Advanced Economic Integration

2025.5.28

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I. Current Global Macro Events

Historical Timeline: Major Global Events and Market Impacts (2000–2025)

Year	Event	Market Impact
2000	Dot-com Bubble Burst	NASDAQ crashed ~78%, global tech stocks collapsed, risk appetite evaporated.
2001	9/11 Terror Attacks	U.S. markets closed for days, S&P 500 fell ~12%, surge in defense & gold.
2003	SARS Outbreak (Asia)	Asian tourism, airlines, and retail sectors hit; recovery followed quickly.
2007–2008	Global Financial Crisis (Lehman Brothers collapse)	S&P 500 lost ~57%; systemic banking crisis triggered global recession.
2010	European Sovereign Debt Crisis (Greece, PIIGS)	Euro weakened, flight to U.S. Treasuries, market volatility rose.
2011	U.S. Debt Ceiling Crisis & S&P Downgrade	S&P 500 dropped ~17% in weeks, VIX spiked, gold hit record high.

2014	Oil Price Crash (OPEC glut, U.S. shale)	Brent crude fell from $100 to <$40; energy stocks collapsed; consumers gained.
2015	China's Yuan Devaluation & Stock Market Crash	CSI 300 fell ~40%; global market tremors, commodities sold off.
2016	Brexit Referendum	GBP fell 10% overnight, FTSE 100 recovered but EU stocks struggled.
2018	U.S.–China Trade War Begins	Tariff announcements led to tech & industrial stock volatility globally.
2020	COVID-19 Pandemic	Global markets plunged ~30% in a month, followed by historic central bank stimulus → record recovery in tech.
2021	Inflation Surge & Supply Chain Disruptions	Bond yields rose, tech corrected; energy and commodities rallied.

2022	Russia–Ukraine War	Brent oil >$120, gas prices soared, Eurozone stocks fell, defense and agriculture surged.
2023	U.S. Regional Banking Crisis (SVB, Credit Suisse issues)	Short-term panic in financials; Fed backstops liquidity → quick rebound.
2024	AI Stock Bubble Builds	NVIDIA, AMD, and big tech surge; market concentration increases; valuations stretched.
2025	**U.S.–China Trade War Escalation 2.0**	Tariffs, blacklists, export controls reignited deglobalization fears → tech correction, VIX rise, capital flows to defense/commodities.


S&P 500 (^GSPC)
SNP - Delayed Quote • USD
5,802.82 -39.19 (-0.67%)
At close: May 23 at 4:57:39 PM EDT
Follow
Comparisons
Indicators
Corporate Events
Mountain
O:331.89 H:344.49 L:331.08 C:339.94 V:3.28b
vol undr 3,283,280,000.00
yahoo!finance
6,000.00
5,000.00
4,000.00
3,000.00
2,000.00
1,000.00
5,802.82
84.37B
1995
2000
2005
2010
2015
2020
2025

NYSE - Nasdaq Real Time Price • USD

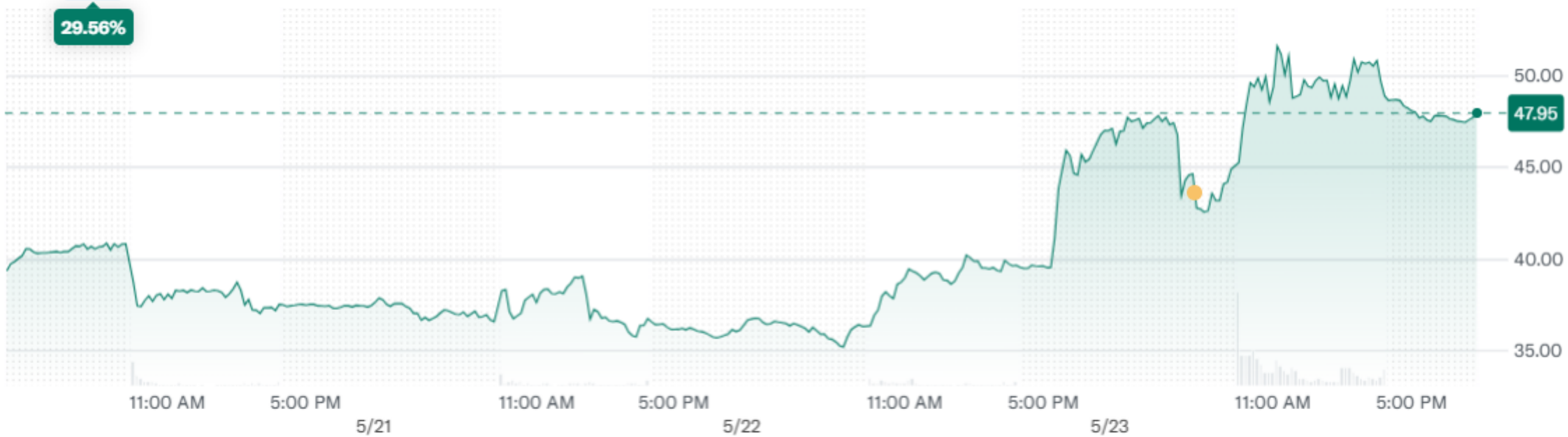
Oklo Inc. (OKLO)

