

Bitcoin 4 ALL - Program content and script

Program content:

Intro

- 1- What is Bitcoin and why was it created?**
- 2 - The problem of fiat money**
- 3- Why Bitcoin is better money**
- 4- Inside Bitcoin: how does Bitcoin work?**
- 5- Why should Bitcoin continue to appreciate?**
- 6- How to have bitcoin: Exchange, p2p or circular economies**
- 7- Countering lies (fuds) about Bitcoin**
- 8- Why do self-custody?**
- 9- What are Bitcoin wallets and how to use them?**
- 10- How to withdraw from the Exchange and have sovereignty with your Bitcoin?**

Intro

Hello, welcome to Bitcoin4All, an open source course from Area Bitcoin designed to help you understand Bitcoin while providing visual and educational resources that educators around the world can use to explain the fundamentals of this financial revolution and open source.

Hello! Welcome to **Bitcoin4All**, a free and open source course created by **Area Bitcoin**. Here, you will learn the basic concepts of Bitcoin in a simple and practical way. Our mission is to make it easier for you to understand Bitcoin and, at the same time, offer visual and educational materials that educators anywhere in the world can use to teach about Bitcoin.

This course represents a powerful movement to expand knowledge about Bitcoin. Because it is open source, you can not only learn, but also use this material to educate others, conduct meetups, re-record videos or adapt the slides available in the supporting materials. All this under license **Creative Commons BY-SA 4.0**, which allows the use and adaptation of the content, as long as you give due credit to Bitcoin4All from Area Bitcoin. It is worth remembering that the material must be used exclusively for educational purposes, without commercial purposes.

This course is more than just learning material—it's a powerful move to expand knowledge about Bitcoin. For being **open source**, it is not only for those who want to learn, but also for those who want to teach. You can use this content to educate others, organize meetups, create your own videos or adapt slides.

All this is possible thanks to the license **Creative Commons BY-SA 4.0**, which allows the use and adaptation of the material, as long as you give due credit to the **Bitcoin4All da Area Bitcoin**. Oh, and an important detail: all material must be used exclusively for **educational purposes, no commercial purposes**.

Bitcoin4All was created in the spirit of transforming Bitcoin education by making content more accessible, collaborative and universal. As the course is open source, free and accessible, it eliminates barriers to learning about Bitcoin. It encourages collaboration, allows anyone to contribute to improving the material or adapt it to their needs. It's flexible, making it easy for educators, meetup organizers, community leaders and enthusiasts to use and customize content according to their realities.

By creating a course in this format, we believe that we are promoting a new culture of learning, truly empowering individuals and communities to understand and adopt Bitcoin as part of a fairer, more transparent and decentralized system.

THE **Bitcoin4All** was born with the mission of transforming education about Bitcoin, making learning more **accessible, collaborative** and **universal**. Because it is a course **open source**, free and easy to access, it breaks down barriers and democratizes knowledge about this revolutionary technology. More than learning, the course encourages **collaboration**, allowing anyone to contribute to improving the material or adapting it to their specific needs.

This flexibility is a big differentiator: educators, meetup organizers, community leaders, and enthusiasts have the freedom to customize content to align with their local realities.

By creating a course with this format, we believe we are promoting a **new learning culture**, which truly empowers individuals and communities. We want everyone to be able to understand and adopt Bitcoin as a fundamental piece of a more comprehensive system. **fair, transparent and decentralized**.

What will you find on the Bitcoin4All course?

The course consists of 10 short classes, lasting around 10 minutes each, and covers the main points for understanding Bitcoin and answering the most common questions, including:

1. What is Bitcoin and why was it created?
2. What is the problem with current money?
3. Why is Bitcoin better money?
4. Inside Bitcoin: how does it work?
5. Why should Bitcoin continue to appreciate?
6. Ways to have Bitcoin: Exchange, P2P or circular economies.
7. Countering lies (FUDs) about Bitcoin.
8. Why do self-custody and not leave everything on the exchange or bank?
9. What are Bitcoin wallets and how to use them?
10. How to withdraw from the Exchange and gain financial sovereignty with Bitcoin?

The files are available on the areabitcoin.co website and on Area Bitcoin's GitHub, as well as in the description of this video.

Let's get into action, watch or send someone this completely free course where anyone will come away knowing how Bitcoin works, how to have Bitcoin and how to take good care of your satoshis.

Now, it's time to take action! Watch the course, share it with someone, or use it to teach. In a free and accessible way, you or anyone will learn how Bitcoin works, how to acquire it and how to protect your satoshis.

We hope this content will not only help you understand Bitcoin better, but also inspire you to teach and train a new generation of Bitcoiners and educators.

Ready to get started? So let's go!

We hope this content not only helps you understand Bitcoin better, but also inspires you to **to teach** and train a new generation of Bitcoiners and educators.

Ready to get started? Let's go together!

1- What is Bitcoin and why was it created?

Explain the emergence and history of Bitcoin

For more than 15 years, the **Bitcoin** It was born as a revolutionary idea, and since then, it has gone from being a little-known technological curiosity to becoming one of the most debated topics in the entire world. Today, many people have heard of Bitcoin or have an opinion about it. But unfortunately, for many, it is still only seen as a speculative asset, something exclusive to financial nerds or a risky and unnecessary investment. This limited vision leaves aside the true purpose and immense potential that Bitcoin offers: to be money accessible to everyone.

Here's a truth that few understand: **Bitcoin wasn't just created for investors, tech nerds, or large corporations**. It was designed to be a fairer, more transparent, and more robust financial system—money that anyone, anywhere in the world can use. Bitcoin is a powerful tool for **protect wealth and preserve financial freedom**.

Today, more than ever, it is essential to understand how Bitcoin can transform your life. In a scenario of rising inflation, loss of purchasing power and distrust in financial institutions, Bitcoin presents itself as a more reliable alternative: **money that is truly yours**, which no one can arbitrarily censor, confiscate or devalue. With Bitcoin, you can be the **your own bank**, eliminating the need for intermediaries to store and control your money.

Bitcoin is not just a technology; it is an invitation to a new system, to rethink how we deal with money and how we can build a freer, safer and more accessible financial system for everyone.



DINHEIRO DIGITAL SEM BANCOS E SEM GOVERNOS



When most people think of money, they imagine paper bills or the amount in their bank account. In other words, the idea of money that most people understand as true is linked to the values that are with third parties, with banks, brokers or in the values that are created by governments, through central banks in paper notes.

Bitcoin is digital money that is independent of both governments and banks, in which you do not need to trust these entities that have failed countless times throughout history. The idea of having digital money is not new, in fact it is the result of centuries of research, trial and error.

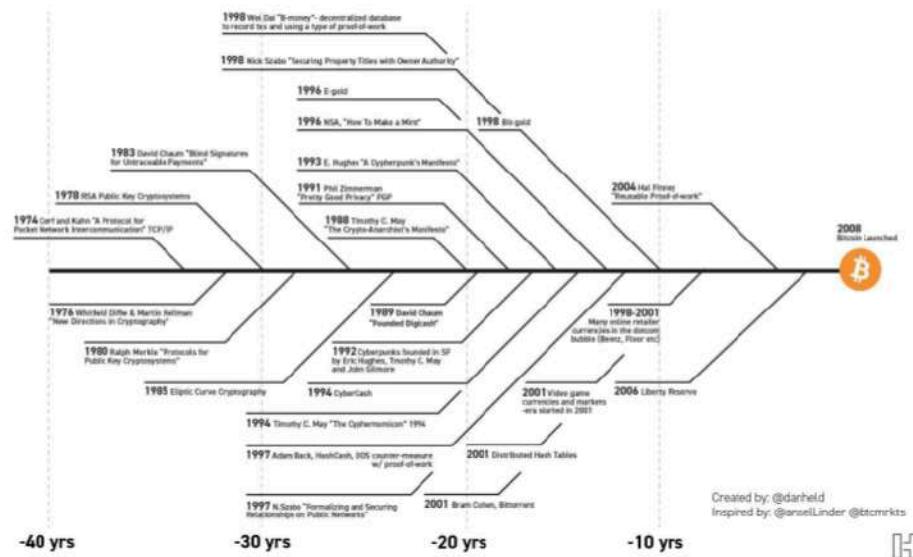
(Tesla scene, Henry Ford, Friedrich Hayek, Milton Friedman, scientists zooming in)

Throughout history, many brilliant minds — physicists, Austrian economists, computer engineers and investors unhappy with inflation have imagined that something like Bitcoin would one day exist.

Tesla and Henry Ford envisioned the creation of energy-backed money that would promote peace. Friedrich Hayek and Milton Friedman, Austrian economists, pointed to the problems of governments deciding monetary policies and how digital money, moved through the internet, could bring more prosperity to people by being incorruptible and unstoppable.

Bitcoin, in a way, has always been present as a latent idea, waiting for the moment to be realized. But what these geniuses of the past didn't know was how this digital money would emerge and through what technological bases.

Bitcoin é resultado de 40 anos de pesquisa e desenvolvimento



Those who took the first steps towards Bitcoin were the Cypherpunks of the past. Since the 70s, cypherpunk cryptographers have been trying to create money that can be used on the internet. But none of them actually worked. That's why it is said that Bitcoin did not appear overnight, it is a discovery that was ready to be realized. Bitcoin is the result of 40 years of previous research. Several projects paved the way for the creation of Bitcoin, each contributing a piece of the puzzle that Satoshi Nakamoto put together in 2008.

That's why many people say that Satoshi Nakamoto, the creator of Bitcoin, didn't invent anything. He discovered Bitcoin. This is because these projects and their failures taught Satoshi crucial lessons for creating Bitcoin from what went right or wrong in these past cryptographic projects.

Bitcoin is the result of decades of research into cryptography and the result of an ancient need that had not yet been resolved.

Okay, so how did Bitcoin come about?

O EMAIL QUE MUDOU O MUNDO

Bitcoin P2P e-cash paper

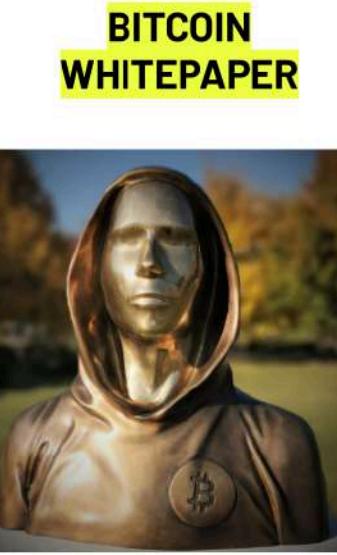
Satoshi Nakamoto [satoshi at vistomail.com](mailto:satoshi@vistomail.com)

Fri Oct 31 14:10:00 EDT 2008

- Previous message: [Fw: SHA-3 lounge](#)
- Messages sorted by: [\[date\]](#) [\[thread\]](#) [\[subject\]](#) [\[author\]](#)

I've been working on a new electronic cash system that's fully peer-to-peer, with no trusted third party.

The first records of Bitcoin begin with an email on October 31, 2008. An anonymous cypherpunk named Satoshi Nakamoto posted on a cryptography mailing list that he was working on an entirely electronic money article. P2P (peer-to-peer), peer-to-peer, without trusted third parties.



In that email there was a link to the Bitcoin Whitepaper, a document with just 9 pages that technically explains how the Bitcoin network works, how digital signatures send and receive transactions, how they are inserted into blocks and how proof of work through the use of

Computational power prevented double spending and would also generate new coins as a reward for those who proved “proof of work” for the network, today known as “mining”.

Double spending was one of the biggest challenges when creating digital money and many cypherpunk projects in the past failed because they could not solve double spending without centralizing the network. Double spending is when you can spend the same coin twice. An analogical example to make it easier to understand, would be like paying the bill at the bakery with a 50 reais bill and then it reappears in your wallet so you can spend it again. This would make the protocol unfeasible as money.

The word Bitcoin is mentioned only twice in the white paper, in the title and on the website. The word “network” is mentioned 21 times. This shows how Satoshi was focused on the architecture of this P2P network and how it would work without intermediaries having decision-making power in the protocol.

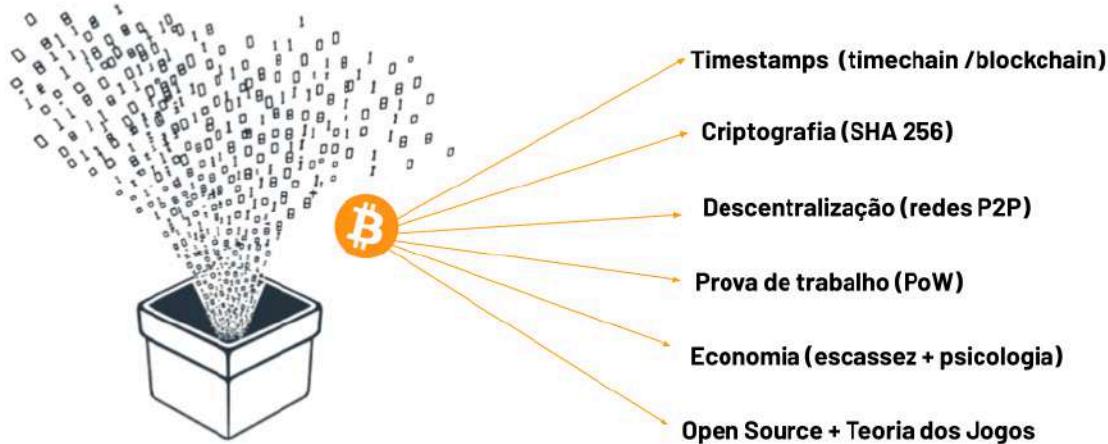
Satoshi also made available the whitepaper do bitcoin no site bitcoin.org and it is still available today in Portuguese and in more than 40 languages. Interestingly, this domain was registered on August 18, 2008, shortly before the release of the white paper.

It is usually possible to find out who owns these domains, but Satoshi thought of everything and kept this information anonymous. Satoshi Nakamoto's decision to remain anonymous is one of the most intriguing aspects of Bitcoin's emergence. The reason behind this choice remains unclear, but several theories have been proposed. To this day, no one knows who Satoshi is, whether he is a person or a group of people, and it doesn't really matter. Bitcoin not having a known creator is also a positive thing because it reduces any noise between your personal life and Bitcoin. Regardless of the motivation, the fact that Satoshi did not reveal his identity allowed Bitcoin to develop as an organic, global and decentralized structure.

Satoshi Nakamoto stayed for a few more years working on the code and exchanging ideas with other cryptographers around bitcoin. Then, in April 2011, he handed over control of the site bitcoin.org, and bitcoin repository, for developer Gavin Andresen. Satoshi stood on the shoulders of giants by merging past cypherpunk projects and going further by making Bitcoin a reality.

Bitcoin is a union of several technologies that alone do not have the same properties as Bitcoin.

UNIÃO DE TECNOLOGIAS E CONCEITOS



The first technology Satoshi used was timestamps, date and time stamps that create a timeline (a timechain) that cannot be modified. Many people know this timeline as “blockchain”, in which blocks of information are linked to each other and record the history of transactions immutably and in the order in which they happen.

He used encryption and cryptographic algorithms, such as SHA-256, so that the network worked through codes and riddles, in which only those who know the answer to that riddle can move funds. Cryptography is a crucial technology in the Bitcoin network as a whole.

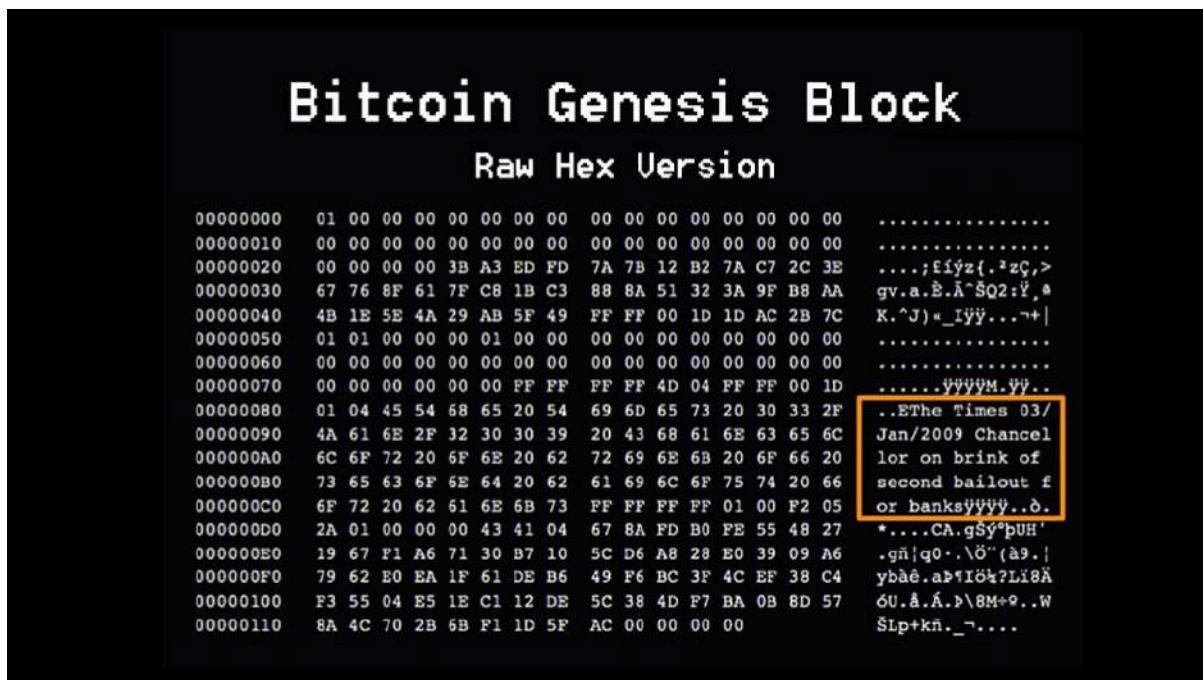
It used P2P network concepts in which anyone can run a node and connect to the network without needing to ask anyone for permission and that is where the basis of decentralization and network architecture lies. The nodes connect to each other to form an institution-independent record storage and verification network.

You used proof of work in which it is not possible to create money out of thin air, you aim to prove to the network that you solved a problem, followed the consensus mechanism and that you deserve to receive the coins as a reward for having provided a service to the network using your computing power. . There is no way to falsify proof of work, it is what brings confidence to the network that the rules for creating each block of information were followed in accordance with the consensus that the network as a whole follows.

It established a limit on the number of coins that can be created through reductions in the issuance of new coins until the creation of new bitcoins finally ends. This limit occurs through halvings in which, on average, every 4 years the issuance of new coins drops by half until the last bitcoin is created. Bitcoin has a limit of 21 million units that can be created, this guarantees monetary properties in addition to the digital properties that underlie the economic concepts that support Bitcoin.

And it also kept the entire bitcoin project open source, open source and public so that anyone could check, collaborate and even copy. Bitcoin is radically transparent and offers much more predictability in its functioning than any central bank with its monetary policies. This transparency is what allows public verification and free access for anyone anywhere in the universe. It is the most accessible, inclusive and open to new users network out there.

Before Satoshi, no one had put all these technologies into a single protocol. In class 4 on how Bitcoin works you will better understand each of these points.



Two months after Satoshi sent the email to the cypherpunk email list, launched the website with the pdf of the whitepaper for anyone to check, collaborate and even copy before Satoshi even launched it, few were interested and on January 3rd, 2009, Satoshi mined the first block of Bitcoin.

This first block is called the “genesis block”. He received 50 Bitcoins as a reward and the most curious thing is that this block contains a message, a quote, left by Satoshi himself:

"The Times 03/Jan/2009 Chancellor on brink of second bailout for banks" - Chancellor on the brink of second bailout for banks. This is the title on the cover of the British newspaper [The Times](#) from January 3, 2009. This cover here:

"Chanceler à beira do segundo resgate aos bancos"



It shows how the history of bitcoin connects with the last major global crises. Bitcoin emerged precisely when the 2008 crisis broke out, as a response to the manipulation of the economy and centralization carried out by central and commercial banks. Otherwise there would be no quote from Satoshi on this cover of The Times.

This report pointed out that in 2009 the British chancellor would rescue a bankrupt bank for the second time. This gives us several clues as to why Satoshi, the pseudonym behind bitcoin, created bitcoin and what he thought about the financial system.

In several speeches, Satoshi exemplified how aware he was about the functioning of the economy and how he saw bitcoin as something opposite to all of this. He created a decentralized currency that cannot be confiscated, monopolized or devalued by any government or any bank.

LANÇAMENTO JUSTO

- SEM PRÉ- MINERAÇÃO
- WHITEPAPER DIVULGADO 2 MESES ANTES DE COMEÇAR A RODAR A REDE
- MOEDAS SEM VALOR POR 1,5 ANOS E CIRCULARAM LIVREMENTE
- CRESCIMENTO ORGÂNICO
- AO CONTRÁRIO DE OUTROS FUNDADORES, SATOSHI NUNCA VENDEU



For all this, the way Satoshi delivered Bitcoin to the world was completely fair.

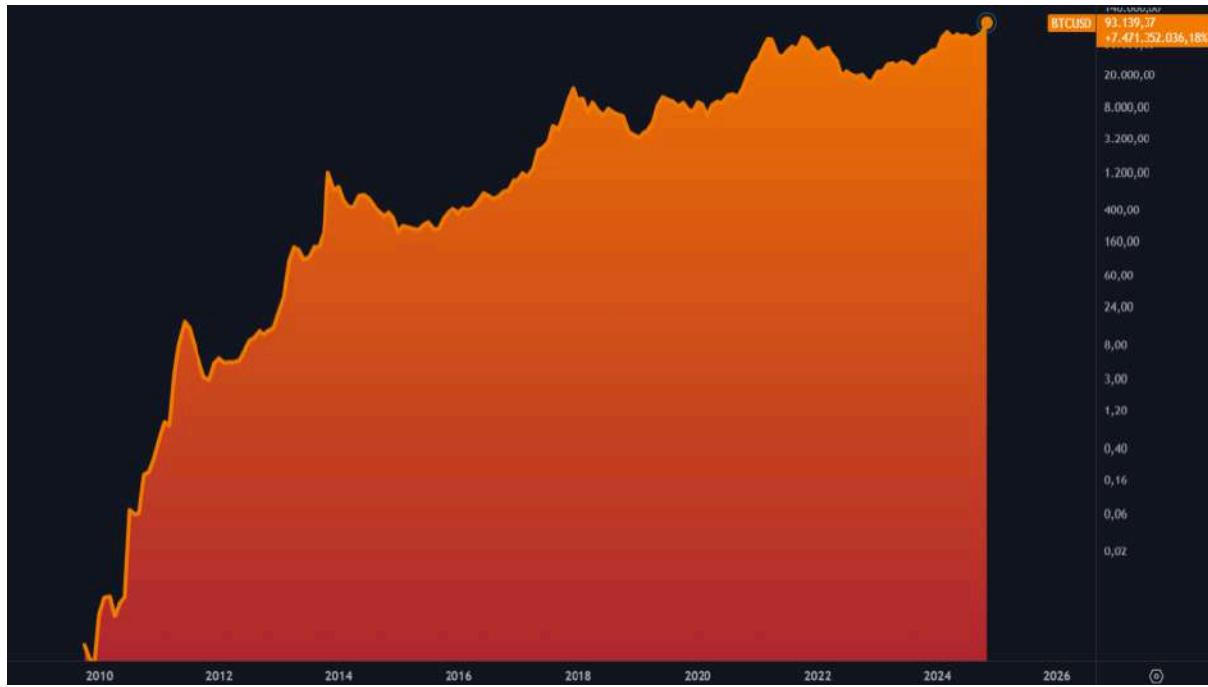
All Bitcoins were created under network consensus, there was no pre-mining. Pre-mining is when project creators issue a quantity to themselves before the network even starts running and this ends up creating a disproportionate privilege for creators and founders.

Furthermore, the whitepaper was released before the first block was launched, in a transparent, public, open source way, giving more people the chance to collaborate or even copy the code.

Bitcoin operated for almost a year and a half worth zero reais, without having any value. This allowed currencies to circulate freely and the network to decentralize organically.

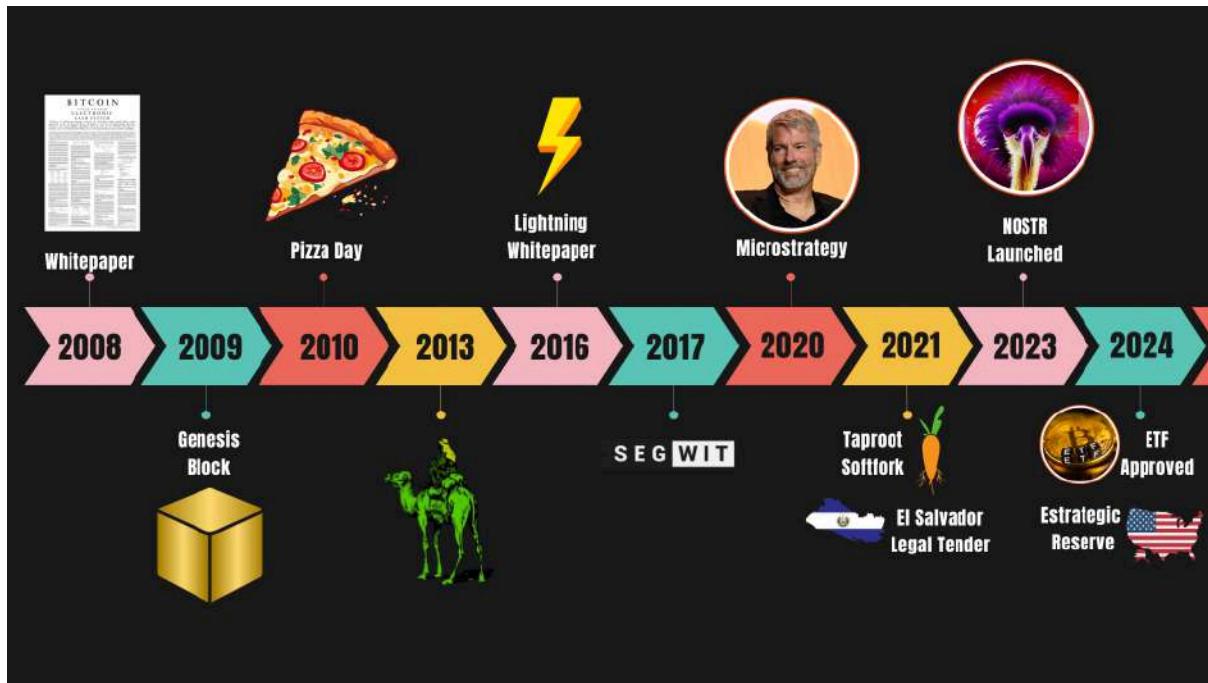
The growth of the Bitcoin network was organic because there was no initial financing, no venture capital and there was no expectation of profit. It was a protocol run by cypherpunks who were discovering how that whole stack of codes could work and evolve.

And unlike all the other founders of digital currency projects that emerged later, there are no records that Satoshi sold a single Bitcoin. He created Bitcoin and disappeared without ever making a profit. He left Bitcoin as a legacy of inestimable value to humanity without taking anything in return.



Since then, Bitcoin, which was worth nothing, has reached peaks with each new appreciation cycle. It reached 99 thousand dollars at the time I'm recording this video and has appreciated in value by more than 7 billion percent in dollars since 2010 when it began to be priced by the first online platforms.

The price of Bitcoin arouses a lot of curiosity, enchantment and greed, but it is actually a proxy that reflects the adoption of a new financial system. It is the first time in the history of humanity that it is possible to witness and document the birth of fully digital money without interference from governments and banks. The great appreciation of Bitcoin reflects demand and with the price it can also tell the story of Bitcoin through many ups and downs.



The history of Bitcoin is full of events. In just 15 years, almost everything has happened to Bitcoin and these past events point to how to better deal with what lies ahead.

Well, you already know the first two events: in 2008 the whitepaper was released and in 2009 the bitcoin network started running.

In 2010 the first transaction was made and became a date commemorative: Bitcoin Pizza Day. On May 22, 2010, Laszlo Hanyecz bought two pizzas for 10 thousand bitcoins, or about \$25 at the time. Today these pizzas are worth billions of dollars but Laszlo's act reinforces the importance of Bitcoin as money that can be used in everyday life and a p2p tool.

Although it seems like a Laszlo mistake and a waste in retrospect, Pizza Day highlights the importance of adopting and circulating Bitcoin as money. This way, there is no need for banks, exchanges or any type of intermediary to have Bitcoin. You simply exchange a product or service with another person who has Bitcoin. It is the most sovereign and independent form of negotiation between two people.

In October 2013 the Silk Road platform was closed. It was an online marketplace that allowed the trade of products and services of the most diverse nature through Tor and Bitcoin.



Created by Ross Ulbricht, the platform sought to create a free market, where users could anonymously negotiate any type of thing, relying on the principles of consent and privacy. It was an experiment in a truly free and unrestricted market that ended up challenging traditional structures of control.

Welcome
messages(0) | orders(0) | account(\$0.00) | settings | search

1 day [redacted] hrs [redacted] mins [redacted] secs until Four Twenty!!!

Shop by category:

- Drugs(2788)
- Cannabis(796)
- Dissociatives(48)
- Ecstasy(307)
- Opioids(211)
- Other(98)
- Prescription(541)
- Psychedelics(366)
- Stimulants(235)
- Apparel(28)
- Books(286)
- Computer equipment(13)
- Digital goods(219)
- Drug paraphernalia(74)
- Electronics(17)
- Fireworks(1)

pecunix
pecunix
pecunix

170\$ pecunix **\$39.23**

20 Grams of MDMA crystals **\$124.60**

1 OZ of Jamaican Oil **\$73.91**

HYDRO 10/325 NORCO/LORATAB **\$1.75**

Need Bitcoins ?

Need bitcoins? Bitcoins for your... **\$0.00**

Swazibudbud888 Swazi - Roolbaard **£ 88 \$ 140**

1oz - "Swazi Red" (Roolbaard)... **\$29.61**

News:

- Who's your favorite?
- Acknowledging Heroes
- A new anonymous market **The Armory!**
- State of the I Address

Silk Road had listed hundreds of products, equipment, service providers and even... drugs for purchase. All products and even those who worked on the platform were paid 100% in Bitcoin.

The objective was to be an Amazon or Ebay but totally free and supported by Bitcoin, when it was worth 50 cents on the dollar. As a result, Silk Road became a target, had 200,000 BTC stolen by the American government and founder Ross Ulbricht was sentenced to life in prison. This is because, and Although it began with good intentions, Silk Road quickly became a marketplace for drugs and illegal goods, although internal rules prohibited items

such as weapons. Ross Ulbricht was arrested and sentenced to a harsh sentence, seen as disproportionate, unfair and politically motivated, especially in light of milder sentences for similar crimes in other cases.

Ross's accusations fueled an online debate about whether a website owner should be responsible for the behavior of its users. Although Ross's family managed to raise 1 million dollars to pay his bail, American judges still did not approve his release. The great irony is that the FBI seized more than 200 thousand bitcoins from silkroad and this today makes the American government one of the largest holders of bitcoin in the world.

Another major milestone in the history of Bitcoin was the release of the lightning network whitepaper, a second layer for fast and cheap payments supported by Bitcoin. In 2017, the lightning network started running after the segwit update and It was an important milestone in the evolution of Bitcoin, because it makes it easier to use Bitcoin as an everyday currency for small payments.

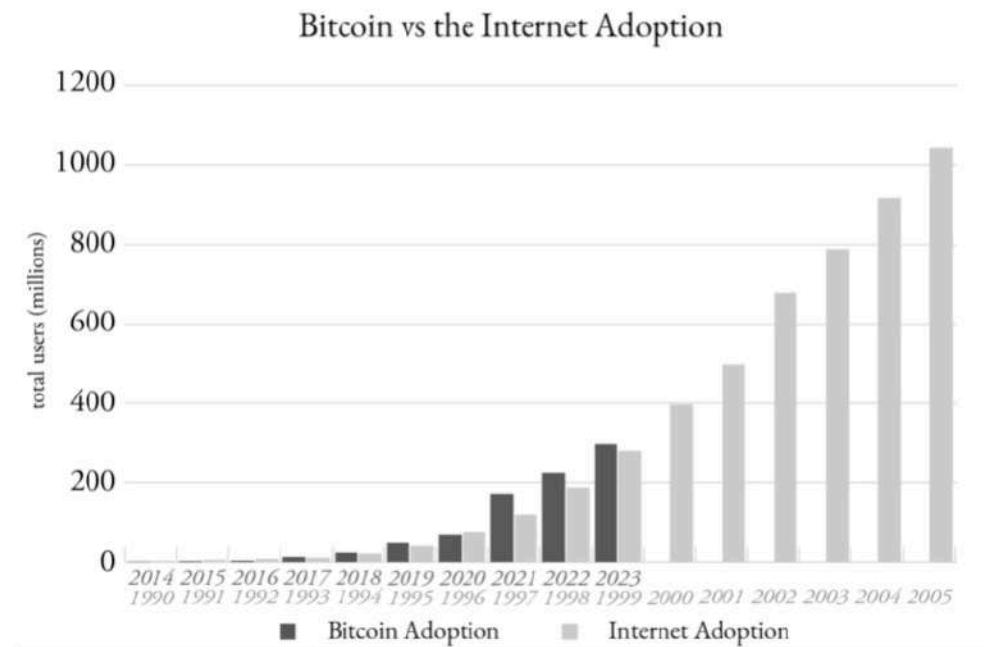
In 2017, the SegWit (Segregated Witness) update was one of the most significant changes to the protocol. It improved the scalability, security and flexibility of the network. SegWit reduced the burden of transactions, fees and allowed the Lightning Network to develop. SegWit activation was the result of years of debate and was an update that did not change the fundamental properties of Bitcoin, it was a soft fork.

In 2020, microstrategy became the first public company to establish a Bitcoin cash strategy, attracting attention from the most different types of investors.

In 2021 Bitcoin had the activation of taproot which also facilitates transactions, scalability and reduces data usage. There was also El Salvador adopting Bitcoin as the first country to make Bitcoin legal tender and becoming an example of how countries can migrate to the Bitcoin standard.

In 2023, the NOSTR protocol began to run, a protocol inspired by Bitcoin but aimed at social networks and online content so that people can once again own their online data without depending on big tech.

And in 2024 Bitcoin had two major events: the first Bitcoin ETF was launched in the USA and broke all trading and growth records. And that year was also the first time that an American president, Donald Trump, committed to creating a strategic Bitcoin reserve.

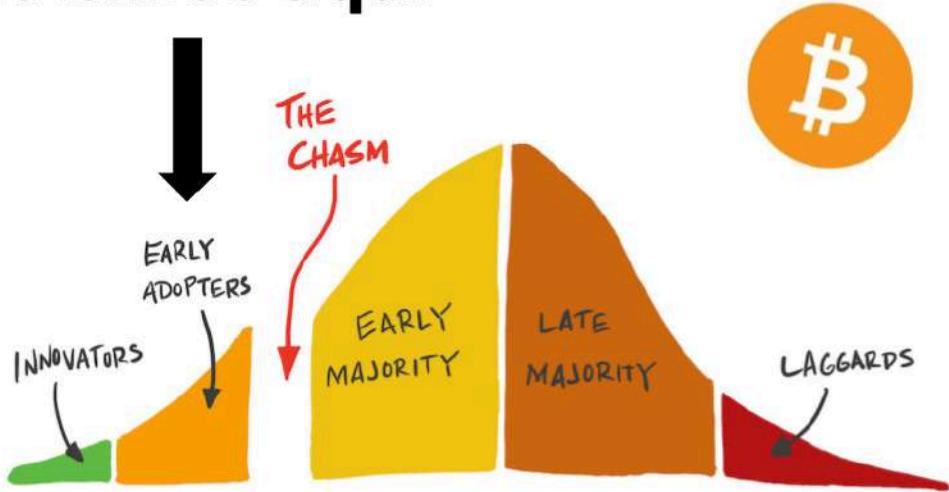


In these 15 years, Bitcoin has grown much faster than any company, commodity or country. While it brings back ancient monetary properties, it has seen parabolic adoption faster than the internet itself. This is what appears in this image: bitcoin in the dark gray bars and internet adoption in the light gray bars since the 90s. Bitcoin now has the same number of users as the internet did in 99.

And if the internet has become the main tool for accessing information, Bitcoin could become the main tool for accessing value without depending on governments or banks.

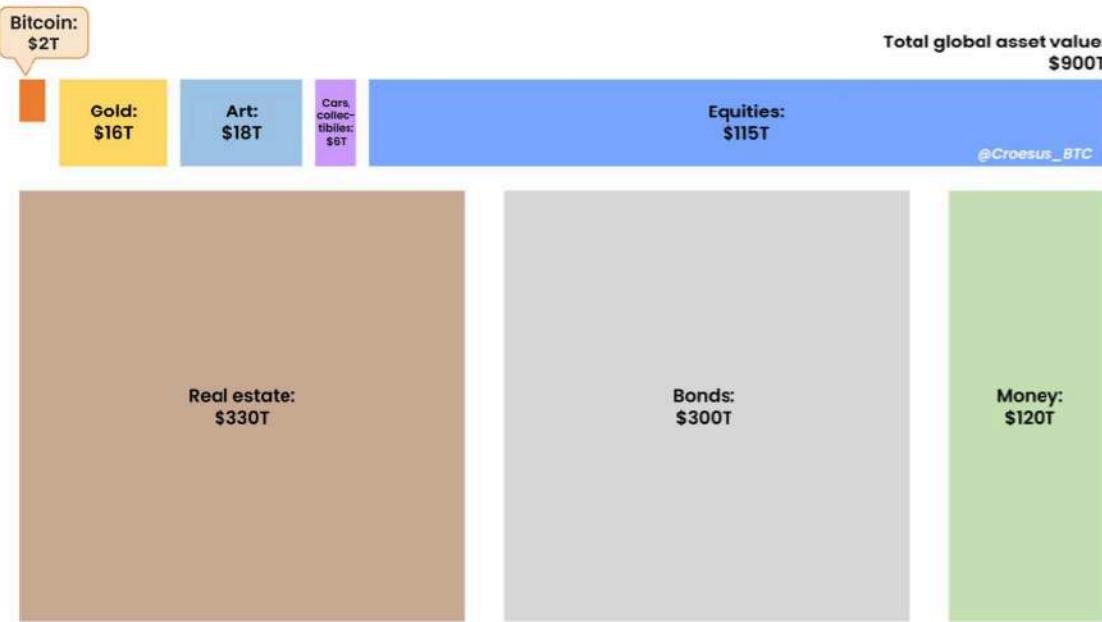
Even though it is growing faster than the internet, Bitcoin still remains at the beginning of its adoption.

Estamos aqui



The Adoption Chasm Chart is a widely used model to explain how new technologies are adopted by people. It divides adopters into five groups: innovators, early adopters, early majority, late majority, and laggards. Between the "early adopters" and the "early majority" there is a "chasm" (or chasm) that represents the challenge of converting a niche innovation into a general-purpose technology. Many technologies cannot even cross the "abyss".

In Bitcoin, the "abyss" symbolizes the transition between those who adopt BTC out of ideology, curiosity or specific interests (such as innovators and market enthusiasts) and the large mass of users who will only adopt the technology when it is perceived as safe, useful and easy to use. Bitcoin is at this critical point, just starting this process of crossing the abyss.

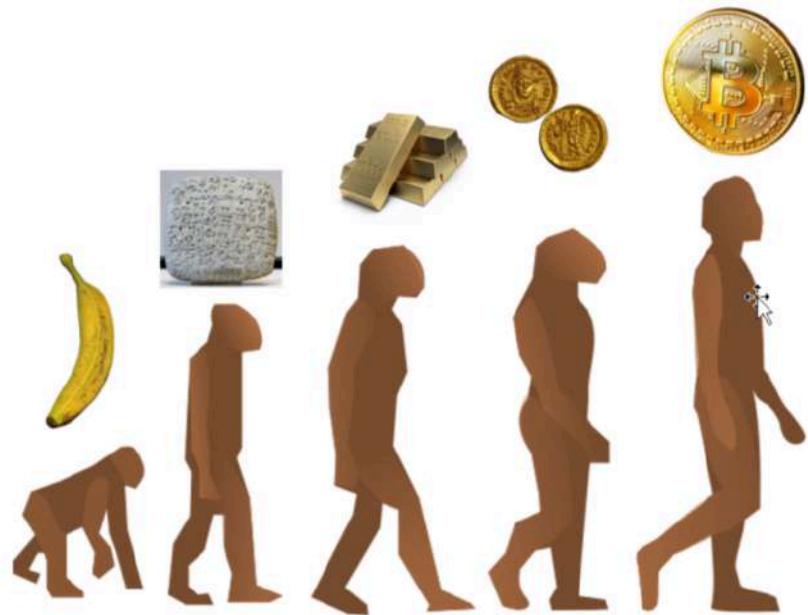


Even when compared to other asset classes, one realizes how small Bitcoin still is and how much it can grow in market capitalization as more people adopt bitcoin as an asset and as money.

Here in this image you see how Bitcoin only has two trillion in market capitalization, while other asset classes have tens or hundreds of trillions of dollars in market value. Bitcoin is a new type of asset, money and decentralized and open source financial system that can grow in value as much as or more than other already consolidated asset classes.

BITCOIN: UM DINHEIRO MELHOR

But the main point is that Bitcoin tends to continue appreciating because it is better money.



To understand why Bitcoin is better money, it is also necessary to understand how money has evolved over time and lost fundamental properties. Bitcoin has the potential to change the way we handle money, how we invest and how the global economy can benefit immensely from this change.

QUAL O PROBLEMA DO DINHEIRO?

