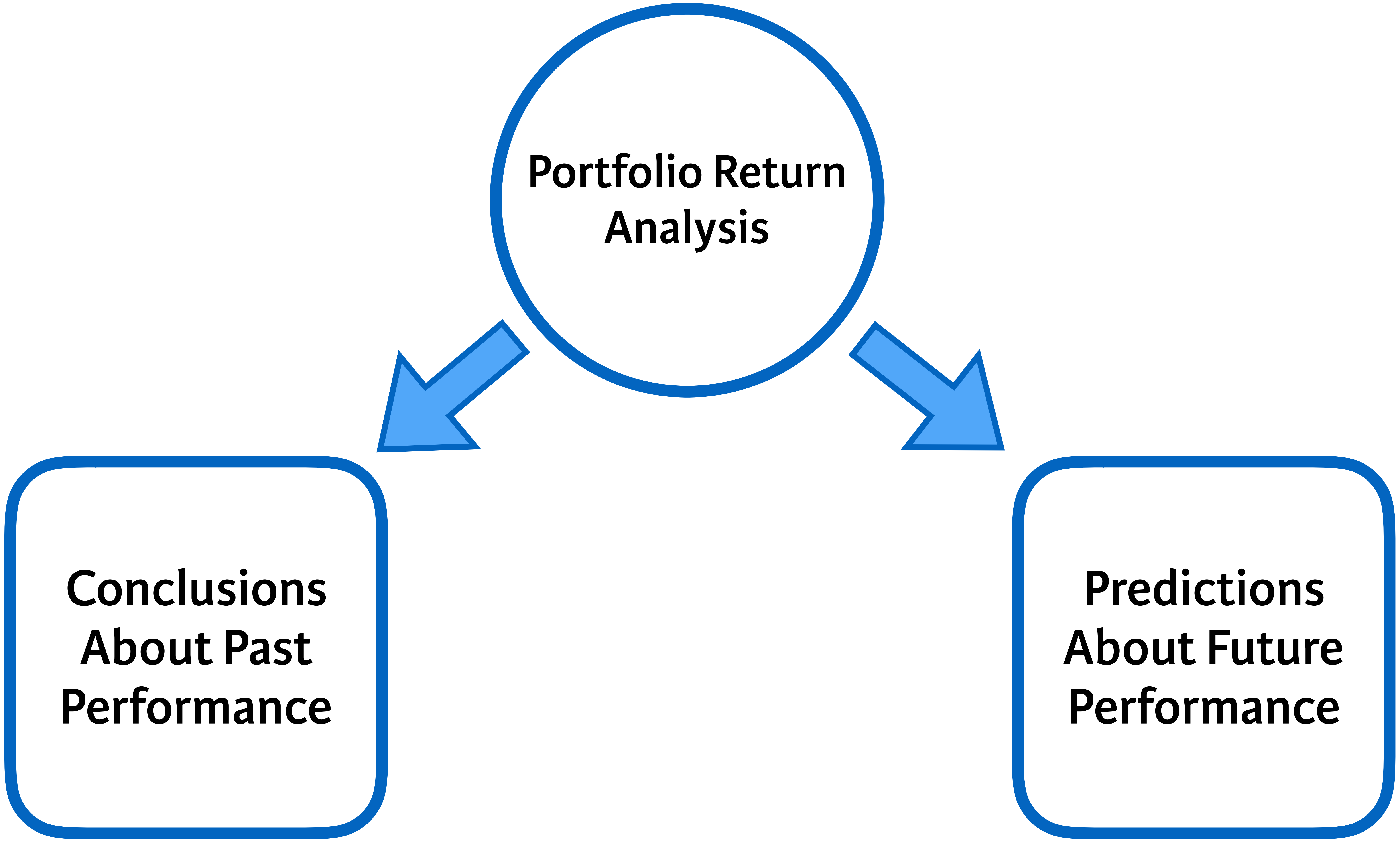
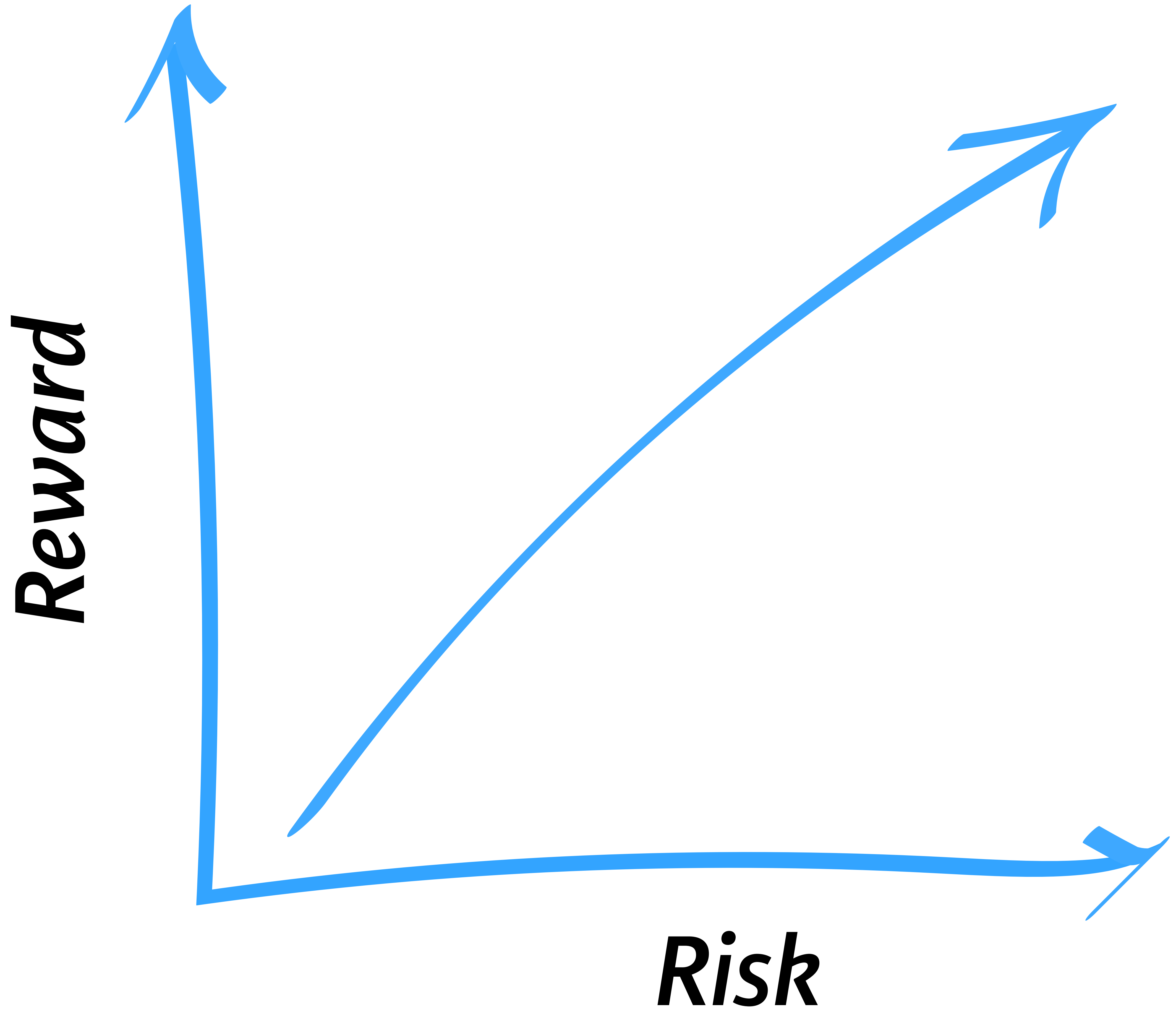
Dimensions of Portfolio Analysis

