

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

Reading Charts and Indicators for Complete Beginners

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## Setting the Stage

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## 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 (FRC)** – 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.

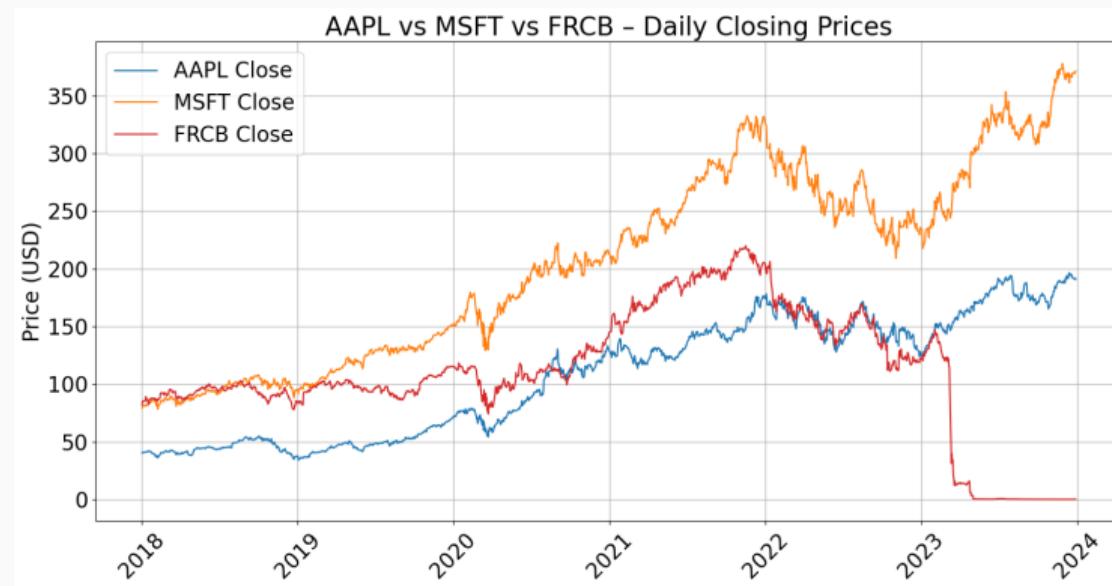
## What Is a Stock Price Chart?

- 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**

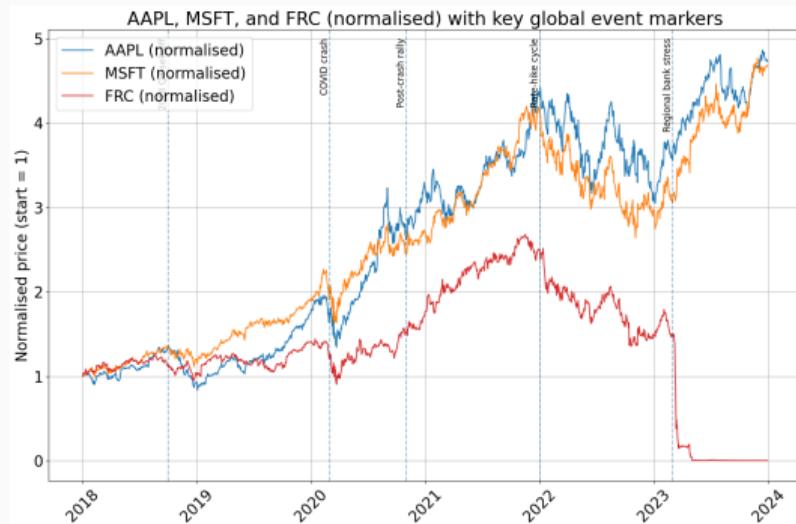
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## Three Stocks on One Chart