Bitcoin solves many of the problems of the current financial system, many people suffer from inflation, negative real interest rates, confiscation, it is deplatformed by banks and they don't even know that bitcoin can save years of accumulated work that are being drained into assets and money cubes. ice.

In the next class you will understand what these problems are and why money was programmed to steal value from people without them realizing it.

Until next class.

2 - The problem of fiat money

Money created by governments has a problem:



It's a big ice cube. It melts in value constantly.

Maybe you haven't realized this yet, but it has an effect that you certainly notice: everything becomes more expensive over time.

Tudo cada vez mais caro...



Every year shopping at the supermarket becomes more and more expensive, the cost of filling the cart with basic products becomes increasingly higher and salaries do not keep up with this generalized price increase.

This happens because your money constantly weakens and loses value.



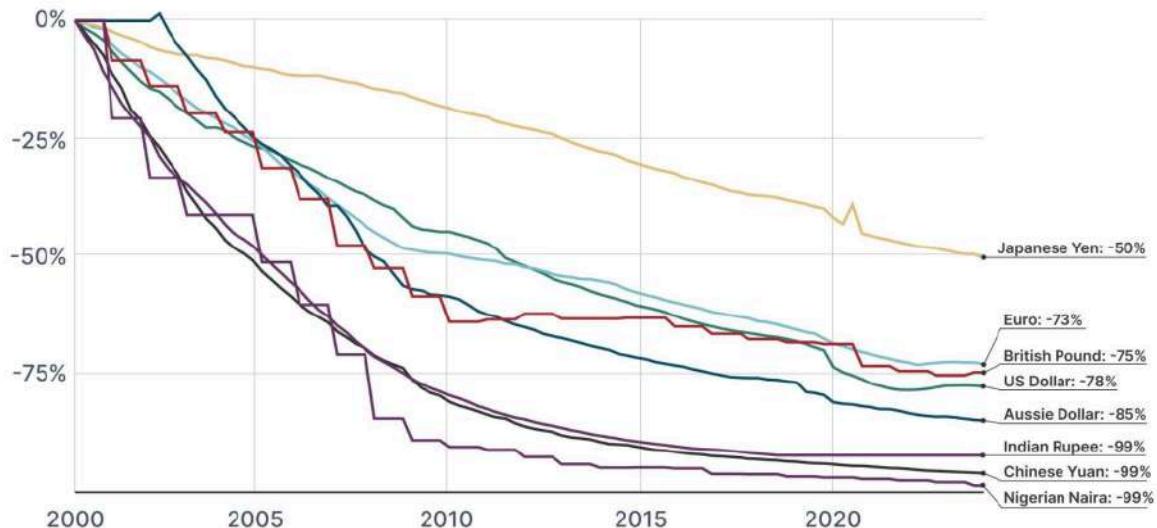
The dollar has lost 97% of value since the Federal Reserve, the US central bank, was created in 1913. The purchasing power of 100 dollars today is equivalent to 3 dollars 120 years ago. This means that today you need to have 100 dollars to buy the same things that you could buy with 3 dollars when the American currency was created. Shocking, isn't it?



The real, the Brazilian currency, has lost 87% of purchasing power since it was created in 1994 after decades of suffering from hyperinflation, confiscation of savings and recurring economic crises. Today, almost 30 years later, the purchasing power of 100 reais has the same purchasing power as 12 reais in 1994. It melted a lot and in less time than the dollar!

All currencies go through this same process and lose purchasing power.

Currency Debasement Since 2000



Source: FRED, World Bank

According to data from the World Bank, all global currencies have lost value since the 2000s, in the last 25 years. The Japanese yen lost -50% in value, the euro -73%, the British

pound -75%, the US dollar -78%, the Australian dollar -85%, the rupee -99%, the Chinese yuan -99% and the Nigerian Naira too, -99%.

ALL government currencies melted in value in just 25 years. This destroys generations who are working every day of their lives to receive money that holds no value. It's an ice cube. (flashing an ice cube on the screen)



That's why you feel everything getting more and more expensive and rising in price... because your money loses value. Prices seem to go up, but in reality it is money that is going downhill.



AUMENTO DE PREÇOS



SINTOMA

The truth is that rising prices are just a symptom and not the cause of inflation.

The most common and accepted concept is that inflation is the continuous and generalized increase in the price index. This means that products are rising in price in the supermarket. But this rise is just a symptom of the weakening and devaluation of the currency.

This means that money is losing value compared to products and services. This has happened several times in history and in several countries. Although inflation is something that everyone knows and feels in their pockets, few people really understand how and why it happens.

And as Austrian economist Milton Friedman said since the 1970s, only central banks can create widespread inflation because only they can print money. Only central banks can manipulate the existing money supply.

OFERTA E DEMANDA



Prices in the economy are determined by the supply and demand of all things, even money. After all, money helps us correlate value between different things. It helps us understand whether something is expensive or cheap.

This means that the price of an apple, for example, depends on the quantity of apples there are and the demand for apples. If an apple costs R\$3 and a lot of people decide to make recipes with apples: demand increases. Apple prices are likely to rise because demand has increased. On the other hand, if an apple costs 3 reais and the harvest was very good to the point that there were a lot of apples in stock and sellers needed to sell everything before they spoiled... what happens? Yes, the price drops.

That's why supply and demand is what determines the prices of anything in the economy and money is the tool we use to measure value.

The same thing happens with money. If more money is created in relation to how much people produce, money will lose value in relation to products and services because the supply of it has increased. And if money stops being created it tends to become more valuable if the demand for it remains the same.

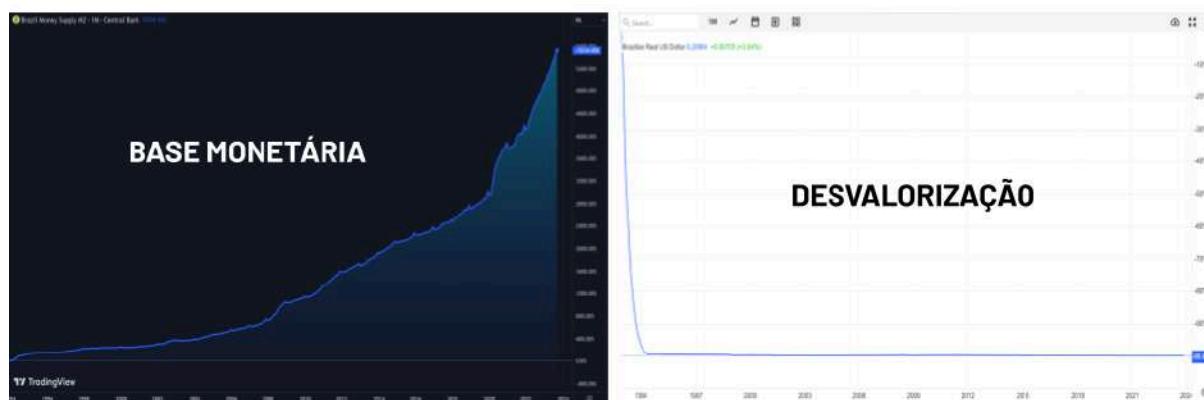
Money created by governments is known as fiat money, because it is money made by decree. The word "Fiat" comes from Latin and means "let it be done". In other words, it is money that third parties determine has value, force people to use, and can be created out of thin air by printing more notes or simply typing it into the central bank's computer.

IMPRIMIR DINHEIRO: AUMENTO DA OFERTA



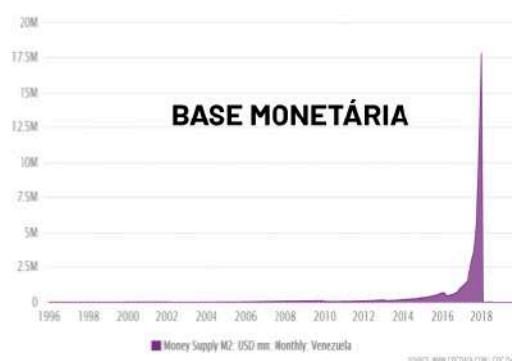
When central banks of governments print money or create digital money at the push of a button, they are increasing the money supply. They are practicing expansion of the monetary base. And it's clear. As central banks print more money they destroy the purchasing power of the local currency. It devalues. This happens in all countries.

BRASIL



In Brazil, the central bank has expanded the monetary base by more than 5 thousand percent since the real was created and since then the Brazilian currency has lost 99% of its value in relation to the dollar.

VENEZUELA

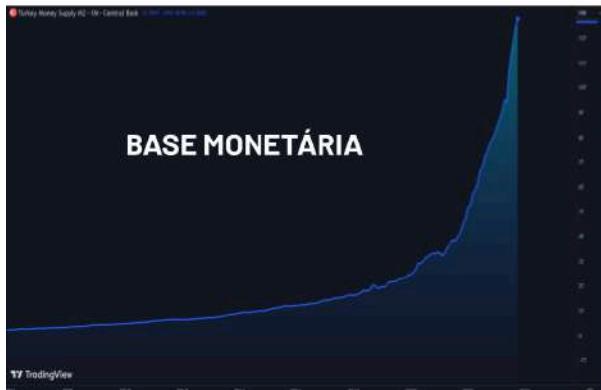


The same thing happened in Venezuela more recently from 2012 to 2018. As the central bank created more money, its value declined.

TURQUIA



BASE MONETÁRIA



DESVALORIZAÇÃO



In Türkiye it's the same film... printing money in the image on the left and the consequent devaluation of the currency in the same period in the image on the right.

ARGENTINA



BASE MONETÁRIA



DESVALORIZAÇÃO



In Argentina we don't even talk about it... Same thing, the graphs and data speak for themselves.

Central banks print money and the currency collapses in value. The more they print, the more the money melts.

EUA



Even the dollar, the strongest currency with the greatest global demand, had its supply constantly increased and constantly lost value as well.

(opens fabric)

As value is drained, money begins to fail in its role as money.

When money fails, people suffer most.



Here in Brazil, we have been through situations where money has completely lost its function. We had several currencies that went extinct because of hyperinflation – that scenario in which prices skyrocket out of control because the government prints money in an uncontrolled way. The currency loses so much value that people can no longer trust it. When

hyperinflation takes hold, desperate attempts are made to try to "control" the situation. Governments try to impose fixed prices for products and services or force the population to carry out "price controls". But guess what? These measures do not work. On the contrary, they only increase the chaos.

With prices rising absurdly every day, traders need to constantly readjust their tables. This instability breaks trust in money as a tool for measuring or storing value. People begin to realize that the money in their wallet or in the bank is worth less every day. What do they do? They run to spend. Instead of saving money, people start buying anything that preserves better value – food, products, durable goods.

And that's when the chaos intensifies. Everyone rushes to stock up on food and basic products, because they know that everything will be more expensive tomorrow. The shelves start to empty. There is no longer a demand for money; there is demand for tangible goods that do not lose value. Money, as we know it, becomes an "ice cube" quickly melting in the hands of whoever holds it.

This cycle leads to widespread shortages. Not because the products have disappeared, but because no one trusts money anymore. People accumulate what they can, commerce is unable to replenish stocks in time, and the economy turns into a desperate race for survival.

This extreme scenario shows us the importance of rethinking what money is and how it should work.

"O DINHEIRO SUMIU" - 1990



When inflation gets out of control, governments often resort to desperate – and often absurd – measures that end up directly harming the population. One of the most striking examples in Brazil occurred in 1990, when the government confiscated Brazilians' savings. Yes, this really happened.

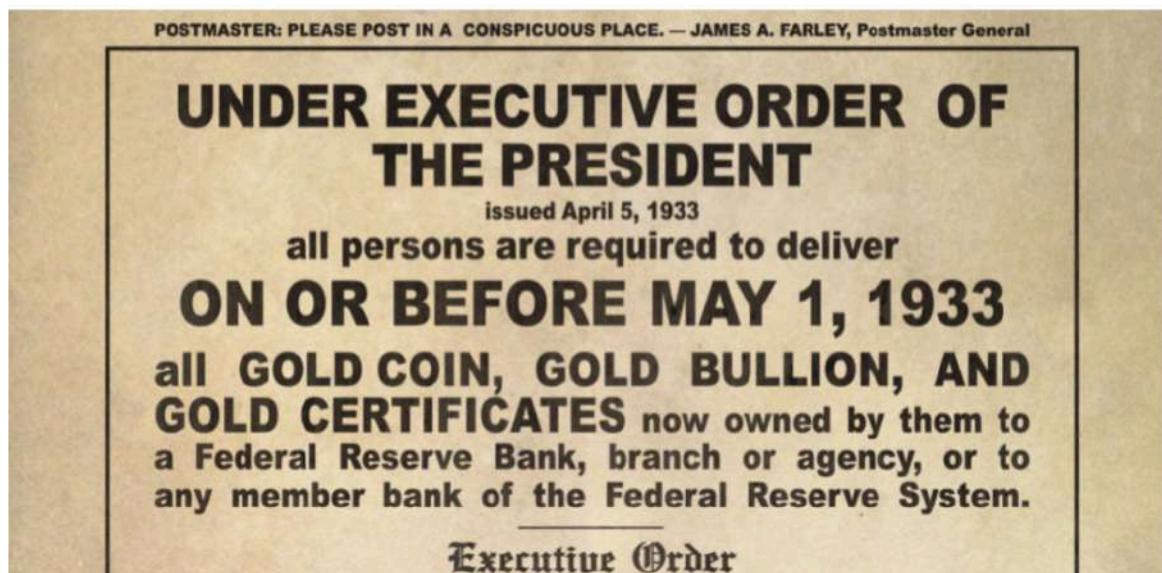
At the time, to "combat inflation", the president declared a bank holiday from one day to the next. Suddenly, people could no longer withdraw their own money from banks. The

justification? Prevent inflation from continuing to grow. But, ironically, this inflation was the result of decades of mismanagement, uncontrolled spending and unrestrained printing of money by the government itself. The result was a true crime against the population, who had their trust and financial security brutally stolen.

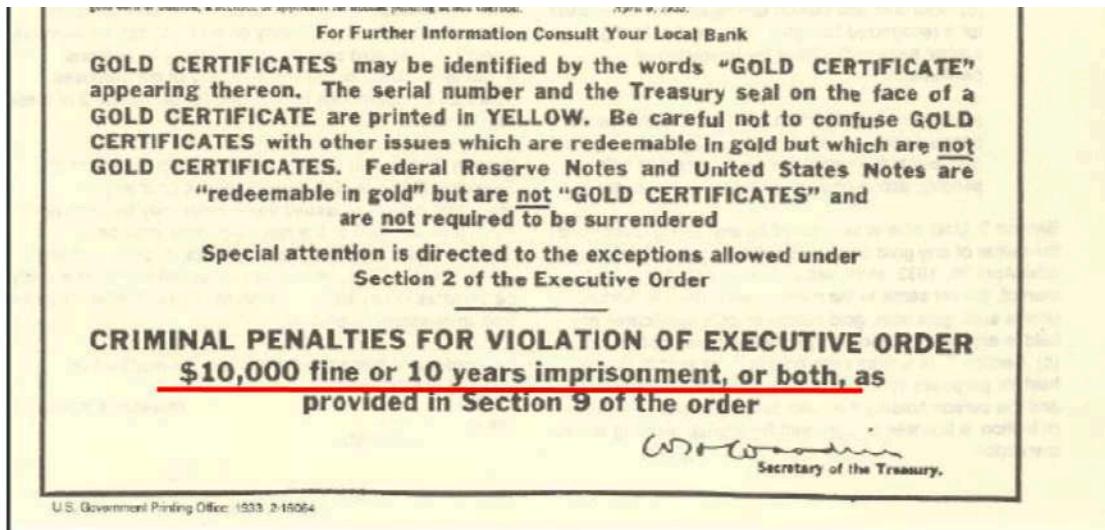
Stories like this are not exclusive to Brazil. Throughout history, in several countries, governments have used control over the financial system to confiscate wealth, either through arbitrary measures such as direct confiscation, or through the printing of money that erodes the value of economies slowly, in a trickle. .

What these cases show us is simple: if your money is in the bank or dependent on a central bank, it is not really yours. You are at the mercy of other people's decisions – decisions that can change overnight. Today it may be a law that freezes your funds; Tomorrow, it could be inflation that silently drains your purchasing power.

But it's not just in Brazil and developing countries that governments confiscate the population from one moment to the next, this has happened in the United States too!



In 1933, the American government confiscated the population's gold in a type of "regulated robbery". They forced all people to turn over their own gold to the federal reserve with the executive order 6102. They lowered the law and people were forced to hand over their wealth, a huge confiscation.



Just imagine: if you didn't hand over the gold, you would face a \$10,000 fine, 10 years in prison, or even both! This is the reality of how governments, at different times in history and in different countries, have abused the power they have. Whether printing money without control thinking no one would notice, or directly confiscating it. The result is always the same: the population ends up paying the price and losing assets.

MAS NÃO FOI SEMPRE ASSIM

The point is: it wasn't always like this. Fiat money as we know it today is actually the exception throughout history. It is the largest experiment ever carried out by governments.



In the past, gold was widely used as money throughout entire civilizations. It was a form of wealth that people could carry with them, without relying on intermediaries. It didn't need banks to be stored or governments to validate its value. The value of gold was organically validated by the people themselves. Gold was, literally, "bearer" money – if you had it in your hands, it was yours, without depending on anyone else.

Today, the financial system is very different, and what we think of as "normal" – money issued by governments and stored in banks – is, in fact, a true anomaly in the history of money. For thousands of years, gold was the basis of commerce and wealth, while the fiat money we use today, without real backing, is a recent invention, the result of recent

decades.



Gold has an amazing feature: you can bury it and leave it there for decades, and it will still maintain its value when you dig it up. It's like in pirate movies, where they hide a treasure map with gold coins. Anyone who finds this treasure, years or even centuries later, would be able to use it, because the gold would continue to be worth no matter how much time passes.

This durability is one of the reasons why gold has been used so much as money throughout history. It does not depend on governments or banks for value. It doesn't rust buried in the ground. This is why gold has been used as money for millennia.

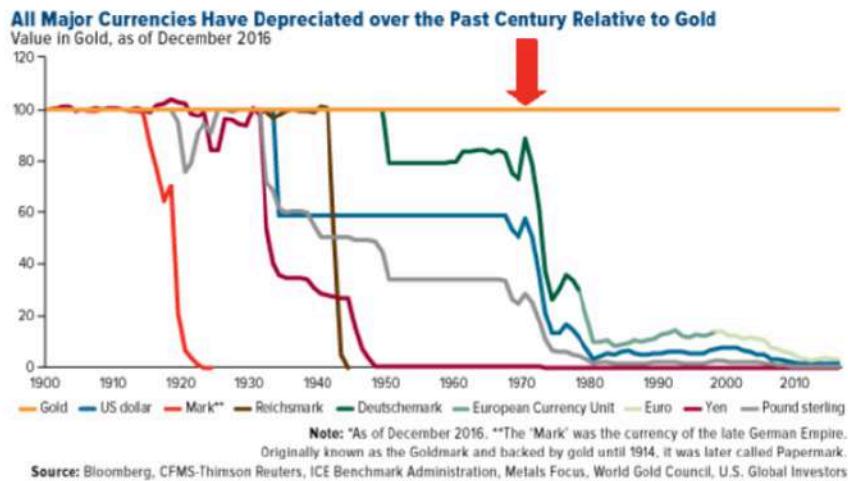
PROPRIEDADES MONETÁRIAS



Gold preserved value because it had very specific monetary properties that placed it in the position of money organically chosen by people as the best way to store value over time, for the future. Gold is durable, divisible, fungible, portable, verifiable, relatively scarce, and globally accepted as a store of value. In the next class we will break down all these properties and compare each one of them between gold, fiat and Bitcoin.

It is these properties that explain why gold has been chosen as money throughout much of history and is still seen as a reliable store of value today. And this is reflected throughout history.

MOEDAS EM RELAÇÃO AO OURO



If you compare the performance of government-issued currencies to gold over time, you will see that they all lose value relative to it. In this graph, the yellow line would represent the value of gold, while other colored lines would show the main global currencies, such as the dollar (in blue), the German mark mixing with the euro (in shades of green), and the pound sterling (in shades of green). The pattern is clear: gold maintains its value while fiat currencies lose.

But why does this happen? The answer lies in the nature of gold and the way it differs from fiat currencies (those issued by governments). Gold is relatively scarce, and its supply cannot be increased easily or arbitrarily. Before the emergence of Bitcoin, gold was the most difficult commodity to expand supply. Extracting gold from the Earth is expensive, laborious and limited by natural reserves. This created a supply that was stable and resistant to manipulation for many years, preserving value over time.

Furthermore, gold has **atomic stability**. This means that, even with advances in science, recreating gold in the laboratory is economically viable, it is practically impossible as it is so expensive.

Meanwhile, fiat currencies are constantly devalued by decisions by central banks that can simply "print" more money whenever they see fit. This reduces the relative value of currency because when there is more money circulating, each unit is worth less. The result? Inflation and loss of purchasing power for everyone.

Gold became the most used money in history, when it became money it assumed 3 functions:

FUNÇÕES DO DINHEIRO



RESERVA DE
VALOR



MEIO DE
TROCAS



UNIDADE DE
MEDIDA

It became a store of value throughout history because people knew that it was capable of preserving value even over time. Unlike other goods that could spoil, wear out, or lose usefulness, gold was durable and reliable. Holding gold meant having something that would be valuable not only in the present but also in the future, across generations.

Furthermore, gold stood out as an efficient medium of exchange. Because it was divisible, it could be transformed into different sizes, from large bars to small coins. This made transactions easier, as people could use gold to buy both simple things, such as food, and high-value items, such as land or armies. The possibility of minting gold into standardized coins also helped to make exchanges more practical and thus it was accepted as a means of exchange.

With coinage it became obvious to price goods and services in quantities of gold. This means that people began to evaluate the value of everything around them in terms of gold. How much is a bag of wheat worth? Xis gold coins. How much is a horse worth? Another amount of gold. This standardization brought clarity to commercial exchanges and helped to build more organized and functional economies. Gold's monetary properties created the basis of good money for ancient and modern economies.

EVOLUÇÃO DO DINHEIRO



But just as stones, shells and salt were used as money in the past and were eventually replaced, gold was also replaced as a monetary standard. All money can be demonetized if something with better monetary properties comes along. This is part of the natural evolution of money, which follows people's needs and improvements in the characteristics that make something useful as a medium of exchange, store of value and unit of measurement.

The evolution of money has always been linked to the improvement of these properties. Millennia ago, for example, shells were used as money. They were valuable because they were scarce in certain regions, such as the mountains. However, when people began to move and take shells from the coast to these regions, they lost their scarcity – and, consequently, their value. The result? Shells stopped functioning as money because they could no longer preserve value.

A fascinating story that helps to understand this evolution is that of the rai stones, used as money on the island of Yap, in Micronesia, until 1871. The rai stones were large limestone discs with a hole in the middle, varying in size and shape. They were not only a form of money but also a status symbol. The families that owned the largest and most beautiful stones were considered the richest on the island.

The limestone needed to make these stones did not exist on the island of Yap. Therefore, it was necessary to search for them on neighboring islands, which made the production of stones an extremely laborious and time-consuming process. Moving a rai stone required effort, energy, and planning, which limited production and thus helped maintain the stones' value as money. This process, which involved significant labor to create and transport the stones, is a precursor to the concept of **proof of work**, which we will explore later in this course.

For a time, rai stones worked well as money. They were difficult to counterfeit, their production was limited and they required effort – all important characteristics to preserve value.

PEDRAS RAI



When the giant stone arrived on the island, the whole village knew who owned it because everyone had to work together to carry the stone. If the stone was used in any negotiation, the Yapanes would only announce who the new owner was. This is a beautiful example of decentralized money recording, the difference is that it was analog and not digital.

(opens camera for me)

But the arrival of an Irish businessman on the island put an end to this monetary standard. The Irishman saw that the Yapanes produced a lot of coconuts and wanted to trade this coconut with the locals, but they did not accept foreign money, they only accepted RAI stone. And then look what the Irishman did. He took explosives and metal tools to neighboring islands, extracted a lot of RAI stones with less effort, took them to Yap island and bought all the coconut stocks.

(go back to the slide and show an excerpt from the video with several rai stones on the island, it's in the class slides folder)

PEDRAS RAI



This is how RAI stones became abundant on the island and the value of the stones fell until they lost their usefulness as money.

This is how gold replaced the stones, salt and other money of the past. Salt, stones, shells and other objects were once money, but today they are no longer because they can be produced unlimitedly. The moment a person realizes that they could just take the shells from the coast and take them to the desert, they end the object's function as money in the desert, because it ends scarcity.

EVOLUÇÃO DO DINHEIRO



This is why gold is the main store of value among commodities to this day, this is why the minting of gold coins was the main format of money for centuries and because of these properties that even fiat money was backed by gold. in the past.

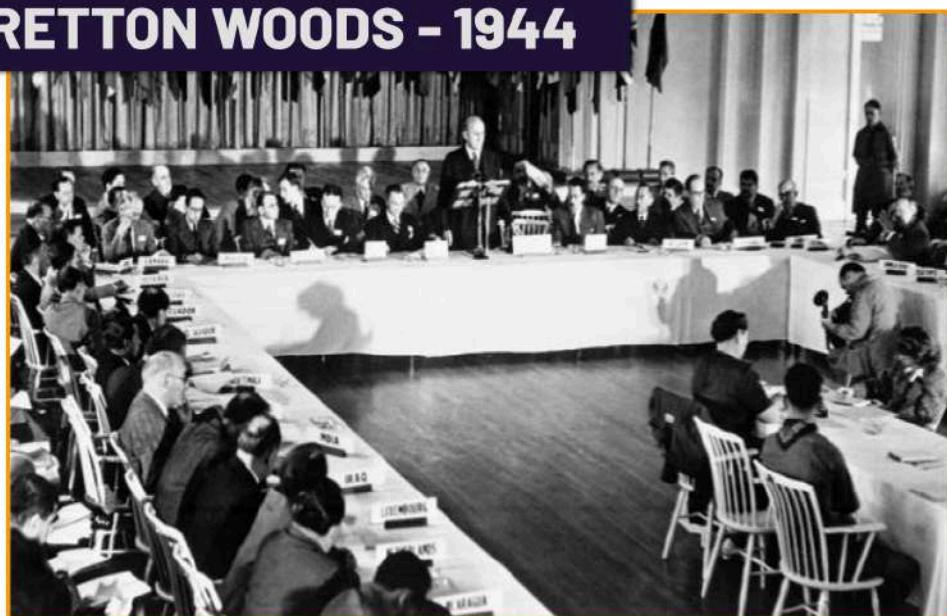
Fiat money replaced gold as the main monetary standard because it managed to drain trust in gold into trust in governments.

PADRÃO OURO: CONVERSIBILIDADE



This note here is from that time and was convertible into gold, it even had a gold certificate seal. In other words, the money was issued by the American government, but it was backed by gold, the notes functioned as a contract that attested to this. It was the scarcity of gold that brought confidence that governments would not print more money than they had in gold in their cash registers and would not destroy the value of money, of the contract that was the paper note.

BRETTON WOODS - 1944



It was because of the large gold reserve in the United States that in 1944, the Bretton Woods Agreement took place between countries around the world, where it was established that the dollar would be the reserve currency of global value and the only one backed by gold. In other words, only the Americans would have gold in their coffers, the other countries would leave their gold with the United States in exchange for dollars. When countries wanted to convert their dollars back into gold, they would trust Americans to make the exchange.

Countries fixed their exchange rates and their currencies in relation to the US dollar, they started to have US dollars and bonds in their treasuries and the United States promised to fix the price of gold at approximately 35 dollars per troy ounce, that is, every 31 grams of gold would cost 35 dollars. This way, all currencies linked to the dollar would also have a fixed value in gold. It was gold that brought confidence in the dollar being the global store of value in the last century.

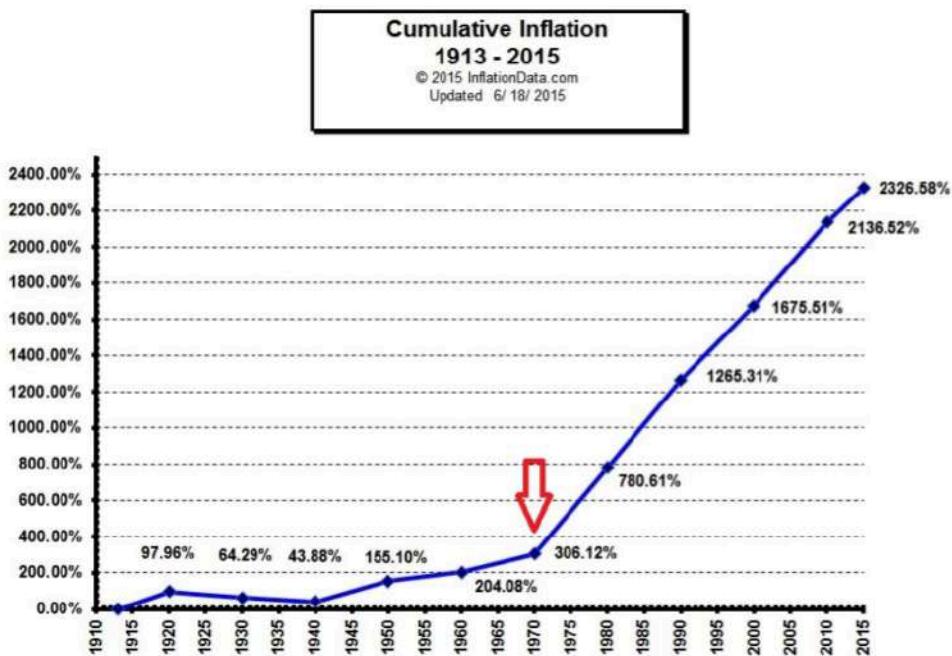
CHOQUE NIXON



But this trust has been constantly attacked throughout history and with the Americans it was no different. In 1971, President Richard Nixon issued a decree that put an end to gold backing and made the dollar convertible into gold. In other words, no country would be able to convert dollars into gold again, it was a kind of global default.

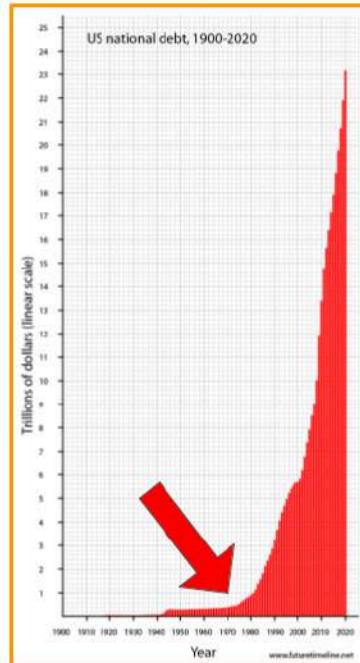
vídeo nixon (mockup para vídeos)

This movement became known as the Nixon shock and marks the main change in the last 100 years: **the money stopped having ballast and became an ice cube**. Trust in the atomic properties of gold was replaced by trust in politicians. And as you can imagine... that trust was constantly abused.



Since then, inflation has become increasingly increasing globally because the United States and central banks around the world no longer had a limit on money printing. They no longer had gold limiting how much they could expand the money supply.

DÍVIDA DOS EUA



Today, we live in a debt-based global economy. Unlike the past, when the financial system was supported by gold, it now depends on the ability of governments to issue debt securities and print money. This model allowed national debts to grow to historic levels, with the United States leading the way. The American debt, for example, continues to break records and has reached an absurd 36 trillion dollars!

([video animation](#))

But how does this work? To print money, governments issue debt securities, which are like promises to pay. These bonds are purchased by other countries, banks and investors, creating a financial system that relies on the confidence that this debt will be repaid in the future. In practice, gold was replaced by government debt as the basis of the global financial system.

This mechanism allows governments to spend without limits, simply increasing how much they owe. In the case of the United States, this debt became the foundation of the global financial system. Confidence in the dollar and the American economy ensures that bonds are widely accepted as "the new gold," or "a risk-free asset" by global markets.

However, this model has a weak point: trust. If at some point the US is unable to pay its debt or even delays payments, confidence in the US economy could collapse. It would have devastating effects, as many countries and institutions depend directly on the stability of the dollar and American bonds. A crisis of confidence in this system could contaminate the entire global economy, triggering a new financial crisis.

This scenario makes us reflect on the fragility of a system based on infinite debt and trust in the "power of money printers". Unlike gold, which was a tangible and scarce asset, today's money and the global financial system are built on something intangible and infinitely expandable: debt.

Governments print money, increase public debt and destroy the purchasing power of currency to often save inefficient banks from bankruptcy.

"Chanceler à beira do segundo resgate aos bancos"



Here we come to why satoshi created Bitcoin and the quote he brought in the genesis block. Making reference to the second rescue of failed banks through the printing of money.



Satoshi knew that the money that the whole world uses is an ice cube that loses value because it has lost monetary properties. It is only based on governments promising to pay their debts without destroying the value of the currency... which does not happen. They are melting.

This scenario leads us to an important reflection: what happens when money loses its confidence as a store of value? As we have seen throughout history, when trust breaks down money is replaced by better monetary technology.

(R)EVOLUÇÃO DO DINHEIRO



It is in this context that Bitcoin emerges as a revolutionary alternative that is better than fiat money and also better than gold. It does not depend on governments, banks or trust in third parties. It revives the idea of a solid financial system, more similar to what gold represented in the past, but even better than gold itself because it is digital, decentralized, globally verifiable and, above all, mathematically scarce.

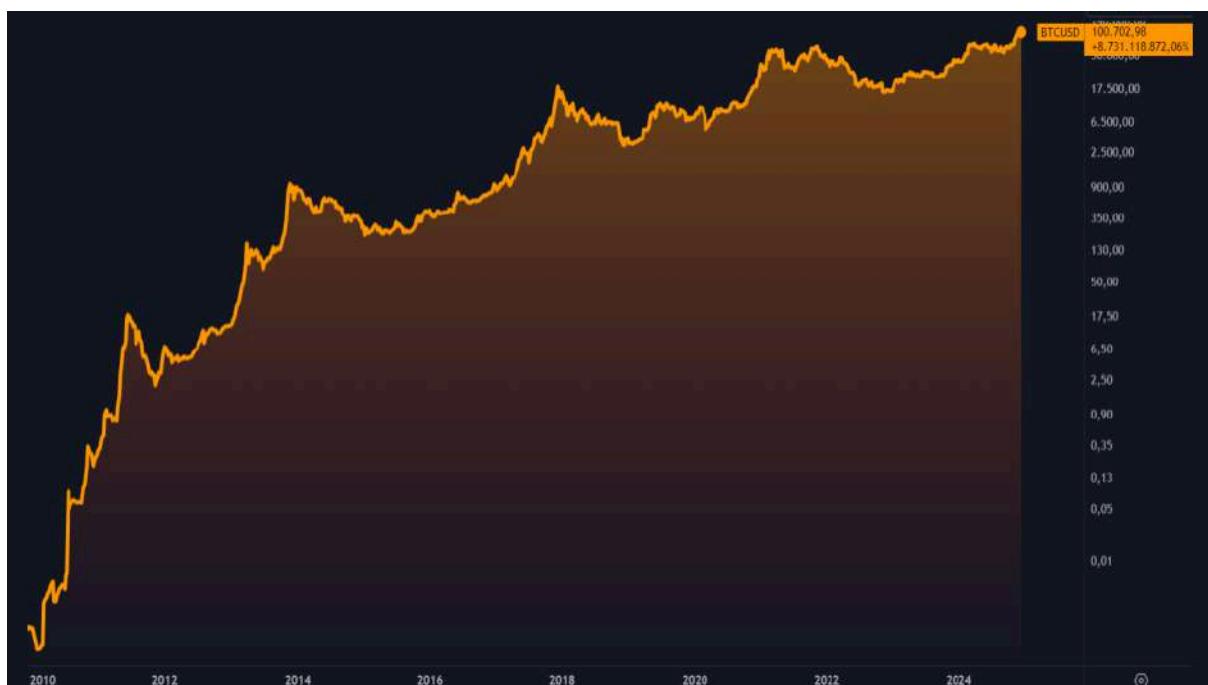
Looking at the current scenario, it is easy to see how Bitcoin represents a paradigm shift in the face of an unsustainable and constantly collapsing system. Bitcoin is a better money and financial system and in the next class you will understand more deeply why.

3- Why Bitcoin is better money

explain monetary properties and history of money (scarcity, verifiability and immutability)

In the previous class you understood why fiat money is an ice cube, the history of money and in this class you will understand how Bitcoin solves critical problems of fiat money and also gold.

The first step to this is understanding that Bitcoin is better money because it has better monetary properties. The main one is preserving value. If fiat money melts in value, Bitcoin is the opposite... **it gains value**.



Since its launch in 2009, Bitcoin has appreciated impressively. Initially, it was priceless—its value was literally zero. However, over the years, Bitcoin has accumulated growth of more

than 8 billion percent in dollars, between 2010 and December 2024. In 2024, it reached the mark of 100 thousand dollars per unit, consolidating its volatile trajectory in the short term but of continuous growth over 15 years.

A GRANDE DIFERENÇA



Fiat: dinheiro por decreto
sem propriedades monetárias
naturais. Curso forçado é adoção
artificial pela força.

Dinheiro sólido:
adotado organicamente
por suas propriedades
monetárias naturais.

Bitcoin is fundamentally different from fiat currencies. The term "fiat" from Latin means "let it be done", it is money by decree, adopted artificially, imposed by governments through forced tender laws, and not by its natural monetary properties. People use fiat currencies because they have to, while Bitcoin and gold are adopted freely due to their natural properties.

Gold has unique atomic properties, formed by cosmic processes, such as nuclear shocks, during the formation of the Earth. Bitcoin is based on mathematical properties that are protected by its decentralized structure. This decentralization, both in the code and in the records, ensures that no one, no matter how powerful, can change the fundamental properties of Bitcoin — just as no one can change the natural atomic properties of gold. Changing gold would be recreating any other metal except gold, same thing with Bitcoin. This is why, despite there being millions, no cryptocurrency can do what Bitcoin does and come close to the relevance that Bitcoin has.

For these reasons, both gold and Bitcoin have appreciated in value over time, while fiat currencies, which depend on arbitrary political and economic decisions, constantly lose value.

A GRANDE DIFERENÇA



Central Banks justify the existence of fiat currencies and their monetary policies by claiming that they serve to “control the economy and guarantee financial stability”. However, reality shows a different story. Since 1971, when the gold standard was abandoned, we have faced recurring global and local economic crises. The Central Bank, in practice, cannot even protect the value of the currency, which should be its main responsibility.

Many economists and investors critical of Bitcoin argue that it is too volatile to be considered money. However, fiat currencies are also extremely volatile — just in a different way. The so-called “stability” of fiat is an illusion, as it constantly loses value over time. Bitcoin, despite its volatility, has shown a significant increase in value and purchasing power over the years.

To illustrate, the real has lost 87% of its value since the Real Plan, and the dollar has lost 97% of its value since its creation in 1913. In contrast, Bitcoin has appreciated in value by around 8 billion percent since it was created in 2009. In just 15 years, Bitcoin has protected and expanded purchasing power more effectively than any national currency.

This is because Bitcoin has superior monetary properties. Just as gold was historically adopted as money by several civilizations due to its monetary properties — such as being a store of value, a medium of exchange and a unit of account — Bitcoin has even more robust characteristics to fulfill these functions. Its decentralized nature and programmed scarcity make it a unique and efficient money for the digital world.

PROPRIEDADES MONETÁRIAS

	Durabilidade	Divisibilidade	Fungibilidade	Portabilidade	Verificabilidade	Escassez	Aceitação
	-	+	-	+	-	-	-
	+	-	+	-	-	+	+
	+	+	+	+	+	+	-

This image presents the main characteristics that define good money, that is, money with strong monetary properties. These characteristics are:

1. **Durability**
2. **Divisibility**
3. **Fungibility**
4. **Portability**
5. **Verifiability**
6. **Scarcity**
7. **Aceitação**

Let's explore each of these properties in detail and compare how fiat money, gold, and Bitcoin perform relative to them.

PROPRIEDADES MONETÁRIAS

Durabilidade	Divisibilidade	Fungibilidade	Portabilidade	Verificabilidade	Escassez	Aceitação
	-	+	-	+	-	-
	+	-	+	-	+	+
	+	+	+	+	+	-

The first characteristic is the **durability**. Good money must resist wear and tear and the passage of time, ensuring its usefulness as a means of exchange and store of value without deteriorating.

- **Fiat:** Paper money is not durable. It can wrinkle, get wet, tear and deteriorate quickly. Central Banks regularly spend millions of dollars to replace damaged banknotes with new ones.
- **Gold:** It is naturally durable as it does not rust or degrade. However, as it is a physical asset, it may suffer some wear and tear over time, especially in coins or exchange items.
- **Bitcoin:** It is extremely durable as it is digital. There is no physical wear and tear and, as long as there is a node running and processing the network, it continues to exist. Furthermore, the Bitcoin network is highly resilient. In its 15 years of existence, it has faced constant attacks, but continues to operate uninterruptedly, being the most secure and powerful network in terms of computing in the world.

PROPRIEDADES MONETÁRIAS

	Durabilidade	Divisibilidade	Fungibilidade	Portabilidade	Verificabilidade	Escassez	Aceitação
Dólar	-	+	-	+	-	-	-
Ouro	+	-	+	-	-	+	+
Bitcoin	+	+	+	+	+	+	-

A **divisibility** is the ability of money to be divided into smaller units, allowing transactions of any value. This is essential to facilitate use both in large negotiations and in everyday purchases. One **practical example:** A house cannot be considered money because it is not easily divided into smaller parts, so houses are not money, they are assets or liabilities that are worth a sum of money.

