

A Simple Story of Three Stocks: Apple, Microsoft, and a Collapsed Bank

Reading Charts and Indicators for Complete Beginners

Setting the Stage

Who Is This For?

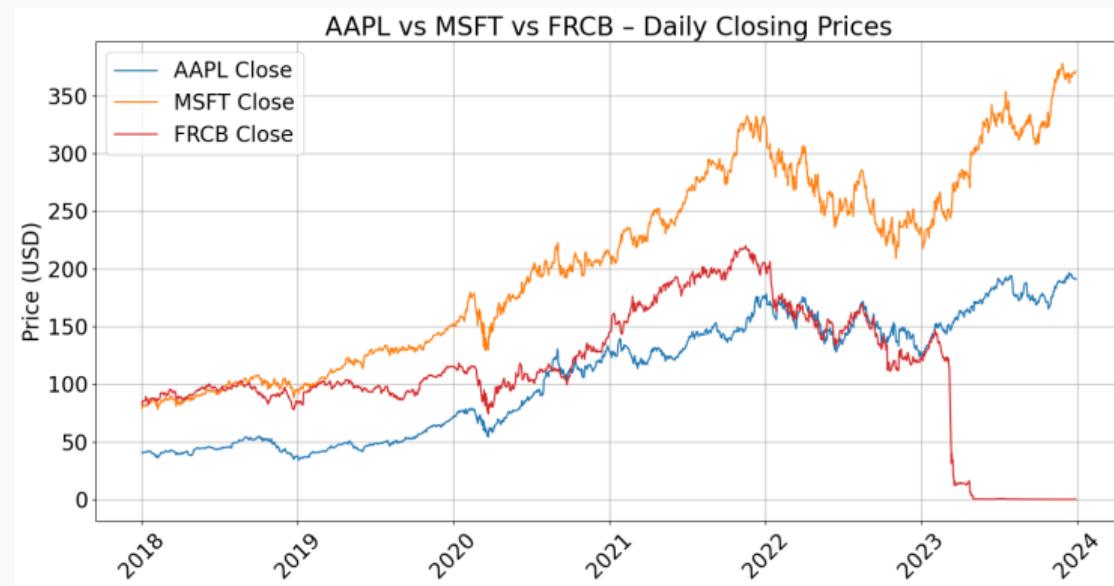
- This presentation is for people who know **the least** about the stock market.
- The goal is to tell a **story**, not to give trading tips.
- We will follow three real companies:
 - **Apple (AAPL)** – big technology company.
 - **Microsoft (MSFT)** – another big technology company.
 - **First Republic Bank (FRCB)** – a bank that later **collapsed**.
- We will slowly introduce:
 - Basic charts (lines, candles, volume).
 - Simple indicators with formulas **and** stories.
 - How big world events show up in these pictures.

What Is a Stock Price Chart?

- Think of a stock as a **score** for a company.
- Every day, people buy and sell tiny pieces of the company (shares).
- The price is the number where buyers and sellers **agree** to trade.
- A price chart has:
 - Left to right: **time** (past to today).
 - Up and down: **price** (how expensive each share is).
- If the line goes up, the market thinks the company is worth **more**.
- If the line goes down, the market thinks it is worth **less**.

