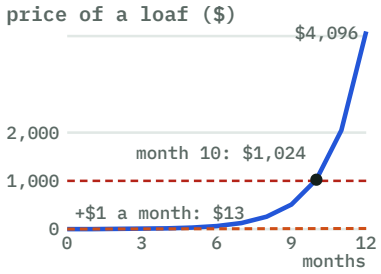
Could a wheelbarrow of money buy a loaf?

Prices follow money, doubling against adding, the rule of 70, hyperinflation (Cagan's line), who loses and who gains, the loop that speeds up, Germany 1921-23 in numbers, the Rentenmark and the stop, the debate, checklist sign 4.

1 Prices follow money

Macroeconomics, Lesson 9

- Coralia (toy island): government spends > taxes → **prints** the difference → money **×2 every month**, output the same
- Same goods, more money → prices follow: money `×2` ⇒ prices `×2`
- $1 loaf: `1 → 2 → 4 → 8` (month 3) … `512` (month 9) → **$1,024** (month 10) → `$4,096` (month 12)
- **Doubling beats adding**: +$1 a month → only `$13` after 12 months
- Practice: $2 loaf → **$1,024 in month 9**, $2,048 in month 10 · +$2 a month → `2 + 2 × 10 = $22`



2 How fast?

Macroeconomics, Lesson 10

- **Rule of 70**: time to double ≈ `70 ÷ g` (g = growth rate per period: years **or** months)
- `10%` a month → `70 ÷ 10 = 7` months · Practice: `7%` a month → `10` months → 30 months = 3 doublings → `$2 → $16` (exact ≈ $15: a shortcut)
- **Hyperinflation** = prices rising **more than 50% in a month** · line drawn by Phillip Cagan (American economist), 1956 · 7% or 10% a month: high, **not** hyper
- Germany, October 1923: prices doubled every **≈3.7 days** → `30 ÷ 3.7 ≈ 8` doublings a month → `2⁸ = 256` → prices **×250+** in 30 days

3 Who loses?

money that melts

- **Real value** = what an amount of money can buy
- Sam: `$80` in a drawer, loaf $1 → $8 after 3 months → `80 ÷ 8 = 10` loaves (was 80) → **holders of cash lose**
- **Lose** ← cash, savings, fixed pensions and wages · **gain** ← fixed debts (Lena, a shop loan, the government's old debt): repaid in money that buys far less
- **Mostly safe** ← things that do not melt: land, grain, a money whose amount is not growing · Mia spends her pay at once → loses little

4 The loop

why it speeds up

- Government spends > it collects → prints to pay the bills → prices ↑ → people spend **at once**, before money melts → prices ↑ **faster** → loop feeds itself
- The stop = the loop backward (practice): no more printing to pay the bills → money stops growing → people expect stable prices → they keep money again → prices stop doubling
- New notes alone ≠ a stop: a new money printed to pay the bills **melts too** · what works = a **limit** people believe

5 Germany 1921-23

the real story

- **Reparations** = payments from the losers of a war to repair the damage · 1921: Germany's bill **132 billion gold marks** · Germany fell behind
- Jan 1923: French + Belgian troops occupy the **Ruhr** (coal + steel region) → workers told to stop working in protest (a strike) → government pays them by **printing**
- Mark = Germany's money then · Loaf in Berlin: **≈250 marks** (Jan 1923) → **≈200 billion** (late Nov) · `$1` : 4.2 marks before the war → **≈4.2 trillion** (Nov 1923) = `×1 trillion` (a million million)
- Stop: Sept, Ruhr strike ended + spending cut → **15 Nov 1923 Rentenmark** = new money, `1 = 1 trillion` old marks, limited by law · Hjalmar Schacht (German banker) in charge · central bank stops lending to the government

6 Debate, checklist

checklist sign 4

- Who is to blame? **The bill was too big**: reparations too large for taxes, printing the way out · **Printing was a choice**: taxes or cuts were possible, the spiral ended when printing stopped · historians still weigh both · no verdict
- Not only Germany: Hungary **1946**, prices doubled every **≈15 hours** (fastest on record) · same mechanism
- Practice: "printing any money always ends in hyperinflation" → **goes too far**: speed matters (10% a month ≠ 3.7 days)
- **Bubble checklist** (warning signs, from Lesson 1) · **Sign 1 · Bought to resell** **Sign 2 · Money is a promise** **Sign 3 · A run fills itself** **Sign 4 · Printing to pay the bills**

Watch out: prices that **double** are multiplied by 2, not raised by $1 · hyperinflation = more than 50% a **month**, not a year · inflation hurts savers and **helps** borrowers · a new money stops nothing without a **limit**