- **Fiat**: It is highly divisible and can be divided into cents, which facilitates its use in transactions of different values.
- **Gold**: It is divisible into units such as ounces of gold, which has allowed it to be used as money in the past. However, gold has limitations for microtransactions, which has led fiat currencies to replace gold as a monetary standard due to its greater divisibility and portability.
- **Bitcoin**: It is even more divisible than fiat, and can be divided into up to 8 decimal places. The smallest unit of Bitcoin is called satoshi, which allows it to be used in transactions of any value, including microtransactions. This makes Bitcoin an extremely practical solution as digital money.

ULTRA DIVISÍVEL



0,00000001 BTC

1 satoshi = 0,00000001 Bitcoin

100.000.000 satoshis = 1 Bitcoin

Satoshi é a menor unidade de Bitcoin.

With the dollar or real, you need more notes over time because these currencies lose value. With Bitcoin, the opposite happens: as it appreciates, you need fewer units to buy the same things. This is why Bitcoin is extremely divisible, with multiple decimal places, to make it easier to price goods and services as smaller fractions of it are used.

- **What is a satoshi?**

A Bitcoin is made up of **100 million satoshis**, with the satoshi being the smallest unit of Bitcoin. To understand better, imagine that a Bitcoin is like a pizza that can be cut into 100 million slices. When you buy 50, 100 or 1,000 reais in Bitcoin, you are actually buying several satoshis.

- **Simple conversion:**

One satoshi is equivalent to **0,000 000 01 BTC** (seven zeros before the number 1).

On the other hand, **1 Bitcoin** is equal to **100 million satoshis**, just as 1 real is made up of 100 cents.

- **Satoshi value today:**

Currently, a satoshi is worth less than one cent of reais, around 0.001 tenth of a cent. In the future, as Bitcoin continues to appreciate and the real depreciates, it is possible that a satoshi will be worth the same as a cent or even a real. This reflects the strength of Bitcoin as a store of value and medium of exchange as it absorbs value, it becomes easier to price products and services.

PROPRIEDADES MONETÁRIAS

	Durabilidade	Divisibilidade	Fungibilidade	Portabilidade	Verificabilidade	Escassez	Aceitação
	-	+	-	+	-	-	-
	+	-	+	-	-	+	+
	+	+	+	+	+	+	-

Fungibility is the property of money in which all its units are equivalent and can be exchanged for each other, regardless of their origin or history. This ensures that the money is universally accepted without discrimination between units.

- **Fiat:** Fiat currencies are not completely fungible. For example, **1 real is not equal to 1 dollar** and the currencies of different countries are not interchangeable. Although within a country a 10 reais note is the same as another 10 reais, the dollar, for example, is not accepted as currency in all countries.
- **Gold:** Gold is highly fungible. One ounce of pure gold is always equal to another ounce of pure gold, regardless of where you are in the world. This makes it more fungible than fiat currencies.
- **Bitcoin:** Bitcoin is also fungible. One Bitcoin is the same as any other Bitcoin, regardless of where it was transacted or its history. This characteristic is essential for its global acceptance as digital money.

PROPRIEDADES MONETÁRIAS

	Durabilidade	Divisibilidade	Fungibilidade	Portabilidade	Verificabilidade	Escassez	Aceitação
	-	+	-	+	-	-	-
	+	-	+	-	-	+	+
	+	+	+	+	+	+	-

Portability is the ability of money to be easily transported and stored, allowing its use in transactions in different places and situations.

- **Gold:** While coins and small amounts of gold are portable, large volumes, such as millions in gold bars, are heavy and expensive to transport and store. To move gold bars between countries, it is common for central banks to melt them to verify their authenticity. Furthermore, transportation involves high logistics and security costs.
- **Fiat:** Fiat money is more portable than gold. Paper notes or metallic coins are lightweight and easy to carry, making them practical for daily transactions. It's like a contract with an assigned value, represented in physical form. Not to mention that fiat money has become digitalized, becoming even more portable.
- **Bitcoin:** Bitcoin surpasses everyone in this aspect. Because it is digital, it weighs nothing, takes up no physical space and can be transported globally in a matter of seconds. Whether it's a small fraction or billions of dollars worth of Bitcoin, transportation is equally fast, secure and efficient as long as you have access to your private key. It is the most portable form of money ever created, because in addition to being digital and not weighing, it does not depend on anyone's permission to move across borders.



US NEWS

Plane passenger caught smuggling gold nuggets in rectum to avoid taxes

By Yaron Steinbuch
Published Oct. 16, 2020 | Updated Oct. 16, 2020, 12:23 p.m. ET



Indian customs officials say they found about 2 pounds in bullion shaved into a man's rectum
Comptrollerate of Customs (Preventive), Cochín

A portability It's a big challenge for analog assets like real estate or commodities. For example, you cannot move land, and even a house could only be moved with great effort, as shown in the image on the left.

With gold, the situation is also complicated. You cannot transport it on a plane without informing third parties that you are carrying this wealth, which compromises privacy and involves bureaucracy.

Bitcoin, on the other hand, is unrivaled in portability. Because it is natively digital, it can be transported instantly, without relying on intermediaries or complicated processes, it is the most portable money and asset in the world.

PROPRIEDADES MONETÁRIAS

	Durabilidade	Divisibilidade	Fungibilidade	Portabilidade	Verificabilidade	Escassez	Aceitação
	-	+	-	+	-	-	-
	+	-	+	-	-	+	+
	+	+	+	+	+	+	-

Verifiability is the ease with which money can be identified and authenticated as legitimate. This property is essential to prevent fraud and forgery. The simpler and more reliable the verification process, the cheaper and more practical it is to use money as a store of value and medium of exchange.

- **Fiat:** Fiat money is relatively easy to counterfeit, so much so that counterfeit notes frequently circulate on the market. This forces merchants and consumers to learn basic identification techniques, such as checking watermarks or security elements on banknotes.
- **Gold:** In the case of gold, verifiability is more complex. Historically, practices such as biting into gold to check its authenticity (observing a mark on the metal) were common but rudimentary. Modern methods such as chemical or density testing are still required, which makes the process expensive and time-consuming.

The ease of verifying the authenticity of money is essential to ensure trust and efficiency in everyday use.

Business

Chinese Jeweler Probed for Using Fake Gold Bars for Loans

By Yvonne Yue Li
July 15, 2020, 8:30 AM PDT
Updated on July 15, 2020, 12:12 PM PDT

- Government investigating 'integrity of gold'; U.S.-listed firm
- Scale of alleged fraud 'simply staggering,' ex-Mint chief says

at that. Would you look at that?

Even gold can be counterfeited, and this reveals important limitations in its verifiability. There are several examples of fraud involving gold, such as:

Tampered Gold Bars: Some bars stored even in central bank vaults have been found with tungsten in the core, coated only with a layer of pure gold.

Coins and jewelry: Gold-plated coins and jewelry made with low-quality metal alloys but sold as pure gold are common scams.

Checking the authenticity of gold is expensive and complicated. The process often requires specialized equipment or chemical testing, as well as certificates issued by trusted third parties. This makes it more expensive and difficult to use as money, especially on a large scale.

These limitations make gold less efficient in verifiability when compared to Bitcoin, whose authenticity can be proven instantly by anyone using a wallet app or software connected to the network.

VERIFICAÇÃO INDEPENDENTE

```
admin@raspberrypi:~ $ bitcoin-cli gettxoutsetinfo
{
    "height": 622752,
    "bestblock": "000000000000000000000b412304c9d4fcfd66c9f5a142a091cf74e90f3dd4901d2",
    "transactions": 39573460,
    "txouts": 66638662,
    "bogosize": 5005621034,
    "hash_serialized_2": "48b8adeald3d57c0e4263537fb5e46e0c4e0930199c494207ea434de89a64fd4",
    "disk_size": 4019686684,
    "total_amount": 18284229.82099991
}

1068 CAmount GetBlockSubsidy(int nHeight, const Consensus::Params& consensusParams)
1069 {
1070     int halvings = nHeight / consensusParams.nSubsidyHalvingInterval;
1071     // Force block reward to zero when right shift is undefined.
1072     if (halvings >= 64)
1073         return 0;
1074
1075     CAmount nSubsidy = 50 * COIN;
1076     // Subsidy is cut in half every 210,000 blocks which will occur approximately every 4 years.
1077     nSubsidy >>= halvings;
1078     return nSubsidy;
1079 }
1080
```

The Bitcoin It is extremely easy and cheap to verify, thanks to its digital and decentralized nature. Unlike other types of money, there is no room for counterfeits:

Transactions are safer because Bitcoin wallets automatically reject fake coins. It is not possible to send or receive "fake Bitcoin" because the network validates all transactions before confirming them.

Verification is global. With a simple computer command, anyone can verify the authenticity of not just a single Bitcoin, but all currencies already existing on the network. This includes the total supply of Bitcoins and the rate of issuance of new coins, ensuring absolute transparency.

This radical transparency is something that has never been offered by any other monetary system in history. All participants have equal access to information about the state of the network, eliminating the need to trust intermediaries or centralized institutions. There is no information asymmetry on the Bitcoin network, records are public and verifiable by anyone.

PROPRIEDADES MONETÁRIAS

	Durabilidade	Divisibilidade	Fungibilidade	Portabilidade	Verificabilidade	Escassez	Aceitação
	-	+	-	+	-	-	-
	+	-	+	-	-	+	+
	+	+	+	+	+	+	-

Scarcity refers to the difficulty of creating new units of money. It is an essential property to protect the value of an asset over time.

Fiat currencies are not scarce. Central banks can print money unlimitedly, which often results in inflation, devaluation and loss of purchasing power. This lack of scarcity is one of the main weaknesses of fiat money.

Gold is relatively scarce because its extraction depends on physical processes and limited resources on Earth. However, the discovery of new mines or technological advances can increase its supply over time, which reduces its predictability compared to Bitcoin.

Scarcity is a crucial factor in determining a money's resistance to inflation and its ability to preserve value.

NOVAS JAZIDAS DE OURO



Although it is extremely difficult and expensive to produce gold in the laboratory, the global supply of gold continues to grow due to the constant discovery of new deposits. Advances in mining and technology allow the extraction of gold from previously inaccessible locations, which gradually increases the amount available on the market.

This unpredictability in the supply of gold, although limited, means that it is not completely scarce, as its quantity can be expanded over time. This differentiates gold from Bitcoin, whose supply is fixed and known from the beginning, and is even more predictable as a store of value.



In addition to onshore deposits, new frontiers for gold mining are being explored, such as asteroid mining and others ocean mining. These futuristic technologies seek to extract resources from previously inaccessible locations:

Some asteroids contain large amounts of precious metals, including gold. Space companies are already developing technologies to exploit these resources in the future. The seabed is also a potential source of gold and other valuable metals. Projects are underway to enable the extraction of these submerged deposits.

Although these technologies are still in their early stages, they represent the possibility of significantly expanding the supply of gold in the future, reducing its scarcity.

Did you know this asteroid is full of gold and costs a whopping \$100,000 quadrillion

TOI Lifestyle Desk / etimes.in / Updated: Jul 29, 2024, 09:21 IST

The asteroid 16 Psyche, valued at \$100,000 quadrillion for its precious metal content, intrigues scientists and space enthusiasts. NASA's Psyche mission, launched in 2023, aims to explore this unique celestial body, potentially the exposed core of a protoplanet. However, challenges such as nascent mining technology and

An artist's rendition of the asteroid 16 Psyche which has an incredible worth of \$100,000 quadrillion. Source: NASA

The asteroid 16 Psyche, located in the asteroid belt between Mars and Jupiter, has captured the imagination of scientists and space enthusiasts alike. This metal-rich asteroid is estimated to be worth a staggering \$100,000 quadrillion due to its abundant reserves of precious metals, including gold, platinum, and nickel. Discovered in 1852 by Italian astronomer Annibale de Gasparis, 16 Psyche is about 140 miles in diameter, making it one of the largest asteroids in the asteroid belt.

Reports like this show that there are asteroids full of precious metals, including gold, with estimated values of 100 thousand quadrillion dollars. If space mining becomes viable, it could completely eliminate gold shortage, one of its main monetary properties.

As gold became abundant, it would lose its ability to act as a reliable store of value. This would narrow it down to more specific uses, such as in jewelry making, where its shine and beauty remain desired, or in industrial applications, such as in the production of electronic chips due to its excellent conductivity.



Ocean mining is becoming another major technological frontier, with countries like **Norway** already exploring the feasibility of extracting gold and other precious metals from the ocean floor. This advance, however, is generating intense debates with environmentalists, who warn of the significant ecological impacts of this activity.

Although ocean mining still faces technical and ethical challenges, it is likely that, over time, technological advances will make these operations more viable. This could lead to a gradual increase in the supply of gold, making it increasingly less scarce.

This scenario reinforces the fragility of gold as a long-term store of value as technology advances.

BITCOIN MATEMATICAMENTE ESCASSO

$$\sum_{i=0}^{32} 210,000 * \left[\frac{50}{2^i} \right]$$

Unlike gold, Bitcoin it does not depend on external factors to maintain its scarcity. Your maximum offer of 21 million units it is fixed and has been programmed since its creation, ensuring that this fundamental characteristic will never be compromised, regardless of technological innovations or future discoveries.

Bitcoin is mathematically scarce. This equation reflects how your supply is calculated and how it tends to become increasingly limited over time. In the next class on halvings you will understand this equation in detail, but the main point is simple: Bitcoin is absolutely scarce, while other types of money, commodities or assets are only relatively scarce.

Gold scarcity is based on statistical estimates and limited data, subject to change with the discovery of new deposits or advances in mining. This inevitably increases supply over time. Fiat money can be printed indefinitely by central banks, eliminating any notion of scarcity.

In the case of Bitcoin, the supply is unchangeable. It is possible to accurately predict how the issuance of new bitcoin will happen decades before, something that no traditional currency or asset can offer. This transparency and predictability make Bitcoin much more reliable and stable as a store of value, contrasting sharply with other financial market assets.

BITCOIN MAIS ESCASSO QUE O OURO

Asset	Total Stockpiles	Ann. Supply Increase	Annual Inflation	Stock-to-Flow Ratio
U.S. Dollars (M2, billions)	20,757	1,591	7.5%*	13.3
Bitcoin, today	19,478,625	328,500	1.70%	59.3
Gold (metric tons)	187,000	2,500	1.34%	74.8
Bitcoin, after 2024 halving	19,687,500	164,250	0.83%	119.9

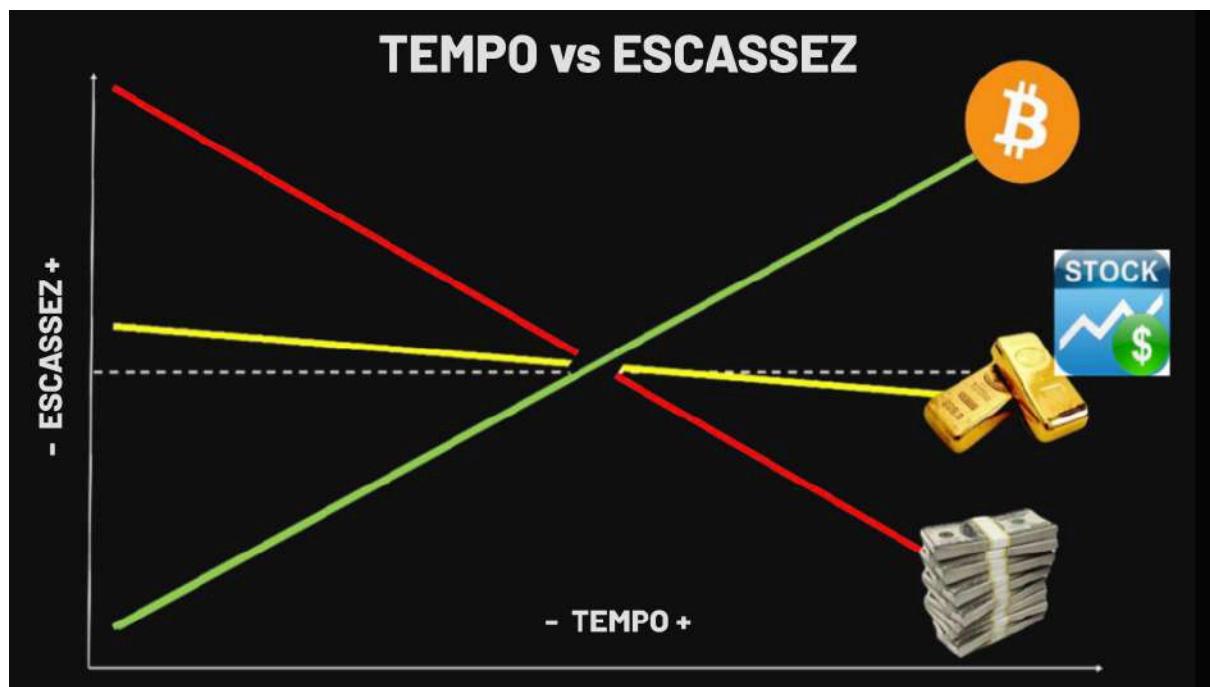
*based on 10 year average



In 2024, Bitcoin officially became scarcer than gold, according to metric stock-to-flow (S2F). This metric is widely used to measure the scarcity of an asset, calculating the proportion between the total available stock (stock) and the quantity produced annually (flow). Assets with a high S2F, such as gold and Bitcoin, have a limited supply, which makes them more valuable due to the difficulty of obtaining them.

In the case of gold, its relative scarcity is tied to its annual production, which depends on factors such as land mining and, potentially, ocean or space mining in the future. Bitcoin is programmed to become increasingly scarce over time, thanks to its halving mechanism, which halves the issuance of new bitcoins every four years. This process ensures that, over the years, the supply of new bitcoins decreases drastically, increasing its stock-to-flow ratio.

Bitcoin's overtaking of gold in terms of S2F cements its position as the world's rarest asset. This is very significant because scarcity is a critical factor in preserving monetary properties. Bitcoin's predictability and increasing scheduled scarcity make it a more robust store of value, and its high S2F suggests it has enormous potential to continue appreciating in value in the future as demand for a truly scarce asset increases.



In short, Bitcoin's scarcity tends to become greater over time, while gold and other assets tend to become less scarce. Fiat money is not scarce at all, which is why it has lost its value in all countries according to the current fiat standard.

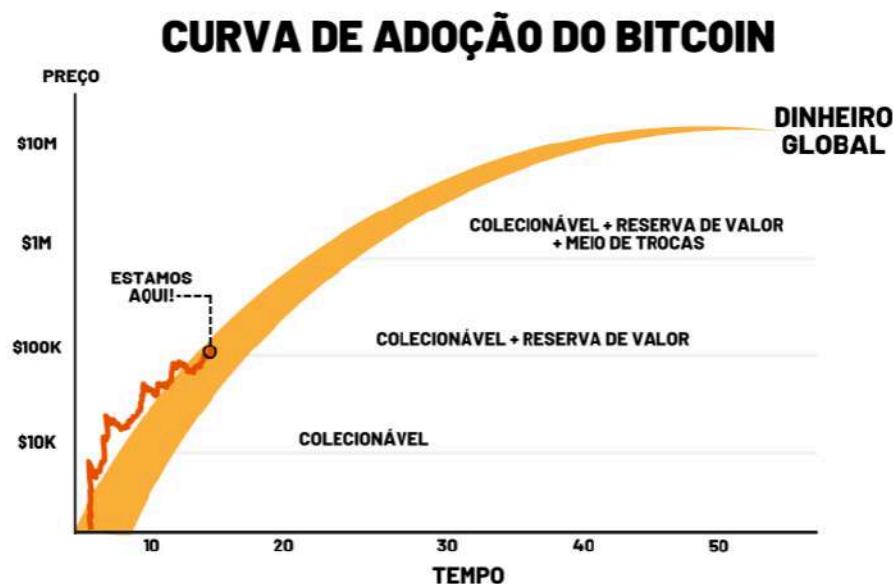
PROPRIEDADES MONETÁRIAS

	Durabilidade	Divisibilidade	Fungibilidade	Portabilidade	Verificabilidade	Escassez	Aceitação
	-	+	-	+	-	-	-
	+	-	+	-	-	+	+
	+	+	+	+	+	+	-

The last monetary property is the acceptance, which measures the level of adoption and how much people recognize something as money. In the case of currencies fiat, acceptance is limited. Each country has its own currency, and it is not always recognized or accepted outside its borders. This creates barriers in international transactions, making it difficult to be universal as money.

Gold, on the other hand, has already had wide acceptance in the past and has established itself as solid money throughout history. To this day, it is recognized globally as a store of value, although its use as a medium of exchange has declined with the emergence of fiat currencies.

Bitcoin is still in the acceptance process. It is not widely recognized as money or a store of value by all people, companies and countries. However, this scenario is changing. In recent years, governments, large companies and investors have started to adopt Bitcoin and recognize it as a legitimate form of digital asset or money. Although it is not yet global unanimity, that does not mean it never will be. The growth in acceptance also reflects the trajectory of evolution as a new monetary paradigm.



Bitcoin has made significant progress in adoption curve, and others Lindy curve It illustrates well the stages that money goes through until it becomes a global standard. This model explains how Bitcoin is evolving:

1. In the beginning, money is born as a collectible, something that few people value or accumulate out of curiosity or vision of the future.
2. Over time, it consolidates as a store of value, being recognized as a reliable way to preserve wealth.
3. The next stage is to be used widely as a medium of exchange, facilitating everyday transactions.
4. The final stage occurs when people begin to price goods and services directly in Bitcoin, indicating that it has become a global monetary standard.

This chart shows that, although Bitcoin is still far from being a global standard, it has already advanced considerably. The recent milestone of reaching 100 thousand dollars it is a reflection of growing acceptance as a store of value. Governments and institutions around the world are starting to recognize its potential. In the United States, for example, there are

discussions about creating a Bitcoin strategic reserve, and other countries are heading in the same direction.

The crucial point is that we are still at an early stage of this technological revolution. THE great opportunity of the century it's the ability to accumulate and engage with Bitcoin now, while its global adoption is just beginning. The current moment represents the chance to participate in this transformation and technological revolution that is consolidating itself as the money of the future.

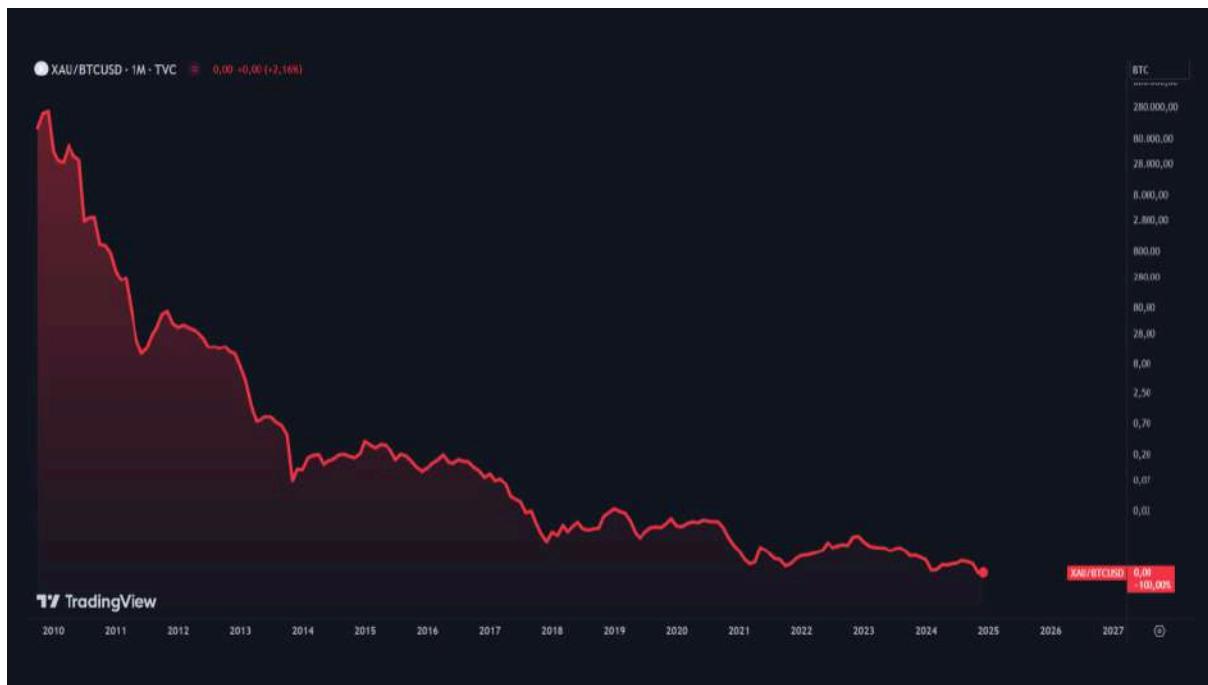
A GRANDE DIFERENÇA



Bitcoin is superior money because its purchasing power increases over time, while the opposite happens with fiat money. With fiat currencies, such as the real or the dollar, the value constantly decreases due to inflation and the rampant printing of new units by central banks. This means that the same notes buy fewer and fewer goods and services over the years.

Bitcoin follows the opposite path. Its limited and scheduled supply of 21 million units means that, as its adoption grows and demand increases, its value and purchasing power will also increase. Historically, those who kept Bitcoin saw their purchasing power grow, in contrast to those who kept their savings in fiat currencies, which continually lose value.

This difference reflects one of the main advantages of Bitcoin: it is money designed to value and protect the purchasing power of its users over time, something that fiat money, due to its inflationary nature, has never been able to offer.



Hence gold is gradually being demonetized for the Bitcoin over the years. When priced in Bitcoin, gold practically lost 100% of its value, highlighting how digital currency is replacing gold as the preferred store of value in the market.

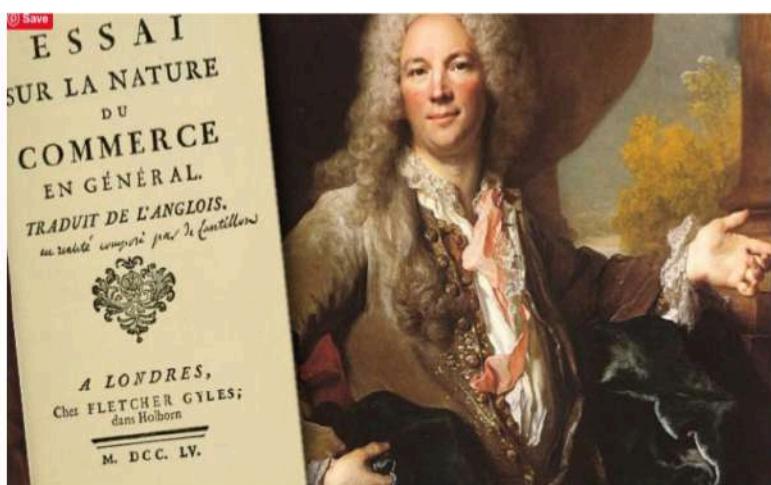
Bitcoin is not just an evolution of gold as a store of value; it is a top money for having significantly better monetary properties. While gold faces limitations such as portability, divisibility and verifiability, Bitcoin overcomes all these barriers with its digital nature, programmed absolute scarcity and ease of transfer and storage.

This transformation reflects how Bitcoin is redefining the concept of money, offering a modern, efficient and globally accessible alternative, in contrast to gold and fiat money, whose limitations are increasingly evident in a digitalized world.

BITCOIN É UM DINHEIRO MAIS JUSTO

Another important point of this class is that Bitcoin is better money because it is fairer money.

EFEITO CANTILLON

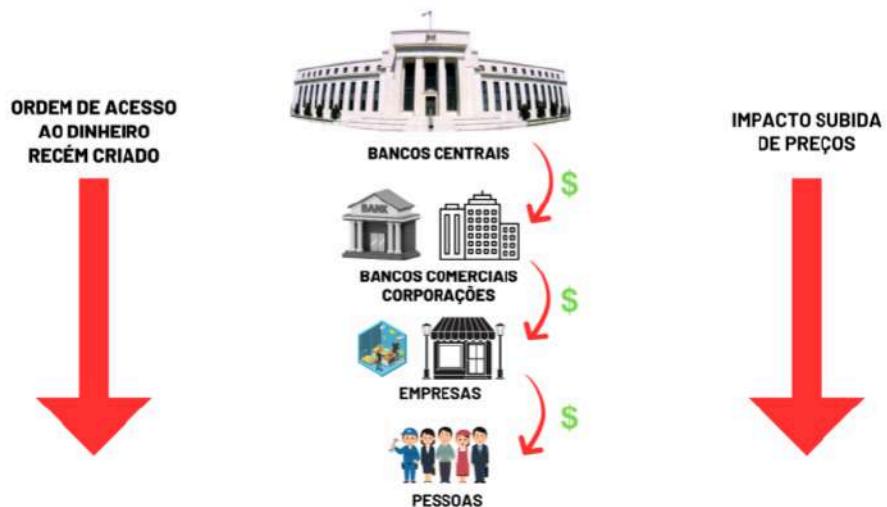


Fiat money suffers from a phenomenon called the Cantillon Effect, described by Richard Cantillon in 1730 in the book *The Cantillon Effect*. This concept illustrates how those closest to the source of new money creation benefit disproportionately, while those furthest away are harmed.

In the past, the creation of money was controlled by kings, who first distributed it to dukes, nobles, and other close allies. These "king's friends" used the new money to acquire goods and assets such as horses, houses and gold before prices were impacted. As the newly created money circulated throughout the economy, it generated price increases. When it finally reached the hands of ordinary people — the poorest — their purchasing power had already been deeply eroded. Thus, the people at the end of the circulation chain were always the most harmed. The money that reached them was already outdated, and its real value was much lower.

Now, replace the "king's friends" with banks, investment funds and large corporations, and you will see that the system still works in a very similar way. Central banks create new money and distribute it first to financial institutions and large companies. These agents, with priority access, buy assets and products before price increases spread throughout the economy. Meanwhile, ordinary people — at the end of the line — receive money that is already devalued, with less purchasing power.

FLUXO DO DINHEIRO NOVO ATRAVÉS DO SISTEMA



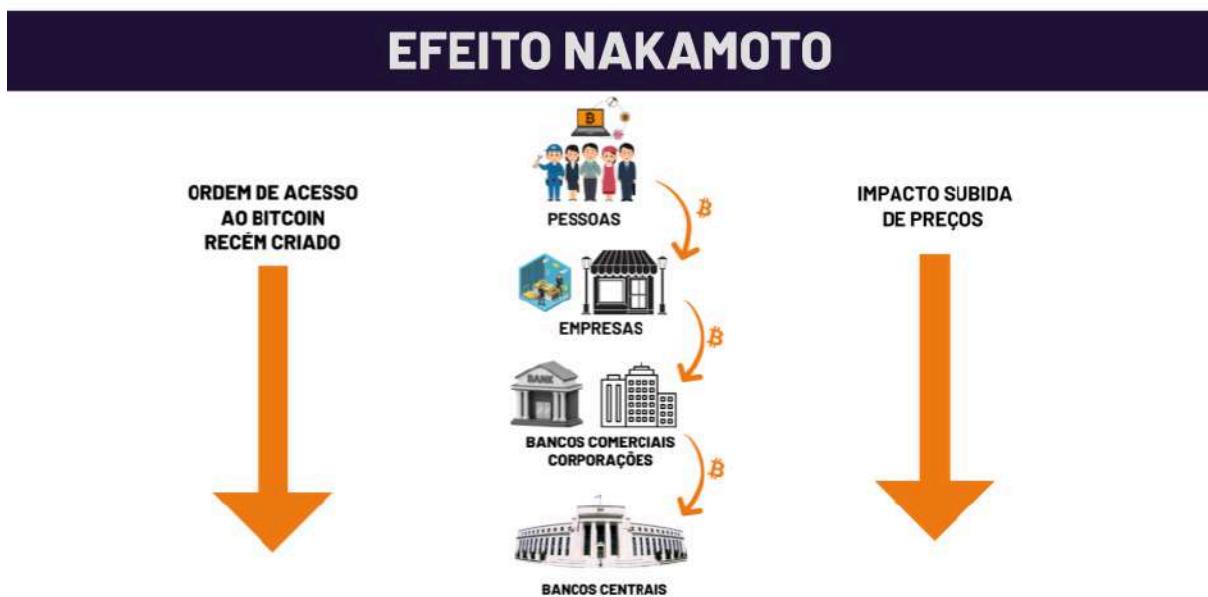
In the modern world, money still follows the same flow observed in the times of kings, but with updated characters. Now, central banks create money and the first to receive it are the big banks and corporations. These actors use the newly created money to invest in or repurchase their own assets, such as stocks. Then, the money is directed to pay executives, directors and other closer sectors. Finally, it reaches employees and customers at the economic base.

This flow explains why those who receive the money first are better able to protect their purchasing power: they have access to the money before prices rise. On the other hand, those at the end of the line, generally the poorest population, suffer the consequences. When the money finally reaches them, the prices of goods, services and assets have already increased, making everything more expensive and unaffordable.

The Cantillon Effect exposes this unfair dynamic. The closer you are to the "money printer", the more you benefit from it, you are less impacted by the dilution and devaluation caused by newly created money. Meanwhile, the poorest people are the most harmed. They receive money that is already devalued and face high prices, including in assets that could protect them, such as real estate or investments. These assets have already received an injection of capital in previous stages, becoming even more expensive and inaccessible for those at the end of the line for new money.

This effect is perverse because it traps people in a vicious cycle of devaluation and impoverishment. Many feel they work tirelessly but are unable to accumulate wealth as the value of their earnings is constantly eroded. This explains why the biggest cause of poverty and inequality in the world today is related to the way central banks and governments handle money and their monetary policies.

These same central banks and governments have the sole power to print money and trigger this cascade of events, which benefits fiat banks and corporations and penalizes the majority of the population, perpetuating the economic abyss.

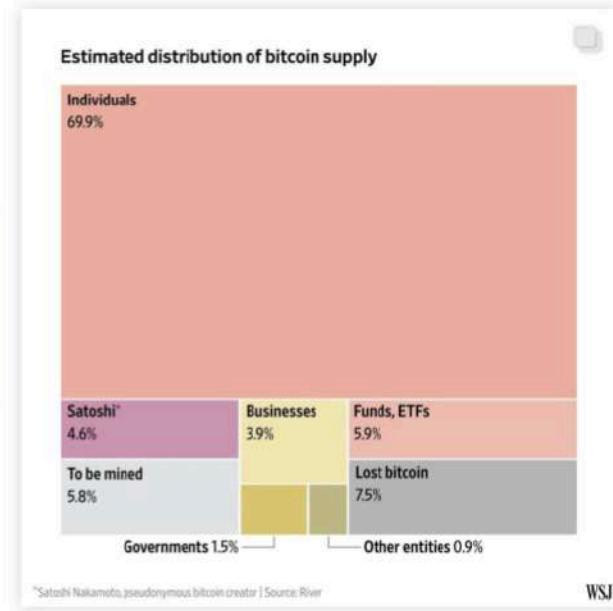


Bitcoin reverses the Cantillon Effect because it does not depend on printing presses controlled by governments or central banks. There is no way to print more Bitcoin and dilute the circulating supply. Inverting the fiat logic, it ends up generating more value for those furthest from the printers: first for ordinary people, who began to accumulate Bitcoin individually, then for companies, later for banks and corporations and, only recently, for governments, which they are beginning to recognize its importance and are finally "giving their hand".

This dynamic is revolutionary, because it redistributes economic power organically. As Bitcoin appreciates, it offers an alternative to the traditional system, freeing people from the vicious cycle of devaluating fiat currencies — the so-called "rat wheel", where one works endlessly just to maintain purchasing power in an inflationary system.

By accumulating Bitcoin, people become less dependent on money controlled by governments and central banks, which constantly loses value like a melting ice cube. Bitcoin represents a way of preserving wealth that empowers individuals and not the cantillionaires who benefit from proximity to central banks and governments. It is a route to escape the economic traps imposed by the fiat system.

DISTRIBUIÇÃO DA OFERTA DE BITCOIN



A Bitcoin distribution over time reflects how it is fairer and decentralized money. At the moment:

- Practically 70% of bitcoins are in the hands of individuals, showing that the majority of ordinary people are the main holders.
- 3.9% are with companies and businesses who use or invest in Bitcoin.
- 5.9% are in ETFs and funds, representing the entry of institutions into the ecosystem.
- 1.5% belong to governments, who are only now beginning to recognize Bitcoin.
- 7.5% are lost due to people not taking good care of their private keys.
- 4.6% are at addresses belonging to Satoshi Nakamoto, which never moved or sold its balances, keeping them out of circulation.
- 5.8% still remains to be mined, being distributed gradually until the year 2140.

CRIAÇÃO JUSTA DO BITCOIN



TRANSPARENTE

21M

PREVISÍVEL



LIVRE ACESSO



UNIVERSAL

Bitcoin is fairer money because its supply cannot be manipulated — it is impossible to “print” more bitcoin. Since its inception, Bitcoin’s monetary policy has been transparent and predictable, with everyone knowing exactly how and when new bitcoins would be issued, even before the first block was mined.

The creation of Bitcoin was accessible and fair. Anyone can connect to the network, become a miner and compete to issue new bitcoin using computing power. This activity is global and decentralized, without prioritizing any specific region or entity.

Unlike any other monetary system created, Bitcoin does not depend on intermediaries, does not favor elites close to power and offers a fairer alternative for individuals anywhere in the world where the rules are clear, predictable and equal for everyone. Everyone follows the same rules, without exception.

EFEITO DE REDE



Bitcoin is incredibly powerful because it has the greater global network effect already seen in the monetary field. It is an independent global monetary network, without control of any country or government. No government or entity can monopolize, censor, or outright ban Bitcoin because it is decentralized and supported by a global infrastructure of independent users, miners, and verifiers.

Network effect of Bitcoin is unparalleled, surpassing any monetary network past or present. The more people and initiatives adopt Bitcoin, the stronger and more valuable the network becomes, creating a cycle of exponential growth resistant to external interference.

This combination of independence and network effect makes Bitcoin a revolution in the concept of money, being much more robust and resilient than any monetary system ever created. This is why Bitcoin is better money, because it is not just money, it is a superior financial system.

BITCOIN É 3 EM 1



MOEDA



BANCOS COMERCIAIS



BANCOS CENTRAIS

After all, Bitcoin is 3 in 1. Fiat money is fragmented. Currencies are fragmented, each country has one, commercial banks are the access network for fiat money and have their own corporate interests and the central bank defines monetary policies and even distributes the currency through the banks.

Bitcoin is best at these three functions.

BITCOIN É 3 EM 1



MOEDA



BANCOS COMERCIAIS



BANCOS CENTRAIS

Bitcoin is money that does not lose value, on the contrary, it gains, bringing more prosperity to everyone. Bitcoin has a monetary network without depending on any bank, without agencies, without a manager, without requesting any personal data. Just download a wallet and you can receive bitcoin from anywhere on the planet without any barriers. And Bitcoin is

better than any central bank because it gives more predictability, transparency and guaranteed preservation of wealth and property than any central bank has ever given. That's why Bitcoin is not only better money, but a better and fairer monetary system globally. It benefits all countries and not just those who have the current reserve currency.

BITCOIN É 3 EM 1



DINHEIRO



REDE P2P



POLÍTICA MONETÁRIA
INDEPENDENTE

Bitcoin is independent money, an independent financial network and an independent, immutable and borderless monetary policy.

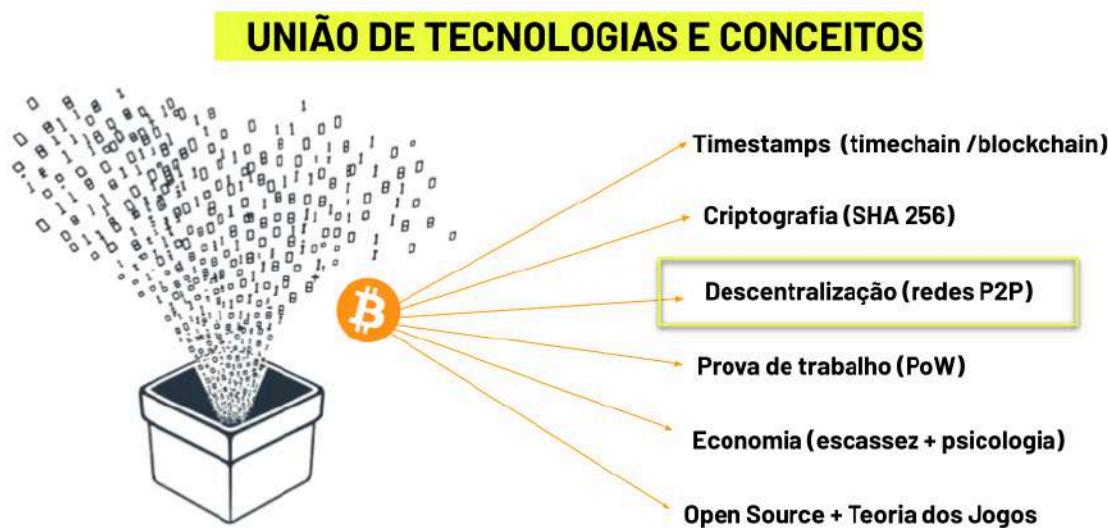
It is for all this that Bitcoin is seeing more and more adoption and should continue to do so, feeding back all of its monetary properties that we talk about here in this class.

Next time we will understand how bitcoin works in detail and you will look inside the protocol. Let's dive into how mining works, blockchain, halvings, nodes and much more, which will be the subject of the next class. See you there.