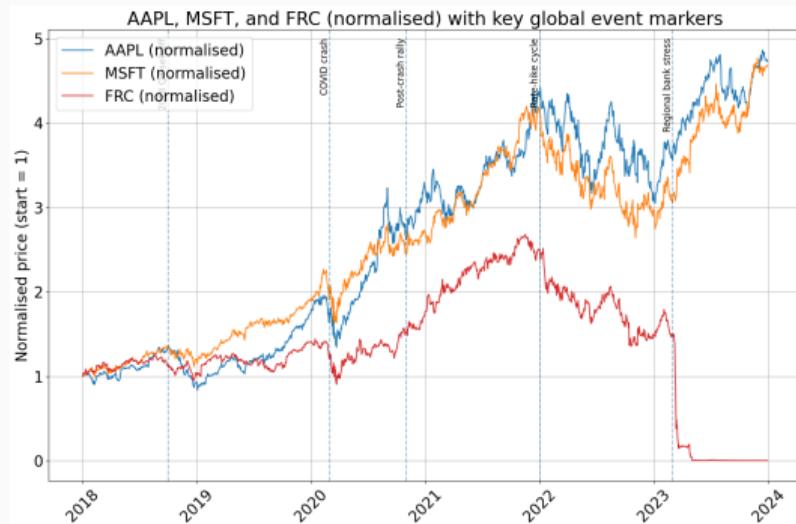
Three Stocks, One Story

Three Stocks on One Chart



- You can already see:
 - Two lines that, over the long run, **tend to go up** (AAPL and MSFT).
 - One line that eventually **falls very hard** and stays low (FRC).
- Same world, same years, but very **different journeys**.

Normalised Prices: Starting Together at 1



- We force all three stocks to start at 1 on the left.
- Interpretation:
 - 1.0 = starting level.
 - 2.0 = price has **doubled**.
 - 0.5 = price has lost **half** its value.
- Now we can compare growth:
 - Apple and Microsoft move up and down, but **grow** over time.
 - The bank rises for a while, then **falls off a cliff**.
- Vertical dashed lines mark important **world events** (Covid crash, rate hikes, banking stress, . . .).

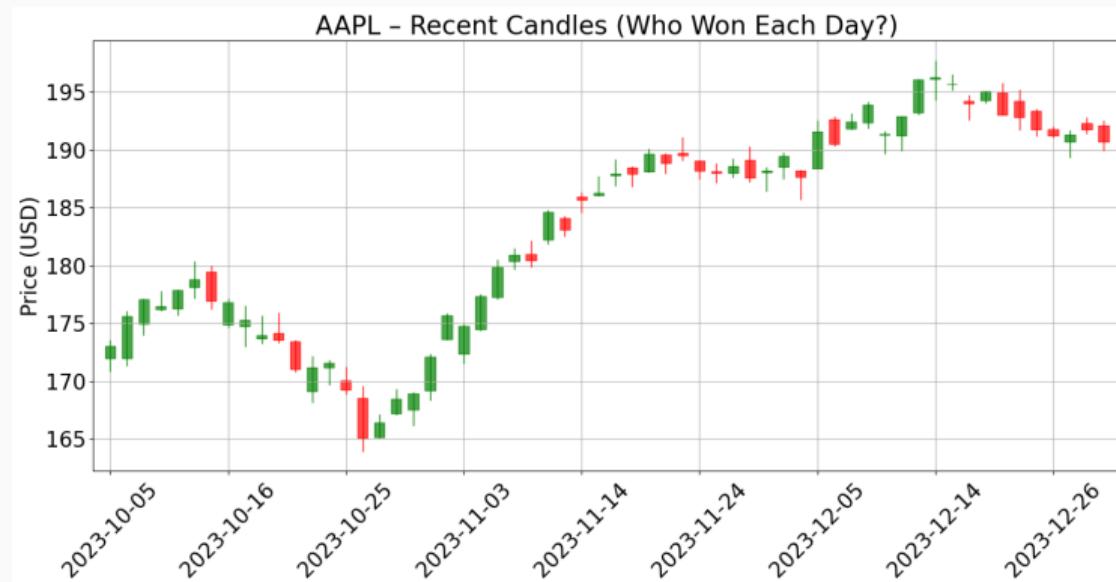
Candles and Volume

From Simple Lines to Candlesticks

A simple line only shows one price per day (usually the **close**). But during the day, the price moves a lot. Candlesticks show more detail for each day:

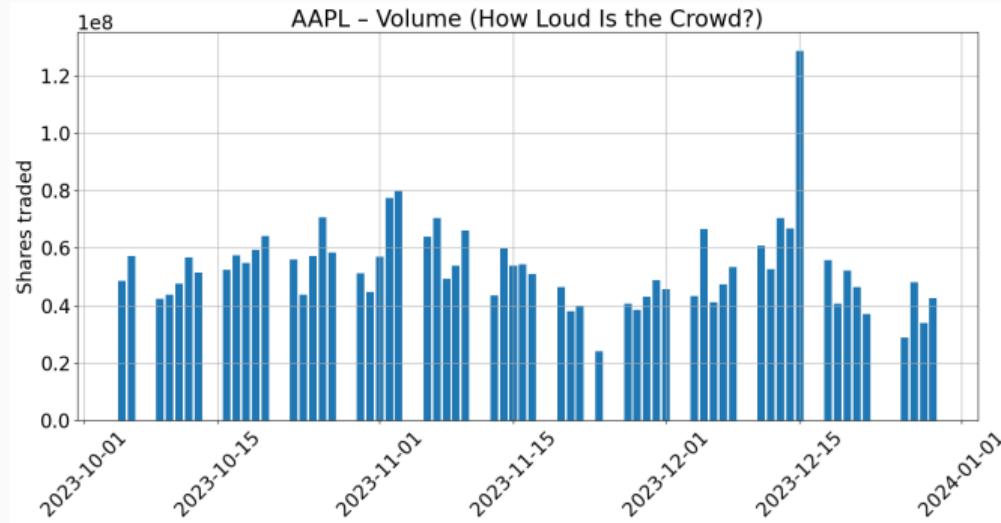
- **Open (O)**: first price of the day.
- **Close (C)**: last price of the day.
- **High (H)**: highest price during the day.
- **Low (L)**: lowest price during the day.
- If $C > O$:
 - Candle is usually **green**.
 - Buyers kept pushing the price **up** by the end of the day.
- If $C < O$:
 - Candle is usually **red**.
 - Sellers kept pushing the price **down**.

Apple: Candles and Volume



- Each candle shows who “won” that day:
 - More green: buyers often won.
 - More red: sellers often won.
- Long wicks (thin lines) mean the price explored higher or lower, but did not stay there.

Apple: How Loud Is the Crowd?



- The bars show **volume**: how many shares were traded.
- On a **high volume** day:
 - Many people are active; the market is **loud**.
- On a **low volume** day:
 - Fewer people are trading; the market is **quieter**.
- Big price changes on **high volume** often mean strong emotions: fear or excitement.

Microsoft: Candles and Volume



- The **candles** show the daily tug-of-war:
 - Green days: buyers pushed the price up by the close.
 - Red days: sellers pushed the price down.
- The **volume** bars show how many shares were traded:
 - High volume: many people joined the fight.
 - Low volume: fewer people trading.
- Same idea as Apple: price is the **score**, volume is how **loud** the crowd was that day.

