AN OVERVIEW OF FINANCIAL MANAGEMENT

LOS 1.A.a: discuss potential agency problems of stockholders versus: (1) managers and (2) creditors.

An **agency relationship** arises when:

- The principal hires an agent to perform some services.
- The decision-making authority is delegated to the agent.
- However, the agent is not fully responsible for the decision that is made.

Since the agent and the principal may have different goals, the agency relationship creates a potential conflict of interest.

Stockholders and Managers

The agency problems arise whenever the managers own less than 100% of the firm.

When a company's shareholders (the principal) delegate decision-making authority to the managers (the agent), a potential conflict of interests arises. The goal of shareholders is to maximize shareholder value. The goals of managers' are job security, power, status, compensation, more opportunities for lower and middle managers, etc. In essence, the fact that the owner-manager will neither gain all the benefits of the wealth created by his or her efforts nor bear all of the costs of perquisites will increase the incentive to take actions that are not in the best interests of other shareholders.

In most large corporations, potential agency conflicts are important since large firms' managers generally own only a small percentage of the stock.

Stockholders and Creditors

Managers are the agent of both shareholders and creditors. Shareholders empower managers to manage the firm, and creditors empower managers to use loans. Being employed by the firm, managers are more likely to act in the best interest of shareholders, not creditors. Stockholders have control (through managers) of decisions that affect the profitability and risk of the firm.

- For example, they may take projects that are far riskier than was anticipated by creditors. If it is successful, all the benefits go to stockholders. If it is not successful, the bondholders may have to share in the losses.

- Another example is that stockholders may borrow capital to repurchase stocks and thus increase the leverage level of the firm. The value of the debt will probably decrease due to higher debt level.

In both cases stockholders tend to gain at the expense of creditors.

Creditors may protect themselves in restrictive covenants in debt agreements. In the long-run, a firm that deals unfairly with creditors may impair the shareholders' interest because the firm may lose access to the debt market or be saddled with high interest rates and restrictive covenants. Managers, as agents of both shareholders and creditors, must act in a

manner that is fairly balanced between the interests of the two classes of security holders.

LOS 1.A.b: describe four mechanisms used to motivate managers to act in stockholders' best interests.

Managers can be encouraged to act in stockholder's best interests through rewards which reward them for good performance but punish them for poor performance.

- Managerial compensation**: the compensation package should be designed to meet two** objectives:

  - To attract and retain capable managers, and
  - To align managers' actions with the interest of shareholders.

  Compensation should be linked to the managers' performance.

  - Annual bonus is based on firm's profitability.
  - Management receives a certain number of performance shares if the company achieves predefined performance benchmarks.
  - Executive stock options may be granted based on the firm's market value of its shares relative to other firms in the same industry.

- **Direct intervention by shareholders:** as the majority of stocks are often owned by institutional investors such as insurance companies, pension funds, and mutual funds, institutional investors can act as lobbyists for the body of shareholders and exercise considerable influence over most of the firm's operations. Also any shareholders with more than 1,000 shares can sponsor a proposal to be voted at annual shareholders' meeting.

- **The threat of firing:** shareholders can nominate and elect the board of directors, who overseas the company. Although the management's control over the voting mechanism is strong, they can still be ousted directly or indirectly (such as a resignation).

- **The threat of takeovers:** hostile takeovers are most likely to occur when a firm's stock is undervalued relative to its potential because of poor management. The acquirer can replace management with their own management team.

THE COST OF CAPITAL

LOS 1.B.a: explain why the cost of capital used in capital budgeting should be a weighted average of the costs of various types of capital the company uses.

A firm's primary financial objective is to maximize shareholders' value. Regardless of the specific financing used to fund a particular project, a firm should be viewed as an ongoing concern and the cost of capital used in capital budgeting should be calculated as a weighted average, or composite, of the various types of funds it generally uses since the current funding affects its future debt or equity financing costs.

- A firm can increase shareholder value by investing in projects that yield a return greater than the cost of capital. Thus, the cost of capital is also referred to as the hurdle rate.
- Though some firms are financed entirely with equity funds, most firms raise a substantial portion of capital as long-term debt and/or preferred stock.
- To finance a particular project, a firm may raise a particular type of capital (e.g. debt), and this may use up some of its capacity for raising capital from that type.
- As the firm expands, it will need to raise additional capital from other sources (e.g. equity) to maintain its target weights of each capital type.

Thus, the cost of capital must reflect the weighted average cost of the various capital the firm uses, and the firm's long-term target weights.

LOS 1.B.b: define and calculate the component costs of (l) debt, (2) preferred stock, (3) retained earnings (three different methods), and (4) newly issued stock or external equity.

Capital components are the types of capital used by firms to raise fund. They include the items on the right side of a firm's balance sheet (debt, preferred stock and common equity). Any increase in the firm's total assets must be financed by one or more of these capital components. Capital is a necessary factor of production, and has a cost. The cost of each component is called the component cost of that particular type of capital.

Here are four major capital structure components and costs:

- Debt

  Since interest is a deductible expense, we are concerned with the after-tax cost of debt, which is $k_d(1 - T)$

  Where:

  k_d = the interest rate on debt
  T = the firm's marginal tax rate.

  This Means That After-Tax Cost Of Debt = Interest Rate - Tax Savings (the government pays part of the cost of debt as interest is tax-deductible).

  Note that the cost of debt should be the interest rate on *new* debt (i.e. the marginal cost of debt, not the interest rate paid on existing debt.

- Preferred Stock

  $K_{ps} = D_{ps}/P_n$

  Where:

  D_{ps} = the preferred dividend
  P_n = the price the firm receives after deducting flotation costs.

  Preferred dividends are not tax-deductible. Therefore there is no tax savings associated with the use of preferred stock.

- Retained Earnings

  The cost of retained earnings, k_s, is the rate of return stockholders require on equity capital the firm obtains by retained earnings. It has no direct costs but is related to the opportunity cost of capital: if the firm cannot invest retained earnings and earn at least k, it should pay these funds to its stockholders and let them invest directly in other assets that do provide this return. So, firms should earn on retained earnings at least the rate of return shareholders expect to earn on alternative investments with equivalent risk. One alternative investment is the firm's own stock.

  Thus, the cost of retained earnings should be the expected rate of return of the firm's own common stock. Since stocks are normally in equilibrium, the required rate of return (k_{RF} + risk premium) is equal to the expected rate of return (D_1/P_0 + Expected g for a constant growth stock).

o The CAPM approach:

$k_s = k_{RF} + (k_M - k_{RF})\beta_i$

where:

k_{RF} = the risk-free rate
k_M = the expected rate of return on the market
β_i = the stack's beta coefficient.

Both k_M and β_i need to be estimated.

The problems are:(l) if a firm's stockholders are not yet well diversified, they may be concerned with stand-alone risk rather than just market risk, and the CAPM procedure would understate the correct value of k_s. (2) it is hard to obtain correct estimates of inputs (k_{RF}, k_M and β_i). For example, there is controversy about whether to use long-term or short-term Treasury yields for k_{RF}.

o Bond-Yield-Plus-Risk-Premium approach:

k_s = Bond yield + Risk premium

This is a subjective, ad hoc procedure: bond yield is the interest rate on the firm's long-term debt, and risk premium is a judgmental estimate (usually 3-5 percent). For example, suppose that ABC, Inc.'s interest rate on long-term debt is 10%. Assume the risk premium is 5%. ABC's cost of retained earnings is 10% + 5% = 15%.

o Discounted Cash Flow (DCF) approach:

$k_s = D_1/P_0$ + Expected g

where:

D_1 = the dividend expected to be paid at the end of year 1
P_0 = the current price of the stock
g = the constant growth rate of dividends.

However, it is difficult to establish the proper growth rate g. One method is to forecast the firm's average future dividend payout ratio and its complement, the retention rate: g = (1.0 - Payout rate) (ROE), where ROE is the expected future rate of return on equity. Another method is to use the firm's historical growth rate, if the past growth rates are stable.

- Newly Issued Stock (External Equity)

$k_e = D_1 / [P_0 (1 - F)] + g$

where F is the percentage flotation cost incurred in selling the new stock so $P_0 (1 - F)$ is the net price per share received by the company. Since F can range from 4 to 21%, dollars raised by selling new stock must "work harder" than dollars raised by retained earnings. Therefore, firms with good investment opportunities typically want to utilize retained earnings as much as possible.

Note that:

- For many firms, depreciation is the largest single source of capital. The cost of depreciation-generated funds is very close to the weighted average cost of capital coming from retained earnings and low-cost debt.
- Most small businesses are privately held. It's difficult to calculate the cost of equity for these firms due to lack of data.
- It's hard to estimate the discount rates due to the difficulty in measuring projects' risks.

LOS 1.B.c: define the target (optimal) capital structure.

It is the percentage of debt, preferred stock, and common equity that will maximize the firm's stock price. Each firm has an optimal capital structure, and it should raise new capital in a manner that will keep the actual capital structure on target over time.

This chapter has taken a firm's target capital structure as given. In reality, establishing the target capital structure is a major task.

LOS 1.B.d: define and calculate a company's weighted-average cost of capital.

WACC is a weighted average of the component costs of debt, preferred stock, and common equity.

$$\text{WACC} - w_d k_d(1\text{-}T) + w_{ps} k_{ps} + w_{ce} k_s$$

Where:

w_d w_{ps} and w_{ce} are the weights used for debt, preferred and common equity, respectively.

Theoretically they should be based on market values, but if a form's book value weights are reasonably close to its market value weights, book value weights can be used as a proxy for market value weights.

LOS 1.B.e: define and calculate a company's marginal cost of capital.

It is the cost of obtaining another dollar of new capital; the weighted average cost of the last dollar of new capital raised. The marginal cost rises as more and more capital is raised during a given period.

The **marginal cost of capital schedule** is a graph that relates the firm's weighted average cost of each dollar of capital to the total amount of new capital raised.

The **break point (BP)** is the dollar value of new capital that can be raised before an increase in the firm's weighted average cost of capital occurs. It will occur in the MCC schedule whenever the amount of equity capital required to finance the firm's capital budget exceeds its retained earnings. At that point, the cost of capital will begin to rise because the firm must use more expensive outside equity.

The firm can invest up to $10 million without issuing new stocks. After $10 million, the firm will have to raise new equity by selling stocks, and the increase in equity cost raises the WACC from 10.0% to 10.3% (the marginal cost of capital).

LOS 1.B.f: distinguish between the weighted-average cost of capital and marginal cost of capital.

MCC is the cost of last dollar raised by the company, while WACC is the weighted average cost of all capital components used by the company.

- The MCC will increase as a firm raises more and more capital.

Large, established firms typically obtain all the equity capital by retained earnings.

- Due to the floating costs of issuing new stocks, the cost of retained earnings is always less than the cost of newly issued common equity.
- If a firm requires so much capital that it has to issue new common stock, the WACC will rise because of the increase cost of new equity.

LOS 1.B.g: explain the factors that affect the cost of capital and distinguish between those factors that can and cannot be controlled by the company.

The cost of capital is affected by a variety of factors.

Factors the firm cannot control:

- The level of interest rates.
- Tax rates

Factors the firm can control:

- Capital structure policy: a firm can change its capital structure ad thus affect its cost of capital. For example, an increase in the use of debt will increase the risk of both the debt and the equity, and these increases in component costs will tend to offset the effects of the change in the weights.

- Dividend policy: for any given level of earnings, the higher the dividend payout ratio, the lower the amount of retained earnings, hence the further to the left the retained earnings break point in the MCC schedule. However, lowering the dividend payout ratio might cause the cost of equity to increase and offset the benefit of changing the break point.

- Investment policy: we have assumed that new capital will be invested in assets of the same type and with the same degrees of risk as is embedded in the existing assets. However, if a firm invests in an entirely new line of business, its marginal cost of capital should reflect the risk of that new business.

THE BASICS OF CAPITAL BUDGETING

LOS 1.C.a: define capital budgeting.

It is the process of planning expenditures on assets (fixed assets) whose cash flows are expected to extend beyond one year. It is the whole process of analyzing projects and deciding which ones to include in the capital budget. The "capital" refers to long-term assets, and a "budget" is a plan which details projected inflows and outflows during future period.

Capital budgeting is perhaps the most important responsibility for financial managers, because:

- The results of capital budgeting decisions continue for many years, and thus the firm loses some flexibility during that period.
- Asset expansion is based on expected future sales over the asset's life.
- A firm's capital budgeting decisions define its strategic business direction.

Invest in projects that yield a return greater than the hurdle rate (i.e. a positive NPV):

- The hurdle rate should be higher for riskier projects.
- The hurdle rate should reflect the firm's capital structure (debt vs equity).
- Returns on projects should be measured based on incremental cash flows.

Project classifications:

- Replacement decisions to maintain the business. The issues are: should we continue the existing operations? If yes, should we continue to use the same processes? Maintenance decisions are usually made without detailed analysis.

- Replacement decisions to reduce costs. Cost reduction projects determine whether to replace serviceable but obsolete equipments. These decisions are discretionary, and a detailed analysis is usually required.

- Expansion of existing products or markets. These projects are more complex because an explicit forecast of future demand is required. A detailed analysis is required.

- Expansion into new products or markets. These projects involve strategic decisions and thus require detailed analysis.

- Safety and/or environmental projects. These projects are mandatory investments, and are often non-revenue-producing.

LOS 1.C.b: describe pay back period, discounted payback period, net present value (NPV), and internal rate of return (IRR), and evaluate capital projects using each method.

Payback Period

It is the expected number of years required to recover the original investment. Payback occurs when the cumulative net cash flow equals 0.

The decision rules: The shorter the payback period, the better. Reject if payback > benchmark.

- A firm should establish a benchmark payback period.
- For projects with paybacks greater than the benchmark, reject them.
- For projects with paybacks less than or equal to the benchmark:
    - If these projects are independent, accept all of them. "Independent" means a project's cash flows are not affected by the acceptance or non acceptance of other projects.
    - If these projects are mutually exclusive, accept the one with the shortest payback. "Mutually exclusive" means if one project is taken on, others must be rejected.

Drawbacks:

- It ignores cash flows beyond the payback period. Payback period is a type of "breakeven" analysis: it cares about how quickly you can make your money to recover the initial investment, not how much money you can make during the life of the project.
- It does not consider the time value of money. Therefore, the cost of capital is not reflected in the cash flows or calculations.

Discounted Payback Period

It is similar to the regular payback method except that it discounts cash flows at the project's cost of capital. It considers the time value of money, but it ignores cash flows beyond the payback period.

The payback provides an indication of a project's risk and liquidity because it shows how long the invested capital will be tied up in a project and "at risk". The shorter the payback period, he greater the project's liquidity, the lower the risk, and the better the project. The payback is often used as one indicator of a project's risk.

Net Present Value (NPV)

This methods discounts all cash flows (including both inflows and outflows) at the project's cost of capital and then sums those cash flows. The project is accepted if the NPV is positive.

$$NPV = \sum \left[\frac{CF_t}{(1+k)^t} \right]$$

Where:

CF_1 = the expected cash flow at period t
k = the project's cost of capital
n = its life.

The NPV represents the amount of present-value cash flows that a project can generate after repaying the invested capital (project cost) and the required rate of return on that capital. An NPV of zero signifies that the project's cash flows are just sufficient to repay the invested capital and to provide the required rate of return on that capital. If a firm takes on a project with a positive NPV, the position of the stockholders is improved.

Decision rules: The higher the NPV, the better. Reject if NPV < 0.

- Reject all projects with negative or zero NPV.
- For projects with NPV > 0: if they are independent, accept all of them; if they are mutually exclusive, accept the one with the highest NPV.

NPV measures the dollar benefit of the project to shareholders. However, it does not measure the rate of return of the project, and thus cannot provide "safety margin" information. **Safety margin** refers to how much the project return could fall in percentage term before the invested capital is at risk.

Internal Rate of Return (IRR)

It is the discount rate that forces a project's NPV to equal to zero.

$$\text{NPV} = \sum \left[\frac{\text{CF}_t}{(1+\text{IRR})^t} \right]$$

Note this formula is simply the NPV formula solved for the particular discount rate that forces the NPV to equal zero. The IRR on a project is its expected rate of return. Mathematically, the NPV and IRR methods will always lead to the same accept/reject decisions.

Decision rules: The higher the IRR, the better. Reject if IRR ≤ the hurdle rate.

- Define the hurdle rate, which typically is the cost of capital.
- Reject all projects with IRR ≤ the hurdle rate.
- For projects with IRR > the hurdle rate: if they are independent, accept all of them; if the are mutually exclusive, accept the one with the highest IRR.

IRR does provide "safety margin" information.

LOS 1.C.c: explain the NPV profile.

NPV profile is a graph showing the relationship between a project's NPV and the firm's cost of capital. The point where a project's net present value profile crosses the horizontal axis indicates a project's internal rate of return.

Some observations:

- The IRR is the discount rate that sets the NPV to 0.
- The NPV profile declines as the discount rate increases.
- Project A has a higher NPV at low discount rates, while project B has a higher NPV at high discount rates. The NPV profiles of project A and B joins at the crossover rate, at which the projects' NPVs are equal.
- The slop of project A's NPV profile is steeper. This indicates that project A's NPV is more sensitive to changes in the discount rates.

LOS 1.C.d: explain the relative advantages and disadvantages of the NPV and IRR methods, particularly with respect to independent versus mutually exclusive projects.

The IRR formula is simply the NPV formula solved for the particular rate that sets the NPV to 0. The same equation is used for both methods.

The NPV method assumes that cash flows will be reinvested at the firm's cost of capital, while the IRR method assumes reinvestment at the project's IRR. Reinvestment at the cost of capital is a better assumption in that it is closer to reality.

For **independent projects,** the NPV and IRR methods make the same accept/reject decisions. Assuming that project A and B are independent, let's look at their NPV profiles.

- The IRR criterion for accepting independent project is IRR > hurdle rate. That is, cost of capital must be less than (or to the left of) the IRR.
- Whenever cost of capital is less than the IRR, the project's NPV is positive. Recall that the decision rule for independent projects: accept if NPV > 0. Thus, both projects should be accepted based on the NPV method.

However, for **mutually exclusive projects,** ranking conflicts can arise. Assuming that project A and B are mutually exclusive, let's look at their NPV profiles.

- If the cost of capital > crossover rate, then $NPV_B > NPV_A$, and $IRR_B > IRR_A$. Thus, both methods lead to the selection of project B.
- If the cost of capital < crossover rate, then $NPV_B > NPV_A$, and $IRR_B > IRR_A$. Thus, a conflict arise because now the NPV method will select project A while the IRR method will choose B.
- Therefore, for mutually exclusive projects, the NPV and IRR methods lead to same decisions if the cost of capital > the crossover rate, and different decisions if the cost of capital < the crossover rate.

LOS 1.C.e: explain the 'multiple IRR problem' and the cash flow pattern that causes the problem.

Multiple IRRs is the situation where a project has two or more IRRs. This problem is caused by non-normal cash flows of a project.

- Normal cash flows means that the initial cash outflows are followed by a series of cash inflows.
- Nonnormal cash flows means that a project calls for a large cash outflow either sometime during or at the end of its life. Thus, the signs of the net cash flows flip-flop during the project's life.

In fact, nonnormal cash flows can cause other problems such as negative IRR or an IRR which leads to an incorrect accept/reject decision. However, a project can have only one NPV regardless of its cash flow patterns so the NPV method is preferable when evaluating projects with nonnormal cash flows.

Modified IRR (MIRR) method corrects the problem caused by non-normal cash flows. MIRR involves finding the **terminal value** (TV) of the cash inflows, compounded at the firm's cost of capital, and then determining the discount rate which forces the present value ofYV to equal the present value of the outflows. That is:

$$\text{PVcosts} = \frac{\text{TV}}{(1 + \text{MIRR})^{n}}$$

TV is the future value of cash inflows, assuming that the cash inflows are reinvested at the cost of capital.

