

Bitcoin:

What the heck is it?

By Kevin Chambers

You might not recognize the name Satori Nakamoto, but you have probably heard of Satori Nakamoto's creation: **Bitcoin**. And yet, no one actually knows who is the creator, or creators, because it is a pseudonym derived from "Satoshi," a name from Japanese Manga comics, and "Nakamoto," an 18th-century Japanese philosopher (The Guardian, 2016). Whomever the founder(s) of Bitcoin happens to be, the consensus is they started developing Bitcoin back in 2007 (Futurism, 2015).

Satori Nakamoto was actively involved on message boards and forums seeking advice and testing the concept. With the collaboration of many developers, the Bitcoin program was built into a robust technology. They registered on a site called SourceForge.net, a community of developers that collaborate on open source software. In 2011, Satori Nakamoto disappeared from the message boards (The Guardian, 2016). Satoshi Nakamoto has mined (more on this soon) close to 980,000 Bitcoins since its inception in 2009. According to Bitcoin's public ledger, these coins have not been sold. This would make Satori Nakamoto's Bitcoin's trove at between \$18-\$20 billion, making them around the 40th

richest person in the world (Wong, 2017). However, their wealth is only derived from the value of their Bitcoin holdings, because they have never profited directly from the creation of Bitcoin. They were never paid for their invention or monetized it in any way. They got their Bitcoins the same way everyone has.

Bitcoin's software and website are now managed by a community of decentralized developers. Similar to Wikipedia, any change needs to be reviewed and can be



rejected by the other developers. There are currently close to 500 core contributors to Bitcoin development (bitcoin.org, 2017).

What is Bitcoin?

Bitcoin is the first, and still most popular, decentralized *cryptocurrency*. Unlike a bank or a credit card company, there is no third party who verifies the transactions. The transactions are recorded on a public ledger that is shared on a network of computers all around the world (Popper, 2017).

Cryptocurrency — a digital coin that can be sent from one person to another electronically

Bitcoins can be used to facilitate online transactions. At first, most of these transactions were done between individuals, mostly for internet services. As Bitcoin gained notoriety and trust and the stock of total Bitcoins grew, more transactions occurred. In May of 2010, a programmer in Florida bought a pizza for 10,000 Bitcoins, making the first transaction of goods using Bitcoin.



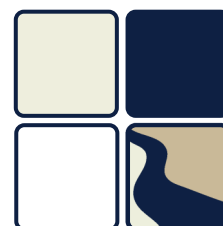
Soon after the creation of Bitcoins, various online markets were created to facilitate the exchange of Bitcoin into currency. The first was The Bitcoin Market, but it was quickly followed by many more (Futurism , 2015). These markets are similar to currency markets around the world, where traders can exchange Dollars for Euros, and Chinese Yaun for Mexican Pesos. When the price of Bitcoin is most often quoted, it is based on the exchange value compared to the US Dollar: how many dollars it takes to buy a single Bitcoin. Bitcoins can be divided down to eight decimal places (Popper, 2017).



Bitcoins are held electronically in accounts called “wallets.” There are many online companies that offer secure cloud-based storage for your Bitcoins. But you can also save the Bitcoin on a desktop computer, on a personal server, or even on your mobile phones. Most people don’t recommend this, as personal devices are often not secure enough to avoid being targeted by hackers. The safest place to hold a Bitcoin is on a hard drive not connected to the internet, people call this “cold storage.” However, to use the Bitcoins you will have to transfer them to an internet compatible device eventually (Bitcoin.org, 2017).

The Blockchain and Bitcoin Mining

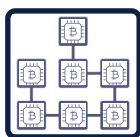
All Bitcoin transactions are recorded on a public ledger. Each party in the transaction is required to have a pseudonym. There is no requirement to get a username, so the users are anonymous. However, the transactions are fully transparent. The ledger is commonly known as “the blockchain.” The blockchain is the real genius of Bitcoin, and it has massive implications for the future of our financial institutions and other industries. Since 2015, well over a billion dollars has been invested in startup companies dedicated to blockchain technology (Statista,



2017). To understand blockchain, and how it works for Bitcoin, we have to understand how Bitcoins are created. They are created through a system called “mining.” They are generated by computers solving complex mathematical problems.

People or companies can sign up to store this ledger on their computers. They are called “Bitcoin miners.” Bitcoin miners are compensated with brand new Bitcoins for helping to secure and record the transactions on the blockchain.