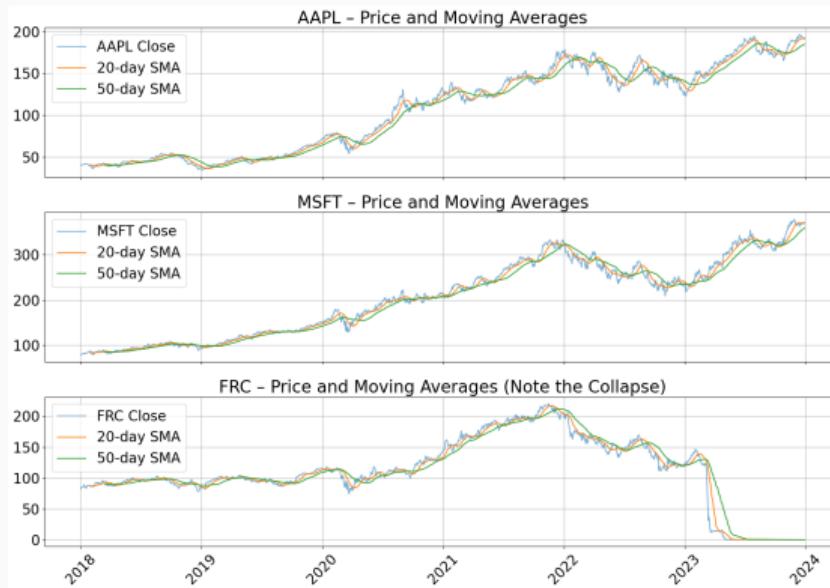
The Bank: Candles and Volume in Crisis



- During the crisis, the pictures change:
 - Many **red candles** in a row: sellers keep winning day after day.
 - **Very high volume**: lots of people are trying to get out.
- In story form:
 - People are running **out** of the bank's stock.
 - Very few want to be the ones still holding it.

Moving Averages & Trend

Moving Averages: Smoothing the Wiggles



Daily prices jump up and down like a child hopping along a path. A **moving average** draws a smoother line that shows the path of the child.

For a simple moving average (SMA) over N days:

$$\text{SMA}_t = \frac{1}{N} \sum_{k=t-N+1}^t P_k,$$

where P_k is the closing price on day k .

- If price stays mostly **above** the moving-average line, we say the trend is **up**.
- If price stays mostly **below** the line, we say the trend is **down**.

Golden Cross and Death Cross (Intuition)

We often use two moving averages:

- Short-term, e.g. 20 days (faster line).
- Longer-term, e.g. 50 days (slower line).

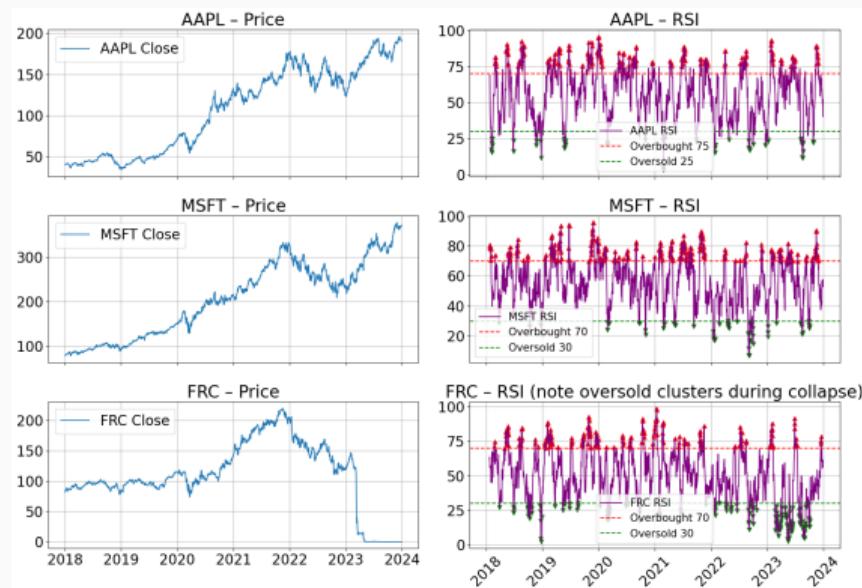
Traders watch the crossings:

- **Golden cross:** short line crosses **above** long line.
 - Recent prices are improving faster than the older average.
 - Often read as “trend may be turning **up**”.
- **Death cross:** short line crosses **below** long line.
 - Recent prices are worse than the older average.
 - Often read as “trend may be turning **down**”.

For the bank, as its crisis grows, you will see the price **failing to get back** above these averages.

RSI: Speed of Moves

RSI: Is the Price Running Too Fast?



RSI (Relative Strength Index) measures how strong recent **up days** are compared to **down days**. It outputs a number between 0 and 100.

- If recent gains are much bigger than losses, RSI moves towards **100**.
- If recent losses are much bigger than gains, RSI moves towards **0**.
- Traders often watch:
 - Above 70: “overbought” (price has run up very fast).
 - Below 30: “oversold” (price has fallen very fast).

