

# BITCOIN

## The Cryptocurrency and the Blockchain

Nov 2017

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**Bitcoin (“BTC”) is the beginning of something great: a currency without a government, something necessary and imperative.**

***What is a Bitcoin?***

Bitcoin is a worldwide cryptocurrency and digital payment system called the first decentralized digital currency. It is a form of virtual currency which was invented by an unknown programmer or a group of programmers, under a mysterious name Satoshi Nakamoto and released as open-source software in January 2009.

It is a digital currency that is not backed by any country's central bank or government. This means that it is decentralised and has no central authority controlling it. Like currency notes, it can be sent from one person to another, but without a central bank or the government attempting to track it. Bitcoins can be traded for goods or services with vendors who accept Bitcoins as a payment.

This Bitcoin system is peer-to-peer, users can transact directly without an intermediary. The transactions are made by digitally exchanging anonymous, heavily encrypted hash codes across a peer-to-peer network. These transactions are verified by network nodes and recorded in a public distributed ledger.

***Understanding the basics***

***We look further into cryptocurrencies to understand how they work:***

***Cryptocurrency*** is a digital currency which uses encryption techniques for regulating the generation of a unit of currency and for the verification of the transfer of funds. They are decentralised and operate independently of a central bank.

In case of ***decentralized cryptocurrency***, companies or governments cannot produce

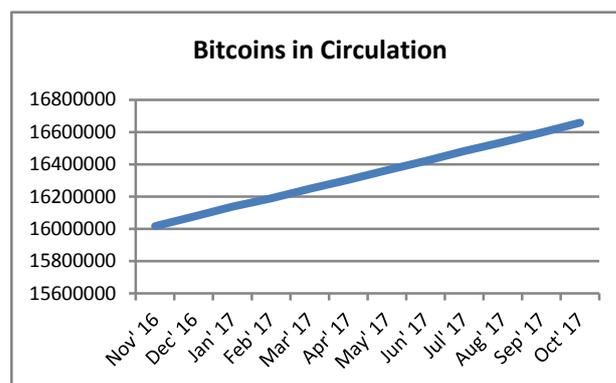
new units. The underlying technical system upon which the decentralized cryptocurrencies are based was created by the group or individual known as Satoshi Nakamoto whose true identity is still unknown.

***Bitcoin is open-source; its design is public, nobody owns or controls Bitcoin and everyone can take part.*** All Bitcoin transactions are recorded permanently on a distributed ledger called the “blockchain” – this ledger is shared between all Bitcoin “miners” and “nodes” around the world, and is publicly-viewable. These miners and nodes verify transactions and keep the network secure. Miners are individuals using their computers to help validate, timestamp transactions and adding them to the ledger in accordance with the blockchain system.

***The Bitcoin protocol is also hard-limited to 21 million Bitcoins, meaning that no more than that can ever be created.*** This implies that no central bank, individual or government can simply print more Bitcoins when it suits them. In this sense, Bitcoin is a deflationary currency and hence is likely to grow in value based on this property alone.

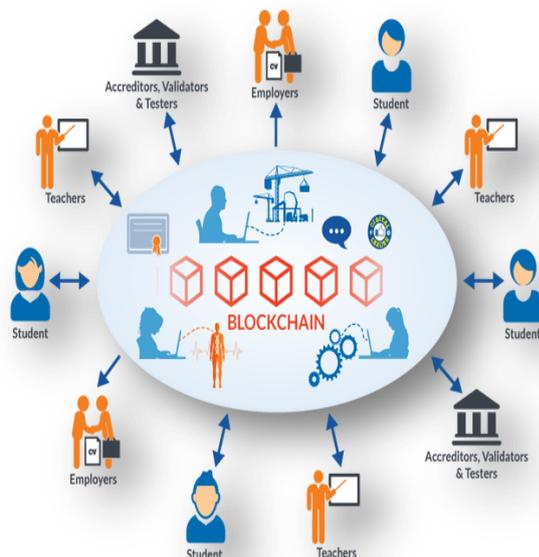
Also, a Bitcoin can be divided down to 8 decimal places. Therefore, 0.00000001 Bitcoin is the smallest amount that can be handled in a transaction (also called as “Satoshi”).

