

CENTRAL BANKING AND MONETARY POLICY

Lecture 3b

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The country where prices doubled every 15 hours

Hungary, July 1946 · In the summer of 1946, prices in Hungary doubled about every **15 hours**. The peak monthly inflation rate was 4×10^{16} percent: a 4 followed by sixteen zeros. Money received at breakfast bought visibly less by dinner.

- Nobody did this to Hungary from outside. The government's **own printing presses** produced the money behind those prices.
- So the real puzzle is not “what happened?” It is: **why would a government destroy its own currency?** It knew exactly what the press was doing.

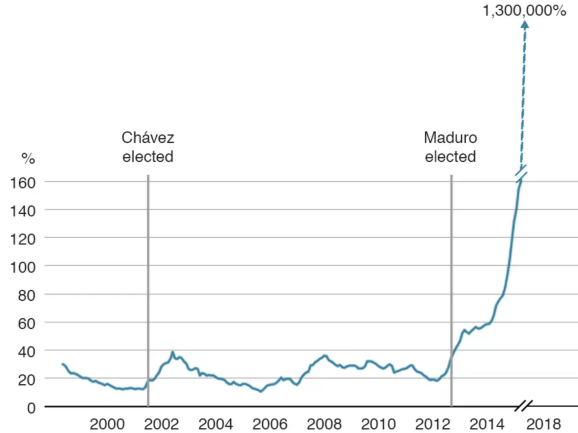
— By the end of today you can answer that question, and you will also see why episodes like this can stop almost as fast as they start.

When money dies · **Venezuela, 2018:** annual inflation reached about 1,300,000% on IMF estimates, prices roughly doubling every 19 days. **Germany, 1923:** a loaf of bread went from 26 pfennig (1919) to 80 billion marks by late 1923; workers were paid at 11am and ran to spend it before noon.

- These are not exotic accidents; they are the mechanism of this lecture, turned up to the extreme.
- Two questions organise the lecture: **where does inflation come from**, and **why is even mild inflation worth a central bank's full attention?**

Inflation: Mother of All Evils

Estimate for 2018 is off the scale

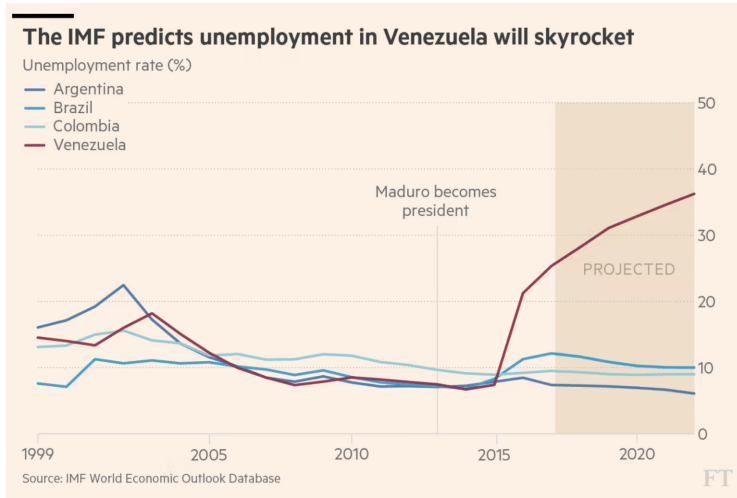


Source: Bloomberg/Reuters estimate for 2018

BBC

SOURCE. BBC: "Venezuela: All you need to know about the crisis in nine charts", 2023. .

Inflation: Mother of All Evils



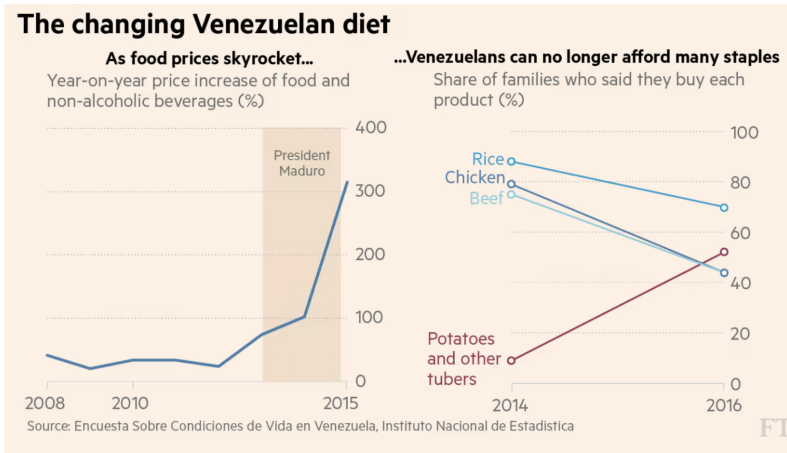
SOURCE. Financial Times: "Venezuela's economic and political crisis in charts", 2023. .

