Money, Inflation, and Cryptocurrencies

Week 06

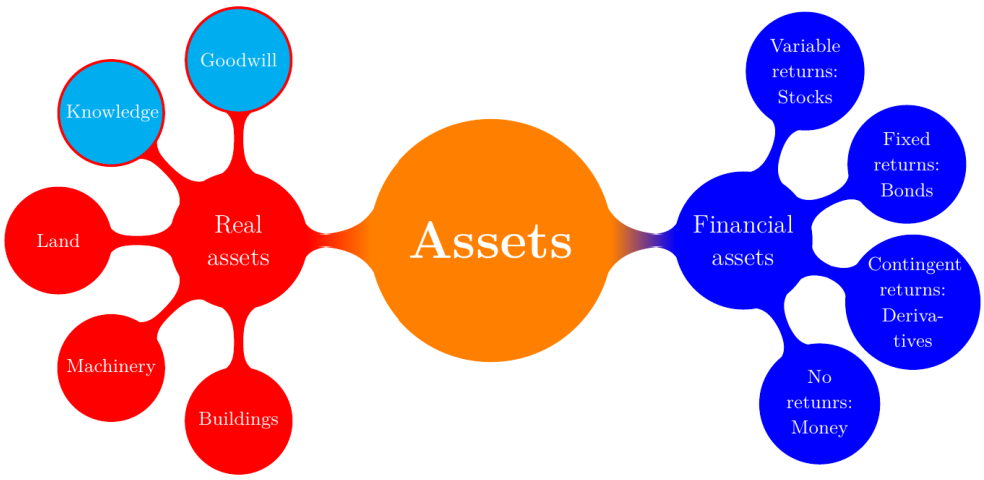
Vivaldo Mendes
Instituto Universitário de Lisboa (ISCTE-IUL)

2026-10-26

1. What is Money?

Assets

- To understand what money is all about, we need to know the difference between the different types of assets



Confusing money with wealth

- It is very common to see people using the term "money" incorrectly. For example, in a recent episode we could hear:

  "Cristiano Ronaldo plays for to the Portuguese national team only because he has a lot of money".

- What the person intended to say was "... because he has a lot of wealth", or "because he is very rich".

- Wealth is the total value of all assets owned by a person or entity.
- Money is a specific type of asset that is used as a medium of exchange, a store of value, and a unit of account.

Characteristics of money

Any asset that may be used as "money" must have the following characteristics:

- Easy to carry, to store, and to transfer
- Very liquid (easy to convert into Goods&Services)
- Very divisible (easy to divide into smaller units)
- Very cheap to use in transactions
- Easily identifiable to be be used as fiat money ("curso forçado")
- Widely accepted by the population

The functions of money

- The classical functions of money are:
  - **Medium of exchange**: Money is used to buy goods and services (i.e., to facilitate transactions).
  - **Store of value)**: Money is used to store value (i.e., to save for future use).
  - **Unit of account**: Money is used to measure the value of goods and services (i.e., to provide a common denominator for the value of different goods and services).
- There is another function of money that is usually overlooked:
  - A **symbol of sovereignty**: used to represent the the political independence of a country.
  - During the financial crisis of the Euro (2010–2016), the fact the UK had its own currency helped the country a lot
  - Spain, for example, went through a bad patch despite having a much lower Debt/GDP ratio than the UK

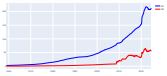
Measuring money

- In the US, the aggregte we associate with "money" is named as "M2"
- **Money Supply (M2)** is the total quantity of money supplied to the economy by the banking sector (central bank + commercial banks) and is given by:

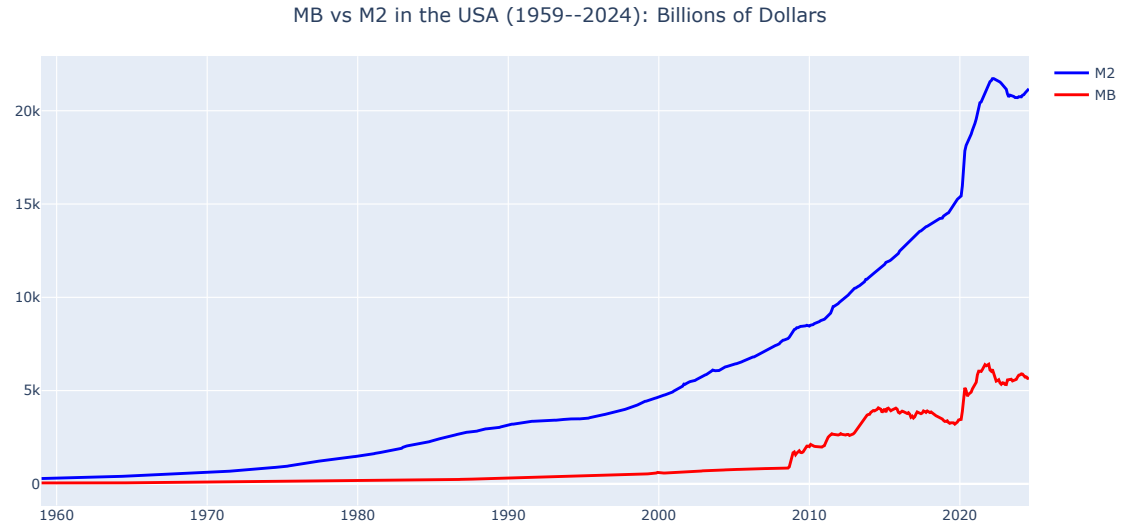
$$M2 = \text{ Currency } + \text{ Deposits } + \text{ Money Market Mutual Funds}$$