For mutually exclusive projects, NPV and MIRR methods will lead to the same accept/reject decision when:

- Two projects are of equal size and have the same life.
- Two projects are of equal size but differs in lives.

If the projects differ in size, then conflicts can still occur!

MIRR has all the virtues of the IRR, but (1) it incorporates a better reinvestment rate assumption, and (2) it avoids the multiple rate of return problem.

LOS 1.C.f: explain why NPV and DIR methods can produce conflicting rankings for capital projects. ^

For **mutually exclusive projects** the two methods can generate conflicting results. If the NPV profiles of two projects cross (and there is a crossover rate):

- as long as the cost of capital (k) is larger than the crossover rate, the two methods both lead to the same decision;
- A conflict exists if k is less than the crossover rate.

Two conditions cause the NPV profiles to cross:

- when project size for scale) differences exist: the cost of one project is larger than that of the other.

- when timing differences exist: the timing of cash flows from the two projects differs such that most of the cash flows from one project come in the early years while most of the cash flows from the other project come in the later years.

The root cause of the conflict between NPV and IRR is the rate of return at which differential cash flows can be re-invested. Both the NPV and IRR methods assume that the firm will reinvest all early cash flows. The NPV method implicitly assumes that early cash flows can be reinvested at the cost of capital. The IRR assumes that the firm can reinvest at the IRR.

Whenever a conflict exists, we should use NPV method. It can be demonstrated that the better assumption is the cost of capital for the reinvestment rate.

LOS 1.C.g: describe the role of the post-audit in the capital budgeting process.

The **post-audit** is a follow-up of capital budgeting decisions. It is a key element of capital budgeting. By comparing actual results with predicted results and then determining why differences occurred, decision makers can:

- **Improve forecasts,** based on which you can make good capital budgeting decisions. Otherwise, you will have the GIGO problem - garbage in, garbage out.
- **Improve operations,** thus making capital decisions well implemented.

CASH FLOW ESTIMATION AND OTHER TOPICS IN CAPITAL BUDGETING

LOS 1.D.a: distinguish between cashflows and accounting profits.

The starting point in cash flow estimation is identifying the **relevant cash flows,** defined as the specific set of cash flows that should be considered in the decision at hand. Past cash flows are irrelevant!

- Capital budgeting decisions must be made on cash flows, not accounting income.
- Only incremental cash flows are relevant to the capital budgeting decision.

Accounting profits only measures the return on the invested capital. They are important for some purposes, but for capital budgeting, cash flows are what is relevant.

Net Cash Flow = Net Income (return on capital) + Depreciation (return of capital)

- Non-cash charges are deducted from sales to get accounting profits. For most firms, depreciation is the largest non-cash charge. Net cash flows should be adjusted to reflect all non-cash charges, not just depreciation.
- Interest payments should not be included in the estimated cash flows since the effects of debt financing are reflected in the cost of capital used to discount the cash flows. The existence of a project depends on business factors, not financing. Therefore, when estimating cash flows, ignore how the project is financed.

LOS 1.D.a: define the following terms and discuss their relevance to capital budgeting: incremental cash flow, sunk cost, opportunity cost, externality, and cannibalization.

Incremental cash flow: it is the net cash flow attributable to an investment project. It represents the change in the firm's total cash flow that occurs as a direct result of accepting the project.

- Forget sunk costs.
- Subtract opportunity costs.
- Consider side effects on other parts of the firm: externalities and cannibalization.
- Recognize the investment and recovery of net working capital.

Sunk cost: it is a cash outlay that has already been incurred and which cannot be recovered regardless of whether the project is accepted or rejected. Since sunk costs are not increment costs, they should not be included in the capital budgeting analysis. For example, a small book store is considering to open a coffee shop within the store which will generate from selling coffee an annual net cash outflow of $10,000. That is, the coffee shop will always be losing money. Back in last year, the book store spent $5,000 in hiring a consultant to perform an analysis. This $5,000 consulting fee is a sunk cost — whether to open the coffee shop or not, the $5,000 is gone.

Opportunity cost: it is the return on the best alternative use of an asset, or the highest return that will not be earned if funds are invested in a particular project. Remember that just because something is on hand does not mean it's free. The opportunity cost should be charged against a project. For example, continue with the book store example, the space to be occupied by the coffee shop is an opportunity cost — it could be used to sell books and generate $5,000 annual net cash inflow.

Externalities: they are the effects of a project on cash flows in other parts of the firm. Although they are difficult to quantity, they (which can be either positive or negative) should be considered.

- Positive externalities create benefits for other parts of the firm. For example, the coffee shop may generate some additional customers for the book store who otherwise may not buy books there. Future cash flows generated by positive externalities occur if with the projects and do not occur if without the project, so they are incremental.

- Negative externalities create costs for other parts of the firm. For example, if the book store is considering to open a branch two blocks away, some customers who buy books at the old store will switch to the new branch. The customers lost by the old store is an negative externality. The primary type of negative externalities is cannibalization, which occurs when the introduction of a new product causes sales of existing products to decline.

  Future cash flows represented by negative externalities occur regardless of the projects, so they are non-incremental. Such cash flows represent a transfer from the existing projects to the new projects, and thus should be subtracted from the new projects' cash flows.

LOS 1.D.c: explain the importance of changes in net working capital in the capital budgeting process.

Typically, a new project requires additional inventories, and expanded sales lead to additional accounts receivables. Accounts payables increase spontaneously, reducing the cash needed to finance inventories and receivables. Capital projects often require an additional investment in net working capital (NWC). The change in NWC is the increased current assets resulting from a new project, minus the spontaneous increase in accounts payable and accruals. An increase in NWC must be included in the Year 0 initial cash outlay, and then shown as a cash inflow in the final year of the project.

The future cash flows due to changes in net working capital occur if with the projects and do not occur if without the project, and thus they are incremental. For example, if you spend $100 on a printer, you will also spend hundreds of dollars on ink cartridges and paper. Failing to consider working capital often overstates the project's cash flows and makes it look better than it really is.

LOS 1.D.d: determine by NPV analysis whether a project (expansion or replacement) should be undertaken.

The incremental cash flows from a typical project can be classified into three categories:

- Initial investment outlay: it includes the up-front cost of fixed assets associated with the project plus any increase in net working capital.

- Operating cash flows over the project's life: these are the incremental cash inflows over the project's economic life. Annual operating cash flows equal after tax operating income plus depreciation.

- Terminal year cash flows: they include the after-tax salvage value of the fixed assets, return of the net working capital.

For each year of the project's economic life, the net cash flow is determined as the sum of the cash flows from each of the three categories. These annual net cash flows, along with the project's cost of capital, are then plotted on a time line and used to calculate the project's NPV andIRR.

An **expansion project** is one where a firm invests in new assets to increase sales. **Replacement analysis** involves the decision of whether or not to replace an existing asset with a new asset: the cash flows from the old asset must be considered in replacement decisions. Specifically, in a replacement project, the cash flows from selling old assets should be used to offset the initial investment outlay. You also need to compare the revenue/cost/depreciation before and after the replacement to identify changes in these elements. For detailed examples please refer to the textbook.

There are four steps to be followed to make capital budgeting decisions (both for expansion and replacement):

- Estimate the initial investment outlay.
- Estimate the operating cash flows.
- Estimate the terminal year cash flow.
- Make the decision, using one or more of the following methods: IRR (or Modified IRR), NPV, Payback (or Discounted Payback).

LOS 1.D.e: define initial investment outlay, operating cashflow over a project's life, and terminal-year cashflow and compute each for an expansion project and a replacement project.

See LOS 1.D.d please.

LOS 1.D.f: compare two projects with unequal lives, using both the replacement chain and equivalent annual annuity approaches.

If mutually exclusive projects have unequal lives, it may be necessary to adjust the analysis to put the projects on an equal life basis. This can be done using either one of the following approaches. They should lead to the same decisions if consistent assumptions are used.

- Replacement Chain Approach: It assumes that each project can be repeated as many times as necessary to reach a common life span; the NPVs over this life span are then compared, and the project with the higher common life NPV is chosen. Also called Common Life Approach. This approach is easier (than EAA) to explain to decision makers. However, the drawback is that the arithmetic may be too complex.

- Equivalent Annual Annuity (EAA) Approach: It calculates the annual payments a project would provide if it were an annuity. When comparing projects of unequal lives, the one with the higher equivalent annual annuity should be chosen. This approach is easier to apply than the first one.

Note that the unequal like issue does not arise for independent projects.

LOS 1.D.g: discuss the effects a/inflation on capital budgeting analysis.

Inflation must be considered in project analysis. Since inflation expectations are built into interest rates and money costs, inflation is reflected (automatically) in the cost of capital (WACC) used in a capital budgeting analysis. It should be built directly into the cash flow estimates to avoid a *downward biased* NPV.

Proposition: adjust cash flows to reflect inflation, unless real interest rates are used in calculating the WACC.

RISK ANALYSIS AND THE OPTIMAL CAPITAL BUDGET

LOS 1.E.a: distinguish among three types of project risk: stand-alone, corporate, and market. Stand-Alone Risk

It is the risk an asset would have if it were a firm's only asset and if investors owned only one stock. It is measured by the variability of the asset's expected returns, and it is often used as a good proxy for hard-to-measure corporate and market risk because (1) it is easier to estimate a project's stand-alone risk than its corporate risk and market risk, and (2) all three types of risks are highly correlated.

Corporate Risk

It is the risk not considering the effects of stockholders' diversification. The project represents only one of the firm's portfolio of assets, hence some of its risk effects on the firm's profits will be diversified away. Corporate risk is measured by a project's effect on uncertainty about the firm's future earnings. Shareholder diversification is not taken into consideration. It is important because it influences the firm's ability to use low-cost debt, to maintain smooth operations over time, and to avoid crisis that might consume management's energy and disrupt employees, customers, suppliers and the community.

Market Risk

It is that part of a project's risk that cannot be eliminated by diversification. It is measured by the project's Beta coefficient. It is also called Beta risk. In theory market risk should be the most relevant type of risk because of its effect on a firm's stock price: Beta affects k, and k affects the stock price.

LOS 1.E.b: distinguish among sensitivity analysis, scenario analysis, and Monte Carlo simulation as risk analysis techniques.

Sensitivity Analysis

It is a technique which shows how much a project's NPV or IRR will change in response to a given change in an input variable such as sales, other things held constant.

- It begins with a base-case situation, which is developed using the expected values for each input.
- A base-case NPV is thus calculated.
- Then each variable is changed by several percentage points above and below the expected value, holding other things constant. A new NPV is calculated using each of these values.
- Finally, the set ofNP Vs is plotted against the variable that was changed. The slopes of the lines show how sensitive NPV is to changes in each of the inputs. The steeper the slope, the more sensitive the NPV is to a change in each of the variable.
- The project with the steeper sensitivity lines would be riskier.

In general, a project's stand-alone risk depends on (1) the sensitivity of NPV to changes in key variables and (2) the range of likely values of these variables as reflected in their probability distributions. The sensitivity analysis considers the first factor only and is incomplete. It only examines the base-case scenario.

Scenario Analysis

It is a risk analysis technique in which the best- and worst-case NPVs are compared with the project's expected NPV. It considers both the sensitivity of NPV to changes in key variables and the likely range of variable values. The least "reasonable" set of circumstances (low unit sales, high construction cost, etc) and the most "reasonable" set are specified first. The NPVs under the bad and good conditions are then calculated and compared to the expected, or base-case, NPV. Even though there are an infinite number of possibilities, scenario analysis only considers a few discrete outcomes (NPVs).

Monte Carlo Simulation

It is a risk analysis technique in which a computer is used to simulate probable future events and thus to estimate the profitability and risk of a project. Random values of input variables are generated on a computer. The mean of the target variable is computed to measure the expected value. Standard deviation (or coefficient of variation) is computed to measure risks.

LOS 1.E.c: describe how the security market line is used in the capital budgeting process.

Security Market Line (SML) shows how investors are willing to make trade-offs between risk as measured by beta and expected returns. The higher the beta risk, the higher the rate of return needed to compensate investors for bearing this risk. It expresses the following risk/return relationship:

$$K_{stock} = k_{risk\text{-}free} + (k_{market} - k_{risk\text{-}free}) \times Beta_{stock}$$

The SML can be used to assess a project's market risk.

Assume a firm uses only equity capital. Its cost of equity is also its corporate cost of capital (WACC). If we can determine the beta for each project ($Beta_{project}$), then the project cost of capital is $K_{project} = k_{risk\text{-}free} + (k_{market} - k_{risk\text{-}free}) \times Beta_{project}$

The SML represents the beta risk of the projects. The higher the project's beta risk, the higher its required rate of return. If the expected rate of return on a given capital project (project A) lies above the SML, the expected rate of return on the project is more than enough to compensate for its risk, and the project should be accepted. Conversely, it should be rejected (project B).

An average-risk project (project D) has the same beta risk as the firm's capital, and thus the project cost of capital equals the corporate cost of capital. If a firm concentrates its new investments in either high- (project E) or low-risk (project C) projects as opposed to average-risk projects, its corporate beta will rise or fall from the current value and its required rate of return on common stock will change from its current value.

LOS 1.E.d. describe the pure play and accounting beta methods for estimating individual project betas.

The pure **play method** is an approach used for estimating the beta of a project in which a firm

1. identifies several companies whose only business is the product in question,
2. calculates the beta for each firm, and then
3. averages the betas to find an approximation to its own project's beta.

This method is often used when a firm considers a major investment outside its primary field, but it is frequently difficult to implement because it's impossible to find pure play proxy firms.

The **accounting beta method** is a method of estimating a project's beta by running a regression of the company's return on assets against the average return on assets for a large sample of firms.

The slope coefficient of this regression is the accounting beta. Accounting betas for a totally new project can be calculated only after the project has been accepted, placed in operation, and begun to generate output and accounting results - too late for capital budgeting decisions. In practice, they are normally calculated for divisions or other large units, not for single assets, and divisional betas are then used for the division's projects.

LOS 1.E.e: define and discuss the procedure for developing a risk-adjusted discount rate.

Many firms attempt to diversify the portfolio of assets to stabilize earnings and reduce risk. Since well-diversified investors can diversify easily at lower cost than the firm, *market risk* should be the only relevant risk in capital budgeting decisions. However, if investors are not well diversified, firms should concentrate more *on project- or firm-specific risks* than market risk.

The **risk-adjusted discount rate** is the discount rate that applies to a particular risky stream of income. It is based on the corporate WACC, which is increased for projects which are riskier than the firm's average project but decreased for less risky projects.

There is no good way of specifying exactly how much higher or lower these discount rates should be: risk adjustments are necessarily judgmental and somewhat arbitrary. However, many firms use a two-step procedure here:

1. divisional costs of capital are established for each of the major operating divisions on the basis of each division's established average risk and capital structure.
2. within each division, all projects are classified into three categories — high risk, average risk, and low risk. Then each division assigns appropriate cost of capital to each category (i.e. average risk projects get the divisional cost of capital but high risk projects get higher ones.)

This procedure is not precise but does recognize that different divisions have different characteristics and hence different costs of capital.

LOS 1.E.f: define capital rationing.

Capital rationing occurs when management places a constraint on the size of the firm's capital budget during a particular period. In such situations, capital is scarce and should be allocated to the best projects to maximize the firm's aggregate NPV. The firm's capital budget and cost of capital must be determined simultaneously to best allocate the firm's capital.

CAPITAL STRUCTURE AND LEVERAGE

LOS 1.F.a: define target (optimal) capital structure.

The **target capital structure** is the mix of debt, preferred stock, and common equity that a firm plans to maintain over time. At any point in time, management has a specific target capital structure in mind, presumably the optimal one, although this target may change over time.

- If the debt ratio is below the target, expansion capital will be raised by issuing debt.
- If the debt ratio is above the target, the firm will raise expansion capital by retaining earnings or issuing new equity.

Capital structure policy involves a trade-off between risk and return. Generally, using more debt:

- Raises the risk borne by stockholders: higher risk generally depresses the stock price.
- Leads to a higher expected rate of return and higher stock price.

Thus, the **optimal capital structure** must strike a balance between risk and return, and maximizes the stock price.

LOS 1.F.b: describe, and state the impact of changes in, factors that influence a company's capital structure decision.

Four factors influence capital structure decisions:

- **business risk:** This is the riskiness inherent in the firm's operations if without debt. The *greater* the firm's business risk, the *lower* its optimal debt ratio.

- **the firm's tax position:** A major reason to use debt is that interest is deductible which lowers the effective cost of debt. If the firm's tax rate is low, additional debt will not be as advantageous as it would be to a firm with a higher effective tax rate. Therefore, the *lower* the firm's tax rate, the *lower* the optimal debt ratio.

- **financial flexibility:** It is the ability to raise capital on reasonable terms under *adverse* conditions. The *greater* the probable future need for capital, and the worse the consequences of a capital shortage, the stronger the balance sheet should be, and the *lower* the optimal debt ratio.

- **managerial conservatism or aggressiveness:** Aggressive managers tend to use debt to boost profits. This subjective factor does not affect the true *optimal,* or value-maximizing capital structure, but it does influence the manager-determined (perceived) *target* capital structure.

These four factors largely determine the target capital structure, but operating conditions can cause the actual capital structure to vary from the target.

LOS 1.F.c: explain business risk and financial risk and discuss factors that influence each risk.

Business risk is the uncertainty (variability) about projections of future returns on assets (ROA). It is the single most important determinant of capital structure. Other things the same, the lower a firm's business risk, the higher its optimal debt ratio.

A firm will have little business risk:

1. if the demand for its products is stable;
2. if the prices of its inputs and products remain relatively constant;
3. if it can adjust its prices freely if costs increase, and
4. if a high percentage of its costs are variable and hence will decrease if sales decrease.

Each of these factors is influenced by the firm's industry characteristics, but each is also controllable to some extent by management.

Financial risk is the additional risk placed on the common stockholders as a result of the decision to use fixed-income securities (debt and preferred stock). Increase **financial leverage** (the use of fixed income securities) increases financial risk and expected return of stockholders due to the obligation of servicing the fixed interest payments. The question is: Is the increased risk sufficient enough to compensate the increased rate of return? What is the optimal financial structure to maximize stock price and the firm's value?

Financial risk depends on several factors:

- **Cash flow volatility:** the more volatile (stable) a firm's cash flows, the higher (lower) the financial risk.
- **Financial leverage:** the higher the financial leverage, the higher the financial risk.

LOS 1.F.d: explain and calculate the effects of changes in sales or earnings before interest and taxes (EBIT) on earnings per share for companies with differing amounts of debt financing.

No matter how much a firm uses debt, the EBIT will always remain the same.

$$EPS = \frac{(EBIT - I)(1 - T)}{\text{Shares Outstanding}}$$

From the formula we can see that the higher the EBIT (or Sales), the higher the EPS.

Can we say (from the formula) that "the higher the interest expense (I, which implies more debt), the lower the EPS."? No!

As debt ratio increases:

- EPS first increases, then reaches its peak. and then starts to decline. As the firm uses more debt to substitute equity, there are two conflicting forces here: higher interest expense will reduce EPS, while smaller amount of outstanding shares will increase EPS. Eventually, interest rates rise so rapidly that EPS falls.

- Cost of capital (WACC) will fall, bottom out and then rise. As the firm begins to use lower cost debt, its WACC declines. The costs of both debt and equity rise due to increased financial risk, eventually offsetting the tax benefits of debt and causing WACC to rise.

- Stock price will rise, peak and then fall. The stock price is maximized when the WACC is the lowest. This generally calls for a debt ratio which is lower than the one that maximizes expected EPS

For a detailed example and illustration, please refer to basic example 1.

LOS 1.F.e: define operating leverage and explain how it affects a project's or company's expected rate of return.