Inflation: Mother of All Evils



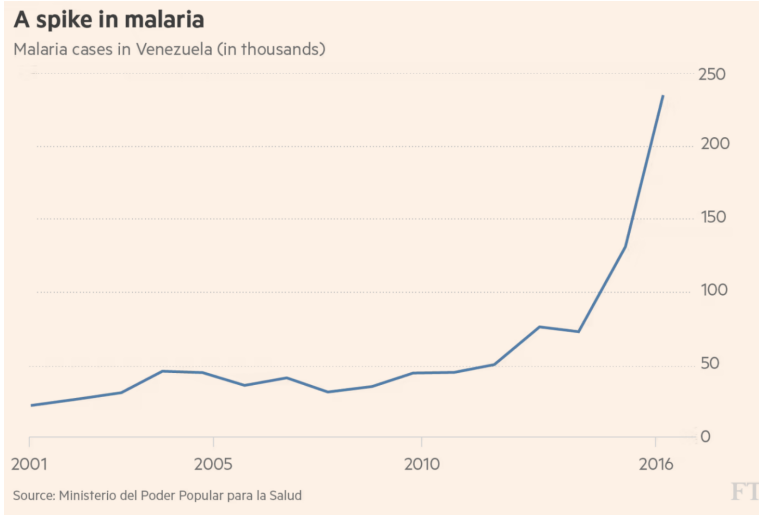
SOURCE. Financial Times: "Venezuela's economic and political crisis in charts", 2023. .

Inflation: Mother of All Evils



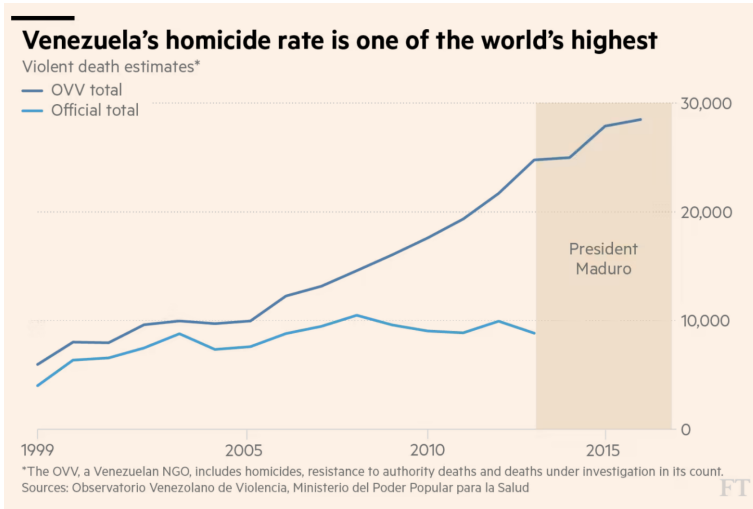
SOURCE. Financial Times: "Venezuela's economic and political crisis in charts", 2023. .

Inflation: Mother of All Evils



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Inflation: Mother of All Evils



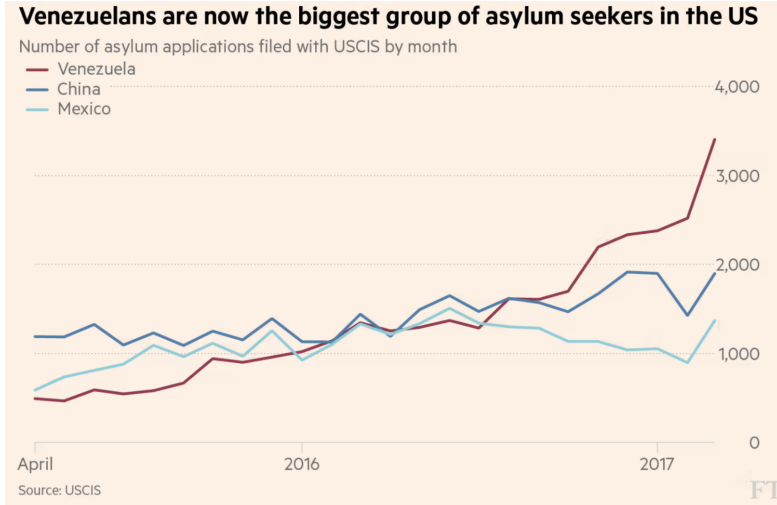
SOURCE. Financial Times: "Venezuela's economic and political crisis in charts", 2023. .

Inflation: Mother of All Evils



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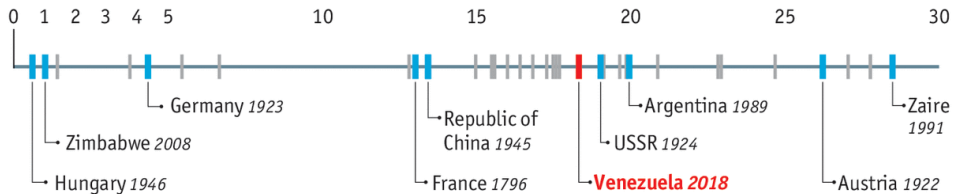
Inflation is everywhere!

- In late 1919, a loaf of bread in Germany cost about 26 pfennig, or just over a fourth of a mark.
- By November 1923, the same loaf of bread cost 80 billion marks.
- More generally, the overall price level in Germany had risen by a factor of 1 trillion in 4 years.
- This massive inflation proved enormously costly to German society, and perhaps to the world as a whole.
- By late 1923, prices were rising 300-fold during the course of a month. The daily price increase was so large at the peak that every day was payday; wages were paid at 11 a.m., and workers immediately dashed with suitcases full of paper money to buy whatever goods they could find.
- Many people lost their lifetime savings, and many businesses failed.
- The economic turmoil and strife caused by the German inflation was one of the factors that led to the rise of the Nazi movement.

