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Bitcoin is a potentially transformative technology whose impacts may extend beyond its use as an investment. For its most ardent advocates, a belief that Bitcoin will change society is close to an article of faith. Conversely, there are many decided non-believers who view the current enthusiasm for Bitcoin as a speculative phenomenon. The financial world is starkly divided on this issue.

Please note that RBC PH&N Investment Counsel does not currently provide any recommendations or solutions related to Bitcoin or other cryptocurrency assets. The following is our effort to summarize and clarify the many questions about what Bitcoin is and how it may be relevant to investors today, and is for information purposes only. In our view, any investment in Bitcoin should be considered speculative and volatile, meaning that investors should be prepared to lose all of their investment.

Decrypting crypto – *caveat emptor*

Part 1: What is Bitcoin? Is it a Ponzi scheme, and can it go to zero?

"Cryptoassets" like Bitcoin combine two very difficult subjects for the majority of people: money and technology. Moreover, as a potentially new burgeoning asset class amongst investors, there is much debate about the validity of the technology and Bitcoin itself. That's not to mention the difficulty in navigating the taxonomy and lexicon of this new industry.

In this two-part series, we provide some insight into Bitcoin. In part one, we consider whether Bitcoin is even real money, why it came to be, and if it's ultimately a Ponzi scheme. In part two, we will discuss specific risks and opportunities, and ask: "Do you even need to invest in Bitcoin?"

Is Bitcoin real money?

Money is typically defined as an economic unit that functions as a generally recognized medium of exchange. There really isn't anything that stipulates what should or should not be used as money. In truth, it can be seen as a social construct. Throughout history, many things have served the function of money – sea shells, beads, gold, silver, government paper, etc. One cannot say for sure there is a "right" or a "wrong" choice in terms of what money should be. However, the type of money that has survived the longest throughout recorded history has been the medium of exchange possessing some mechanism to restrain the supply of new units in order to preserve the value of existing units in circulation.

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When it comes to the three traditional functions of money – unit of account, medium of exchange and store of value – the jury's still out on Bitcoin.

- **Unit of account:** a common base of comparison that people use to present prices and record debts. It helps to create an efficient economy that allows for goods and services to be priced independently of each other. A unit of account allows the economy to grow through increased exchange of goods and services and increased specialization.
- **Medium of exchange:** one of the most important functions that defines money, as money is a type of "good" primarily used to exchange for other goods, such as products. The more acceptable a good is as a medium of exchange, the more liquid it is and the more likely it can be bought and sold without much loss.
- **Store of value:** to function as a store of value, money has to appreciate when people demand it as a store of value, and the supply of the good has to be constrained. All else equal, the good that has a defined supply schedule should serve as a store of value. Keep in mind that this store of value must also be liquid, universally accepted, and hopefully maintain a stable value.

Bitcoin at present doesn't hold on to all three traditional functions of money. While goods and services today may be transacted in Bitcoin, the prices of goods and services are usually quoted first in fiat (or government-issued) currencies, and may be exchanged for Bitcoin. That unit of account function may take considerable time for Bitcoin to live up to, especially given the volatile nature of Bitcoin prices at present. This may change over time as workers say, "Pay me in Bitcoin." Yes, there are reports of some professional sports athletes being paid in Bitcoin, but for the vast majority of us, fiat currency dominates payday.

What is the purpose of Bitcoin?

Limited use as a currency today: Bitcoin is based on a technology called "blockchain" which is essentially an encrypted digital ledger. It runs on a decentralized network, across large computer networks. This decentralized record-keeping function does have one major drawback – it is an inefficient way to process high volumes of transactions. The trade-off between decentralization and security means that scalability is an issue for the Bitcoin blockchain today. This creates a barrier to widespread adoption as a global payment network. However, it may have value facilitating very large transactions/payments rather than everyday payment facilitation and remittances. In the future, smaller everyday transactions may still be facilitated with other cryptocurrencies, and indirectly with Bitcoin, but not in its present form. The ability to hold a currency with deflationary properties such as bitcoin is particularly attractive to individuals living in high-inflation fiat currency regimes, which is another use case for Bitcoin today.