Operating leverage is the extent to which fixed costs are used in a firm's operations. In many respects it is determined by technology. High (low) operating leverage is associated with capital (labor) intensive industries.

Operating leverage is a two-edged sword. Other things held constant, high operating leverage means a relatively small change in sales will result in a large change in operating income. A small decline (increase) in sales can lead to a large decline (increase) in operating profits. That is, the greater the operating leverage, the higher the expected rate of return, and the greater the business risk as measured by variability of EBIT and ROE.

LOS 1.F.f: calculate the breakeven quantity of sales and determine the company's gain or loss at various sales levels.

The **breakeven point** is the volume of sales at which total costs equal total revenues, causing operating profits (or EBIT) to equal zero.

$$PQ - VQ - F = 0$$

Where:

P = average price per unit of output
Q = units of output
V = variable cost per unit
F = fixed operating costs.

Thus at the breakeven point $Q_{BE} = \frac{F}{P-V}$

LOS 1.F.g: define financial leverage.

Financial leverage is the extent to which fixed-income securities (debt and preferred stock) are used in a firm's capital structure.

LOS 1.F.h: describe the relationship between financial leverage and financial risk

As a general proposition, financial leverage raises the expected rate of return, but at the cost of increased financial risk (and thus total risk). So, we are faced with a trade-off: if we use more financial leverage, we increase the expected rate of return, which is good, but we also increase risk, which is bad.

LOS 1.F.i: discuss why the use of greater amounts of debt in the capital structure can raise both the cost of debt and the cost of equity capital.

In general, increasing the use of debt increases the expected rate of return, but more debt also means that the firm's stockholders must bear more risk. The cost of equity capital must be higher now than before.

The higher the percentage of debt, the riskier the debt, hence the higher the interest rate lenders will charge.

LOS 1.F.j: describe how changes in the use of debt can cause changes in the company's earnings per share and in the stock price.

See basic questions please.

LOS 1.F.k: distinguish between the value of a company and the value of the company's common stock

The value of a company is the total value of its assets, including those financed by debt and equity. The value of a company's common stock = total number of outstanding shares x price per share.

Common stockholders care about:

- Maximizing the value of common stock, not the value of the entire firm.
- Maximizing the per-share value of the common stock, not the value of the entire common equity.

Suppose you own 100 shares of XYZ Inc., which has 1000 shares. Now XYZ issues another 1000 shares at the current stock price of$l, and you buy another 100 shares. The value of XYZ's entire equity has doubled from $1000 to $2000, and the value of your shares is now $200. Are you better off?

LOS 1.F.I: explain the effect of taxes and bankruptcy costs on the cost of capital, the optimal capital structure, and the Modigliani and Miller (MM) capital structure irrelevance proposition.

Modigliani and Miller (MM) proved, under a very restrictive set of assumptions, that how a firm finances its operations has no effect on the value of the entire firm and the share value of its stock.

- A firm's value is determined by its assets, not its capital structure.
- Capital structure does not affect the share value of the stock.

Therefore, there is no optimal capital structure! WACC equals the required rate of return of the firm's assets (ROA), which is determined by the firm's investment decisions, not capital structure.

These assumptions include:

1. no brokerage costs.
2. no taxes.
3. no bankruptcy costs.'
4. investors can borrow at the same rate as corporations.
5. all investors have the same information as management about the firm's future investment opportunities. This is called **symmetric information.**
6. EBIT is not affected by the use of debt.

Under these assumptions, capital structure irrelevance theory is all about slicing a pie: the size of the pie represents the value of a firm. It is determined by the size of the pie pan, not how it is sliced. With a given pie pan, the size of the pie will be always the same no matter how you slice it. Similarly, the value of a firm depends on the firm's assets, not its capital structure. With a given asset base, the value of the firm and the share value of the stock remain the same no matter how the firm finances its investments. Capital structure only affects the distribution of the firm's value among debtholders and equity holders.

Relaxing some assumptions above:

1. The Effect of Taxes

The value of a firm is still determined by the firm's assets, which generate cash flows. By levying taxes, the government joins debtholders and shareholders to share the cash flows (and thus, the value) of the firm. Miller pointed out that:

- The deductibility of interest expense favors the use of debt financing for companies. Since this tax shelter accrues to shareholders, using debt will increase the value of the entire equity. The more the firm borrows, the greater the tax shelter, and thus the higher the share value of the stock. Therefore, if other MM assumptions hold, firms will maximize debt in their capital structures: the optimal capital structure in a tax world will be infinitely close to 100% debt!

- As debt-equity ratio (thus the financial risk) rises, so does the cost of equity. However, the weight of equity declines as the firm uses more debt. The reduction in the cost of debt can more than offset the effect of rising cost of equity. Therefore the cost of capital (WACC) declines as the firm uses more debt.

Based on the above analysis, the optimal capital structure should be as close to 100% debt as possible. But, this is based on "no bankruptcy costs" and "symmetric information"

assumptions.

2. The Effect of Bankruptcy Costs

Bankruptcy costs have two components:

- the probability of their occurrence;
- the costs they would produce given that financial distress has arisen.

As a firm continues to add more debt, bankruptcy costs start to rise slowly at first and then more rapidly, increasing the effective cost of debt and thus the WACC. Therefore, the WACC will first fall, then bottom out and finally start to rise. The conclusion is: in a world with taxes and bankruptcy costs, there is an optimal capital structure where the WACC is minimized and the share value of the stock is maximized.

The threat of bankruptcy and the bankruptcy costs discourage firms from pushing their use of debt to excessive levels. Firms whose earnings are more volatile, all else equal, face a greater chance of bankruptcy and should use less debt than more stable firms.

LOS 1.F.m: compare the MM capital structure irrelevance proposition with the trade-off theory of leverage.

The trade-off theory recognizes the fact that:

- Debt is useful because interest is deductible: debt provides tax shelter benefits. The tax shelter will be divided by all remaining shareholders.
- Debt brings with it costs associated with actual or potential bankruptcy. Shareholders have to share the bankruptcy costs.

MM assumes no taxes and no bankruptcy costs, while trade-off assumes both. Under MM, the capital structure is irrelevant: capital structure has no impact on firm value or share value. Under trade-off, share value is maximized at the debt level where marginal tax-shelter benefits equal the marginal bankruptcy costs. However, the firm value remains the same. Put it in another way, the pie is still the same size, but each share of the stock gets a bigger slice because of the tax shelter.

Thus, the optimal capital structure strikes a balance between the tax benefits of debt and the costs associated with bankruptcy.

However, many large, successful firms such as Intel and Microsoft use far less debt than the theory suggests.

LOS 1.F.n: describe how a company signals its prospects through its financing choices.

One of MM's assumptions is that investors and managers have the same information about the firm's prospects. This is called **symmetric information.** In reality, managers often have better information than outside investors. This is called **asymmetric information.**

An alternative (or complementary) theory of capital structure relates to the signals given to investors by a firm's decision to use debt versus stock to raise new capital.

- Managers often have better information than outside investors, and this has an important effect on the optimal capital structure.
- One would expect a firm with very favorable prospects to try to avoid selling stock and, rather, to raise any required new capital by other means, including using debt beyond the normal target capital structure. Why? Assume that managers act in the best interest of shareholders.

    - If the firm sells new stock, then as the firm expands successfully, the stock price will rise and the new stockholders will make a fortune.
    - Had the company not sold more stocks, the current shareholders would have avoided sharing the success with new shareholders.
    - So there is a motivation on the firm's part to avoid selling new stocks when it has exceptional prospects. On the other hand, a firm with unfavorable prospects would want to sell stock which would mean bringing new investors to share the losses.

A stock issue sets off a negative **signal** (the firm's prospects as seen by its management are not bright), while using debt is a positive, or at least a neutral, signal.

- As a result, companies try to avoid having to issue stock by maintaining a **reserve borrowing capacity,** and this means using less debt in "normal" times than the MM trade-off theory would suggest. Why? If you don't have reserve borrowing capacity, and you have to issue new stocks for good projects, your stock price will be penalized: investors cannot see your good project (asymmetric information), and all they see is your negative signal — bad companies sell stocks.

LOS 1.F.o: calculate degree of operating leverage, degree of financial leverage, and degree of total leverage.

$$\text{Degree of operating leverage (DOL)} = \frac{Q(P - V)}{Q(P - V)-F} = \frac{S - VC}{S-VC - F}$$

Where:

Q = the initial units of output
P = the average sales price per unit of output
V = the variable cost per unit
F = fixed operating cost
S = initial sales in dollars
VC = total variable costs.

DOL measures the impact of a change in sales on EBIT. It reaches the highest point near the breakeven point.

$$\text{Degree of financil leverage (DFL)} = \frac{\text{Percentage Change in EPS}}{\text{Percentage Change in EBIT}} = \frac{\text{EBIT}}{\text{EBIT - 1}}$$

It shows how a given percentage change in EBIT will affect EPS. Operating leverage **(first-stage leverage)** affects EBIT, while financial leverage **(second-stage leverage)** affects earnings after interests and taxes, which are the earnings available to shareholders. Financial leverage further magnifies the operating leverage's impact on earnings per share (EPS) due to changes in sales.

$$\text{Degree of total leverage (DTL)} = \text{DOL} \times \text{DFL} = \frac{Q(P - V)}{Q(P - V) - F - I} = \frac{S - VC}{S - VC - F - I}$$

If both DOL and DFL are high, a small change in sales leads wide fluctuations in EPS. DTL combines DOL and DFL, and measures the impact of a given percentage change in sales on EPS.

DIVIDEND POLICY

LOS 1.G.a: describe the dividend irrelevance theory, the 'bird-in-the-hand' theory, and the tax-preference theory.

A successful firm must decide if net income should be reinvested in the firm or distributed to shareholders. **Dividend policy** involves three issues:

- What fraction of earnings should be distributed, on average, over time?
- Should the distribution be in the form of cash dividends or stock repurchases?
- Should the firm maintain a steady, stable dividend growth rate?

A firm's objective is to maximize shareholders' value. Therefore, a firm's target payout ratio (the percentage of net income paid out as dividends) should be based on investors' preference for dividends vs. capital gains. Think about the constant growth valuation model: $P_0 = D_1/(k - g)$. Any change in payout policy has two opposing effects:

- If the firm increases the payout ratio, D_1 will rise. This should increase the stock price if everything else remains the same.
- However, less money will be available for reinvestment, causing expected growth rate g to decline. This will lower the stock price.

Therefore, the **optimal dividend policy** should strike a balance between current dividends and future growth so as to maximize the firm's stock price.

The **dividend irrelevance theory** holds that a firm's dividend policy has no effect on either the value of its stock or its cost of capital. MM argued that the firm's value is determined by its basic earning power and its business risk. The value of the firm depends only on the income produced by its assets, not on how this income is split between dividends and retained earnings. If investors could buy and sell shares and thus create their own dividend policy without incurring *(* costs, then the firm's dividend policy would truly be irrelevant.

- If an investor wants higher dividends, he can simply get cash by selling an appropriate fraction of his shares.
- If an investor wants lower dividends, he can use part of the cash dividends he receives to buy more shares.
- Thus, investors can create their own dividend policy, regardless of the firm's dividend policy.
- If investors can buy/sell shares without costs, they do not need dividends to convert shares to cash.
- Therefore, they will not pay higher prices for firms with higher dividend payouts. Therefore, dividend policy is irrelevant.

However, since taxes and brokerage costs exists and dividend policy may well be relevant.

The **bird-in-the-hand theory** holds that the firm's value will be maximized by a high dividend payout ratio, because investors regard cash dividends (D_1/P_0) as being less risky rather than potential capital gains (g): $k_s = D_1/P_0 + g$. Therefore, investors prefer dividends to capital gains, and pay higher prices for firms with higher dividend payouts. Hence, the required rate of return on equity (kg) decreases as dividend payout increase.

The **tax preference theory** states that investors prefer to have companies retain earnings rather than pay them out as dividends.

- Dividends are taxed more heavily than capital gains.
- Capital gains taxes are not paid until the stock is sold, and have a lower effective tax rate due to time value effects.
- If a stock is held by someone till death, no capital gains tax is due when the beneficiary receives the stock.

However, some investors are subject to low or no taxes, and thus may prefer dividends to capital gains.

Empirical tests of the three theories have been inconclusive. Therefore, academicians cannot tell corporate managers how a given change in dividend policy will affect stock prices and capital costs.

Both evidence and logic suggest that investors prefer firms which follow a stable, predictable dividend policy (regardless of the payout level). The **"stable dividend policy"** generally means increasing the dividend at a reasonably steady rate.

LOS 1.G.b: explain the dividend irrelevance theory in the context of the determinants of the value of the company.

Refer to LOS 1.G.a please.

LOS 1.G.c: discuss the principal conclusion/or dividend policy of the dividend irrelevance theory.

Refer to LOS 1.G.a please.

LOS 1.G.d: describe how any shareholder can construct his or her own dividend policy.

Any shareholder can construct his or her own dividend policy. If a firm does not pay dividends, a shareholder who wants a 5 percent dividend can "create" it by selling 5 percent of his or her stock. Conversely, if a company pays a higher dividend than an investor desires, the investor can use the unwanted dividends to buy additional shares of the company's stock. Note that taxes (taxes on dividend income) and brokerage costs will be incurred and dividend policy may well be relevant.

LOS 1.G.e: calculate, assuming a constant return on equity, a company's dividend growth rate, given the company's dividend payout rate.

Use the formula: g = (1 - Payout) (ROE).

LOS 1.G.f: describe how managers signal their company's earnings forecast through changes in dividend policy.

It has been observed that an increase in the dividend is often accompanied by an increase in the price of a stock, while a dividend cut generally leads to a stock price decline. This could indicate that investors, in the aggregate, prefer dividends to capital gains. However, MM argue dividend policy should take account of the **information content of dividends (signaling).** This relates to the fact that investors regard an unexpected dividend change as a signal of management's forecast of future earnings.

- Managers have better information about a firm's future prospects than outside investors.
- Investors may regard dividend changes as signals of management's earnings forecast — only good firms can afford high dividends.
  - A higher-than-expected dividend increase signals a firm's good prospects and its managers' confidence in future cash flows.
  - Conversely, a dividend reduction or smaller-than-expected increase is a signal that managers is forecasting poor earnings in the future.
- Thus, stock prices rise when firms announce dividend increases, and fall when firms announce dividend cuts. This simply indicates that investors believe there is an important information content in dividend announcements.

Empirical studies of this subject have had mixed results. Still, signaling effects should definitely be considered when a firm is contemplating a change in dividend policy.

LOS 1.Gg: describe the clientele effect.

Different groups of investors (called clienteles) prefer different dividend policies: Investors who want current investment income should own shares in high dividend payout firms, while investors with no need for current investment income should own shares in low dividend payout ratio. The **clientele effect** suggests that a firm will attract investors who like the firm's dividend payout policy. After every investor has made the choice, the market is in equilibrium, and each firm serves its own clientele.

The implication is: dividend policy should be stable. Management should avoid changing its dividend policy frequently since a change might cause current shareholders to sell their stock, forcing the stock price down: current clientele may pay brokerage costs and capital gains taxes to sell their stock, and there may not be many investors (new clientele) who like the new dividend policy.

Evidence from several studies suggests that there is in fact a clientele effect, but MM and others have argued that one dividend policy is not necessarily better than any other.

LOS 1.G.h: describe the residual dividend model and discuss the model's possible advantages or disadvantages to the company.

Dividend stability is important. It has two components: 1. how stable is the dividend growth rate? 2. how stable is the amount of dividend per year? As a firm's profits and cash flows typically vary over time, theoretically a firm should vary its dividends accordingly. However, fluctuating dividend policy can force stock price down in the short-run. Therefore, if a firm stabilizes its dividends as much as possible, its cost of equity will be minimized and its stock price will be maximized.

Since retained earnings are cheaper than new common stocks, a firm should retain earnings to meet equity requirements. On the other hand, since a firm's cash flows belong to its shareholders, it should pay the excess cash to shareholders if there are not enough investments that earn its hurdle rate.

For a given firm, the optimal capital ratio is a function of four factors:

- Investors' preferences for dividends versus capital gains.
- The firm's investment opportunities.
- Its target capital structure.
- The availability and cost of external capital.

Most firms use the **residual dividend model** to set the long-run target payout ratio at a level which will permit the firm to satisfy its equity requirements with retained earnings. A firm follows four steps in this model:

- It determines the optimal capital budget.
- It determines the amount of equity needed to finance that budget, given its target capital structure.
- It uses retained earnings to meet equity requirements to the extent possible.
- It pays dividends only if more earnings are available than are needed to support the optimal capital budget.

Pros: by following the residual dividend policy, the firm can meet its target capital structure at the optimal cost of capital, thus maximizing the shareholders' value.

Cons: since investment opportunities and earnings surely vary over time, a firm that strictly follows the residual dividend policy will have unstable dividends.

Firms should use the residual policy to help set their *long-run* target payout ratios, but not as a guide to the payout in any one year.

Some companies set a very low "regular" dividend and then supplement it with an "extra" dividend when times are good. This is called **low-regular-dividend-plus-extras policy.** Investors recognize that the extras may not be maintained in the future, so they don't interpret them as a signal.

LOS 1.G.i: describe dividend payment procedures, including the declaration, holder-of-record, ex-dividend, and payment dates.

The dividend payment procedure is as follows:

- **declaration date:** the date on which a firm's directors issue a statement declaring a dividend.

- **ex-dividend date:** the date on which the right to the current dividend no longer accompanies a stock; it is usually two working days prior to the holder-of-record date. That is, if you buy a stock before this day you can get the dividend, and if you buy a stock after this day the prior owner gets the dividend. For stock transactions, the normal settlement period is three working days.

- **holder-of-record date:** if the company lists the stockholder as an owner on this date, then the stockholder receives the dividend. On this day the company closes its stock transfer book.

- **payment date:** the date on which a firm actually mails dividend checks.

We summarize dividend policy decision here:

- Dividend policy is not an independent decision — it's made jointly with capital structure and capital budgeting decisions.
- Due to asymmetric information, firms should strive to avoid issuing new common stocks or cutting dividends.
- Thus, appropriate dividend policy typically includes:
  - Setting dollar dividend and the long-term target payout ratio low enough so that there is a remote chance of dividend cut.
  - Varying actual capital structure from year to year within the range of optimal capital structure to maintain stable dollar dividend.
  - Using the residual dividend model in the long-term framework.
  - Providing a steady or increasing stream of dividends in the long run.

LOS 1.G.j: describe stock dividends and stock splits and explain their likely pricing effects.

A stock split divides each outstanding share into several shares. In a 2-for-l stock split, the holder of I share will get additional I share. It increases the number of shares outstanding and is generally used after a sharp price run-up to produce a large price reduction. Normally, splits reduce the price per share in proportion to the increase in shares because splits merely "divide the pie into smaller slices." However, firms generally split their stocks only if (1) the price is quite high and (2) management thinks the future is bright. Therefore, stock splits are often taken as positive signal and thus boost stock prices.

A stock dividend is a dividend paid in additional shares of stock rather than in cash. Stock dividends are expressed in percentage. For example, on a 100% stock dividend, the holder of 1 share will get additional 1 share. Stock dividends used on a regular basis will keep the stock price more or less constrained. However, small stock dividends create bookkeeping problems and unnecessary expenses.

Both are used to keep stock prices within an "optimal" trading range. Stock dividends/splits are just more pieces of paper: they both divide the pie into smaller slices without affecting the fundamental position of the current stockholders. As a result, each shareholder will own more shares, but his/her slice of the firm's "pie" remains the same and each share is worth less.

The price of a stock typically rises shortly after the announcement of a stock dividend/split. However, the price increases is the result of positive signals of favorable prospects for earnings and dividends, not a desire for stock dividends /splits per se. If without good earnings /dividends news in the next few months, stock price will fall back to the earlier level.