☆ Follow + Add holdings

48.87 +9.15 +(23.04%) **47.95** -0.92 (-1.88%)

At close: May 23 at 4:00:02 PM EDT After hours: May 23 at 7:59:57 PM EDT

1D 5D 1M 6M YTD 1Y 5Y All Key Events Mountain Advanced Chart



Previous Close	39.72	Day's Range	43.63 - 52.17	Market Cap (intraday)	6.803B	Earnings...	Aug 11, 2025 - Aug 15, 2025
Open	44.66	52 Week Range	5.35 - 59.14	Beta (5Y Monthly)	--	Forward Dividend & Yield	--
Bid	47.95 x 1000	Volume	91,264,317	PE Ratio (TTM)	--	Ex-Dividend Date	--
Ask	47.99 x 1000	Avg. Volume	14,688,972	EPS (TTM)	-0.47	1y Target Est	48.34

II. Efficient Market Hypothesis

Hypothesis: a supposition or proposed explanation made on the basis of limited evidence as a starting point for further investigation

Theory: a supposition or a system of ideas intended to explain something, especially one based on general principles independent of the thing to be explained.

The **Efficient Market Hypothesis (EMH)** is a foundational theory in finance that suggests:

> Financial markets are "informationally efficient," meaning that asset prices fully and immediately reflect all available information.

🔍 Key Points of EMH

1. No Free Lunch

- Since prices already incorporate all known information, it's **impossible to consistently outperform the market** through stock picking or market timing.
- Any new information is instantly reflected in prices, so opportunities for "bargains" disappear quickly.

2. Random Walk Theory

- Price movements are **random and unpredictable**.
- Historical data or patterns (like technical charts) **cannot predict future prices** in an efficient market.

Forms of Market Efficiency

Form	What Information Is Reflected in Prices?	Implication
Weak-form	All past price and volume data	Technical analysis is ineffective
Semi-strong	All publicly available information (financials, news, etc.)	Fundamental analysis is ineffective
Strong-form	All information, including insider or private data	No one can consistently beat the market, even insiders

🔬 Evidence For and Against EMH

✅ Support for EMH

- Index funds often outperform actively managed funds over time.
- Prices react quickly to public news (e.g., earnings announcements).
- Arbitrage reduces mispricing rapidly.