4- Inside Bitcoin: how does Bitcoin work? (decentralization, blockchain, game theory)

In this class you will delve into how Bitcoin works, learning about its characteristics, how the blockchain works, mining, halvings and fundamental technical concepts. This class is the entire basis of how Bitcoin works.

Don't worry if you don't understand everything at first! It is normal to need to review and re-watch a few times for the learning to solidify. Over time, the concepts will fit together and make more and more sense.



As you saw in class 1, Bitcoin is the combination of several technologies and concepts. Decentralization is what separates Bitcoin from any other invention in recent history.

DESMATERIALIZAÇÃO E DESCENTRALIZAÇÃO



Tecnologia desmaterializa funções



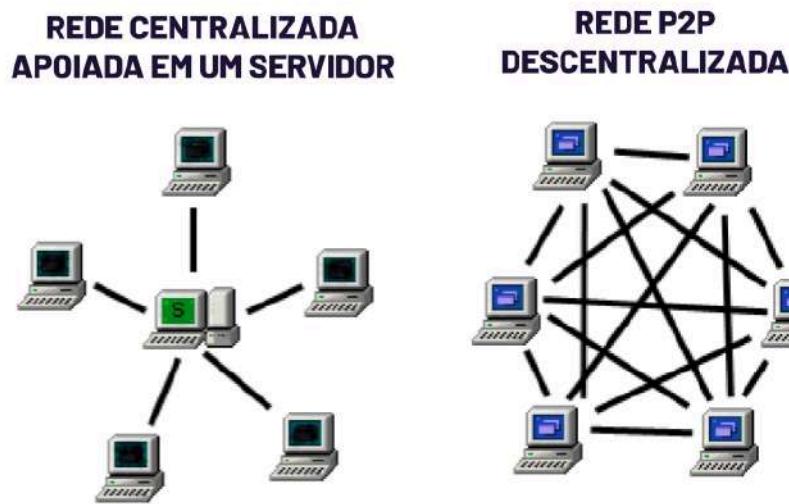
Descentraliza o acesso a valor
e desmaterializa o sistema
financeiro global

A internet do valor

And what has been happening in recent decades is the action of two technological forces at the same time: the decentralization and dematerialization of things. Dematerialization began in the 90s with computers and smartphones, which condense and dematerialize various devices that we previously only knew in physical form. Radio, diary, television, camera, calculator, fax, mail, all of this in just 20 years was dematerialized and digitized into the palm of your hand, on your cell phone. It turned everything into one.

Bitcoin continues this evolutionary and technological change bringing both these effects to the economy and money. In other words, bitcoin decentralizes access to value for anyone from anywhere in the world without access restrictions and also dematerializes a banking financial system of branches, safes, ATMs and safe deposit boxes. And if the internet has already decentralized information and changed the world, imagine what Bitcoin cannot do by decentralizing value, dematerializing central banks, commercial banks and the properties of solid

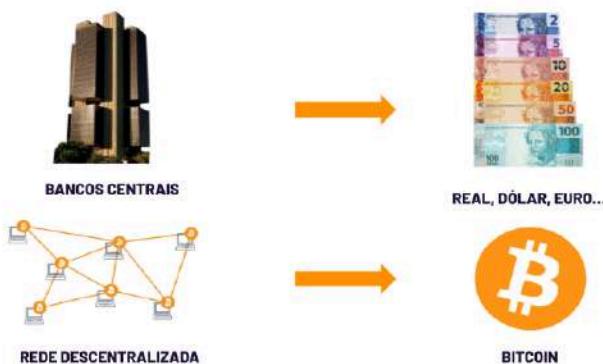
money.



Bitcoin can only do this because it is decentralized. Without decentralization Bitcoin would be a company. It is decentralization that sets Bitcoin apart from everything else and provides immutability. If there is no one making decisions for other people, it is a network that is difficult to change. For a change to be made, almost all participants need to agree to change. And this is not easy either in Bitcoin or in any system that involves thousands of human beings making decisions. Decentralization is what guarantees the immutability of properties and that bitcoin rules will follow the same. It brings confidence and predictability that no one could monopolize or corrupt bitcoin.

Bitcoin's decentralization happens because it is a P2P, peer-to-peer network. It is made up of computers that connect to each other and follow rules that everyone agrees with. There is no central server coordinating or storing the data. They all store the data and coordinate with each other. This also means that there is no single point of failure. If any computer connected to the network falls, is destroyed or attacked, the network survives and continues to function because there are thousands of others fulfilling the same function.

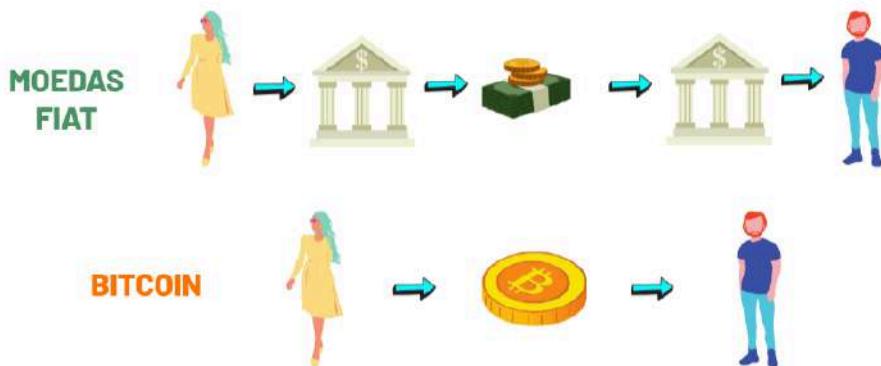
CENTRALIZADO vs DESCENTRALIZADO



In practice, this means that there are no intermediaries in Bitcoin. Each person can connect to the network without depending on anyone, without needing to ask for permission and without the possibility of being excluded by third parties. Unlike fiat money, which is centralized and you depend on numerous entities, minister of economy, director of the central bank, payment institutions, mint, banks, etc. to access the system.

Central banks determine monetary policies and you don't have the option of not following the rules, you are forced to. Hence the expression "forced course" comes from. Commercial banks give access to the system, to participate you need to ask for permission and if you don't meet the requirements you may not have a bank account or they may even close your account.

FIAT vs BITCOIN



Another big difference is when making transactions. Currently, when you make a digital transaction you need to ask your bank to send an amount to another person's bank, and then that person's bank deposits the amount into the corresponding account. In a transaction between two people using the fiat banking system, there is at least one intermediary, a bank, between you

and me. If we have accounts at different banks, then there will be two banks intermediating this transaction.

Through Bitcoin, it is possible to carry out digital transactions without the need for banks between two people. It's like making a physical money transaction, just like when you buy a product and hand the bills directly into the other person's hand. With bitcoin you send the amount directly to someone else's wallet without going through any type of fiat intermediary or bank. Unless you want it to happen, you choose to transact through brokers, for example, but it is a choice, not a mandatory route. This completely changes the way the financial system works, because today the fiat system depends on these intermediaries to transfer values online.

It was through cryptography, timestamps, p2p networks and a robust consensus mechanism that Satoshi managed to digitize the financial system as a whole, but without needing governments or banks.

COMPONENTES DA DESCENTRALIZAÇÃO



CÓDIGO
(CONSENSO E COORDENAÇÃO)



MINERADORES
(CONSENSO E COORDENAÇÃO)



NODES
(DESCENTRALIZAÇÃO E VERIFICAÇÃO)

The Bitcoin network is made up of code, a set of programming rules that guide participants to coordinate between transactions. The code determines how records will be made and how the bitcoin blockchain should work. The code is public and anyone can suggest modifications, audit it to find bugs and even copy it. It is this code that is difficult to modify and monopolize because there is no single place storing the records. The code is run by thousands of participants and to modify it, practically the entire network must agree to run the modified version.

You can check out the bitcoin github where developers discuss updates and where you can also contribute if you want. I will leave the link of bitcoin here below the class. The code works through software and the most used is Bitcoin Core, an implementation of the original version created by satoshi nakamoto.

Miners are the participants who propose blocks, insert transactions and defend the network from attacks through computational power. They are the first to receive Bitcoin from the network for each block mined.

And the third type of network participant are nodes. Nodes are common computers that check whether miners are following the consensus determined by the code. Nodes are powerful agents of decentralization because it is from them that anyone can have a copy of the blockchain, decide which version of the code to run and be part of the bitcoin network with autonomy to send their own transactions. Even if miners come together to attack bitcoin, it is the nodes that have the power to prevent this attack from being effective. This has even happened on the call [blocksize war](#) which took place in 2016.



It is the thousands of nodes on common computers connected together that make the Bitcoin network the strongest, most resilient and accessible computing system for anyone anywhere in the world to verify. Anyone can run a node and the cost is low, today you can run a node even on an old computer you have at home.

Nodes check records all the time, that's why the bitcoin network's accounting is round, because nodes constantly check whether transactions close and whether the number of coins circulating is correct. It is a distributed system of records, in which the accounting always matches correctly, this is also something powerful and unique.

Central banks, for example, do not allow you to look at their internal accounts, and this will not change with the arrival of CBDCs, central bank digital currencies, nor with DREX or the digital dollar. Central bank accounting is shielded. In Bitcoin, anyone can audit the network because it is freely accessible.



Centralized structures are hierarchical, like a company: there is a CEO, someone making decisions about the next steps, there is a marketing team, a research development team, etc. and they are all paid by this hierarchy of power. Companies compete with each other to gain market share. Cryptos are like companies and compete with each other for market share by selling utility, like companies do.

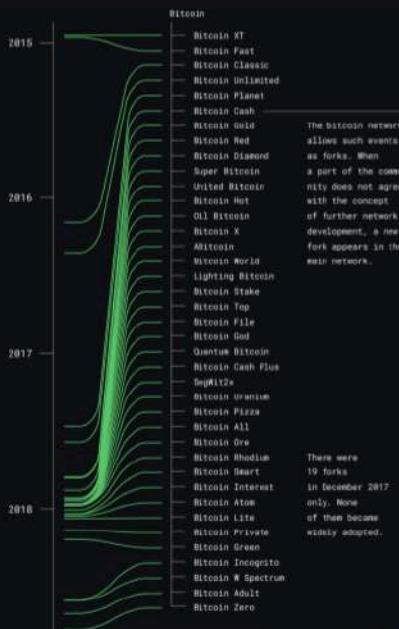
Bitcoin is horizontal, it is collaborative, it simply exists and allows anyone to enjoy and participate in the network. There is no one determining where the protocol goes, what the next update will be. It is the collective of users, nodes and miners that define which versions of the protocol will run without even them agreeing among themselves. This is why Bitcoin has no competitor, nothing works like it. Bitcoin embraces adversarial thinking and uses these individual incentives to strengthen the network as a whole.

And that's why Bitcoin is so resilient and open, there's no way to censor or prevent people from accessing it, even if they disagree with each other. Unlike banks that close user accounts all the time and constantly change the rules.

Many protocols even claim to be decentralized, but when you analyze them deeply, they are the opposite: they are like companies. It has leaders, has concentrated decision-making power, is easily censored and would not survive hacker attacks or government censorship.

Bitcoin has been constantly attacked and has continued to run non-stop for more than 10 years due to this resilient and decentralized structure.

MAPA DE FORKS DO BITCOIN



That's why, even though there are hundreds of copies, none of them managed to surpass bitcoin, nor even any other cryptocurrency that emerged later. This image shows the forks, the copies, that bitcoin had from 2015 to 2018. Many call themselves the real bitcoin" and tried to steal narrative, visibility and liquidity, but none actually succeeded. No project can steal the properties and networking feat that Bitcoin has.

Any level of centralization is already a point of mutability, of monopoly of decision-making power and also a potential point of failure that can be exploited by attackers.

"muita gente automaticamente descarta moedas digitais porque muitas empresas falharam desde os anos 90. Eu espero que fique óbvio que o motivo era a natureza centralizada que controlava esses sistemas que causou esse fracasso".

Satoshi Nakamoto | 15 de fevereiro de 2009



Satoshi knew from the beginning that decentralization was the key point of bitcoin and one of the main reasons why previous digital money projects did not succeed. He even wrote in 2009: “Many people automatically dismiss digital currencies because so many companies have failed since the 1990s. I hope it becomes obvious that the reason was the centralized nature that controlled these systems that caused this failure.”



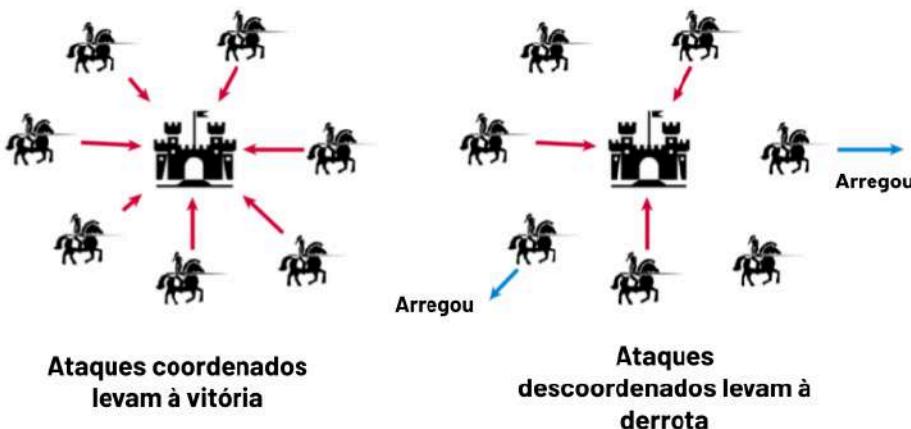
Bitcoin's decentralization is the result of a unique combination of factors that work together to protect the network. To attempt to compromise the system would require an attack that required extreme coordination, enormous financial resources and a colossal amount of energy. This nearly insurmountable barrier is supported by the practical application of game theory, which encourages participants to collaborate to strengthen the network rather than trying to hack or trick others.

In Bitcoin game theory, collaboration is always more profitable than sabotage. Miners, validators, and other participants have financial and structural incentives to play into the hands of the network, as any attempted attack would be extremely expensive and, in most cases, futile.

Furthermore, for this collaboration to be possible and reliable, Bitcoin operates with complete transparency. Its code is open source, that is, open and accessible to everyone, allowing continuous auditing and ensuring that no rules are changed without network consensus. This alignment between decentralization, economic incentives and transparency is what makes Bitcoin the most robust and secure monetary network ever created.

Satoshi managed to unite these points by solving one of the oldest problems: the problem of Byzantine generals.

PROBLEMA DOS GENERAIS BIZANTINOS



This analogy tries to answer, through a war analogy, how computer systems could communicate in a decentralized way. Even before Bitcoin emerged, this problem had no answer.

Have you watched Game of Thrones? If you watched it, now imagine a scene of an invasion of a city like the one in the series. This city is called Byzantium and there are several generals wanting to attack this place. They have surrounded the city and must decide together when to attack. If everyone attacks at the same time, they win the battle because there was coordination. If they attack at different times, they lose because they are susceptible to being attacked.

Generals do not have secure communication channels with each other to create this coordinated action. Firstly because they are at different points around the city, and secondly because they cannot guarantee that the message will arrive, the chances of a messenger being captured by the enemy are very high.

So, they need to find a way to communicate, to reach a consensus on the right time to attack. The first general can start by sending an attack message at 9am, but he has no way of knowing whether the messenger delivered the message or not. This uncertainty may lead the first general to give up attacking. Dilemmas like this generated many failures in digital money before Bitcoin.

Bitcoin managed to solve the problem of Byzantine generals, having complete coordination through Proof of Work, which establishes a set of rules that coordinates everyone, through P2P networks that connect all participants to the same system and through blockchain, a

system of records that everyone can check without depending on any “messenger” outside the system.

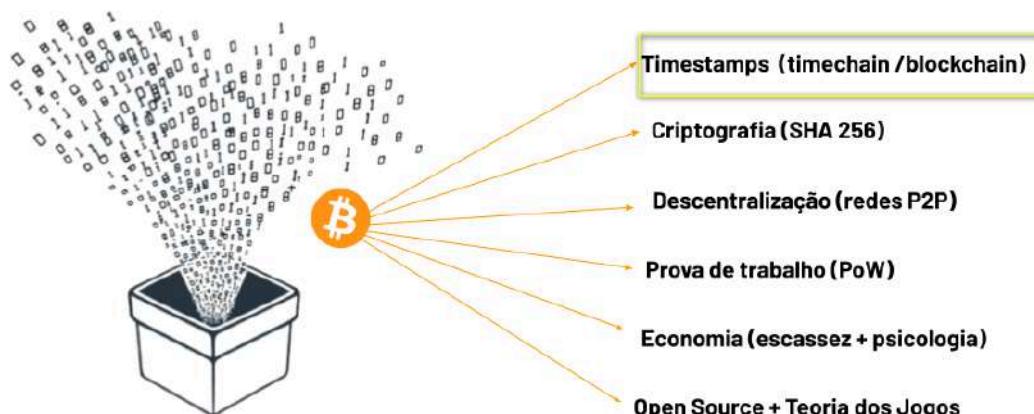
Through this system, all generals would be able to coordinate on the right time to attack Byzantium without depending on third parties, in a synchronized, safe way and without anyone hesitating in the attack.

ALGORITMOS DE CONSENSO



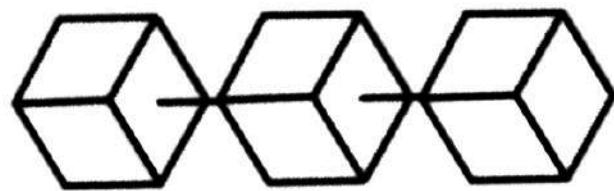
I talked just now about Proof of work and consensus mechanisms, these terms are the rules that guide the protocol. These are algorithms that establish how the network will coordinate. This set of rules seeks, from an initial situation called input, to reach a final result, called output.

UNIÃO DE TECNOLOGIAS E CONCEITOS

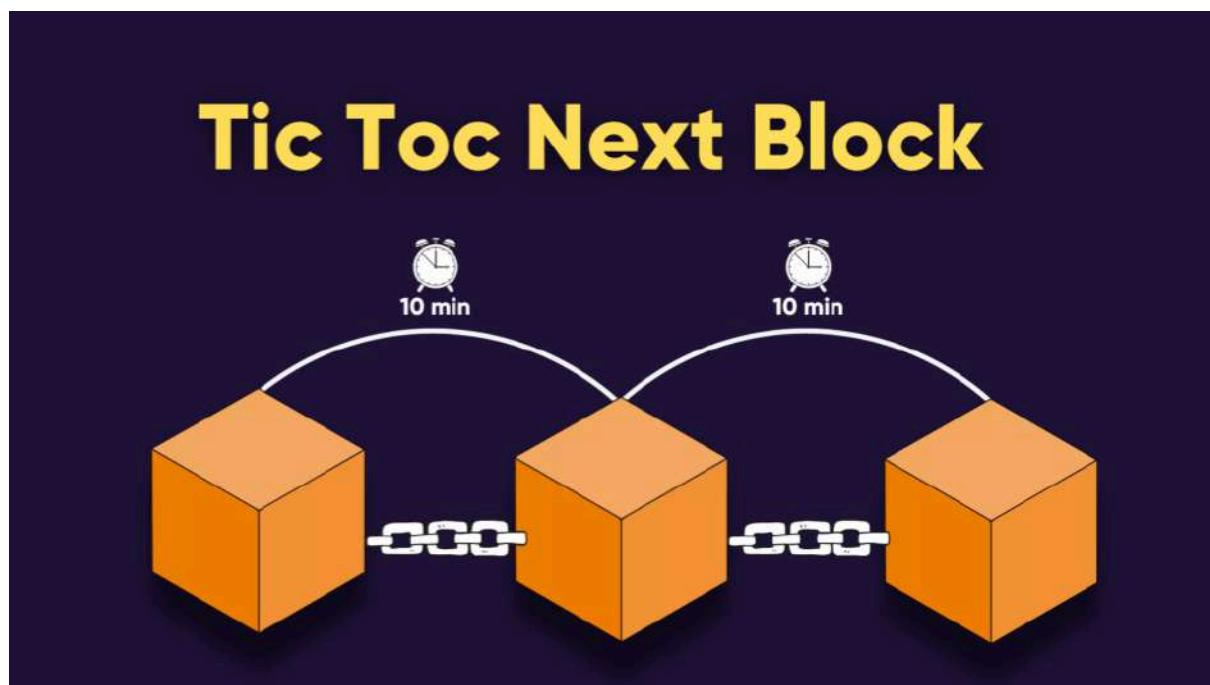


All of this works by recording information in a chained, distributed and indelible system called blockchain. Satoshi used timestamps and timechain to describe this mechanism in the bitcoin whitepaper.

O QUE É BLOCKCHAIN?

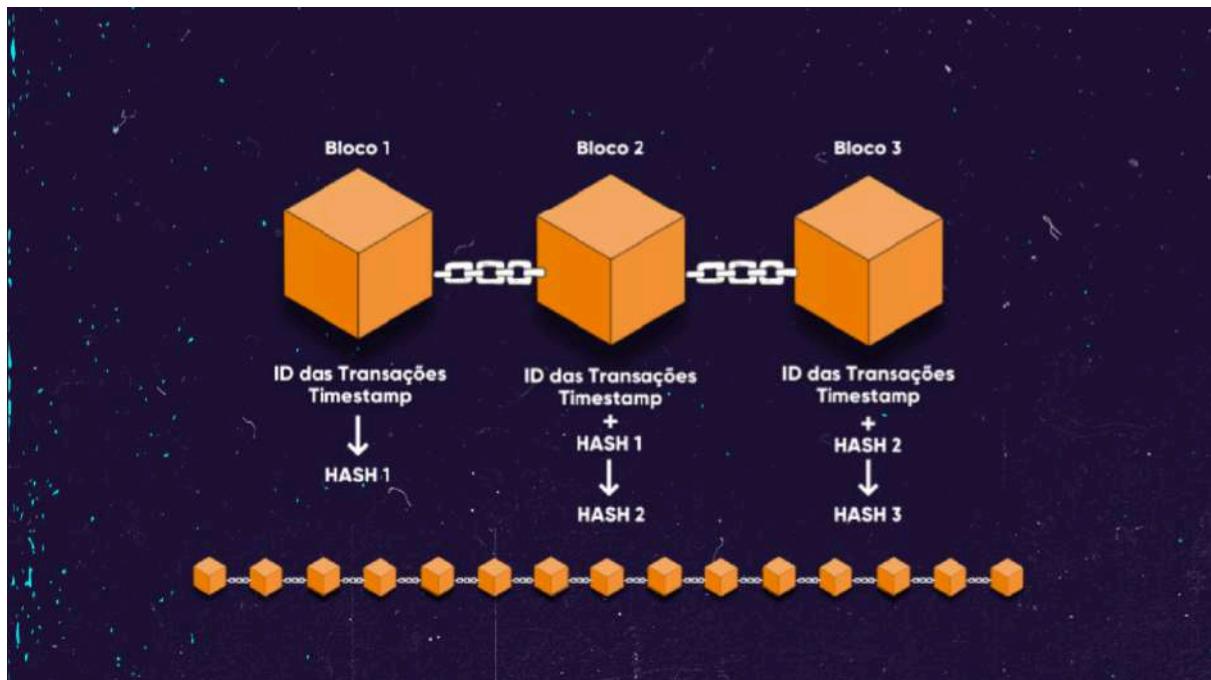


There are people who say that blockchain is the true innovation behind Bitcoin, but that's nonsense. Blockchain is important, but alone and without other properties it is just a slow, expensive and equally centralized database.



Blockchain or timechain means chain of blocks. These are blocks of information linked to each other and processed by the network every 10 minutes on average. This means that it

often takes less than 10 minutes and other times it can last more than an hour. It depends on the speed of miners to process and the mining difficulty of each block.



The immutability of records means that there is no way for you to remove or change the block in the middle of the chain. If there are 200 blocks and you try to delete or modify the one in the middle, the neighboring blocks will be affected.

It's like a digital seam. If you pull the thread in the middle of a seam, it distorts all the next stitches, right? With Bitcoin it is very similar. If any information is changed in a block, it ends up distorting all subsequent blocks.

So, let's suppose we are now looking at the bitcoin blockchain. Each block here contains information about the financial transactions made on the network and about the block itself.

Example: address A sent 2 BTC to address B. And it also has a digital marking, the date and time stamp, called timestamp. All this data forms the content of each block and is mixed randomly and transformed into a Hash. Hash is the encrypted code that summarizes and identifies everything that is inside that block of information.

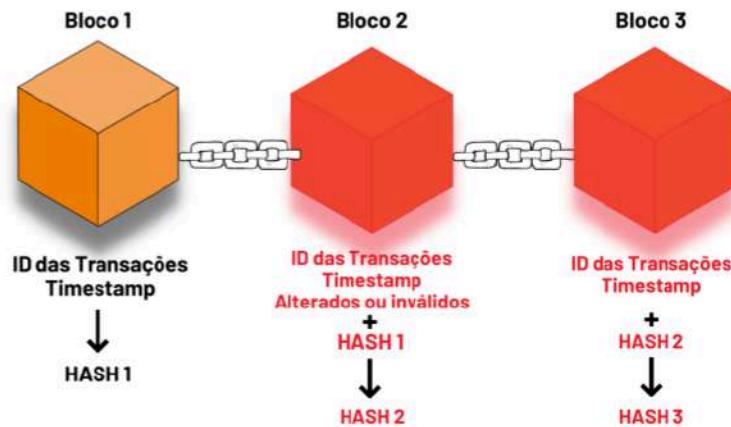
Let's suppose you make a transaction, like "Kaka sent 10 BTC to Carol". There in that block, the information recorded is that address A sent 10 btc to address B.

This operation will be encrypted, transformed into cryptographic codes, mixed with other information and codes from other transactions, which entered this block. All of this will be transformed into a Hash, which is like a sentence that summarizes all the information that is inside a block of information. It is from the Hash that the magic works.

After Hash 1 of block 1 has been created, it will be inserted together with the content of the next block, block 2. It will be liquidized, mixed randomly and will form Hash 2.

Hash 2 summarizes the entire content of its block and also the previous block, because Hash 1 was inserted inside the content of block 2 and so on. Hash 3 will be the cryptographic summary of block 3, which contains the hash of the previous block 2. Through these functions, the network chaining takes place. In other words, the following blocks will always have a summary of the previous blocks.

QUALQUER MUDANÇA AFETA O TODO

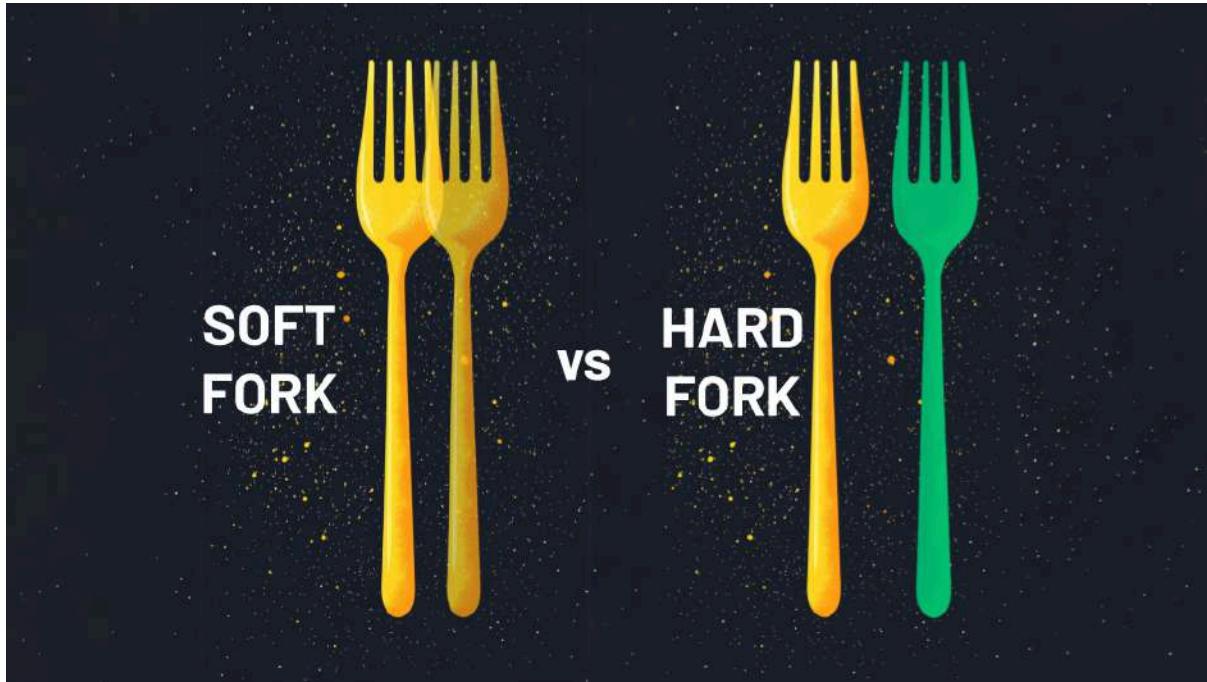


It is because of this chain of information that the network is always confirming everything before mining the next block. So if you change anything in block 1, the hash of all subsequent blocks also changes. If I change a comma, a space, a letter, anything changes the Hash. If something is changed after being registered on the blockchain, miners or nodes that verify the network will identify the change through the hash and will not accept this transaction as valid. It is very easy to see if there has been an attack on the transaction history.

This is because both nodes and miners have copies of the bitcoin blockchain, if any information from the past is changed and does not match the copies that exist on their computers, they will be easily identified and will not accept that block as valid.

This is one of the constant verification factors that makes the BTC network very secure and difficult to "skip" and hack. It's a network that manages to decentralize trust, because everything is correct, nothing has changed. All calculations match.

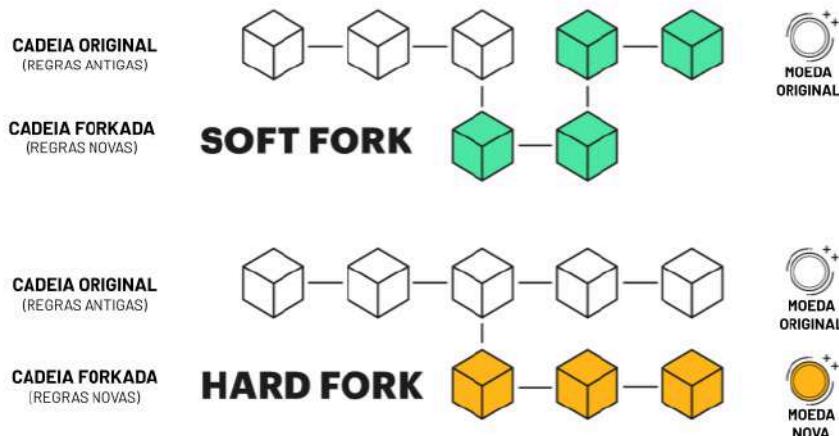
If someone decides to change the way the network works, that person could cause a fork!



Blockchain version updates are called forks. There are two types of updates: soft forks and hard forks.

Forks comes from branching and means fork in English, which is why you will see images of forks when someone talks about forks. They are branches, different versions of the initial rules.

HARD FORK E SOFT FORK



So what is the difference between these two types of fork?

Soft forks are when the network makes an update so that both those who run the old version of the code, the software, and those who run the new version can coordinate. It is a backwards compatible, optional fork that does not change the consensus mechanism. It

remains the same network and the same currency, but with some different details in the versions.

Hard forks are when radical updates are made, to the point of changing the protocol's consensus and those running the old version are unable to coordinate with those running the new version. Old users are unable to participate in the new network if they do not update and as a result a new currency is created. This type of update forces users to update to the new version.

Bitcoin does not do hard forks, only soft forks. Because hard forks are centralizing forces, they exclude users who may not agree with the new version and end network immutability. Hard forks are more frequently observed in other cryptocurrency protocols and in private company blockchains.

4.1- Inside Bitcoin: how does Bitcoin work? Part II (mining, halving and price explosion)



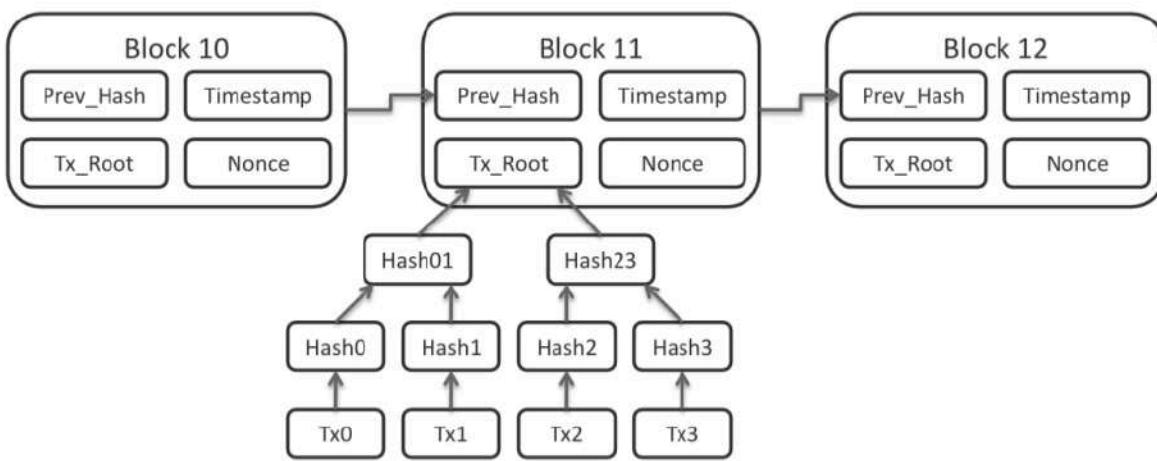
Now that you understand how the Bitcoin blockchain works and that it needs consensus from participants for decentralized coordination. Now let's understand how the network manages to agree among themselves through the mechanism called Proof of Work (PoW).



Bitcoin mining is an analogy for the process of searching for something precious, like gold, but on the Bitcoin network that precious thing is the hash of each block. Node gold, the miners keep digging the deposit until they find the precious metal, when they find it, they have something scarce and valuable in their hands. Gold is scarce and over time it becomes more difficult and more expensive to mine gold because you have to dig deeper into the ground. It requires increasingly modern and efficient equipment to access the deepest and most complex deposits.

Something very similar happens with bitcoin. In the bitcoin network, miners compete with each other, through trial and error, to see who first arrives at the hash that closes each block of information.

MINERAÇÃO



Remember the block is made up of several components: the hash of the previous block (**mark “Prev hash” when editing**), a date and time stamp called a timestamp (**flag “timestamp”**) and All transaction data is available (**flag “tx root”?**)?

Along with this information there is also a piece of data called “nonce”. (**mark “nonce” when editing**).Nonce means “number used only once” - a number that can only be used once. When miners use computational power to mine the block it means that they are, at an absurd speed, trying to find this number that can only be used once by the network. This is the number that all miners are racing to find.

The block header contains the hash that mixes all these components: the hash of the previous block, the timestamp, the root transaction that summarizes all the transactions that entered the block and the nonce.

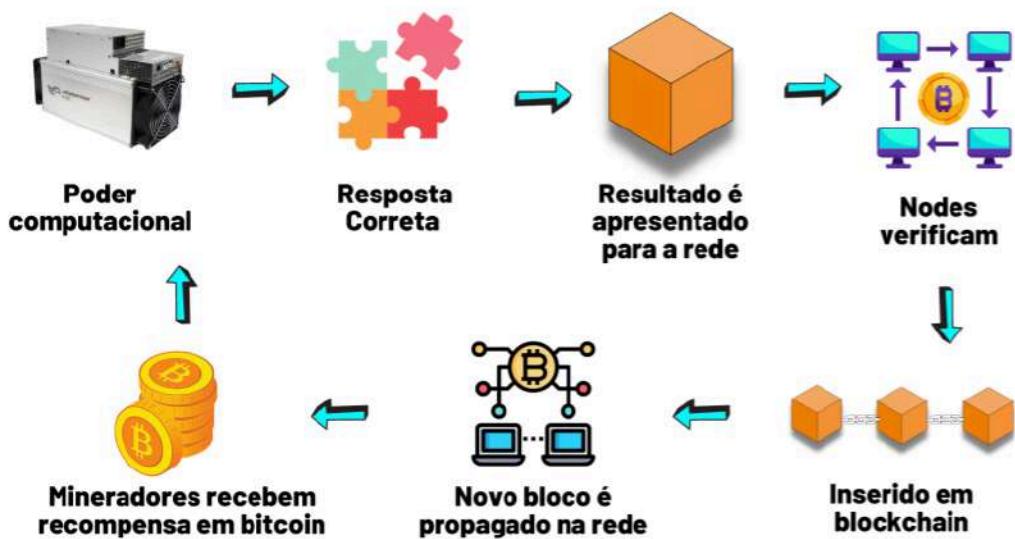
MINERAÇÃO E O QUEBRA-CABEÇAS



A good analogy for this mining process is a puzzle. So in this analogy Bitcoin mining is like a puzzle, a game, in which every 10 minutes miners need to find the missing piece to complete the picture.

Everyone is looking for the correct piece out of all the possibilities and whoever finds it first tries to fit it into the image. When the miner finds the missing piece, it is very easy for everyone to see if it fits together. Just look at the image and see if the piece was correct or not.

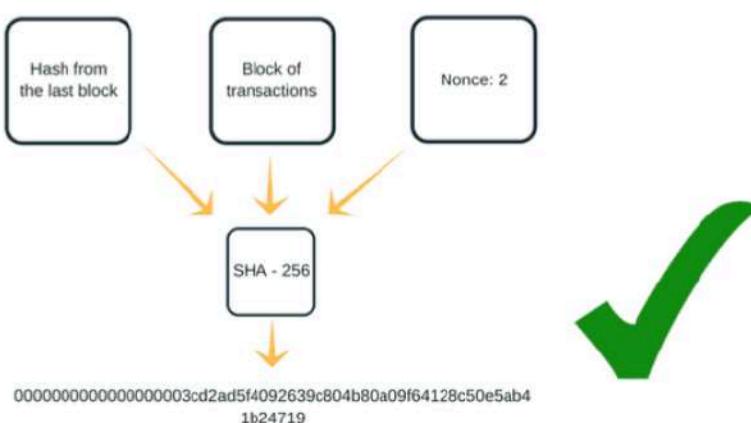
This means that mining is a process that is difficult to defraud and at the same time very easy to verify. Just as it is difficult to find the correct piece in a giant puzzle, but it is easy to check whether it was the missing piece or not. Bitcoin is like a global puzzle in which everyone participates and follows the results in real time.



The entire mining and consensus process when registering the bitcoin blockchain works like this: miners employ computational power, investing in machines with great computational power to try to find the block hash as quickly as possible. When they find the hash, the correct answer, they show it to the network and the nodes check if the proposed block is following the rules. If everything is ok, this block is inserted into the blockchain, propagated across the network and all participants insert this block into their copies of the blockchain. And in the end, miners receive Bitcoin as a reward for completing the task.

This entire process is known as proof of work.

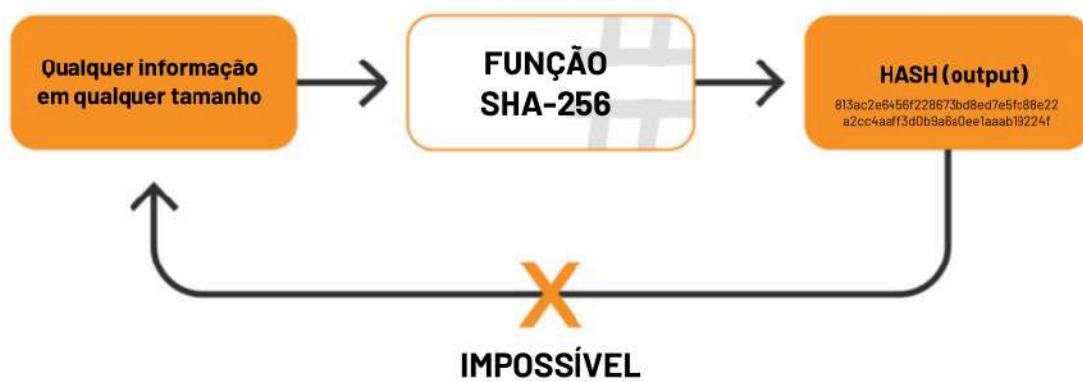
PROVA DE TRABALHO



Proof of work means that the miner found the hash of the block, followed the rules, and provided a service to the network. When all block information is found (**mark the three blocks in the image when editing**) they go through the encryption process, of transforming the information into a

cryptographic enigma using SHA-256. The result is that huge number below, which represents the block's hash, the result of all the miner's work.

FUNÇÃO DE HASH: SHA 256



This process is not exclusive to Bitcoin, anything can be encrypted, SHA-256 is the algorithm that does this. THE SHA-256 takes information of any size and creates a 256-bit sequence — a series of 256 zeros and ones. From this huge number filled with 01010101, the algorithm creates a hexadecimal sequence made up of 64 digits between letters and numbers that is easier to write down. In other words, it is easy to check if it is correct but it is practically impossible to forge the information that has been encrypted.

(opens camera)

Trying to randomly hit a hash and break sha-256 encryption is practically impossible. It involves an absurdly high number of possible combinations, are more numbers than the number of atoms in the observable universe! This would require such a large number of attempts that it would take a normal computer billions of years to accomplish this.

That's where the story of the quantum computer comes in! People often ask us if a quantum computer could break bitcoin's encryption. This is one of the great hopes of Bitcoin haters, but the truth is that not even a quantum computer could kill Bitcoin.
Underneath this class I will leave a article which explains this.

The screenshot shows the SHA256 Hash Generator page on codebeautify.org. The input field contains the text "Bitcoin Starter". Below the input field, it says "Size : 15 B, 15 Characters". There are buttons for "Auto", "Generate", "File..", and "Load URL". The generated hash is displayed in a box below, with "Upper Case" and "Lower Case" options above it.