The security, transparency and balance of ledgers in cryptocurrency system is maintained through a community of mutually distrustful parties referred to as miners.



**Blockchain**

**Blockchain is a continuously growing list of records, called blocks, which are linked and secured using cryptography.**



Each block generally contains a hash pointer as a link to a previous block, a timestamp and transaction data. A blockchain can serve as "an open, distributed ledger" that can record transactions between two parties efficiently and in a verifiable and permanent way.

The data in the blocks, once it has been recorded, cannot be changed retroactively without changing the subsequent blocks and collusion of the network majority.

**Double-Spending**

It is the act of using the same Bitcoins twice. There is a 21 million cap on the Bitcoins and no more can be produced. So, the network protects against double expenditure by the verification of each recorded transaction. The blockchain ledger ensures that the transactions are finalized by the inputs confirmed by miners. The confirmations make every Bitcoin unique and its subsequent transactions legitimate. If someone tries to duplicate a transaction, the original blocks

deterministic function would change, showing the network that it is counterfeit and hence would be rejected.



**Bitcoin mining**

New Bitcoins are generated by the network through the process of "mining". Nakamoto himself mined the first 50 Bitcoins—which came to be called the "Genesis Block".

Mining is the mechanism used to introduce Bitcoins into the system by solving mathematical algorithm equations.

**Bitcoin mining is the process by which transactions are verified and added to the open-ledger**, known as the blockchain. It is the means through which new Bitcoins are released. Participants who mine the Bitcoins are called Miners. Anyone with access to the internet and suitable hardware can participate in mining. A Miner validates the transaction, mine the equation and publish the block on the blockchain.

Miners are paid transaction fees as well as a subsidy of newly created coins, called block rewards. This serves the purpose of disseminating new coins in a decentralized manner as well as motivating people to provide security for the system through mining.

Miners are rewarded with new Bitcoins with each 10-minute block. The block reward started at 50 BTC per block in 2009, it is currently 12.5 BTC per block and will continue to decrease.

### **Bitcoin Cash (BCC)**

Bitcoin Cash is a cryptocurrency created via a fork of the Bitcoin network. Any user who held Bitcoin at the time of the fork (August 1, 2017), now has an equivalent amount of BCC on the forked Bitcoin Cash blockchain.

The term **fork** refers to a situation when a blockchain splits into two separate chains as a result of using two distinct sets of rules trying to govern the system.

BCC was created as an answer to scale Bitcoin to more users. While Bitcoin's block size limit remains at 1MB, Bitcoin Cash has increased the limit to 8MB, allowing for around 2,000,000 transactions to be processed per day as compared to around 250,000 transactions per day with Bitcoin.

## **How a blockchain works**

**The following describes how a blockchain works:**

### **Step 1: Transaction**

The parties exchange data such as money, contracts and other assets that can be described in digital form.

### **Step 2: Verification**

Depending on the network, the transaction may either be verified instantly or transcribed into a secured record and placed in a queue of pending transactions. The computers or servers in the network known as nodes, determine whether the transactions are valid based on a set of criteria.

### **Step 3: Blocks**

Each block is identified by a hash (256-bit) number created with an algorithm agreed by the network. The block is comprised of a reference to the previous block, a header and a group of transactions. The sequence of linked hashes creates a secure chain.



### **Step 4: Validation**

Only validated blocks are added to the blockchain. The most recognised validation of open source blockchain is the proof of work, which are basically the mathematical puzzles solved by the miner.

### **Step 5: Mining**

Miners attempt to solve the block through incremental changes to one variable, until the solution satisfies a network-wide target. This is known as mining or proof of work. These answers cannot be altered since the solutions must prove that appropriate level of power has been used in the computation of the puzzle.



