Different Kinds of Stocks in the Real World

A Beginner's Tour with Stories, Data and Simple Math

Goal of This Mini-Course

In this part of the course we want to:

- Meet different **kinds of stocks**:
  - Growth, defensive, small-cap, cyclical.
- See how they behave using **real market data**.
- Use **simple maths** (returns, volatility, drawdowns) to describe what our eyes see.
- Link this to **risk appetite**: Which type might suit which kind of beginner?

Kinds of Stocks (Recap)

Size Buckets: Large-cap, Mid-cap, Small-cap

Roughly speaking, companies are grouped by their total market value (market capitalisation):

- **Large-cap**: very big companies, often well-known brands.
- **Mid-cap**: medium-sized companies.
- **Small-cap**: smaller listed companies.

Typical behaviour:

- Large-caps: prices often move more **smoothly**.
- Small-caps: prices often **wiggle** more (more risk, more upside and downside).

How Size Affects Behaviour

	Large-cap	Mid-cap	Small-cap
Size	Very big	Medium	Smaller
Price wiggles (volatility)	Usually smaller (smoother)	Medium	Often large (bumpier)
Liquidity[1] (ease to trade)	High (easy to buy/sell)	Medium	Often lower (harder to trade size)
Info / coverage	Many analysts	Some coverage	Often less coverage

In charts:

- Small-caps often jump around more from day to day.
- Large-caps often have **smoother** moves.

[1] Liquidity means how easily and quickly you can buy or sell a stock at or near the current market price, without moving the price too much.

Income Stocks: The Cash-Flow Friends

Income or **dividend** stocks regularly pay out part of their profits to shareholders as **dividends**[2].

Simple total return idea over some period:

$$\text{Total return} \approx \frac{P_{\text{end}} - P_{\text{start}}}{P_{\text{start}}} + \frac{\text{dividends received}}{P_{\text{start}}}.$$

Story:

- These are like **rental properties**: you care about both the price of the house and the rent.
- Beginners who like regular income often feel more comfortable with such stocks.

[2]Dividends are payments that a company chooses to distribute to its shareholders, usually in cash (sometimes in extra shares), as a share of its profits. They are not guaranteed and are decided by the company's board.

Four Real Examples

Our Four Friends on the Market

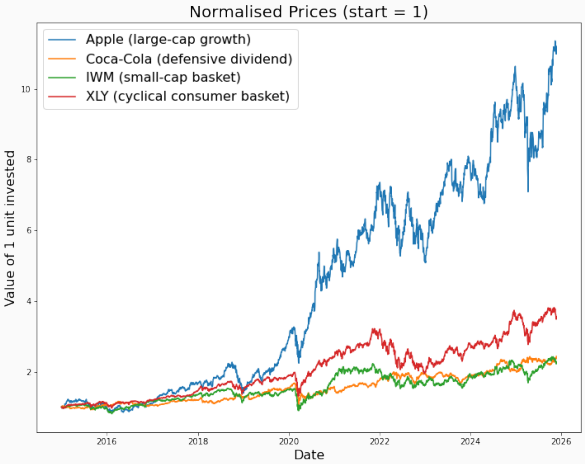
We will look at four real tickers from the US market (data from Yahoo Finance, 2015–today):

- **AAPL** – Apple: large-cap **growth** stock (big tech, fast runner).
- **KO** – Coca-Cola: large-cap **defensive, dividend** stock (everyday drinks, steady).
- **IWM** – ETF of many **small-cap** companies.
- **XLY** – ETF of **cyclical consumer** companies (things people buy more in good times).

We treat the ETFs like "big stocks" for this lesson.

Returns Over Time

Normalised Prices: Starting Everyone at 1



We pretend we invested **1 unit of money** in each stock at the start:

$$\text{Normalised price at time } t = \frac{P_t}{P_{\text{start}}}.$$

- If the line goes to 2, the price has **doubled**.
- If it goes to 0.5, it has lost **half** its value.

Story:

- Apple is the friend who often **runs ahead**.
- Coca-Cola walks more **steadily**.
- Small-caps (IWM) and cyclical (XLY) jog up and down more.