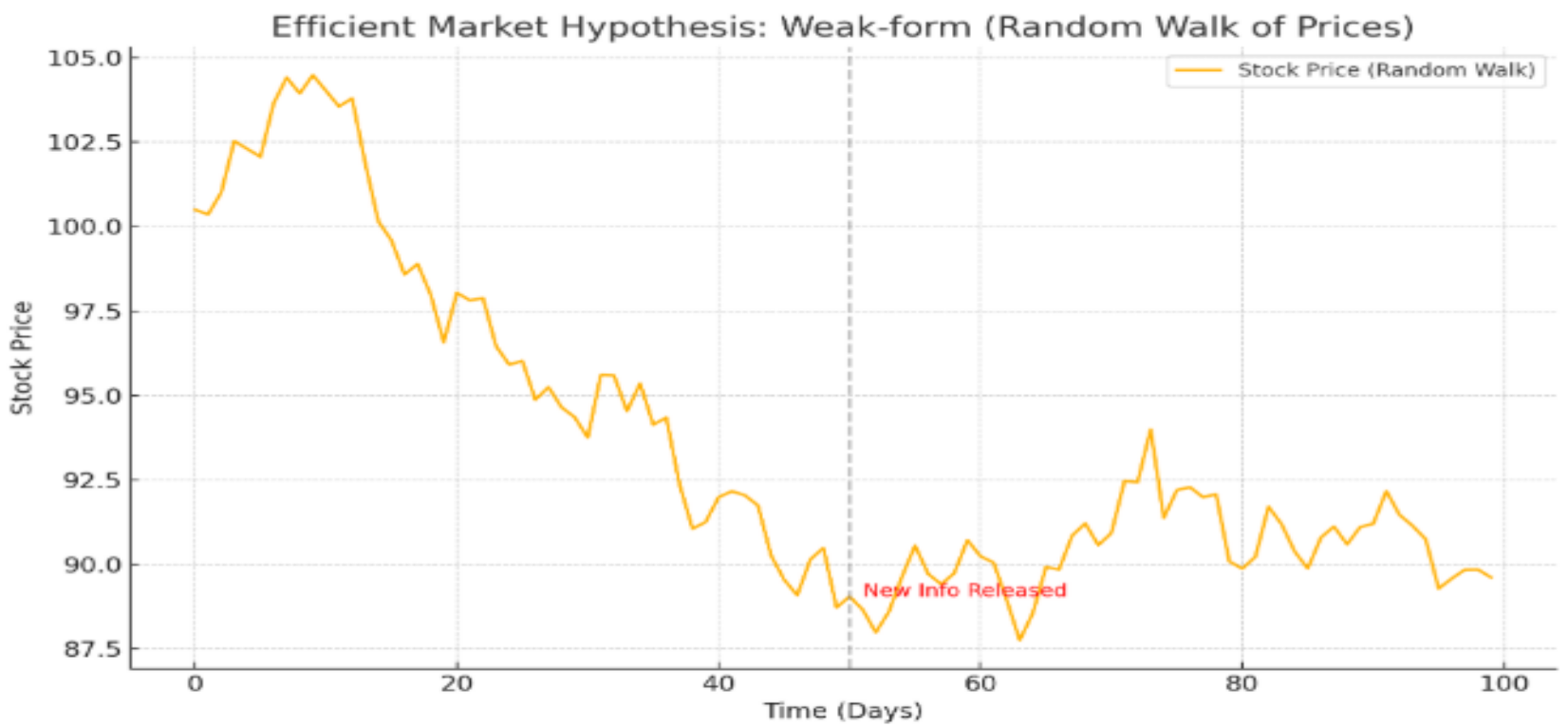
❌ Challenges to EMH

- **Market anomalies** like the January effect or momentum trends.
- **Behavioral biases** (overconfidence, herd behavior) create irrational market moves.
- **Bubbles and crashes** suggest prices don't always reflect true value (e.g., dot-com bubble, housing crisis).