LOS 1.G.k: discuss the advantages and disadvantages of stock repurchases and calculate the price effect of a stock repurchase.

Under a **stock repurchase plan,** a firm buys back some of its outstanding stock, thereby decreasing the number of shares, which should increase both EPS and the stock price. It is an alternative way of paying cash dividends.

There are two primary types of stock repurchase:

- Paving dividends: rather ran paying cash dividends, a firm can distribute cash to shareholders by repurchasing stocks. As a result, capital gains have been substituted for cash dividends.
- Increase debt ratio: if a firm's capital structure is too heavily weighted with equity, it can sell debt and use the proceeds to buy back stocks, thus increase debt ratio.

Repurchases are useful for making major changes in capital structure, as well as for distributing temporary excess cash.

To calculate the price effect, you need to make sure that P/E ratio remains constant. For example, XYZ company is expected to have $10 million earnings. It plans to distribute $6.3 million to shareholders through dividends or stock repurchases. The current stock price is $20. The company has 10 million shares outstanding. The stock repurchase can be completed at $21. The effects of the repurchase on the EPS and stock price are:

- Current EPS: $ 10 million /10 million = $ 1.
- P/E ratio: $20/$1 =20.
- Shares to be repurchased: $6.3 million / $21 = 0.3 million.
- EPS after stock repurchase $10 million/(10 million - 0.3 million) = $1.03.
- Stock price after repurchase = (P/E) x EPS = 20 x 1.03 = $20.6.

The advantages of stock repurchases are:

- Repurchase announcements are viewed as positive signals by investors because the repurchase is often motivated by management's belief that the firm's shares are undervalued.

- Since the stockholders have a choice to sell or not, a repurchase permits both income- and growth-oriented stockholders to get what they want.

- It can remove a large block of stock that is overhanging the market and keeping the price of per share down.
- If the excess cash is thought to be only temporary, management may prefer to make the distribution in the form of a share repurchase rather than to declare an increased cash dividend which cannot be maintained.

- Companies can use the residual model to set a target cash distribution level, then divide the distribution into a dividend component and a repurchase component. The company has more flexibility in adjusting the total distribution than it would if the entire distribution were in the form of cash dividends.

- Repurchases can be used to produce large-scale changes in capital structures.

The disadvantages are:

- Stockholders may not be indifferent between dividends and capital gains, and the price of the stock might benefit more from cash dividends than from repurchases.

- The selling stockholders may not be fully aware of all the implications of a repurchase.

- The corporation may pay too high a price for the repurchased stock, to the disadvantage of remaining stockholders.

DISCOUNTED CASH FLOW APPLICATIONS

LOS 2.a: calculate the net present value and internal rate of return of a capital investment project.

The net present value (NPV) of an investment is the present value of its cash inflows minus the present value of its cash outflows. The internal rate of return (IRR) is that discount rate which makes net present value equal to 0.

LOS 2.b: explain the decision rule for making investment decisions under the net present value and internal rate of return methods.

A company should choose those capital investment processes that maximize shareholder wealth.

According to the NPV Rule, the company should accept those projects whose NPV is positive and reject those whose NPV is negative. A positive NPV suggests that cash inflows outweigh cash outflows on a present value basis. That is, the positive cash flows are sufficient to repay the initial investment along with the capital costs (opportunity cost) associated with the project. If the company must choose between two, mutually-exclusive projects, the one with the higher NPV should be chosen.

According to the IRR Rule, the company should accept those projects whose IRR is greater than the discount rate used (WACC) and reject those whose IRR is less than the discount rate. An IRR greater than the WACC suggests that the project more than repays the capital costs (opportunity costs) incurred.

LOS 2.c: discuss problems associated with the internal rate of return method.

There are three problems associated with IRR as a decision rule. The problems are: reinvestment problem, scale problem, and timing problem.

Reinvestment Problem

The IRR is intended to provide a single number that represents the rate of return generated by a capital investment. As such, it is an easy number to interpret and understand. However, calculation of the IRR assumes that all project cash flows can be reinvested to earn a rate of return exactly equal to the IRR itself. In other words, a project with an IRR of 6% assumes that all cash flows can be reinvested to earn exactly 6%. If the cash flows are invested at a rate lower than 6%, the realized return will be less than the IRR. If, however, the cash flows are invested at a rate higher than 6%, the realized return will be greater than the IRR.

Scale Problem

In most cases, NPV and IRR give the same recommendation whether to accept or reject a given capital investment project. However, when choosing between (ranking) two, mutually-exclusive projects, NPV and IRR may give conflicting recommendations. In such cases, the NPV's recommendation should take precedence.

One of the situations in which IRR is likely to contradict NPV, is that of two, mutually-exclusive projects of greatly differing scale - one that requires a relatively small investment and returns relatively small cash flows, compared to another that requires a much larger investment and returns much larger cash flows.

Timing Problem

The other situation in which IRR is likely to contradict NPV, is that of two, mutually-exclusive projects whose cash flows are timed very differently C one that receives its largest cash flows early in the project versus another that receives its largest cash flows rate in the project.

THE INVESTMENT SETTING

LOS 1.A.a: explain the concept of required rate of return and discuss the components of an investor's required rate of return.

The **required rate of return** is the minimum rate of return that you should accept from an investment to compensate you for deferring consumption. It is complicated since:

- a wide range of rates are available for alternative investments at any time.
- the rates of return on specific assets change dramatically over time.
- the difference between the rates available (the spread) on different assets changes over time.

The three components of the required rate of return are:

- The real risk free rate of interest: the time value of money during the period of investment. It is influenced by
  - o the investment opportunities in the economy (that is, the long-run real growth rate): higher real growth rate of the economy generates more investment opportunities, thus driving up the RRFR.
  - o Time preference: the more the consumers prefer current consumption, the higher the RRFR"

  the inflation premium: it is an adjustment to the real risk free rate to compensate investors for expected changes in the price indexes and money market conditions being tightened or eased due to inflationary expectations. Nominal risk free rate (NRFR) is the risk-free rate that has not been adjusted for inflation and decreasing purchase power:

  NRFR = (1 + RRFR) x (1 + Inflation Rate) - 1

  It is approximated as: NRFR = RRFR + Inflation rate. It is a poor approximation of RRFR because BRFR is influenced by the expected inflation rate and the supply and demand for funds in the economy

- the risk premium: it is what investors demand for the uncertainty associated with an investment. The fundamental view of risk is that it is caused by factors such as: business risk, financial risk, liquidity risk, exchange rate risk, and country risk.

That is:

RRR =: Time Value Of Money + Inflation Rate + Risk Premium

The time value of money is a pure return, net of all other criteria, that the investor should receive to compensate for delayed consumption. The additional amounts related to inflation and risk are determined by the "market" as appropriate compensation for additional risks inherent with the desired investment.

LOS 1.A.b: differentiate between the real risk-free rate of return and the nominal risk-free rate of return and compute both.

The real risk-free rate of interest is the price charged for the exchange between current goods and future goods by investors in the economy, assuming no inflation and no uncertainty about future flows. This price is influenced by a subjective and an objective factor. These two factors are:

- Consumer preferences for current consumption (time preference).
- The set of investment opportunities available in the economy (investment opportunities), which indicates mat a positive relationship exists between the real growth rate in the economy and RRFR.

The **inflation premium** is an adjustment to the real risk-free rate to compensate investors for expected changes in the price indexes and money market conditions being tightened or eased due to inflationary expectations. This adjustment is not a simple summation of the real risk free rate of return and inflation expectations, rather the correct adjustment is:

Nominal Risk Free Rate ^ (1 + Real Risk Free Rate)(l + Inflation Rate) - 1

The nominal risk free rate is approximated by: real risk free rate + inflation rate.

Although the variables that determine the RRFR change only gradually over the long term, NRFR is not stable in the long run or in the short run.

Candidates should realize that the nominal risk free rate is a starting point for determining a non-treasury security's required rate of return. In addition to the nominal risk free rate of return, the investor demands a premium over-and-above the NRFR. This premium provides compensation for the uncertainty associated with the payments from the investment (known as the risk premium or investment risk).

LOS 1.A.c: explain the risk premium and the associated fundamental sources of risk.

The risk premium is what investors demand for the uncertainty associated with an investment. The fundamental view of risk is that it is caused by factors such as: business risk, financial risk, liquidity risk, exchange rate risk, and country risk. These risk components are considered as a security's fundamental risk.

Under portfolio theory, the risk of an investment has two components (systematic risk and unsystematic risk). Please note that fundamental risk is not systematic risk used by Markowitz portfolio theory. An investment's systematic risk is measured by the portion of its total variance attributable to the variability of the total market portfolio. However, studies have shown that a significant relationship exists between the market measure of risk (systematic risk) and the fundamental measures of risk.

The Nominal Required Rate = (1 + Real Rate)(1 + Expected Inflation Rate)(1 + Risk Premium)

The risk premium addresses the following types of risk exposure:

- **Business risk** is the uncertainty of income flows caused by the nature of a firm's business. It is caused by the nature of the firm itself.
- **Financial risk** is the uncertainty introduced by the method by which the firm finances its investments. It is caused by how the firm financed itself.
- **Liquidity risk** is the uncertainty introduced by the secondary market for an investment. It is caused by the mechanics of the market.
- **Exchange rate risk** is the uncertainty of returns investors face when they acquire securities in currencies other than their own.
- **Country risk (political risk)** is the uncertainty of returns caused by the possibility of a major change in the political or economic environment of a country. It is caused by the firm's environment.

Therefore:

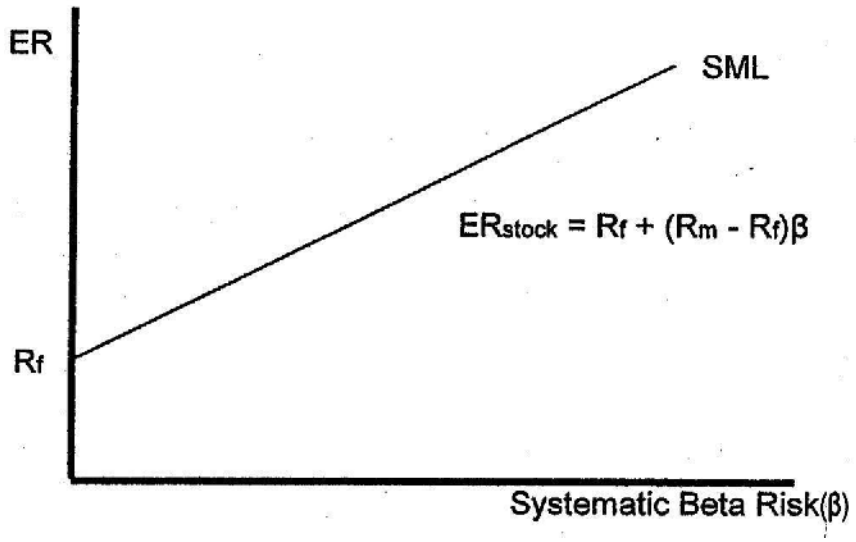
Risk premium = f(business risk, financial risk, liquidity risk, exchange risk, country risk)
risk premium = f(Systematic market risk)

LOS 1.A.d: discuss the factors that cause movements along, changes in the slope of and shj/is of the security market line.

The plotted relationship between expected return and the level of systematic risk is called the security market line (SML). It shows that investors increase their required rates of return as perceived risk increases. It reflects the risk-return combinations available for all risky assets in the capital market at a given time. The equation of the SML is:

$$ER = R_f + (R_M - R_f) \times Beta$$

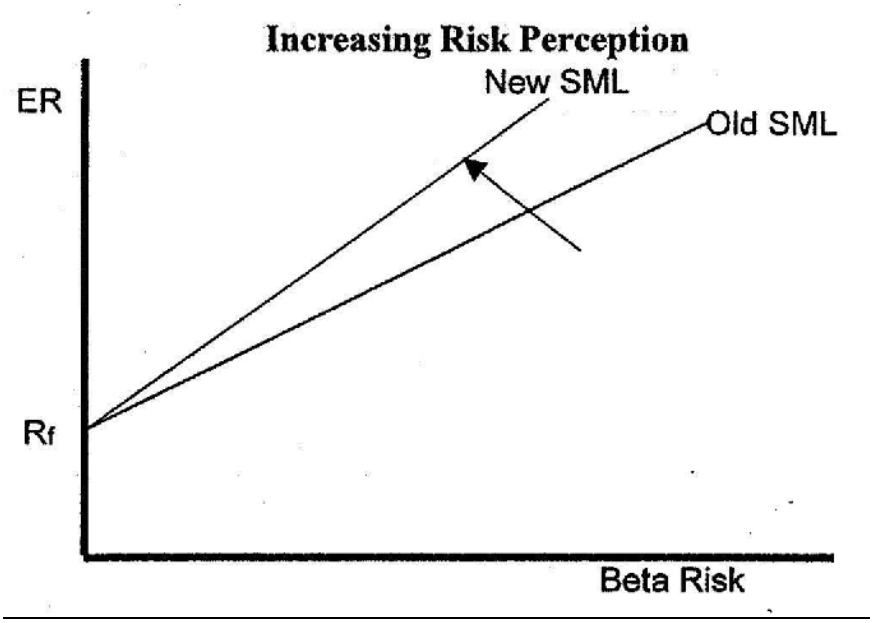
where R_f is the nominal risk free rate, RM is the market rate of return.



Whatever your view of risk, the riskier the security, the greater the expected rate of return an investor will demand to buy and hold the security.

- Movement along the SML demonstrates a change in the risk characteristics of the individual investment.
  - Any change in an asset that affects 1. its fundamental risk factors, or, 2. its market risk (its beta) will cause the asset to move along the SML.
  - The SML itself does not change, only the position of assets on the SML does (that is, this change affects only the individual investment).

- Changes in the slope of the SML demonstrate a change in the attitudes of investors toward risk. Investors can change the returns they require per unit of risk. This is a change in the market risk premium. If investors are more (less) willing to take risk, the slope of the SML will decrease (increase), and the required rate of return for all risky assets will drop_(rise). Such a change will affect all risky assets and their required rate of return, although their individual risk characteristics remain unchanged.



Why does it change? There are changes in the yield differences between assets with different levels of risks (yield spreads), and this change would imply a change in the market risk premium.

Implication: If a point on the SML is identified as the portfolio that contains all the risky assets in the market, it's possible to compute a market risk premium as RPm = E(Rm) - NRFR. This market risk premium is not constant since the slope of the SML changes over time.

- Parallel shifts in the SML demonstrate changing market conditions. For example, lower economic growth, lower inflation rate or lower capital market tightness ((a change in the real risk free rate) will shift the SML downward. It indicates that the nominal risk free rate has changed, leading to the *same* size of change in required rate of return for all assets. Again, this change affects all investments. Note that the risk characteristics of individual investments and investors' attitudes toward risk do not change.

THE ASSET ALLOCATION DECISION

LOS 1.B.a: describe the steps in the portfolio management process.

Asset allocation is the process of distributing an investor's wealth among different countries and asset classes. It is part if the portfolio management process, and is related to the investor's age, financial status, future plans, needs and attitude toward risk.

The process of managing an investment portfolio never stops. Once the "funds are initially invested according to the plan, the real work begins in monitoring and updating the status of the portfolio and the investor's needs.

- Policy statement: this step focuses on the investor's short-term and long-term needs, familiarity with capital market history, and expectations.

- Examine current .and projected financial, economic, political and social-conditions: this step focuses on the short-term and intermediate-term expected conditions to use in constructing a specific portfolio.

- Implement the plan by constructing the portfolio: meet the investor's needs at minimum risk levels.

- Feedback loop: monitor and update investor needs, environmental conditions, evaluate portfolio performance.

LOS 1.B.b: explain the need for a policy statement.

The first step of portfolio management process is to develop a **policy statement.** The statement covers the types of risks the investor is willing to assume along with the investment goals and constraints. It should focus on the investor's short-and-long-term needs, familiarity with capital market history, and investor expectations and constraints. Periodically the investor will need to review, update and change the policy statement.

A policy statement should incorporate an investor's objectives (risk and return) and constraints. It should address the following issues:

- What are the risks of an adverse financial outcome?
- What are the emotional reactions to an adverse financial outcome?
- How knowledgeable is the investor to investments and markets?
- What other capital or income sources does the investor have? How important is the portfolio to the overall financial position?
- What legal restrictions may affect the investment needs?
- What unanticipated consequences of interim fluctuations in portfolio value may affect investment policy?

Moreover the policy statement should attempt to answer the following questions:

- Does the policy statement meet the specific needs and objectives of this investor?
- Does the policy statement enable a competent stranger to manage the portfolio in compliance with the client's needs?
- Does the client understand the investment risks and the need for a disciplined approach to the investment process?
- Does the portfolio manager have the discipline and flexibility to maintain the policy during an adverse market?
- Does the policy statement, if implemented, meet the client's needs and objectives?

A policy statement is like a road map: It forces investors to understand their own needs and constraints and to articulate them within the construct of realistic goals. It not only helps investors understand the risks and costs of investing, but also guides the actions of portfolio managers.

Performance can not be judged without an objective standard. The policy statement should state the performance standards by which the portfolio's performance will be judged and specify the *specific benchmark* which represents the investor's risk preferences. The portfolio should be measured against the stated benchmark .and not the portfolio's raw overall performance.

LOS 1.B.c: explain why investment objectives should expressed in terms of risk and return.

The investor's objectives are his or her investment goals expressed in terms of both risk and returns. Why?

- The investment decision is a trade-off between risk and return, and that trade-off varies depending on the preferences and situation of each investor.

- Investment objectives expressed solely in terms of returns can lead to inappropriate investment practices, such as the use of high-risk investment strategies or account "churning", which involves moving quickly in and out of investments in an attempt to buy low and sell high. Here is another example: if achieving high investment returns is the only goal, the portfolio manager may invest funds in high-risk assets, which have a high possibility of loss. For a risk-averse investor (e.g. a retiree), such an investment strategy makes little sense.

- A careful analysis of the client's risk tolerance should precede any discussion of return objectives: it makes little sense for a person who is risk averse to invest funds in high-risk assets.

LOS 1.B.d: list the factors that may affect an investor's risk tolerance.

Risk tolerance is an investor's attitude toward risk. It is more than a function of an individual's psychological makeup:

- current insurance coverage and cash reserves.
- family situation (i.e. number of children) and age.
- current net worth and income expectations.
- And so on.

LOS 1.B.e: describe the return objectives of capital preservation, capital appreciation, current income, and total return.

The investor's objectives are his or her investment goals stated in terms of both risk and returns.

- **Risk tolerance analysis** should precede any return objectives. It is affected by an individual's psychological makeup, current insurance coverage, cash reserves, family situation, age, current net worth and income expectations, etc. Investment firms survey clients to gauge their risk tolerance.

- **Return objective** can be stated in terms of absolute or a relative percentage return, or other terms: _

    - **Capital preservation:** minimize risk of loss, used for extremely risk-averse investors.
    - **Capital appreciation:** -growth in capital, aggressive strategy for long-term investors willing and able to assume risk.
    - **Current income:** focus on income (fixed income) versus capital gains, more appropriate for older investors that may depend on income for living expenses,
    - **Total return:** focus on return through both capital appreciation and fixed income, this approach is a hybrid of returns and risk of other approaches.

LOS 1.B.f: describe the investment constraints of liquidity, time horizon, tax concerns, legal and regulatory/factors, and unique needs and preferences.

The following constraints affect the investment plan:

- **Liquidity needs:** liquidity in the investment sense is the ability to quickly convert investments into cash at a price close to their market value. Investors may need some cash to meet unexpected needs (e.g. emergencies, good investment opportunities) but don't want to sell assets at unfavorable terms. Investment plan must take this need into consideration.