- **Monetary Base (MB)** is the total amount of money printed by the central bank that is outside of this bank's vaults (its liabilities).

$$MB = \text{ Currency } + \text{ Reserves}$$

- M2 is much greater than MB and the link between the two aggregates is known as the **Money Multiplier**. 

Measuring money



US Monetary Agregates: September 2025

Data collected from the Fed's Money Stock Measures - H.6 Release

M2 Aggregates	Billions of dollars
Currency	2324.2
Demand deposits	5648.9
Other liquid deposits	10987.3
M1	**18870.3**
Time Deposits	1083.3
Money Market Mutual Funds	2181.1
M2	**22134.7**

2. The Money Multiplier

The Money Multiplier

- The derivation of the money multiplier is not required in this course.[1]

- The money multiplier gives the following relationship:

$$M2 = \kappa \times MB$$

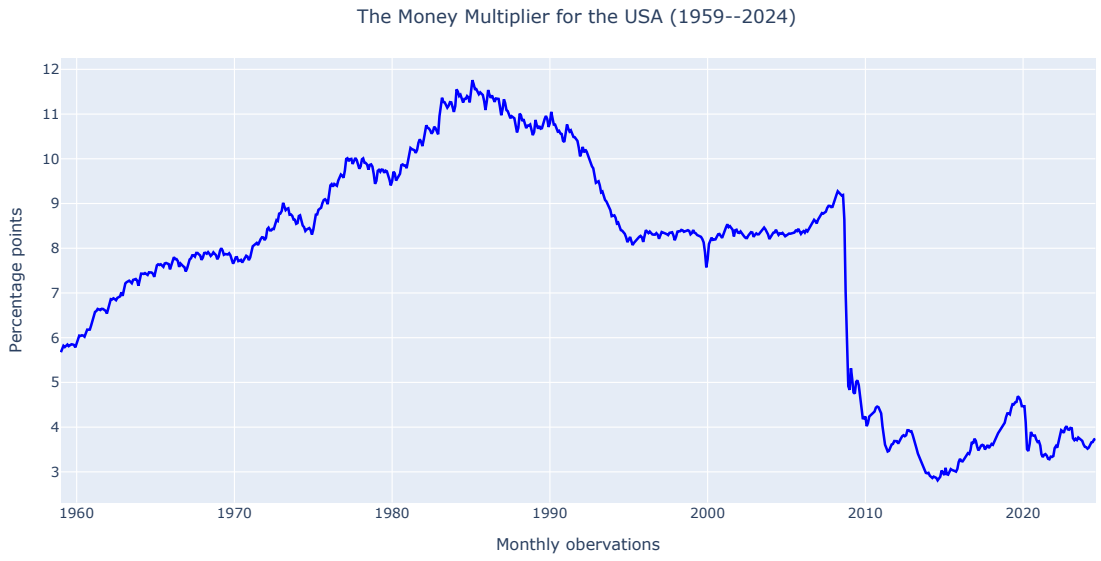
where κ is called the money multiplier and

$$\kappa = \frac{\beta + 1}{\beta + rr}$$

- $\beta = Currency/Deposits$
- $rr = Reserves/Deposits$

The Money Multiplier: Terribly Unstable

. . .



- The money multiplier (κ) is extremely unstable.

. . .

- So, even if the central bank has a large control over the MB, it ends up with no control over the M2 because κ is terribly unstable.

R.I.P., Money Multiplier

> "*Well, when you and I studied economics a million years ago, M2 and monetary aggregates generally seemed to have a relationship to economic growth... that classic relationship between*

[1]See appendix A, if you are curious how the money multiplier is obtained. But, **its derivation is not required for this course**.

monetary aggregates and economic growth and the size of the economy, it just no longer holds... so something we have to unlearn, I guess."

Jerome Powell, Federal Reserve Chair, Feb. 23, 2021, see here.

- Nowadays, no central bank in a developed country pays any attention at all to the Money Multiplier.
- It is a useless concept in modern macroeconomics: should be erased from textbooks!
- But it is still there in all of them!

3. The Quantity Theory of Money (QTM)

The origins of the QTM

- This theory was firstly presented by Martín de Azpilcueta (1536) to explain the Spanish high inflation during the XVI century.
- That inflation was caused by the huge inflow of gold and silver from the Spanish colonies.
- The Spanish Price Revolution was not only a novelty but it spread out to the rest of Western Europe.
- The QTM is very simple to explain:

$$M \times V = P \times Y$$

Y is Goods&Services produced, P is the price level, M is the quantity of money supplied, V is the velocity of money circulation

---

QTM and inflation

- Assume that the V is constant in the short term (pretty acceptable assumption)
- Assume that Y is not affected by M nor V (pretty acceptable)
- Then, the price level will be given by:

$$P = (M \times V)/Y$$

- This equation can be written in terms of **growth rates** as:

$$\hat{P} = \widehat{M} + \hat{V} - \hat{Y}$$

- As in the short run, $\hat{V} = 0$, and $\hat{Y}$ changes very litle, the rate of inflation will be mainly determined by the money growth rate $\left(\widehat{M}\right)$.