This is how it works.



First, a group of transactions by people sending Bitcoins to each other get bundled into a “block.” The ledger is a list of “blocks,” or a “chain” of blocks, hence: blockchain.



Once the block is created, the miners validate the transaction, to ensure the Bitcoins left the correct person and were received by the correct person. This validation process, called a “hash,” confirms that the transaction occurred at a specific time, comparable to a thousand notaries time-stamping the transaction. Then they attempt to solve an algorithm to basically guess a very large number. The first person to get the correct number, generated randomly by the Bitcoin software, wins. If you’re the first computer to solve the algorithm, you are granted the right to record the transaction block; add it to the blockchain, and are compensated with, currently, 12.5 Bitcoin as a reward.

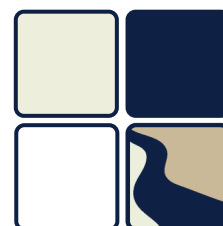


This system does a few things.

- It has thousands of computers verifying each transaction. If there is a problem, or someone tries to mess with the transaction, it is going to be caught by someone.
- It makes the transactions public.
- It makes the transactions irreversible.
- And, finally, it allows a steady stream of new Bitcoins to come into the market.

When Bitcoin first entered the market, individuals could mine Bitcoin from their home computers. The algorithms and storage requirements were not overwhelming. Now, the only way to compete as a Bitcoin miner is to have essentially a warehouse full of dedicated computers and servers. The algorithm has a system that makes it more difficult based on the number Bitcoins available, and the number of people attempting to mine them. Thus, the difficulty of the algorithm has been steadily increasing over the course of the life of Bitcoin.

This technology has other applications. The blockchain management system is not complicated. It essentially operates like email. With email, there is no central email authority. No email tsar making sure all emails get to where they need to go. We set up a universal system



that allows information to pass between two servers, without needing a middleman. Blockchain is essentially like email, but instead of sending information to one server, you send the information to a group of servers. They all independently verify and store the information.

The other exciting implication of blockchain transactions is that, due to their online nature, they can be programmable. Transactions or contracts can be programmed to meet certain requirements before processing. This can be written right into the code. This could basically eliminate types of fraud. Say a company gives an employee money that is

supposed to be used for health care expenses. The money that the company gives the employee could be programmed with the requirement that it has to be spent on healthcare. Therefore, the transaction, when the employee tries to use the money, would only process if it was going to a healthcare company. (Afshar, 2017).

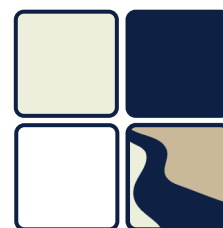
This technology could be applied to all online monetary transactions. In fact, some banks are already implementing it. It can also be used in supply chain management, government document validation, election voting verification, and healthcare, just to name a few applications (Block Geeks, 2017).

Currency or Commodity?

Although Bitcoin is called a cryptocurrency, it is not acting like other traditional currencies. To explain, we are going to delve into the reasons different currencies have value. Prior to 1971, the United States dollar was backed by gold. Every dollar that the US government printed had to be matched by adding a dollar's worth of gold into the US Treasury. However, we broke away from that system making the dollar a "fiat currency." The value of the US Dollar was no longer determined by the price of gold but by the supply and demand of the dollar itself. Now this is the world standard for currency. Bitcoin is essentially another fiat currency.

It is important to remember that all currencies are priced relative to another currency. This produces exchange rates. Exchange rates are an indicator of economic health, a country's foreign trade policy, and political or social issues.

As a currency value increases, it makes a country's exports more expensive and makes imports cheaper. Higher currency prices tip the balance of trade (the ratio of imports to exports) toward importing more goods than are exported. A lot of factors can influence exchange rates. We will review a few of the most powerful reasons for exchange rate changes. Again, these are all relative between two countries, but usually can be generalized to the entire global economy.



Inflation Differentials:

If a country's relative inflation is constantly lower, it will tend to have a higher relative currency value. This is because higher inflation decreases the purchasing power of a currency.

Interest Rate Differentials:

Since bonds are denominated in local currencies, the purchasing of bonds is a driver of exchange rate changes. As interest rates increase, more investors are likely to demand more of the local currency to buy those bonds to get the higher yield. Thus, pushing the exchange rate to increase.

