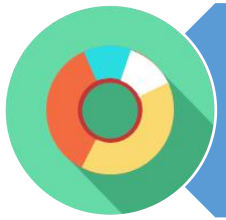
CFA Pre-Courses

Portfolio Management

Instructor: Queenie

CFA LEVEL 1: Portfolio Management

First insight to portfolio management



Investment Clients

Asset Allocation

Security Selection

Portfolio Management in CFA

- Topics in CFA curriculum:

Ethics & Professional Standards	
Investment Tools	Quantitative Methods (QM)
	Economics
	Financial Reporting & Analysis
	Corporate Finance
Asset Classes	Equity Investment
	Fixed Income
	Derivatives
	Alternative Investments
Portfolio Management & Wealth Planning	

Brief Introduction

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学习建议:

- 能够掌握一些基本的英文单词以及翻译
- 尽量理解每一个基本概念，有利于正课更有效的学习。
- 最重要的，认真、仔细的听课。

First Insight to Portfolio Management

First Insight to Portfolio Management

Diversification (分散化)

- Investing in different securities instead of a single asset.
- Investing in more securities will still yield diversification benefits, albeit at a drastically smaller rate.

“不要将鸡蛋放在一个篮子里”

Advantages for portfolio diversification

Reduce Risk

- The portfolio approach provides investors with a way to reduce the risk associated with their wealth without necessarily decreasing their expected rate of return.
  - ✓ Avoiding disaster(避免灾难性结果)

First Insight to Portfolio Management

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How to dealing with the Portfolio Management?

✓ Step 1: Determine the Client's Demand and Market Supply

Client's Demand

Higher Return with Higher Risk
OR
Lower Return with Lower Risk

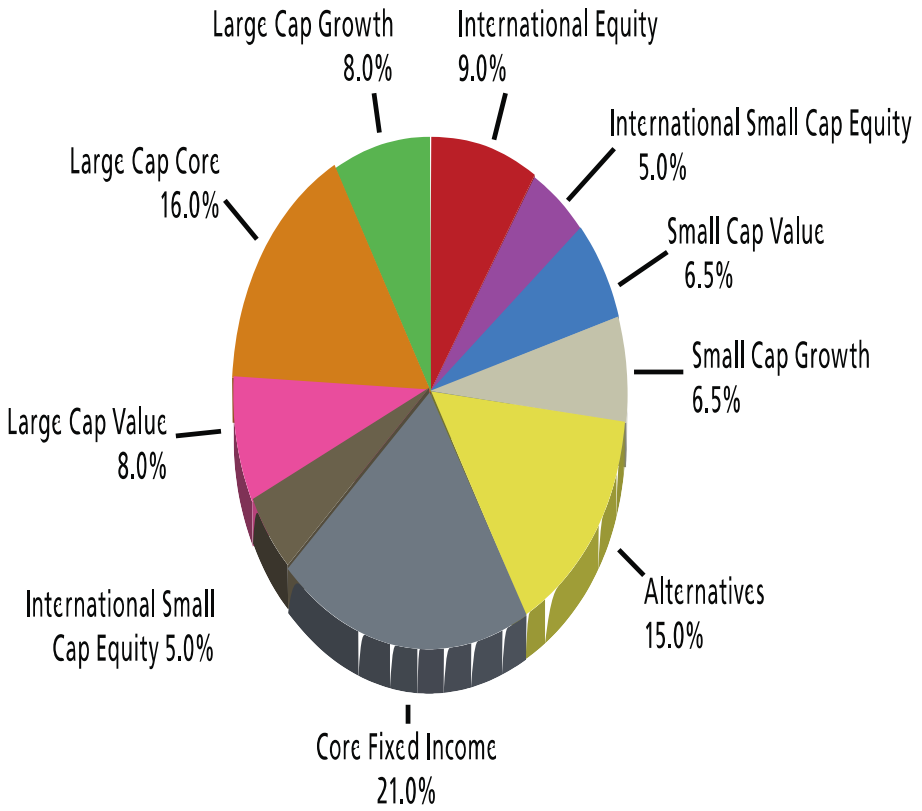
Market Supply

Products on different levels of risk.
(E.g. Stocks, Bond, Derivatives etc.)

First Insight to Portfolio Management

➢ Step 2: Asset allocation

- ✓ Balance risk versus reward by adjusting the percentage of each asset
- ✓ According to the investor's risk tolerance（风险承受度）, goals and investment time horizon.



First Insight to Portfolio Management

Step 3: Security Selection

- ✓ Buy the security which is undervalued.
- ✓ Sell the security which is overvalued.

Individual Clients

Tasks:

- Describe risk objective, risk tolerance, and return objective
- Identified individual investor’s investment constrains.

Investment Clients

- **Individual Investors** (个人投资者)
  - ✓ Individual investors investing and constructing portfolios for providing children's education, saving for a major purchase, starting a business or retirement.

- **Institutional Investors** (机构投资者)
  - ✓ Including corporations, banks, insurance companies, endowments & foundations, defined benefit pension plans, investment companies, etc.

Investment Clients

- **Return objectives** (收益目标)
  - ✓ Absolute Objective: the client want to achieve 10% rate of return.
  - ✓ Relative Objective: an endowment aiming for a return that is in the top 50 percent of returns of similar institutions, or a private equity mandate aiming for return in the top quartile among the private equity universe.

