

The background of the slide is a blurred image of a computer monitor displaying a financial candlestick chart. A hand holding a silver pen is visible on the right side, pointing towards the chart. The chart features white candlesticks, a blue moving average line, a green moving average line, and a purple line. The interface includes a 'Chart' tab, a 'View' button, and an 'Index' dropdown menu.

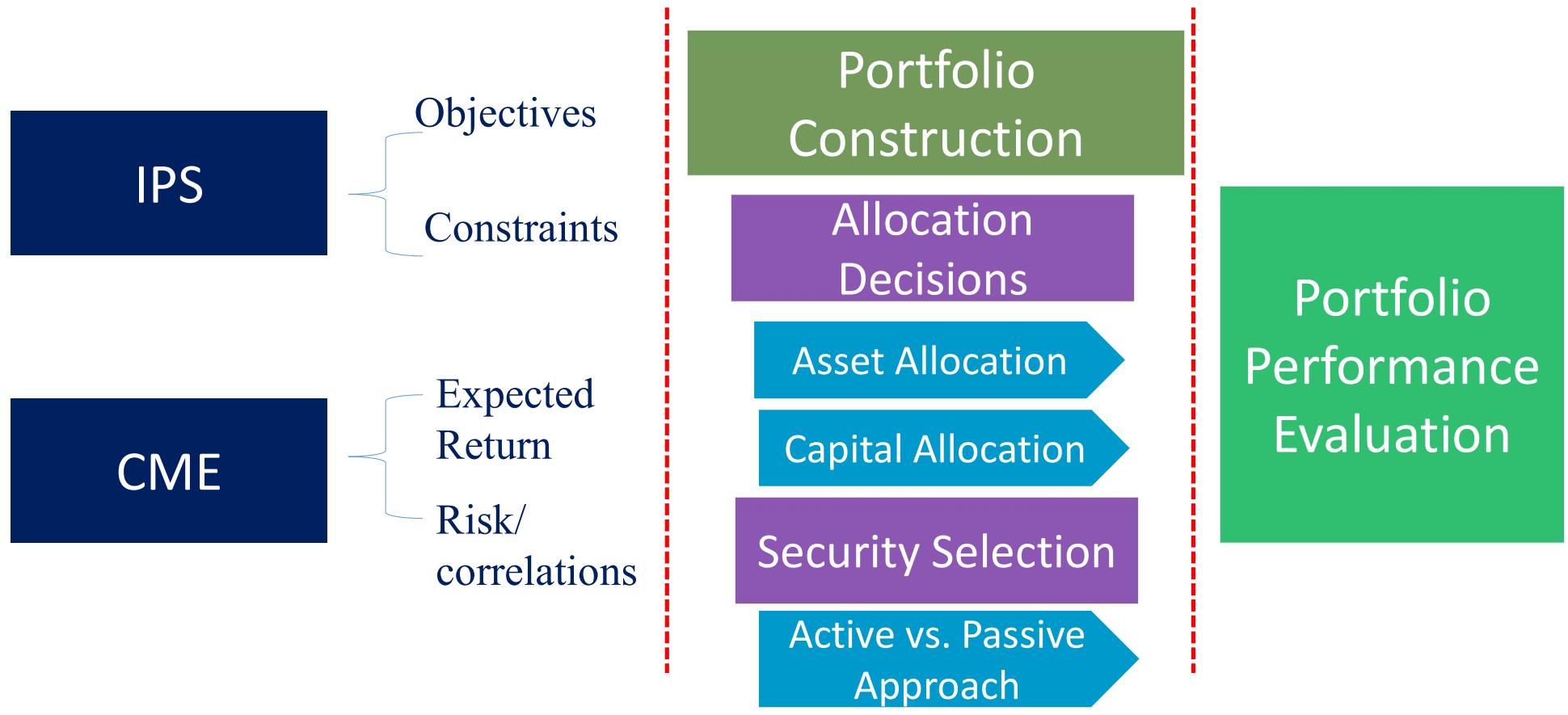
Investment Portfolio Management Course Dr. Ra'fat Jallad



Chapter 18: Portfolio Performance Evaluation



Portfolio Management Process: Review





Introduction

- Performance Evaluation is used to test the notion of **market efficiency**.