- **Time horizon;** this is the time between making an investment and needing the funds. There is a relationship between an investor's time horizon, liquidity needs and the ability to handle risk. Investors with long investment horizons generally require less liquidity and can tolerate greater portfolio risk, and losses are harder to overcome during a short time frame for investors with short investment horizons.

Tax concerns: Investment planning is complicated by the tax code. For example, income from dividends, interests and rents is taxable at the investor's marginal tax rate. Capital gains are only taxable after the asset has been sold for a price higher than its cost or basis, but unrealized capital gains are not taxable at all (the tax liability can deferred indefinitely). Sometimes we have to make a trade-off between taxes and diversification needs. Other factors, such as tax deductible IRA contributions and 401(k) plans also complicate this issue.

- **Legal and regulatory factors:** individual investors are generally not affected by regulations, but professional and institutional investors need to be aware of regulations.

- **Unique needs and preferences:** there may be a number of unusual considerations that affects the investor's risk-return profile. For example, investment requirements may depend on goal spending. Thus, individuals will require adequate funds to be set aside to meet known spending demands. Moreover, many investors may want to exclude certain investments from the portfolio based on personal preferences. For example, investors may specify that no investments in their portfolio be affiliated with the manufacture or distribution of alcohol, pornography, tobacco or environmental harmful products.

AN INTRODUCTION TO PORTFOLIO MANAGEMENT

LOS 1.C.a: describe risk aversion and discuss its implications/or the investment process.

Every investor wants to maximize the investment returns for a given level of risk. Risk refers to the uncertainty of future outcomes. Investors are risk averse.

Risk aversion: it relates to the notion that investors as a rule would rather avoid risk. Given a choice of two investments with equal returns, risk averse investors will select the investment with lower risk. Consequently, investors will demand a risk premium for taking on additional levels of risk. The more risk averse the investor, the more of a premium he/she will demand prior to taking on the level of risk.

Investors that do not demand a premium for risk are said to be **risk neutral** (i.e. those that will be willing to place both a large and small bet on the flip of a coin and be indifferent) and those investors that enjoy risk are said to be **risk seekers** (i.e. people that buy lottery tickets despite the knowledge that for every $1 spent, on average they will get less than $.1 back.

Example: Three investors Sam, Mike and Mary are considering two investments A & B. Investment A is the less risky of the two requiring an outlay of $1,000 with an expected rate of return at 10%. Investment B also requires an investment of $1,000 and has an expected return of 10% but appears to have considerably more variability in potential returns compared to A. Sam requires a return of 14%, Mike requires 10% but Mary seeks only 8% expected return.

Question: Given the information above, which of the three investors is considered risk-averse?

Solution: Only Sam would be considered risk-averse. He is the only investor that demands a premium of return given the higher risk level. Mike would be considered risk-neutral since he demands no premium in return (despite the higher risk) and Mary would be considered a risk-seeker since she, in fact, will accept less return for a riskier situation.

Risk aversion implies that there is a positive relationship between expected returns (ER) and expected risk (Es), and the risk return line (CML and SML) is upward sweeping.

Evidence that suggests that individuals are generally risk averse:

- Purchase of insurance: most investors purchase various types of insurance (e.g. life insurance, car insurance, etc). By buying insurance, an investor avoids the uncertainty of a potential large future cost by paying the current known cost of the insurance policy.

- Difference in the promised yield for different grades of bonds: the promised yield of a bond is its required rate of return. Different grades of bonds have different degrees of credit risk. The promised yield increases as you go from the lowest-risk grade (e.g. AAA) to a grade with higher risk (e.g. AA). That is, as the credit risk of a bond increases, investors-will require a higher rate of return.

LOS 1.C.b: list the assumptions about individuals' investment behavior of the Markowitz Portfolio Theory.

Harry Markowitz introduced the basic concept of portfolio theory. He argued that the value of an additional security to a portfolio ought to be measured with its relationship to all of the other securities in the portfolio. Thus, he calculated the movement of each security to all of the others. This was a very challenging assignment back in the late 1950's, and began the existence of modem portfolio theory. He showed that the variance of the rate of return was a meaningful measure of portfolio risk under a set of assumptions and derived a formula for computing the variance of a portfolio.

Markowitz Portfolio Theory is based on several very important assumptions. Under these assumptions a portfolio is considered to be efficient if no other portfolio offers a higher expected return with the same or lower risk.

- Investors view the mean of the distribution of potential outcomes as the expected return of an investment.
- Investors view the variability of potential outcomes about the mean as the risk of an investment. Variability is measured by variance or standard deviation.
- Investors all have the same holding period. This eliminates time horizon risk.
- Investors base all their decisions on expected return and risk. By connecting all the points of equal utility, a series of curves called the investor's indifference or utility map is created.
- For a given risk level, investors prefer higher returns to lower returns, or for a given return level, investors prefer less risk to more risk.

Risk is measured by the variability of the expected returns. The following inputs are included in the Markowitz portfolio optimization process: variance, standard deviation of returns, range of returns and semi-variance.

- **Standard deviation** measures the dispersion of returns around the expected value **(variance** is the standard deviation squared), with larger dispersion associated with higher risk.

The **range of returns** measures the spread of possible outcomes. It is assumed presumes that a larger range generates greater uncertainty. However, range is very sensitive to extreme observations (i.e. outliners).

- The **semi-variance** approach addresses the likelihood of falling below a specified minimum rate of return. This measure only considers deviations below the mean.

Variance (or standard deviation) is the most commonly used measure of risk.

LOS 1.C.c: describe and compute expected return for an individual investment and for a portfolio.

See Study Session 2, Section B, LOS k for details.

LOS 1.C.d: describe and compute the variance and standard deviation for an individual investment.

See Study Session 2, Section B, LOS k for details.

LOS 1.C.e: describe and compute the covariance of rates of return and show how it is related to the correlation coefficient.

Covariance of returns measures the degree to which the rates of return on two securities move together over time.

- A *positive* covariance indicates that the rates of return on the two securities tend to move in the *same* direction.
- A *negative* covariance indicates that the rates of return on the two securities tend to move in the *opposite* direction.
- A covariance *of zero* indicates that there is no relationship between the rates of return on the two securities.

The magnitude of the covariance depends on the magnitude of the individual stock's standard deviations and the relationship between their co-movements. The **covariance** is an absolute measure of movement and is measured in return units squared. As the magnitude of the covariance is affected by the variability of return of each individual security, covariance cannot be used to compare across different pairs of securities.

The measure can be standardized by dividing the covariance by the standard deviations of the two securities being tested.

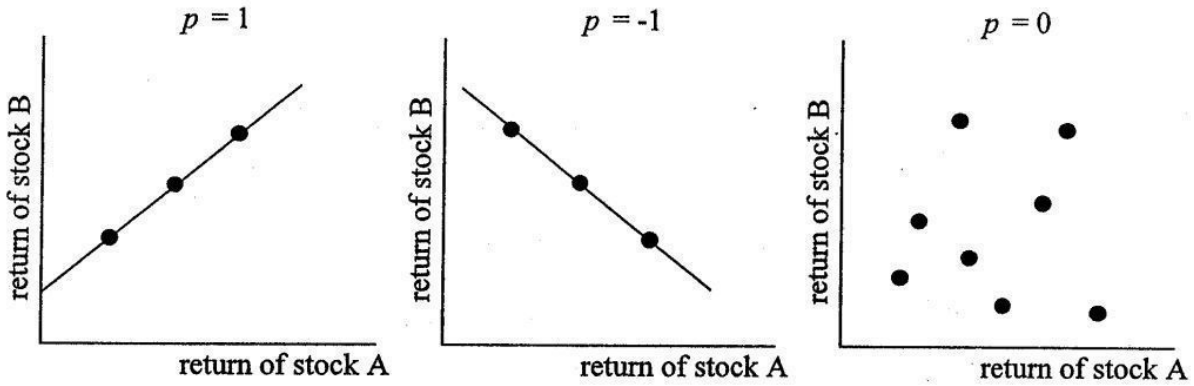
$$\rho_{(1,2)} = \frac{cov_{(1,2)}}{s_1 s_2}$$

rearranging the terms gives: $cov_{(1,2)} = \rho_{(1,2)} s_1 s_2$

The term $\rho_{(1,2)}$ is called the correlation coefficient between the returns of securities 1 and 2. The correlation coefficient has no units. It is a pure measure of the co-movement of the two stack's returns. It varies in the range of-1 to 1.

How should you interpret the correlation coefficient?

- A correlation coefficient of +1 means that returns always move together in the same direction. They are perfectly positively correlated.
- A correlation coefficient of -1 means that returns always move in the completely opposite direction. They are perfectly negatively correlated.
- A correlation coefficient of zero means that there is no relationship between the two stock's returns. They are uncorrelated.



Example:

Two risky assets, A and B, have the following scenarios of returns:

Probability	A	B
35%	10%	7%
35%	-4%	4%
30%	9%	-6%

What is the co variance between the returns of A and B?

The expected return is a probability weighted average of the returns. Using this definition, the expected return of A = 0.35 x 10% + 0.35 x (-4%) + 0.3 x (9%) = 4.8%. The expected return of B = 0.35 x 7% + 0.35 x (4%) + 0.3 x (-6%) = 2.05%.

The covariance between the returns equals the expected value of the product of the deviations of the individual returns from their means. Remember this! Hence, to calculate this, we construct the following table:

Probability	R(A)-E(A)	R(B) - E(B)
35%	10%-(4.8)% =5.2%	7% - 2.05% = 4.95%
35%	-4% - (4.8)% = -8.8%	4%-2.05%-1.95%
- 30%	-9% - (4,8)% = 4.2%	-6% - 2.05% = -8.05%

The expected value of the product of the deviations equals 0.35 x 5.2% x 4.95% + 0.35 x (-8.8%) x 1.95% + 0.3 x 4.2% x (-8.05%) = -7.14%.

LOS 1.C.f: list the components of the portfolio standard deviation formula and explain which is the most important factor to consider when adding an investment to a portfolio.

Standard deviation of a portfolio: it is a function of 1. the weighted average of the individual variances, plus 2. the weighted covariances between all the assets in the portfolio.

When an asset is added to a large portfolio with many assets, the new asset affects the portfolio's standard deviation in two ways:

- The asset's own variance, and
- Covariance between this asset and every other asset in the portfolio. The effect of these numerous covariances will out-weight the effect of the asset's own variance. The more assets in the portfolio, the more this is true.

Therefore, the important factor to consider when adding an investment to a portfolio is not the investment's own variance, but its average covariance with all the other investments in the portfolio.

Adding securities to a portfolio that are not perfectly, positively correlated with each other will reduce the standard deviation of the portfolio. The lower (higher) the correlations between returns of assets in the portfolio, the lower (higher) the portfolio risk, and thus the higher (lower) the diversification benefits. The ultimate benefit of diversification occurs when the correlation between two assets is -1.00.

For example, imagine a portfolio of investments, one of which moves with sun-related activities (i.e. sunglasses) and the other moving in the direction of rain-related activities (i.e. umbrellas). The combined portfolio of sunglasses and umbrellas ought to negate weather-related issues (theoretically speaking) as the two assets move in opposite directions.
The maximum amount of risk reduction is predetermined by the correlation coefficient. Thus, the correlation coefficient is the engine that drives the whole theory of portfolio diversification.

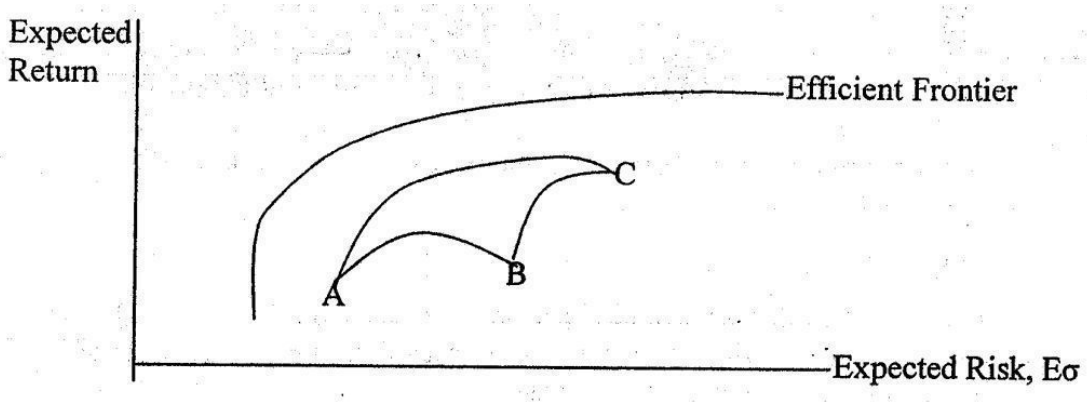
LOS 1.C.g. describe the efficient frontier and explain its implications for an investor willing to assume more risk.

Markowitz constructed what is called the **efficient frontier**. First, he combined all the stocks in the universe together into a "two stock" portfolios. He observed that the risk-return line of each of the two stock combinations bent backwards toward the return (Y) axis. He then built a "two portfolio" portfolios out of all the two-stock-portfolios. The risk-return line of these combination portfolios bent even further back toward the return (Y) axis. He kept combining stocks and portfolios composed of different weightings until he discovered at some point you get no more benefits from diversification. He called this final or "optimal" bent line the efficient frontier.

Efficient frontier: the efficient frontier represents the set of portfolios that

- has the maximum rate of return for every given level of risk, or
- the minimum risk for every level of return.

Any point beneath the efficient frontier is inferior to points above. Moreover, any points along the efficient frontier, by definition, are superior to all other points for that combined risk-return tradeoff.



The portfolios on the efficient frontier have different return and risk measures. As we move upward along the efficient frontier, both risk and the expected rate of return of the portfolio increase, and no one can dominate any other on the efficient frontier. An investor will target a portfolio on the efficient frontier on the basis of his attitude toward risk and his utility curves.

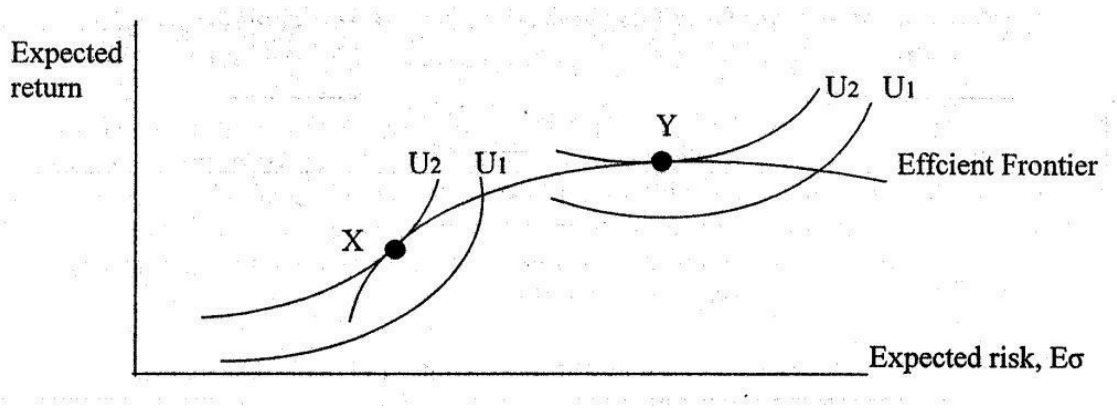
LOS 1.C.h: define optimal portfolio and show how each investor may have a different optimal portfolio.

How do you use the knowledge discovered by Markowitz. You combine the efficient frontier with the investor's indifference or utility map. An investor's utility curves specify his or her preferences when making risk-return trade-offs.

- The investments along each curve are equally attractive to the investor.
- The slope of the utility curves represents how risk-averse the investor is. Steep indifference curves indicate a conservative investor while flat indifference curves indicate a less risk-averse investor.

The optimal portfolio for each investor is the highest indifference curve that is tangent to the efficient frontier. The optimal portfolio is the portfolio that gives the investor the greatest possible utility.

- Two investors will select the same portfolio from the efficient set only if their utility curves are identical.
- Utility curves to the right represent less risk-averse investors; utility curves to the left represent more risk-averse investors.



AN INTRODUCTION TO ASSET PRICING MODELS

LOS 1.D.a: list the assumptions of the capital market theory.

Because capital market theory builds on the Markowitz portfolio model, it requires the same assumptions, along with some additional ones:

- All investors are Markowitz efficient investors who want to target points on the efficient frontier where their utility maps are tangent to the line. The exact location on the efficient frontier and, therefore, the specific portfolio selected, will depend on the individual investor's risk-return utility function.
- Investors can borrow and lend any amount of money at the risk-free rate of return.
- All investors have homogeneous expectations: that is, they estimate identical probability distributions for future rates of return.
- All investors have the same one-period time horizon (e.g. 1 year).
- All investors are infinitely divisible, which means that it is possible to buy or sell fractional shares of any asset or portfolio.
- There are no taxes or transaction costs involved in buying or selling assets.
- There is no inflation or any change in interest rates, or inflation is fully anticipated.
- All investments are properly priced on the basis of their risk levels. That is, capital markets are in equilibrium.

LOS 1.D.b: explain what happens to the expected return, the standard deviation of returns, and possible risk-return combinations when a risk-free asset is combined with a portfolio of risky assets.

The risk free asset is important to the capital asset pricing model. It is assumed to have an expected return commensurate with an asset that has no standard deviation (i.e. zero variance) around the expected return. This assumption allows us to derive a generalized theory of capital asset pricing under conditions of uncertainty from the Markowitz portfolio theory. The standard deviation of a portfolio that combines the risk-free asset with risky assets is the linear proportion of the standard deviation of the risky asset portfolio.

First, pick a risky stock or risky portfolio A. Hint: start with one that is already on the Markowitz efficient frontier since you know that these portfolios dominate everything below them in terms of return offered for risk taken.

Now combine the risk-free asset with portfolio A. Remember, the combination of the risk-free asset and portfolio A will be a straight line. Observe that any combination on the line R_fA dominates the portfolios below it. But any combination on the line R_fB will dominate R_fA. Why? Because you always get more return for a given amount of risk.

You can keep getting better portfolios by moving up the efficient frontier...

At point M you reach the best combination. The R_fM line dominates everything else in terms of return offered for the level of risk taken.

LOS 1.D.c: identify the market portfolio and describe the role of the market portfolio in the formation of the capital market line (CML)

The introduction of a risk-free asset changes the Markowitz efficient frontier into a straight line. This straight efficient frontier line is called the Capital Market-Line (CML). Since the line is straight, the math implies that any two assets falling on this line will be perfectly positively correlated with each other. Note: When $P_{(a,b)} = 1$ then the equation for risk changes to $s_{portfolio} = W_A s_A + W_B s_B$

- Investors at point R_f have 100% of their funds invested in the risk-free asset.
- Investors at point M have 100% of their funds invested in portfolio M.
- Between R_f and M investors hold both the risk-free asset and portfolio M. This means investors are lending some of their funds (buying the risk-free asset).
- To the right of M, investors hold more than 100% of portfolio M. This means they are borrowing funds to buy more of portfolio M. This represents a levered position.

Now, the line R_f - M dominates all portfolios on the original efficient frontier. Thus, **the CML becomes the new efficient frontier.**

Portfolio M is a completely diversified portfolio that includes all risky assets in proportion to their market value. It is referred to as the **market portfolio**. It includes all risky assets, including:

- US and non-US stocks/bonds.
- Futures and options, real estate, coins, art, etc.