Inflation is everywhere!

Runaway reaction

Hyperinflation, number of days for prices to double at peak monthly rate



Sources: "World Hyperinflations" by Steve Hanke and Nicholas Krus; *The Economist*

The Economist

SOURCE. The Economist, 2023. .

Inflation is everywhere!

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US inflation stays at 40-year high, defying expectations of bigger drop

CPI increase of 8.3% in April includes rise in core inflation and prompts fall in equities

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A photograph showing a person from behind, standing in a grocery store aisle. The shelves are stocked with various fruits, including apples and oranges, and some packaged goods like juice. The person is wearing a dark jacket and is looking at the products on the shelves.

Economists broadly expect the pace of consumer price growth to moderate further from these levels as the immediate effects of the war in Ukraine abate © George Frey/Bloomberg

Colby Smith in Washington MAY 11 2022

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SOURCE. Financial Times, 2023. .

Inflation is everywhere!



SOURCE. Financial Times, 2023. .

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German economy

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German inflation hits 40-year high as calls mount for bigger ECB rate rises

Consumer prices in Europe's largest economy driven by soaring costs of energy and food

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The European Central Bank headquarters in Frankfurt. The bank's policymakers will be under pressure when they meet next week to be more aggressive in their response to inflation © Michael Probst/AP

Martin Arnold in Frankfurt AUGUST 30 2022

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Inflation is everywhere!

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Opinion Global Insight

While the world fights inflation, China's problem is deflation

Zero-Covid policy has left the world's second-largest economy out of sync with its peers

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Residential buildings under construction in Shanghai. The property market has seen waves of defaults among developers and a fall in transactions © Aly Song/Reuters

Thomas Hale NOVEMBER 15 2022

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SOURCE. Financial Times, 2023. .

What causes inflation?

“

Inflation is
always and
everywhere a
monetary
phenomenon.

Milton Friedman

the recipient of the 1976 Nobel
Memorial Prize in Economic

@kansoy



What causes inflation?

“

Inflation is
always and
everywhere a
fiscal
phenomenon.

Thomas Sargent

the recipient of the 2011 Nobel
Memorial Prize in Economic

@kansoy

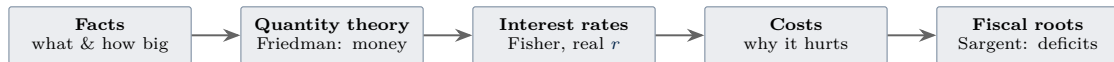


What is Inflation?

- **Inflation** is a sustained rise in the general level of prices—the price level.
- **The inflation rate** is the rate at which the price level increases.
- Deflation is a sustained decline in the price level (negative inflation rate).
- Both can be good or bad.
- Macroeconomists typically look at two measures of the price level, **two price indexes**: *the GDP deflator* and *the Consumer Price Index*.

The third macro number

- We now have output (Lectures 2 to 4) and unemployment (Lecture 5). The missing number is **inflation**, the rate at which the price level rises.



— The lecture is organised around a debate. Friedman: inflation is “always and everywhere a monetary phenomenon.” Sargent: persistent high inflation is “always and everywhere a fiscal phenomenon.” Both are right, at different links of one chain.

What inflation is

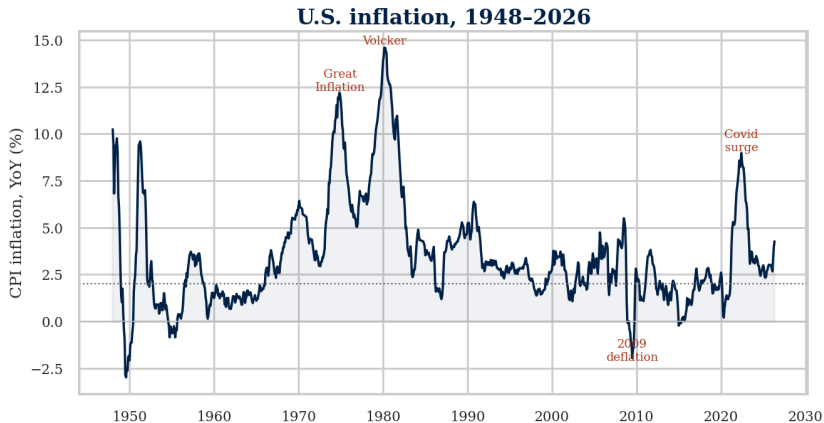
Definition · Inflation is the rate at which the general price level rises:

$$\pi_t = \frac{P_t - P_{t-1}}{P_{t-1}} \times 100\%.$$

- The price level P is a **price index**. Two main ones (recall Lecture 2):
 - CPI: the cost of a *fixed basket* a typical household buys.
 - GDP deflator: nominal GDP $\div$ real GDP, the price of *everything produced*.
- **Deflation** is $\pi < 0$ (a falling price level), rarer and, as we will see, more dangerous.

— We built the deflator in Lecture 2; here we take P and π as known and ask what *moves* them.