- 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

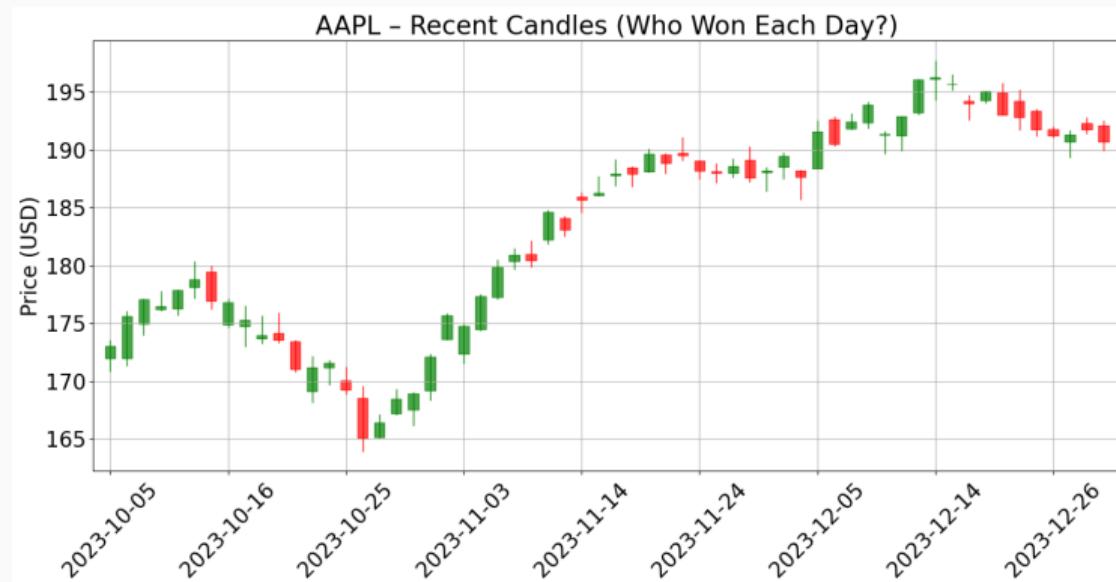
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## From Simple Lines to Candlesticks

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:

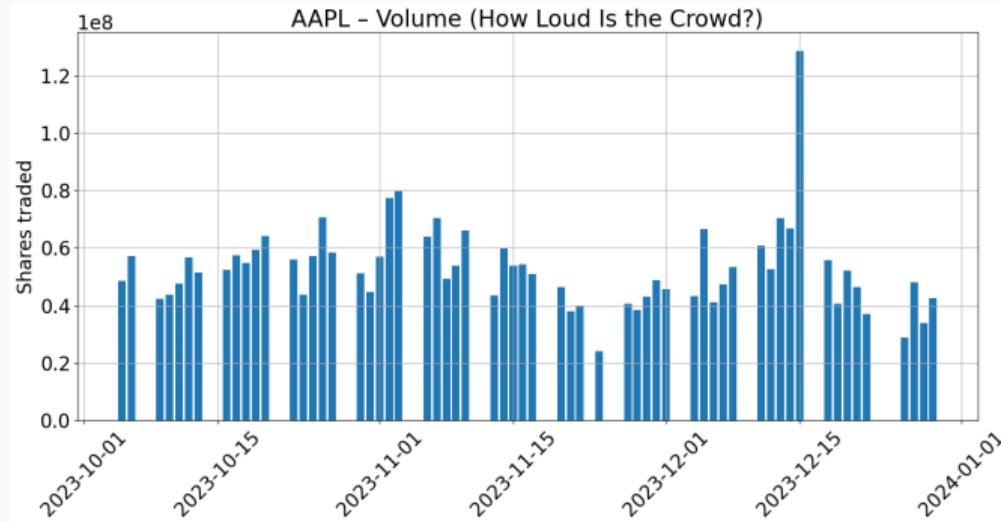
- **Open (O)**: first price of the day.
- **Close (C)**: last price of the day.
- **High (H)**: highest price during the day.
- **Low (L)**: lowest price during the day.
- If  $C > O$ :
  - Candle is usually **green**.
  - Buyers kept pushing the price **up** by the end of the day.
- If  $C < O$ :
 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