## **Bitcoin mining**

### **Step 6: The Chain**

After the block has been validated, miners that solved the algorithm are rewarded and the block is distributed through the network. The node adds the block to the blockchain.

**Step 7: Security**

If a miner attempts to submit an altered block to the chain, the hash function of the block and the following blocks would also change. The other nodes would detect the changes and reject the block from the chain, hence preventing the corruption of the blockchain.

***How to obtain a Bitcoin?***

We need a place to store the Bitcoins. In the Bitcoin world, they are called a 'wallet' but it might be best to think of them as a kind of bank account.

**Step 1: Creating Bitcoin wallet**

Download the software to your computer or smartphone to set up a Bitcoin wallet. Create one using your email address. This would allow you to buy, receive and send Bitcoins. The software shall generate a unique code of numbers and letters which would be your Bitcoin address. This address is not linked to your personal data and serves as your identification to the Bitcoin network. This address is used by payers.

**Step 2: Set-up an exchange account**

Set-up an exchange account on your Bitcoin Wallet.

**Step 3: Start buying/exchanging Bitcoins**

Start buying Bitcoins and using them for transactions. You can buy Bitcoins with a standard offline currency, either from another user via marketplaces, through the Bitcoin exchange or by mining new ones. You can pay for them in a variety of ways, ranging from hard cash to credit and debit cards to wire transfers, or even with other cryptocurrencies.

Also, Bitcoin payments are easier to make than debit or credit card purchases and can be

received without a merchant account. Payments are made from the Bitcoin Wallet, either on your computer or smartphone, by entering the recipient's address, the payment amount and pressing send.

***Bitcoin- Good or Bad?*****Benefits of using Bitcoins:**

Due to the unique nature of virtual currencies, there are some inherent advantages to transacting through Bitcoin that users of other currencies do not get. Some of the unique possibilities that Bitcoin appears to offer are as under:

1. **User anonymity:** Bitcoin purchases are discrete. Unless a user voluntarily publishes his Bitcoin transactions, his purchases are never associated with his personal identity, much like cash-only purchases and cannot be traced back to him. This protects the users identity. In fact, the anonymous Bitcoin address that is generated for user purchases changes with each transaction.

Also, Bitcoin Wallets use secure keys and cannot be accessed without the passwords.

2. **No third-party interruptions:** One of the most widely publicized benefits of Bitcoin is that governments, banks and other financial intermediaries have no way to interrupt user transactions or place freezes on Bitcoin accounts. The system is purely peer-to-peer wherein users experience a greater degree of freedom than with national currencies.

Also, even the processing time of transactions across borders is significantly reduced as there is no bureaucracy.

3. **Freedom in payment:** With Bitcoin, it is very possible to be able to send and get money anywhere in the world at any given time. There is no central authority to figure in the cross border transactions, rescheduling for bank holidays, or any other limitations when transferring money.
4. **Purchases are not taxed:** Since there is no way for third parties to identify, track or intercept transactions that are denominated in Bitcoins, one of the major advantages of Bitcoin is that sales taxes are not added onto any purchases.
5. **Very low transaction fees:** Standard wire transfers and foreign purchases typically involve fees and exchange costs. Since Bitcoin transactions have no intermediary institutions or government involvement, the costs of transacting are kept very low. This can be a major advantage for travelers. Additionally, any transfer in Bitcoins happens very quickly, eliminating the inconvenience of typical authorization requirements and wait periods.
6. **Mobile payments:** Like with many online payment systems, Bitcoin users can pay for their coins anywhere they have internet access. This means that purchasers never have to travel to a bank or a store to buy a product. However, unlike online payments made with bank accounts or credit cards, personal information is not necessary to complete any transaction.
7. **Transparency:** Open ledgers of Bitcoin provide transparency. Anyone at any time can verify transactions in the Bitcoin blockchain. Bitcoin protocol cannot be manipulated by any person, organization, or government. This is due to Bitcoin being cryptographically secure.
8. **No risk of "charge-backs":** Bitcoins are digital and cannot be counterfeited or reversed arbitrarily by the sender, as with credit card charge-backs. The malicious miners are unable to submit corrupted blocks as the hash function of the block along with the following blocks would also change on reversing the transaction. This ensures that there is no risk involved when receiving Bitcoins.
9. **No paperwork:** Anyone, from any country, of any age can accept Bitcoins within minutes. There is no requirement for ID card, passport or proof of address that all conventional banks required to open an account.
10. **Bitcoins cannot be stolen:** Bitcoins' ownership address can only be changed by the owner. No one can steal Bitcoins unless they have physical access to a user's computer, and they send the Bitcoins to their account. Unlike conventional currency systems, where only a few authentication details are required to gain access to finances, this system requires physical access, which makes it much harder to steal.