Daily Wiggles and Volatility

Daily Returns: Little Steps Each Day

Instead of looking at price levels, we look at the **change** from one day to the next:

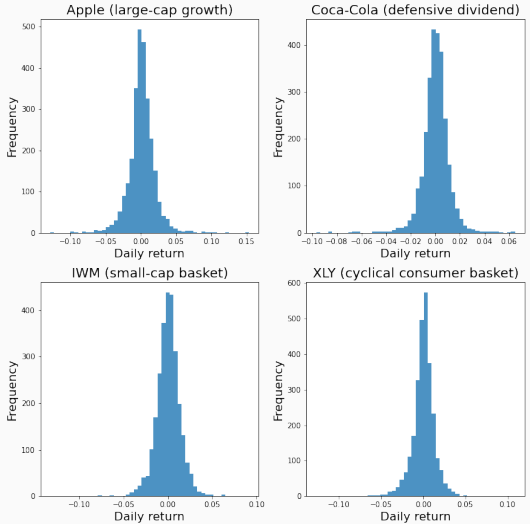
$$r_t = \frac{P_t - P_{t-1}}{P_{t-1}}.$$

This is the **daily return**: roughly "How many percent did we move today?"

If we collect all these daily returns we can:

- See the typical size of moves.
- Measure the overall **wiggliness** (volatility).

Histograms of Daily Returns



Each panel shows a **histogram** of daily returns:

- Narrow shape ⇒ most days are small moves (calmer).
- Wider shape ⇒ more big jumps up or down (wilder).

Typically:

- KO (defensive, everyday drinks) has a **narrower** shape.
- IWM (small-caps) has a **wider** shape.

This visual idea will later be summarised by one number: the **volatility**.

Volatility: How Shaky Is the Path?

Mathematically, we measure **volatility** as the standard deviation of returns:

$$\sigma_{\text{daily}} = \sqrt{\frac{1}{N-1}\sum_{t=1}^{N}(r_t - \bar{r})^2}.$$

To get an approximate **annual** volatility we scale:

$$\sigma_{\text{annual}} \approx \sigma_{\text{daily}}\sqrt{252},$$

where 252 is the usual number of trading days in a year.

Story:

- Bigger $\sigma \Rightarrow$ path is **shakier**.
- Smaller $\sigma \Rightarrow$ path is **smoother**.

Drawdowns: How Painful Are the Falls?

Drawdowns: Distance Below the Peak

Another way to feel risk is to ask:

From the highest point so far, how far have we fallen?

For a price series P_t:

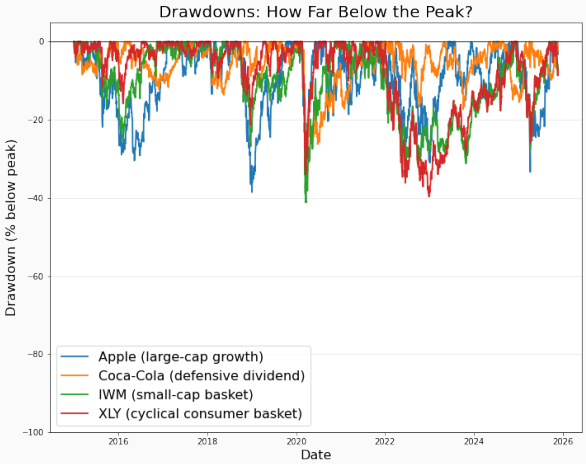
$$M_t = \max_{s \le t} P_s \qquad \text{(running maximum up to time } t\text{)},$$

$$\mathrm{DD}_t = \frac{P_t - M_t}{M_t} \qquad \text{(drawdown at time } t\text{)}.$$

DD_t is usually negative. For example, $\mathrm{DD}_t = -0.3$ means "30% below the previous peak".

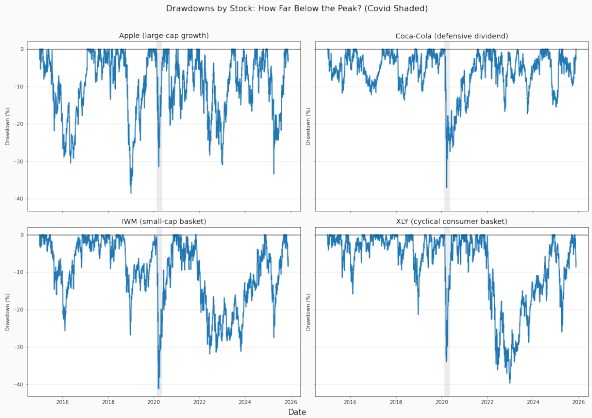
Story: think of walking up a hill and then sliding down from the top.

Drawdowns: All Four Together



- The y-axis shows drawdown in % below the past peak.
- Deep spikes downward are **painful falls**.
- Notice:
  - Some series fall more deeply than others.
  - Small-caps and cyclicals often have larger drops.

Drawdowns by Stock, Covid Period Shaded



Here each stock has its own panel. The grey band marks the **Covid crash** (early 2020).

