currencies on overseas exchanges are targeted to enforce nationwide efforts to cut-off crypto trading in China.

South Korea, one of the main markets for cryptocurrencies (20 percent of all Bitcoin trading) and the most expensive location to mine Bitcoins (25,170 USD/Bitcoin according to Elite Fixtures<sup>11</sup>), announced its own steps to ban trading and opening anonymous crypto accounts as well as new legislation to control domestic coin exchanges.

Apart from regulation, the possibility to trade bitcoin futures and thus to short sell the cryptocurrency on the CBOE/CME beginning mid-December 2017 caused the first red days for the price the cryptocurrencies. Was the market originally dominated largely by true believers, as time went on market participants interested in “correcting” the price of the asset class through short selling received the opportunity to do so, too. Bitcoin fall by 22 percent in the first 6 trading days after futures trading was initiated.

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<sup>11</sup> <https://www.elitefixtures.com/blog/post/2683/Bitcoin-mining-costs-by-country/>

The investment community soon faced another reason to question the stability of the investment, which often was perceived as a quick way to become wealthy in a very short period of time.

As the price of cryptos has fallen notably from its ATH, the price of energy used for mining is becoming an even bigger problem to make blockchain transactions sustainable. The break-even cost of mining a Bitcoin is estimated to be around 8.000 USD taking three components into consideration: price of electricity, price for equipment which constantly needs to be enhanced and other overhead costs for maintaining cooling facilities.<sup>12</sup> End of November 2018, the price of Bitcoin dropped to 4.000 USD. Who will engage in the crucial validation process via mining of Bitcoins if the reward's value in the form of Bitcoins is falling due to deteriorating Cryptocurrency prices not even covering the cost for the mining process itself, in this specific case? Carl-Ludwig Thiele, Member of the Board of Deutsche Bundesbank pointed out that the validation process for one Bitcoin transaction on blockchain requires about 430 kilowatt hours of energy, sufficient to provide electricity for an average four member German household for over a month. To put that in another perspective, one Bitcoin transaction requires as much energy as processing 515.000 commonly used bank transfers.<sup>13</sup> Therefore, purely from an energy point of view, one might want to move the mining base to Venezuela, being the cheapest location with 531 USD/Bitcoin<sup>14</sup> mining costs as electricity cost is heavily subsidized by the government.

## 6. Phase 5: Panic

With hindsight it seems to be quite easy to tag certain events and developments to any of the stages of a speculative bubble. In December 2018, we can only assume in which phase a bubble might be. With that in mind, the drop of about 80 percent in Bitcoin prices from their ATH of 20.000 USD in December 2017 to a low at 3.800 USD end of November 2018, makes a valid case to see this development as the

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<sup>12</sup> <https://www.cnn.com/2018/03/15/bad-news-for-Bitcoin-miners-as-its-no-longer-profitable-to-create-the-cryptocurrency.html>

<sup>13</sup> <https://www.n-tv.de/wirtschaft/Bundesbank-warnt-vor-Bitcoin-article20267329.html>

<sup>14</sup> <https://www.elitefixtures.com/blog/post/2683/Bitcoin-mining-costs-by-country/>

deflationary event characterizing the move to be the last phase of a speculative bubble.

In the past, speculative bubbles collapsed usually by either rising inflation that lead to deteriorating corporate profits or a mean reversion event when the asset class in question is highly deviated the 200 day moving average. As stated in the intro of this paper, Bitcoin was 400 Percent above its 200 day moving average. A mean reversion, even way back below that average is very likely to be the reason for the collapse of the cryptocurrencies.

In line with that, the market value of the digital assets fell notably from the highs of USD 830bn to below USD 150bn by end of November 2018 according to Coinmarketcap.com.<sup>15</sup> Top 10 Cryptocurrencies by market value such as Ripple have fallen as much as 90 percent from ATHs seen in mid-December 2017. One reason for recent price drops especially in November 2018 resulting in a 30 percent loss from a Bitcoin price oscillating at 6.000 USD for most of 2018, were tensions among the bitcoin community to agree on a further adjustment of the open source code resulting in a new Bitcoin “fork”.

Not surprising but still remarkable are the calls from European Supervisory Authorities<sup>16</sup> to warn consumers that Virtual Currencies are very risky and that unregulated products are “unsuitable as investment, savings or retirement planning products”.