Investment Clients

- **Risk objectives** (风险目标)
  - ✓ Absolute risk objective(绝对风险目标): not to suffer any loss of capital; not to lose more than a given percent of capital in any 12-month period
  - ✓ Relative risk objective(相对风险目标): the standard deviation of the portfolio relative to the market returns'

Investment Clients

- **Risk tolerance** (风险承受度)
  - ✓ Ability to bear risk: depends on time horizon, expected income, and the level of wealth relative to liabilities.
  - ✓ Willing to bear risk/ Risk attitude: based on the client's psychology , attitudes and beliefs about investment risk and perhaps also his or her current circumstances

Investment Clients

投资顾问

能否先了解一下您的基本情况，比如说年龄，婚姻等等，以便我们为您制定更合适的方案。

客户

我目前30岁，暂时未婚，是一家公司的IT部主管，月收入在$80,000左右。现金资产大概在$200万左右还有100万股，本公司股份（股份激励）。

投资顾问

Ok. 关于固定资产方面，比如说是否有房产，汽车等等。

客户

目前有两套房产，一套自住，已付清贷款；另一套出租，每月租金收入$2000，租金基本能够支付每月的房贷。有一辆SUV，价值在$500,000左右。

投资顾问

Ok. 那有没有医疗保险，养老金？

客户

公司有帮我买医疗保险以及缴纳养老金，同时我个人也有再额外再买了一份保险，个人也缴纳一部分养老金，这部分每月支出大约在$6000。

Investment Clients

投资顾问

您的财务状况很不错。那您平时有哪些业余爱好呢？

客户

平时还是比较喜欢运动，如果不太忙的话，会去冲浪，潜水或骑山地自行车；如果时间较紧张，一般就去家附近的健身房运动一下。

投资顾问

Ok. 那您过去和现在都一直在做个人投资吗？

客户

由于平时工作比较忙，没有太多的时间关注股票，所以投资基本都是短期的理财产品或个别的债券投资，不过我还是看好长期投资的。

投资顾问

Ok. 那您对于投资的损失能承担的最大程度是多少？另外在收益方面的要求如何？

客户

我想15%-20%的损失是我的底线，而收益方面希望每年能达到10%-15%。

Practice Question 1

An investment policy statement that includes a return objective of outperforming the FTSE 100 by 120 basis points is best characterized as having a(n):

A. relative return objective.

B. absolute return objective.

C. arbitrage-based return objective.

Answer: A

Because the return objective specifies a target return relative to the FTSE 100 Index, the objective is best described as a relative return objective.

Investment Constraints

投资顾问

好的，那未来几年有没有什么个人的计划？比如说结婚，或是其他方面的支出计划？

客户

下礼拜出国旅游，需要$300,000；父母明年退休，每个月固定给父母$10000作为养老补充。

Liquidity Needs

- That is, easily converted to cash,and low risk at the point in time the liquidity need is actually present.

Investment Constraints

投资顾问

您期望的投资期限是多久呢？

客户

我打算投资到60岁退休，退休后用这笔钱进行环球旅行

➢ Time Horizon

- ✓ It may over until the portfolio is accumulating before any assets need to be withdrawn;
- ✓ Illiquid or risky investment may be unsuitable for an investor with a short time horizon because the investor may not have enough time to recover from investment losses.

Practice Question 1

Frank Johnson is investing for retirement and has a 20-year horizon. He has an average risk tolerance. Which investment is likely to be the least suitable for a major allocation in Johnson's portfolio?

A. Listed equities.

B. Private equity.

C. US Treasury bills.

Answer: C

With a 20-year horizon and average risk tolerance, Johnson can accept the additional risk of listed equities and private equity compared with US Treasury bills.

Investment Constraints

投资顾问

您的资产有没有限制性资产？比如您的100万股，本公司股份（股份激励），是否在锁定期内呢？

客户

对的，这些股份还在锁定期内，明年才会解禁。其他资产都是可以用来投资的！

➢ Legal and regulatory

✓ There may be a limit on the proportion of equities or other risky assets in the portfolio, or on the proportion of the portfolio that may be invested overseas. (法律和监管的投资限制主要适用于机构投资者，比如养老金账户不允许配置太多的高风险资产。个人投资者也会受到监管的限制)

Investment Constraints

投资顾问

在投资过程中，我们可能会适当加入一些衍生品，您能接受这样的安排么？

客户

我个人不太了解衍生品，也经常看到新闻上报道衍生品巨亏案，所以请不要在我的资产组合中配置任何衍生产品。

- **Tax concerns**
  - ✓ Is the account taxable, tax-deferred, or tax-exempt.
- **Unique Circumstances**
  - ✓ Anything that does not fit into the above categories.

Institutional Clients

Tasks:

- Interpret the Defined benefit pension plan
- Interpret the Endowment and Foundation

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Institutional investors are major participants in the investment markets.

Investment Clients

Defined benefit pension plan (收益确定型养老金计划)

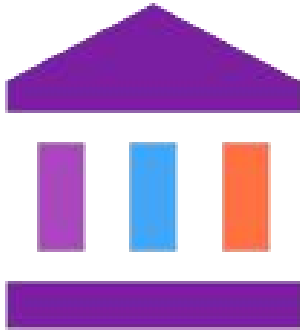
- It is a retirement plan that an employer sponsors, where employee benefits are computed using a formula that consider factors, such as length of employment and salary history.
- 指雇主支持的养老金计划，员工退休，或丧失就业能力后可按工龄、职位等因素，确定一个固定的（可按通货膨胀率调整）退休津贴数额，通常按月发放直至去世。

Investment Clients

Before Retire

Company

Deposit



DB Account

After Retire

Employee

Withdraw

Investment Clients

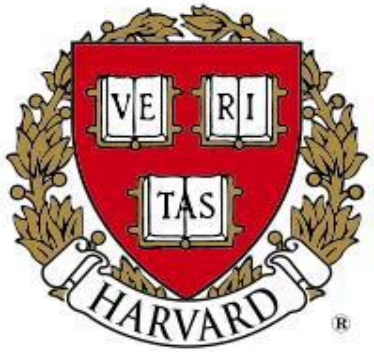
Characteristics on DB plan

- Retirees do not bear the risk of low investment returns on contributions or of outliving their retirement income.
- The investment returns can exceed the actuarial estimate. Employees do not benefit from the resulting surplus.
- It can be considered long-term investors.