💡 Real-World Implications

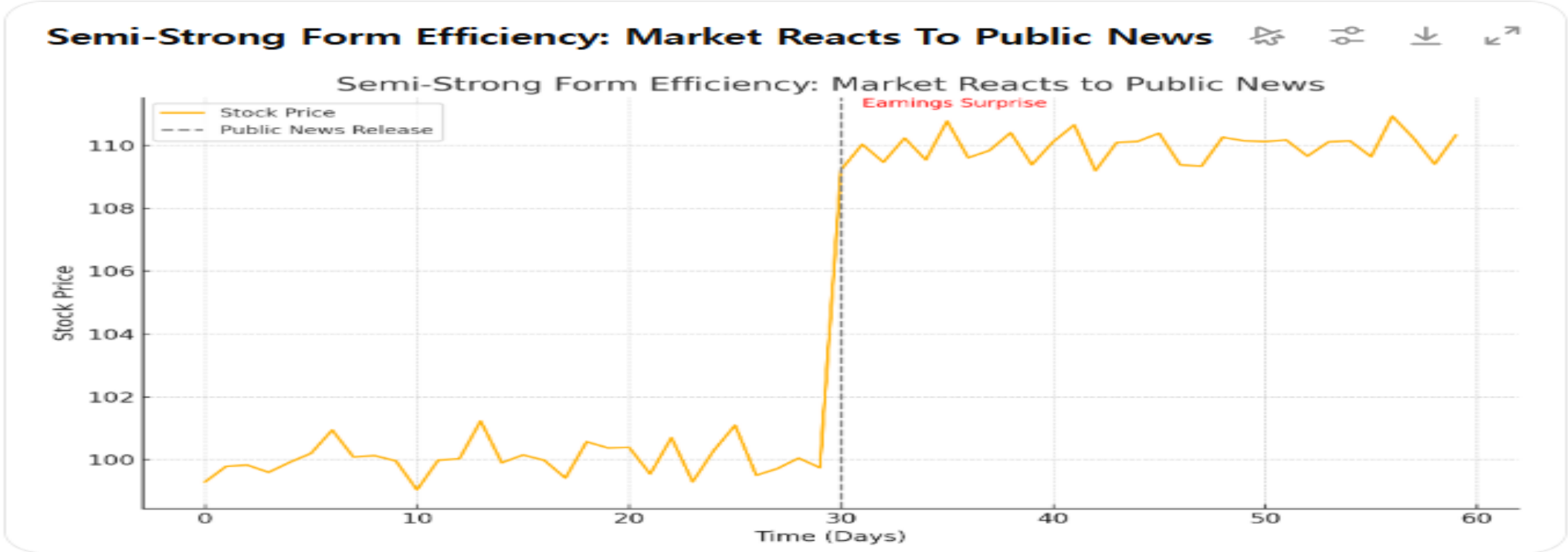
- **Passive investing** (e.g., index funds, ETFs) is favored over active management.
- Focus shifts to **risk control**, **diversification**, and **cost minimization**.
- EMH doesn't say markets are *always right*, but that they are *unbeatable in a systematic way*.

Efficient Market Hypothesis: Weak-Form (Random Walk Of Prices)



This chart demonstrates the **Weak-form Efficient Market Hypothesis** using a **random walk model**:

- The stock price fluctuates in an unpredictable way because **all past price information is already reflected** in the current price.
- The vertical line marks a point where **new information** is released. The market adjusts quickly, but the price continues to move randomly afterward



This chart illustrates the **Semi-Strong Form of Market Efficiency**:

- On **Day 30**, public news (e.g., an earnings surprise) is released.
- The stock price reacts **immediately and sharply**, jumping by a fixed amount.
- After the announcement, the price stabilizes and reflects the new information.

Key Insight:

👉 In a semi-strong efficient market, **publicly available information is instantly priced in**, so there's no advantage in reacting to news after it's released.

III. Portfolio Theory and its Application

Portfolio Theory, also known as **Modern Portfolio Theory (MPT)**, is a fundamental financial concept developed by **Harry Markowitz** in the 1950s. It explains how investors can **construct an optimal portfolio** that **maximizes expected return for a given level of risk** or **minimizes risk for a given level of expected return**, through diversification.

🧠 Core Ideas of Portfolio Theory

1. Expected Return (E[R])

The return an investor expects from a portfolio, calculated as a **weighted average of the returns of individual assets**.

$$E(R_p) = \sum w_i \cdot E(R_i)$$

Where:

- w_i = weight of asset *i* in the portfolio
- $E(R_i)$ = expected return of asset *i*