It is used for two key purposes:

- To test and **report investment performance**
- To **back test** prospective **investment strategy**
- **Performance evaluation measures:**

Mean Variance Measures	CAPM (beta) measures
Sharpe Ratio	Treynor Measure
M ² Measure	Jensen's Alpha



Mean-Variance Performance Measures

- Sharpe Index:

$$\frac{\bar{r}_p - \bar{r}_f}{\sigma_p}$$

\bar{r}_p = Average return on the portfolio

\bar{r}_f = Average risk free rate

σ_p = Standard deviation of portfolio return



M² Measure

- Developed by **Modigliani and Modigliani**
- Equates the **volatility of the managed portfolio** with the market by **creating a hypothetical portfolio** made up of T-bills and the managed portfolio
- If the risk is lower than the market, **leverage** is used and the hypothetical portfolio is compared to the market

$$M^2 = \left[\left(\frac{\sigma_M}{\sigma_P} \right) \cdot R_P + \left(1 - \frac{\sigma_M}{\sigma_P} \right) \cdot R_f \right] - R_M$$



Example

Suppose:

Managed Portfolio: return = 35%

standard deviation = 42%

Market Portfolio: return = 28%

standard deviation = 30%

bank-bill return = 6%

Sharpe ratio (Managed Portfolio 0.69)

Sharpe ratio (Market Portfolio 0.73)



Solution

Hypothetical Portfolio:

$30/42 = .714$ in Managed Portfolio and $(1-.714)$ or $.286$ in bank-bills

Return on this portfolio is

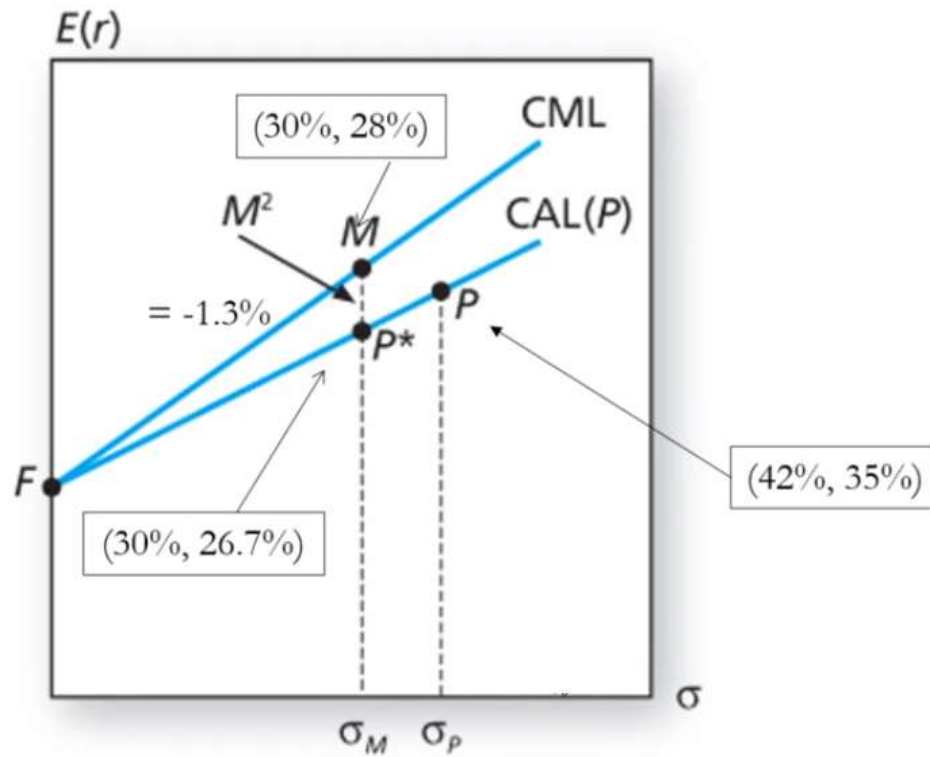
$$(.714) (.35) + (.286) (.06) = 26.7\%$$