#### **Cautions with Bitcoins:**

If Bitcoin has many advantages it also carries various disadvantages as well. Digital currencies are a relatively new and untested medium of exchange. Since Bitcoin is also an experimental new currency, the users should be careful to weigh their benefits and risks.

1. **Bitcoins are not widely accepted:** Bitcoins are still only accepted by a very small group of online merchants. This makes it unfeasible to completely

rely on Bitcoins as a currency. There is also a possibility that governments might force merchants to not use Bitcoins to ensure that users' transactions can be tracked.

2. **Bitcoin valuation fluctuates:** The value of Bitcoins is volatile and constantly fluctuating according to demand. In August 2017, Bitcoin prices soared to \$4,000 whereas the recent news of China shutting down local cryptocurrency exchanges has caused the cryptocurrency prices to drop.

However, CryptoCompare CEO and founder Charles Hayter indicating that China may issue licensing of digital-currency exchanges for reopening them after the ban and introduction of Bitcoin Gold, alternative Bitcoin version has made Bitcoin prices to reach at its all-time high value of \$7,895.

3. **Wallets can be lost:** Bitcoins can be inaccessible if the wallet key is lost / forgotten. Also, if a hard drive crashes, or a virus corrupts data, and the wallet file is corrupted, Bitcoins have essentially been "lost". There is nothing that can be done to recover it. These coins will be forever orphaned in the system. This can bankrupt a wealthy Bitcoin investor within seconds with no way form of recovery.
4. **Irreversible:** Bitcoin payments are irreversible. After a confirmation, a Bitcoin transaction can't be reversed, they can only be refunded by the person receiving the funds. Thus,

caution must be exercised while using it.

5. **Lack of security:** Transactions may not be secure. There is no safety net or perfect way to protect your Bitcoins from human error (passwords), technical glitches (hard drive failures, malware), or fiduciary fraud.
6. **Built in deflation:** Since the total number of Bitcoins is capped at 21 million, it will cause deflation. Each Bitcoin will be worth more and more as the total number of Bitcoins maxes out. This system is designed to reward early adopters. Since each Bitcoin will be valued higher with each passing day, the question of when to spend becomes important. This might cause spending surges which will cause the Bitcoin economy to fluctuate very rapidly, and unpredictably.
7. **Bitcoin is not completely anonymous:** All Bitcoin transactions are stored permanently on the public network, which means that everyone can see the balance and transactions of any Bitcoin address. However, the identity of the user of an address remains anonymous unless information is revealed during a purchase or other circumstances. This can be avoided if Bitcoin addresses are used only once.
8. **Increased regulations:** While relatively benign guidelines are currently in place, law enforcement agencies could decide that Bitcoins are a giant money laundering scheme and enact more stringent regulations that would diminish the currency's value.

9. **Pseudonymous:** Neither transactions or accounts are connected to real world identities. You receive Bitcoins on so-called addresses, which are randomly seeming chains of around 30 characters. While it is usually possible to analyze the transaction flow, it is not necessarily possible to connect the real world identity of users with those addresses.
10. **No valuation guarantee:** Since there is no central authority governing Bitcoins, no one can guarantee its minimum valuation. If a large group of merchants decide to dump Bitcoins and leave the system, its valuation will decrease greatly which will immensely hurt users who have a large amount of wealth invested in Bitcoins. The decentralized nature of Bitcoin is both a curse and blessing.