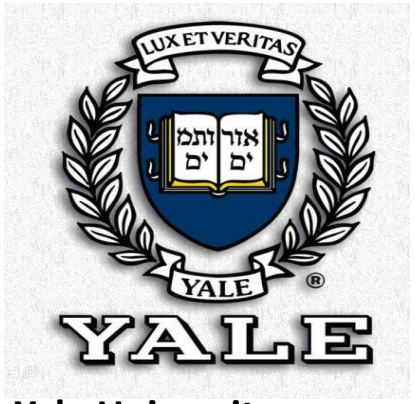
Comparison of DB and DC Plans

Defined Benefit Plan	Defined Contribution Plan
Member's benefit in retirement is defined.	Member's benefit in retirement is not defined.
Employer's contribution are not defined.	Employer's contribution are defined.
Investments are chosen by a pension fund manager(s).	Investments are chosen by the member.
Risk that investments do not perform as expected is borne by the employer. Employer may need to make additional contributions.	Risk that investments do not perform as expected is borne by the member. Member may need to adjust lifestyle or defer retirement.

Investment Clients



Harvard University endowment
哈佛大学捐赠基金
$36 billion

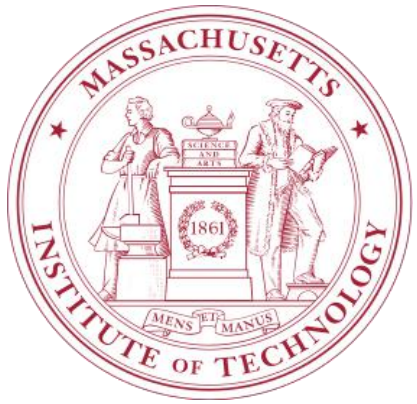


Yale University endowment
耶鲁大学捐赠基金
$22 billion

Stanford University endowment
斯坦福大学捐赠基金
$17 billion

Princeton University endowment
普林斯顿大学捐赠基金
$16.35 billion

University of Texas System endowment
德克萨斯州立大学捐赠基金
$16.11 billion



Massachusetts Institute of Technology endowment 麻省理工学院捐赠基金
$10 billion

Investment Clients

Top US Foundation by Asset value(2007)

比尔和梅琳达·盖茨基金会 $38 billion

保罗•盖蒂信托 $11.19 billion

福特基金会 $11.05 billion

罗伯特·伍德·约翰逊基金会 $10 billion

威廉和休利特基金会 $9.28 billion

凯洛格基金会 $8.40 billion

Investment Clients

Summary of Investment Needs by Client Types

Client	Time Horizon	Risk Tolerance	Liquidity Needs
Defined Benefit Pension Plans	Typically long term	Typically quite high	Typically quite low
Endowments and foundations	Very long term	Typically high	Typically quite low

Practice Question 1

In a defined benefit pension plan:

A. the employee is responsible for making investment decisions.

B. the employer is promised a periodic payment upon retirement.

C. the employer’s pension expense is equal to its contributions to the plan.

Practice Question 1

Answer: B

In a defined benefit pension plan, a periodic payment, typically based on the employees' salary, is promised to the employee upon retirement and the employer contributes to an investment trust that generates the principal growth and income to meet the pension obligation. The employees do not direct the investments in their accounts as they do in a defined contribution plan.

Asset Allocation

Tasks:

- Classify risk seeking, risk neutral and risk averse
- Explain the indifference curve and efficient frontier

Modern Portfolio Theory

Harry Max Markowitz(马克维茨)

- 1927年8月24日生于美国伊利诺伊州
- 经济学家，1989年获得 John von Neumann Theory Prize(诺依曼奖)，1990年获得 Nobel Memorial Prize(诺贝尔奖) in Economic Sciences.
- He is best known for his pioneering work in modern portfolio theory (MPT), studying the effects of asset risk, return, correlation and diversification on probable investment portfolio returns.

Modern Portfolio Theory

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Portfolio Selection (1952), *Journal of Finance*

- The HM model is also called Mean-Variance Model due to the fact that it is based on expected returns(mean) and the standard deviation(variance) of the various portfolios. 最早采用均值作为风险资产的期望收益率（均值）；用方差（或标准差）代表风险来研究资产组合和选择问题。

The Concept of Risk Aversion

- It related to the behavior of individuals under uncertainty.

A: Sure for $100

B: 50:50 chance for $200 or 0

Choose which one?

Asset Allocation

Risk Seeking（风险偏好）

- Chooses B
  - ✓ The investor gets extra “utility” from the uncertainty associated with the gamble.

Risk Neutral（风险中性）

- No difference
  - ✓ The investor cares only about return and not about risk。

Risk Averse（风险厌恶）

- Choose A
  - ✓ The investor does not want to take the chance of not getting anything at all.