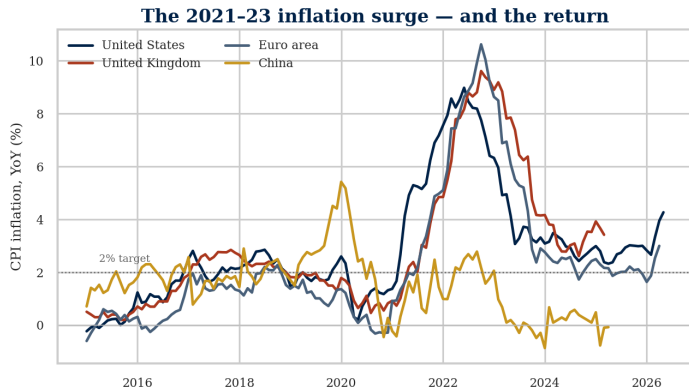
A century of US inflation



Source: U.S. BLS, CPI-U via FRED (CPIAUCSL). Low and stable from the mid-1980s until the 2021 surge.

- Low in the early 1960s, the **Great Inflation** of the 1970s, the **Volcker** squeeze, then low and stable for 30 years, until the **2021 surge** (and a brush with deflation in 2009).

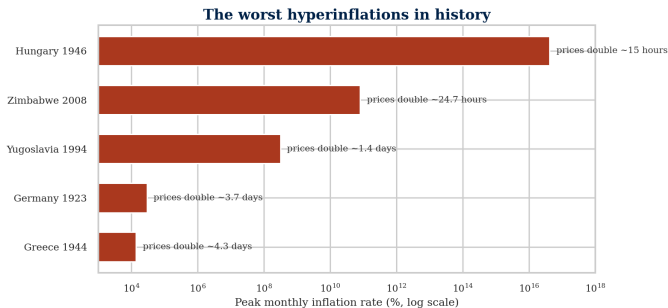
The 2021-23 surge, and China's contrast



Source: BLS / ONS / Eurostat / NBS via FRED (YoY of CPI indices). China stayed near zero — a deliberate contrast.

- The US, UK and euro area spiked to roughly 9 to 11% in 2022 (US 9.1%, euro 10.6%, UK 11.1%), then fell back towards the 2% target.
- **China** stayed near zero, even brushing deflation, a reminder that inflation is a *policy* outcome, not weather.

The full range, from hyperinflation to deflation



Source: Hanke & Krus (2013), 'World Hyperinflations'; Cagan (1956) for Germany. Note the log axis — Hungary cannot share a linear scale with Germany.

- At the top: **hyperinflation** (Hungary 1946, prices doubling every ~ 15 hours).
- At the bottom: **deflation**, Japan's mild, persistent price falls since the late 1990s.

One mechanism, a vast range · Everything from -1% to $4 \times 10^{16}\%$ comes from the *same* forces. Build the mechanism once; the extremes are just the dial turned up.

What is Inflation?

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The plan for today

One question drives the lecture: *who prints money until it dies, and why?* Four steps to the answer.

- ❶ **How bad can inflation get?** What inflation is, and the all-time records. (the facts)
- ❷ **Where does inflation come from?** One equation ties money to prices, in theory and in a century of data. (the quantity theory)
- ❸ **Who wins and who loses?** Interest rates, surprise inflation, and the five costs. (the damage)
- ❹ **Why print anyway?** The government's budget, the inflation tax, and the answer to Hungary. (the motive)

— After today, a headline inflation number stops being noise. You can name its mechanism, its victims, and, when it is extreme, the budget problem hiding behind it.

What inflation is

- The **price level** is the average price of what people buy. Two standard measures: the CPI (Consumer Price Index: the cost of a fixed shopping basket for a typical family) and the GDP deflator (the price of everything in GDP).
- **Inflation** is the percentage change in the price level from one year to the next. It is a speed: how fast prices as a whole rise.
- **Hyperinflation** is an episode of extremely high inflation, by convention above **500 percent per year**.
- Hyperinflation keeps returning. Germany in the early 1920s: prices rose by a factor of more than a trillion. Then Latin America in the 1980s, Russia in the early 1990s, Zimbabwe in 2008, Venezuela in the 2010s.

— A calm 2 percent year and Hungary's 1946 are the same object at very different speeds. One set of tools will explain both.

Part 2: The quantity theory of money

First, what money is

- Money is whatever people widely accept in payment. History has used rocks, seashells, gold, and paper.
- Today's paper is **fiat money**: money because the government says so, backed by no gold or silver. You accept it because you expect everyone else to accept it. Its value is a social convention.
- Money does three jobs: a medium of exchange (you pay with it), a store of value (you hold it), and a unit of account (you quote prices in it).
- How much money exists depends on how broadly you count. The narrowest count is currency plus banks' reserve accounts at the central bank (the government's bank, which issues the currency; the Federal Reserve in the US). The broad count we use later, **M2**, also includes checking, savings, and money-market accounts.

— The theory ahead compresses all of this into one number, M . Now you know what that number counts.