<https://codebeautify.org/sha256-hash-generator>

I want to show you one [site](#) very cool, it's this one, called code beauty. This site allows you to try and convert any information into a sha-256 function.

I'm going to type here Bitcoin 4 all look at how the code in the box below changes with each letter, space or punctuation entered. This is what happens with the bitcoin network block hash. If any information is modified. Notice how fast it was too, it didn't require mega computing power to find this hash. So if it was that easy to create a hash here on this website, why does it take 10 minutes on the Bitcoin network and it is no longer possible to mine from your home computer?

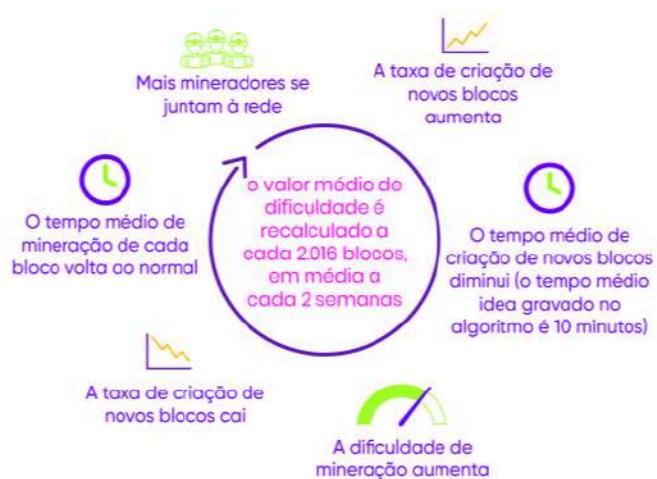


This has to do with a mechanism called difficulty adjustment.

The adjustment and difficulty have the role of regulating the issuance of new bitcoins, it is what guarantees that the average creation of new blocks and rewards delivered by the network is 10 minutes. This is because every 2016 blocks mined, around 15 days on average, there is an algorithm that will analyze the amount of computational power in the network and increase or decrease the difficulty of finding the block's hash.

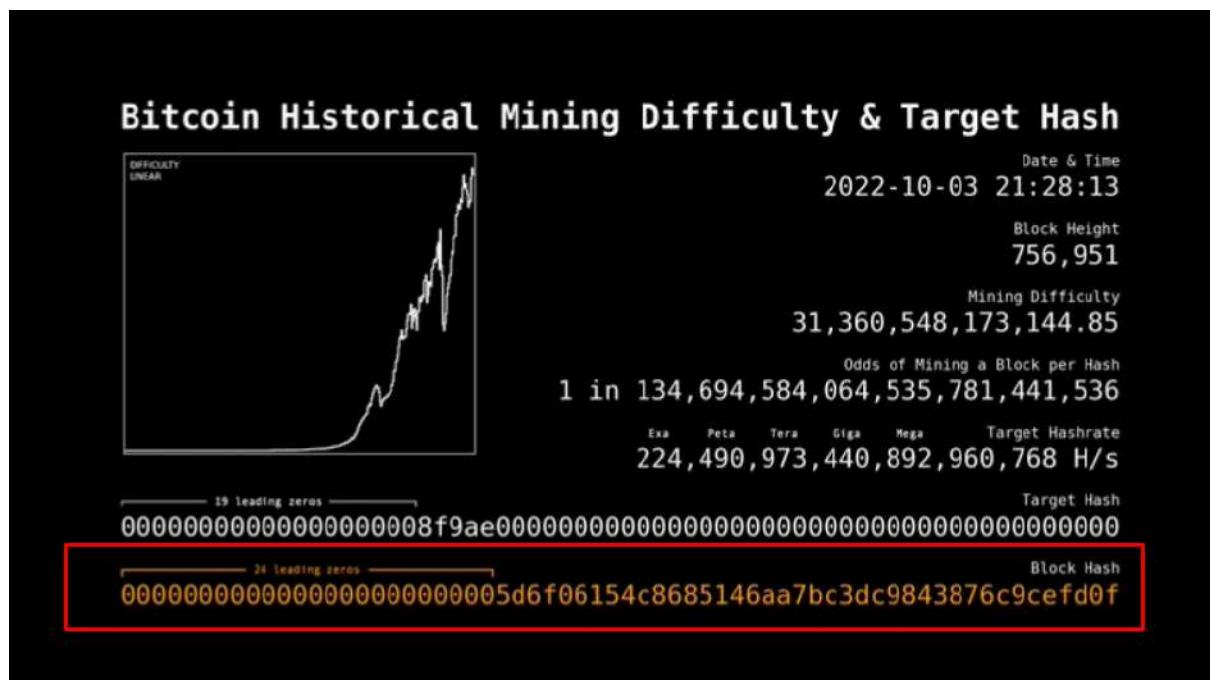
If from one moment to the next the number of miners increases a lot, the network will regulate itself to increase the mining difficulty and not accelerate the speed at which new blocks are created nor accelerate the speed at which new bitcoins are created.

AJUSTE DE DIFICULDADE



It works like this: as more miners join the network and the hashrate increases (the rate at which new blocks are created), miners begin to find blocks more easily and the average mining time between one block and another becomes faster. The network realizes this through algorithms and increases the mining difficulty, as a result the speed of creating new blocks drops, because it becomes more difficult for miners to find blocks, until it stabilizes at an average of 10 minutes between one block and another.

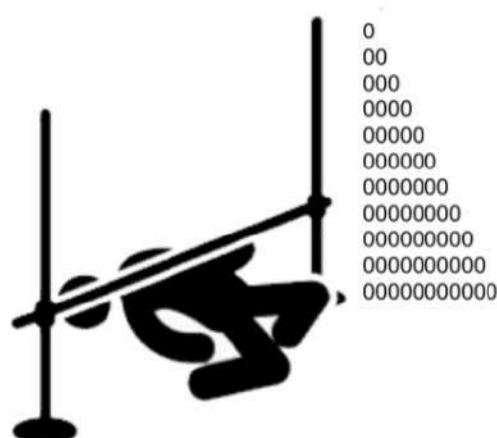
This is how the network regulates itself with the increase in demand so as to never lose its predictability.



You can know the level of difficulty of mining each block according to the number of zeros that appear before the block's hash number. This block, for example, has 24 zeros leading the hash, was mined in October 2022 and is one of the blocks that had the most difficulty being mined at the time.

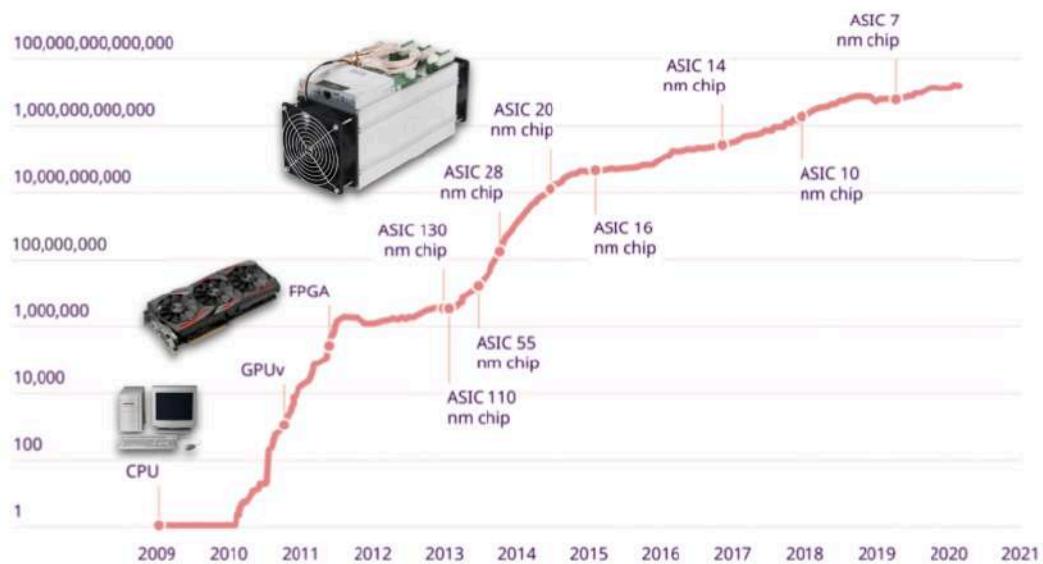
The miner's objective is to assemble a block where the hash code (last line) is smaller than the current target (penultimate blank line). The smaller the target, the harder it is to find a valid block. The more miners on the network, the more difficult it becomes.

QUANTO MAIS ZEROS INICIANDO O HASH MAIS DIFÍCIL DE MINERAR



In other words, the more zeros leading a hash, the more difficult it is to mine, the more the miner had to search for the block's nonce until he found it.

DIFICULDADE DE MINERAR



It is because of the difficulty adjustment that nowadays it is no longer profitable to mine from your home PC, from a CPU. Today bitcoin mining is done with specific machines called ASICS. As the price of Bitcoin rose, it ended up attracting more and more people, more computing power was being used in the network and with this the difficulty adjustment algorithm rose to maintain the average of one block mined every 10 minutes.

As the difficulty increased, more tuned-in people began to use more powerful machines: GPUs, widely used in gaming computers. Bitcoin continued to attract more and more people wanting to mine, until they decided to create a specific machine: ASICs.

This type of machine is much more powerful and beats CPUs and GPUs in the speed of finding the block hash. Mining has become a giant and dedicated industry, to the point where it is no longer worth mining from home. Still, a lot of people want to do this and you can, you can buy an ASIC and run it, but this machine consumes a lot of electricity, you will waste a lot of light trying to find a block and if you receive any reward you probably won't even pay your bill.

Besides, it makes a horrible noise, listen....

(insert video shorts that are in the folder, to show the noise it makes)

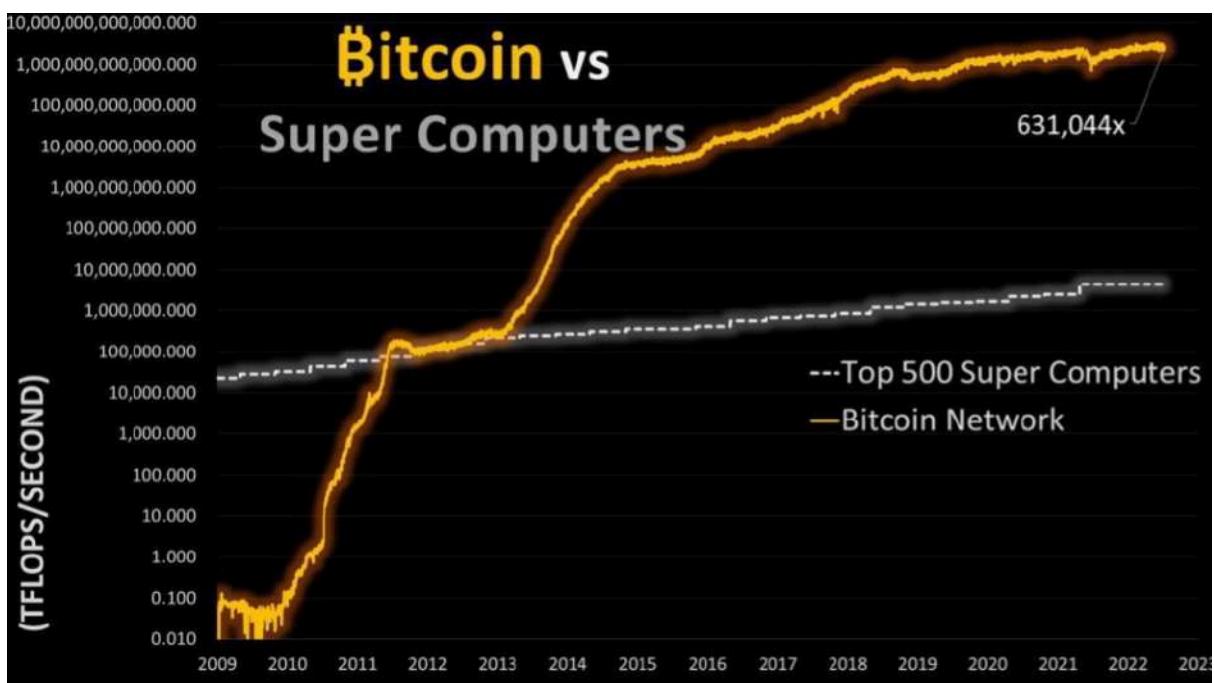
You can't simply install an Asic in your living room and leave it running, you have to think about an environment for this machine, invest in acoustic insulation, refrigeration and know how to maintain the machine. These are all details that you must take into consideration.

So the price doesn't matter. Bitcoin could reach 10 billion dollars. The speed of issuing bitcoins does not change. Even the increase in hashrate power cannot lead to the issuance of more BTC beyond what is planned for each halving cycle. The addition of more miners to the network does not produce more bitcoin, but it makes the network more secure and decentralized.



Safe because the greater the computational power, the more difficult it is to carry out a 51% attack and monopolize the network's decision-making power. This appears in this graph where the line represents the hashrate and the colors represent the computational power growing exponentially since bitcoin started running, as the difficulty of mining a block becomes orange. The greater the computational power, the more the network has adapted to protect Bitcoin's properties.

This is why Bitcoin has no competitor in mining, it is the protocol with the most miners distributed around the planet and with the greatest computational power of all.



Bitcoin is 631 times more powerful than the world's 500 largest supercomputers combined, represented in the white line and bitcoin is shown in the orange line. Bitcoin has the most attack-resistant computer network and is 600x stronger than any centralized computer system or datacenter.

(Opens fabric)

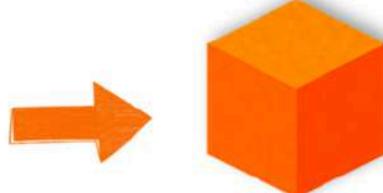
However, the advancement of mining did not stop with ASICs machines. Over time, even though we had a super powerful machine, it became increasingly difficult to find blocks and miners ended up grouping themselves into pools, that is, miners pool computational power to have a better chance of finding blocks and sharing the reward.

POOLS DE MINERAÇÃO



Mining pools work between Bitcoin software and miners. This mechanism allows miners to pool the computing power of their machines and have a better chance of finding a block. Pool comes from the word pool in English, a concentrate of grouped computing power.

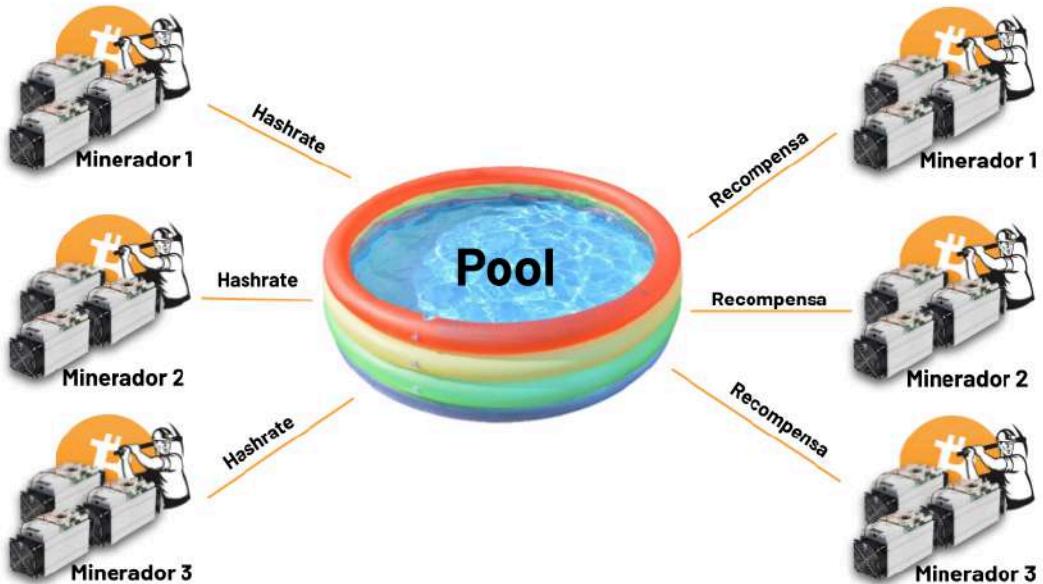
CHANCES DE MINERAR UM BLOCO



0,000000208%

1 EM 4.807.692.307

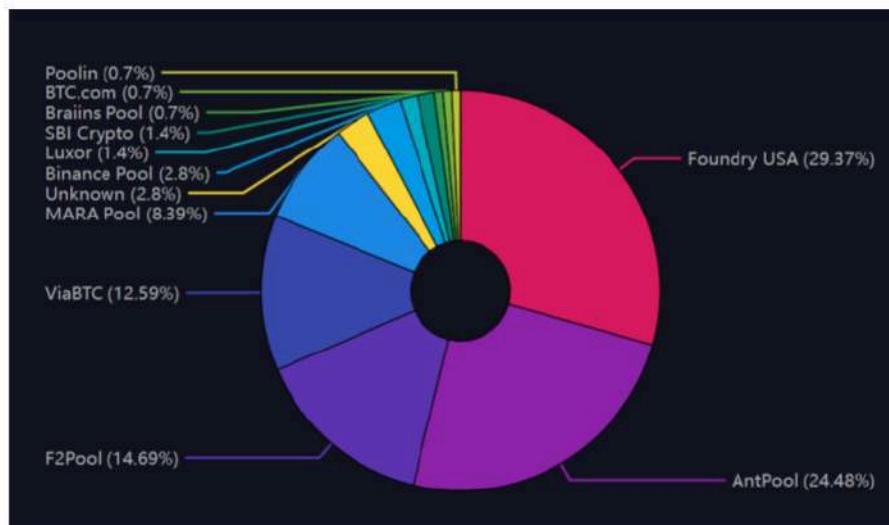
To give you an idea of how difficult it is to mine outside of a pool, that is, to mine solo, an S19JPRO, which is one of the most modern ASICS machines, has a 0.000 000 208% chance of mining a block of Bitcoin. This means one chance in almost 4.8 billion attempts over the entire lifetime of the machine, which lasts an average of 5 to 8 years. This probability will continue to decrease over time as more miners arrive, the hashrate rises, and the difficulty increases.



That's why miners come together in pools, like a pool of computational power that when someone finds the block, everyone shares the Bitcoin reward in proportion to each person's hash power. This way, miners can earn frequent revenue instead of waiting for luck to find a

block on their own, which can take years and still has no guarantee of getting it right.

PRINCIPAIS POOLS

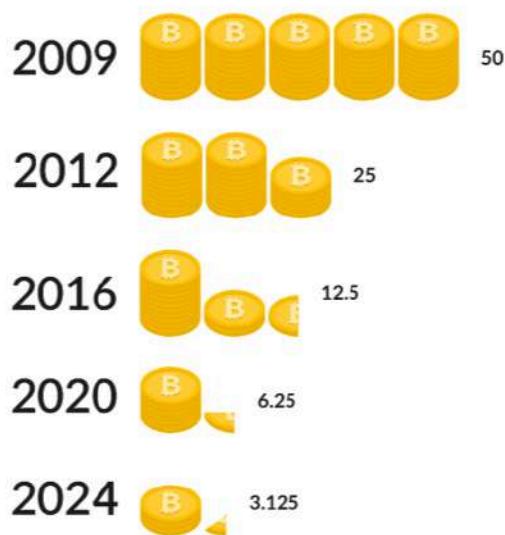


Today the Bitcoin network has dozens of pools, but 5 of them are the largest and account for most of the hashrate: Foundry, Antpool, F2Pool, ViaBTC and Mara. Although many people say that this would be a centralization mechanism, in reality miners can leave the pool at any time and go to another, or they can even mine solo if they want to try their luck. In other words, the concentration in these 5 largest pools was a natural market movement by the miners themselves wanting to be in the pools with the highest probability of finding blocks and sharing the rewards. Pools do not rule the network, because it is the nodes that check and decide whether the mined blocks are valid or not,

(opens fabric)

And the last very important point in the functioning of Bitcoin are halvings, which have everything to do with mining. Bitcoin becomes increasingly scarce. Growing scarcity coupled with growing demand is what has caused parabolic movements in Bitcoin. It is the Halving, or “Halving”, which causes Bitcoin to gradually become more scarce and at the same time creates cycles of appreciation that have been repeated for 15 years.

HALVING



Halvings are emission cuts that affect the incentives that the Bitcoin network provides.

Halving comes from the word “halving”, meaning “cut in half” in English. This means that for every 210,000 blocks mined, on average every 4 years, the protocol cuts the reward delivered to the network's miners in half.

Halving	Data Estimada	Altura do bloco	Recompensa por bloco (BTC)
0	N/A	0	50
1	28/11/2012	210.000	25
2	09/07/2016	420.000	12,5
3	11/05/2020	630.000	6,25
4	2024	840.000	3,125
5	2028	1.050.000	1,5625

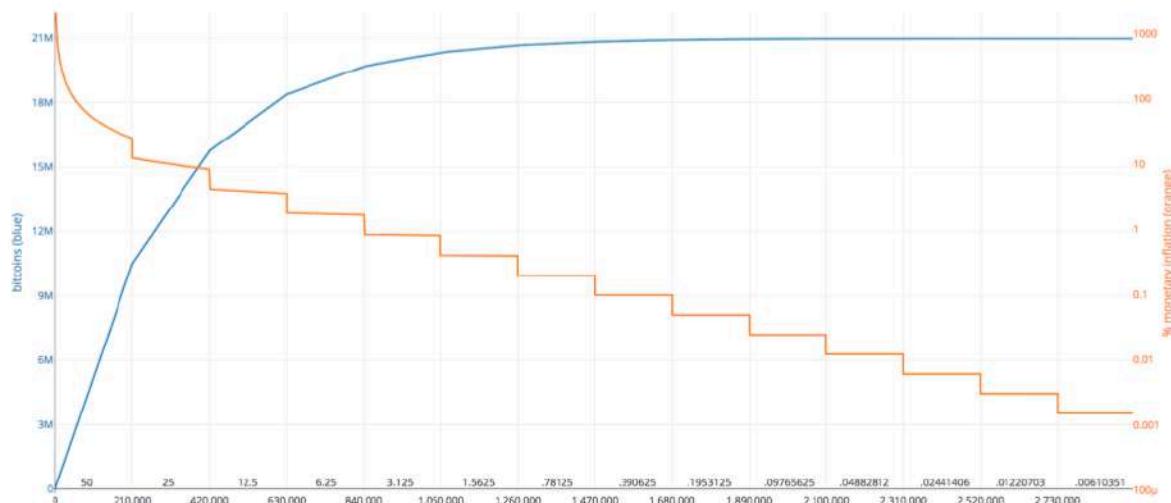
The first halving took place on November 28, 2012, at the very beginning of the network, at the time the BTC network produced 50 Bitcoin per block of information processed. In other

words, every 10 minutes, on average, at that time, miners received 50 btc as a reward and with the 2012 halving, miners started to receive 25 bitcoin per block mined.

In 2016, the second halving took place, in block 420 thousand, and cut the issuance in half again. Instead of receiving 25 bitcoins, each miner now receives 12.5 bitcoins per block mined. And the third halving took place in 2020, on May 11th, in block 630 thousand, where miners started to receive 6.25 btc per block.

Look how it is reducing, less and less bitcoin is entering the market. The next halving, the fourth, is scheduled for April 2024 at block 840 thousand. And the cool thing about all this is that we know in advance which block it will be in and what the new reward for miners will be.

HALVINGS E A “INFLAÇÃO DE OFERTA” DO BITCOIN



This image demonstrates how with each step of the orange line, that is, with each halving, Bitcoin slowly becomes more scarce and approaches the Bitcoin supply limit, on the blue line.

This image is incredible because it shows how Bitcoin is transparent, programmable, and has a predictable monetary policy that cannot be expanded or modified. It is something very different from any other asset or currency that changes monetary rules or policies at any time.

The last satoshi will be mined in the year 2140 and that is when the issuance of new bitcoins will end. Only network fees will be the source of revenue for miners to pay operating costs.

Years	Years since Inception	Total # of Blocks	Block Reward (BTC)	Total Mined BTC	% of Total Mined
2008- 2012	0 - 4	210,000	5.000000000	10,500,000.000	50.00000000%
2012 - 2016	4 - 8	420,000	2.500000000	15,750,000.000	75.00000000%
2016 - 2020	8 - 12	630,000	1.250000000	18,375,000.000	87.50000000%
2020 - 2024	12 - 16	840,000	0.625000000	19,687,500.000	93.75000000%
2024 - 2028	16 - 20	1,050,000	0.312500000	20,343,750.000	96.87500000%
2028 - 2032	20 - 24	1,260,000	0.156250000	20,671,875.000	98.43750000%
2032 - 2036	24 - 28	1,470,000	0.078125000	20,835,937.500	99.21875000%
2036 - 2040	28 - 32	1,680,000	0.039062500	20,917,968.750	99.60937500%
2040 - 2044	32 - 36	1,890,000	0.019531250	20,958,984.375	99.80468750%
2044 - 2048	36 - 40	2,100,000	0.009765625	20,979,492.188	99.90234375%
2048 - 2052	40 - 44	2,310,000	0.004882813	20,989,746.094	99.95117188%
2052 - 2056	44 - 48	2,520,000	0.002441406	20,994,873.047	99.97558594%
2056 - 2060	48 - 52	2,730,000	0.001220703	20,997,436.523	99.98779297%
2060 - 2064	52 - 56	2,940,000	0.000610352	20,998,718.262	99.99389648%
2064 - 2068	56 - 60	3,150,000	0.000305176	20,999,359.131	99.99694824%
2068 - 2072	60 - 64	3,360,000	0.000152588	20,999,679.565	99.99847412%
2072 - 2076	64 - 68	3,570,000	0.000076294	20,999,839.783	99.99923706%
2076 - 2080	68 - 72	3,780,000	0.000038147	20,999,919.891	99.99961853%
2080 - 2084	72 - 76	3,990,000	0.000019073	20,999,959.946	99.99980927%
2084 - 2088	76 - 80	4,200,000	0.000009537	20,999,979.973	99.99990463%
2088 - 2092	80 - 84	4,410,000	0.000004768	20,999,989.986	99.99995232%
2092 - 2096	84 - 88	4,620,000	0.000002384	20,999,994.993	99.99997616%
2096 - 2100	88 - 92	4,830,000	0.000001192	20,999,997.497	99.99998808%
2100 - 2104	92 - 96	5,040,000	0.000000596	20,999,998.748	99.9999404%
2104 - 2108	96 - 100	5,250,000	0.000000298	20,999,999.374	99.99999702%
2108 - 2112	100 - 104	5,460,000	0.000000149	20,999,999.687	99.99999851%
2112 - 2116	104 - 108	5,670,000	0.000000075	20,999,999.844	99.99999925%
2116 - 2120	108 - 112	5,880,000	0.000000037	20,999,999.932	99.99999963%
2120 - 2124	112 - 116	6,090,000	0.000000019	20,999,999.961	99.99999981%
2124 - 2128	116 - 120	6,300,000	0.000000009	20,999,999.980	99.99999991%
2128 - 2132	120 - 124	6,510,000	0.000000005	20,999,999.990	99.99999995%
2132 - 2136	124 - 128	6,720,000	0.000000002	20,999,999.995	99.99999998%
2136 - 2140	128 - 132	6,930,000	0.000000001	20,999,999.998	99.99999999%

And this table, here, is another way of showing the same thing. Here, we can table the entire monetary policy of BTC, from the first Satoshi, the first halving to the last halving in 2140.

This table shows that more than 90% of Bitcoins have already been issued and that, by the year 2036, 99% of Bitcoins will be mined. The rest, the other 1% of final BTC will be created from 2036 to 2140. It takes 110 years to mine 1% of the bitcoin supply.

In the year 2030, the biggest source of income for miners will probably be fees. At this moment, the demand for Bitcoin must be very high, to the point that the fees charged by miners support their operation, including the maintenance of the machines and the energy cost, and no longer so much the reward for the block.

O que acontece quando o último BTC for minerado?



When we talk about 2140 there is fear of the unknown and the question: "what happens when the last bitcoin is mined?"

The answer is: nothing. This big change starts in 2030 when fees become the main source of income for miners, as I just mentioned. By 2140, miners will be receiving much more in fees than the few satoshis offered by the network, because of the increasing scarcity of the currency and increased use of the network.



And why is halving so important? Halvings cause supply shocks, with less Bitcoin available for the same demand. From one block to the next, half of the bitcoins you previously had will be issued. This supply shock is what pushes the price up, because if there is demand for bitcoin and no more units can be created, the only way to get hodlers to sell is for buyers to offer to pay a higher price.

The screenshot shows a forum post titled "I AM HODLING" by GameKyuubi. The post has been read 780317 times. The author's profile includes a picture of a man, a yellow rating bar, and activity stats (240). The post content discusses the author's trading mistakes and their adherence to holding onto Bitcoin despite market fluctuations. It ends with a BTC address for a tip.

I AM HODLING
December 18, 2013, 10:03:03 AM

I type d that tytide twice because I knew it was wrong the first time. Still wrong. w/e. GF's out at a lesbian bar, BTC crashing WHY AM I HOLDING? I'LL TELL YOU WHY. It's because I'm a bad trader and I KNOW I'M A BAD TRADER. Yeah you good traders can spot the highs and the lows pit pat piffy wing wong wang just like that and make a millino bucks sure no problem bro. Likewise the weak hands are like OH NO IT'S GOING DOWN I'M GONNA SELL he he he and then they're like OH GOD MY ASSHOLE when the SMART traders who KNOW WHAT THE FUCK THEY'RE DOING buy back in but you know what? I'm not part of that group. When the traders buy back in I'm already part of the market capital so GUESS WHO YOU'RE CHEATING day traders NOT ME~! Those taunt threads saying "OHH YOU SHOULD HAVE SOLD" YEAH NO SHIT. NO SHIT I SHOULD HAVE SOLD. I SHOULD HAVE SOLD MOMENTS BEFORE EVERY SELL AND BOUGHT MOMENTS BEFORE EVERY BUY BUT YOU KNOW WHAT NOT EVERYBODY IS AS COOL AS YOU. You only sell in a bear market if you are a good day trader or an illusioined noob. The people inbetween hold. In a zero-sum game such as this, traders can only take your money if you sell.

so i've had some whiskey
actually on the bottle it's spelled whisky
w/e
sue me
(but only if it's payable in BTC)

BTC: 15SLrNo6PKVfsH5JLtatUcvkSQXck1Lxyq
full stack Node

Hodlers are bitcoiners who accumulate bitcoin for the long term and do not sell even during the biggest short-term drops. The term Hodler became a meme because a guy on bitcoin talk, a famous bitcoin forum, spelled it wrong and people adopted the slang to differentiate it from the traditional stock exchange crowd. This one on the screen is the print of the post that gave the hodlers their name: bitcoiners who hold bitcoin tightly and do not sell at all.

(opens fabric)

This rise forms parabolic movements, attracting general attention, bitcoin is in the news and increases demand even more. This is where the mind-blowing euphoria of the high begins. This happens because the only way to have the same liquidity to satisfy new buyers is to increase the premium so that those who have Bitcoin change their mind and want to sell. It is the simplest law of economics: Law of supply and demand. If there is a lot of demand and supply reduces, prices rise. As the number of Bitcoin is limited to 21 million units and there is no way to issue more, when demand increases, the only way for supply to meet demand is for the price to rise.

Halvings cause supply shocks that cause bitcoin to rise until a new price discovery. This entire process creates cyclical movements of appreciation and contraction until the new price is defined.

4 FASES DOS CICLOS



Bitcoin cycles are made up of four phases. The first phase is the BEAR, when the market is bears. This is when the price drops a lot after a period of highs and that's when those who entered the high leave. 2011, 2014, 2018 and 2022 were bear years for Bitcoin. This is when only negative news comes out and whoever was a tourist in Bitcoin leaves.

After the bear comes a VERY agonizing phase, which is the accumulation phase. Which is when bitcoin sits aside for an entire year. Nothing happens, it's pure boredom and it seems like it will never end.

The next phase is the expansion or growth phase. When bitcoin starts to rise slowly, like someone who wants nothing. It is the phase in which haters attack because they do not believe in a new rise and bitcoiners begin to renew their hopes that a new bull run is approaching. 2012, 2016, 2020 and 2024 were years of expansion.

And finally comes the Bull run, the bull run. When bitcoin reaches the peak of the cycle and runs like a rampant bull with nothing to hold back. This phase is just joy, euphoria and the haters disappear! Bitcoin becomes popular, attracts attention and reaches a new price level. When the euphoria passes, the drop comes and a new price floor is established, and everything goes back to the beginning, to the Bear phase. It's a mental and emotional rollercoaster.

ÍNDICE DE MEDO E GANÂNCIA



So much so that to measure the emotional state of the market, the fear and greed index was created. Where the closer to 0 means "Extreme Fear", and the closer to 100 represents "Extreme Greed".



Generally, people want bitcoin to appreciate in a straight line, but the biggest rises took a year to reach the peak of the movement. Here I zoomed in so we can analyze the price of bitcoin during halvings. From the halving to the top of the cycle it has taken about a year to hit ATH, but this does not happen in a straight line, the graph fluctuates a lot, but with an increasing average of appreciation. Bitcoin appreciated 11 thousand percent after the first

halving, 2,500 percent after the second halving and one thousand percent after the third halving in 2020 when it reached its last ATH at 69 thousand dollars. In 2024 the fourth halving took place, Bitcoin has already reached \$100k and whoever lives will see how far the price can go in this cycle.

MAIORES QUEDAS

Bitcoin: Price Drawdown from ATH



And everything that goes up, also comes down. Bitcoin despite having had large valuations and they have decreased in intensity over the years, the same has happened with the falls. In 2012 bitcoin had a brutal drop of 93%, after the first halving 84%, in the second it fell 84% again and in the last halving the drop was 77%, less than in the previous bears.

This means that over time bitcoin is decreasing the intensity of price dynamics. Obviously it is far from having the stability of fiat or even gold, but it is already possible to observe this trend.



And beyond that, what can be observed is that bitcoin has had increasingly higher lows throughout the cycles. In 2012 bitcoin was worth less than one dollar, in 2014 the minimum was ten dollars, in 2016 one hundred dollars, in 2019 one thousand dollars and in 2022 ten thousand dollars.

In other words, no matter how much bitcoin falls a lot, it has maintained increasingly higher minimum prices over time. But will it always be like this? Will Bitcoin continue to appreciate forever?

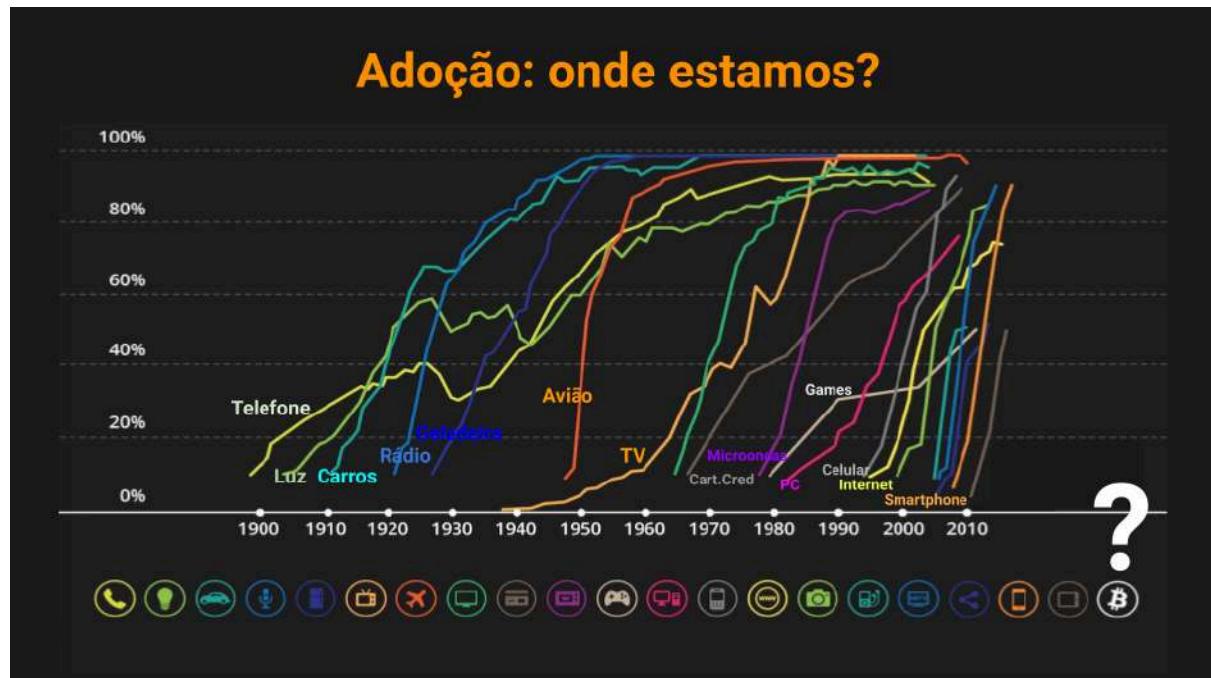
This is the subject of the next class. Here in this class you learned in one sitting the essence of how bitcoin works. Next time you will understand why it tends to continue growing in the long term.

5- Why should Bitcoin continue to appreciate?

Explain adoption and how the price of bitcoin is an adoption metric

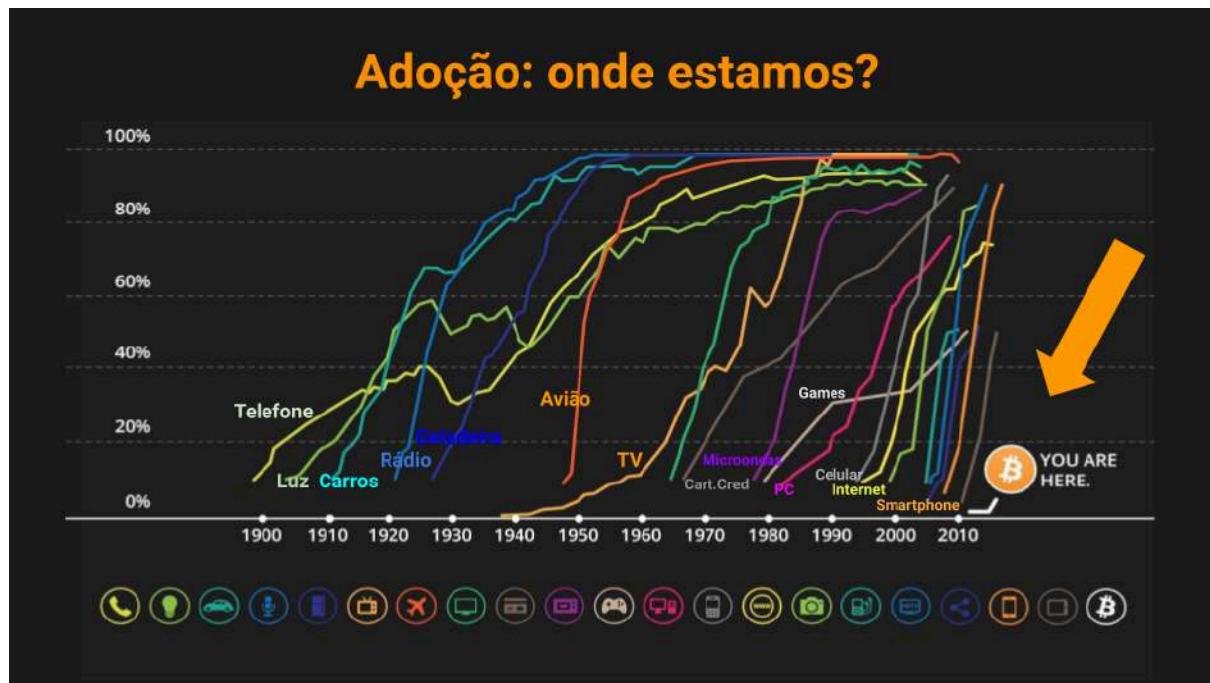
Have you ever heard the phrase “Bitcoin has no top because fiat has no bottom”? Bitcoin tends to continue to appreciate more and more in the long term even with a lot of volatility. This is because everyone needs and demands solid money. Nobody wants money that loses value year after year.

Most people have never encountered deflationary, independent, uncensorable, digital money. Ultimately, Bitcoin is a monetary technology, money that has superior technology and properties. Therefore, the price of Bitcoin also reflects its adoption process.



This has to do with the speed at which new technologies are adopted. Older technologies took around 100 years to be used by almost 100% of the population, such as the telephone, lights and cars. This delay in adoption forms the well-known S-curve of adoption.

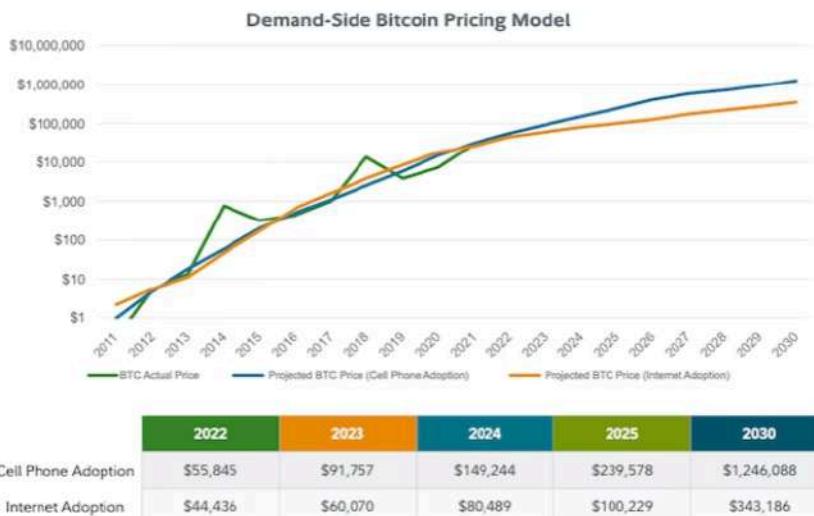
New technologies such as the internet, cell phones and smartphones took around 10 to 20 years to be adopted. The S-curve has turned into a J- or I-curve, where adoption is vertical and faster.