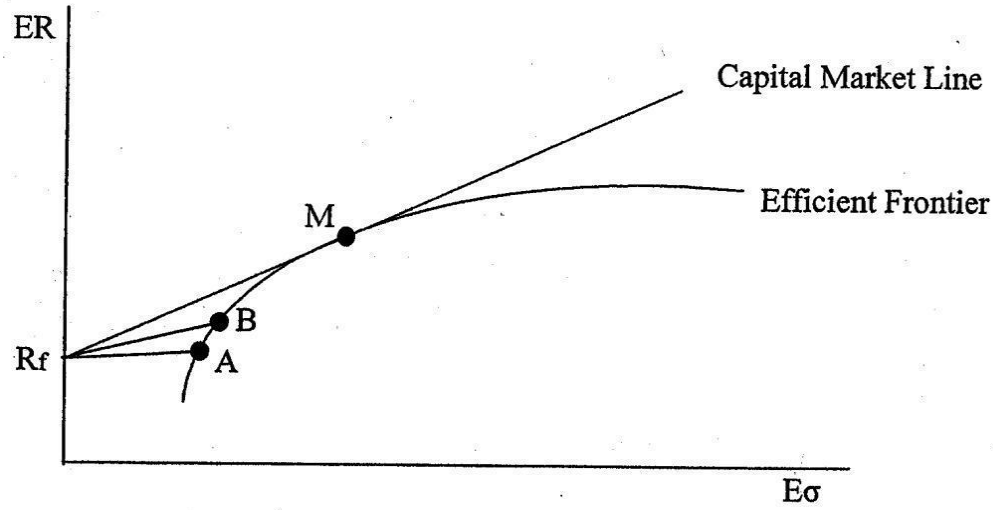
The CML represents all the possible portfolio combinations by investing in the risk-free asset and the market portfolio.

- The risk of an alternative portfolio on the CML comes entirely from the market portfolio.
- The difference between the risks of various portfolios on the CML is caused by the weight of the market portfolio in each portfolio.

The CML leads all investors to invest in the same risky portfolio, the market portfolio. That is, all investors make the same investment decision. They can, however, attain their desirable risk preferences by adjusting the weight of the market portfolio in their portfolios.

- A strongly risk-averse investor will lend some fund at the risk-free rate and invest the remainder in the market portfolio.
- A less risk-averse investor will borrow some fund at the risk-free rate and invest all the fund in the market portfolio.

Therefore, investors make different financing decisions based on their risk preferences. The separation of the investment decision from the financing decision is called the **separation theorem.**


ER
Capital Market Line
Efficient Frontier
M
B
Rf
A
Eσ

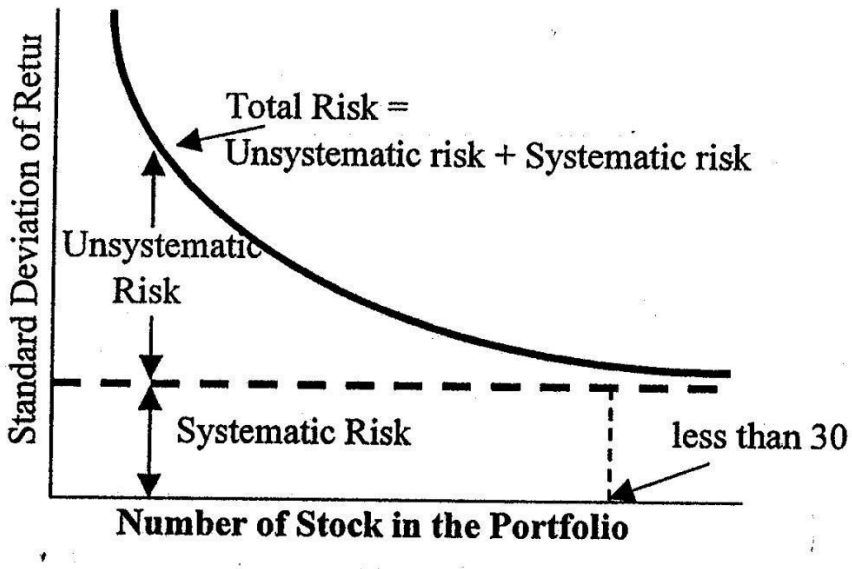
LOS 1.D.d: define systematic and unsystematic risk and explain why an investor should not expect to receive additional return/or assuming unsystematic risk.

Total risk is measured as the standard deviation of security returns. It has two components:

- The systematic risk is the risk that is inherent in the market that cannot be diversified away. The systematic risk of an asset is the relevant risk for constructing portfolios. Examples of systematic risk or market risk include macro economic factors that affect everything (such as the growth in US GNP, inflation, etc.).

  Note that different securities may respond differently to market changes, and thus may have different systematic risks. For example, automobile manufacturers are much more sensitive to market changes that discount retailers (e.g. Wal-Mart). As a result, automobile manufacturers have higher systematic risk.

- Unique, diversifiable or unsystematic risk is the risk that can be diversified away. This risk is offset by the unique variability of the other assets in the portfolio. An investor should not expect to receive additional return for assuming unsystematic risk.



As the number of securities increase, the portfolio manager can eliminate unsystematic risk (or diversifiable risk) and focus on the systematic or undiversifiable risk.

- It takes less than 30 stocks to achieve 90% of the diversification benefit.
- If you add more stocks to the portfolio, the standard deviation of the portfolio will eventually reach the level of the market portfolio.
- We can reduce systematic risk by diversifying globally rather than in the US only. This is due the low correlations between the systematic factors in the US and foreign markets. Such factors include monetary policies, inflations, etc.

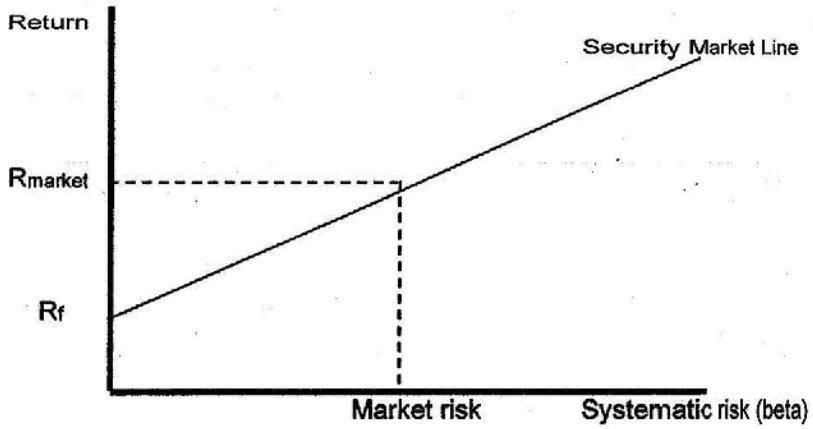
LOS 1.D.e: describe the capital asset pricing model.

In our discussion about the Markowitz efficient frontier, we assume that:

- Investors have examined the set of risky assets and identified the efficient frontier.
- Every investor will choose the optimal portfolio of risky assets on the efficient frontier. The optimal portfolio lies at the point where the highest indifference curve is tangent to the efficient frontier.

Capital market theory builds on portfolio theory, and develops the CAPM. CAPM is used to determine the required rate of return for any risky asset.

CAPM refers to the capital asset pricing model. The CAPM uses the SML or security market line to compare the relationship between risk and return. Unlike the CML which uses standard deviation as a risk measure on the X axis, the SML uses the market Beta, or the relationship between a security and the marketplace.



The use of beta enables an investor to compare the relationship between a single security and the market return, rather than a single security with each and every security (as Markowitz did). Consequently, the risk added to a market portfolio (or a fully diversified set of securities) should be reflected in the security's beta. The expected return for a security in a fully diversified portfolio should be equal:

$$E(R_{stock}) = R_f + (E(R_M) - R_f) \times Beta_{stock}$$

$E(R_M) - R_f$ is the market risk premium, while the risk premium of the security is calculated by $\beta(E(R_M) - R_f)$

- The market portfolio has a β of 1.
- If β > 1, the security is more volatile than the market.
- If β > 1, the security is more volatile than the market.

Note that under this LOS, the "expected" and the "required" returns mean the same thing. The expected return based on the CAPM is exactly the return an investor requires on the security. -

- To compute the required rate of return:
  $$E(R_{stock}) = R_f + (E(R_M) - R_f) \times Beta_{stock}$$

- To compute the expected rate of return of an individual security, you need to use forecasted future security price and dividend:

$$R = \frac{(\text{Future price - current price + dividend})}{\text{Current Price}}$$

The SML represents the required rate of return, given the systematic risk provided by the security. However, if the expected rate of return exceeds this amount, then the security provides an investment opportunity for the investor. The difference between the expected and required return is called the **alpha** (α) or **excess rate of return**. The alpha can be positive when the stock is undervalued (it lies above the SML), or negative when the stock is overvalued (it falls below the SML). The alpha becomes zero when the stock falls directly on the SML (properly valued).

Security Market Line vs. Capital Market Line:

- The CML examines the expected returns on efficient portfolios and their total risk (measured by standard deviation). The SML examines the expected returns on individual assets and their systematic risk (measured by beta). If the expected return-beta relationship is valid for any individual securities, it must also be valid for portfolios constructed with any of these securities. So, the SML is valid for both efficient portfolios and individual assets.

- All properly priced securities and efficient portfolios lie on the SML. However, only efficient portfolios lie on the CML.

LOS 1.D.f: diagram the security market line (SML).

See los e please.

LOS 1.D.g: define beta.

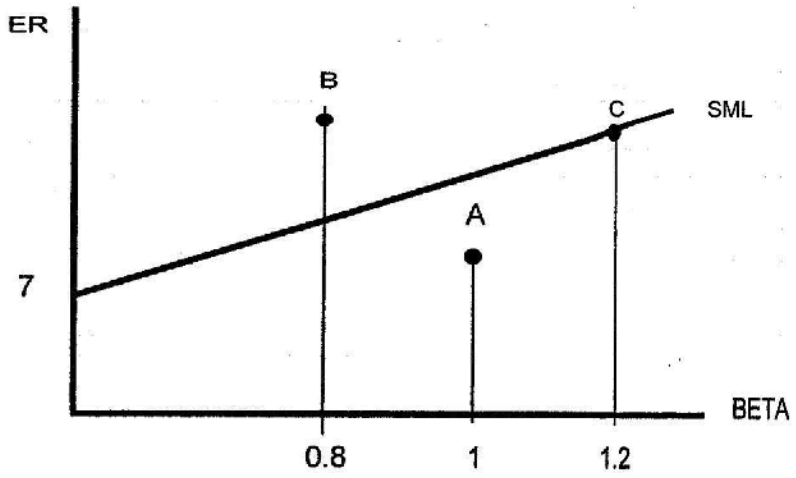
Beta (β) is the standardized measure of systematic risk.

Since all investors want to hold the market portfolio, a security's covariance -with the market portfolio ($Cov_{i,M}$) is the appropriate risk measure. $Cov_{i,M}$ is an absolute measure of the security's systematic risk. Its magnitude is affected by the variability of both the security and the market portfolio (Recall that $Cov_{i,j} = r_{rj}\ \sigma_{ij}\ \sigma_{ij}$). To standardize the measure of systematic risk, we can divide $Cov_{i,M}$ by the covariance of the market portfolio with itself ($Cov_{M,M}$)- Therefore, the standardized measure of systematic risk (called beta) is defined as

$$\beta = \frac{Cov_{i,M}}{Cov_{M,M}} = \frac{Cov_{i,M}}{s\ M^2}$$

LOS 1.D.h: calculate, using the SML, the expected return on a security and evaluate whether the security is undervalued, overvalued, or properly valued.

Overvalued and undervalued securities are those securities mat-do not lie on the SML line. By definition, securities that are efficiently priced should fall directly on the (calculated) SML line. If a security is above the line it is deemed undervalued since it is providing more expected return than what is demanded for that risk level. Securities falling below the SML line are, on the other hand, providing less return than the market demands. Securities that fall below the SML are considered overvalued. In the former case, the security price will be bid up, such that the expected return declines and the security falls back to the SML line. In the situation where the security is overvalued, the security price declines until the expected return rises.



All sets and all portfolio should plot on the SML.

- Stock C has an estimated rate of return equal to its systematic risk or required rate of return.
- Stocks B is expected to provide rate of return above the required rate of return.
- Stocks A is expected to provide rate of return below the required rate of return.

SELECTING INVESTMENTS IN A GLOBAL MARKET

LOS P1.a: discuss the characteristics of fixed-income securities available to investors, including U.S. Treasury securities, corporate bonds, and Eurobonds.

Investors who acquire fixed-income securities (except for preferred stock) are really lenders to the issuers. Characteristics of fixed income investments:

- The payment schedule of fixed income securities is contractually mandated.
- Fixed income securities promise specific payments at predetermined times.
- By purchasing fixed income securities, investors loan money (called the principal) to the borrower.
- In return, the borrower promises to make periodic interest payments, and pay back the principal at maturity.

Savings Accounts
They are convenient, liquid and low-risk because almost all are insured. The rates of return are generally low too. Several versions are:

- Pass book savings account: no minimum account balance; funds can be withdrawn at any time with little loss of interest; high flexibility and thus low interest rate.
- certificate of deposit (CDs): require minimum deposits and have fixed durations;
- Interest rates increase with the size and the duration of the deposit; cashing in a CD before maturity will result in a heavy penalty.
- Money market certificates: minimum investment of $10,000 and minimum maturity of 6 months; interest rates are higher than that of 6-month T-bills; heavy penalty if withdrawn before maturity.

Capital Market Instruments
They are fixed-income obligations that trade in the secondary market.

- US Treasury securities

  The US government borrows funds in large part by selling Treasury securities. They are essentially free of credit risk. The income earned on T-securities is exempt from all state and local taxes.

  - T-bills mature in one year or less. Investors buy the bills at a discount from the stated maturity value, and the difference between the purchase price and ultimate maturity value constitutes the investor's earnings. They are highly liquid: they are easily converted to cash and sold at low transaction cost and with not much price risk.

  - **T-notes** maturities range up to 10 years. **T-bonds** are issued with maturities ranging from 10 to 30 years. Both are issued in denomination of $1,000 or more. Both make semiannual coupon payments that are set at an initial level that enables the government to sell the securities at or near par value. Aside from their differing maturities at issuance, the only major distinction between the two is that T-bonds may be callable during a given period, usually the last five years of the bond's life.

- **US government agency securities**

  Some government agencies issue their own securities to finance their activities. These agencies usually are formed to channel credit to a particular sector of the economy that Congress believes might not receive adequate credit through normal private sources. The majority of the debt is issued in support of farm credit and home mortgages. The major agencies are Fannie Mae, Ginnie Mae, Freddie Mac, etc. Although the debt of federal agencies is not explicitly insured by the federal government, it is widely assumed that the government would step in with assistance if an agency neared default. Thus, these securities are considered extremely safe assets, and their yield spread above Treasury securities is quite small.

- **Municipal bonds**

  They are issued by state and local governments.

  - Taxation: This is the key feature. Their interest income is exempt from federal income taxation. The interest income also is exempt from state and local taxation in the issuing state. Capital gains taxes, however, must be paid on "munis", when the bonds mature or if they are sold for more than the investor's purchase price. Because investors need not pay federal (and possibly state) taxes on the interest proceeds, they are willing to accept lower yields on these securities. These lower yields represent huge savings to state and local governments. An investor choosing between taxable and tax-exempt bonds must compare after-tax returns on each bond, and high tax-bracket investors tend to hold municipals.

  - Two types: General obligation bonds are backed by the full faith and credit of the issuer, and revenue bonds are issued to finance particular projects and are backed by the revenues from that project or by the particular municipal agency operating the project. Typical issuers of revenue bonds are airports, hospitals and turnpike or port authorities.

  - Maturity: they vary widely in maturity.

Corporate bonds

They enable private firms to borrow money directly from the public. They are similar in structure to Treasury issues - they typically pay semi-annual coupons over their lives and return the face value to the bondholder at maturity. However, they differ most importantly from Treasury bonds in degrees of risk. They can be categorized by the credit quality of the issuer, maturity, components of the indenture (sinking fund or call feature); or type of security offered by the issuer.

Preferred Stock

Preferred stock has features similar to both equity and bond.

1. It promises to pay to its holder fixed dividends each year. In this sense it is similar to an infinite-maturity bond (a perpetuity).
2. It also resembles a bond in that it does not convey voting power.
3. However, the dividends are not legally binding, as are the interest payments on a bond. It is sometimes considered an equity investment in the sense that failure to pay the dividend does not precipitate corporate bankruptcy.
4. It is cumulative: firms can decide not to pay preferred dividends even if the firm earns

enough money to make the payment. However, unpaid dividends cumulate and must be paid in full before any dividends may be paid to holders of common stock. In practice, preferred dividends are binding because of the credit implications of a missed dividend.

5. It also differs from bonds in terms of its tax treatment for the firm: because preferred stock payments are treated as dividends rather than interest, they are not tax-deductible expenses for the firm. This disadvantage is somewhat offset by the fact that corporations may exclude 80 percent of intercompany dividends from taxable income. They therefore make desirable fixed-income investments for some corporations. Due to this tax benefit, the yield on high-grade preferred stock is typically lower than that on high-grade bonds.

International bond

1. **Eurobond**: it is an international bond denominated in a currency not native to the country where it is issued. Examples are: Eurodollar bonds, Euroyen bonds, and Eurosterling bonds. A Eurodollar bond is denominated in US dollars and sold outside the US to non-US investors. A Euroyen bond is denominated in yen but sold outside Japan. A US corporation can issue Euroyen bond in London.

2. **Yankee bond**: it is sold in the US, denominated in US dollars, but issued by foreign corporations or government. This allows a US citizen to buy the bond of a foreign firm or government but receive payments in US dollars, eliminating exchange rate risk. In the UK this kind of bond is called Bulldog, and in Japan it is called Samurai.

3. **International domestic bond:** it is sold by an issuer within its own country in that country's currency. For example, a bond (denominated in yen) sold in Japan by Sony. A US investor acquiring such a bond would receive maximum diversification, but would incur exchange rate risk.

LOS P1.b: discuss the characteristics of equity securities available to investors, including classes of stock and American Depository Receipts.

The returns of equity securities are not contractual. This means that return of an equity investment can be much better or worse than that of a bond, which has contractually fixed payment schedule.

Common stocks represent ownership shares in a corporation. Owners of the common stock of a firm share in the company's successes and problems. The two most important characteristics of common stock as an investment are:

- Residual claim: it means that stockholders are the last in line of all those who have a claim on the assets and income of the corporation.
- Limited liability: it means that the greatest amount shareholders can lose in event of failure of the corporation is their original investment.

People tend to divide the vast universe of stocks into categories based on general business lines and by industry within these business lines. The division gives classifications for *industrial firms, utilities, transportation firms, and financial institutions.* Within each of these business lines are industries. The most diverse group - the industrial group -includes such industries as automobiles, industrial machinery, chemicals and beverages. There are four ways to invest in foreign equities:

- The easiest way to acquire foreign shares directly is through **American Depository Receipts (ADRs),** which are domestically traded securities representing claims of shares of foreign stocks. Those shares are held in deposit in a bank in the firm's home country. Investors buy and sell ADRs in US dollars and receive all dividends in US dollars. This means that the price and returns reflect both the domestic returns for the stock and the exchange rate effect. They are now quite popular in the US because of their diversification benefits.

- **American shares** are issued in the US by a transfer agent acting on behalf of a foreign firm.

- **Direct purchase of foreign shares:** buy the shares on the stock exchange where the firm is listed.

- **International or global mutual funds:** international funds invest in almost only foreign stocks; global fund invest in both US stocks and foreign stocks.

LOS P1.c: discuss the characteristics of derivative investments (e.g., options, futures).

Equity Options are the right to buy or sell common stock at a specific price for a specific period of time. There are two kinds of equity option instruments:

- **Warrants** are options issued by *a firm* that allow the holder to buy the firm's common stock from the firm at a specific price within a given period. Warrants do not constitute ownership of the stock.

- **Puts and Calls:**

  - **Call options** are the right to buy the common stock of a firm within a given period at a specific price (called the *striking price).* It is not issued by the firm but by *another investor* who is willing to assume the other side of the transaction.
  - **Put options** are the right to sell a stock during a given period at a specific price. They are useful to investors who expect a stock price to decline during the specific period, or own the stock and want protection from a price decline.
  - Options are generally valid for a shorter time period than warrants. Call options are typically valid for less than a year, while warrants extend over five years.