Political and Economic Stability:

The relative health of an economy will lead investors to favor one country over another. When a country is relatively healthy, investment funds are drawn into that country, driving the price of the currency up. Political or economic troubles would make investors less likely to invest in a country (Van Bergen, 2014). If there are problems, less people demand this currency and the value will fall.

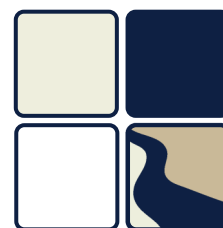
Bitcoin doesn't have any of the underlying economic factors to rely on, which is why some people like it. It's value, which is different than it's price, is derived from its ability to facilitate online transactions. In a perfect world, the price of Bitcoin would always reflect this value. However, without any underlying fundamental value measures, like other currencies have, it is very hard to know if the price of Bitcoin is reflective of its value. As the number of

transactions increase and the availability to use Bitcoin as a medium of exchange for more products increases, its fundamental value and price will converge.

In late 2017, Bitcoin was listed on the Chicago Mercantile Exchange (CME), one of the largest commodity exchanges in the world. The CME is an exchange for investors or companies to buy futures of a certain commodity. Futures are contracts defined to purchase a commodity at a pre-determined date and price. Futures can be used for hedging or speculative purposes. For example, an airline can buy jet fuel futures to lock in a price to hedge against fuel price increases. Also, investors can buy commodities for speculative purposes to make money off price fluctuations.

This led rise to a conversation for Bitcoin to be treated more like a commodity. This method of valuation may be more appropriate; however, the lack of fundamental value is still a struggle to determine. There is no hedging market for Bitcoins. There is no balancing force to the speculator investors. The vast majority of people buying Bitcoin are buying it for speculation. They think the price will go up tomorrow, or over the next few months, so they buy today.

In terms of a commodity, Bitcoin is most similar to our good friend, gold. Gold also has a problem with its price and fundamental value being at odds. The price of gold fluctuates daily. It is impacted by its fundamental uses, primarily for use in jewelry. It has some limited uses in manufacturing and technology, but the consumer



gold market is dominated by jewelry. In fact, 48% of the world's gold is in jewelry. Surprisingly, only 17% can be found in central bank vaults. This means that the 21% owned by investors makes speculative purposes the second most common use of gold (Desjardins, 2017).

Gold has significant historical value. It has been used as currency since ancient times. Even today, it is considered a safe investment by many people. On June 24th, 2016, the price of gold surged. Was there a problem at a gold mine? No. Was there a new use for gold in a new technology product? No. On June 23rd, 2016, the UK voted to leave the European Union (EU). Gold hit its record high of \$1,895 in 2011 surrounding the Eurozone crisis and the debt ceiling crisis in the US (Amadeo, 2017). Gold has a security value. But the reasoning behind it is somewhat of a collective delusion. Precious metals with valuable fundamental values and uses in manufacturing and technology would actually be "safer" investments. They have a higher floor value.

Proponents argue that Bitcoin is the gold of the future. They believe that if gold has historical significance, Bitcoin has futuristic significance. Investors think of gold as safe because no government can make gold less valuable. Any government can make their currency less valuable by printing more money. Bitcoin doesn't have this option. Miners will continue to mine them, but it doesn't increase or decrease production based on global events. Bitcoin is apolitical. Just like gold. For many, Bitcoin is digital gold. However, this is true for any cryptocurrency. Bitcoin just happens to be the first, and currently, the most popular.

Cryptocurrency Market Overview

There are 40 cryptocurrencies¹ with a value of over \$1 billion each. Collectively, the 40 most valuable currencies have a market capitalization of \$675 billion. Billions are traded every day. About 35% of the top 40 are minable, with the rest not. Bitcoin is worth the most, has the highest price, and trades at the highest volume. However, there are other currencies that are gaining ground. The two biggest competitors to Bitcoin are Ether and Ripple.



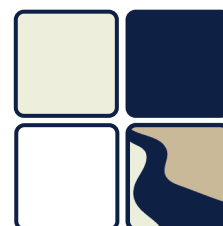
Ethereum, commonly called Ether, was started by Vitalik Buterin in 2015. This cryptocurrency builds on the foundation of blockchain used by Bitcoin. However, it extends it from just transaction confirmation to a full host of computing tasks. It uses its decentralized network of computers to complete many different tasks. Ether is the internal currency to compensate computers for helping complete assignments. Therefore, proponents of Ether claim it has a higher fundamental value than Bitcoin, as more companies are using Ethereum software. Investors are buying Ether, now, for speculative purposes as well (Popper, Understanding Ethereum, Bitcoin's Virtual Cousin, 2017).