Utility Theory（效用理论）

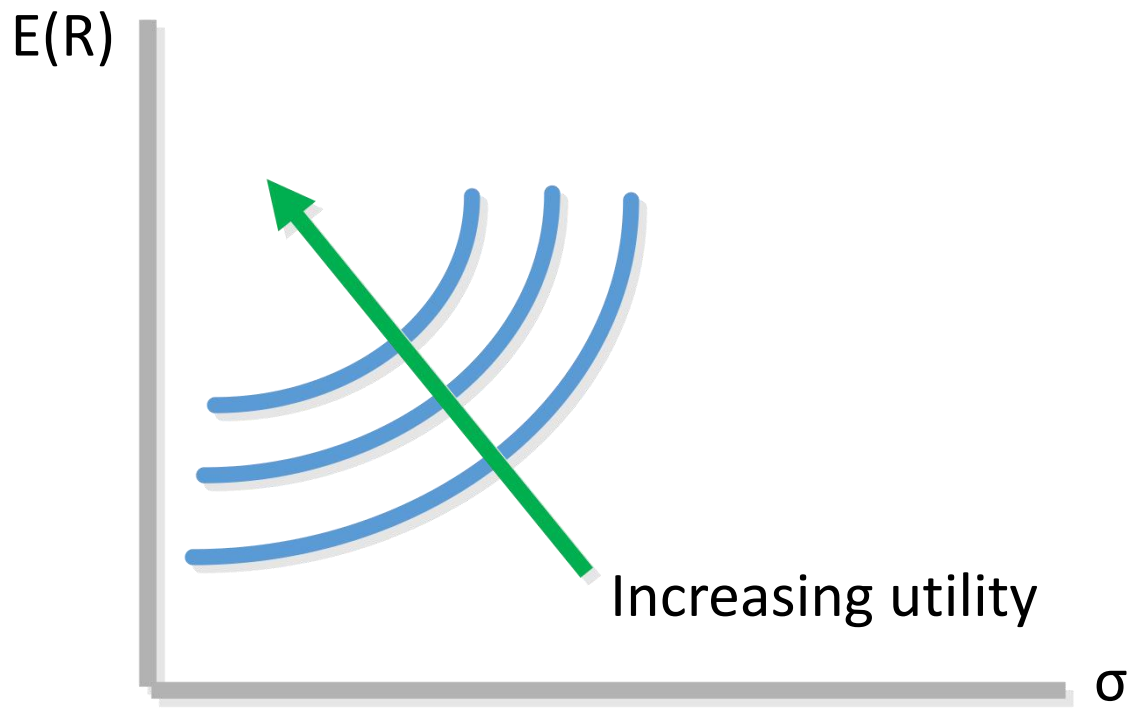
- Assumption：the investors are risk averse.
  - ✓ They always prefer more to less (greater return to lesser return)

$$U = E(R) - \frac{1}{2} A \sigma^2$$

Where, U is the utility of an investment, E(r) is the expected return, and σ^2 is the variance of the investment.

Indifference Curves（无差异曲线）

- It plots the combination of risk-return pairs that an investor would accept to maintain a given level of utility.



Characteristics of Indifference Curves

- The indifference curve runs from the southwest to the northeast because of the risk-return trade-off.
  - ✓ If risk-increases (going east) then it must be compensated by higher return (going north) to generate the same utility.
- It is convex because of diminishing marginal utility of return (or wealth).
- The greater the slope, the higher is the risk aversion of the investor as a greater increment in return is required to accept a given increase in risk.

Asset Allocation

Portfolio of two risky asset

- Portfolio Return
  - ✓ $R_p = w_1 R_1 + (1 - w_1) R_2$
- Portfolio Risk
  - ✓ $\sigma_p^2 = Var(R_p) = Var(w_1 R_1 + w_2 R_2) = w_1^2 Var(R_1) + w_2^2 Var(R_2) + 2 w_1 w_2 Cov(R_1, R_2) = w_1^2 \sigma_1^2 + w_2^2 \sigma_2^2 + 2 w_1 w_2 Cov(R_1, R_2)$
  - ✓ $\sigma_P = \sqrt{w_1^2 \sigma_1^2 + w_2^2 \sigma_2^2 + 2 w_1 w_2 Cov(R_1, R_2)}$

Covariance and Correlation Coefficient

- $Cov(R_1, R_2) = \rho\sigma_1\sigma_2$
  - ✓ Covariance is unbounded on both side, but correlation coefficient is bounded on -1 and 1.
- Let $\rho = 1$
  - ✓ $\sigma_p^2 = Var(R_p) = w_1^2\sigma_1^2 + w_2^2\sigma_2^2 + 2w_1w_2\rho\sigma_1\sigma_2 = (w_1\sigma_1 + w_2\sigma_2)^2$
  - ✓ $\sigma_P = w_1\sigma_1 + w_2\sigma_2$

Asset Allocation

Example 1

- Asset 1 has an annual return of 7 percent and annualized risk of 12 percent, whereas Asset 2 has an annual return of 15 percent and annualized risk of 25 percent.
- Calculate the Portfolio return and risk on different weighting on different correlations.