Milton Friedman and Monetarism

- Milton Friedman won the Nobel Prize in Economics in 1976.
- He was the most respected monetarist figure ever.
- His most famous remark is this:

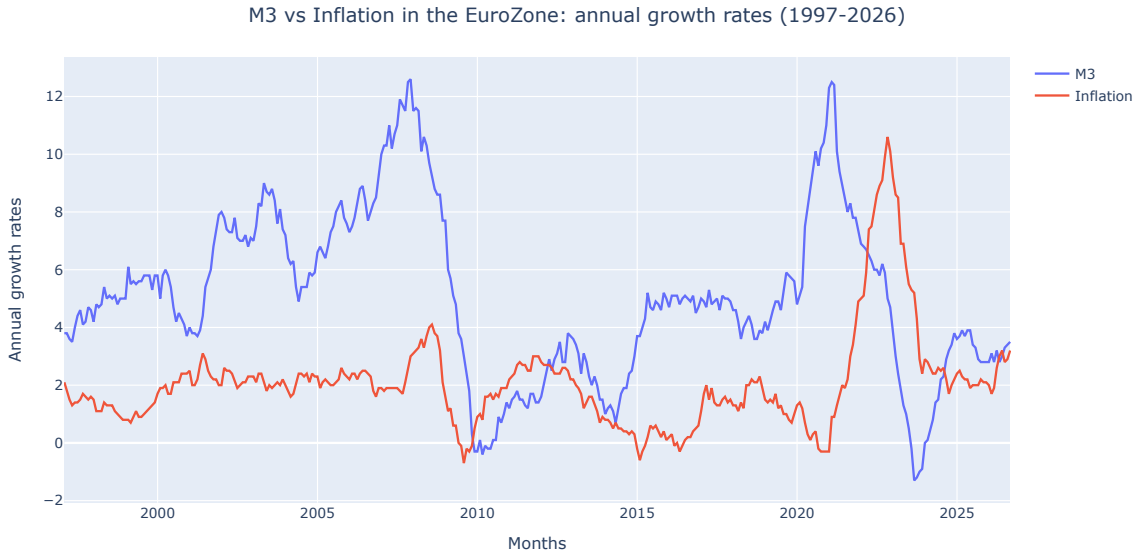
> "Inflation is always and everywhere a monetary phenomenon in the sense that it is and can be produced only by a more rapid increase in the quantity of money than in output." page 24 in:

Friedman, M. (1970). Counter-Revolution in Monetary Theory. Wincott Memorial Lecture, Institute of Economic Affairs, Occasional paper 33.

How relevant is the QTM?

- The QTM is very limited to explain inflation in a modern economy:
  - Prices do not depend only on money and GDP
  - It is true that GDP is not affected by monetary aggregates, but it is affected by monetary factors (i) in all developed economies
  - The QTM has been easily refuted when considering the set of developed countries
- However, the QTM has been vindicated when we consider huge increases in M in less-stable countries, like Zimbabwe, Venezuela, or Argentina.
- So, if you think that "money" will be the solution to all our economic problems, think twice, be prudent.
- Money, more money, more money and nothing else is a poor recipe for economic policy: GDP will not increase, inflation will.