## ***Acceptability of Bitcoin***

The legality on Bitcoin and other cryptocurrencies depends on where you are and what you wish to do with it. Governments all over the world are trying to get to grips with its risks and rewards, playing the game between consumer protection, anti-criminal activity and encouraging innovation. The risks for Governments can vary, most emerging markets are either heavily anti or pro the use of digital currencies such as Bitcoin but in general western economies are using soft touch principle based regulation to encourage innovation.

Some countries explicitly permit the use of Bitcoin and are attempting to create laws that govern the Bitcoin transactions. While, some countries are still skeptical of the cryptocurrency and are proposing bans.

### **India's take on Bitcoin:**

Cryptocurrency Bitcoin still has few takers in India despite its stupendous rise elsewhere. Bitcoin is neither banned nor regulated in India. It can be purchased on various exchanges in India like Zebpay, Unocoin, Bitxoxo and Coinbase. Bitcoin wallet provide like Zebpay is confident of rapid adoption in the country.

Cryptocurrencies has the potential to make India a global financial technology (FinTech) hub. It can save billions of dollars in remittance fee that overseas Indians pay to US firms for money transfer back home. For this privilege, India has to pay US firms 5-7 billion dollars a year as remittance fee alone every year, which can be saved by introducing cryptocurrency in the system.

After a China crackdown on the cryptocurrencies and public remark by the Reserve Bank of India (RBI) official, the Bitcoin has plummeted in India, falling much faster than elsewhere around the globe.

The value of the cryptocurrency in the Indian currency declined from INR 3,40,116 per unit on September 2, 2017 to hit a low of INR 2,29,417 on September 15, 2017, indicating a fall of 48 per cent in less than two weeks.

However, in spite of all the speculations, regulations and several heads of top financial institutions talking against the cryptocurrency wave, it seems there is nothing that is stopping investors from buying Bitcoins. A huge investor participation and turnout is witnessed recently taking the Bitcoin Price to its all-time high value of \$7,442 i.e. INR 4,85,253 per unit on November 8, 2017.

With cryptocurrencies like Bitcoin gaining popularity in India, the government may roll out the country's very own cryptocurrency. According to a report in Business Standard,

RBI is currently looking into bringing out its own cryptocurrency “**Lakshmi**”, as an alternative to the Indian rupee.

The introduction of this new cryptocurrency may require the amendment of the Currency Act.

### Europe

In Europe, nearly all of the countries have Bitcoin regulations, which are mainly supposed to minimize financial crimes like money laundering, but not to legalize its use as currency.

The European Banking Authority has pointed out that since the Bitcoin is not regulated, consumers are not protected and are at risk of losing their money. However, they may still be liable for taxes when using virtual currencies.

### China

China Central Bank barred financial institutions from partaking in digital currency and Bitcoin transactions. They do however allow private individuals to hold and trade in Bitcoin between themselves.

### Japan

Starting on the April 1, 2017, Bitcoin was considered a legal form of payment in Japan, with several public institutions accepting it as currency.

Moreover, Japan is expanding its horizons in Bitcoin mining. GMO Internet Inc. a comprehensive provider of internet service worldwide, has announced that it is expanding into the businesses of Bitcoin mining and chip manufacturing. It plans to produce and sell 7nm semiconductor chips which would significantly improve the Bitcoin mining process.

### Iceland

Iceland has the largest Bitcoin mine in the world.

After the fallout of the financial crisis and collapse of Icelandic banking strict financial

foreign exchange controls were imposed on the Icelandic Krona. Thus, one can own Bitcoins by mining but not buy Bitcoins from a foreign exchange.

### Colombia

The Colombian government has taken a hands off approach to Bitcoin and has declined to recognise it as a legal currency.

However, Colombia has not banned Bitcoins and said the risks are for the individual partaking in the industry.

### United States

The United States has taken a generally positive approach towards Bitcoin. At the same time, it has several government agencies working on preventing or reducing the use of Bitcoin for illegal transactions.