RSI: Formula and Story

For each day t with closing price P_t we look at the change

$$\Delta_t = P_t - P_{t-1}.$$

We turn this into *gains* and *losses*:

$$\text{Gain}_t = \max(\Delta_t, 0), \quad \text{Loss}_t = \max(-\Delta_t, 0).$$

Then we average these over the last N days:

$$\text{AvgGain}_t = \frac{1}{N} \sum_{k=t-N+1}^t \text{Gain}_k, \quad \text{AvgLoss}_t = \frac{1}{N} \sum_{k=t-N+1}^t \text{Loss}_k.$$

From these we compute

$$\text{RS}_t = \frac{\text{AvgGain}_t}{\text{AvgLoss}_t}, \quad \text{RSI}_t = 100 - \frac{100}{1 + \text{RS}_t}.$$

Story:

- If recent gains are much bigger than losses, RSI moves towards **100**.
- If recent losses are much bigger than gains, RSI moves towards **0**.

RSI Zones: Overbought and Oversold

People often use two simple levels:

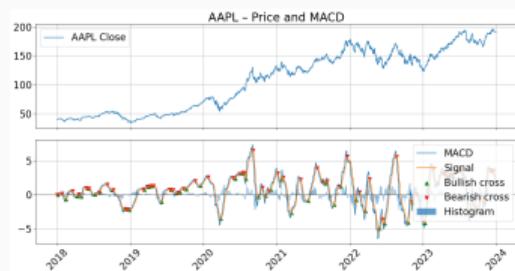
- RSI above 70:
 - Called **overbought**.
 - Price has run up very quickly.
- RSI below 30:
 - Called **oversold**.
 - Price has fallen very quickly.

Important notes:

- “Overbought” does *not* mean the price must fall *now*.
- In strong uptrends, RSI can stay high for a long time.
- For the bank, during collapse, RSI often stays near or below **30**: the price is falling **fast and often**.

MACD: Trend Mood

MACD: When Does the Trend Change Its Mind?



MACD (Moving Average Convergence Divergence) compares a **fast** and a **slow** exponential moving average (EMA) of the price.

MACD: Formula and Interpretation

For an EMA with span n :

$$\text{EMA}_t = \alpha P_t + (1 - \alpha) \text{EMA}_{t-1}, \quad \alpha = \frac{2}{n+1}.$$

Standard MACD settings:

- Fast EMA: 12 days.
- Slow EMA: 26 days.
- Signal EMA: 9 days (applied to MACD itself).

We compute:

$$\text{MACD}_t = \text{EMA}_{12}(P_t) - \text{EMA}_{26}(P_t),$$

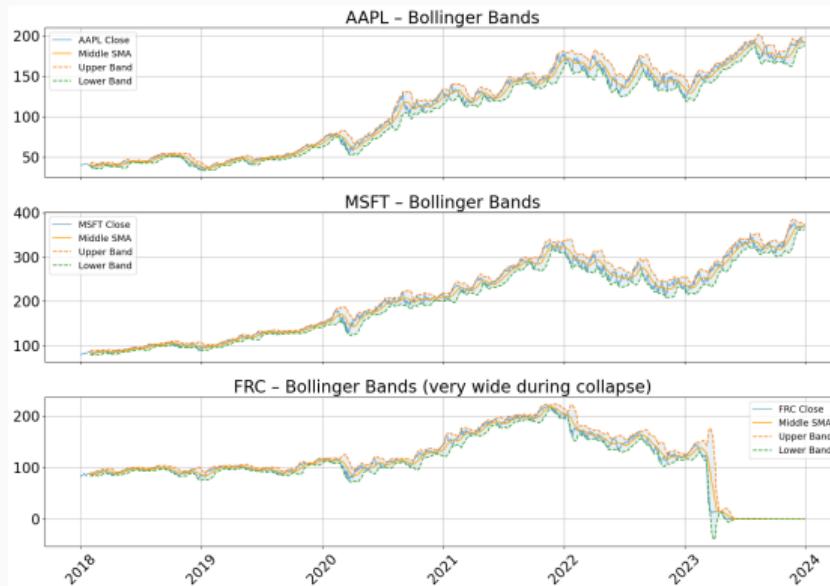
$$\text{Signal}_t = \text{EMA}_9(\text{MACD}_t).$$