Potential store of value: The supply schedule for new Bitcoins is known with certainty and cannot be changed (it's limited to 21 million units in its source code). This supply constraint is unique to Bitcoin compared to fiat currencies and even many cryptocurrencies, and has long formed part of the rationale for investing in it. Because each Bitcoin is divisible by 100 million "satoshis" (the smallest unit of Bitcoin), there is plenty of room for its growth through ever-small units as the value appreciates. However, stability of value over time is yet to be seen – anything that has positive price appreciation must have positive utility to consumers and businesses. Examples of stores of value that have utility include jewelry/diamonds, art, fine wine, gold or copper. What is Bitcoin's utility? It seems to be intertwined with its underlying blockchain network and the consumption of energy to power it. However, at this point, we recognize that interest in Bitcoin may have more to do with speculation on its future value.

Speculative commodity: Given the above arguments, at present, Bitcoin might be viewed more as a speculative commodity than as a currency. Material price swings in Bitcoin are, in part, due to fluctuating demand based on utility or speculation around a finite supply of Bitcoins. Speculation about future utility of sovereign digital money (issued by central governments), and a deflationary store of value, is likely behind considerable price appreciation of Bitcoin in its limited existence as an asset. Yet even this is quite difficult to quantify.

Speculation of future utility or yet-to-be-defined applications should not to be dismissed outright as irrational exuberance. Looking back to the early 1990s, for most people it would have been hard to comprehend what impact the internet would have on our lives. To that end, we should not be entirely dismissive of Bitcoin and cryptocurrencies either. There are yet-to-be-defined use cases for cryptocurrencies that may, or may not, result in financial rewards for current investors. Time will tell.

Digital gold? Many Bitcoin holders have said that Bitcoin is a "new digital gold." While Bitcoin and gold share many similar properties (such as limited scarce supply), gold has a much longer history. It has existed for a few thousand years as a recognized store of value, while Bitcoin came into existence in 2009. Bitcoin is less costly than gold in terms of storage costs, and it is easily divisible into units of 100 millionth that can be transferred electronically. Both gold and Bitcoin exist outside of governed structures, and both have a perception of value even though you cannot consume these assets (i.e. hard commodities) due to a finite supply.

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Overall, the properties shared between Bitcoin and gold suggest the two are complements rather than competitors for investor assets. One has a longer track record of providing investment portfolio stability during periods of inflation and periods of declining real interest rates, while the other has a limited track record but a scarcity factor that may result in store of value through time.

Bitcoin holders may say that the digital coin is the world's best hedge against rising consumer prices. Their logic might be that unlike fiat currency, it's designed to have a limited supply, so it can't be devalued by a government or a central bank distributing too much of it. Bitcoin is theoretically positioned as an inflation/stagflation hedge, with some comparing its worth to that of gold during the 1970s period of high inflation, as fiat currencies like the U.S. dollar slid in value. Bitcoin by design is a deflationary currency that encourages owners of Bitcoin to hold it and not trade it, or consume it. In practice, the value of this inflation/stagflation hedge has been mixed over Bitcoin's short trading history.

Could Bitcoin go to zero?

Never say never. There is nothing, technically speaking, that guarantees that the value of one Bitcoin couldn't be worthless. A finite supply or not, any form of money is a social construct and rests within a collective belief of its value. It is possible that Bitcoin may never live up to its promise of a fiat currency or as a store of value.

However, over the last few years, the cryptocurrency asset class (Bitcoin in particular) has grown considerably. Growth has come in terms of size and value, measured by the industry and Bitcoin's market capitalization, the number of institutional firms/investors involved including regulated exchanges, a few notable high-profile investors, custodians, financial institutions, as well as publicly listed corporations, and of course the participation of individual investors. The market capitalization of Bitcoin is presented below relative to some well-known publicly traded companies.