Asset Allocation

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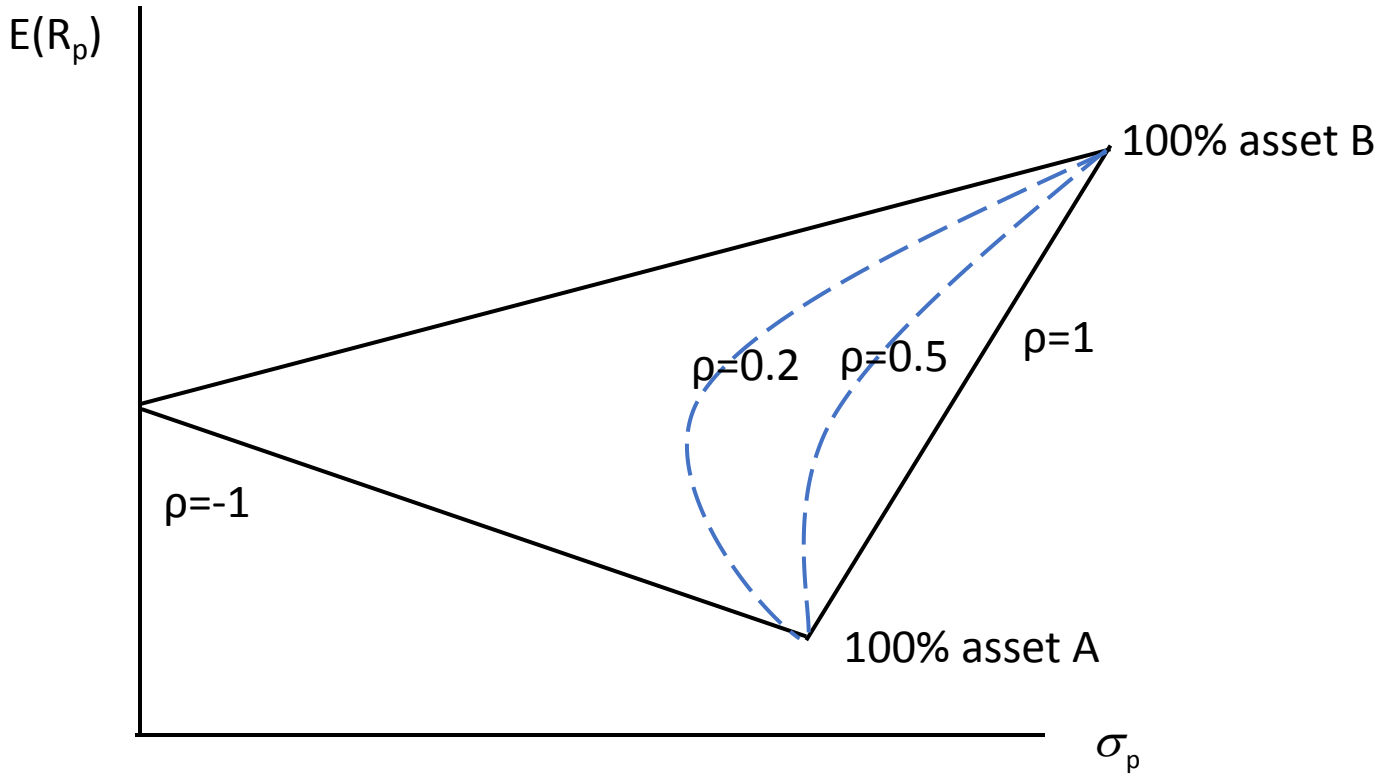
Answer

- Relationship between Risk and Return

		Portfolio Risk with Correlation of			
Weight in Asset 1 (%)	Portfolio Return	1.0	0.5	0.2	–1.0
0	15.0	25.0	25.0	25.0	25.0
10	14.2	23.7	23.1	22.8	21.3
20	13.4	22.4	21.3	20.6	17.6
30	12.6	21.1	19.6	18.6	13.9
40	11.8	19.8	17.9	16.6	10.2
50	11.0	18.5	16.3	14.9	6.5
60	10.2	17.2	15.0	13.4	2.8
70	9.4	15.9	13.8	12.3	0.9
80	8.6	14.6	12.9	11.7	4.6
90	7.8	13.3	12.2	11.6	8.3
100	7.0	12.0	12.0	12.0	12.0