One equation for money and prices

Every purchase in a year is paid with money, and each unit of money can be spent more than once. Write that as an equation:

Quantity equation ·

$$M_t V_t = P_t Y_t$$

- M_t is the money supply. V_t is **velocity**: the number of times each unit of money is spent during the year.
- P_t is the price level and Y_t is real GDP (the quantity of goods, at fixed prices), so the right side $P_t Y_t$ is nominal GDP: total spending at this year's prices.
- As written, this is an **identity**: an equation that is true by definition, like bookkeeping. It cannot be wrong, and it explains nothing yet.

— One modelling assumption turns this bookkeeping into a theory of the price level. That step is next.

From bookkeeping to a theory of prices

To make the equation pin down P_t , say where the other three variables come from:

- Y_t : real GDP is set by the real side of the economy (capital, ideas, productivity). Money does not enter.
- $V_t = \bar{V}$: velocity is treated as constant, a good approximation for M2.
- M_t : the money supply is whatever the central bank chooses.

Solve for the price level and read it in words: prices are money times velocity, divided by goods.

$$P_t = \frac{M_t \bar{V}}{Y_t}$$

Classical dichotomy · In the long run the real side (Y) and the nominal side (M , P) of the economy separate. Real GDP depends on real forces only; money moves only prices.

— Too much money chasing too few goods means a higher P . And the dichotomy explains why we studied growth for weeks without once mentioning money.

The quantity theory of inflation

Inflation is a growth rate, so take growth rates of the whole equation. The gray notes give the reason for each step.

$$g_M + g_V = g_P + g_Y$$

growth rate of a product = sum of growth rates

$$\pi = g_M + g_V - g_Y$$

call g_P inflation, π , and move g_Y across

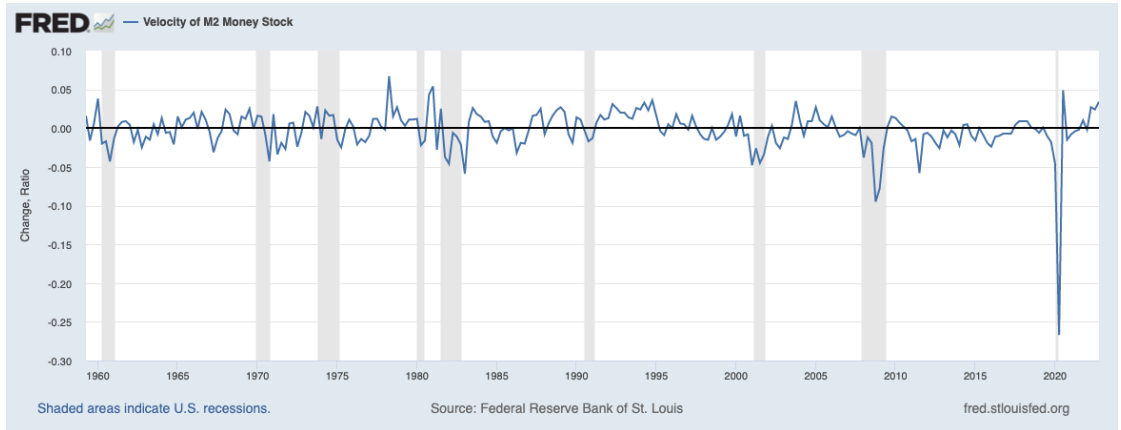
$$\pi = g_M - g_Y$$

velocity is constant, so $g_V = 0$

- In the long run, inflation equals money growth minus real growth. Print money faster than the economy grows, and prices rise.
- Keep the middle line in mind: if velocity moves (say a panic makes people hold on to their cash), the g_V term comes back.

— Milton Friedman's summary: "Inflation is always and everywhere a monetary phenomenon." Half of today's answer is on this slide.

Velocity of Money Supply



A worked example: speed up the press

A country's money supply grows at 7 percent a year and its real GDP grows at 4 percent. Then the central bank raises money growth to 10 percent. **What happens to inflation?**

$$\pi = 7\% - 4\% = 3\%$$

inflation = money growth minus real growth

$$g_M \text{ rises to } 10\%, \quad g_Y = 4\% \text{ still}$$

classical dichotomy: real growth does not move

$$\pi = 10\% - 4\% = 6\%$$

every extra point of money growth lands in prices

Faster money growth feeds one for one into inflation, and it changes nothing real.

— This is the theory's sharpest prediction, and it is testable. The next slide tests it on US decades since the 1870s and on the whole world.

Does the data agree?

Two tests. Left: each dot is a US decade since the 1870s, money growth against inflation. Right: each dot is a country since 1990, on ratio scales (equal steps show equal percentage changes).

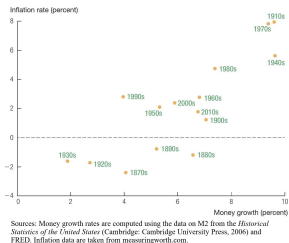


Figure 8.3. Source: Jones 6e (Norton, 2024).

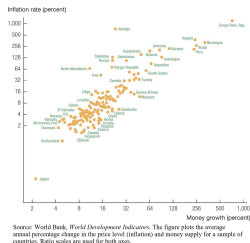


Figure 8.4. Source: Jones 6e (Norton, 2024).