Company/security	Market Cap (USD BN)
Microsoft	$1,831
Amazon	$1,630
Alphabet (Google)	$1,534
Facebook	$889
Bitcoin	**$742**
Berkshire Hathaway	$655
Tesla	$543
JP Morgan Chase	$488
Visa	$479
Johnson & Johnson	$448
Bank of America	$360
Home Depot	$338
Ethereum	**$309**
Walt Disney	$308
Royal Bank of Canada	$144
Dogecoin	**$47**

Source: FactSet, Coinmarketcap.com, RBC PH&N Investment Counsel. Market capitalization as of May 19/21, in U.S. dollars.

At the time of writing, the entire cryptoasset universe had a market capitalization in excess of US $1.6 trillion, with Bitcoin making up about 40% of that value. At one point in May 2021, total cryptoassets market capitalization was greater than the value of U.S. dollar coins and bank notes in circulation, and approximately 22% of the value of the entire gold market. The cryptoasset market has grown into a material asset class within the investment industry in a very short period of time. Despite the most recent pullback in cryptoasset prices, the industry has grown in size, questions related to systemic risks naturally start to occur, especially as institutional investors such as pension plans, endowments gain exposure.

Writer, mathematician, and former risk analyst Nassim Taleb wrote about a theoretical phenomenon known as the "Lindy Effect." The Lindy Effect proposes that there is a proportional relationship between the current age of an object/idea and its future life expectancy. Put simply, the longer something has been around, the more likely it will continue to be relevant. Some have likened the staying power of Bitcoin technology to the Lindy Effect. In the early days of Bitcoin there were substantial fears of cyberattacks and fraud. To date, the Bitcoin blockchain has proved resilient to these risks. There have not been any successful hacks of the blockchain itself, though exchanges and individual wallets are more susceptible. As time passes and the Bitcoin network continues to grow in size, staying power should not be underestimated.

Is Bitcoin a Ponzi scheme?

Ponzi schemes have played out over history, even before we were introduced to the term named after notorious swindler Charles Ponzi (1882-1949). Ponzi schemes operate by encouraging a self-feeding frenzy of large and continuous flows of money to feed ever-rising prices. These schemes have been observed many times in the past across various asset classes.

A traditional Ponzi scheme usually has some defining features that are important to watch out for, which we outline here:

- There is usually a central authority involved in the scheme.
- There is usually a promise of a consistent annual return on your investment.
- Investors in the scheme eventually experience difficulty receiving payments or return of capital (new investors pay old investors, and the scheme ends when there are no new investors).

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- Access to the scheme comes through a connection or "someone in the know."
- All schemes have a great story.
- Ponzi schemes and bubbles have benefited from periods of excess liquidity and low interest rates.

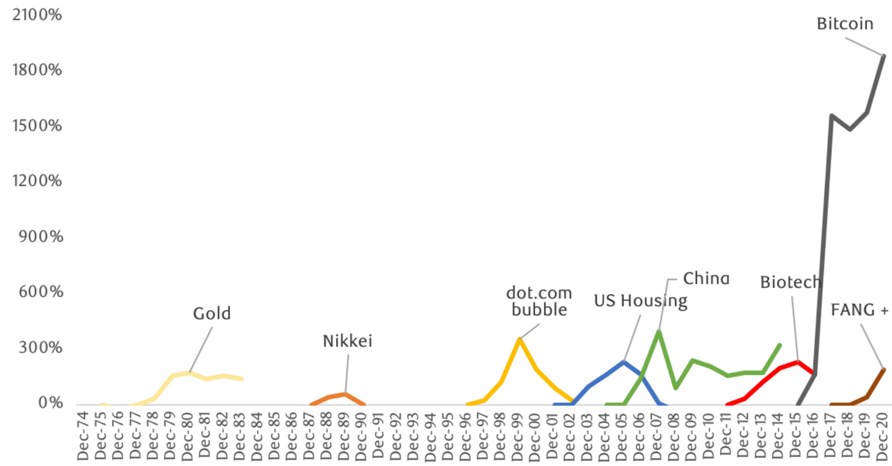
Bitcoin doesn't fit the defining features of a Ponzi scheme. There is no central authority that governs inflows and outflows of Bitcoin. The transactions that take place on the Bitcoin blockchain are transparent and available for all to see at any time. Bitcoin's blockchain is open source code, downloadable by anyone with a computer, offering complete transparency. Participants can buy and sell at any time, and, so far, no return guarantees have been issued on Bitcoin.