The last phase of speculative bubbles are often characterized by fraudulent activities regarding the asset class in question. Systematic fraud can turn the bubble to be more devastating when it unravels according to Karl-Heinz Thielmann, Managing Director at Long-Term Investing Research AG.<sup>17</sup> In the case of Cryptocurrencies the Wall Street Journal conducted an analysis covering 1,450 digital coin offerings and found 271 offerings with red flags including plagiarized investor documents,

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<sup>15</sup> <https://www.bloomberg.com/news/articles/2018-06-10/bitcoin-tumbles-most-in-two-weeks-amid-south-korea-exchange-hack>

<sup>16</sup> <https://www.esma.europa.eu/press-news/esma-news/esas-warn-consumers-risks-in-buying-virtual-currencies>

<sup>17</sup> Vgl. DAXHAMMER, R./FACSAR, M (2017) Spekulationsblasen S. 70

promises of guaranteed returns as well as missing or fake executive teams.

According to the analysis, investors have pooled over 1bn into the 271 offerings.<sup>18</sup>

It remains to be seen if companies will fall back to cosmetic tricks in the wake of the crypto bubble's burst to regain market capitalization. The authors P. Raghavendra Rau, Ajay Patel, Igor Osobov, Ajay Khorana, Michael J. Cooper from Purdue University<sup>19</sup> in 2002 revealed abnormal returns of 70 Percent for the sixty days surrounding the announcement day that companies changed back their names after the internet bubble burst as a way to build up lost reputation.

Whether Long Blockchain Corp. will receive that much attention remains to be seen. On April 10 2018 the company was delisted from the Nasdaq due to its low market value.

## 7. Outlook - New Industries on the horizon

The boom and bust of Cryptocurrencies, failing ICOs (as about 50 percent of last year's ICOs already failed<sup>20</sup>) and tougher regulation on the horizon is one side of this highly disruptive industry of blockchain based services in its early years. The opportunity to create new applications based on blockchains is the main benefit this technological development has to offer. Nonetheless, this opportunity can pose dangers to established financial institutions if they miss to engage with pros and cons of blockchain based transactions. In fact, US-banks JPMorgan Chase and Bank of America have added Cryptocurrencies as a risk factor to their business development for the first time in their annual reports released for 2017.<sup>21</sup>

The cost of energy as well as local regulatory implications already demonstrate how this very young industry is being shaped. It creates demand for new ways to make mining aka the validation process of blockchain transactions more affordable and sustainable. This is just one innovative effect the blockchain crypto bubble has on the overall economy. New players such HydroMiner from Austria and Envion AG from Switzerland emerge with solutions that make mining less expensive and

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<sup>18</sup> <https://www.wsj.com/articles/buyer-beware-hundreds-of-bitcoin-wannabes-show-hallmarks-of-fraud-1526573115>

<sup>19</sup> <https://business.illinois.edu/f/wp-content/uploads/sites/46/2014/12/khorana.pdf>

<sup>20</sup> <https://news.bitcoin.com/46-last-years-icos-failed-already/>

<sup>21</sup> <http://fortune.com/2018/02/27/cryptocurrency-jp-morgan-risk/>

sustainable. HydroMiner uses its ICOs to create mining facilities at hydroelectric power facilities around the world. Envion AG on the other hand developed computer-packed cargo containers that can be transported easily to remote locations to be used at e.g. solar farms with unused local overcapacities creating a win-win situation for both the solar farms as well as the miners.

In the light of constant requests from regulatory bodies and finance ministers around the world for setting up regulatory measures with the goal to reduce money laundering, terror financing and also to increase investor protection, there are first positive indications as when it comes to using the blockchain technology for regulatory purposes itself.<sup>22</sup> As stated by Christine Lagarde, Head of the IMF:

*“The technology that enables instant global transactions could be used to create registries of standard, verified, customer information along with digital signatures. Better use of data by governments can also help free up resources for priority needs and reduce tax evasion, including evasion related to cross-border transactions.”(Lagarde, IMFBlog March 13, 2018)*

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<sup>22</sup> <https://blogs.imf.org/2018/03/13/addressing-the-dark-side-of-the-crypto-world/>

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