Commodity Future Trade Commission of US has classified Bitcoin as a commodity while the US Treasury Department sees it not as currency, but as a money services business (MSB). This places it under the Bank Secrecy Act which requires exchanges and payment processors to adhere to certain responsibilities like reporting, registration, and record keeping.

Thus, it is legal to use Bitcoin in the United States and payments in Bitcoins are subject to the same anti-money laundering regulations that apply to transactions in traditional currencies and to payments by banks and other financial institutions.

### Canada

Like its southern neighbour the United States, Canada maintains a generally Bitcoin-friendly stance while also ensuring the cryptocurrency is not used for money laundering. Bitcoin is viewed as a commodity by the Canada Revenue Agency (CRA). This means that Bitcoin transactions are viewed as barter transactions and the income generated is considered as business income. Canada also considers Bitcoin exchanges to be money service businesses.

**Australia**

Australia allows entities to trade, mine or buy Bitcoin. The Australian Taxation Office (ATO) considers Bitcoin transactions as barter arrangement subject to appropriate taxes depending upon the use and user. On July 1, 2017, Australia has officially confirmed it will treat Bitcoin “just like money” and it will no longer be subject to double taxation.

**Taiwan**

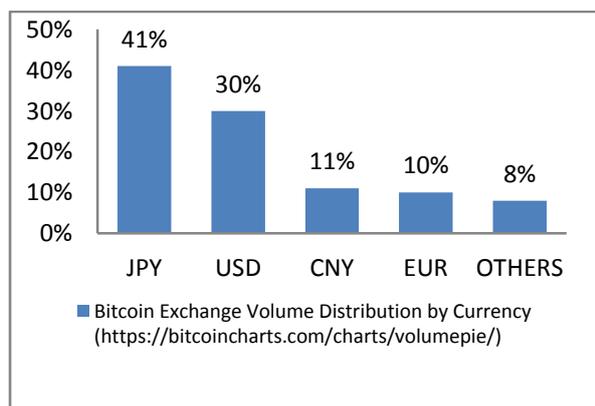
Regulators in Taiwan have warned the public that Bitcoin does not have legal protection, as the currency is not issued by any monetary authority and is therefore not entitled to legal claims or guarantee of conversion.

Thus, while Bitcoin is not illegal in Taiwan, financial institutions have been warned by regulators that necessary regulatory actions may be taken if they use it.

**Others**

The Bitcoin is banned in the following countries:

- Bolivia
- Ecuador
- Bangladesh
- Kyrgyzstan



While the world may be polarised on the cryptocurrencies like Bitcoin, the countries seem to be more acceptant of using the Blockchain technology.

***Six global banks join forces to create digital currency using Blockchain.***

According to the Financial Times, “Barclays, Credit Suisse, Canadian Imperial Bank of Commerce, HSBC, MUFG and State Street have teamed up to work on the “utility settlement coin” which was created by Switzerland’s UBS to make financial markets efficient.”

The utility settlement coin aims to let these banks pay each other or buy securities using blockchain. These digital coins would be directly convertible into cash at central banks and hence would cut the time, cost and capital required in settlement and clearance.

“Existing members of the project are Deutsche Bank, Banco Santander, BNY Mellon and NEX.”

***Other Cryptocurrencies***

Cryptocurrency Bitcoin still has few takers in India despite its stupendous rise elsewhere.