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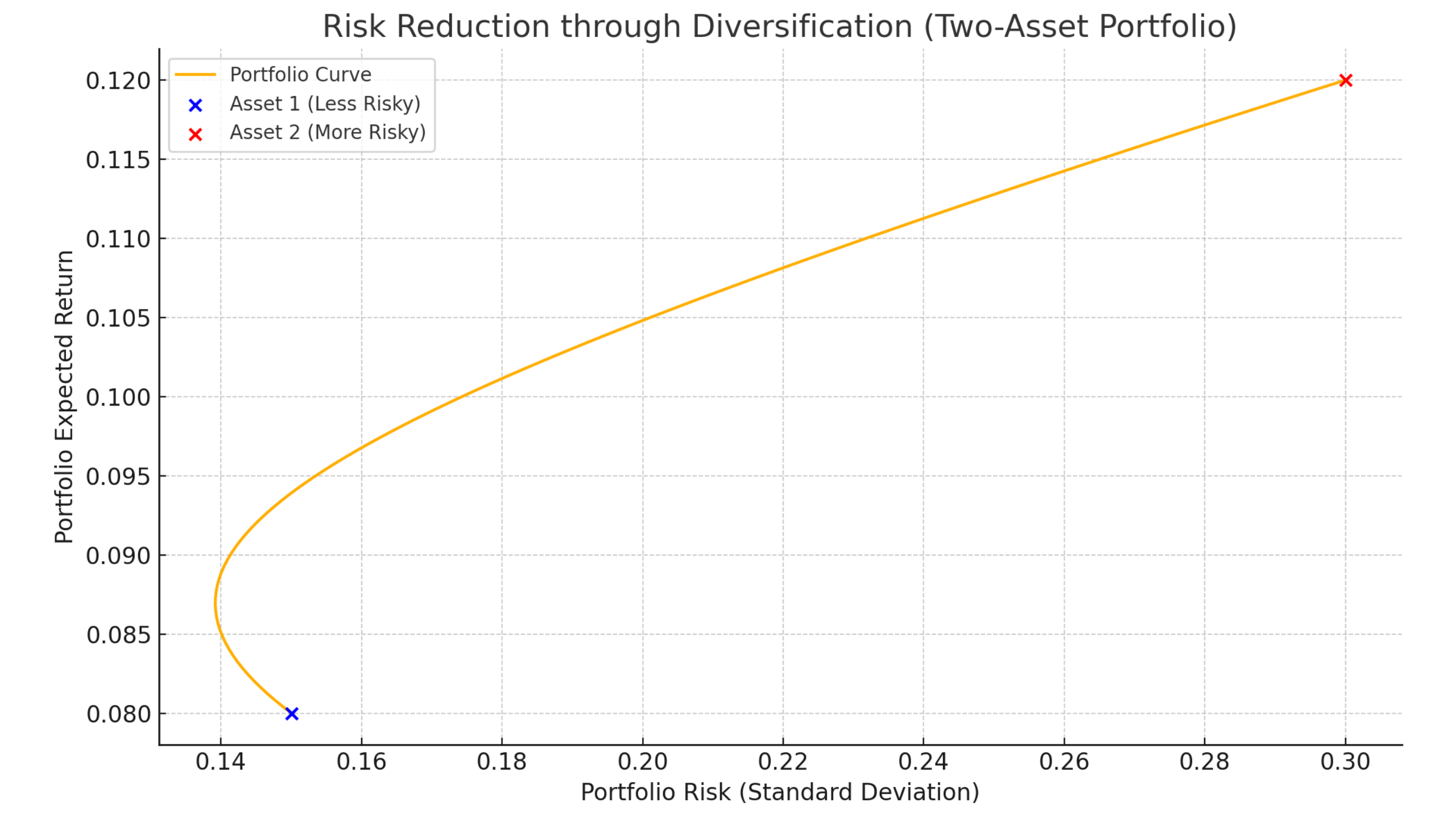
2. Portfolio Risk (Standard Deviation, σ)

Risk is measured by the **variance** or **standard deviation** of portfolio returns. Importantly, **not just individual asset risks, but how the assets move together (correlation)** determines portfolio risk.