- Left: the fast-money decades (the 1910s, the 1970s) had the highest inflation; the slow-money decades (the 1920s, the 1930s) even saw **deflation**, falling prices.
- Right: the dots climb together across a vast range. Switzerland and Japan sit at the bottom, Nicaragua and the Democratic Republic of Congo at the top.

— Across decades and across countries, money growth and inflation move together. The quantity theory is a strong long-run regularity.

Why money is neutral

Imagine the central bank simply doubles the money supply so that all prices double.

- **Relative prices**, the price of one thing compared with another, are unchanged: a loaf of bread still costs the same number of haircuts. And relative prices are the only prices that matter for real choices.
- So nobody has a reason to change any real decision. This is the **neutrality of money**: changes in the money supply move prices, not real quantities.
- Neutrality holds in the **long run**. In the short run prices are **sticky** (they do not all adjust at once), so money can move real output for a while. That short run comes later in the course.

— Back to Hungary. The presses could multiply the pengo, Hungary's currency, but they could not create a single loaf of bread. The mechanism of our puzzle is now clear; the motive is still missing.

Part 3: Who wins and who loses

Two interest rates

Your bank quotes one interest rate. You should care about a different one.

- The **nominal interest rate**, i , is the stated rate on a deposit or a loan. It is paid in dollars.
- The **real interest rate**, r , is the return measured in goods: how much more you can actually consume. In the long run it equals the marginal product of capital, the extra output one more unit of capital produces.
- Save 100 dollars at 8 percent and you have 108 dollars next year. If prices rose 3 percent over that year, part of the 8 percent only keeps up with prices. What is left, about 5 percent, is real.

— Whenever inflation is not zero, the quoted rate and the true reward differ. The next equation says exactly how.

The Fisher equation

A lender who wants a real reward must also charge for the inflation both sides expect. Irving Fisher wrote that as one line:

Fisher equation ·

$$i = r + \pi^e$$

where π^e is **expected inflation**: the inflation people believe is coming.

$$i = 5\% + 3\% = 8\%$$

real reward 5, expected inflation 3: quote 8

$$r^{\text{ex ante}} = i - \pi^e$$

the real rate you expect, before the year runs

$$r^{\text{ex post}} = i - \pi$$

the real rate you actually got, at realized inflation

Ex ante means “before the event”: it uses expectations. **Ex post** means “after the event”: it uses what actually happened.

— A nominal interest rate carries an inflation forecast inside it. Whenever that forecast is wrong, somebody pays. Try it, next slide.

Your turn: who pays for a surprise?

Your turn · You lend 100 dollars for one year at a fixed nominal rate of 8 percent, and both sides expect 3 percent inflation. Inflation actually comes in at 8 percent, roughly the United States in 2022. Who gained from the surprise, and by how much? Start from the real return you actually got.

$$r^{\text{ex ante}} = 8\% - 3\% = 5\%$$

given: the deal both sides thought they signed

$$r^{\text{ex post}} = 8\% - 8\% = 0\%$$

repaid 108; deflate: $108/1.08 = 100$, just what you lent

$$\text{your loss} = 5\% - 0\% = 5 \text{ points}$$

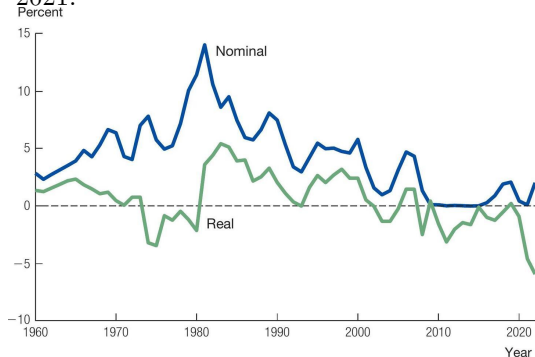
and the borrower gains exactly what you lose

Surprise inflation is a transfer machine: it moves real wealth from lenders to borrowers. A fixed-rate mortgage in a surprise inflation is a transfer from the bank to the homeowner; a retiree on a fixed pension loses.

— In Hungary in 1946 this arithmetic ran at full speed. Anyone who held cash or a fixed claim for even a day was paying someone else.

The two rates since 1960

This chart shows the nominal and the real interest rate on 3-month US Treasury bills (short-term government debt) since 1960. Watch the two lines around 1980, and again around 2021.



Source: FRED and author's calculations. The nominal interest rate plotted here is the annualized return on 3-month Treasury bills.

- The nominal rate peaked near 14 percent in 1981 and tracked the inflation peak: the Fisher equation in action.
- The real rate went **negative** in the 1970s and again in 2021–22: savers earned interest and still lost goods.

Figure 8.5. Source: Jones 6e (Norton, 2024); FRED.

— When you see a high nominal rate, read it as an inflation forecast first and a reward second.

The five costs of inflation

If inflation were fully expected and every contract adjusted to it, it would cost little. The damage comes when it is high, uncertain, and unexpected. Five costs:

- **Arbitrary redistribution:** real wealth moves between borrowers and lenders. You just computed one such transfer.
- **Tax distortions:** taxes are charged on nominal income, so a high nominal return in a high-inflation year is taxed even when the real return is near zero. After tax it can turn negative, and that discourages investment. Martin Feldstein, a Harvard economist, argued this badly hurt US investment in the 1970s.
- **Distorted relative prices:** some prices adjust fast, some slowly, so the price signals that steer resources become blurred.
- **Shoe-leather costs:** cash loses value quickly, so people hold less of it and go to the bank more often. That wears out shoe leather, which is where the name comes from.
- **Menu costs:** the real resources firms spend on changing posted prices, literally reprinting menus.