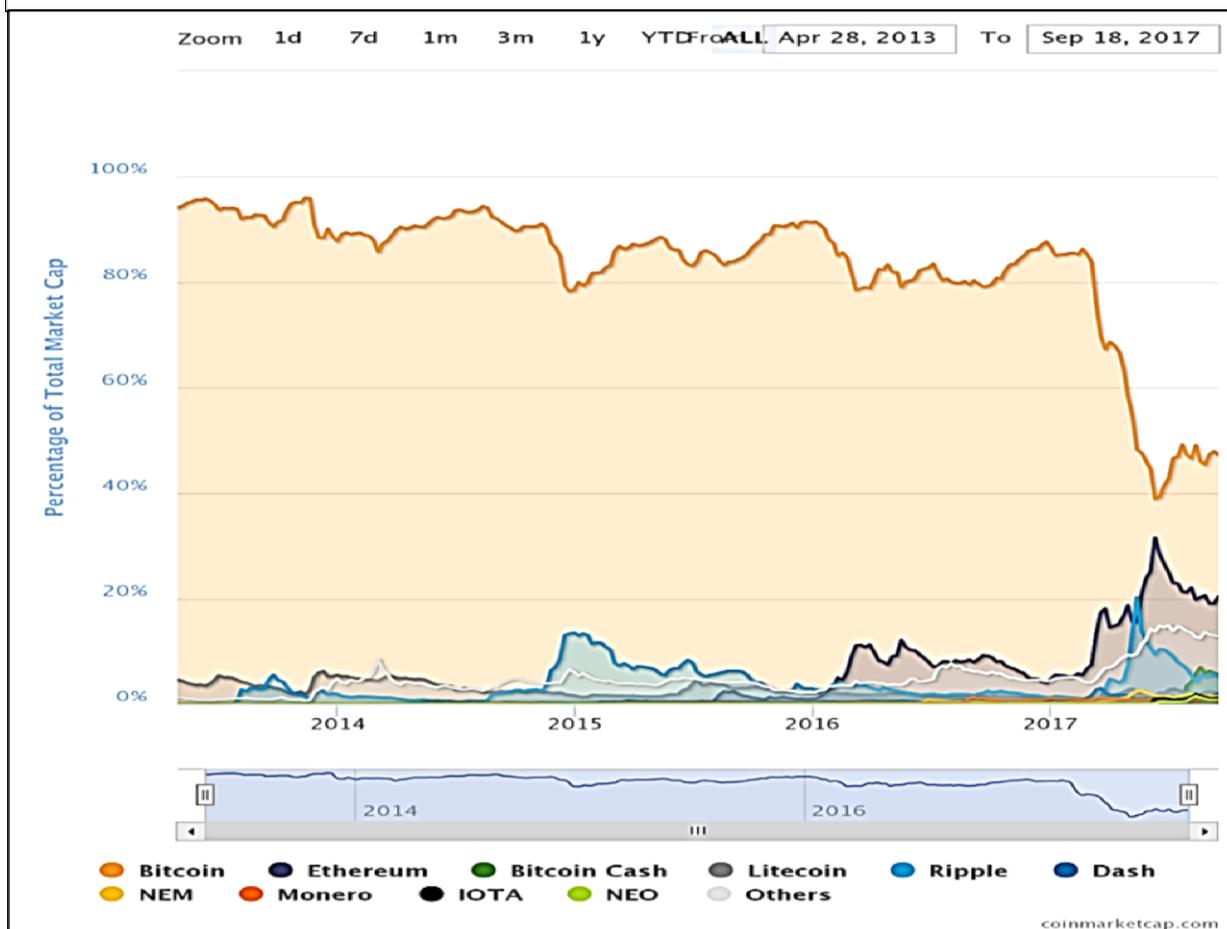
***There are over 900 cryptocurrencies.*** A new cryptocurrency can easily be created any time. Even India is looking into launching its own cryptocurrency.

While some of these currencies are easier to mine as compared to Bitcoin, there are other factors that differ and would need to be considered, such as higher risk due to decreased liquidity, acceptance of the cryptocurrency and its value retention. ***Bitcoin is currently the largest blockchain network with a market capitalisation of \$120 billion.***

We look further into four other cryptocurrencies (***altcoins***) and their market capitalisation as compared to Bitcoin:

- ***Ethereum***
- ***Ripple***
- ***Zcash***
- ***Litecoin***

Market capitalisation comparison of the cryptocurrencies:



**Ethereum (ETH)**

The Ethereum applications are run on its platform-specific cryptographic token, “ether”. According to Ethereum, it can be used to codify, decentralize, secure and trade just about anything and enables smart contracts and distributed applications to be built and run. “Gas”, an internal transaction pricing mechanism, is used to mitigate spam and allocate resources on the network. In 2016, Ethereum was split into two blockchains Ethereum (ETH) and Ethereum Classic (ETC). **Ethereum (ETH) has a market capitalisation of \$30 billion, second cryptocurrency after Bitcoin.**

**Ripple (XRP)**

The digital currency, XRP, acts as a bridge currency to other currencies, including USD, Yen, Litecoin or Bitcoin. The Ripple network

does not run with a proof-of-work system like Bitcoin.

Instead, transactions rely on a consensus protocol in order to validate account balances and transactions. **It has a market capitalisation of \$8.3 billion.**

**Zcash (ZEC)**

“If Bitcoin is like http for money, Zcash is https,” is how Zcash defines itself, implying it has selective transparency. It provides extra security or privacy where all transactions are recorded and published on the blockchain, however, details such as the sender, recipient, and amount remain private. **It has a market capitalisation of \$0.6 billion.**

**Litecoin (LTC)**

Litecoin is based on an open source decentralised global payment network which

uses "script" as the proof of work, and can be decoded with the help of CPUs of consumer grade. The difference between Litecoin and Bitcoin is that Litecoin has a faster block generation rate which means it offers a faster transaction confirmation. ***It has a market capitalisation of \$3.5 billion.***



***The Bottom Line***

Although Bitcoin is now eight years into existence, countries still do not have explicit systems that restrict, regulate, or ban the cryptocurrency. The decentralized and anonymous nature of Bitcoin has challenged many governments on how to allow legal use while preventing criminal transactions. Most countries are still analyzing ways to properly regulate the the cryptocurrency. Overall, Bitcoin remains in a grey area as the technological leap has left lawmakers far behind.

***Investing in Bitcoin***

There are many Bitcoin supporters who believe that digital currency is the future. Those who endorse it are of the view that it facilitates a much faster, no-fee payment system for transactions across the globe. Although it is not itself backed by any government or central bank, Bitcoin can be exchanged for traditional currencies, in fact, its exchange rate against the dollar attracts

potential investors and traders interested in currency plays. Indeed, one of the primary reasons for the growth of digital currencies like Bitcoin is that they can act as an alternative to national fiat money and traditional commodities like gold. If you are considering investing in Bitcoin, understand these unique investment risks:

1. **Regulatory Risk:** Bitcoins are a rival to government currency and may be used for black market transactions, money laundering, illegal activities or tax evasion. As a result, governments may seek to regulate, restrict or ban the use and sale of Bitcoins and some already have. Others are coming up with various rules.
2. **Security Risk:** Bitcoin exchanges are entirely digital and as with any virtual system, are at risk from hackers, malware and operational glitches. If a thief gains access to a Bitcoin owner's computer hard drive and steals his private encryption key, he could transfer the stolen Bitcoins to another account.
3. **Fraud Risk:** While Bitcoin uses private key encryption to verify owners and register transactions, fraudsters and scammers may attempt to sell false Bitcoins.
4. **Market Risk:** Like with any investment, Bitcoin values can fluctuate. Indeed, the value of the currency has seen wild swings in price over its short existence.

If fewer people begin to accept Bitcoin as a currency, these digital units may lose value and could become worthless. There is already plenty of competition, and though Bitcoin has a huge lead over the other 900 odd digital currencies that have sprung up.

5. **Tax Risk:** As Bitcoin is ineligible to be included in any tax-advantages, there are no good, legal options to shield investments from taxation.

Overall Bitcoins may have many advantages and disadvantages but it is up to the people and society in what way does they want to use it.

Some global bankers and experts have warned investors against investing in cryptocurrencies. However, owners and operators of Bitcoin exchanges are of an entirely different opinion. So what should one do? Follow the simple yet profound wisdom of Warren Buffett, "if you don't understand it, don't invest in it."

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