$$\sigma_p^2 = \sum\sum w_i w_j \cdot \mathrm{Cov}(R_i, R_j)$$

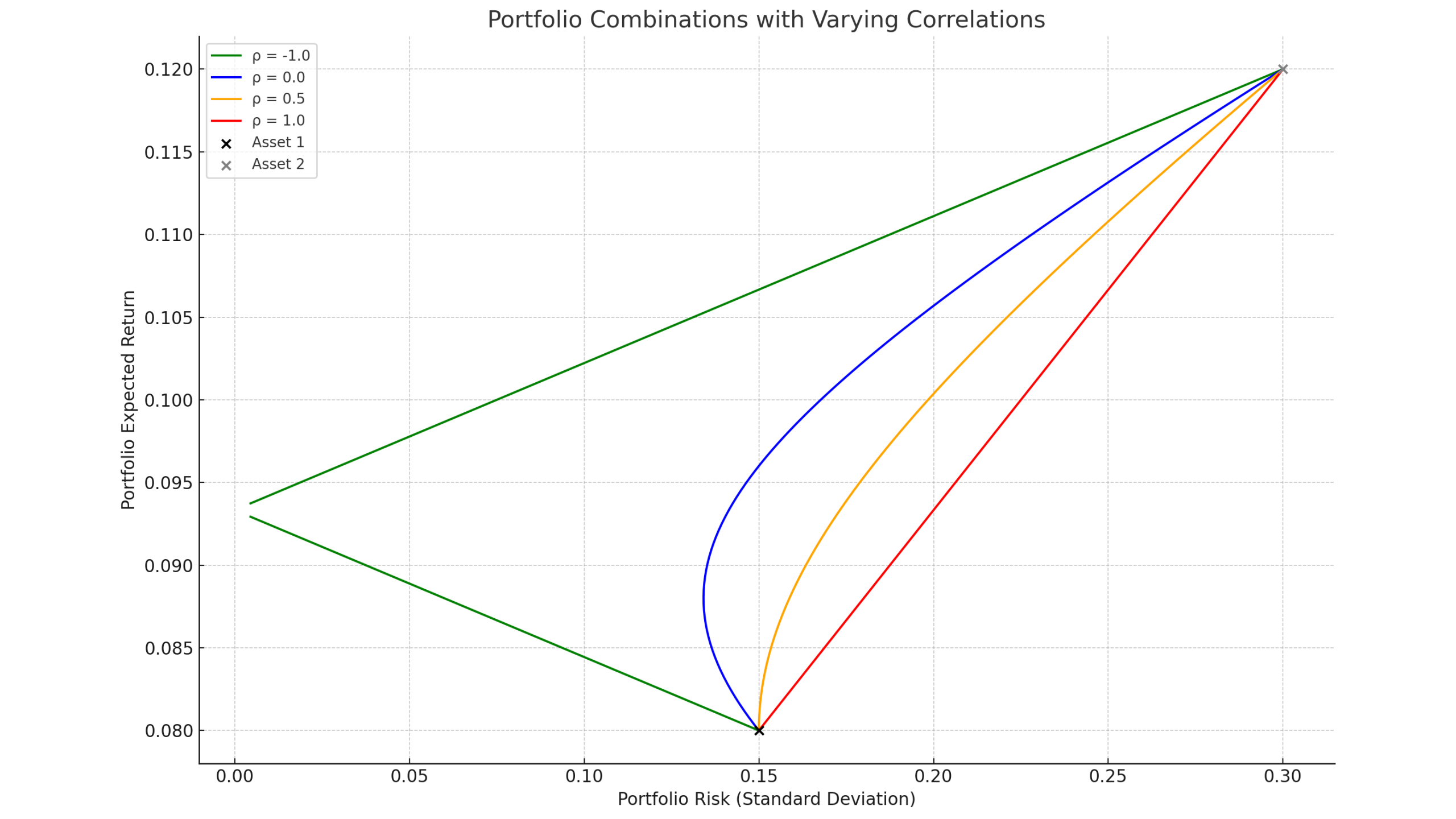

Risk Reduction through Diversification (Two-Asset Portfolio)
Portfolio Curve
Asset 1 (Less Risky)
Asset 2 (More Risky)
Portfolio Expected Return
0.120
0.115
0.110
0.105
0.100
0.095
0.090
0.085
0.080
0.14
0.16
0.18
0.20
0.22
0.24
0.26
0.28
0.30
Portfolio Risk (Standard Deviation)

This chart shows how **combining two assets with different risks** can **reduce overall portfolio risk** through **diversification**:

- **Blue point**: Asset 1 (lower risk, lower return)
- **Red point**: Asset 2 (higher risk, higher return)
- The **curve**: All possible combinations (portfolios) of the two assets
    - Notice how the **curve bends leftward**—some combinations have **lower risk than either asset alone**.
    - This happens because the **correlation** between the assets is less than 1 (in this case, 0.1).