Answer

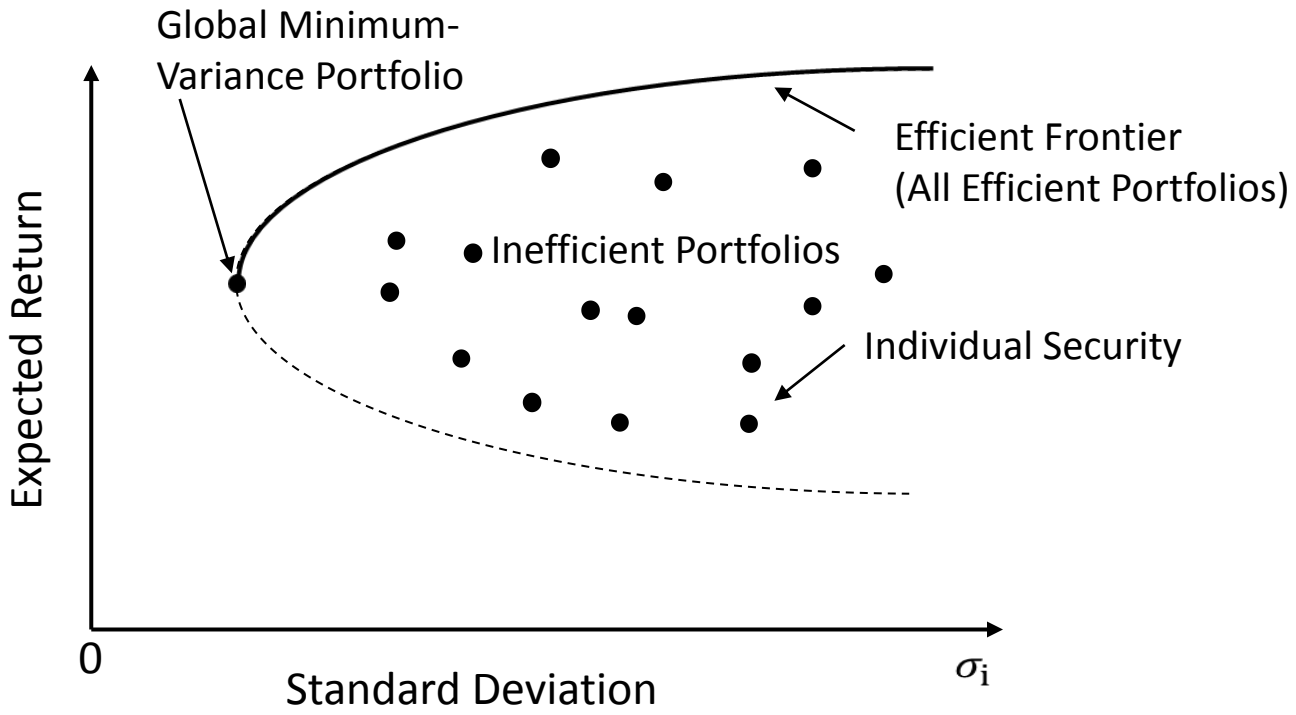
- Relationship between Risk and Return



Asset Allocation

Efficient frontier of risky assets

- **All attainable portfolios with risky assets:**

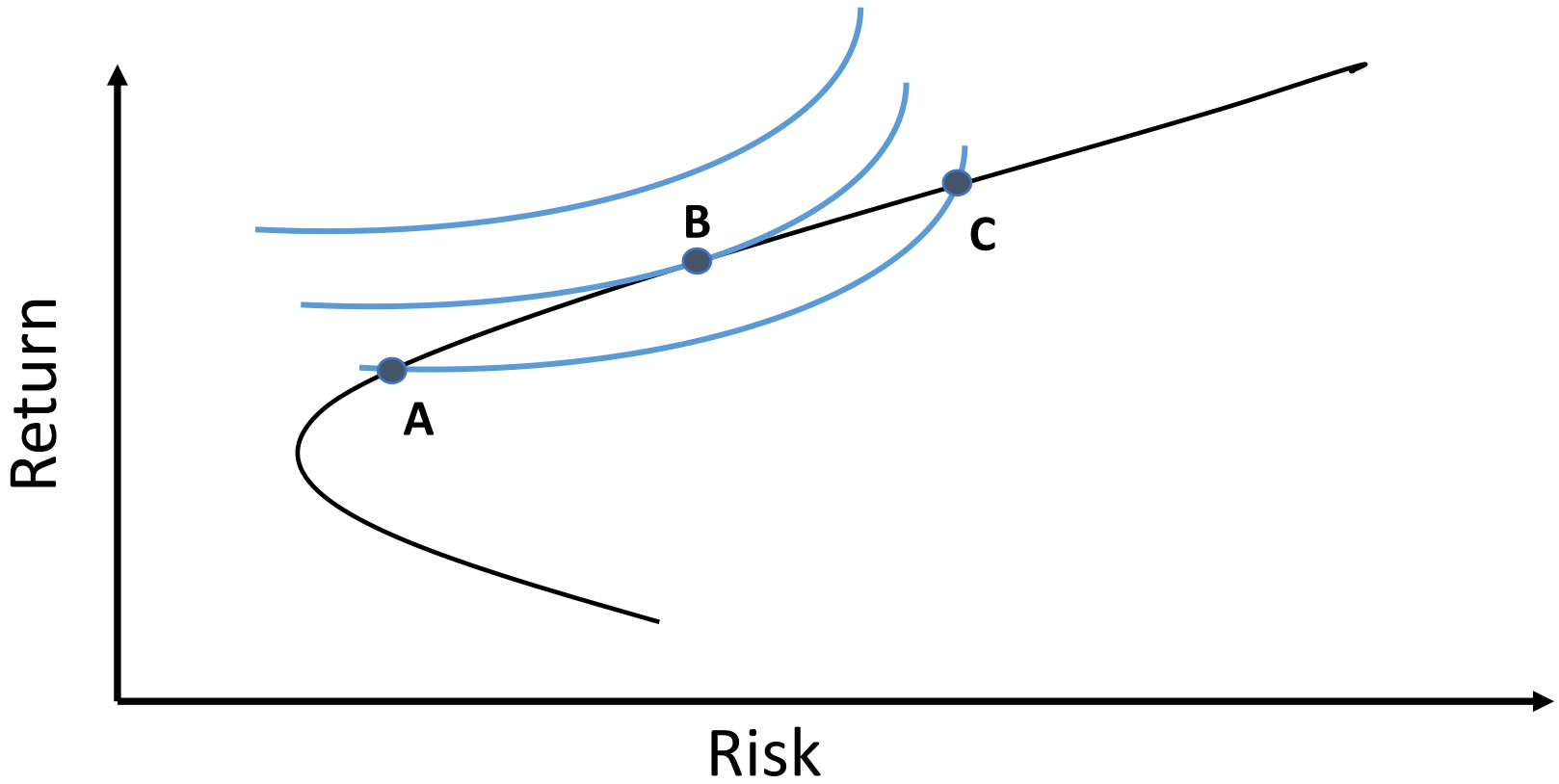


Efficient frontier of risky assets (Cont.)

- **Minimum-variance frontier of risky assets:** the investment portfolios of risky assets that provide minimum variance (the lowest risk) given a certain level of return.
  - ✓ **Global minimum-variance portfolio:** the investment portfolio that has the lowest variance on minimum-variance frontier of risky assets.