— At Hungarian speeds these stop being distortions. Money itself stops working, because nobody will hold cash that halves in value by tomorrow.

Why aim for 2 percent, not zero?

If inflation is costly, zero looks like the natural target. Central banks instead aim for low, positive inflation, usually about 2 percent. Three reasons:

- A cushion above **deflation**, falling prices, which is worse than mild inflation. Deflation is dangerous twice over. At the **zero lower bound** nominal rates cannot fall much below zero, so the central bank runs out of room to cut. And under **debt deflation** falling prices raise the real value of debts, and that squeezes borrowers just when the economy is weakest.
- The cautionary case is Japan after 1990: years of near-zero inflation, stuck interest rates, and weak growth.
- Measured inflation slightly overstates true inflation, so 2 percent measured is close to true price stability.

— Zero is not the safe number it appears to be. “Should the target be 2 or 0?” is a real policy debate, and you can now argue both sides.

Case: freezing prices by law

If inflation is painful, why not simply forbid price increases? It has been tried, at the highest level.

Nixon, August 1971 · With inflation near 5 percent and an election ahead, President Nixon froze wages and prices for 90 days to break a supposed **wage-price spiral**: wages push up prices, prices push up wage demands, and the loop repeats.

- Controls suppress the symptom, not the cause. If money growth keeps pushing prices up, the postponed inflation returns the moment the controls end.
- Meanwhile the controls block the price signals that allocate goods, and shortages and queues follow.

— You cannot legislate inflation away while the press keeps running. Which sharpens today's question: why would anyone keep the press running?

Part 4: The motive: paying bills with the press

The question behind the question

The quantity theory explains *how*: too much money chasing too few goods. It does not explain *why* a central bank would create that much money while knowing the costs. The answer is usually **fiscal**: it concerns the government's budget.

Government budget constraint ·

$$G = T + \Delta B + \Delta M$$

- G : government spending. T : tax revenue. ΔB : new borrowing (bonds sold). ΔM : new money printed.
- Every bill must be paid somehow: with taxes, with borrowed money, or with printed money.
- When taxes cannot rise and lenders will not lend, one term is left: ΔM .

— Here is Hungary's motive taking shape. Printing money is not a policy gone mad; it is how a government out of other options pays its bills.

The inflation tax

Revenue raised by printing new money has a name: **seignorage**, also called the **inflation tax**. Here is who pays it. Suppose each person holds 200 dollars in cash, and the government doubles the money supply and spends the new notes itself.

$P \longrightarrow 2P$ quantity theory: double M and the price level doubles

\$200 in cash $\longrightarrow$ \$100 of goods $200/2 = 100$: same notes, half the purchasing power

- You paid a 100-dollar tax. No law was passed, and nobody voted.
- Who pays: holders of currency and of fixed nominal claims. Holders of stocks, gold, or real estate largely escape, because those prices rise with the price level.

— The inflation tax is the one tax a weak government can always collect. It needs no tax office and no parliament, only a press.

When governments reach for the press

In normal times, governments pay for spending with taxes and borrowing. The inflation tax is a last resort, and the road to it looks the same in every century:

- A government runs large **deficits** (it spends more than it collects in taxes) and borrows heavily.
- Lenders begin to fear **default**: not being repaid. They charge more, and then they stop lending at all.
- Raising taxes is hard, politically or administratively.
- With taxes and borrowing exhausted, the budget constraint leaves one term: ΔM .

This often happens during and after wars. And there is one more problem: printing repays lenders in devalued money, and that confirms the very fear that made them flee.

— Hungary, July 1946, sits exactly where this chain predicts: a country just out of a devastating war, when taxes are hardest to collect and lenders are most afraid.

A tax that eats its own base

Could a government live on the inflation tax forever? No. This tax destroys the thing it taxes.

- Print a little, and you collect revenue. Print a lot, and inflation rises so high that people flee from cash: they hold as little as possible, for as short a time as possible.
- The tax base, the real value of the cash people hold, shrinks. Beyond some point, faster printing collects *less* revenue. This hump-shaped relation is the **Cagan curve** (after Phillip Cagan): a Laffer curve for the inflation tax, where pushing the rate too far lowers the revenue collected.
- In a hyperinflation, real revenue can collapse even while money growth explodes. Countries in hyperinflation typically raise about **5 percent of GDP** this way; Argentina once reached about **10 percent**.

— Even judged purely as a tax, hyperinflation fails. Past the peak, the press runs faster and faster for less and less. Hungary's 4×10^{16} percent was far beyond any revenue peak.

Episodes end, and they end fast

Two charts of annual inflation in six countries. Left: Argentina, Brazil, and Russia. Right: Mexico, Nigeria, and Venezuela. Look at how the spikes stop.