This is why bitcoin tends to have an adoption more similar to new technologies, even though it is something that disrupts centuries of money monopoly by centralized entities.

This image shows where we are in the speed of adoption and, just like the internet, bitcoin may have a slower adoption in its first decade and accelerate in the following decades. This is what this study of fidelity shows.

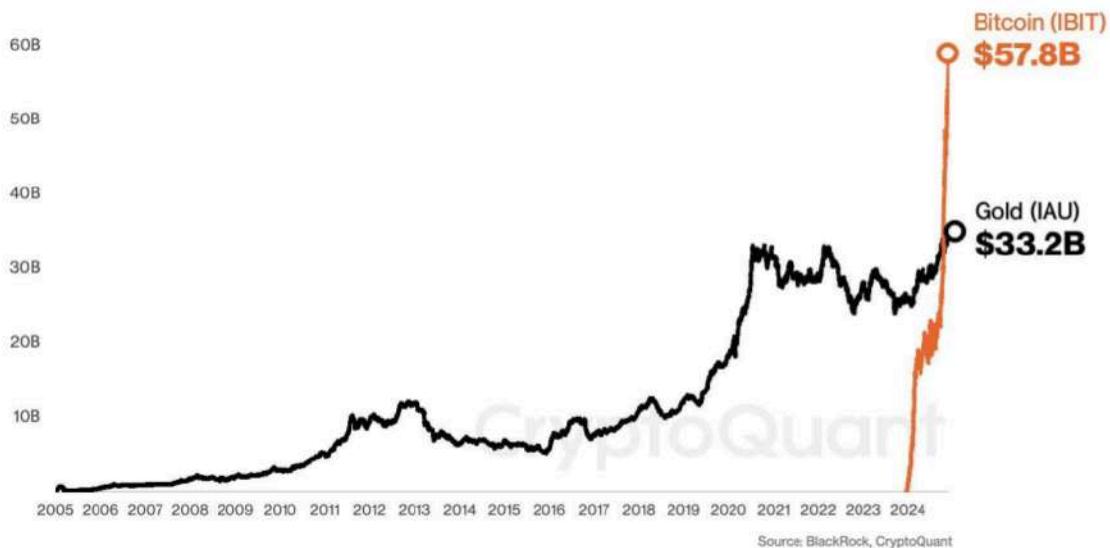
FIDELITY



Yesrrien Timmer, who is the director of Global Macro at Fidelity Investments, posted this graph comparing bitcoin appreciation models if it followed the speed of cell phone or internet adoption. If bitcoin keeps up with the speed of the cell phone, its price would make a movement similar to the blue line, reaching 150 thousand dollars in 2024, 239 thousand dollars in 2025 and would surpass one million in 2030. If it follows the speed of the internet, there will be more slow, around 80 thousand dollars in 2024, 100 thousand dollars in 2025 and 343 thousand dollars in 2030.

In other words, depending on demand and comparing with the adoption of other technologies in the past, you can get an idea of the speed of adoption and consequent appreciation of bitcoin.

BlackRock iShares ETF AUM: Gold vs. Bitcoin



Bitcoin is already showing signs of how its adoption is faster than other financial technologies. The Bitcoin ETF itself, when launched in 2024, did in 8 months what the gold ETF took 19 years to do: reach 33 billion in value of assets under management.

The greater the AUM value, the assets under management, the greater the size, popularity and liquidity of the ETF. A higher AUM can mean that the ETF is attractive, trustworthy and well-established in the market. And observe how Bitcoin reached this mark in a vertical line, while the gold ETF made the classic S-curve of older technologies.

Bitcoin tends to continue to appreciate in value because it is a superior financial technology, which is in high demand and should continue to be so. After all, the world is just starting to learn about Bitcoin and accumulate it.

Bitcoin

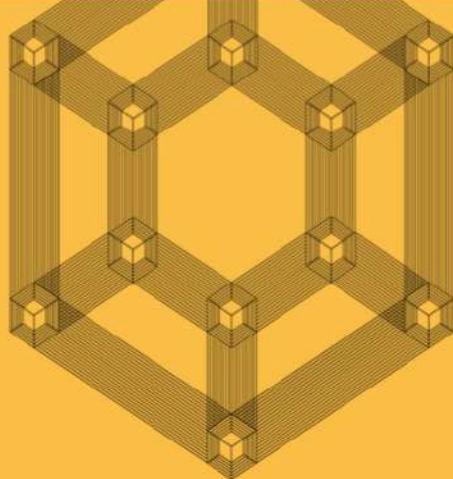
ARK INVESTMENTS

A Durable Network

We believe Bitcoin's long-term opportunity is strengthening. Despite a turbulent year, Bitcoin has not skipped a beat. Its network fundamentals have strengthened and its holder base has become more long-term focused.

Contagion caused by centralized counterparties has elevated Bitcoin's value propositions: decentralization, auditability, and transparency.

The price of one bitcoin could exceed \$1 million in the next decade.



Research by Yassine Elmandjra, Crypto Lead
Frank Downing, Director of Research, Next Generation Internet
David Puel, Research Associate

Sources: ARK Investment Management LLC, 2023. Forecasts are inherently limited and cannot be relied upon. For informational purposes only and should not be considered investment advice or a recommendation to buy, sell, or hold any particular security or cryptocurrency. Past performance is not indicative of future results.

Ark investments, a globally famous manager for having funds with different types of technology, also made a price projection at the beginning of 2023.

According to their report, Bitcoin is a long-term opportunity and that, despite the year 2022 being turbulent, bitcoin remained firm and strong, its fundamentals have strengthened and its hodlers have further developed a long-term vision. The contagion effect that occurred in 2022 with the bankruptcy of Celsius and FTX made Bitcoin's value proposition such as decentralization, auditability and transparency even more evident. And even though bitcoin could surpass one million dollars in the next decade.

BIG IDEAS 2023: BITCOIN

65

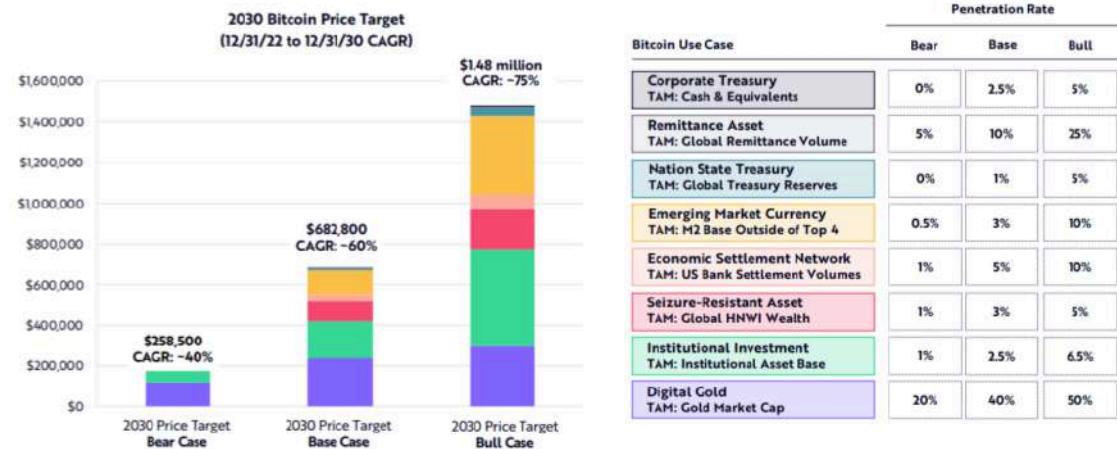


Bitcoin Is Likely To Scale Into A Multi-Trillion Dollar Market

ARK's research estimates that the price of one bitcoin could exceed \$1 million by 2030.

Price Target Assumptions

Penetration Rate



[II] In this year's presentation of Bitcoin price target, ARK has added bear, base, and bull price targets as opposed to the single price target given in 2022's Big Ideas report. Sources: ARK Investment Management LLC, 2023. Forecasts are inherently limited and cannot be relied upon. For informational purposes only and should not be considered investment advice or a recommendation to buy, sell, or hold any particular security or cryptocurrency. Past performance is not indicative of future results.

In Ark's calculations, they establish 3 possible scenarios: the pessimistic (bear case), the median (base case) and the optimistic (bull case), all until 2030. This is if BTC absorbs part of the liquidity of other markets, such as gold, institutional investments, as a censorship-resistant asset, as a currency of emerging countries in crisis, as part of the national treasury, as a remittance asset and as an asset on company balance sheets. Shockingly, how bitcoin can be part of all these categories, few assets can fulfill all of these. papers...

If Bitcoin has a CAGR, an average compound annual growth of 40% per year until 2030 it should be worth \$258,000. And believe me, this growth is pessimistic, in the parabolic portfolio module you will understand why.

In the base case, the ok - average scenario, it would have a CAGR of 60% per year and a price in 2030 of 682 thousand dollars. And in the bull case, the optimistic scenario the CAGR would be approximately 75% per year and the price would be 1.48 million dollars. Ark is super long on Bitcoin and believes it will be a multi-trillion dollar market in the coming years as it absorbs value from other assets and advances in adoption.

This is where the next category of theories emerges.



Absorption theories are the theories that bitcoin will suck up liquidity and value that would go to other assets as investors agree to increasingly expose themselves to it and add it to their portfolio. These theories consider Bitcoin to be a sponge that little

by little sucks liquidity from the fiat system full of bad investments and negative interest rates.

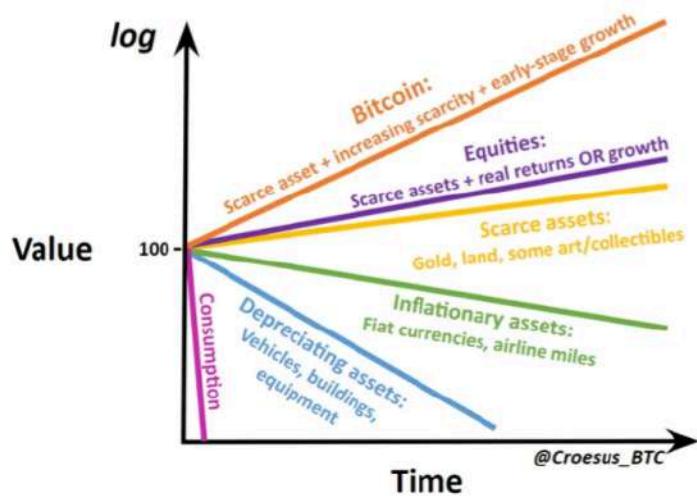


According to Jesse Meyers, who has been posting several studies and projections for bitcoin, it could capture 25% of global wealth and could be worth 10 million dollars in the future.

<https://www.onceinaspecies.com/p/bitcoins-full-potential-valuation>

He posted this in the article "bitcoins full potential valuation".

Bitcoin compete com todos os ativos



<https://www.onceinaspecies.com/p/bitcoins-full-potential-valuation>

This is because bitcoin competes for liquidity with all assets, as shown in this image. It competes with assets that lose value such as vehicles and products, it competes with inflationary assets such as fiat currencies, it competes with scarce assets such as gold, real estate and collectibles, it competes with equities that encompass scarce assets and also those that pay returns on growth. Bitcoin tends to grow more than everyone else because it mixes all of this into a single asset in the initial stage of appreciation and growth.

Store-of-Value	Total addressable market (\$T)	Bitcoin capture	Bitcoin full potential (\$T)
Gold	12	50%	6
Cars, other collectibles	6	5%	0.3
Fine art	18	5%	0.9
Stock market	115	15%	17
Real estate	330	15%	50
Bonds	300	30%	90
Money	120	30%	36
<small>@Croesus_BTC</small> \$900T		\$200T <small>(meaning ~\$10m/BTC)</small>	

According to surveys that Jesse carried out, bitcoin can absorb 50% of the market capitalization of gold, 5% of the market capitalization of collectibles, 5% of the art market, 15% of the stock market, 15% of the real estate market, 30 % of government bonds and 30% of the value in cash. Which could take bitcoin to a market capitalization of 10 trillion dollars, approximately 10 million dollars per Bitcoin, or 50 million reais per unit of bitcoin.



Bitcoin had a market cap of 400B when Jesse made this calculation in February 2023. If Bitcoin absorbed half of gold's market cap it could multiply by 30x in value. And if it reaches its full potential, the appreciation could be 500 times.

CÁLCULOS FREESTYLE



And now some classic baker's calculations that have been circulating on the internet since the time when Hal Finney exchanged ideas with Satoshi.

Re: Bitcoin v0.1 released

"Hall Finney" - Sun, 11 Jan 2009 10:22:14 -0800

Satoshi Nakamoto writes:

- > Announcing the first release of Bitcoin, a new electronic cash system that uses a peer-to-peer network to prevent double-spending.
- > It's completely decentralized with no server or central authority.
- >
- > See bitcoins.org for screenshots.
- > Download link:
<http://downloads.sourceforge.net/bitcoin/bitcoin-0.1.0.tar.gz>

Congratulations to Satoshi on this first alpha release. I am looking forward to trying it out.

> Total circulation will be 21,000,000 coins. It'll be distributed to network nodes when they make blocks, with the amount cut in half every 4 years.

- > first 4 years: 10,500,000 coins
- > next 4 years: 5,250,000 coins
- > next 4 years: 2,625,000 coins
- > next 4 years: 1,312,500 coins
- > etc...

It's interesting that the system can be configured to only allow a certain maximum number of coins ever to be generated. I guess the idea is that the amount of work needed to generate a new coin will become more difficult as time goes on.

One immediate problem with any new currency is how to value it. Even ignoring the practical problem that virtually no one will accept it at first, there is still a difficulty in coming up with a reasonable argument in favor of a particular non-zero value for the coins.

An amusing thought experiment. Imagine that Bitcoin is successful and becomes the dominant payment system in use throughout the world. Then the total value of the currency should be equal to the total value of all the wealth in the world. Current estimates of total worldwide household wealth that I have found range from \$100 trillion to \$300 trillion. With 21 million coins, that gives each coin a value of about \$10 million.

So the possibility of generating coins today with a few cents of compute time may be quite a good bet, with a payoff of something like 100 million to 1! Even if the odds of Bitcoin succeeding to this degree are slim, are they really 100 million to one against? Something to think about...

Hal

The Cryptography Mailing List

Riqueza no mundo / 21 milhões
\$100 a \$300 trilhões / 21 milhões

\$10 milhões (2009)

In email exchanges between Hall Finney and Satoshi, they even calculated how much a bitcoin could be worth if it absorbed all the wealth in the world. At the time, the world's wealth was somewhere between 100 and 300 trillion dollars. Dividing this by 21 million btc would give about 10 million dollars per bitcoin. But that was in 2009, let's see what it would be like at current values.

CÁLCULO VERSÃO ATUAL

Riqueza no mundo / 21 milhões

\$900 Trilhões / 21 milhões

**\$40 milhões
por 1 BTC**



Today wealth in the world is around 900 trillion dollars, divided by 21 million would be equivalent to 40 million dollars per unit of bitcoin. That's why I'm not even discounting the lost Bitcoins, which would further increase the scarcity and value of Bitcoin in this calculation.

BITCOIN VS BONDS

Bitcoin pode substituir títulos, diz Cathie Wood

Última atualização: 4 de março de 2021 às 08h50 ET
Primeira publicação: 27 de fevereiro de 2021 às 13h05 ET

Por Andrea Rinaldi [Seguir](#)

'A renda fixa fez 40 anos de muito trabalho... Se o Bitcoin representa uma nova classe de ativos, por que não investir nele?'

Vai substituir bonds!



É um seguro contra os bonds!

Another theory that has been gaining traction is that bitcoin could demonetize bonds, government securities, due to the drop in confidence in them. As investors and people lose confidence in governments that they can pay their debts to creditors and in their printing presses, it is possible that liquidity that would go into government assets will no longer go. Remembering that government bonds are considered the safest and most risk-free, which is not true. You saw in macro classes that there are titles with negative profitability with each crisis that happens.

As bitcoin is much more transparent, auditable, verifiable and immutable than politicians, people are likely to trust it much more than governments who act in accordance with their own interests. That's why Ark Investments' Cathie Wood and risk manager Greg Foos have been talking about how bitcoin can absorb value from bonds and even replace bonds in the future.



According to Greg Foss, governments and the fiat system are supported by debt and that this debt can be the trigger for a massive loss of confidence and then bitcoin starts to be seen as insurance against the government.

The bond market, government bonds, is worth around 400T dollars at the beginning of 2024, these bonds are given as guarantees for debts between banks and governments. If 10% of this value leaves these bonds and goes to bitcoin, bitcoin's market cap could reach 40 trillion dollars. 40 trillion divided by 21 million btc would give 2 million dollars per btc, or 10 million reais.

This is only with a small change in people's perception of risk. If the world realizes that fiat is a bubble, this could happen overnight.

Bitcoin 21-Year Price Forecast				
	2024		2045	
	Bear	Base	Bull	
				
฿ Price	\$65K	\$3M	\$13M	\$49M
฿ % of Assets	0.1%	2%	7%	22%
฿ Market Cap	\$1.3T	\$68T	\$280T	\$1,030T
฿ ARR		21%	29%	37%

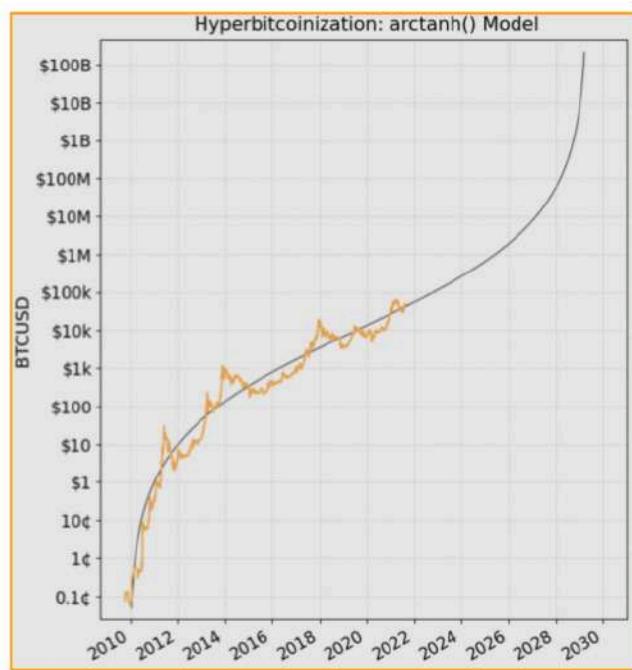
Michael Saylor, founder of Microstrategy also projected Bitcoin in three different scenarios: pessimistic (bear), base or optimistic (bull). In this calculation, he projected the price of Bitcoin until 2045 if it absorbed 2%, 7% or 22% of the value of global assets. According to Saylor, in the worst case scenario if Bitcoin absorbs just 2% of the value that is in other asset classes it could reach 3 million dollars per BTC in the next 20 years. In the base case it would reach 13 million and in the bullish case it would reach an impressive 49 million dollars per unit.

That's why looking at Bitcoin at 100k dollars at current levels seems extremely cheap when compared to the potential it has projected by these various studies and calculations.



Even the Simpsons have already predicted the price of bitcoin in one of the episodes where a news sign appears that suggests that the price of bitcoin has gone to infinity. But it's obvious that no one took this projection seriously, despite The Simpsons having already got it right several times.

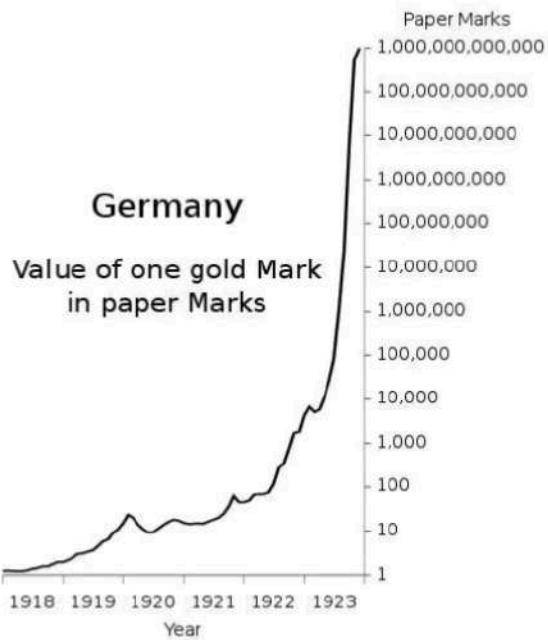
STOCK TO FOMO



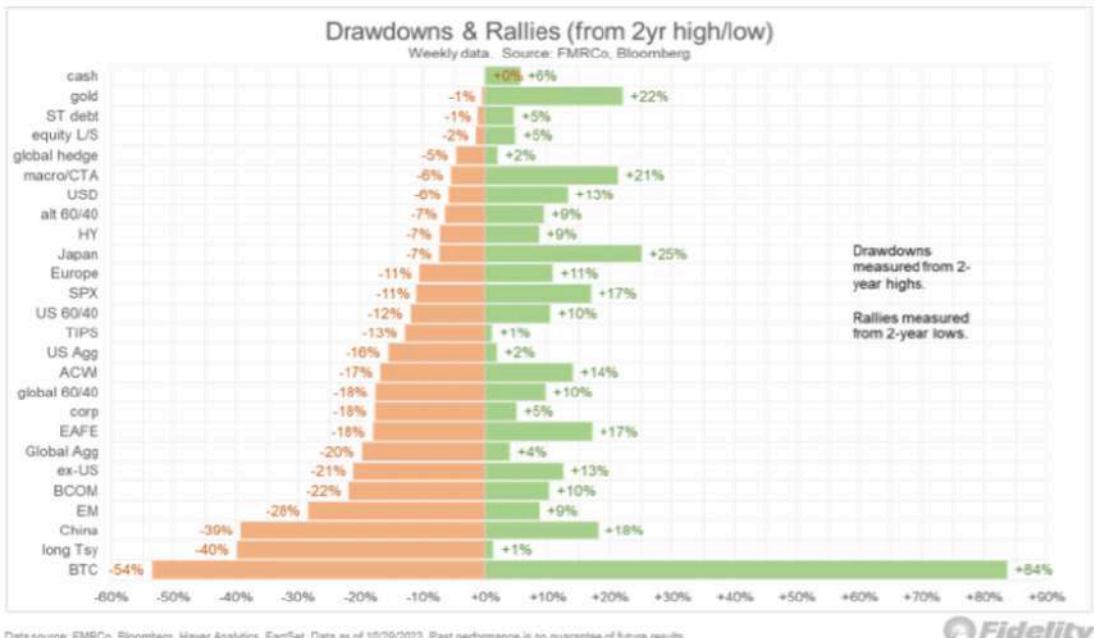
This Simpsons prediction of bitcoin to infinity is basically what the stock to fomo chart shows, which is a rapid adoption chart and a satire of stock to flow. What if the world went into desperation mode and decided to buy bitcoin in a hurry? The result would be this graph. A large vertical and upward risk.

That's why FOMO: fear of missing out, or fear of missing the chance to buy.

A HISTÓRIA NÃO
SE REPETE, MAS
ELA RIMA



It sounds crazy, but this has happened before, it's that saying: history doesn't repeat itself but it rhymes. In Germany in 1914, with the hyperinflation of the German mark, gold entered a vertical parabolic movement. When the fiat currency at the time collapsed, gold appreciated just like the stock to fomo chart. In other words, bitcoin does not need to explode in adoption to have a graph like this. If fiat currencies enter hyperinflation, one by one each country could have a graph like this in their local currencies, only no longer in gold, but in bitcoin.



Data source: FMRCo, Bloomberg, Haver Analytics, FactSet. Data as of 10/29/2023. Past performance is no guarantee of future results.

This is why traditional fiat investors are only now starting to realize that bitcoin volatility is not necessarily a bad or dangerous thing. Because just as it falls a lot, its recovery is much faster than any traditional asset and it also does not permanently melt in value like fiat currencies do.

This is what this image shows, in which the Fidelity manager for a period of 2 years, compared bitcoin, at the end of the list, with several other traditional assets, such as fiat currencies, gold, shares, bonds, etc. Bitcoin had the biggest drop, but also the biggest returns, which demonstrates a great buying opportunity for those who understand this volatility and cycles.

PESSOAS, EMPRESAS E PAÍSES



It is because of the greater understanding about bitcoin and everything we have explained so far that people, companies and countries are accumulating, encouraging and entering the Bitcoin industry.

Steve Wozniak (founder of Apple), Stanley Druckenmiller (renowned investor), Cathie Wood (manager of Ark Investments), Robert Kiyosaki (author of the book Rich Dad, Poor Dad) and Jack Dorsey (founder of Twitter, now X), are examples of entrepreneurs in different niches who support Bitcoin. Companies like Microstrategy, Block, Tesla and Rumble also added Bitcoin to their cash registers. Even countries already have Bitcoin, whether buying or mining it, as is the case with El Salvador and Bhutan, or indirectly through seizures, as is the case with the USA and China.



This all means that Bitcoin should continue to appreciate because everyone wants and needs reliable money that does not lose value and has predictable properties.

This is why the Bitcoin price chart is rising, volatile but also exposes growing adoption.

(opens fabric)

In this class you understood why Bitcoin should continue to appreciate in the long term, we presented several calculations of possible future prices of bitcoin. It's cool to take a look at these possibilities, follow what great managers are projecting. This class probably gave people FOMO, right? But it is important to say that these are theses, projections, and in fact there is no way of knowing in the short term what will

happen with bitcoin. Anyone who says they know is lying to you. You can just prepare yourself for all scenarios, both up and down and keep your feet on the ground.

At the end of the day, Bitcoin is a global and long-term trend. Preparing today is easier than regretting not getting involved in 10 or 30 years.

In the next class you will learn ways to have Bitcoin and how to start accumulating it.

6- How to have bitcoin?

Explain access methods: Exchange, p2p or circular economies accepting as payment

The race to have Bitcoin has already begun and if you are thinking about having a whole bitcoin, you better be quick because time is running out and it will get increasingly difficult. But the good news is that there are 2.1 quadrillion satoshis and little by little you can accumulate them until you get your entire Bitcoin. You can accumulate fractions of Bitcoin.

BITCOIN POR PESSOAS NO MUNDO

$$\frac{21.000.000 \text{ BTC}}{8.000.000.000 \text{ PESSOAS}} = 0.002625 \text{ BTC}$$

262.500 sats por pessoa (-\$245 no preço atual \$94.000)

Today there are around 8 million people in the world. If there can only be 21 million Bitcoins by the year 2140 and most of these Bitcoins have already been mined, it means that if everyone in the world wanted to have Bitcoin, each person could only have 0.002625 BTC. Around 260 thousand satoshis, which represents 245 dollars at the current price of 94 thousand dollars.

There is not enough Bitcoin for the whole world, nor for all the millionaires in the world. But there is satoshis in abundance for all inhabitants of the earth. Because a whole Bitcoin is rounded, it means that the person has 100 million satoshis.

And here I'm making estimates of 21 million units, but we probably won't have that total available since 20% of the bitcoins mined were lost in wallets without access to passwords. Which makes bitcoin even more scarce. It is estimated that of the 21 million bitcoins, 4 million were lost by people who lost their wallet keys.

FORMAS DE TER BITCOIN



MINRAR



COMPRAR
(EXCHANGES, ON RAMPS, P2P)



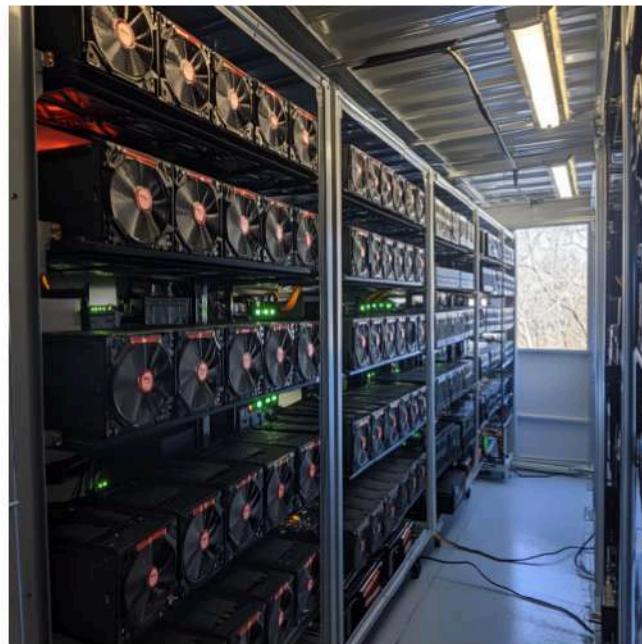
**ACEITAR
PAGAMENTOS**

There are three ways to have Bitcoin. The first and most classic way is to mine Bitcoin! It is through mining that new bitcoins enter the market and it is a way for you to receive bitcoin directly from the network when you provide work for it. You employ computing power, help mine a block and receive Bitcoin as a reward. Of course, nowadays you need powerful equipment to mine a large amount of Bitcoin but it is something that you can study, specialize in and start competing in mining.

The second way to have Bitcoin is to buy from someone who has Bitcoin. Today there are also platforms that facilitate the purchase of Bitcoin such as exchanges, on ramps, even banks are selling Bitcoin. Today it is much easier to buy Bitcoin than 10 years ago.

And the most independent way to have Bitcoin other than mining is by accepting it as payment in exchange for products or services you offer. Let's understand how each of these ways works.

MINERAÇÃO



Mining is a way to obtain Bitcoin directly from the network, without having to buy it from another person or platform. Today, mining has become a highly specialized industry, with operations ranging from small individual miners to large mining farms. These farms use advanced technologies and, in many cases, use energy that would otherwise be wasted, helping to put these resources to productive use while helping to ensure the functioning of the Bitcoin network.

HOME MINING



You don't need to have a large mining farm to get started. It is possible to mine Bitcoin at home, as long as you are willing to learn how the machines work, carry out maintenance, optimize energy efficiency and understand electrical wiring well. After all, it was with home mining that it all started, and it is through this that this practice could become increasingly accessible and common in the future.

BITAXE NERDMINER



Currently, there are machines like Bitaxe and Nerdaminer, which have reduced computing power compared to the powerful ASICS. Despite this, they can be connected to a mining pool to receive small rewards in satoshis (sats) or even used to try your luck at solo mining.

Bitcoin mining is constantly evolving, and who knows, in the future, maybe even your kitchen appliances will be helping you mine Bitcoin!

In addition to mining you can also buy Bitcoin from another person or company that has bitcoin.

FORMAS DE COMPRAR

Exchanges e Contas digitais



P2P



Vouchers



Telegram



Bancos



There are several ways to buy Bitcoin. You can buy through exchanges, platforms that function as digital exchange offices. You can buy from another person who has Bitcoin, the famous P2P (peer-to-peer). You can purchase vouchers or gift cards that can be redeemed for Bitcoin. You can buy through social networks that have Bitcoin buying and selling channels such as Telegram or Nostr. And finally, currently even banks sell Bitcoin and you can buy from them.

Now let's talk about each of these ways, their advantages and disadvantages.

EXCHANGES OU CORRETORAS

**Intermediação
entre compradores
e vendedores**



Exchanges are companies that connect buyers and sellers, ensuring that both sides that are negotiating receive what is being negotiated in a practical way. The exchange is an intermediary between two people who don't know each other and who want to trade bitcoin.

COMO FUNCIONA A NEGOCIAÇÃO



So for example, here in this image there are Ana and João. They both have accounts on the

same exchange and they don't know each other and won't know each other. Ana wants to buy bitcoin and João wants to sell bitcoin. The two place an order on the exchange.

Ana placed an order to buy bitcoin at a price of 100 thousand dollars and João created an order to sell bitcoin at a price of 100 thousand dollars. So here in this example, one wants to buy and the other wants to sell for the same value as the bitcoin price at that moment. And so this negotiation worked. The orders of one and the other are executed at the broker, João's bitcoin balance is settled in fiat or another currency and Ana receives the bitcoin balance that previously belonged to João in her bitcoin wallet within the exchange.



These buy and sell orders that I mentioned are made through a mechanism called an order book or order book. This is the classic way of trading on an exchange, but today there are other ways besides this, there are simplified ways where you don't see these orders.

In this image here we can see the list of sales orders in red and below, in green, the lists of purchase orders. Each order in the book includes the price at which someone is willing to buy or sell Bitcoin, as well as the amount of Bitcoin they want to buy or sell at that price. Orders are generally organized by price. There you can see that purchase orders are organized from the highest to the lowest price that buyers are willing to pay. Sell orders are arranged from the lowest to the highest price that sellers are willing to accept.

VANTAGENS X DESVANTAGENS

Praticidade



Privacidade



The big advantage of buying on exchanges is practicality. In just a few minutes you can open an account, transfer fiat currency and you can start buying bitcoin. It doesn't matter where you are and it's open 24 hours a day from Sunday to Sunday.

However, if you are looking for privacy, this will not be the best way to buy, as these are companies and as such they follow the regulations of their countries. Most ask for KYC, which means know your customer, that is, customer data at the time of registration. There is generally a lower negotiation limit with basic data and if you want to negotiate larger amounts, they ask for more documents.

RISCOS

- Invasão de hackers
- Falta de segurança da plataforma

Negócios Notícias

KuCoin hackeada: exchange tem US\$ 150 milhões em criptomoedas roubados

Por Chico Andrade Instituto - 26 Setembro 2020, 04:01 - 03 Atualizado por Paula Alves - 27 Setembro 2020, 07:31 - 03

Hackers teriam roubado US\$ 150 milhões de exchange em criptomoedas KuCoin. O site de notícias especializada em tecnologia e negócios diz que o roubo é o maior já registrado. KuCoin afirma que a segurança continua os fundos investidos que os clientes do usuário estão seguros. A KuCoin também informou que os usuários podem solicitar reembolsos.

[Leia mais](#)

MAIS LIDAS

- Microsoft anuncia nova versão do Windows 10 com 2000 novos recursos
- Dois aplicativos móveis ganham prêmio para o ano
- Microsoft anuncia investimento de US\$ 10 bilhões para construir novo centro de dados no Brasil
- Microsoft anuncia nova versão do Office para dispositivos e tablets

A screenshot of a news article from UOL Business. The headline is "KuCoin hackeada: exchange tem US\$ 150 milhões em criptomoedas roubados". The article discusses a major hack where US\$ 150 million in cryptocurrencies were stolen from the exchange. It includes a quote from KuCoin stating that user funds are safe and they are offering refunds. Below the main article, there is a section titled "MAIS LIDAS" (Most Read) with links to other news stories.

28/02/2014 14h01 - Atualizado em 28/02/2014 14h01

Mt. Gox entra com pedido de falência e culpa hackers por perda de bitcoins

Ex-líder em negociações da moeda virtual 'sumiu' da web nessa semana. 'Reducir o impacto é o ponto mais importante', disse o CEO da Mt. Gox.

Da Reuters

29 comentários [Twittar](#) [Compartilhar](#)

Mt. Gox, maior casa de câmbio de bitcoins até agora, pediu nesta sexta-feira (28) proteção contra falência no Japão, declarando que pode ter perdido quase meio bilhão de dólares em moedas virtuais devido a invasões.

A screenshot of a news article from UOL Business. The headline is "Mt. Gox entra com pedido de falência e culpa hackers por perda de bitcoins". The article discusses the collapse of Mt. Gox, a major Bitcoin exchange, due to a hack that resulted in the loss of billions of dollars in user funds. The CEO stated that reducing the impact is the most important thing. Below the main article, there is a section for comments and sharing.

And although today the market is more mature and it is relatively safe to buy from these companies, it still has some risks. Today here in Brazil, if you want to undertake and open an

exchange, you will have to go through endless bureaucracy, you will have to ask the government for permission to operate in this market, you will have to follow the rules of IN 1888, which is to report monthly to federal revenue customers' movements. Despite not being banks, exchanges function like banks and are under the eyes of regulators.

The idea of regulation is to eliminate bad actors from the market, but even so it does not prevent these companies from failing due to poor management or hacks. In exchanges, the biggest risk is hacker invasions. It has happened in the past that hackers have invaded exchanges and stolen bitcoin balances, and this has led to several exchanges closing their doors.

RISCOS

- Má administração e falência



veja

ECONOMIA

Corretora de bitcoin declara falência após roubo de moeda virtual

Sul-coreana YoBit anunciou que foi alvo de ataque na segunda; a empresa já havia perdido 4.000 bitcoins no ano, em caso atribuído à Coréia do Norte

Por Da redação | Edição: am | 20 dez 2017, 17h00 | Polêmicas | 28 dez 2017, 14h00

A screenshot of a news article from the magazine 'veja'. The title is 'Corretora de bitcoin declara falência após roubo de moeda virtual'. The text discusses a South Korean Bitcoin exchange that was hacked, losing 4,000 bitcoins. The article is dated December 20, 2017, and includes a photo of a gold Bitcoin coin.

Another risk is bankruptcy. In the case of partners and managers not knowing how to manage the business, or carrying out illegal operations, as happened with FTX, and the exchange goes bankrupt and is unable to return customers' money. In bitcoin exchanges there is no mandatory Credit Guarantee Fund, the famous FGC as it exists in banks and brokers in the traditional market here in Brazil. This means that, if a hacker attack happens, or a broker goes bankrupt, there is no fund to quickly return the value to customers. If this happens, it could take years of legal proceedings for you to get the money back or you could never get your bitcoin back.

EXCHANGE ≠ CARTEIRA



- Facilita trocas entre pessoas
 - Não fornece chaves privadas só o endereço de BTC para depósito
 - Pode travar saldos ou falir
 - Armazena saldo em fiat e em bitcoin
- Ajuda a enviar, receber e armazenar com mais facilidade
 - Te fornece as chaves privadas ou seed
 - Mesmo se a empresa falir vc recupera o seu saldo
 - Não armazena fiat (pix por exemplo)

This is why an exchange is not a wallet and you should not leave your bitcoins in it for long periods of time. Exchange is an access platform only for you to buy and send for your own custody, leaving bitcoin on an exchange means being exposed to the risk of the platform going bankrupt or being hacked and taking your BTC with it.

These are platforms that facilitate exchanges between people, but they do not provide the private keys to customers' wallets, only the address, which is why on the exchange the bitcoin is not yours because you do not have the private keys that allow you to move your coins autonomously. We will talk more about this in the following classes about portfolios and sovereignty.

They can lock up balances and go bankrupt, taking with them both fiat and Bitcoin balances. Wallets are applications and devices that facilitate sending, receiving and storing Bitcoin easily and without depending on third parties. They provide all the information and keys so that you don't depend on anyone to store your Bitcoin. Even if the company that created the wallet goes bankrupt, you can recover your balance in other wallets. and they are not connected to the fiat banking system, they are not banks.

Now let's move on to P2P ways to buy.

O QUE É P2P

P2P é uma forma de transacionar bitcoin diretamente com outra pessoa. **Não tem intermediários.**



Do you remember the Bitcoin white paper? what was written on it...? Satoshi wrote in the title of the white paper "Bitcoin: a peer-to-peer, peer-to-peer electronic payment system", and in the early days of the Bitcoin network, negotiations were basically done like this, directly between people. Nowadays, even with so many exchanges and digital accounts to choose from, the P2P way of trading remains firm and strong and will probably never cease to exist, because no matter how much a country prohibits the use of bitcoin, it is decentralized and open source, so there is no way to prevent people negotiate between itself in a P2P way.

P2P



Vantagens

- Menos burocracia
- Um pouco mais privado
- Envio direto pra cold wallet

Desvantagens

- Mais arriscado
- Taxas mais caras

The biggest advantage of buying P2P is having less bureaucracy and a little more privacy. So for example, buying via P2P you don't need to send all the documents that an exchange often asks for, do facial recognition, send proof of income and address. There are exchanges that are as bureaucratic as a bank. The very fact of having to send a lot of data is bureaucratic. P2P is a little more private, but that doesn't mean it's KYC-free. Many people

buy via P2P because some do not require identification and do not report to the IRS in Brazil, but it is increasingly difficult to find a P2P that does not declare and report. So whenever you negotiate with P2P, ask whether that person declares it or not, so that the information matches correctly and you don't have a headache later.

Another advantage is that P2P sends the bitcoin balance directly to the address, which could be your cold wallet, for example. It's very practical and one less step for you to do. On the other hand, it has disadvantages and risks. As everything is generally done directly online, there is no company intermediating and providing guarantees, so you are the one who has to make sure that the P2P you choose is trustworthy. You need to trust that the person will not disappear with your money and that you will receive the equivalent in bitcoin back in your wallet. There are P2Ps who have been working in the market for a long time and are honest people, but there are scammers too, like in every market.

So how to detect that a P2P is a scammer? First, a P2P will never contact you via Facebook Messenger, Telegram or even WhatsApp offering bitcoin. No serious P2P does this. If they contact you in this way there is a high chance of it being a scam.

Another situation that could happen, if it is a scammer, is that you send the amount to the P2P's bank account and the person simply disappears with your money. The scammer will block you on your cell phone, on social media and disappear with your money. These are the critical situations.

But then where can you find reliable P2P? Many P2P work alone, with their own website or connected to an exchange, but the best thing is to find it through a recommendation from someone you trust. Another way is to buy on P2P platforms, such as Bisq and Hodl Hodl which are global and Peach which is American and is in the development and expansion phase.