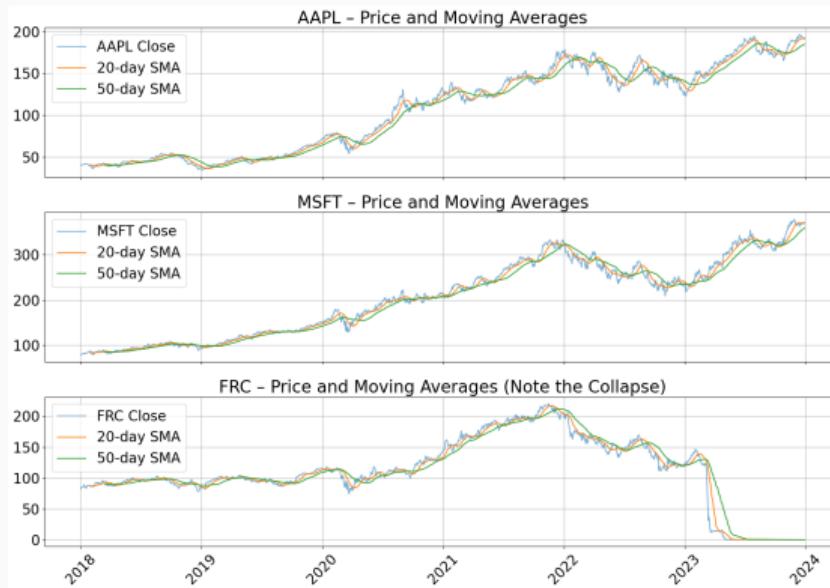


- During the crisis, the pictures change:
  - Many **red candles** in a row: sellers keep winning day after day.
  - **Very high volume**: lots of people are trying to get out.
- In story form:
  - People are running **out** of the bank's stock.
  - Very few want to be the ones still holding it.

## Moving Averages & Trend

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# 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:

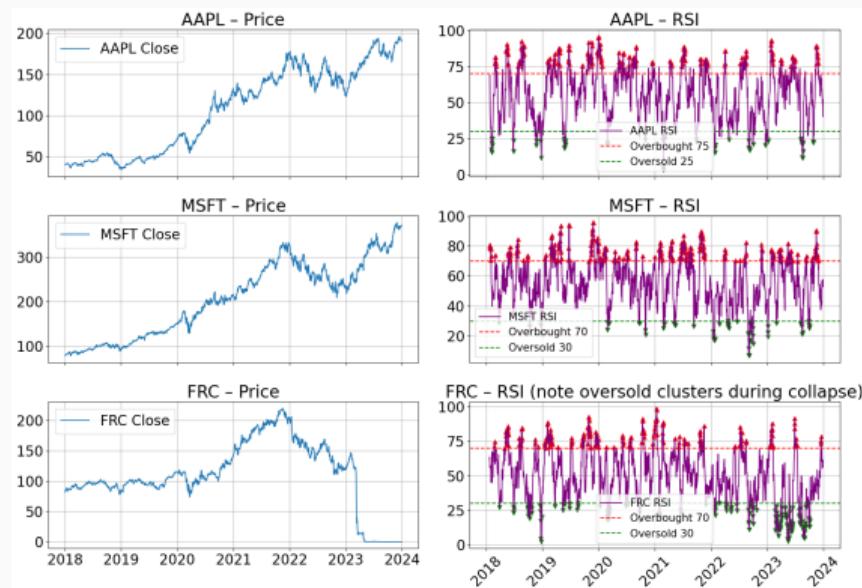
- **Golden cross:** short line crosses **above** long line.
  - Recent prices are improving faster than the older average.
  - Often read as “trend may be turning **up**”.
- **Death cross:** short line crosses **below** long line.
  - Recent prices are worse than the older average.
  - Often read as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

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# 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.

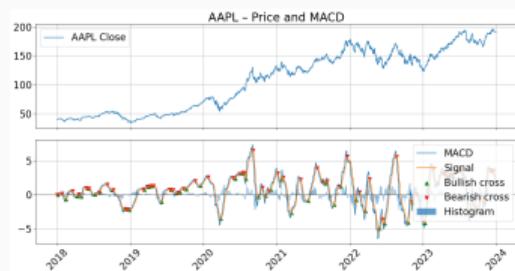
Important notes:

- “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

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# 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:

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

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

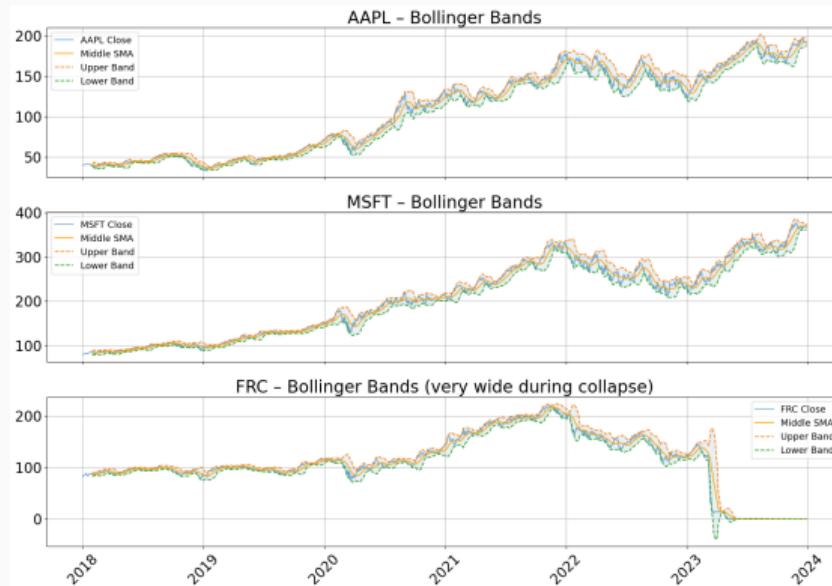
**Story:**

- $\text{MACD} > 0$ : 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

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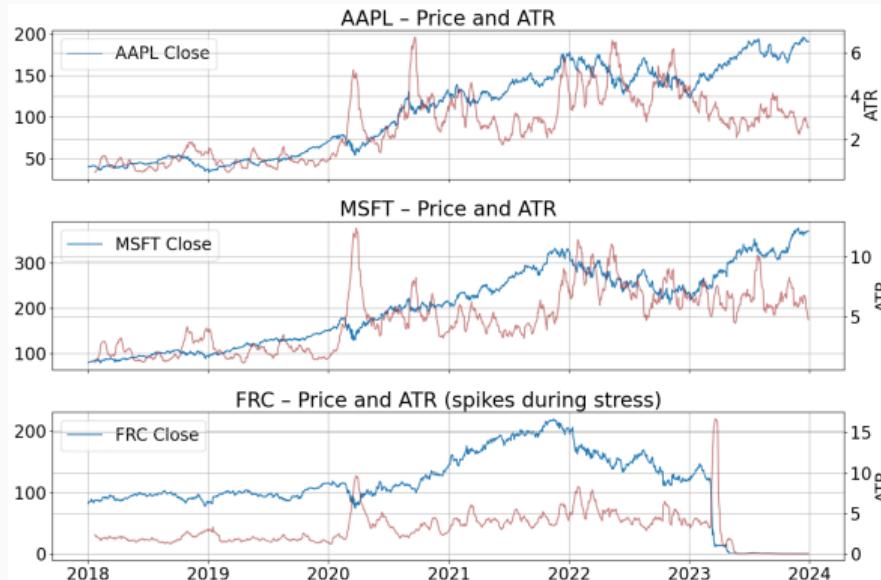
# Bollinger Bands: How Wide Is the Road?



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

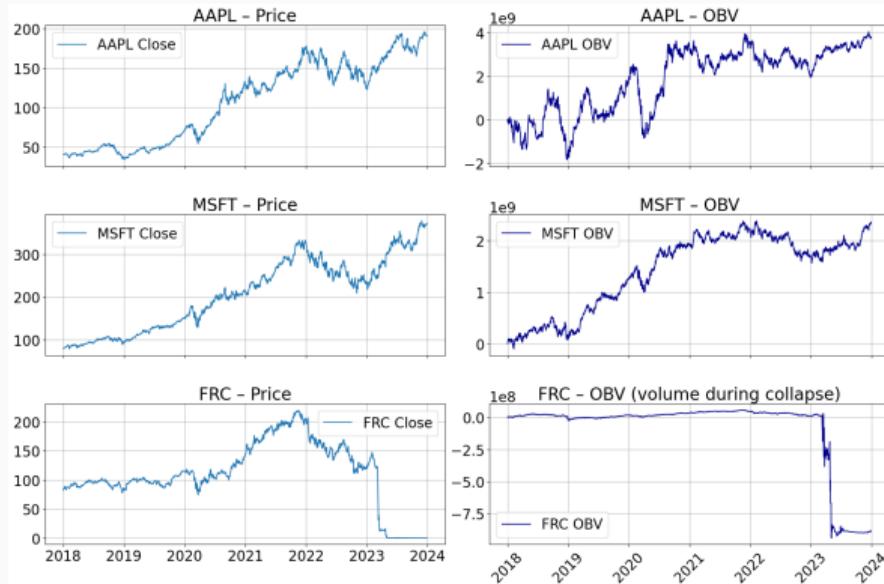
$$\text{ATR}_t = \frac{1}{N} \sum_{k=t-N+1}^t \text{TR}_k.$$

- 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**

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# 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**

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## 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

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## 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.