Interpretation of Portfolio Returns



Risk vs. Reward



Need For Performance Measure

Portfolio Returns

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Performance & Risk Measures
Computed From Returns

↓

Interpretation

Arithmetic Mean Return

- Focus on mean return & volatility
- Assume a sample of T portfolio return observations:

$$R_1, R_2, \ldots, R_T$$

- Reward Measurement: Arithmetic mean return is given:

$$\hat{\mu} = \frac{R_1 + R_2 + \cdots + R_T}{T}$$

- It shows how large the portfolio return is on average

Portfolio Volatility

- **Risk Measurement:** Variance of the portfolio

$$\hat{\sigma}^2 = \frac{(R_1 - \hat{\mu})^2 + (R_2 - \hat{\mu})^2 + \cdots + (R_T - \hat{\mu})^2}{T - 1}$$

- **Portfolio Volatility:** $\hat{\sigma} = \sqrt{\hat{\sigma}^2}$

No Linear Compensation In Return

- Mismatch between average return and effective return

final value=
*initial value * (1 +0.5)*(1-0.5)= 0.75 * initial value*

Average Return = (0.5 - 0.5) / 2 = 0

Geometric Mean Return

- Formula for *Geometric Mean* for a sample of T portfolio return observations $R_1, R_2, \ldots, R_T$:

$$Geometric\ Mean = [(1 + R_1) * (1 + R_2) * \ldots(1 + R_T)]^{\frac{1}{T}} - 1$$

- *Example:* +50% & -50% return

$$Geometric\ Mean = [(1 + 0.50) * (1 - 0.50)]^{\frac{1}{2}} - 1 = [0.75]^{\frac{1}{2}} - 1 = 0.866 - 1$$
$$-13.4\%$$

Application to the S&P 500