QTM: Some evidence in the EuroZone



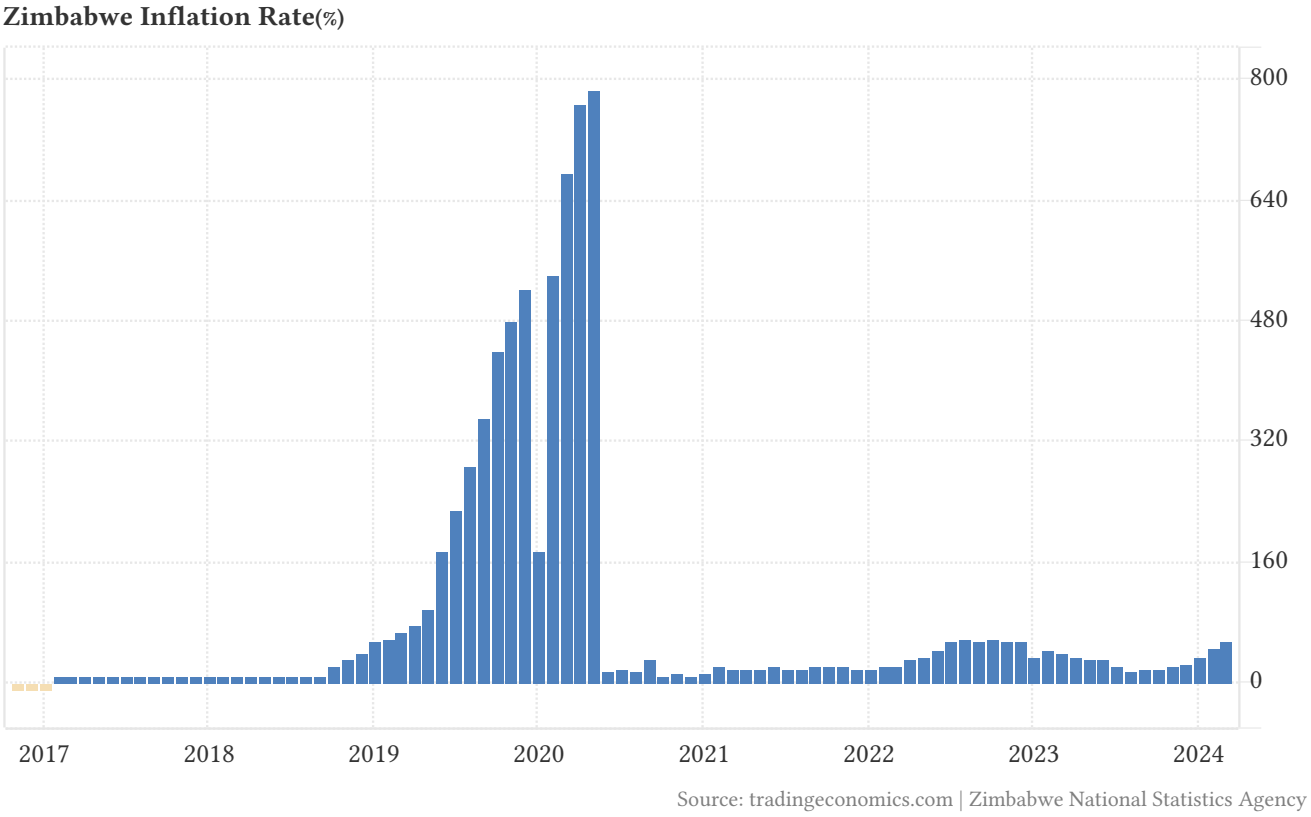
4. Hyperinflation

What is hyperinflation?

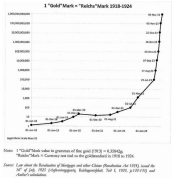
- Hyperinflation is a situation where the rate of inflation reaches values so high that it becomes uncontrollable.
- Famous cases of hyperinflation are: Germany in the 1920s, Zimbabwe in the 2010s, and Argentina in various occasions, among others.
- In all cases of hyperinflation there is a common feature: the government resorts to printing money as the solution to serious problems.
- Usually, these situations reflect a political structure at the verge of breaking down, rather than a clear and rational decision to print huge amounts of money to solve any problem at all.

Zimbabwe hyperinflation in the 2010s

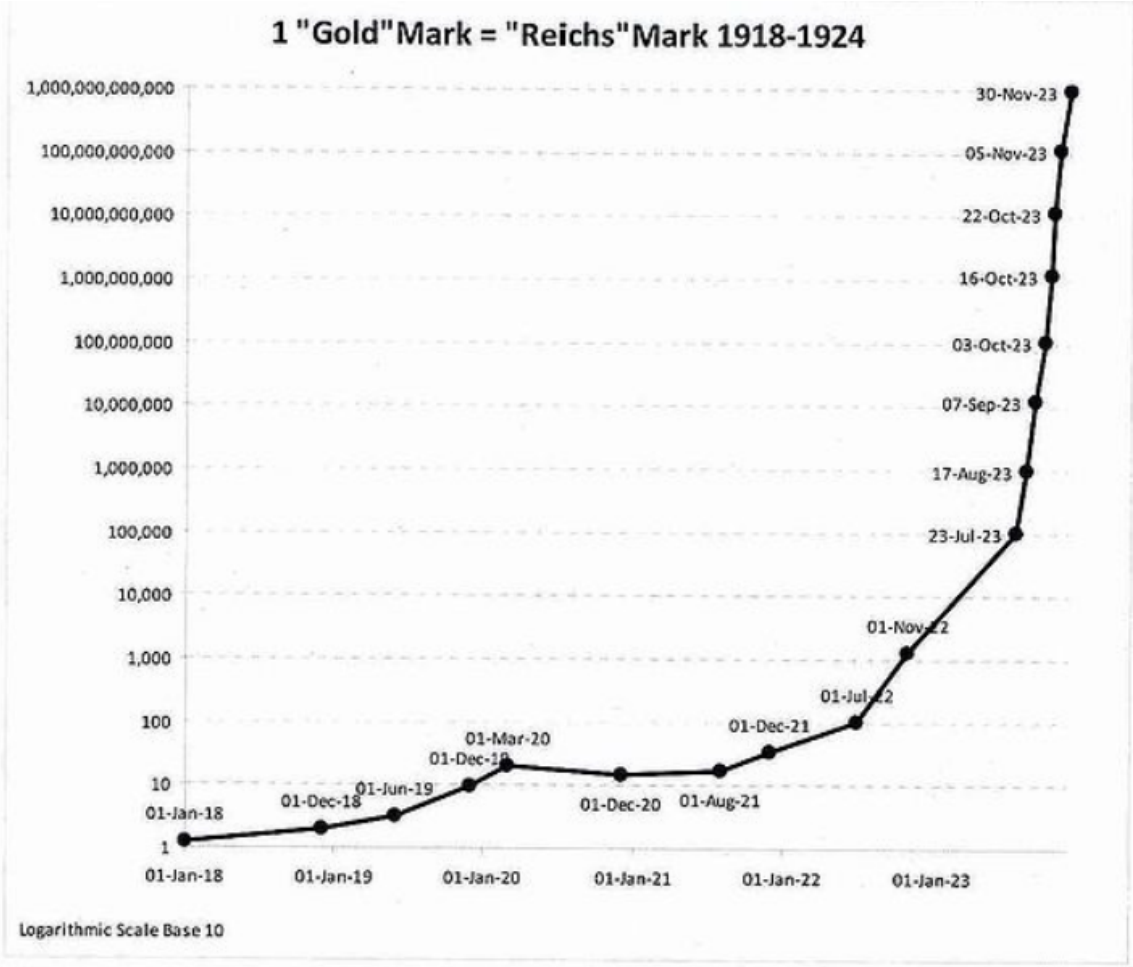
A political regime at the verge of breaking down resorted to the money printer … as a miraculous solution



