R40 Portfolio Risk and Return: Part II

- **Capital Market Line (CML)**
  - Homogenous Expectations
    - 基于一致性假设，形成一条唯一的CML
  - Market Portfolio
    - CML与Markowitz EF的切点
    - 包含所有的Risky Asset
    - 按市值权重组成
  - CML
    - 公式
      - $E(R_P) = R_F + \frac{E(R_M) - R_F}{\sigma_M}\sigma_P$
      - 斜率=市场组合的Sharpe Ratio
      - 线上所有的点的Sharpe Ratio =市场组合的Sharpe Ratio
    - 组合
      - Lending Portfolio
      - Borrowing Portfolio
    - 应用：资产配置（Passive Investment Strategy）
- **Systematic Risk and Nonsystematic Risk**
  - 定义
    - 总风险=系统性+非系统性风险
    - 企业或行业特有的风险是非系统性，可分散
    - 市场，宏观带来的是系统性，不可分散
  - 衡量Systematic Risk — β
    - $\beta_i = \frac{Cov_{i,mkt}}{\sigma_{mkt}^2} = (\frac{\sigma_i}{\sigma_{mkt}}) \times \rho_{i,mkt}$
    - SCL的斜率，超额收益对于市场超额收益的敏感程度
- **CAPM and SML**
  - 假设
    - 投资者是risk-averse, 效用最大化且理性的
    - 市场是frictionless，无摩擦的，无交易成本及税费
    - 投资者投资相同single holding period
    - 一致性假设
    - 产品可无限拆分
    - 投资者都是price taker
  - 公式
    - $E(R_i) = R_f + \beta_i[E(R_m) - R_f]$
    - 斜率=Market Risk Premium=E(R m)-Rf
  - 应用 — 定价
    - Undervalued
      - 收益率高于CAPM
    - Overvalued
      - 收益率低于CAPM
- **Differences between SML and CML**
  - Measure of Risk
    - CML：衡量总风险
    - SML：衡量系统性风险
  - Slope
    - CML：sharp ratio
    - SML：市场超额收益
  - 应用
    - CML用做资产配置，risk-free asset+market portfolio
    - SML用做资产定价，只有系统性风险可以被定价
  - 图示

	SML	CML
Measure of risk	Uses systematic risk (non-diversifiable risk)	Uses standard deviation (total risk)
Application	Tool used to determine the appropriate expected (benchmark) returns for securities	Tool used to determine the appropriate asset allocation (percentages allocated to the risk-free asset and to the market portfolio) for the investor
Definition	Graph of the capital asset pricing model	Graph of all the combinations of the risk-free asset and the market portfolio
Slope	Market risk premium	Market portfolio Sharpe ratio

- **Performance Evaluation Indicators**
  - 用total risk来衡量
    - Sharpe Ratio
      - **(Rp−Rf)/σp**
      - 相对指标，需要与其他SR进行比较
      - Rp-Rf不能小于0
    - M-Squared
      - $M^2 = (R_P - R_f)\frac{\sigma_M}{\sigma_P} - (R_M - R_f)$
      - **(SRP−SRm)*σm**
      - 以市场收益为benchmark
  - 用beta来衡量
    - Treynor Ratio
      - **(Rp−Rf)/βp**
      - 相对指标，需要与其他TR进行比较
      - Rp-Rf & β不能小于0
    - Jensen's Alpha
      - 基于CAPM
      - **αp = Rp − [Rf + βp(Rm − Rf)]**

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