And while a valuation framework for Bitcoin is quite difficult to construct with any degree of confidence, this isn't indicative of a Ponzi scheme on its own. We would propose that without any cash flows or an income stream to use as a traditional valuation framework, perhaps Bitcoin is more subjectively valued, like fine art. Scarcity in terms of Bitcoins is a real thing – only 21 million of these will ever exist. Of course, value is in the eye of the autonomous beholder.

Not a traditional Ponzi scheme but potentially a speculative bubble

Today's environment can certainly be described as having a fair degree of excess liquidity in the financial system coupled with historically low interest rates (both real and nominal), both of which have fueled financial bubbles in the past. While Bitcoin may not be a traditional Ponzi scheme as outlined here, it could be a naturally occurring Ponzi scheme, or a speculative bubble as outlined in a 2014 paper by the World Bank titled Ponzis: The Science and Mystique of a Class of Financial Frauds. The simplest definition of a bubble is an extraordinary price gain in excess of an asset's fundamental value which eventually ends in a high-volatility collapse as more realistic expectations take hold. Time will tell, but timing isn't something anyone can really predict.

Chart 1: Historical market bubbles vs. Bitcoin



Source: Bloomberg, data set Dec 31/74 through Dec 31/20 unless noted below, RBC PH&N Investment Counsel. All returns are compounded annually, in USD, time-weighted returns, before fees, transaction costs and taxes. Past performance does not guarantee future results. Reference indices/proxies for events and dates used in the chart: Gold (XAU Currency) – dates = Jan 1975 to Jan 1984. Nikkei (NKY Index) – dates = Jan 1988 to Jan 1991. Dot.com bubble (NDX Index) – dates = Jan 1997 to Jan 2003. US housing (S&P Homebuilders Select Industry Index; S5HOME Index) – dates = Jan 2002 to Jan 2010. China (SHCOMP Index) – dates = Jan 2005 to Jan 2015. Biotech (Nasdaq Biotechnology index; NBI Index) – dates = Jan 2012 to Jan 2017. FANG+ (Facebook, Apple, Amazon, Netflix and Alphabet; NYFANG Index) – dates = Jan 2018 to Dec 31/20. Bitcoin (XBTUSD Currency) – dates = Jan 2016 to Dec 31/20. See required disclosures for indices referenced.

We illustrate some financial market bubbles over the last 50 years in the chart. As can be seen, Bitcoin's price appreciation really stands out when compared to past bubbles. Typically, we see financial market bubbles progress through various stages before they either deflate or pop. It's very difficult to try and identify where Bitcoin might be in a bubble cycle, if it is in a bubble at all. However, given the magnitude of its price appreciation when compared to past bubbles, we are nonetheless extremely cautious around anyone saying "this time is different."

To add a final point to the degree of speculation in Bitcoin and cryptocurrencies today, we look to the degree of interest and investment in smaller fringe coins. Investors in Bitcoin should be concerned about potential collateral damage to Bitcoin as speculators have piled into corners of the cryptocurrency world. Dogecoin, which was actually created as a lighthearted joke in 2013 for crypto enthusiasts, has increased in price from less than US$0.005 to over US$0.71 in the last few months, and is now the seventh largest cryptocurrency by market capitalization. This should certainly be a red flag for anyone in this space or interested in investing now. Caveat emptor.