Germany hyperinflation in the 1920s

- Germany lost the First World War and had to pay huge war reparations
- The government made a series of stupid decisions
- A political regime at the verge of breaking down resorted to the money printer … as a miraculous solution
- A loaf of bread in Berlin that cost around 160 marks at the end of 1922 cost 200 billion marks by late 1923. 

Germany hyperinflation in the 1920s

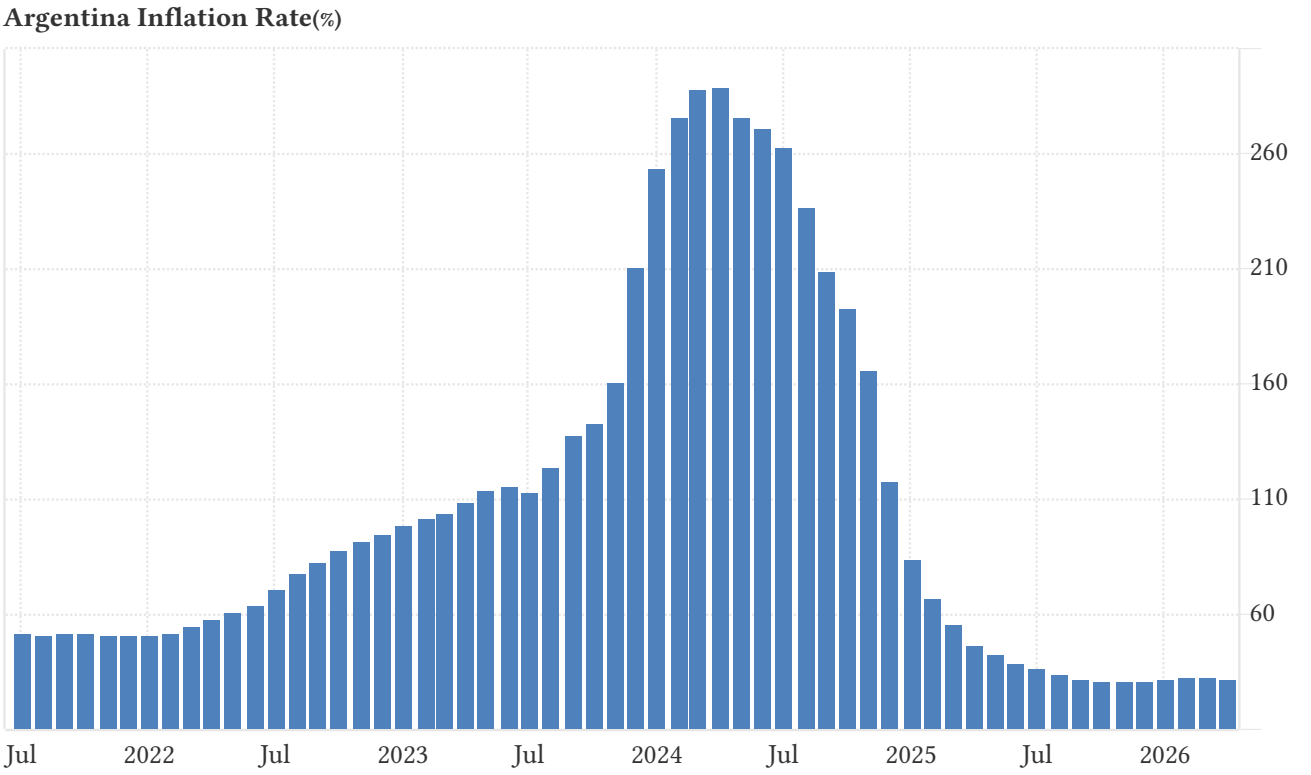


Note: 1 "Gold"Mark value in grammes of fine gold (1913) = 0.35842g;
"Reichs"Mark = Currency not tied to the goldstandard in 1918 to 1924.