Story:

- $\text{MACD} > 0$: fast EMA above slow EMA \Rightarrow recent prices are **stronger**.
- $\text{MACD} < 0$: fast EMA below slow EMA \Rightarrow recent prices are **weaker**.
- When MACD crosses **up** through Signal: “bullish cross” (trend may turn up).
- When MACD crosses **down** through Signal: “bearish cross” (trend may turn down).

Volatility: Bollinger Bands and ATR

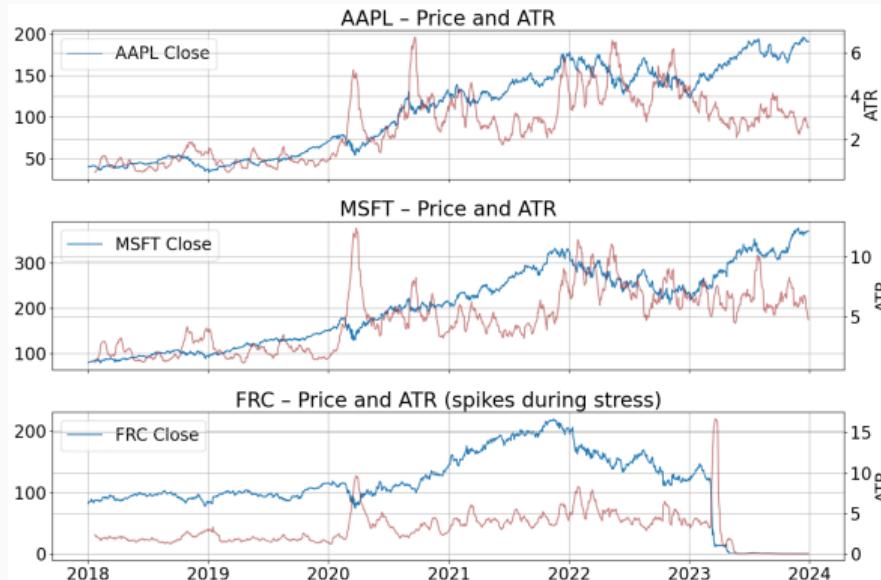
Bollinger Bands: How Wide Is the Road?



Bollinger Bands draw a kind of **road** around the price:

- The **middle line** is a moving average (often a 20-day simple moving average).
- The **upper band** is the middle line plus $2 \times$ the recent standard deviation.
- The **lower band** is the middle line minus $2 \times$ the recent standard deviation.
- **Narrow bands** \Rightarrow calm road: price is not jumping much.
- **Wide bands** \Rightarrow bumpy road: price is jumping a lot.
- During shocks (Covid, banking stress, ...), the bands suddenly become **very wide**.

ATR: How Far Does Price Travel in a Day?



Notation: $|x| :=$ Absolute value of x , meaning how far it is from the origin (0).

$$|-2| = 2 \text{ and } |2| = 2.$$

ATR (Average True Range) measures the typical size of the daily move.

For day t with high H_t , low L_t , close C_t , and previous close C_{t-1} , the *True Range* is