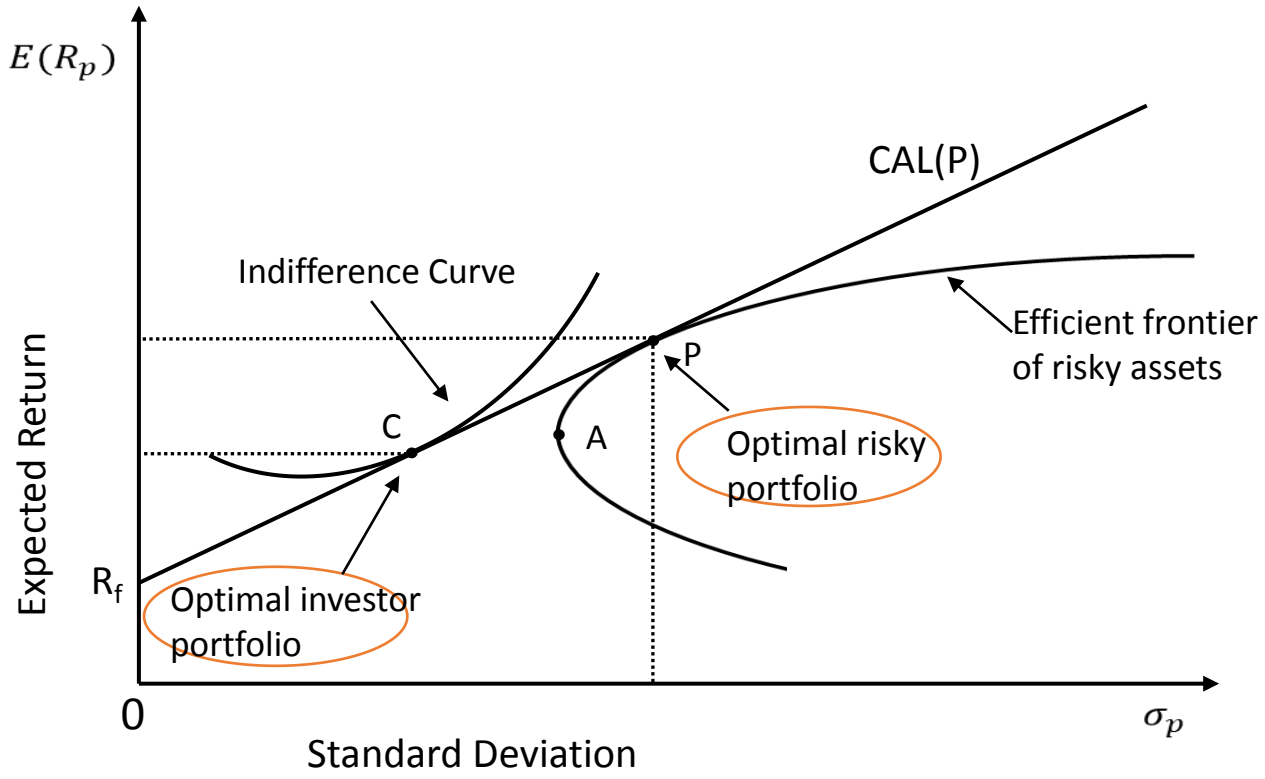
Optimal portfolio for an investor

- The matching point of an individual's utility curve and efficient frontier.
- Point B is the optimal point for an investor



Optimal risky portfolio & Optimal investor portfolio

- CAL(P) is the optimal CAL, which is tangent to efficient frontier of risky assets.



Practice Question 1

Which of the following statements is least accurate? The efficient frontier is the set of all attainable risky assets with the:

A. highest expected return for a given level of risk.

B. lowest amount of risk for a given level of return.

C. highest expected return relative to the risk-free rate.

Answer: C

The efficient frontier does not account for the risk-free rate. The efficient frontier is the set of all attainable risky assets with the highest expected return for a given level of risk or the lowest amount of risk for a given level of return.

Security Selection

Tasks:

- Explain the Capital Asset Pricing Model
- Classify if the asset price is overpriced, fair valued or underpriced

Capital Asset Pricing Model

- 资本资产定价模型（Capital Asset Pricing Model 简称CAPM）是由美国学者夏普（William Sharpe）、林特尔（John Lintner）、特里诺（Jack Treynor）和莫辛（Jan Mossin）等人于1964年在资产组合理论和资本市场理论的基础上发展起来的，主要研究证券市场中资产的预期收益率与风险资产之间的关系，以及均衡价格是如何形成的，是现代金融市场价格理论的支柱，广泛应用于投资决策和公司理财领域。

Security Selection

Capital asset pricing model (CAPM)