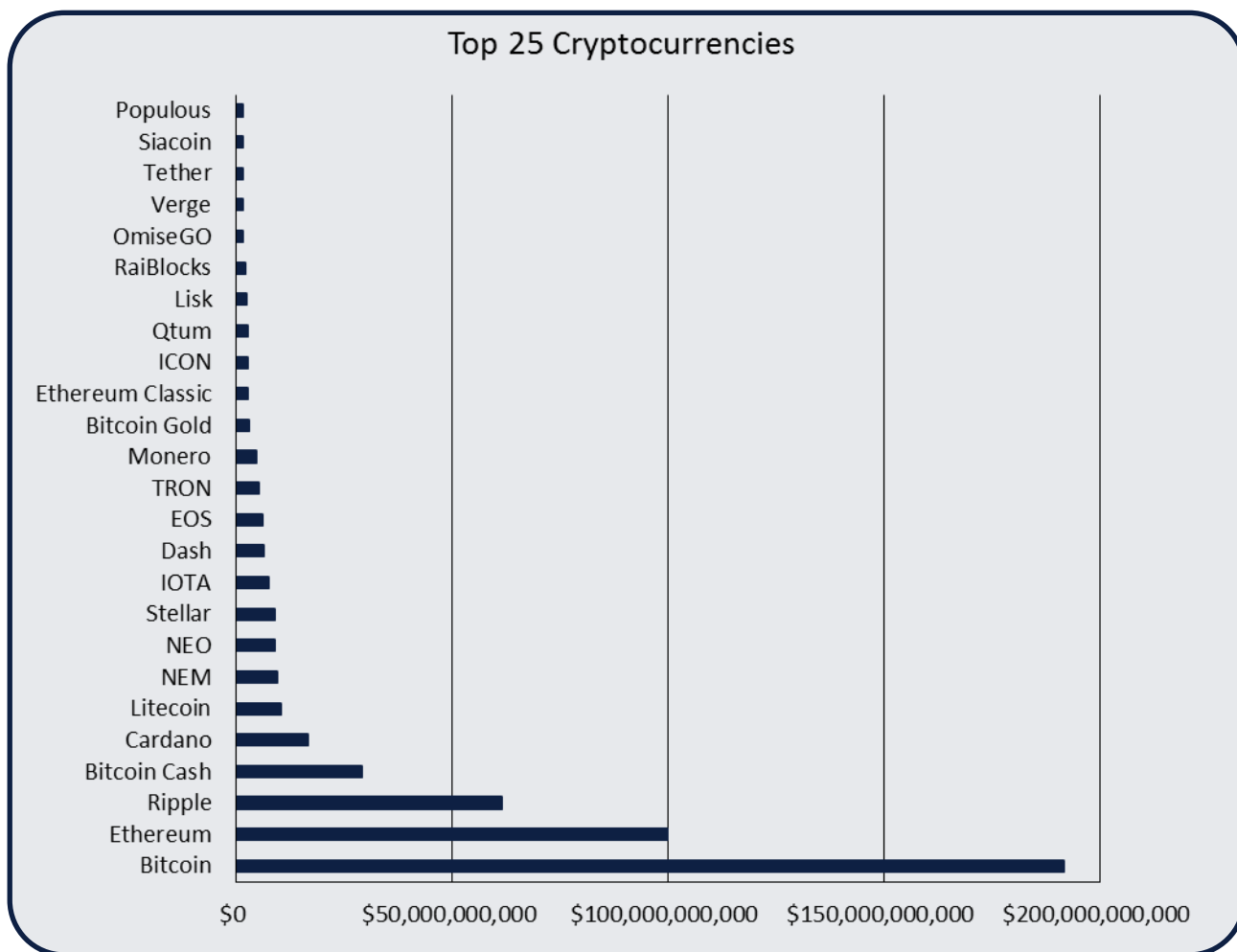


Ripple was created by programmers Chris Larsen and Jed McCaleb². Ripple is a faster version of Bitcoin, that doesn't have a mining process. The ledger is controlled by the private company that

¹As of 1/8/18

²McCaleb left Ripple and started Stellar, but is still one of the largest Ripple holders.