Key Insight:

👉 Even if one asset is riskier, adding it to a portfolio can **reduce total risk** if its movements are not perfectly aligned with the other asset.


Portfolio Combinations with Varying Correlations
ρ = -1.0
ρ = 0.0
ρ = 0.5
ρ = 1.0
Asset 1
Asset 2
Portfolio Expected Return
0.120
0.115
0.110
0.105
0.100
0.095
0.090
0.085
0.080
0.00
0.05
0.10
0.15
0.20
0.25
0.30
Portfolio Risk (Standard Deviation)

This chart shows how the **shape of the portfolio risk-return curve** changes based on the **correlation (ρ)** between two assets:

🟩 ρ = -1.0 (Perfect Negative Correlation)

- **Most powerful diversification effect**.
- It's possible to create a **zero-risk portfolio**.

🔵 ρ = 0.0 (Uncorrelated)

- Risk is reduced significantly, but not to zero.
- Portfolio combinations lie well inside the straight line connecting the assets.

🟠 ρ = 0.5 (Positive but moderate correlation)

- Diversification benefit exists but is smaller.

🔴 ρ = +1.0 (Perfect Positive Correlation)

- **No diversification benefit**.
- Portfolio risk is simply a weighted average of the two asset risks.

To calculate the **correlation coefficient (ρ)** between two different assets, you can use the following formula:

📐 Correlation Coefficient Formula

$$\rho_{XY} = \frac{\mathrm{Cov}(X,Y)}{\sigma_X \cdot \sigma_Y}$$

Where:

- $\mathrm{Cov}(X,Y)$ = covariance between asset returns X and Y
- σ_X, σ_Y = standard deviations of returns of assets X and Y

💡 Interpretation:

- A correlation close to **+1** means the assets move together.
- A correlation close to **0** means the assets move independently.
- A correlation close to **-1** means the assets move in opposite directions (ideal for diversification).

📊 Example: Monthly Returns of Two Assets

Month	Asset X	Asset Y
1	2%	1%
2	3%	4%
3	-1%	-2%
4	4%	3%
5	1%	0%

Let's convert these to decimals for calculation:

$$X = [0.02, 0.03, -0.01, 0.04, 0.01]$$

$$Y = [0.01, 0.04, -0.02, 0.03, 0.00]$$

🔢 Step 1: Calculate Means

$$\bar{X} = \frac{0.02 + 0.03 - 0.01 + 0.04 + 0.01}{5} = 0.018$$
$$\bar{Y} = \frac{0.01 + 0.04 - 0.02 + 0.03 + 0.00}{5} = 0.012$$

🔢 Step 2: Covariance

$$\mathrm{Cov}(X,Y) = \frac{1}{n-1}\sum_{i=1}^{n}(X_i - \bar{X})(Y_i - \bar{Y})$$

$$= \frac{1}{4}\left[(0.02-0.018)(0.01-0.012) + (0.03-0.018)(0.04-0.012) + (-0.01-0.018)(-0.02-0.012) + (0.04-0.018)(0.03-0.012) + (0.01-0.018)(0.00-0.012)\right]$$

$$= \frac{1}{4}(-0.000002 + 0.000336 + 0.000896 + 0.000396 + 0.000096) = \frac{0.001722}{4} = 0.000431$$

🔢 Step 3: Standard Deviations

$$\sigma_X = \sqrt{\frac{1}{4}\sum(X_i - \bar{X})^2} = \sqrt{0.000392} = 0.0198$$
$$\sigma_Y = \sqrt{\frac{1}{4}\sum(Y_i - \bar{Y})^2} = \sqrt{0.000472} = 0.0217$$

✅ Step 4: Final Correlation

$$\rho_{XY} = \frac{0.000431}{0.0198 \times 0.0217} = \frac{0.000431}{0.000429} \approx 1.005$$

> In practice, this value will be **very close to 1**, which indicates **very strong positive correlation.**