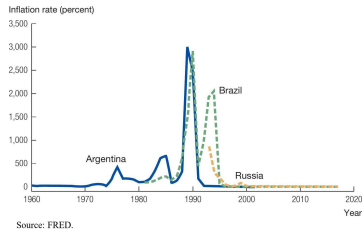


Figure 8.6. Source: Jones 6e (Norton, 2024); IMF.

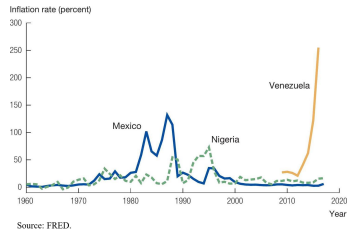


Figure 8.7. Source: Jones 6e (Norton, 2024); IMF.

- Left: inflation above 2,000 percent a year in the early 1990s fell below 5 percent within a few years.
- Right: Mexico and Nigeria had high inflation but never hyperinflation. Venezuela in the 2010s is the modern full case: collapsing oil revenue, large deficits, and a press to cover them.

— A sudden stop is the signature of a fiscal cause. Fix the budget, and the reason to print disappears at once.

Why it keeps coming back

Ending a hyperinflation is hard for two reasons, and both must be solved at once:

- **Fiscal reform is painful:** lower spending, higher taxes, or new loans. All are hard choices, which is why they were avoided in the first place.
- **Coordination:** every shop and wage contract has built expected inflation into its prices. So inflation has inertia (it keeps rolling on its own) until everyone believes it will truly stop.

Because both are hard, episodes recur. And the temptation to pay bills with the press is not special to desperate governments; every government faces it in some degree.

— The cure is known but painful, so the real question is how to keep the temptation at a distance. The standard answer is a piece of institutional design, next.

The standard defense: central bank independence

If printing is the tempting way out of every budget problem, the guard must be built into institutions, not left to good intentions.

- The standard guard is **central bank independence**: the central bank (the Federal Reserve, the European Central Bank) decides about money. The elected government, which spends and taxes, cannot order it to print.
- The design separates who prints from who spends. In the euro area the separation is even wider: one multinational central bank serves many governments.

— Independence exists because every government faces this temptation. The design keeps the press out of the treasury's reach, though never perfectly: politicians still appoint the central bankers.

Mechanism and motive: the answer to Hungary

Two famous sentences, one from each side of today's story:

Two sentences, one story · Milton **Friedman**: “Inflation is always and everywhere a monetary phenomenon.”

Thomas **Sargent**: “Persistent high inflation is always and everywhere a fiscal phenomenon.”

- Friedman names the **mechanism**: too much money. Sargent names the **motive**: an unsolved budget problem that forces the money to be printed.
- Now answer July 1946. Hungary's government did not want inflation; it wanted revenue, and after the war the press was the only tax it could still collect.
- And that is why such episodes end fast: the moment the budget is fixed, the reason to print is gone, and prices that doubled every 15 hours can simply stop.

— Money is the lever; fiscal pressure is the hand that pulls it. Cure the budget and you cure the inflation.

A caveat: the US 1970s were not Hungary

Was the Great Inflation of the 1970s a fiscal episode too? No. The inflation tax raised only a tiny share of US spending. The causes were more ordinary:

- Oil-price increases by OPEC, the oil producers' cartel, pushed prices up.
- The Federal Reserve let money grow too fast, partly because it worried about a productivity slowdown.
- It ended only when **Paul Volcker**, Fed chairman from late 1979, tightened policy sharply, at the cost of a deep recession.

— The fiscal story explains hyperinflations. Moderate inflations can come from plain policy mistakes: the same quantity-theory lever; a different hand pulls it.

Recap

Recap

- **Inflation** is the growth rate of the price level; **hyperinflation** runs above 500 percent a year. Hungary 1946: prices doubled about every 15 hours.
- **Quantity theory**: $MV = PY$, so in the long run $\pi = g_M - g_Y$. Money is **neutral** in the long run: it moves prices, not real quantities.
- **Fisher equation**: $i = r + \pi^e$. Surprise inflation transfers real wealth from lenders to borrowers (your loan: 5 percent expected, $8\% - 8\% = 0$ received).
- The costs: redistribution, taxes on nominal income, blurred relative prices, shoe leather, menus. **Deflation** is worse, hence the 2 percent target.
- The **motive**: $G = T + \Delta B + \Delta M$. When taxes and lenders are exhausted, the press is the last tax, and past the **Cagan** peak even that fails. Fix the budget, and the inflation stops.

Inflation is monetary in mechanism and fiscal in motive: the press does the printing, the unfixed budget supplies the reason. That is why hyperinflations can end the day the budget is fixed.

Sources

This lecture follows, and reproduces figures and examples from, the work of **Charles I. Jones**.

- Charles I. Jones, *Macroeconomics*, 6th edition, W. W. Norton, 2024, Chapter 8. Figures 8.1–8.7 and Tables 8.1–8.3 are © W. W. Norton.
- Norton instructor lecture slides for Chapter 8.
- Charles I. Jones, Stanford GSB lectures (2023), Session 9: “A Dismal Science: Inflation in the Long Run.”
- Milton Friedman and Thomas J. Sargent on the monetary and fiscal roots of inflation.
- Underlying data credited in the figures: FRED (Federal Reserve Bank of St. Louis) and the IMF.

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