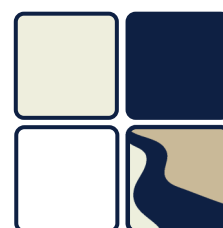


Source: Morningstar; As of 1/18/2018

backs the currency. This makes Ripple less anonymous and less decentralized, yet more attractive to private companies and banks. Ripple already has contracts with many big financial companies, including American Express. They are not using the Ripple currency but using the underlying technology used by Ripple. The price of Ripple has exploded in the last six months. The net worth of Larsen, with his Ripple holdings, has been reported to have surpassed that of Mark Zuckerberg (Popper, Rise of Bitcoin Competitor Ripple Creates Wealth to Rival Zuckerberg, 2018).

Bitcoin as an Investment

At Headwater Investments, we have always been skeptical of investments that are overly speculative. We like cash flow with our investments. We like dividends and interest that we get from our stock and bond investments and the rent we get from real estate investments. We are inherently conservative investors. We primarily invest our client’s money in established companies and in developed sovereign debt through low-cost mutual funds. This is why we haven’t been a fan of gold and silver in the past and Bitcoin going forward. Although we might give up on huge gains associated with speculative investments, we also protect ourselves from the big drops.



Works Cited

Afshar, V. (2017, September 25). Blockchain Innovation In Healthcare And Life Sciences. Huffington Post, pp. https://www.huffingtonpost.com/entry/blockchain-innovation-in-healthcare-and-life-sciences_us_59c91296e4b0b7022a646c4b.

Amadeo, K. (2017, November 7). Gold Prices and the U.S. Economy. The Balance, pp. <https://www.thebalance.com/gold-prices-and-the-u-s-economy-3305656>.

bitcoin.org. (2017). Bitcoin development. <https://bitcoin.org/en/development>: bitcoin.org.

Bitcoin.org. (2017). Choose your Bitcoin wallet. <https://bitcoin.org/en/choose-your-wallet>: Bitcoin.org.

Block Geeks . (2017). 17 Blockchain Applications That Are Transforming Society. <https://blockgeeks.com/guides/blockchain-applications/>: <https://blockgeeks.com/guides/blockchain-applications/>.

Desjardins, J. (2017, October 26). All of the World’s Money and Markets in One Visualization. The Money Project, pp. <http://money.visualcapitalist.com/worlds-money-markets-one-visualization-2017/>.

Futurism. (2015). Bitcoin: History and Timeline. <https://futurism.com/images/the-entire-history-of-bitcoin-in-a-single-infographic/>: Futurism.

Popper, N. (2017, October 1). Understanding Ethereum, Bitcoin’s Virtual Cousin. New York Times, pp. <https://www.nytimes.com/2017/10/01/technology/what-is-ethereum.html>.

Popper, N. (2017, October 1). What Is Bitcoin, and How Does It Work? New York Times, pp. <https://www.nytimes.com/2017/10/01/technology/what-is-bitcoin-price.html>.

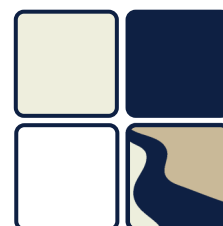
Popper, N. (2018, January 4). Rise of Bitcoin Competitor Ripple Creates Wealth to Rival Zuckerberg. The New York Times, pp. <https://www.nytimes.com/2018/01/04/technology/bitcoin-ripple.html>.

Statista. (2017). Statista Report 2017 - FinTech. <https://www.statista.com/study/45600/statista-report-fintech/>: Statista.

The Guardian. (2016, May 2). The long search for Satoshi Nakamoto. The Guardian, pp. <http://www.bbc.com/news/technology-36168864>.

Van Bergen, J. (2014). 6 Factors That Influence Exchange Rates. Alberta: Investopedia.

Wong, J. (2017, December 17). Bitcoin’s mysterious inventor is now one of the world’s 50 richest people. Quartz, pp. <https://qz.com/1159188/bitcoin-price-approaches-20000-making-satoshi-nakamoto-worth-19-4-billion/>.



HEADWATER INVESTMENT CONSULTING, INC.



408 SE First Street
McMinnville, OR 97128

T: 503-565-2100

www.headwater-ic.com