Since this return is less than the market, the managed portfolio underperformed

$$M^2 = 26.7\% - 28\% = -1.3\%$$



Graphical Solution





CAPM Measures: Treynor Measure

$$\frac{\bar{r}_p - \bar{r}_f}{\beta_p}$$

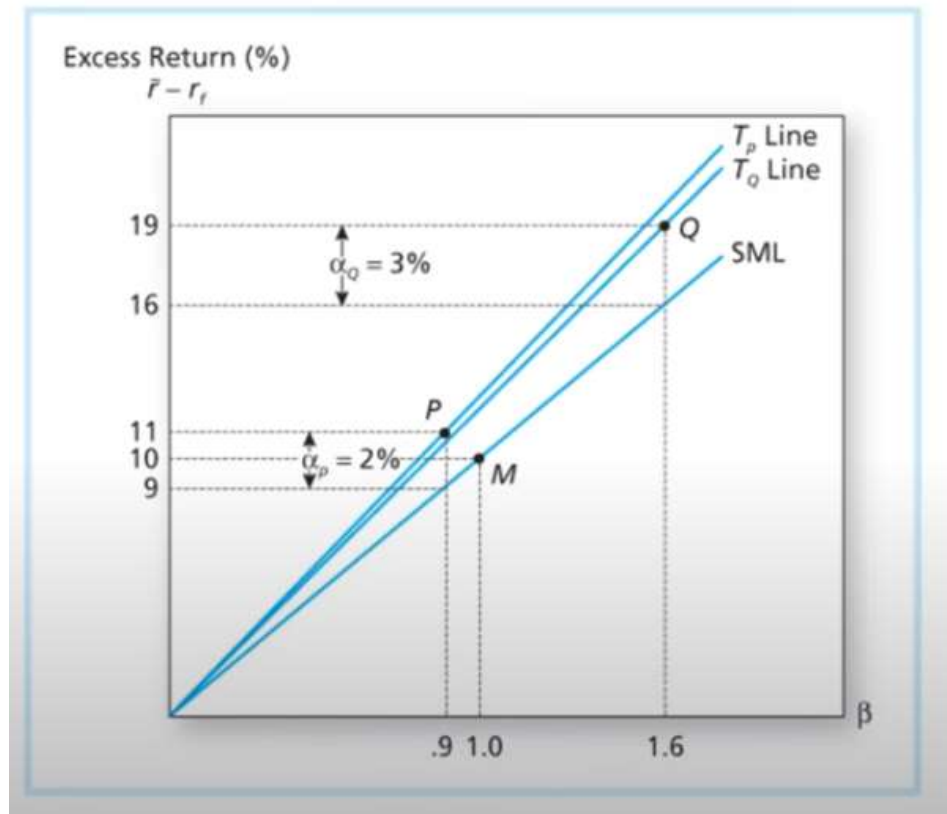
\bar{r}_p = Average return on the portfolio

\bar{r}_f = Average risk free rate

β_p = Weighted average β for portfolio



CAPM Measures: Treynor Measure





CAPM Measures: Jensen's Alpha

$$\alpha_p = \bar{r}_p - [\bar{r}_f + \beta_p (\bar{r}_m - \bar{r}_f)]$$

α_p = Alpha for the portfolio

\bar{r}_p = Average return on the portfolio

β_p = Weighted average Beta

\bar{r}_f = Average risk free rate

\bar{r}_m = Avg. return on market index.



Performance Attribution

- When measuring portfolio returns, investors need to decompose overall performance into components.
 - Components are related to specific elements of performance:
 - Security Selection
 - Asset Allocation
 - Portfolio attribution involves setting up a Benchmark' or 'Bogey' allocations of assets and uses indexes for expected security returns in each component.
-



Performance Attribution

- Calculate the return on the 'Bogey' and on the managed portfolio
 - Explain the difference in return based on component weights or selection
 - Summarize the performance differences into appropriate categories
-



Performance Attribution: Example

Component	Bogey Performance and Excess Return	
	Benchmark Weight	Return of Index during Month (%)
Equity (S&P 500)	.60	5.81
Bonds (Lehman Brothers Index)	.30	1.45
Cash (money market)	.10	0.48
Bogey = $(.60 \times 5.81) + (.30 \times 1.45) + (.10 \times 0.48) = 3.97\%$		
	Return of managed portfolio	5.34%
	– Return of bogey portfolio	<u>3.97</u>
	Excess return of managed portfolio	1.37%



Performance Attribution: Example

A. Contribution of asset allocation to performance					
Market	(1) Actual Weight in Market	(2) Benchmark Weight in Market	(3) Active or Excess Weight	(4) Market Return (%)	(5) = (3) × (4) Contribution to Performance (%)
Equity	.70	.60	.10	5.81	.5810
Fixed-income	.07	.30	−.23	1.45	−.3335
Cash	.23	.10	.13	.48	.0624
Contribution of asset allocation					.3099
B. Contribution of Selection to Total Performance					
Market	(1) Portfolio Performance (%)	(2) Index Performance (%)	(3) Excess Performance (%)	(4) Portfolio Weight	(5) = (3) × (4) Contribution (%)
Equity	7.28	5.81	1.47	.70	1.03
Fixed-income	1.89	1.45	0.44	.07	0.03
Contribution of selection within markets					1.06