- Everyone falls during the storm.
- Defensive KO falls, but less than some others.
- Small-cap IWM and cyclical XLY experience deep dives.

This shows how different "personalities" react to the same shock.

Rolling Volatility: When the Road Gets Bumpy

Rolling Volatility: Local Wiggliness

Volatility is not constant. Sometimes the market is calm, sometimes stormy.

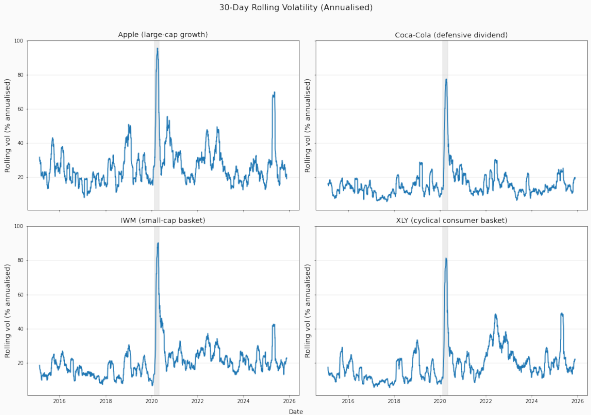
We compute a **30-day rolling volatility**:

- For each day, look at the last 30 daily returns.
- Compute their standard deviation.
- Annualise it to get "volatility right now".

Story:

- Low rolling volatility: road is relatively **smooth**.
- High rolling volatility: road is very **bumpy**.

30-Day Rolling Volatility (Annualised)



We plot a **30-day rolling volatility** for each stock:

- For each day, look at the last 30 daily returns.
- Compute their standard deviation and annualise it.
- This gives "how shaky the road is *right now*".

Reading the panels:

- All lines **spike** during Covid: the road suddenly gets very bumpy.
- The small-cap basket (IWM) often has higher volatility than KO.
- Even steady KO has a volatility spike, but not as extreme as some others.

Risk vs Return Map

Risk vs Return: Compressing the Story

For each stock we can summarise the whole period by two numbers:

$$\text{Annual return} \approx \bar{r}_{\text{daily}} \times 252,$$
$$\text{Annual volatility} \approx \sigma_{\text{daily}} \sqrt{252}.$$

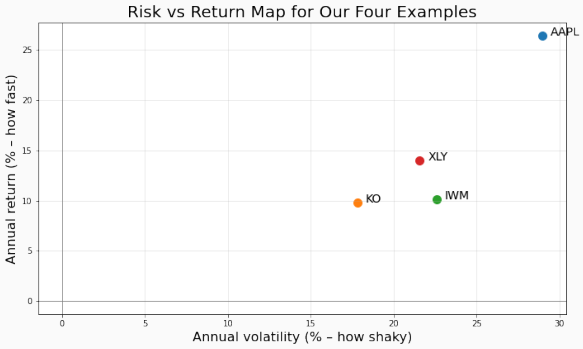
We then put them on a **map**:

- Horizontal axis: volatility (**how shaky**).
- Vertical axis: return (**how fast**).

Story:

- Points further to the right are riskier.
- Points higher up have earned more on average.

Risk vs Return Map for Our Four Examples



Reading the picture:

- Apple (AAPL) is **fast and shaky**: high return, high volatility.
- Coca-Cola (KO) is **slower but calmer**.
- IWM (small-caps) is quite shaky for its return.
- XLY (cyclical) sits in between.

This kind of chart helps match stock types to **investor personalities**:

- More cautious people may prefer calmer points.
- More adventurous people may accept shakier, faster points.

Matching Stock Types to Beginners

Which Stock Fits Which Beginner?

Using the data and stories, we can sketch:

- **Very cautious beginner**:
  - Prefers smoother ride, smaller drawdowns.
  - May like defensive, dividend stocks (KO-type) or broad large-cap funds.
- **Moderate beginner**:
  - Can tolerate some wiggles.
  - May mix growth (AAPL, XLY-type) with calmer names.
- **Adventurous beginner**:
  - Accepts large swings and deep drawdowns.
  - May include small-caps (IWM-type), but should size them carefully.

The key idea: **behaviour matters** when choosing what to own.

Big Picture: What We Learned

In this beamer section we:

- Saw that different stocks have different **personalities**.
- Used:
  - Normalised prices (growth over time),
  - Daily returns and volatility (wiggles),
  - Drawdowns (falls from previous peaks),
  - Rolling volatility (when the road gets bumpy),
  - Risk vs return maps (fast vs shaky).
- Linked these to **risk appetite** for beginners.

The message for a new investor:

Do not look only at "How high can it go?"

Also ask, "How wild is the ride, and can I sleep at night?"