Source: Law about the Revaluation of Mortgages and other Claims (Revaluation Act 1925), issued the 16th of July, 1925 (Aufwertungsgesetz, Reichsgesetzblatt, Teil I, 1925, p.133-135) and Author's calculations.

Argentina hyperinflation in the 2020s

A political regime at the verge of breaking down resorted to the money printer … as a miraculous solution



Source: tradingeconomics.com | Instituto Nacional de Estadística y Censos (INDEC)

5. Cryptocurrencies

Cryptocurrencies: new and dangerous

"*November 4, 2024, was America's Hard Fork on digital assets. Since taking office, President Trump has righted the wrongs of his predecessor by fashioning the United States into a crypto superpower.*" U.S. Treasury Secretary Scott Bessent, 30 July 2025

"*I've always been deeply opposed to crypto, bitcoin, etc. The only true use case for it is criminals, drug traffickers … money laundering, tax avoidance. If I was the government, I'd close it down.*" JPMorganChase CEO Jamie Dimon, 6 December 2023, here

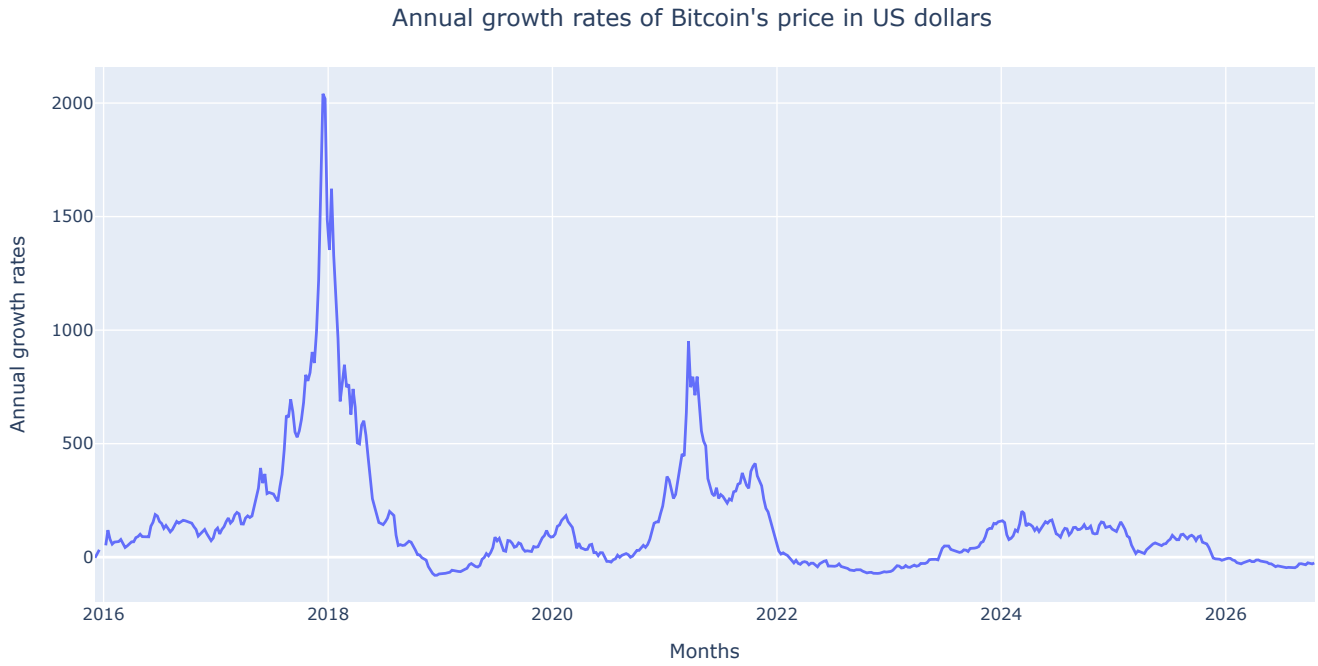
Cryptocurrencies: new and dangerous