ETAPAS DA COMPRA P2P

1º - Tenha uma carteira e aprenda como funciona (assista módulo de carteiras)

2º - Contate um P2P de confiança e solicite cotação

3º - Envie valor em reais e informe seu endereço BTC de recebimento

4º - Aguarde o envio e monitore a transação

In total there are 4 steps when purchasing via P2P.

The first is that you already have an address in a bitcoin wallet, you will learn how to do this in classes 8, 9 and 10 here in Bitcoin 4 all. Watch before making your first P2P purchase.

Second, you will contact a trusted p2p and ask for a quote for the amount you want to buy.

Once the quote is approved, you send the amount via PIX or other formats and paste your bitcoin address for sending into the message.

Finally, you wait for the shipment and monitor receipt through a tracking code on the Bitcoin network that p2p will send you.

Another way to buy Bitcoin is using vouchers.

VOUCHERS



Vouchers are gift certificates where you buy a value and redeem it in your digital wallet, as is the case with AZTECO and Bitrefill. Buying Bitcoin through vouchers is more private than through exchanges and you receive the redeemed balance directly in your wallet.

TELEGRAM E NOSTR



There are also online platforms such as Robosats on Telegram and Mostro on the NOSTR protocol that allow the purchase and sale of Bitcoin P2P in discussion groups without necessarily being a centralized company intermediating the operations. This type of purchase generally offers more privacy and less data binding to your Bitcoin purchases.

The important thing about this type of purchase is to make sure you are using the correct platform and not a fake version of them.

BANCOS E CONTAS DIGITAIS



Currently, banks and digital accounts also allow the purchase of Bitcoin. The main difference between these digital accounts and exchanges is that, in digital accounts, you buy Bitcoin directly from the institution, while in exchanges, the purchase is made from other people who have entered sell orders on the platform.

Regardless of where you acquire your Bitcoins, it is essential to transfer them from these platforms to your own wallet and avoid leaving them in third-party custody. Both banks and exchanges are subject to the same risks, such as bankruptcy, hacker attacks or even government seizures.

EXCHANGE TRADED FUND



It's 2024, and traditional financial institutions are vying for space to offer Bitcoin ETFs, both in Brazil and the United States. ETF is the acronym for *Exchange Traded Fund*, which stands for exchange-traded fund. These funds allow investors to buy and sell shares directly on the Stock Exchange, in a similar way to shares, and can be used to trade different types of assets, such as commodities and, now, Bitcoin.

Os ETFs spot of Bitcoin aim to replicate the price of Bitcoin on the spot market, following its fluctuation in value. Each ETF is issued by an institution that follows the rules of local regulators. In Brazil, this role is played by the Securities and Exchange Commission (CVM), while in the United States, the responsible regulator is the Securities and Exchange Commission (SEC).

The main advantage of Bitcoin ETFs is that they offer a regulated way for companies and investors, who normally would not or could not have Bitcoin in their own custody, to expose themselves. These ETFs created a bridge between Bitcoin and the traditional financial market, establishing Bitcoin as a new asset class recognized in this environment.

Furthermore, ETFs actually increase demand for Bitcoin, as funds theoretically need to buy and sell Bitcoin as investors acquire or dispose of ETF shares. In other words, they could not trade Bitcoin without those transactions being backed by purchases or sales of real Bitcoin in the market.

RISCOS DOS ETFS

- **Gestão: depende de intermediários**
- **Não consegue sacar: Bitcoin de papel**
- **Prazo para resgate**
- **Rehipotecagem**
- **Perda das chaves**
- **Confisco**



But ETFs are not real Bitcoin, they are paper Bitcoin that only represent the price of Bitcoin. They do not have the monetary properties or network effect of Bitcoin. They need a manager issuing these papers and it requires trust in these institutions.

You can't withdraw your bitcoin to your wallet, you need to sell it and convert it to fiat. At least there is still no way to buy ETFs and withdraw them in Bitcoin to your own wallet. This means that when you buy an ETF you don't actually have Bitcoin, you are depending on intermediaries to do the custody for you. This defeats the entire purpose of Bitcoin and its sovereignty. You end up exposing yourself only to the price, but you don't have the freedom to transact your currencies and the sovereignty that Bitcoin provides.

In addition, there are redemption and trading deadlines within the exchanges' opening hours, during business hours. Bitcoin works 24 hours a day, every day of the week. If the price falls or rises over the weekend, the ETF will only reflect this on Monday. You spend the weekend and holidays without being able to buy or sell.

You don't buy and sell freely and withdraw it to your wallet, as happens when you buy bitcoin directly. The redemption period for ETFs is generally 2 business days (T+2) after the order is executed, according to B3 regulations. This time gap is an eternity if tense news starts to emerge about the possibility of management companies going bankrupt or something like that.

Another risk is rehypothecation, of issuers making risky operations with customers' Bitcoins that may only appear years later and be a headache. It would be something like them using customers' BTC to provide collateral for loans to buy other assets. This is not such an unrealistic thing to happen, this is basically how FTX went bankrupt in 2022.

This type of operation, using customers' money, is obviously illegal, but the market does things behind the scenes that we can't even imagine. In this rehypothecation situation, if the price of Bitcoin plummets they could be liquidated and lose their customers' BTC.

Another risk is the poor management of the private keys of the bitcoins they have under management. Some managers take custody of clients' bitcoins, but most ETFs and banks use exchanges to hold the BTC they sell. Coinbase, for example, holds the bitcoins of most American ETFs. In these cases, the risk is that these third-party custodians, these exchanges, will go bankrupt or mismanage the keys.

Another risk is seizure by the Government. If bitcoin becomes a global reserve asset and this threatens global hegemonies, a government can easily confiscate BTC from these regulated players. Easier than people who keep their own keys. From one day to the next they invent a bank holiday and people lose access to their own assets. With bitcoin in banks and regulated management companies, it is very easy for governments to confiscate them.

ACEITANDO COMO PAGAMENTO



And finally, the most sovereign way to have bitcoin is to offer your work, products and services, your time in exchange for bitcoin. You transform your work and profit margin into an accumulation strategy and receive it directly without needing to convert anything, it goes straight to your wallet. You even save on fees by doing this.

There are websites and platforms like Bitcoinerjobs where you can look for jobs in companies that pay in bitcoin. Be it something temporary or fixed. Behance also already has a tab where you can choose jobs that pay in Bitcoin.

You can offer your services to other Bitcoiners you know and start your own local circular economy with your friends. After all, for you to receive payment in Bitcoin, someone will have to pay you in Bitcoin. If a group uses Bitcoin as its currency, it is much easier to start with these people.

Furthermore, if you generate incentives, such as a discount, people will be willing to spend some sats to get this discount if your product is good. After all, no one exchanges BTC for a half-assed product! Let's get fancy.

VANTAGENS E DESVANTAGENS

- SEM KYC
- COTAÇÃO DO MOMENTO
- MENOS TAXAS (LIGHTNING)
- SEM INTERMEDIÁRIOS
- MAIS BARATO DE ADQUIRIR
- ECONOMIAS CIRCULARES
- POUcos ACEITAM
- DESCONHECIMENTO
- EDUCAÇÃO (WALLETS E REDES)

Accepting Bitcoin as a payment method offers several advantages that can modernize and simplify financial operations. One of the main ones is the absence of KYC (Know Your Customer). By accepting Bitcoin directly, it is not necessary to carry out identity verification procedures normally required by financial intermediaries, which simplifies transactions, preserves customer privacy and eliminates unnecessary bureaucracy. Furthermore, there is the advantage of taking advantage of the current price. When receiving payments in Bitcoin, the value is transferred immediately, ensuring the use of the current quote and avoiding giant spreads and delays common in transactions that depend on financial intermediaries.

The Lightning Network also makes life much easier, allows fast transactions with extremely low fees, and is especially advantageous for payments of small amounts. Compared to fees charged by credit cards or other digital platforms, this can bring considerable savings.

Another advantage is the elimination of intermediaries. When receiving Bitcoin directly, there is no need for banks or payment companies, which reduces costs, speeds up receipt and avoids problems such as withholding funds or arbitrary or fraudulent cancellations.

For those who already accept Bitcoin, purchasing directly from customers is cheaper than purchasing from exchanges or platforms that charge additional fees. This practice also encourages circular economies, where payments and receipts in Bitcoin strengthen adoption, local use and reduce the need to convert to fiat currencies, saving time and money.

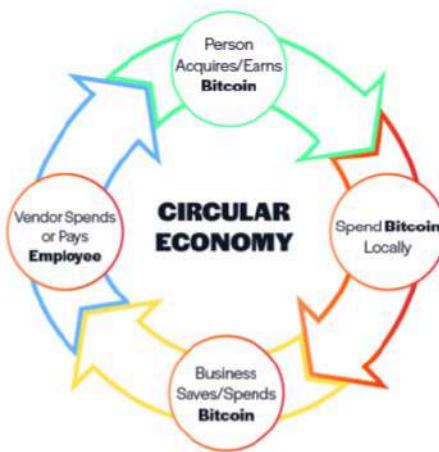
But it also has some disadvantages that need to be considered. One of them is that few use Bitcoin for payments. Although adoption is growing, not many people pay in Bitcoin yet. Furthermore, there are many people who don't want to spend at all, they just want to receive.

Furthermore, lack of knowledge on the subject is a challenge. Many people even want to receive it but don't understand what Bitcoin is or how it works, they find it difficult and become discouraged. Accepting Bitcoin requires knowledge of how to set up a secure

digital wallet and, in many cases, how to use the Lightning Network for fast and cheap transactions. For those just starting out, this learning curve can be a significant obstacle.

But little by little circular economies are becoming increasingly popular, people accepting to receive and pay in Bitcoin are beginning to create a local microcosm of P2P exchanges.

ECONOMIAS CIRCULARES



A Bitcoin circular economy occurs when Bitcoin is used continuously within a sustainable cycle, without the frequent need for conversion to fiat currencies. This model promotes greater adoption, strengthens local communities and reduces dependence on financial intermediaries, creating a more autonomous and efficient system.

The flow of this model begins with acquiring or receiving Bitcoin. A person can acquire Bitcoin by mining, buying on exchanges, accepting it as payment for products or services or even receiving it as a salary. Thus, it now has a decentralized and global asset, which can be used without the need for banks or intermediaries.

Instead of converting your Bitcoin to fiat currency, it directly uses Bitcoin to pay for products and services at local businesses that accept it. Merchants who receive Bitcoin, in turn, can choose to keep part of their revenue in Bitcoin, as a form of savings with potential for appreciation over time, or they can also choose to pay salaries to employees and suppliers who also accept Bitcoin.

This continuous cycle of payments and receipts reduces the need for conversions to fiat currency and increases the use of Bitcoin as money.

The Bitcoin circular economy concept represents a natural evolution in adoption, promotes greater financial independence, strengthening local economies and economic sustainability. For communities that embrace this model, Bitcoin becomes not just a tool of exchange but also a catalyst for innovation and economic resilience.

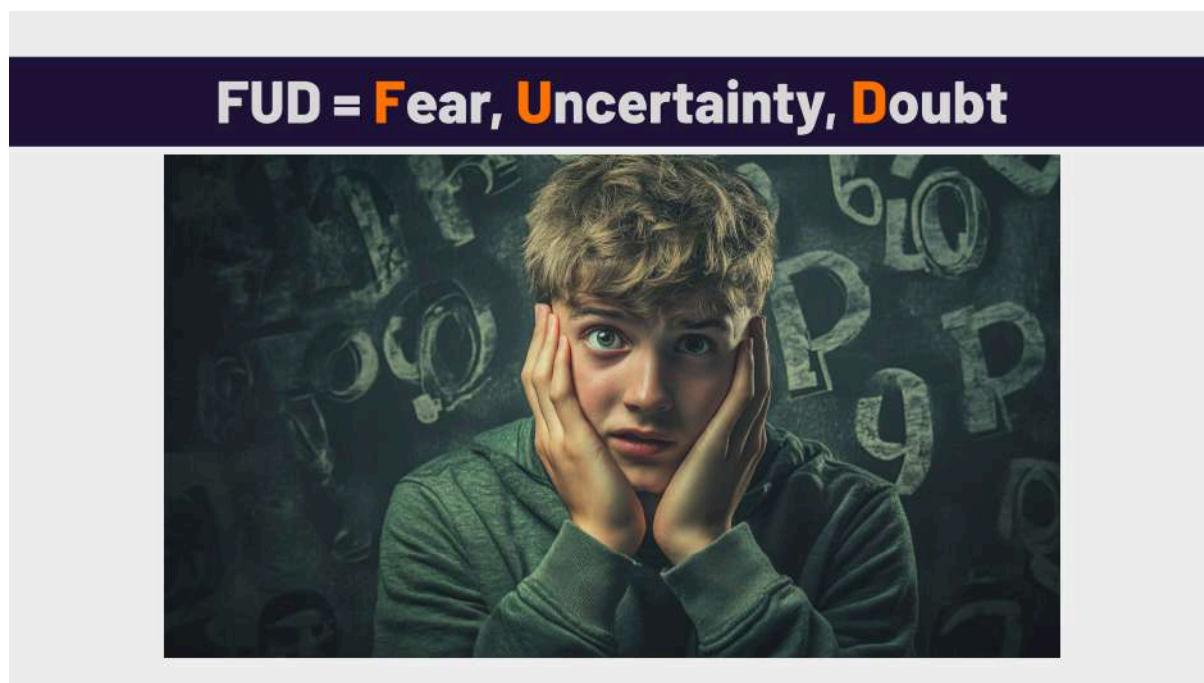
(opens fabric)

Well, I hope you enjoyed this class and realize that there are multiple ways to have Bitcoin. You can use all of these mechanisms to continue accumulating.

Until next class.

7- Countering lies (fuds) about Bitcoin

Since Bitcoin emerged, they have created FUDs to try to convince people that Bitcoin is no good.



FUD is the acronym for fear, uncertainty and doubt. In this class you will uncover the main lies that people tell about Bitcoin and narrative attacks to prevent people from being interested, studying and having Bitcoin. The idea is that at the end of this class you are aware of these fuds so that when they appear, you know that they are nothing more than bullshit. And there is no shortage of FUD on bitcoin, because if there is no way to stop the bitcoin network, the alternative for defenders of the fiat system will generate fear.

FUD Nº 1

BITCOIN É USADO PARA ATOS ILÍCITOS



The first big FUD is that Bitcoin is used by criminals to commit crimes and illicit acts, in drug trafficking, money laundering and even terrorism. It even seems that it was from Bitcoin that crime exploded! No, right! All of this already existed before Bitcoin. Do you know what is used much more frequently to commit crimes?

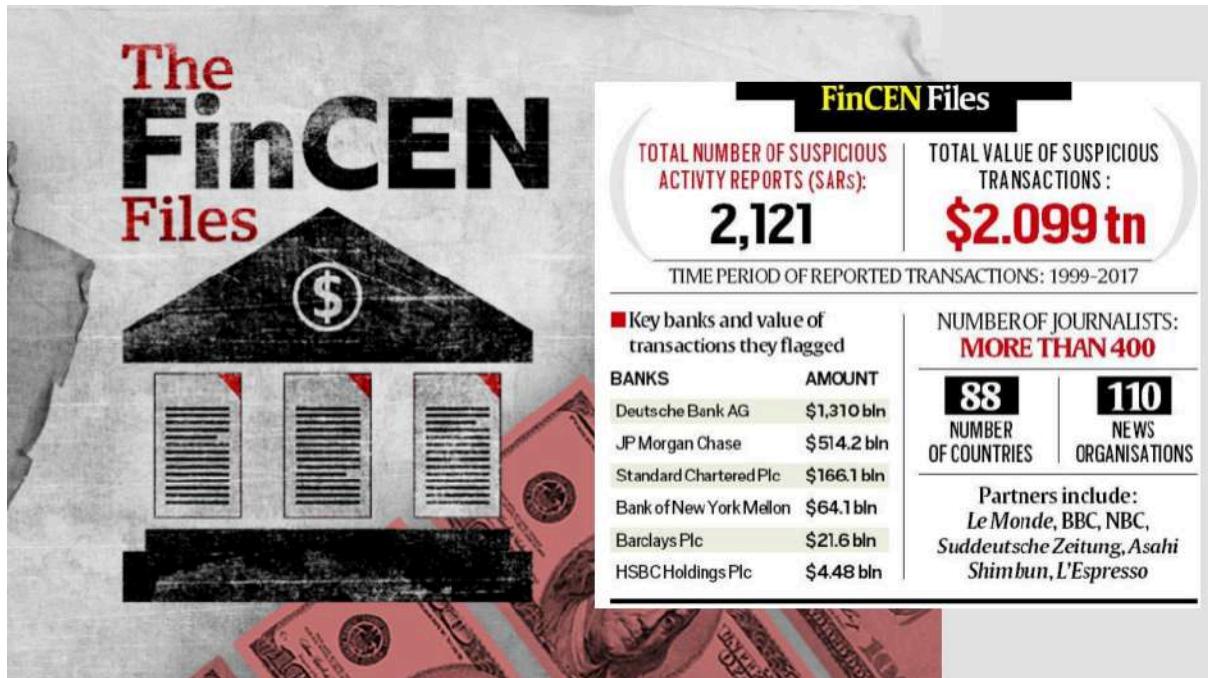


Yes, fiat money created by central banks: the real and the dollar for example. In most police seizures, what they have are bags and bags of physical money, and that doesn't mean people blame the central bank for crimes using government money! Why do they do the same with Bitcoin?

Criminals will use anything that has value to commit a crime. It's not Bitcoin, paper money, wine or gold bars that are to blame. Being used for crimes does not take away the value of

these assets and currencies. Just like no one blames and bans knives for murders. A knife is a tool that can be used for good or evil. Bitcoin is also a tool.

The problem is the crime committed and that is what needs to be investigated and punished. Bitcoin, like gold, is neutral, you can use it to finance an orphanage, donate to charity or use it to finance a gang. It is the use that determines whether the intention is good or bad, not the tool.

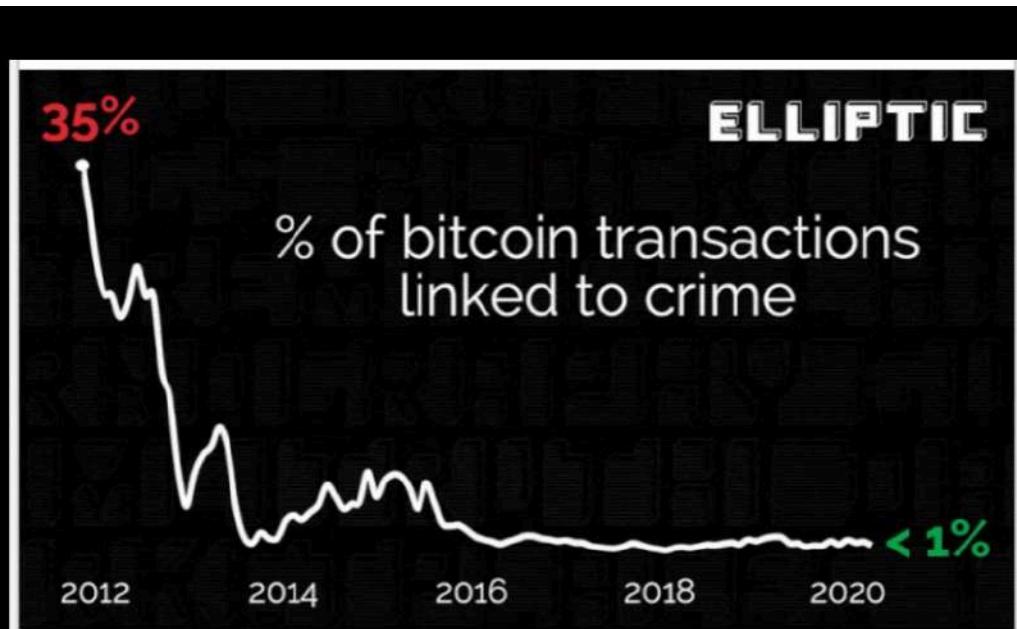


And it has been proven countless times that criminals mainly use banks to launder illicit money. A FinCEN files report demonstrated how banks processed more than \$2 trillion in suspected criminal transactions. Even the largest banks in the world, such as Deutsche Bank and JP Morgan were on the list of entities that processed transactions arising from crimes between 1999 and 2017!

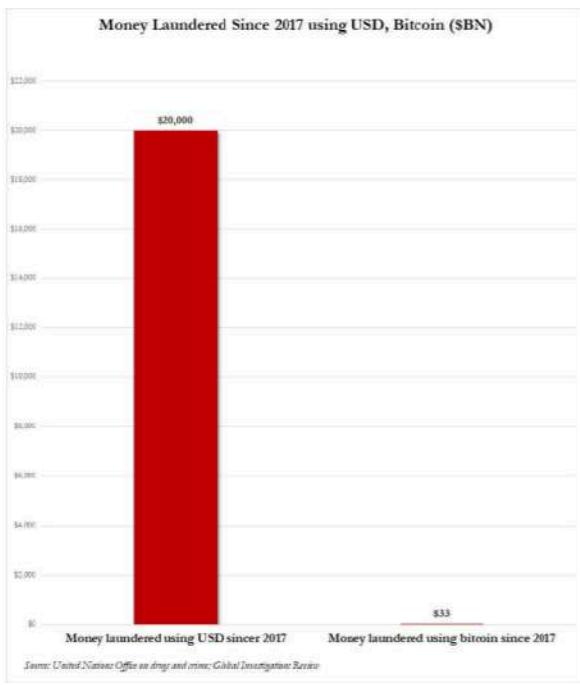
In the end they just paid a fine and continued operating. Two trillion dollars in suspicious transactions is more than twice the current Bitcoin market cap, which is in the range of one trillion dollars.



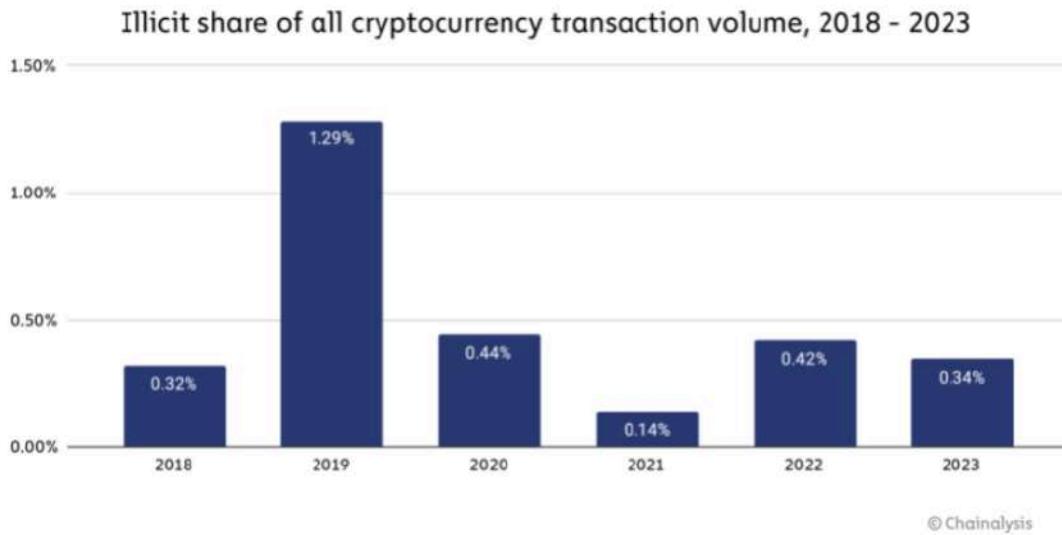
There is even a documentary that shows how HSBC facilitated the laundering of money from drug cartels in Mexico. In other words, banks have always processed money coming from criminals, terrorists, drug trafficking, etc. But they blame it on Bitcoin.



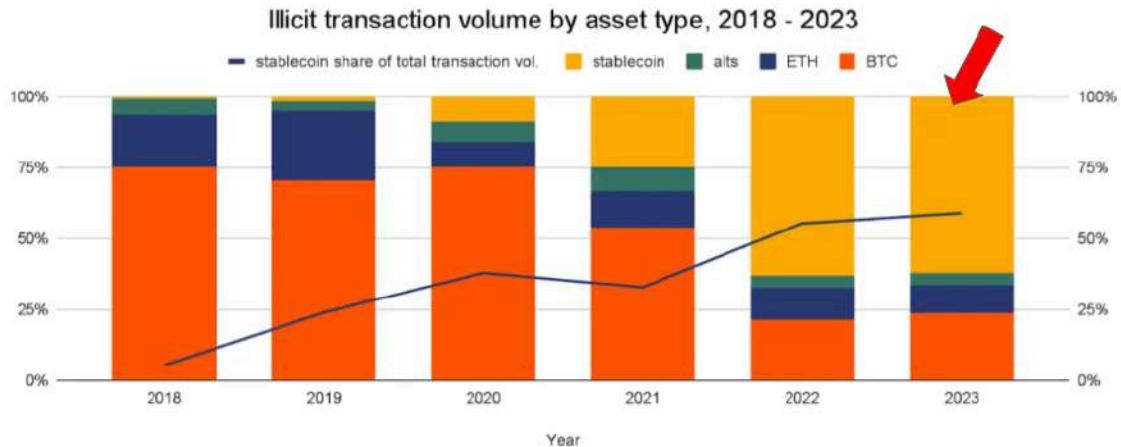
This Elliptic research shows how at the beginning of the bitcoin network, around 35% of transactions had illicit origins. But as it became clearer that the bitcoin network is transparent and there is no way to delete transactions that have already been made, criminals stopped using the network. Today, less than 1% of transactions have illicit origins, especially because no criminal wants to create indelible evidence about themselves. Today this type of use is less than through the dollar and the banking system.



This other study shows the dimension. Since 2017, around 2 trillion dollars have been used for illicit activities, while 33 billion dollars worth of Bitcoin have been used to commit crimes. The dollar is used 60x more than Bitcoin for illicit purposes and 3 to 5% of dollar transactions are used to finance crime. While with Bitcoin it doesn't even reach 1%.



This is what this chainlaisys study shows. Today, less than 0.34% of cryptocurrency transactions overall are used for crime. This is talking about cryptos in general.



Even of this 0.34%, the majority still prefer to use stablecoins, in the yellow column. In other words, criminals prefer to use dollar stablecoins than Bitcoin to commit crimes! In 2022, bitcoin ceased to be the main way for criminals to receive values when compared to cryptocurrencies in general.

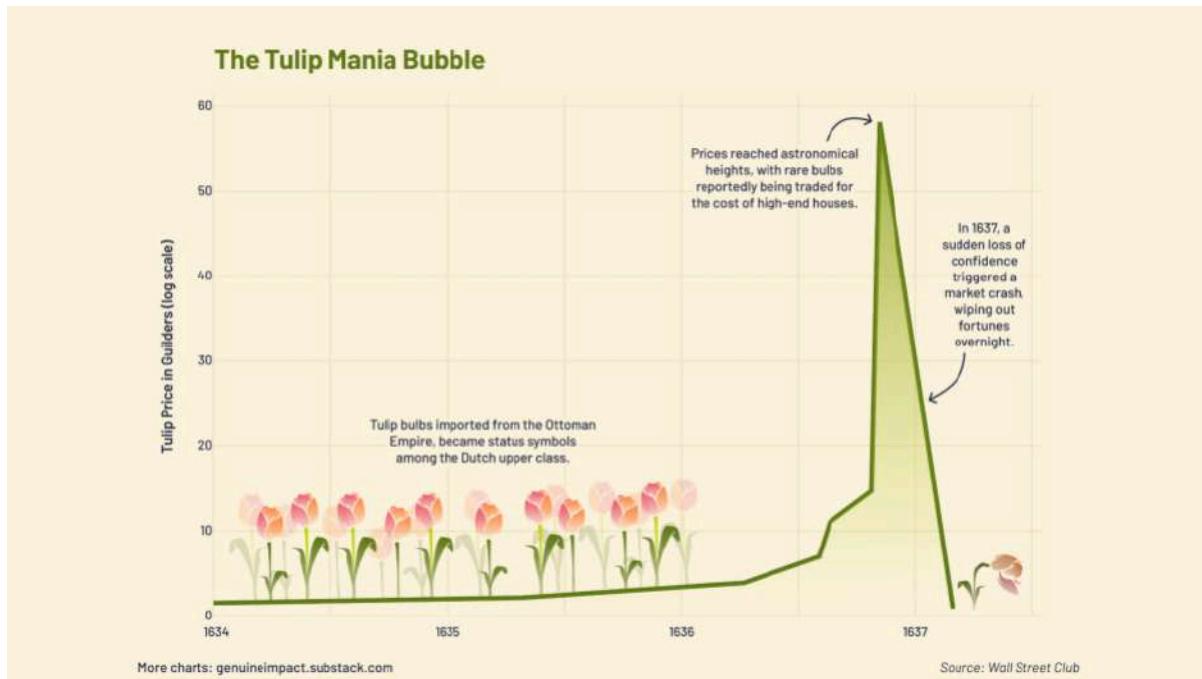
That's why saying that Bitcoin is for criminals is actually for people who don't know what they're talking about. You're just reproducing a false narrative you heard out there. Bitcoin is used less by criminals than the dollar and even stablecoins.



The next FUD is well known: Bitcoin is a bubble!

Bubbles happen when assets appreciate too much and quickly in an unsustainable way.

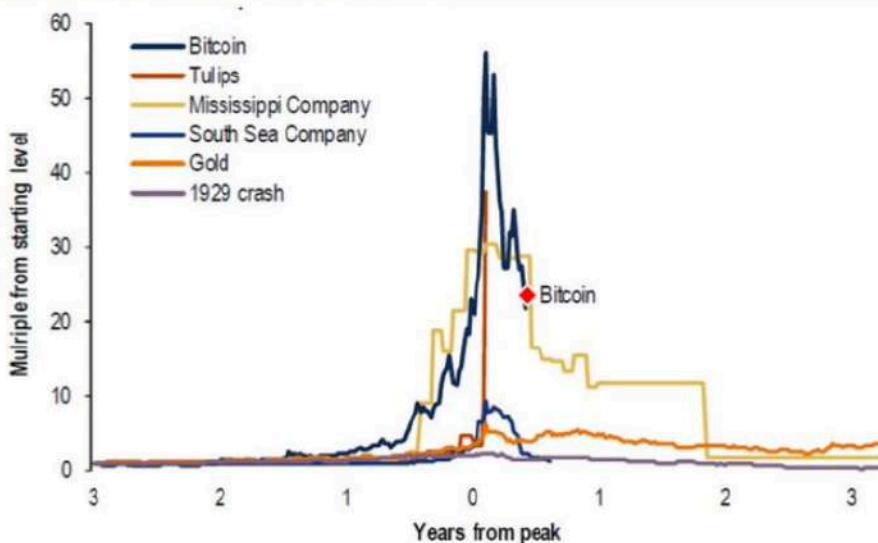
They end up bursting when investors realize that prices are much higher than the fundamental value of the asset. Bitcoin is often compared to “tulip fever,” which is said to have occurred in 17th-century Holland.



The story of tulips in Holland is very famous and describes how suddenly the price of tulips started to rise a lot and then people, thinking it was a good deal, started buying tulips, which made the price rise even more, leading to a stage of generalized euphoria. When people realized that tulips were a plant and that they had no value, they started selling them and the price plummeted. From start to collapse, the tulip bubble took a little over 3 years, from 1634 to 1637. Many people watched their money melt.

There are people who say that this story never happened and that it is actually a metaphor to explain how financial bubbles work. But anyway, tulips are still mentioned today and when someone calls Bitcoin a “tulip” they are referring to this story.

Chart 2: The greatest asset price bubbles in history



Source: BofA Merrill Lynch Global Investment Strategy, Global Financial Data, Garber (2000), Frehen (2012), Bloomberg

Many fiat defenders like to post this image to try to compare bitcoin with other bubbles of the past, showing how bitcoin made a movement similar to the tulip bubbles in red, the Mississippi bubble, the South Sea bubble, etc... But What they don't show is this image here.

Bolhas seguem valorizando?



Source: BofA Merrill Lynch Global Investment Strategy, Global Financial Data, Garber (2000), Frehen (2012), Bloomberg

The reality is that bitcoin has gone through several cycles over 15 years and has always recovered, breaking new high records with each passing halving. A fact that doesn't happen with real bubbles. After they collapse, they never return to value as they did in the past.

Anyone who compares Bitcoin to bubbles is not paying attention to Bitcoin's cyclical movements and this type of comment only exposes the lack of understanding on the subject.

When you update the chart you notice that Bitcoin continues to appreciate even after more than 15 years of calling it a bubble.



Bitcoin moves in appreciation cycles that take it to increasingly higher levels. Every time it falls or rises there is always a skeptic to say that Bitcoin is dead or that it is a bubble. But what happens is that Bitcoin never dies and the bubble never explodes.

Bitcoin's price curve actually reflects the adoption curve growing year after year.



Another common FUD is when they say that Bitcoin has no real use. Unlike gold, which is used, for example, to make jewelry, Bitcoin has no use in the physical world and therefore has no value. If it's not tangible, it's worthless.

(opens fabric)

This is more nonsense. Increasingly, the digital world has displaced the physical world. Companies now have websites and social networks, banks have closed branches and now have apps, newspapers have stopped being printed and now publish on websites. Discrediting bitcoin just because it doesn't exist in the physical world is turning a blind eye to the digital transformation that has been happening in the world for decades!

Being digital only amplifies Bitcoin's properties as money. The fact that Bitcoin has no other secondary use in the physical world is not a disadvantage. Gold became money after centuries of competition with less scarce metals with inferior monetary properties. Its use as adornment and decoration was a case of use as a demonstration of wealth and power, not as a seal of monetary properties. Something that had already been proven centuries before.

Bitcoin does not need to be hanging around someone's neck to have value and Bitcoin's digitality does not disqualify it from being money. If money is a tool that everyone demands to make exchanges and preserve value, bitcoin fulfills this role in a much more efficient and useful way than any other money in history precisely because it is digital and easier to verify and transport.



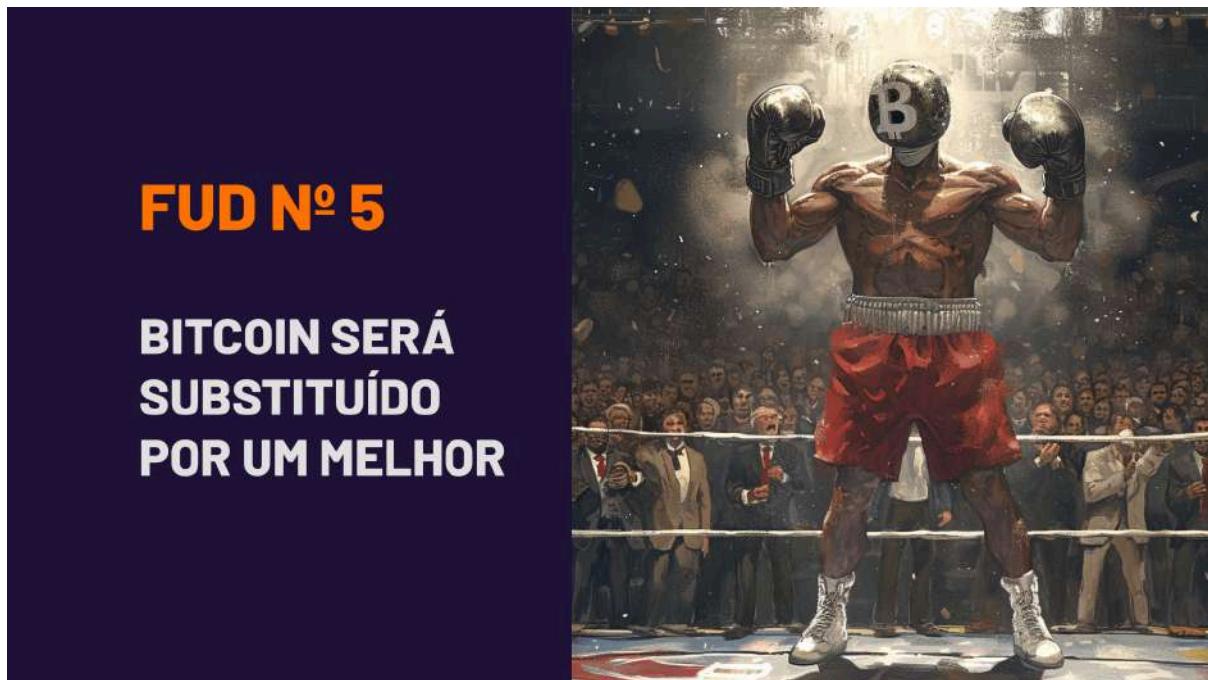
Although bitcoin is not backed by a physical asset like gold, it is worth noting that the dollar, the real and any fiat currency are not backed by gold or any other asset or commodity.

The value of Bitcoin is offering for the first time an alternative, decentralized financial system that cannot be corrupted, inflated or monopolized by anyone, including governments.

Bitcoin's backing is its unique properties that no other asset offers. Bitcoin is the ballast of itself. This talk of intrinsic value just shows how whoever says this doesn't even know how fiat money works and attacks Bitcoin out of pure ignorance.

Gold relies on its atomic properties and these are what guarantee that gold will not change. Gold is its own backing. Nobody asks what the gold is backed by! Bitcoin through encryption, proof of work and p2p networks digitizes and amplifies the properties of gold and this is what gives Bitcoin its value.

Bitcoin is the backing of itself, it is digital gold and that is why in the future it tends to back everything just like gold did in the past.



This is another classic FUD: bitcoin will be replaced by a better competitor!

Millions of cryptocurrencies have already emerged, none of them have come close to displacing Bitcoin in market capitalization or fundamentals. Despite great competition, it is increasingly clear that decentralization and the discovery of digital scarcity are unique developments in money. Even if they try, no one can replicate it.

Still have questions about this? There are more than 2 million cryptocurrencies and they all function as companies and not as a decentralized protocol. As Michael Saylor says "there is no second best", there is no second best.

FUD Nº 6

BITCOIN É JOGO DE AZAR



Another FUD they spread is that Bitcoin is a game of chance, it is pure speculation. Many people treat bitcoin as something you buy low and sell high. Generally, those who do this end up taking a beating trying to guess the top and bottom. Those who treat Bitcoin as a speculative asset are precisely those who lose the most money.

Bitcoin is a new financial system being monetized. It is public, transparent and everything that will happen to the network in terms of monetary policy is known from the beginning. It's the opposite of a casino, where the house usually wins and has no way to audit the machines or infiltrate the administration of the business. Casinos are shady, Bitcoin is transparent.

Furthermore, anyone who buys bitcoin and holds it for at least 4 years does not make a loss with bitcoin. This is what this image shows here:



Anyone who does not treat Bitcoin as a speculative asset and holds it for at least 4 years has never made a loss with Bitcoin. It was positive 99% of the time and only those who bought at the top and sold are negative. But as bitcoin appreciates, those who bought at the tops in the past will also become positive. This is what has been happening for 15 years.

Those who accumulate constantly and with a long-term focus leave speculation mode and go to savings mode, as a store of value. As was done with gold in the past. Nobody keeps casino chips for the long term, but gold is kept. That's the difference. Crypto tokens and casino chips are speculative, there is an expectation that they will rise quickly to convert into fiat.

With Bitcoin, the focus is on accumulating as much as possible now because we know that in the future it will be more difficult to accumulate in this price range. People save it not to convert it into fiat but because all the value in fiat is being converted into bitcoin, it is a new monetary denominator.

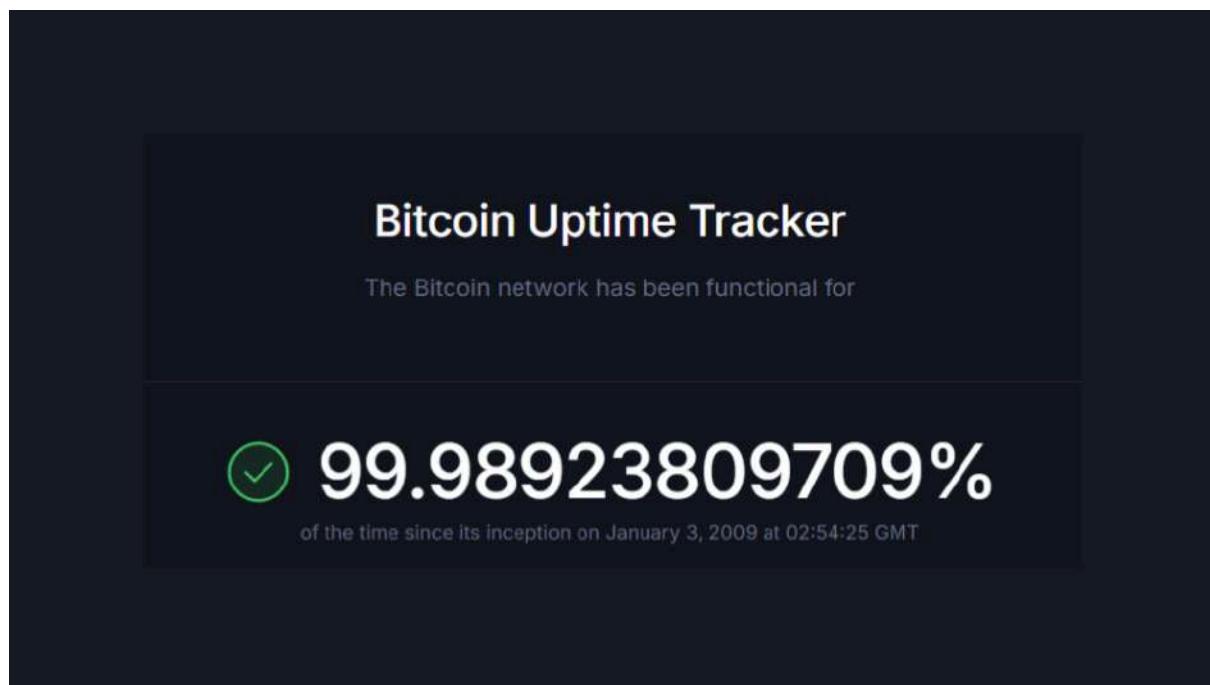
This is why Bitcoin is not a game of chance, but it is a game of luck to still be able to accumulate at such an early point of adoption and value.