Futures contracts provide for the delivery of an asset at a specified delivery date, with payment being made *at the time of delivery.* The current price of a futures contract is determined by investors' belief about the future price of the asset. If an investor expects the price of the asset to rise, she will buy a futures contract. If the investor expects the price to fall, she will sell a futures contract. Later when the price has dropped, she will buy a similar contract to cover her obligation.

Financial futures are futures contracts on financial instruments such as T-bills, T-bonds and Eurobonds. They allow investors to protect against changes in interest rates. Certain currency futures allow investors to speculate on or to protect against changes in currency exchange rates. In addition, there are certain futures contracts on stock market series such as the S&P 500 or the Value Line Index. Differences between buying a futures contract and buying the asset itself:

- **Use of leverage:** when buying a futures contract, the investor only puts up a small proportion of the contract value. Thus, a small change in the price of the underlying asset can lead to the significant change in the return on the investment.

- **Term of the investment:** futures contracts typically expire in less than a year, while stocks can have infinite maturities.

LOS P1.e: discuss the characteristics of various alternative investments (e.g., investment companies, real estate, low-liquidity investments).

Investment Companies
An investment company sells shares in it and uses the proceeds of this sale to acquire stocks, bonds or other investment instruments. It is also called mutual fund. The shares issued to the investors entitle them to a pro rata portion of the income generated by these assets.

- **Money market funds:** they acquire high-quality, short-term investments such as T-bills, high-grade commercial paper and large CDs. The yields on the money market portfolio always surpass those on normal bank CDs, and you can always withdraw funds from your money market fund without penalty. They are also quite safe (although they are not insured, they typically limit their investments to high-quality, short-term investments).

- **Bond funds:** they generally invest in various long-term government, corporate, or municipal bonds. They differ by type and quality of the bonds included in the portfolio as assessed by various rating services.

- **Common stock funds:** they invest in common stocks to achieve stated investment objectives which can include aggressive growth, income, precious metal investments, and international stocks. They offer smaller investors the benefits of diversification and professional management.

- **Balanced funds:** they invest in a combination of bonds and stocks of various sorts of depending on their stated objectives.

- **Index funds:** they match the performance of a market index (e.g. S&P 500), and thus appeal to passive investors.

- **Exchange-traded funds:** ETFs are traded continuously, while mutual funds (particularly index funds) are only priced daily at the close of the market.

Real Estate can provide significant diversification benefits due to their low correlation with stocks and bonds.

- **Real Estate Investment Trusts (REITS):** a real estate investment trust is similar to a stock or bond mutual fund, but the money is invested in property and buildings. Construction and development trusts lend money to builders. Mortgage trusts provide long-term financing for properties. Equity trusts own various income-producing properties.

- **Direct real estate investment:** the most common type is the purchase of a home by an individual.

- **Raw land:** purchase it now and plan to sell it later at a profit.

- **Land development:** it typically involves buying raw land, dividing it into individual lots, and building houses on it.

- **Rental property:** acquire apartment buildings or houses with low down payments, with the intention of deriving enough income from the rents to pay the expenses of the structure (including mortgage payments).

Low-Liquidity Investments

- Financial institutions do not typically acquire them since they are considered to be fairly illiquid with high transaction costs and high price volatility. Typically there is no national market for low-liquid assets.

- Antiques: many serious collectors enjoy substantial rates of return on them.

- Art: investing in art requires substantial knowledge of art and the art world, a large amount of capital, patience and the ability to absorb high transaction costs.

- Coins and stamps: Collecting coins and stamps is viewed by many people as a hobby, not an investment. The market for coins and stamps is more liquid than the market for art and antiques.

- Diamonds: diamonds are highly illiquid. The grading process that determines their quality is quite subjective. They generate no positive cash flows during the holding period until they are sold, but incur insurance and storage costs. There are also appraisal costs before selling.

ORGANIZATION AND FUNCTIONING OF SECURITIES MARKETS

LOS 1.A.a: describe the characteristics of a well-functioning securities market.

A good market for goods and services has the following characteristics:

- **Availability of Information:** timely and accurate information is available on the price and volume of past transactions and the prevailing bid and ask prices.

- **Liquidity:** as asset can be bought and sold quickly (has marketability, which means an asset's likelihood of being sold quickly.) at a price close to the prices for previous transactions (has price continuity), assuming no new information has been received. In turn, price continuity requires depth, which means the numerous potential buyers and sellers must be willing to trade at prices above and below the current market price.

- **Transaction cost:** low costs (as a percent of the value of the trade) include the cost of reaching the market, the actual brokerage costs, and the cost of transferring the asset. This attribute is often referred to as internal efficiency.

- **Informational (or external) efficiency:** prices rapidly adjust to new information; thus the prevailing price is fair because it reflects all available information regarding the asset.

LOS 1.A.b: distinguish between competitive bids, negotiated sales, and private placements for issuing bonds.

Government bond issues are sold at Federal Reserve auctions.

New municipal bond issues are sold by one of three methods:

- **Competitive bids.** It typically involves sealed bids. The bond issue is sold to the bidding syndicate of underwriters that submits the bid with the lowest interest cost in accordance with the stipulations set forth by the issuer. The underwriter is responsible for risk bearing and distribution, not for origination of the issue. However, the underwriter may help originate the issue for a separate fee.
- **Negotiation.** It involves contractual arrangements between underwriters and issuer wherein the underwriter helps the issuer prepares the bond issue and set the price and has the exclusive right to sell the issue.
- **Private placement.** It involves the sale of a bond issue by the issuer directly to an investor or a small group of investors (usually institutions).

Note that two of the three methods require an *underwriting* function. Specifically, in a competitive bid or a negotiated transaction, the investment banker typically underwrites the issue, which means the firm participates in the design and initial planning of the issue **(origination),** purchases the entire issue at a specified price, relieving the issuer from the risk and responsibility of selling and distributing the bonds **(risk bearings).** Subsequently the underwriter sells the issue to the investing public **(distribution).**

Corporate bond issues are almost always sold through a negotiated arrangement with an investment bank. The investment bank is responsible for origination, risk bearing and distribution.

New stock issues are divided into two groups:

- **Seasoned equity issues:** new shares issued by firms that already have stocks outstanding.
- **Initial public offerings (IPO):** the new shares that a firm offers to the public for the first time. They are typically underwritten by investment bankers through negotiated arrangement (the most common form), competitive bid and **best-effort arrangement** (investment banker's act as brokers, not taking the price risk).

LOS 1.A.c: compare and contrast the secondary markets for U.S. government/ municipal bonds with the Secondary markets for corporate bonds.

US government bonds are traded by bond dealers that specialize in either Treasury bonds or agency bonds. These issues are bought and sold through a set of 35 primary dealers (banks and investment firms). However, unlike Treasury issues, there is no formal set of dealers for agency bonds.

The major market makers in the secondary municipal bond market are banks and investment firms. Banks are active in municipal bond trading because they are involved in the underwriting of general obligation issues and they commit large parts of their investment portfolios to these securities.

The secondary market for corporate bonds has two major segments:

- Securities exchanges: the major exchange is the New York Stock Exchange Fixed Income Market. Some issues are listed on the American Stock Exchange (AMEX).
-
- The over-the-counter (OTC) market: all corporate bonds not listed on one of the exchanges are traded over-the-counter by dealers who buy and sell for their own accounts. In the US about 90% of corporate bond trades occur on the OTC market. Because of the limited trading in corporate bonds compared to the fairly active trading in government bonds, corporate bond dealers do not carry extensive inventories of specific issues. Instead, they hold a limited number of bonds desired by their clients, and when someone wants to do a trade, they work more like brokers than dealers.

Secondary markets for financial futures on bonds: such futures contracts are mainly traded on two major exchanges (The Chicago Board of Trade (CBOT) and The Chicago Mercantile Exchange (CME)).

LOS 1.A.d: distinguish between primary and secondary capital markets and explain how secondary markets support primary markets.

The **primary markets** are where new issues of bonds, preferred stock, or common stock are sold by government units, municipalities, or companies to acquire new capital.

- New issue.
- Key factor: issuer receives the proceeds from the sale.

Two important rules in the primary capital markets:

- **Rule 415** allows large firms to register security issues and sell them in piecemean over the following 2 years. Such issues are called **self-registration**

- **Rule 144A** allows corporations (including non-US firms) to place securities privately with *large, sophisticated investors.* The issuer of a *private placement* reduces issuing costs because it does not have to complete the extensive registration documents. However, investors will require a higher return since no secondary market exists and thus the liquidity risk is high.

The **secondary markets** permit trading in outstanding issues; that is, stocks or bonds already sold to the public are traded between current and potential owners.

- Existing owner sells to another party.
- Issuing firm does not receive proceeds and is not directly involved.

Secondary markets support primary markets.

- The secondary market provides *liquidity* to the individuals who acquired these securities, and the primary market benefits greatly from the liquidity provided by the secondary market because investors would hesitate to acquire securities in the primary market if they thought they could not subsequently sell them in the secondary market.

- Secondary markets are also important to issuers because the *prevailing market price* of the securities is determined by transactions in the secondary market. New issues of outstanding securities (seasoned securities) in the primary market are based on the prices in the secondary market. Forthcoming IPOs in the primary market are priced based on the prices of comparable stocks in the public secondary market.

LOS 1.A.e: distinguish between call and continuous markets.

Securities exchanges differ in when the stocks are traded.

In **call markets,** trading for individual stocks takes place at *specified times.* The intent is to gather all the bids and asks for the stock and attempt to arrive at a *single price* where the quantity demanded is as close as possible to the quantity supplied.

- This trading arrangement is generally used during the early stages of development of an exchange when there are few stocks listed or a small number of active investors / traders.

- Call markets also are used at the opening for stocks on the NYSE if there is an overnight buildup of buy and sell orders, in which case the opening price can differ from the prior day's closing price.

- The concept is also used if trading is suspended during the day because of some significant new information. The mechanism is considered to contribute to a more orderly market and less volatility in such instances because it attempts to avoid major up and down price swings.

In **continuous market,** trades occur at *any time* the market is open. Stocks are priced either by auctions or by dealers. In an auction market, there are sufficient willing buyers and sellers to keep the market continuous. In a dealer market, enough dealers are willing to buy or sell the stock.

Please note that dealers may exist in some auction markets. These dealers provide temporary liquidity and ensure market continuity if the market does not have enough activity.

Although many exchanges are considered continuous, they (i.e. NYSE) also employ a call-market mechanism on specific occasions.

LOS 1.A.f: compare and contrast the structural differences among national stock exchanges, regional stock exchanges, and the over-the-counter (OTC) markets.

There are two major segments of secondary equity markets: securities exchanges and over-the-counter (OTC) market.

A securities exchange has formal members and specific securities that have qualified for listing. Various securities exchanges differ in size, geographic emphasis, listing requirements and trading (pricing) systems. There are two major pricing systems, and an exchange can use one or a combination of them:

Pure auction (price-driven) market: Buyers and sellers submit bid and ask prices to the exchange. Orders are matched at the exchange by a broker who does not own the stock. Securities are sold to the investor with the highest bid price, and bought from the investor with the lowest asked price.

Dealer market: individual dealers provide liquidity to investors by trading the shares for themselves.

Some securities exchanges (such as NYSE, American Stock Exchange (AMEX), the Tokyo "^ Stock Exchange (TSE), the London Exchange (LE)) are considered national in scope because of

- the large number of listed securities from companies within the countries,
- the prestige of the firms listed,
- the wide geographic dispersion within the country of the listed firms, and
- The diverse clientele of buyers and sellers.

Except for London Stock Exchange which is a dealer market (dealers communicate via computers in offices outside the LSE), the other three (NYSE, AMEX and TSE) are all price-driven markets. They constitute the global **24-hour market,** where stocks can be traded continuously world-wide 24 hours a day.

Regional exchanges typically have the *same operating procedures* as the national exchanges in the same countries, but they differ in their *listing requirements (less stringent) and the geographic distributions* of the listed firms. In the US they are Chicago Stock Exchange, Boston Stock Exchange, and Cincinnati Stock Exchange. They exist for two main reasons:

- They provide trading facilities for local companies not large enough to qualify for listing on one of the national exchanges.
- They list firms that also list on one of the national exchanges **(dual listing)** to give local brokers who are not members of a national exchange access to these securities.

Each country typically has one national exchange (two in the US: the NYSE and AMEX) and several regional exchanges.

Over-The-Counter (OTC) Market includes trading in all stocks not listed on one of the exchanges. It can also include trading in listed stocks (third market).

It is not a formal organization with membership requirements or a specific list of stocks deemed eligible for trading.

- Any security can be traded on the OTC market as long as a registered dealer is willing to make a market in the security. "Make a market" means buying and selling the shares. Thus, the OTC market is a **negotiated market** where investors directly negotiate with dealers.

- The US OTC market is the largest segment of the US secondary market in terms of the number of issues traded *(trading volume):* NASDAQ has almost 5,000 active issues while NYSE has 3,500 (However, NYSE has a larger total *trading value).*

- It is also the most diverse in terms of quality (it imposes no minimum requirements): small, unprofitable firms vs. Microsoft vs. Treasury securities.

The NASDAQ System is an automated, electronic quotation system for the vast OTC market. Any number of dealers can elect to maker markets in an OTC stock. NASDAQ makes all dealer quotes available immediately. It has three levels to server firms with different needs and interests.

- Level I provide a single median representative quote for the stocks on NASDAQ. It is for a typical firm who does not consistently buy or sell OTC stocks for its customers but want current quotes only.

- Level 2 provides instantaneous current quotations on NASDAQ stocks by all market makers in a stock. It is for firms that consistently trade OTC stocks.

- Level 3 is for OTC market makers so they can change their own quotations.

The **Third Market** describes over-the-counter trading of shares listed on an exchange. An investment firm that is not a member of an exchange can make a market in a listed stock. The market is crucial during the relatively few periods when trading is not available on the NYSE either because trading is suspended or the exchange is closed.

The **Fourth Market** describes direct trading of securities between two parties with no broker intermediary. Typically both parties of the transaction are institutions. The market evolved because of the substantial fees charged by brokers to institutions with large orders.

You can see that the shares of a large company like Ford may be traded on:

- The national exchange,
- The OTC market (the third market), and
- The fourth market.

LOS 1.A.g: compare and contrast major characteristics of exchange markets, including exchange membership, types of orders, and market makers.

Exchange Membership Listed US securities exchanges typically offer four major categories of membership.

1. The investor places an order with a broker. The brokerage firm owning a seat on the exchange contacts its **commission broker,** who is on the floor of the exchange, to execute the order.

2. **Floor brokers** are independent members of the exchange who own their own seats and handle work for commission brokers when those brokers have too many orders to handle. They act as brokers for other members.

3. **Registered traders** are frequent traders who use their membership to execute trades for their own accounts. By trading directly, they avoid the commissions that would be incurred if they had to trade through a broker. They are believed to have an advantage because they are on the trading floor. They now have specific trading obligations set by the exchange, and thus are called **registered competitive market makers.**

4. The **specialist** is central to the trading process. Specialists **(market makers)** maintain a market in one or more listed securities. A specialist has two major functions.
   - Serve as a *broker* to match buy and sell orders and to handle special limit orders placed with member brokers.
   - Act as a *dealer* to maintain a fair and orderly market by dealing personally in the stock. The specialist provides liquidity to the market by standing ready to trade at quoted bid and asked prices.

Specialists are not expected to prevent prices from rising or declining, but only to ensure that the prices change in an orderly fashion (that is, to maintain price continuity). For example, if there is an inadequate flow of orders, specialists buy and sell shares for their own accounts to narrow the bid ask spread and improve the price continuity.

The specialist derives income from the broker (commissions) and the dealer (spread between the bid and asked prices at which they buy and sell securities) functions. It also appears that specialists' access to their book of limit orders gives them unique knowledge about the probable direction of price movement over short period of time.

Types of Orders Investors may issue several types of orders to their brokers.

- **Market orders** are simple buy or sell orders that are to be executed immediately at current market prices. They provide immediate liquidity for someone willing to accept the prevailing market price.

- Investors can also issue **limit orders,** whereby they specify prices at which they are willing to buy or sell a security. For example, if the stock falls below the limit on a **limit-buy order,** then the trade is to be executed. Orders also can be limited by a time period (1 day, 1 week, 1 month, or good till cancelled, etc). Limit orders are sent to the specialist who controls the limit-order book.

- **A short sale** allows investors to profit from a decline in a security's price. It is the sale of stock that you do not own with the intent of purchasing it back later at a lower

price. Refer to the LOS 1.A.f for detailed explanations.

- **Special orders** often accompany short sales, and they are used to limit potential losses from the short position. They include:

  - **Stop-loss orders,** which are similar to limit orders in that the trade is not to be executed unless the stock hits a price limit. It specifies the price at which the stock must be sold if the price drops to a level. For example, you buy a stock at $5 and want to limit your loss if price drops. So you issue a stop loss order at $3. If the price drops to $3, the stock will be sold at the prevailing market price.

  - **Stop-buy orders** specify that the stock should be bought when its price rises above a given limit.

  - **Margin transactions:** Investors who purchases stocks on margin borrow part of the purchase price of the stock from their brokers, and leave purchased stocks with the brokerage firm in street name because the securities are used as collateral for the loan.

LOS 1.A.h: describe the process of selling a stock short and discuss an investor's likely motivation for selling short.

A short sale allows investors to profit from a decline in a security's price if they believe the security is overpriced. In this procedure an investor (the seller) borrows shares of stock from another investor (the lender) through a broker and sells the shares. The lender keeps the proceeds of the sale as *collateral.* Later, the investor (the short seller) must repurchase the shares in the market in order to return the shares that were borrowed *(covering the short position)* to the lender. If the stock price has fallen, the shares will be repurchased at a lower price than that at which they were initially sold, and the short seller reaps a profit equal to the drop in price times the number of shares sold short.

LOS 1.A.i: discuss the technical points affecting short sales.

Three technical points affect short sales.

1. Exchange rules permit short sales only after an **upstick,** that is, only when the last recorded change in the stock price is positive. This rule is meant to prevent waves of speculation against the stock. Specifically, a short sale must be traded at a price:

    - higher than the last trade price (uptick trade), or
    - Equal to the last trade price only if the last trade is higher than its previous trade (zero uptick). For example, if the transaction prices of the last two trades are 7.50 and 7.25, then you must short higher than 7.25 because that prior trade was not an uptick.

2. The short seller must pay any dividend due to the investor who lent the stock, because the lender of the shares would have received the dividends directly from the firm had the shares not been lent.

3. Exchange rules require that proceeds from a short sale must be kept on account with the broker so the seller cannot invest those funds to generate income. In addition, short sellers must post the same margin as an investor who had acquired stock.

LOS 1.A.j: describe the process of buying a stock on margin.

Margin transactions: Investors who purchases stocks on margin borrow part of the purchase price of the stock from their brokers, and leave purchased stocks with the brokerage firm in street name because the securities are used as collateral for the loan. The interest rate of the margin credit charged by the broker is typically 1.5% above the rate charged by the bank making the loan. The bank rate (called the call money rate) is normally about 1% below the prime rate.

The Federal Reserve sets the minimum proportion of total transactions value that must be paid in cash (referred to as the margin requirement). Currently, the initial margin requirement is 50%. That is, the investor must pay up to at least 50% of the value in cash, and the broker may lend up to 50% of the value. The market value of the collateral stock minus the amount borrowed is called the investor's equity.

Investors can achieve greater upside potential, but they also expose themselves to greater downside risk. The leverage equals l/margin%. Buying stocks on margin increases the investment's financial risk and thus requires a higher rate of return.