- The first cryptocurrency that appeared was the "Bitcoin" in 2009/2010

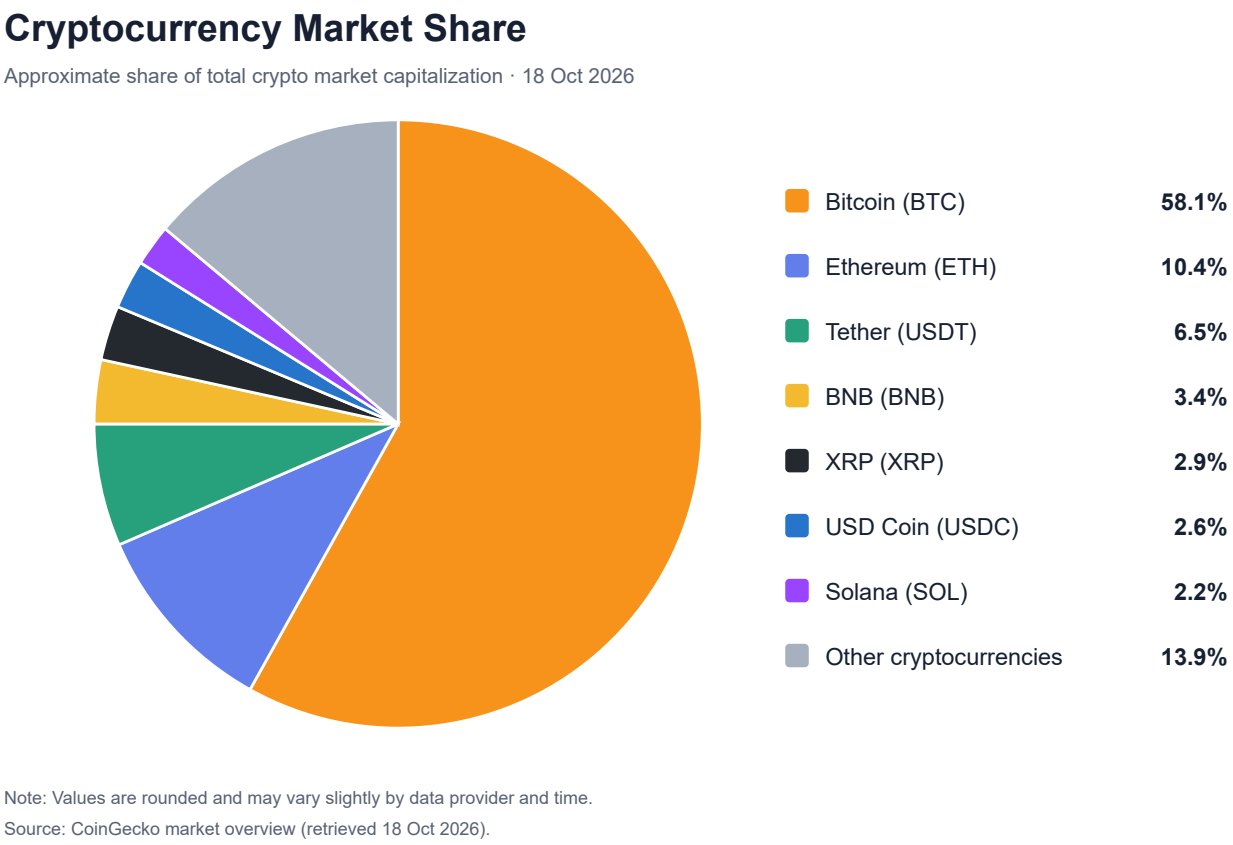
- Until 2018, cryptocurrencies were like a fairy-tale: we had heard about it, but never bothered about it
- Then in 2018, there was a monumental burst in crypto valuation
  - the price of Bitcoin increased by 2000% 
- Today, there are approximately 18000 actively tracked cryptoassets, but tens of millions of tokens have been created

---

Cryptocurrencies: new and dangerous



Current distribution of market share



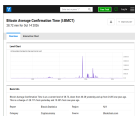
A series of frauds, scandals, kidnappings

- **FTX**. In 2022, the FTX bankruptcy sent Sam Bankman-Fried to prison for a fraud of more than 8 billion US dollars.
- **OneCoin (2014–2019)**: popularized as a "Bitcoin killer" by founder Ruja Ignatova, a Ponzi scheme with no actual blockchain, defrauding investors of roughly 4.4 billion US dollars. Ignatova vanished in 2017.
- **Bybit**. On February 21, 2025, Bybit lost about 401,000 ETH, close to 1.5 billion US dollars.
- **Violent crime** There is an increasing trend involving kidnapping related to crypto: NBC NEWS here