FUD Nº 7

BITCOIN NÃO É SEGURO



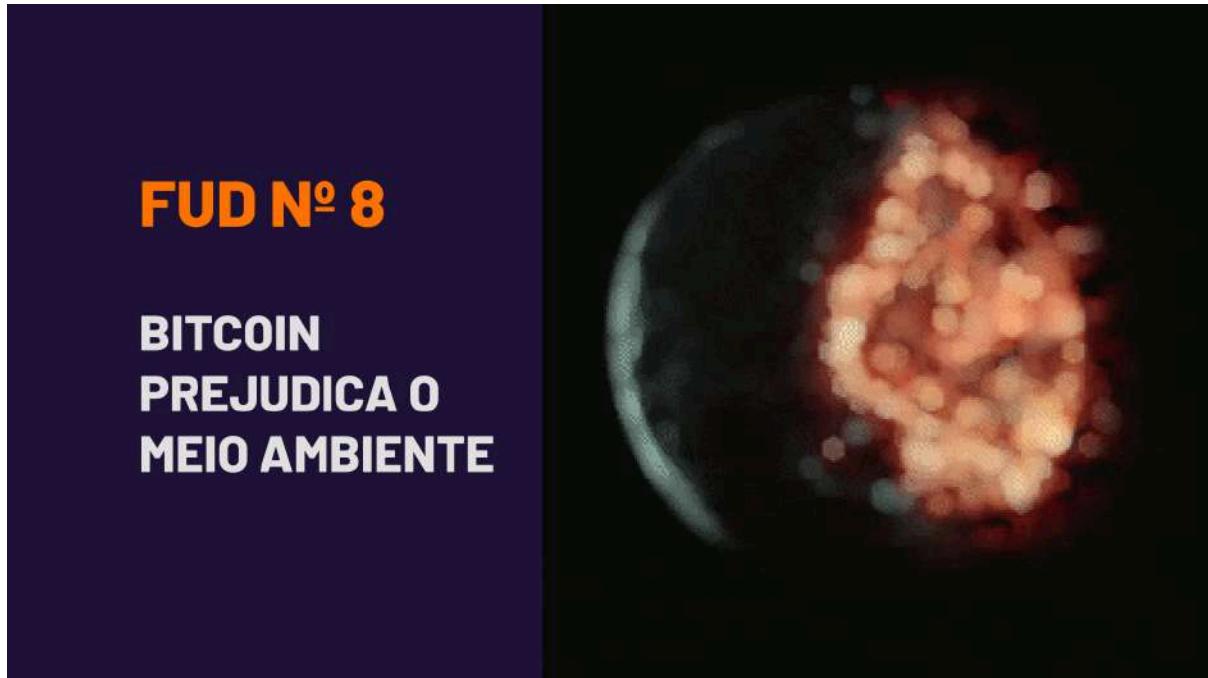
Another very common fud is people saying that bitcoin is not safe. And then they spread the word that it can be hacked, that governments can shut down, that Satoshi will come back and put an end to the network.



Many of the misconceptions about Bitcoin's security come from attacks on exchanges and other platforms that use Bitcoin, rather than the Bitcoin network itself. Bitcoin has run securely and non-stop 99.9% of the time since it began running in 2009. No centralized network has uptime like this.

The security of the bitcoin network is guaranteed by immense computational power. Miners and nodes are distributed all over the world and there is no single point of failure to attack.

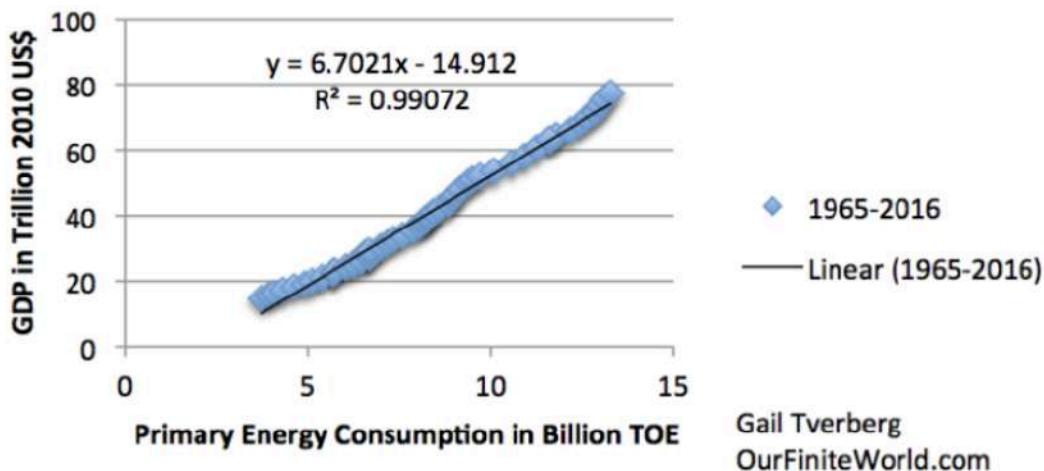
Anyone who says that Bitcoin is not safe has not stopped to understand Bitcoin, decentralization and is comparing it to centralized models that have nothing to do with Bitcoin. In 2024, for example, there was a global Microsoft blackout, Pix stopped working, Twitter was shut down in Brazil. Centralized platforms showed that they can be censored or shut down by hackers or bugs. Bitcoin has been running non-stop for 15 years while all of these platforms have had some sort of blackout.



And finally the FUD that Bitcoin harms the environment. Have you ever heard someone say that Bitcoin is terrible for the planet, that it uses a lot of energy and that it should be modified or prevented from continuing to function? This controversy could not be left out of this class.

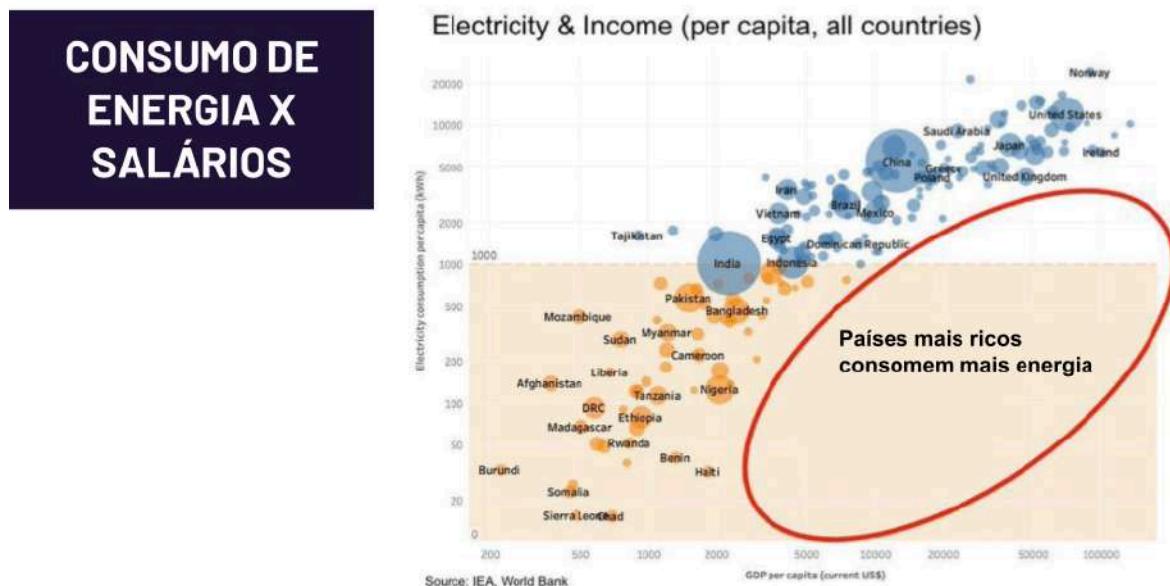
This has been one of the biggest lies in recent times to keep people away from Bitcoin, generating fear. The first point to understand is: is wasting energy a problem?

Energy Consumption vs. World GDP in 2010\$ 1965 to 2016



Energy and its use are fully correlated to the level of civilizational development. This graph shows that, as global GDP grew, energy consumption also grew.

As time goes by, we as a civilization tend to spend more energy, because this energy starts to be converted into technological, human, health and production advances that help us evolve. Or would you prefer to go back to the cave era when energy was barely wasted, but those were very difficult times?

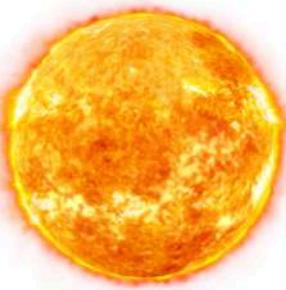


This image also shows us that, richer and more developed countries are the ones that consume the most energy. Poorer countries with lower wages consume less. Realize that energy use is fully correlated to human development. So much so that there is a scale to measure this called the Kardashev Scale.

ESCALA KARDASHEV



TIPO 1



TIPO 2



TIPO 3

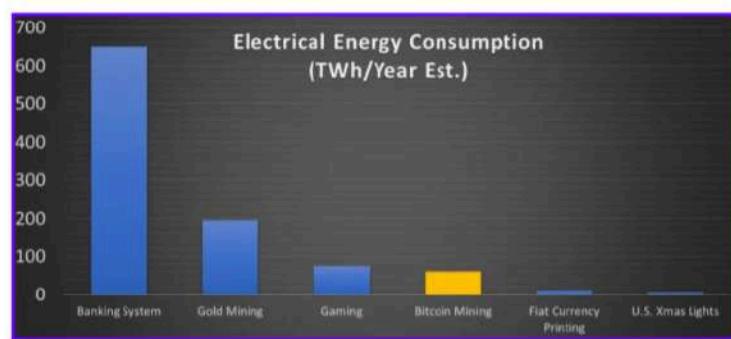
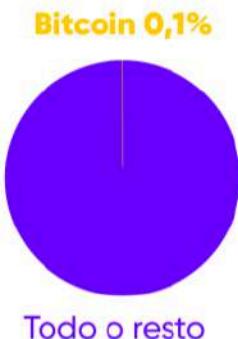
This scale suggests that measuring civilizational progress relies on consuming more energy, not less. The Kardashev scale is measured in watts and states that there are types of civilization according to the degree of dominance over energy sources. We, for example, have not even managed to become a type I civilization, which dominates all the energy sources on the planet itself.

Type 2 dominates energy sources in its solar system. Type 3 dominates the energy sources of its galaxy. In other words, if we want to evolve as a species we will need more energy, not less. Therefore, spending more energy is not a problem, it is an evolutionary necessity.

So if using energy is natural and necessary, what's the point? The problem in reality is how this energy is produced and how to produce energy and bitcoin efficiently.

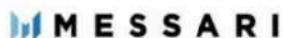
Okay, but how much energy does the bitcoin network as a whole use?

QUANTO DE ENERGIA BITCOIN CONSUME ?



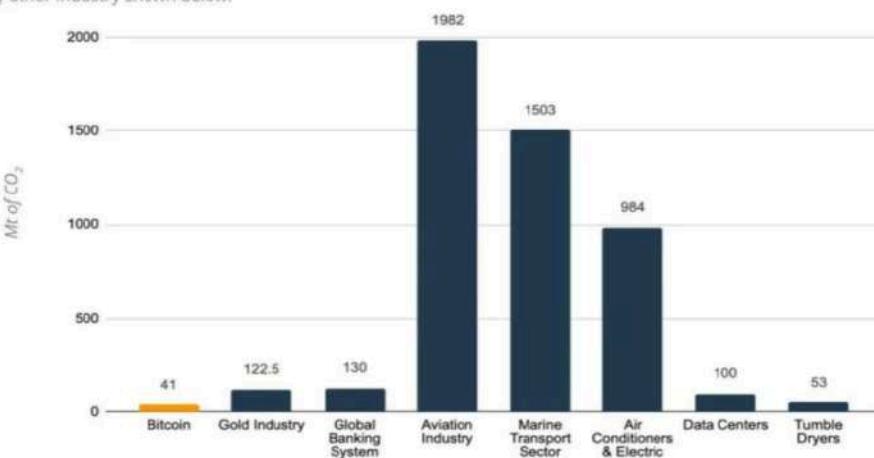
In general, Bitcoin consumes a lot of energy, around 70.4 TWh per year, but compared to other industries it is still a very small consumption. Bitcoin consumes around 0.01% of the energy produced in the world and in tera watts of time it consumes less than the gaming industry, gold mining and 8x less than the entire banking system.

If we compare the carbon footprint of these industries, they are also much larger than the emissions of the Bitcoin network.



Emissão de Carbono do Bitcoin Comparado com Outras Indústrias

In 2021, the Bitcoin network emitted an estimated 41 metric tons of CO₂ which is lower than the global banking industry, gold industry, and every other industry shown below.



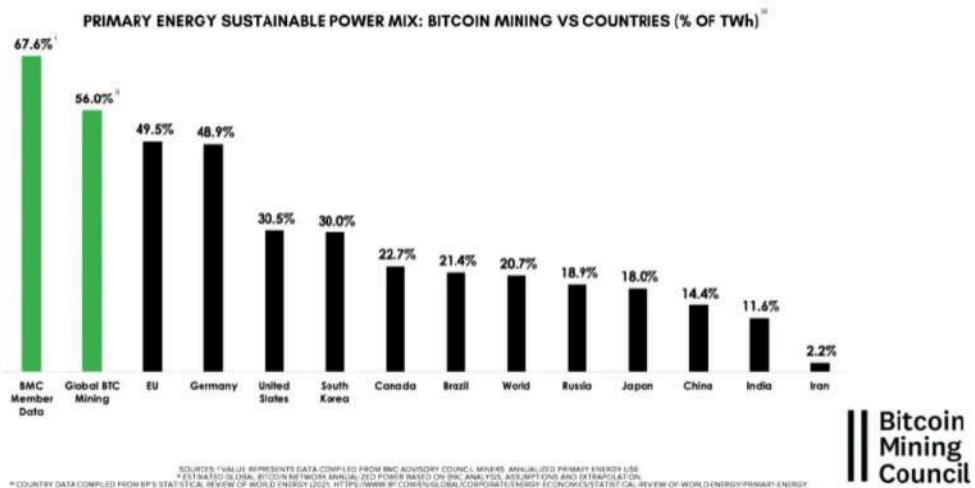
Data as of: Jan. 2022
Source: CoinShares

Note: Data was pulled from CoinShares' report released in Jan. 2022 which references multiple data sources from various dates.

Bitcoin has a carbon footprint of 41 metric tons. This is 3x smaller than gold mining, the banking system, data centers and less than the clothes dryers in the entire world. The center columns are the aviation sector, marine transport and global air conditioning.

Bitcoin is responsible for just 0.07% of all CO2 emissions on the planet and, unlike other industries that are stagnant, Bitcoin tends to produce less of a carbon footprint as new, more efficient devices are developed. Just like when refrigerators also began to be replaced by models that use less light.

BITCOIN TEM O MAIOR MIX SUSTENTÁVEL DE ENERGIA

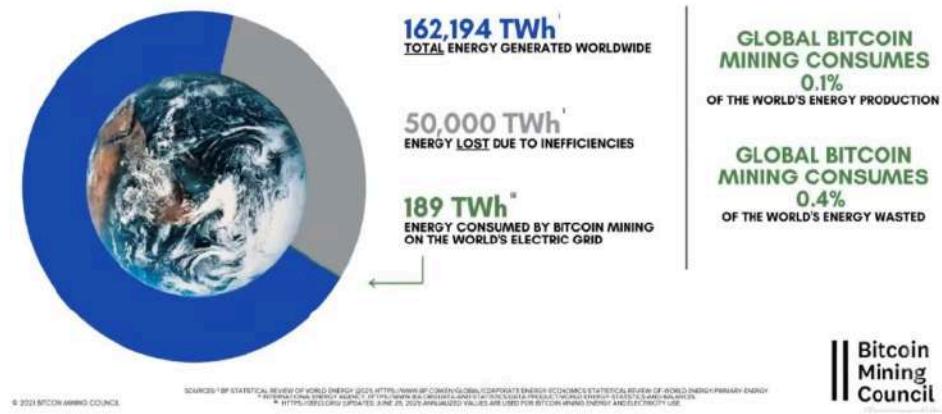


Compared to other countries or industries, Bitcoin uses much more renewable energy sources, there in the green bars, than more sustainable countries like Germany, the United States, Canada and Europe.

Bitcoin has at least 56% of the network made up of renewable sources, compared to 49% in Europe, 48% in Germany and 30% in the United States.

Remember from mining class that Bitcoin forces miners to be efficient? So it is. These miners naturally settle in places with abundant and cheap energy, these places generally have renewable sources.

USO DE ENERGIA DO BITCOIN VS USO DE ENERGIA GLOBAL TOTAL



This image demonstrates how bitcoin uses only 0.1% of global energy and consumes 0.4% of the energy that would otherwise be wasted. In other words, a large part of the energy that bitcoin consumes is precisely the energy that would be wasted by other industries.

What happens is that miners naturally end up installing themselves in places with surplus energy production, energy that would otherwise be thrown away. Generally, renewable sources such as hydro and geothermal are the most chosen locations, such as in Iceland, Siberia, Canada, Russia and the United States. These are places with a lot of energy and little population or industry present to consume the excess energy. These locations generally cannot store all the energy produced.

That's where Bitcoin mining comes in. A plug n play industry, easy to install in any region of the planet and which has provided an economically useful destination for this energy that was previously being thrown away.

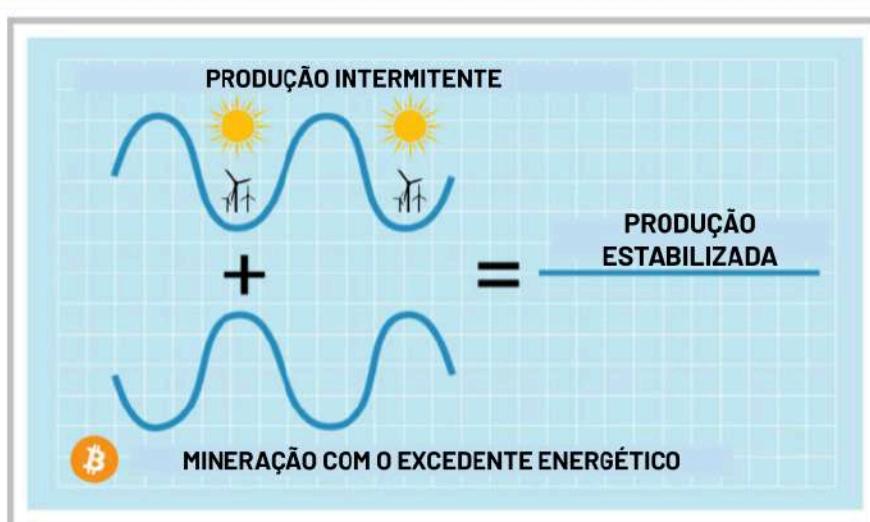
A BATERIA BITCOIN



This is where the theory of Bitcoin as a global battery that converts wasted energy into the strongest money there is emerged. Money that can be easily stored and used to buy more energy in the future if necessary.

This is why energy producers have approached Bitcoin, it offers a possibility that did not exist before: monetizing idle energy.

BITCOIN ESTABILIZA FONTES RENOVÁVEIS



Intermittent sources such as wind or solar have periods of lots of sun or wind in which a large energy surplus is produced. But there are also periods when there is no wind or only rain and production is reduced. At these times, these sources even need to buy energy from other places to be able to feed the local grid.

So for the energy industry, Bitcoin is a magnificent tool because it stabilizes the grid and provides more predictability. In other words, when they produce excess energy, these sources turn on the miners and receive bitcoin and in periods of low production they turn off the miners and use the accumulated bitcoin to buy more energy from other sources, if necessary.

This means that bitcoin stimulates renewable sources in a way that was not possible before, avoids energy waste and provides more predictability for the entire renewable energy industry.

BITCOIN CARBONO NEGATIVO



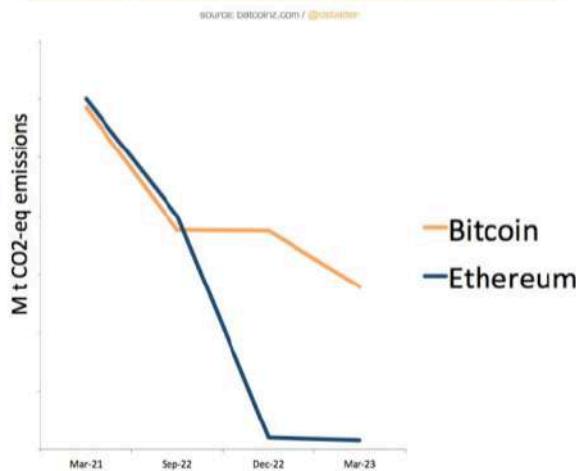
In addition to stimulating renewable sources, Bitcoin is also becoming carbon negative by collaborating with refineries and landfills to prevent polluting gases from being released into the atmosphere.

Methane gas is 86x more polluting than CO₂ and is a by-product of oil extraction and the putrefaction of waste in landfills. That's why these places set fire to the gas outlet before releasing it into the atmosphere, as in this photo, it is preferable to release CO₂ into the air than methane, which is absurdly more polluting. And they have nothing to do with CO₂, if it accumulates there is a risk of explosion.

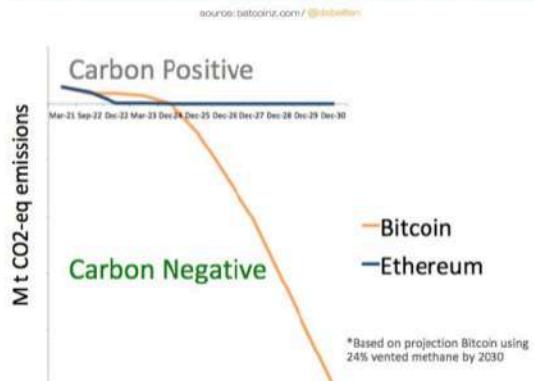
This is why refineries and landfills are starting to mine Bitcoin. Ultimately they waste energy, methane, and they realized that by plugging into bitcoin mining they can monetize the wasted gas and also PREVENT methane from being released into the atmosphere.

As a container full of ASICs is super easy to install, this mechanism is starting to spread around the world. In this way, Bitcoin prevents both methane and CO₂ from being released into the environment and also converts these gases into energy to mine a scarce currency that appreciates in value over time. Until then, no industry had a real use for these gases and Bitcoin, while monetizing and avoiding waste, also prevents these polluting gases from entering the atmosphere.

O Caminho para Carbono Neutro



O Caminho para Carbono Negativo

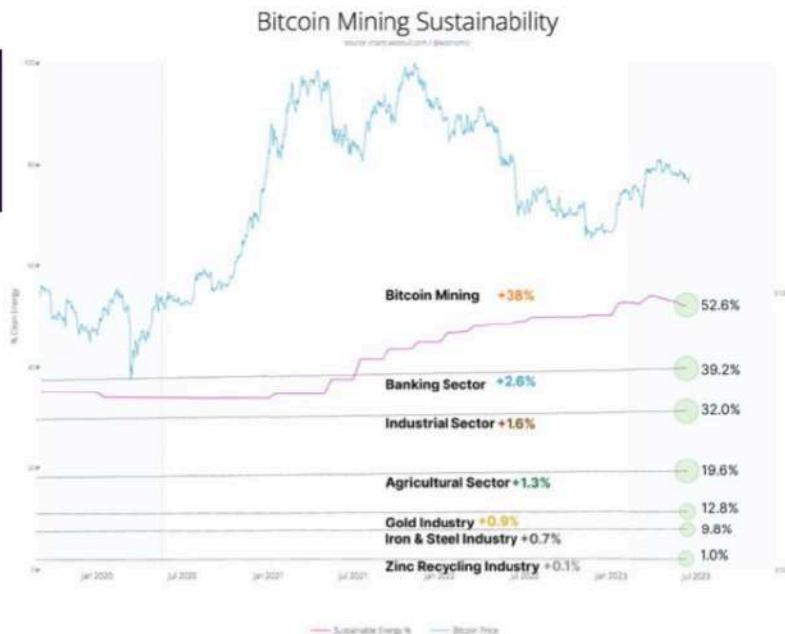


Fonte: Daniel Batten

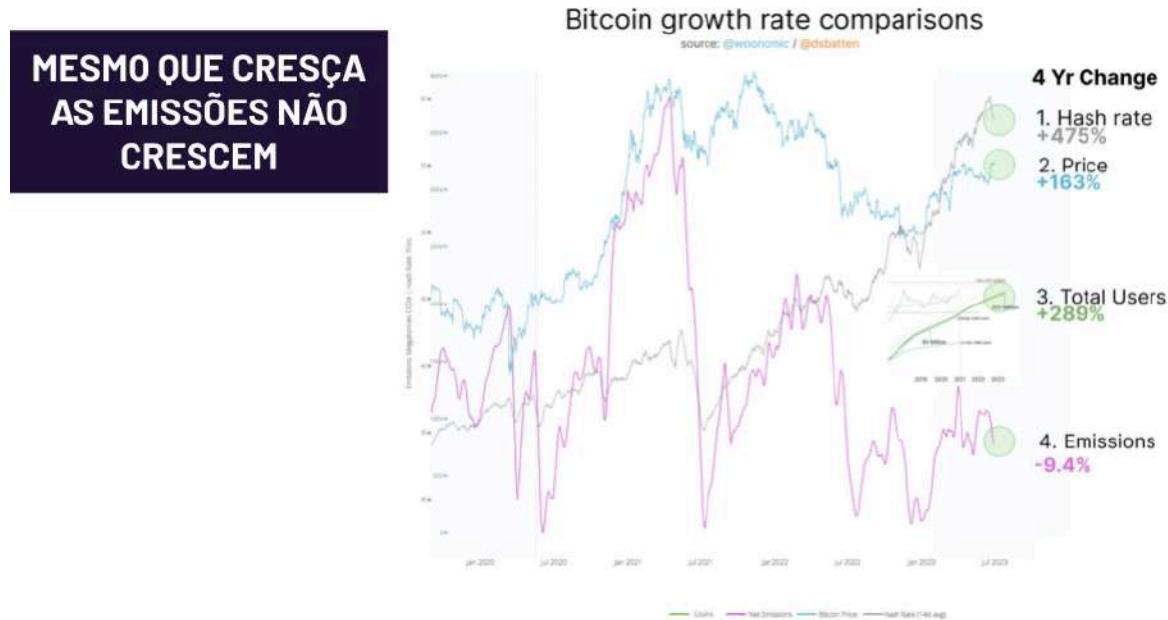
There is even a researcher that I really like called Daniel Batten, who is a former green peace researcher and also a bitcoiner, who has already shown how Bitcoin is the network that has the most potential to contribute to the environment, because it can be carbon negative, he prevents co2 from entering the atmosphere while other networks do not offer this possibility. Like ethereum for example, which can even become carbon neutral but does not contribute to being carbon negative.

According to Daniel's research, Bitcoin could use 24% of all landfill methane by 2030 and the waste industry could end up joining the Bitcoin industry.

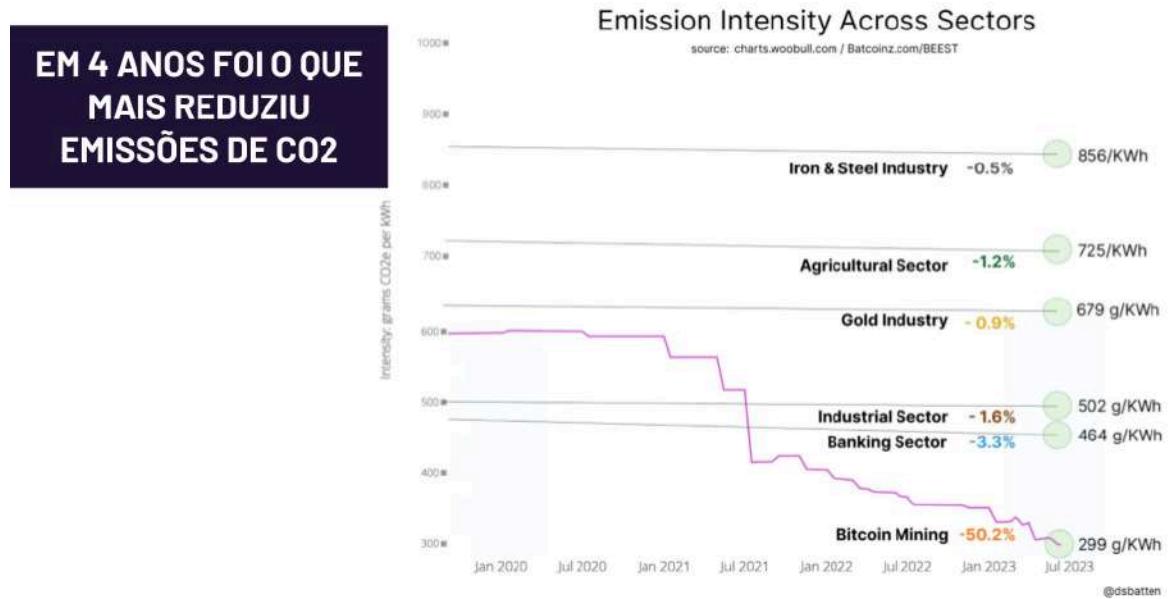
BITCOIN É A INDÚSTRIA MAIS ESG



In other research by Daniel Batten, he shows how bitcoin is the most ESG industry in the world. It has grown a lot in sustainability in the last two years and is more sustainable than any other sector, such as banks, industries, agriculture, gold mining, metallurgical and zinc recycling.



This graph shows that even if bitcoin continues to grow and any metric increases, such as hashrate, users, price and addresses, network emissions will be the same at the end of any cycle. Something no other industry has ever managed to do.



In just four years, Bitcoin halved the intensity of co2 emissions. In such a short period of

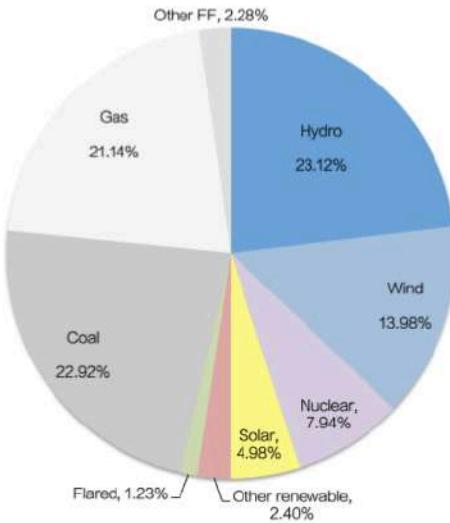
time, it has had the lowest carbon emissions of any major global industry. A reduction that would collapse any other industry.

This is also a consequence of the ban on bitcoin mining in China in 2021. Most sources there use coal, which is very polluting. The simple fact that miners moved to other locations with renewable and abundant sources such as hydroelectric plants caused bitcoin to reduce CO₂ emissions by half, and it did so without crashing once, the network continued to function normally.

PRINCIPAIS FONTES

Bitcoin Energy Sources

source: batcoinz.com / @dcbatten

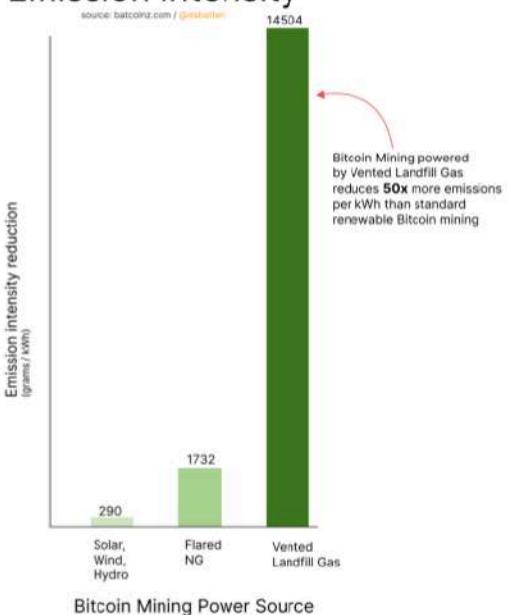


So much so that this graph shows that Bitcoin's main energy source is currently hydroelectric.

Because Bitcoin mining is not anchored to the global grid, 36.7% of which uses coal, it is also the only major industry where fossil fuels are not the main source of energy. This is a slap in the face to anyone who says that bitcoin destroys the environment.

MINERAÇÃO EM ATERROS SANITÁRIOS

Emission Intensity



Even Bitcoin in landfills could revolutionize how we deal with waste. Bitcoin mining in landfills reduces greenhouse gas emissions by 50x more than any other form of Bitcoin mining, such as mining with wind, solar, hydro or flared gas from refineries.

Atacar a energia é um bode expiatório socialmente mais aceito



In 2020 Bitcoin will consume more power than the world does today



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TECH & SCIENCE

Bitcoin Mining on Track to Consume All of the World's Energy by 2020

BY ANTHONY SPURGEON ON DECEMBER 14, 2017 AT 10:07 AM EST

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World Economic Forum @wef

In 2020 Bitcoin will consume more power than the world does today
wef.ch/2odVW4z



Here's the official tweet so you can see how I'm not lying! In 2017, the newspapers began to fill the newspapers with this FUD. It was a huge lie that only shows how the owners of the fiat system are terrified of Bitcoin, which takes the printer out of their hands.

ATAQUES DO GREENPEACE

Change The Code @CleanUpBitcoin · Mar 29, 2022
#Bitcoin uses more energy than some countries, and it's already resurrecting fossil fuel plants and driving devastating climate impacts.
We can reduce Bitcoin's carbon emissions and make crypto cleaner.
#ChangeTheCode #CleanUpBitcoin

Here's how:

DOES BITCOIN ACTUALLY USE MORE POWER THAN ALL OF SWEDEN? HELL JA.

CHANGE THE CODE NOT THE CLIMATE.

GO TO CLEANUPBITCOIN.COM

GreenpeaceUSA @greenpeaceusa · ...
"I'd be boozed off stage. They'd throw tomatoes at me."
Our @CleanUpBitcoin campaign lead @josharcher spoke at @SolanaConf #Breakpoint2023 about our work to stop #Bitcoin 's growing carbon emissions.
Bitcoin's most fervid supporters may not like it, but Bitcoin needs to change.

S SOLANA BREAK POINT 2023

Readers added context they thought people might want to know
GreenpeaceUSA was paid \$5 million by the founder of Ripple to create the "Change the Code" campaign: [bloomberg.com/news/articles/...](https://bloomberg.com/news/articles/)
It should be noted that anyone, including GreenpeaceUSA or Josh Archer, can change the Bitcoin code at any time.

In addition to banks, governments and other protocols, even Greenpeace started a campaign demonizing Bitcoin, spreading the message far and wide that it is bad for the planet and that the code would need to be changed. In 2023, Green Peace launched the "change the code" campaign, a manifesto for Bitcoin to abandon the proof of work model. They demonized bitcoin in several ways, the leader of the campaign appeared at a solana conference attacking bitcoin, stressing that bitcoin had to change its code and be proof of stake like ethereum.

GREENPEACE FUND

Help Greenpeace protect the planet. Please donate today.



I want to become a monthly supporter with a gift of:

\$50 \$100 \$250 \$1,000 Other \$ per month

Monthly giving is the best giving option for both Greenpeace and our supporters - it allows us to have a dependable base of support and save time, banking fees and paper by not having to send supporters future reminders and renewal notices.

I want to make a donation of:

\$10,000 \$5,000 \$2,500 \$1,000 \$500 Other \$

Make a one-time Bitcoin donation [Bitcoin](#) [Donate Now](#) 

*First Name *E-mail
 *Last Name Phone
 *Address 1 This is a cell phone.

The curious thing is that Greenpeace itself accepted donations in bitcoin... what made them change their mind and start attacking bitcoin?...

GREENPEACE COMPRADO!

JESSE COGHLAN

29 MAR 2022

Tecnologia

Greenpeace e cofundador da Ripple se unem em campanha por mudança no código do Bitcoin

Chris Larsen, colunista da Ripple também participou do apelo, dizendo que o Bitcoin é uma "exceção" agora que o modelo do Ethereum está prestes a mudar.



Bitcoiners zombam da campanha de US\$ 5 milhões de Chris Larsen para forçar uma mudança de código BTC

O executivo da Ripple e aliados do Greenpeace presumem que tudo o que é necessário para uma mudança fundamental no código do bitcoin é conseguir a adesão de 50 empresas e desenvolvedores principais.

Por Eliza Grivitsa | 29 de março de 2022 às 11h52 | Atualizado 11 de maio de 2023 às 12h47.



Exactly. Money. Greenpeace received 5 million dollars from executives at Ripple, the company that created the cryptocurrency XRP, to defame bitcoin and try to force changes through social pressure and lies.

This is the most bizarre thing I've ever seen. Greenpeace abandoned its purpose and scruples for money. He attacked precisely the protocol that could help the organization

reduce emissions and be more environmentally friendly. Surreal! Just take a look at a snippet of the video from this campaign:



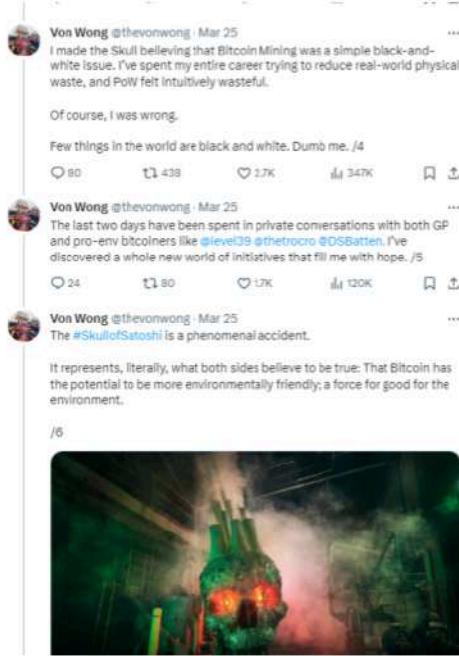
Greenpeace paid an artist called Von Wrong to make a skull with laser eyes and some nuclear power towers, nothing like that, to show how bitcoin creates climate damage. They wanted to make something like a bitcoin horror movie.



But in the end, all attacks end up strengthening bitcoin even more. Bitcoiners loved the skull, it became a meme and a symbol of how bitcoin is evil and deadly, but for central banks and fiat currencies and not for the planet.

Bitcoiners loved the metal atmosphere of the work of art, they appropriated the narrative and started making memes like this one: they took the photo of the Greenpeace car, which was campaigning against bitcoin, and changed the phrase to Buy bitcoin, or Compre Bitcoin , which was brilliant and people shared this meme a lot on social media.

O PRÓPRIO ARTISTA SE REDIMIU



With all the fuss, several bitcoiners contacted Von Wrong, the artist who made the skull, explained the graphics that I showed here in this class and days later the artist posted about how he didn't know everything about bitcoin, that the skull was a great accident and that bitcoin is a positive force for the environment. And the cardboard of the lies told was once again for Greenpeace.



Bitcoin's large electricity usage could turn out to be a benefit in some cases, Batten argued, where it could soak up excess supply of energy generated via renewable sources such as solar or wind. A KPMG report looking at bitcoin and ESG notes potential social benefits, too. The cryptocurrency could allow previously unprofitable, small electrical grids linked to local renewable energy to become "financially viable" in developing countries and in turn improve electricity access, it said.

Bitcoin could support renewable energy development

A new study calculated renewable energy projects' potential to profit from bitcoin mining during the precommercial development phase, when a wind or solar farm is generating electricity, but has not yet been integrated into the grid.

This all happened in March 2023, but now it appears the narratives are changing. New studies and reviews of previous studies are emerging and providing more real evidence and not attacks financed by crypto-fiat. This Financial Times article says it like this:

"Bitcoin's large electricity consumption could end up being a benefit... it could absorb excess supply of energy generated through renewable sources such as solar and wind."

and this other article says "...bitcoin can support the development of sustainable energy". Finally, newspapers are starting to publish these studies and review old articles.



Well, I could have just shown this image in this topic but perhaps I wouldn't give the dimension of the data and how much bitcoin actually helps us advance in energy, environmental and civilizational issues.

On the left is a photo of a gold mine, notice how destructive it is. Not to mention the contamination by heavy metals and the landslides that occur. On the right appears a Bitcoin mining farm coexisting in the middle of nature. If one day it leaves there, there won't be any holes and no type of local environmental impact, on the contrary.

Mining is being added to several local industries such as plant and fish production using heat, a byproduct of mining, to be even more efficient.

(opens fabric)

I hope this class made it clear to you that bitcoin does not destroy the environment and those who do this most are fiat structures.

I hope that, with this class, you have understood the main FUDs that spread about Bitcoin. It is important to remember that, from time to time, new FUDs emerge, it is important to be aware and do your own research so as not to fall into the herd effect of ignorance.

Now that you know what bitcoin is, how it works, ways to have it and the main lies about it, in the next class you will learn why storing your bitcoins sovereignly is important. Until then.

8- Why do self-custody?

(under development)

9- What are Bitcoin wallets and how to use them?

(under development)

10 - How to withdraw from the Exchange and have sovereignty with your Bitcoin?

(under development)