$$\text{TR}_t = \max(H_t - L_t, |H_t - C_{t-1}|, |L_t - C_{t-1}|).$$

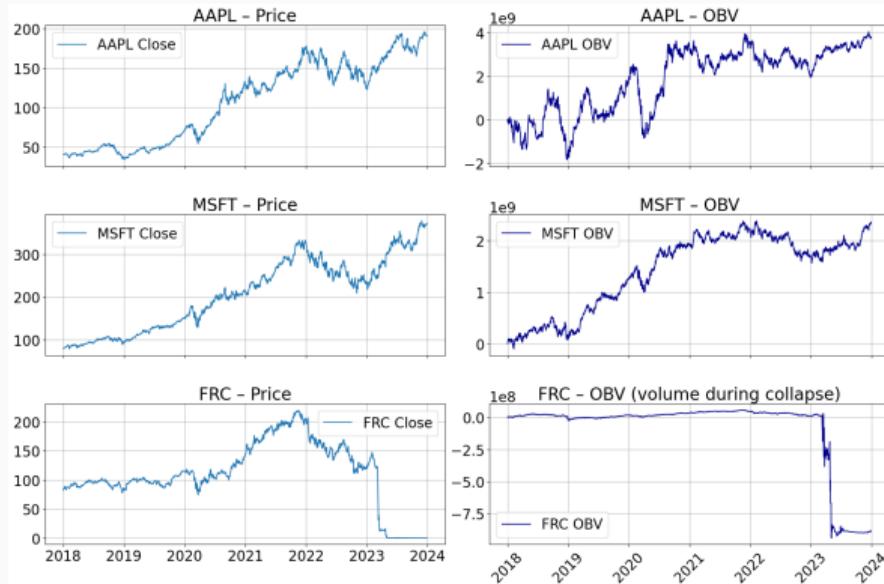
The ATR over N days is

$$\text{ATR}_t = \frac{1}{N} \sum_{k=t-N+1}^t \text{TR}_k.$$

- Small ATR: price is walking **calmly**.
- Large ATR: price is **running and jumping**, with big daily swings.
- In the bank's collapse, ATR **spikes**: almost every day is a wild day.

OBV: Volume + Direction

OBV: Is the Crowd Walking With the Price?



On-Balance Volume (OBV) asks: is trading volume moving **with** the price or **against** it?
We start with $OBV_0 = 0$ and update each day t :

- If $C_t > C_{t-1}$:
add today's volume to OBV.
- If $C_t < C_{t-1}$:
subtract today's volume from OBV.
- If $C_t = C_{t-1}$:
OBV stays the same.

Story:

- Price up + OBV up: many traders join the upmove (healthy trend).
- Price down + OBV down: many traders join the sell-off (strong selling pressure).
- For the bank, OBV falling hard during the collapse means **lots of people are selling, very few are buying**.

World Events and the Three Journeys

How World Events Show Up in Charts

Big world events are like **storms** hitting all boats at sea. In our period (2018–2024), important storms include:

- Late 2018: market drop (fear about growth and interest rates).
- Early 2020: **Covid crash** (lockdowns, panic).
- 2022: strong **interest-rate hikes** (to fight inflation).
- 2023: **US regional banking stress** (some mid-sized banks wobble and fail).

In the charts, storms look like:

- Large red candles and wide Bollinger Bands.
- ATR jumping up (big daily moves).
- RSI diving into oversold zones.
- OBV dropping when many traders sell.

Two Strong Boats and One Sinking Ship

Apple and Microsoft:

- Shaken by storms but generally **stay afloat**.
- Over years, their normalised price lines move **up**.
- Indicators show:
 - Periods above moving averages, positive MACD.
 - OBV often rising during rallies.

The bank (FRC):

- Fragile when interest rates rise and trust vanishes.
- Price falls hard and stays down – like a ship **taking on water**.
- Indicators show:
 - Many red candles, very wide bands, high ATR.
 - RSI often oversold, OBV strongly negative.

Same tools, same years, but **very different stories**.

Wrap-Up

What You Should Take Away

- You learned to read:
 - Basic price charts and candlesticks.
 - Volume, moving averages, RSI, MACD, Bollinger Bands, ATR, OBV.
- You saw:
 - How world events create **storms** in the charts.
 - How two big tech companies could survive and grow.
 - How one bank could **collapse** when confidence and funding disappear.
- Most important:
 - These indicators describe the **past**; they do not guarantee the future.
 - They are **story tools**, not magic predictors.