For more information about Bitcoin, please see RBC Wealth Management's introductory article.

S&P 500 Index: The S&P 500 Index includes 500 companies across many sectors of the U.S. economy. The index is weighted by market capitalization so bigger companies make up a larger proportion of the index than smaller companies. The index is designed to measure performance of the broad US economy through changes in the aggregate market value of the largest US companies.

Canada S&P/TSX Composite: Comprises the majority of market capitalization for Canadian-based, Toronto Stock Exchange listed companies. It is a benchmark used to measure the price performance of the broad, Canadian, senior equity market. It was formerly known as the TSE 300 Composite Index.

Bitcoin reference - XBT USD Currency: A Bloomberg CFIX rate fixings are designed as reference points for Cryptocurrencies. As used in this methodology, the term "fixings" refers only to such Cryptocurrency fixing rates and not to any other rate, calculation or other information that may be related to, or associated with, such fixings that are made available by Bloomberg. Based on pricing provided by the Bloomberg Generic Price ("BGN") using Bloomberg's well-known data, technology and distribution platforms, CFIX is made broadly available to the investment community with the objective of providing Cryptocurrency fixings that are reliable, representative, and transparent for the Cryptocurrency markets around the world. Pricing sources are trading platforms that facilitate buying and selling Cryptocurrencies online. Many Pricing Sources refer to themselves as "exchanges," which can give the misimpression that they are regulated or meet regulatory standards of a national securities exchange. Many of the U.S.-based digital Cryptocurrency trading platforms have elected to be state-regulated 'money-transmission services'. Traditionally, from an oversight perspective, these predominantly state-regulated payment services have not been subject to direct oversight by the SEC or the CFTC.

The Nikkei 225, or the Nikkei Stock Average, more commonly called the Nikkei or the Nikkei index, is a stock market index for the Tokyo Stock Exchange. It has been calculated daily by the Nihon Keizai Shimbun newspaper since 1950. It is a price-weighted index, operating in the Japanese Yen (JP¥), and its components are reviewed once a year. The Nikkei measures the performance of 225 large, publicly owned companies in Japan from a wide array of industry sectors.

NDX, the Nasdaq-100 is a stock market index made up of 102 equity securities issued by 100 of the largest non-financial companies listed on the NASDAQ stock market. It is a modified capitalization-weighted index.

Shanghai Stock Exchange: The Shanghai Stock Exchange is a stock exchange based in the city of Shanghai, China. It is one of the two stock exchanges operating independently in mainland China, the other being the Shenzhen Stock Exchange. The Shanghai Stock Exchange Composite Index is a capitalization-weighted index. The index tracks the daily price performance of all A-shares and B-shares listed on the Shanghai Stock Exchange. The index was developed on December 19, 1990 with a base value of 100. Index trade volume on Q is scaled down by a factor of 1000.

NBI Index: The NASDAQ Biotechnology Index is a stock market index made up of securities of NASDAQ-listed companies classified according to the Industry Classification Benchmark as either the Biotechnology or the Pharmaceutical industry. A list of the 213 components of the index is published online.

XAU Currency: A symbol for the Philadelphia Gold and Silver Index, an index of precious metal mining company stocks that are traded on the Philadelphia Stock Exchange.

US housing (S&P Homebuilders Select Industry Index); S5HOME: This index is comprised of stocks in the S&P Total Market Index that can be classified as being part of the GICS (Global Industry Classification Standard) homebuilding sub-industry.

NYSE FANG Index: An equal-dollar weighted index representing a segment of consumer discretionary and technology sectors, made up of highly-traded growth companies such as Facebook, Apple, Amazon, Netflix, and Alphabet's Google.

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