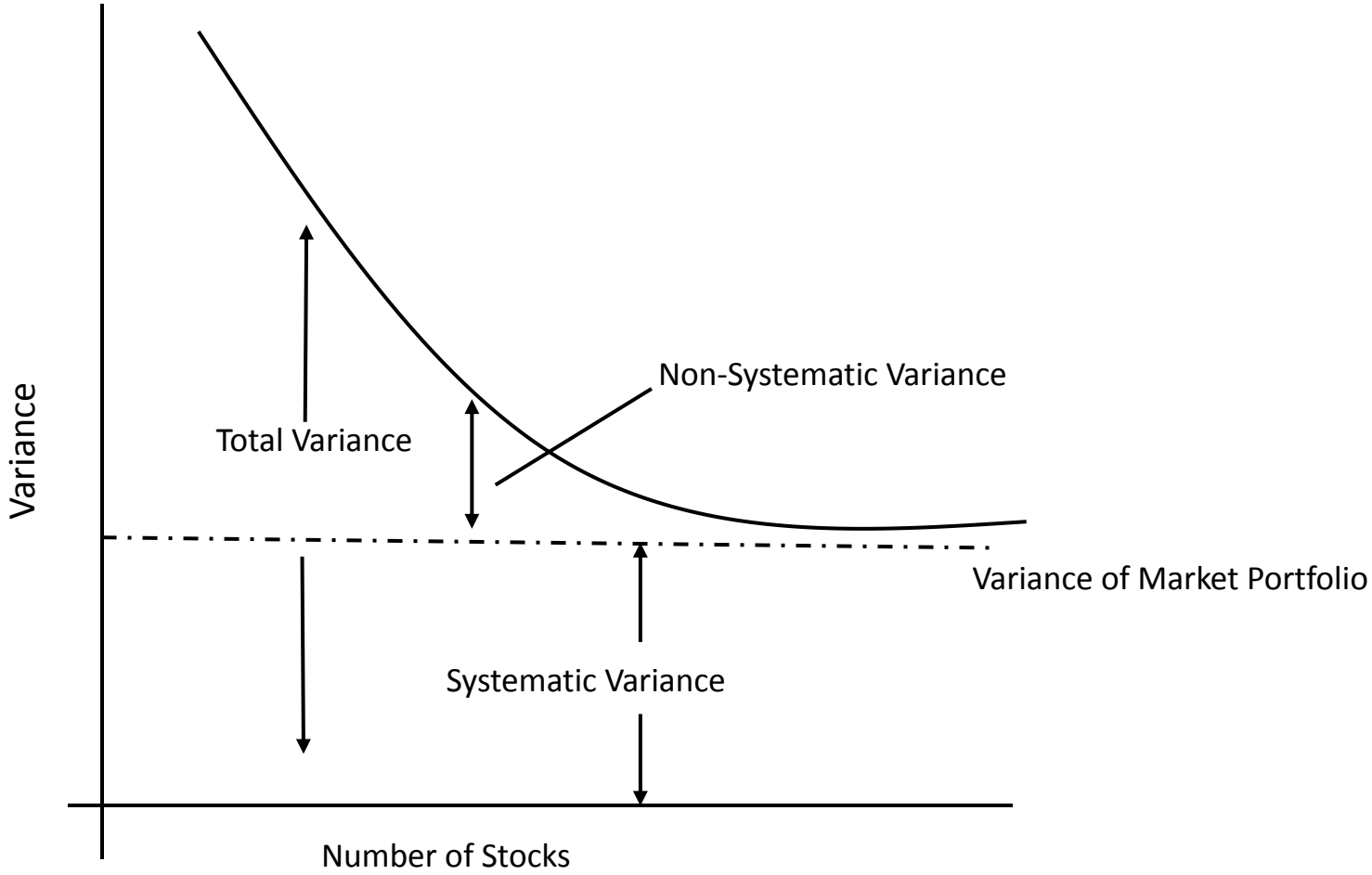
- $E[R_i]=R_f+\beta_i[E(R_m-R_f)]$
  - ✓ The expected returns (required return) of assets vary only by their ***systematic risk*** as measured by beta (β);
  - ✓ R_f = Risk-free rate (e.g., yields of U.S. T-bills)
  - ✓ R_M= Market return (e.g., S&P 500 Index return)
  - ✓ Expected return (required return) obtained from the CAPM is used for assets valuation by investors.

Decomposing the total risk

- Systematic Risk (系统性风险), also known as non-diversifiable or market risk, is the risk that affects the entire market or economy.
- Unsystematic Risk (非系统性风险) is the risk that pertains to a single company or industry and is also known as company-specific, industry-specific, diversifiable, or idiosyncratic risk.

Security Selection

Decomposing the total risk



Sources of Systematic Risk

Interest Rate Risk
利率风险

Inflation
通货膨胀

Sources of Systematic Risk (Cont.)

Recessions
经济萧条

War
战争

Security Selection

Sources of Unsystematic Risk

Strike
罢工

Default
违约

Security Selection

Advice?

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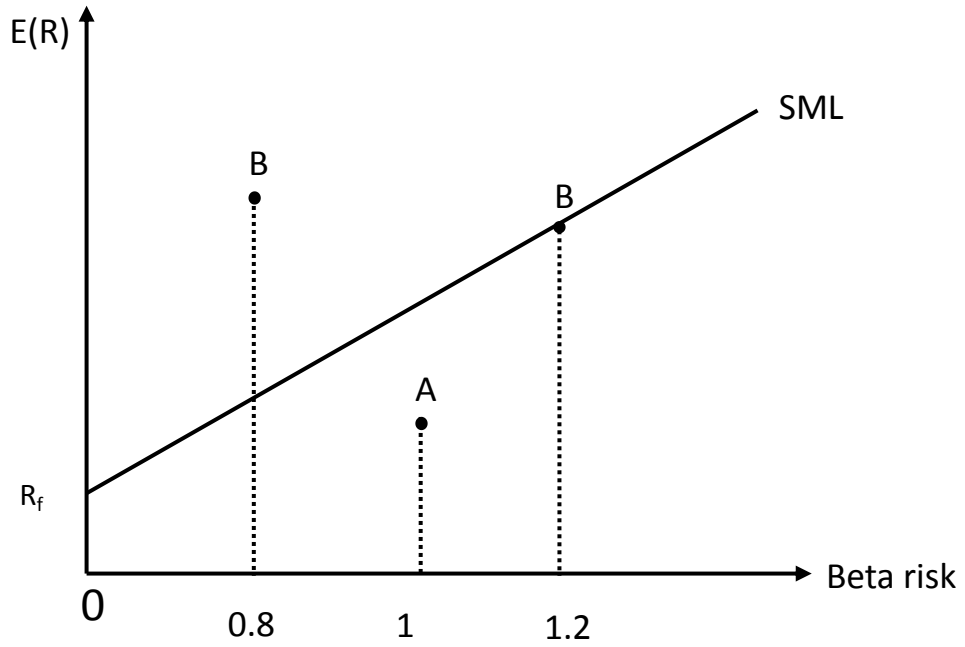
Security market line (Cont.)

- Any asset or portfolio that are properly priced plots on SML.
- Any asset or portfolio that are overpriced plots below SML.
- Any asset or portfolio that are underpriced plots above SML.



Practice Question 1

Systematic risk is the portion of total risk that:

A. Is related to a certain company or security

B. Is created by general economic conditions

C. Results from a lack of portfolio diversification

Answer: B

Systematic risk(also known as market risk) is the risk created by general economic conditions.

You're a Champion!

Thanks for staying with us. You have finished this chapter.