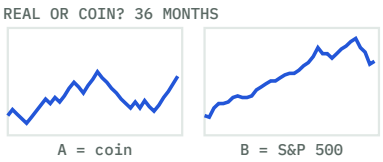
Can you read the chart?

The random walk and why a coin can draw a market chart; efficient markets and why only surprises move prices; technical analysis, support and resistance; data snooping; what the studies of chart rules found; what the data do not say.

1 Random walk

a price steps like a coin

- **Random walk**: “a path where each step is up or down by chance, and the past does not tell you the next step”
- **Louis Bachelier** (French mathematician), 1900 → next move of a price as hard to call as a **coin flip**
- Coin: 5 heads in a row → next flip still **50-50** (no memory) · “due to fall” ×
- Real or coin? S&P 500 (500 largest US companies, as one number) over 3 years vs coin (heads +4%, tails −3% a month) → shapes look alike



2 Efficient market

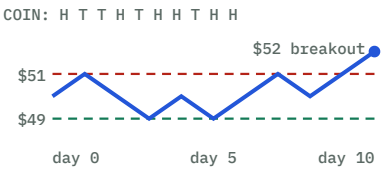
news is in the price

- **Efficient market**: “a market where prices already reflect what is publicly known”
- **Eugene Fama** (American economist), 1970 · Nobel Prize 2013
- Record profits at 9:30 → traders (buy and sell for a living) act in seconds → by lunch the price has **already moved**
- Only **surprises** move the price → surprises are random → so are the steps · storm nobody expected → sell → price falls at once → the old chart could not warn

3 Technical analysis

reading charts

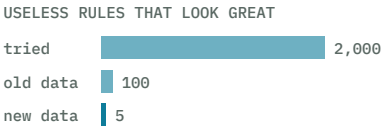
- **Technical analysis**: “reading patterns in past prices to predict future prices”
- “**Support**”: a low it keeps bouncing up from · “**resistance**”: a high it cannot pass · “head and shoulders”: a peak between two lower ones · “the trend is your friend”: buy what is rising
- Coin chart, ±$1 a day from $50 → support $49 · resistance $51 · day 10: $52 = “**breakout**” (passes a line) → next flip **still 1 in 2**
- Any up-and-down path has highs and lows → lines “fit” the past, say nothing of the next step



4 Data snooping

luck fits the past

- **Data snooping**: “trying many rules on the same past data and keeping the one that fits best: it fits by luck, so it fails on new data”
- 1,000 useless rules × 1 in 20 → `1,000 ÷ 20 = 50` look great on the past
- 2,000 rules → `÷ 20 = 100` on old data → `÷ 20 = 5` pass new data too, by luck
- Signal “called 9 of 10 turns” (turn: rising → falling, or back) → ask: **how many tried?** · **new data?**



5 The evidence

studies of chart rules

- **Fama & Blume**, 1966 (Journal of Business 39): **filter rules** (buy after a rise of a set %, sell after a fall) → gains vanished after trading costs
- **Sullivan, Timmermann & White**, 1999 (Journal of Finance 54): `7,846 rules · 100 years` of Dow data (price index of 30 big US companies) → best rules fit 1897–1986 ⇒ stopped working 1987–96 (new data)
- **Burton Malkiel** (American economist), 1973: blindfolded monkey + darts at a list of shares ≈ the experts
- **Trading costs** (fees, buy-sell gap): right half the time, ±$20, 50 trades × $2 → `$0 − $100 = −$100`

6 What it does not say

next step vs long run

- Random walk = the **next step**, not the long run → US stocks **drift** up ≈ 10% a year (Lesson 6) with a coin’s zigzag around it
- Not: “no one ever profits from a pattern” (a few may) · it says: the simple patterns an ordinary investor reads have not paid once costs and luck counted

Watch out: a line that fits the past is **not** a rule for the future · random walk ≠ “the market never rises” · a rule that worked on old data proves nothing until it works on **new** data

This is a lesson, not financial advice. It shows what the evidence says about choices like these; what is right for you depends on your life.