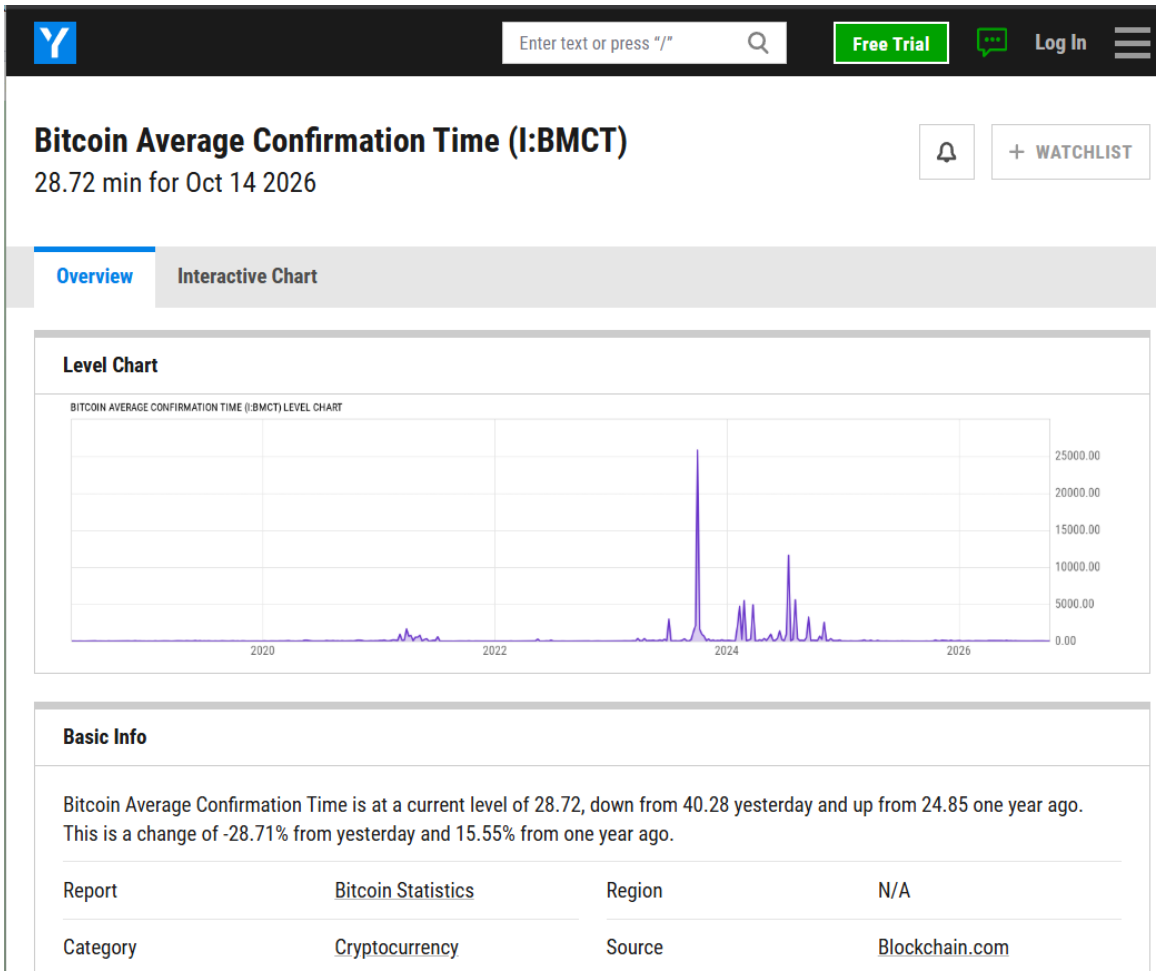
---

Crypto can not be "money"

- Crypto transactions use **pseudonymous**: digital wallet addresses rather than real-world identities:
  - Most people do not want to have transactions with "secret" people

    - This creates a problem for general acceptability of crypto as money
- Crypto valuation is terribly **unstable**:
    - Those that may accept crypto, convert the payment into fiat currency immediately
    - They must have someone immediately interested in buying those crypto assets
- Small transactions with crypto **cost much more** than those with money:
    - 5% for a payment of $20 with crypto
    - 1.2% for a payment of $20, currently in the the USA using a debit card
- Transactions with crypto **take longer** than those with traditional money instruments:
    - A debit card transaction is authorized almost instantly (in 2 to 3 seconds)
    - It takes several minutes using major crypto assets. 

Crypto can not be “money”



So, what is crypto?

- It is merely a **speculative** asset.
- Performs **only one** function of money: store of value
- It is used mainly by those who want to keep their **identity secret** when paying for something.
- Relevance for monetary policy: **none** currently, none in the future.
- More cryptocurrencies, more money, does not solve any real economic problems of modern societies.
  - But they may create some serious problems instead: **hyperinflation, fraude, violent crime**, etc.

Appendix: Derivation of the Money Multiplier
— Not part of the evaluation process —

Money Multiplier: Derivation

- Money Supply (M2) and Monetary Base (MB) are defined as:

$$M2 = Cur + Dep$$

$$MB = Cur + R$$

Cur is "Currency", Dep is "Deposits", R is "Reserves". From (1) and (2):

$$\frac{M2}{MB} = \frac{Cur + Dep}{Cur + R}$$

- Dividing the right hand side of eq. (3) by Dep:

$$\frac{M2}{MB} = \frac{Cur/Dep + Dep/Dep}{Cur/Dep + R/Dep}$$

Money Multiplier: Derivation (continuation)

- In eq.(4) we have Cur/Dep, a ratio that is stable in the short-run: $Cur/Dep = \beta$
- Moreover, the reserves requirement rate set by the central bank is given by:

$$R/Dep = rr$$

- Therefore, eq. (4) can be simplified to:

$$\frac{M2}{MB} = \frac{\beta + 1}{\beta + rr}$$

- Then:

$$M2 = \underbrace{\frac{\beta + 1}{\beta + rr}}_{=\kappa} \times MB$$

- κ is the money multiplier.

6. Readings

Readings

Read Chapter 5 “Money and Inflation” of the adopted textbook:

- Frederic S. Mishkin (2015). Macroeconomics: Policy & Practice, Second Edition, Pearson Editors.

For the specific issue of “Cryptocurrencies” read sections 1, 3, and 4 of the paper:

- Stephen G. Cecchetti and Kermit L. Schoenholtz (2025). Crypto, tokenisation, and the future of payments, CEPR Policy Insight 146, London. See here

Bibliography