Active Money Management Notes

CAPM Framework

What is alpha? | • α_i = manager skill beyond market risk

| • Measures excess return after adjusting for systematic risk

| • Positive alpha indicates outperformance

CAPM equation? | • $r_{i,t} - r_{F,t} = \alpha_i + \beta_i(r_{M,t} - r_{F,t}) + \varepsilon_{i,t}$

| • r_i = return on asset i, r_F = risk-free rate

| • r_M = market return, β_i = systematic risk

What is beta? | • β_i = systematic risk measure

| • $\beta_i = (\text{Cov}(r_i, r_M))/(\text{Var}(r_M))$

| • Beta > 1: more volatile than market

Risk decomposition? | • Total risk = Systematic risk + Unsystematic risk

| • $\sigma_i^2 = \beta_i^2 \sigma_M^2 + \sigma_{\varepsilon_i}^2$

| • Only systematic risk is compensated in equilibrium

Portfolio Performance Evaluation

Sharpe Ratio? | • SR = (r[p] - r[f])/(σ_p)

| • Measures excess return per unit of total risk

| • Higher ratio indicates better risk-adjusted performance

Treynor Ratio? | • TR = (r[p] - r[f])/(β_p)

| • Measures excess return per unit of systematic risk

| • Useful for well-diversified portfolios

Information Ratio? | • IR = (α_p)/(σ(ε_p))

| • Measures active return per unit of active risk

| • Alpha divided by tracking error

Jensen's Alpha? | • α_J = r[p] - [r[f] + β_p(r[m] - r[f])]

| • CAPM-based performance measure

| • Positive alpha indicates outperformance

Market Efficiency & Anomalies

EMH Forms? | • **Weak**: Prices reflect historical information

| • **Semi-strong**: Prices reflect all public information

| • **Strong**: Prices reflect all information (public + private)

Size Effect? | • Small-cap stocks tend to outperform large-cap

| • r[small] - r[large] > 0 historically

| • May be risk premium for illiquidity

Value Premium? | • High book-to-market stocks outperform growth stocks

| • r[HML] = r[high B/M] - r[low B/M] > 0

| • Captured in Fama-French 3-factor model

Momentum Effect? | • Past winners tend to continue winning (3-12 months)

| • r[WML] = r[winners] - r[losers] > 0

| • Reverses over longer horizons (3-5 years)

Summary

The CAPM framework provides a foundation for understanding risk-return relationships in financial markets. Alpha (α) represents manager skill, while beta (β) captures systematic risk exposure. Performance evaluation metrics like Sharpe ratio, Treynor ratio, and Information ratio help assess risk-adjusted returns. Market anomalies such as size effect, value premium, and momentum challenge the strong form of market efficiency and suggest opportunities for active management strategies.