- **Percentage margin:** the ratio of the net worth, or "equity value" of the account to the market value of the securities.
- **Maintenance margin:** the required proportion of your equity to the total value of the stock. It protects the broker if the stock price declines. At present, the minimum maintenance margin specified by the Federal Reserve is 25 percent.
- **Margin call:** if the percentage margin falls below the maintenance margin, the broker issues a margin call requiring the investor to add new cash or securities to the margin account. If the investor fails to provide the required funds in time, the broker will sell the collateral stock to pay off the loan.

Example:
Suppose an investor initially pays $6,000 toward the purchase of $10,000 worth of stock ($100 shares at $100 per share), borrowing the remaining from the broker. The maintenance margin is set to be 30%. The initial percentage margin is 60%. If the price of the stock falls to $57.14, the value of his stock will be $5,714. Since the loan is $4,000, the percentage margin now is (5,714 -4,000) / 5714 = 29.9%. The investor will get a margin call.

LOS 1.A.k: compute the rate of return on a margin transaction.

When you acquire stock or other investments on margin, you are increasing the financial risk of the investment beyond the risk inherent in the security itself. You should increase your required rate of return accordingly.

$$\mathrm{Re}\,turnOnM\,\arg\,inTransaction = \frac{(ChangeInInvestorsEquity - Interest - Commission)}{InitialInvestorsEquity}$$

Example:
Suppose an investor is bullish (optimistic) on Microsoft stock, which is currently selling at $100 per share. The investor has $10,000 to invest and expects the stock to go up in price by 30 percent during the next year. Ignoring any dividends and commissions, the expected rate of return would thus be 30 percent if the investor spent only$ 10,000 to buy 100 shares. If the investor borrows $10,000 from his broker and invest it in the stock (along with his own $10,000). Assume the interest rate is 9% per year.

- If the stock goes up 30 percent, his 200 shares will be worth $26,000. After paying off $10,000 of principal and interest on the margin load leaves $15,100. The rate of return therefore will be ($15,100 - $10,000) / $10,000 = 51%. Good investment, huh?

- Doing so, however, magnifies the downside risk. Suppose the stock actually goes down by 30 percent: his 200 shares of stock are worth $14,000 now. After paying off $10,900 he is left with only$3,100. The result is a disastrous rate of return of-69%!

- If there is no change in the stock price, he will lose 9 percent, the cost of the loan.

LOS 1.A.l: define maintenance margin and determine the stock price at which the investor would receive a margin call.

Please refer to LOS 1.A.j and 1.A.k for detailed explanations.

LOS 1.A.m: discuss major effects of the institutionalization of securities markets.

The institutionalization of the market refers to the significant growth of trading by large financial L_/ institutions. It has the following major effects:

- **Negotiated (competitive) commission rates:**

The *minimum commission schedule* was initially developed at NYSE to compensate for handling small orders and made no allowance for the trading of large orders by institutions. Starting in May 1975 the SEC changed this and began a program of negotiated commissions on all transactions. The overall effect is that the total commissions paid have declined dramatically, and the size and structure of the industry have changed (e.g. numerous mergers and liquidations of small investment firms).

- The influence of **block trades:**

The specialist system had three problems (the ***"three** Cs")* with block trading (block transactions of over 10,000 shares): capital (no enough capital needed to acquire blocks of 10,000 shares), commitment (unwilling to commit the capital because of large risks involved), and contacts (due to Rule 113, they were prohibited from soliciting interest in shares from other institutional traders).

In response to this problem, **Block Houses** have evolved to aid in the placement of block trades. They are also called *upstairs traders* since they are away from the exchange floor. They are brokerage firms that help to find potential buyers or sellers of large stock trades). They have the "three Cs": if they cannot find potential traders, they might purchase all or part of a block sale for its own account.

- The impact on **stock price volatility:**

Empirical studies indicate that there is *not a* strong positive relationship between institutional trading and stock price volatility: institutions actually provide liquidity for one another and for non-institutional investors.

- The development **of National Market System** (NMS):

It is expected to provide greater efficiency, competition, and lower transaction cost. Four major characteristics are generally expected for the NMS:

1. Centralized reporting of all transactions:
   This requires a composite tape to report all transactions in a stock regardless of where the transactions took place. The intent is to provide a tape that contains full information of all completed trades. Currently NYSE has a central tape that includes all NYSE stocks traded on other exchanges and on the OTC.

2. Centralized quotation system:
   It would list the quotes for a given stock from all market makers on the national, regional exchanges and the OTC. It is currently available through the Intel-market Trading System (ITS). However, it does not have the capability for automatic execution at the best market, and it's not mandatory that a broker go to the best market.

3. Centralized limit order book (CLOB):

Ideally the CLOB would be visible to everyone, and all market makers and traders could fill orders on it. NYSE has opposed a CLOB since its specialists do not want to share this lucrative business.

4. Competition among all qualified market makers:
   Market makers have always competed on the OTC, but competition has been opposed by the NYSE.

SECURITY-MARKET INDICATOR SERIES

LOS 1.B.a: distinguish among the composition and characteristics of the three predominant weighting schemes used in constructing stock market series.

Security market indexes are used:

- To evaluate the portfolio performance on a risk-adjusted basis.
- To create index funds to track the performance of the specific market series over time.
- To examine factors that affect aggregate market movements.
- To help "technicians" predict future market movement.
- As a proxy for the market portfolio to calculate the systematic risk of an asset.

To compute an index, the following factors are important:

- The size of the sample: the larger, the better - but eventually the costs of taking a larger sample will outweigh the benefits.
- The breadth of the sample: the sample must represent the total population.
- The source of the sample: samples must be taken from each different segment of the population.
- The weight given to each member in the sample (discussed below).
- Computational procedure (discussed below).

Price-Weighted Series

It is an *arithmetic* average of current prices. Index movements are influenced by the differential prices of the components.

- Dow Jones Industrial Average

It is the best-know price-weighted series. Also the oldest and the most popular stock market indicator series. It is computed by adding the prices of the 30 companies of NYSE and dividing by a "divisor". The weight of each firm in the index is proportional to the share price rather than the total outstanding market value of the shares. As stocks are added or dropped from the average or stock split over time, the divisor is continually adjusted to leave the average unaffected by the change.

The limitations are:

- The sample used for the series is limited to 30 large, mature and blue-chip companies only: small sample size and narrow sample breadth.

- When a firm has a stock split, its price declines, and therefore its weight in the DJIA is reduced even though it may be large and important - the weighting scheme causes a downward bias in the DJIA: the stocks that have higher growth rates will have higher prices, and because such stocks tend to split, they will consistently lose weight within the index.

- **Nikkei-Dow Jones Average**

  It includes 225 stocks on the First Section of the Tokyo Stock Exchange.

The price-weighted series has a downward bias.

- High-priced stocks have greater impact on the index than low-priced stocks, as the scheme assumes that an investor purchases an equal number of shares for each stock in the index.
- As illustrated for DJIA, large, successful firms consistently lose weight within the

index since high-growth companies tend to split their stocks more often. Over time, low growth, small firms with high prices will dominate the index.

Value-Weighted Series
It is generated by deriving the initial total market value of all stocks used in the series. The importance of individual stocks in the sample depends on the market value of the stocks. There is an automatic adjustment for stock splits and other capital changes in this series.

- **Standard & Poor's Indexes**

It is based upon 500 firms from NYSE and OTC. The number of stocks in the index is different (from that of DJIA), but more importantly, the source of the sample is also different. However, the index does not reflect cash dividends paid out by those firms.

- NASDAQ Composite: Based on almost 5,000 OTC firms.
- Amex Market Value

Firms with large market value have greater impact on the index than firms with small market value. Thus, over time the large market value stocks will dominate changes in a market-value-weighted series.

Unweighted Price Indicator Series
All stocks carry equal weight regardless of their price or market value. The actual movements in the index are typically based on the arithmetic average of the percent changes in price or value for the stocks in the index: each percent change has equal weight. Such an index can be used by individuals who randomly select stock for their portfolio and invest the same dollar amount in each stock.

- **Value Line Index:** It is equally weighted geometric average of the performance of about 1,700 firms.
- Financial Times: It also computes a geometric mean of the holding period returns.

Note that the geometric average is less than the arithmetic average. This is a general property: whenever there is variation in performance among the stocks in an index, the geometric average will be less than the arithmetic average. For this reason value Line index provides a *downward-biased measure* of the rate of return that would be earned by an investor purchasing an equally weighted portfolio of all the stocks in the index.

Both market value-weighted (which requires to acquire equal number of shares of each stock) and price-weighted (which requires investments in proportion to outstanding value) indexes reflect the returns to buy-and-hold portfolio strategies, but unweighted indexes do not correspond to such portfolio strategies.

LOS 1.B.b: discuss the source and direction of bias exhibited by each of the three predominant weighting schemes.

Refer to LOS 1.B.a please.

LOS 1.B.c: compute a price-weighted, a value-weighted, and an unweighted index series for three stocks.

Price-Weighted Series:

A price-weighted series is computed by:

- Adding up the market price of each stock in the index, then
- Dividing this total price by the number of stocks in the index:

$$Price-WeightedSeries = \frac{SumOfStock\,Prices}{\#OfStocksInTheSeries}$$

Example: the shares of firm A sells for $100, and the shares of firm B sells for $25. The initial price index is (100 + 25) / 2 = 62.5. The divisor is therefore 2.

- Normal situation: suppose that A increases by 10 percent to $110, and B increases by 20 percent to $30, the price index would be (110 + 30) /2 = 70. The rate of return would be: (70 - 62.5) / 62.5 =12%.
- Stock split: if A were to split two for one, and its share price were therefore to fall to $50, we would not want the average to fall since that would incorrectly indicate a fall in the general level of market prices. Following a split the divisor must be reduced to a value that leaves the average unaffected by the split. The new divisor is: (50 + 25) / 62.5 = 1.2 which will make the initial value of the average unaffected.

Market Value-Weighted Index A market-value-weighted series is generated by:

- Adding up the total market value of all stocks in the index:

  Market Value = Number Of Shares Outstanding x Current Market Value.

- Dividing this total by the total market value for the base period.

- Multiplying this ratio by the beginning index value:

$$NewMarketValue = \frac{CurrentMarketValue}{BaseValue} \times BeginningIndexValue$$

The shares of firm A sells for $100 with 1 million shares, and the shares of firm B sells for $25 with 20 million shares. Their market value is therefore $100 million and $500 million, respectively. If A increases by 10 percent to $110, and B increases by 20 percent to $30, their market value will be $110 million and $600 million, respectively. The rate of return would be:
(710-600)7600 =18.3%.

Unweighted Price Series

In an unweighted series, all stocks carry equal weight regardless of their price or market value. Thus, a $1 stock is as important as a $10 stock, and a firm with $200 million market value is the same as one with $200 billion. It assumes that equal dollar amounts are invested in each stock in the index at the beginning of the period. It is typically generated by taking the arithmetic or geometric mean of the percentage changes in the value for the stocks in the index.

Continue with. the above example. An equally weighted arithmetic average of these returns

would be: (10% + 20%) / 2 ^ 15%. In contrast, the geometric mean is computed as 1 + r = [(1 + 0.1) x (1 + 0.2)] (1/2) = 1.1489. So the geometric average would be 14.89%, less than the arithmetic average.

LOS 1.B.d: compare and contrast major structural features of domestic and global stock indexes, bond indexes, and composite stock-bond indexes.

Refer to LOS a - c for domestic stock indexes.

Global Equity Indexes:
Local indexes of individual countries lack consistency in sample selection, weighting, or computational procedures. Global equity indexes are created to solve this comparability problem.

- FT / S&P Actuaries World Indexes: about 2,461 equity securities in 30 countries are measured. Market-value weighted.
- Morgan Stanley Capital International (MSCI) Indexes: they consist of over 50 market-value weighted indexes worldwide.
- Dow Jones World Stock Index: 2,200 companies in 33 countries.

Bond Indexes:
The creation and computation of bond-market indexes is more difficult than a stock market series:

- The universe of bonds is much broader than that of stocks.
- The universe of bonds is changing constantly because of new issues, bond maturities, calls and bond sinking funds.
- The volatility of prices for individual bonds and bond portfolios changes because bond price volatility is affected by duration, which is changing constantly.
- Pricing individual bonds is more difficult compared to the current and continuous transactions prices available for most stocks used in stock indexes.

All bond indexes indicate total rates of return for the portfolio of bonds, including price change, accrued interest, and coupon income reinvested. They are relatively new and not widely published. Most of indexes are market-value weighted.

- Investment-Grade Bond Indexes: four indexes created by investment firms.
- High-Yield Bond Indexes: Men-ill Lynch Convertible Securities Indexes.

Composite Stock-Bond Indexes:
They measure the performance of all securities in a given country.

- Men-ill Lynch-Wilshire US Capital Market Index (ML-WCMI): it tracks more than 10,000 stocks and bonds in the US.
- Brinson Partners Global Security Market Index (GSMI): It includes US stocks and bonds, non-US equities and nondollar bonds and an allocation for cash. It is closest to the theoretically specified "market portfolio of risky assets" referred to in the CAPM literature.

EFFICIENT CAPITAL MARKETS

LOS 1.C.a: define an efficient capital market and discuss arguments supporting the concept of efficient capital markets.

An **efficient capital market** is one in which security prices adjust rapidly to the arrival of new information and the current prices of securities reflect all information about the security. Therefore, it is also called an **informationally efficient capital market.**

Why should capital markets be efficient? Competition is the source of efficiency, and price changes should be independent and random.

- A large number of competing profit-maximizing participants analyze and value securities, each independently of the others.
- New information regarding securities comes to the market in a random fashion, and the timing of the announcement is generally independent of others.
- The competing investors attempt to adjust security prices rapidly to reflect the effect of new information. The price adjustment is unbiased: sometimes the market will over adjust and other times it will under adjust, but you cannot prefect its behavior.

In an efficient market, the expected returns implicit in the current price of the security should reflect its risk. Investors buying the security should receive a return that is consistent with the perceived risk of the security.

LOS 1.C.b: describe and contrast the forms of the efficient market hypothesis (EMH) (i.e., weak, semistrong, strong).

There are three versions of the EMH: they differ by their notions of what is meant by the term "all available information".

- The **weak-form hypothesis** asserts that stock prices already reflect all information that can be derived by examining market trading data such as the history of past prices, trading volume, or short interest. This implies that trend analysis is fruitless: if such data ever conveyed reliable signals about future performance, all investors would have learned already the exploit the signals.

- The **semistrong-form hypothesis** states that all publicly available information regarding the prospects of a firm must be reflected already in the stock price. Such information includes, in addition to past prices, fundamental data on the firm's product line, quality of management, balance sheet composition, patents held, earning forecasts, and accounting practices. Obviously this version encompasses the weak-form EMH. This hypothesis implies that an investor cannot achieve risk-adjusted excess returns using important *public* information.

- The **strong-form hypothesis** states that stock prices reflect all information (from *public and private sources)* relevant to the firm even include information available only to company insiders. This version of EMH encompasses both the weak-form and the semistrong-form EMH. It is quite extreme. It implies that no investor has monopolistic access to information that influences prices. Thus, no investor can consistently derive risk-adjusted excess returns. In fact, the strong-form EMH assumes **perfect markets,** in which all information is cost free and available to everyone at the same time. In contrast, in an efficient market prices adjust rapidly to new *public* information.

LOS 1.C.c: describe the tests used to examine the weak form of the EMH.

Note: the original LOS is "describe the tests used to examine the weak form, the semistrong form, and the strong form of the EMH". We will examine the semistrong form in LOS 1.C.d, and strong form in LOS 1.C. f.

Two groups of tests have been formulated to examine the weak-form EMH:

- Statistical Tests of Independence:
  It involves statistical tests of independence between rates of return since the EMH contends that security returns over time should be independent of one another.

  - Autocorrelation tests: It measures the significance of positive or negative correlation in returns over time. Serial correlation refers to the tendency for stock returns to be related to past returns. Positive serial correlation means that positive returns tend to follow positive returns. Researchers found that the correlations were typically not statistically significant, although some recent studies have indicated that the correlation is stronger for portfolios of small stocks.

  - Runs test: A run occurs when two consecutive changes are the same (i.e. two or more consecutive positive or negative price changes constitute one run). Tests found that the actual number of runs for stock price series consistently fell into the range expected for a random series. The tendency for runs to persist was so slight that any attempt to exploit them would generate trading costs in excess of the expected abnormal returns.

- Tests of Trading Rules:
  This entails a comparison of risk-return results for trading rules that make investment decisions based on past market information versus results from a simple buy-and-hold policy. Technical analysts felt that their trading rules were too sophisticated and complicated to be simulated by rigid statistical tests. In response, investigators examine alternative technical trading rules through simulation. However, there are still operations problems in carrying out these tests since some trading rules require too much subjective interpretation of data, and there are too many potential trading rules to test.

- Filter rules: such a technique gives a rule for buying or selling a stock depending on past price movements. One rule, for example, is to trade a stock when the price change exceeds a filter value set for it. Tests found that when trading commissions were considered, any possible trading profits would turn to losses.

The conclusion of the majority of weak-form tests using short-horizon returns is that the EMH is validated by stock market data.

LOS 1.C.d: describe the tests used to examine the semistrong form of the EMH.

Two sets of tests are used to examine this version of EMH. In both sets of tests the emphasis is on the analysis of abnormal rates of return that deviate from long-term expectations, or returns that are adjusted for a stock's specific risk characteristics and overall market rates of return during the period.

Studies to predict future rates of return using available public information

The numerous studies on predicting rates of return over time or for a cross section of stocks presented evidence that indicated markets were NOT semistrong efficient.

- **Time series analysis:** it assumes that in an efficient market the best estimate of future rates of return will be the long-run historical rates of return. However, the evidence from such tests is mixed.

  - **Quarterly earnings studies,** which can be considered part of the time-series analysis, examine if it is possible to predict future returns for a stock based on publicly available quarterly earnings reports. The results of various studies indicate that the market has not adjusted stock prices to reflect the release of quarterly earnings surprise as fast as expected by the semistrong EMH. It appears that earnings surprise can be used to predict returns for individual stocks.

  - **Calendar studies** question whether some regularities exist in the rates of return during the calendar year that would allow investors to predict returns on stocks.

  - **The January Anomaly:** Also called "small-firm-in-January" effect. The hypothesis is that many people sell stocks that have declined in price during the previous months to realize their capital losses before the end of the tax year. Such investors do not put the proceeds from these sales back into the stock market until after the turn of the year. At that point the rush of demand for stock places an upward pressure on prices that results in the January effect.

The effect is said to show up most dramatically for the smallest firms because the small-firm group includes stocks with the greatest variability of prices during the year (and the group therefore includes a relatively large number of firms that have declined sufficiently to induce tax-loss selling).

However, according to a study by Reinganum, the size effect continues even after adjusting for taxes. Reinganum found that small firms that rose in price continue to show abnormal January returns, while large firms that declined in prices show no special January effect. Hence, although taxes appear to be associated with the abnormal January returns, size per se remains a factor in January.

Despite numerous studies, the January anomaly poses as many questions as it answers.

Other calendar studies include monthly effect, weekend / day of the week effect, and intraday effect. Again, the evidence to test semistrong EMH is mixed.

- **Cross-sectional distribution of returns** or other characteristics for individual stocks: If the semistrong EMH is true, all securities should have equal risk-adjusted returns because security prices should reflect all public information that would

influence the security's risk. Using public information, is it possible to determine what stocks will enjoy above-average, risk-adjusted returns?

All tests involve a joint hypothesis since they consider both the efficiency of market and the validity of asset pricing model which provides the measure of risk used in these tests.

- **Price-earnings ratio and return:** Basu's study concluded that publicly available P/E ratios possessed valuable information, and the risk-adjusted returns for stocks in the lowest P/E ratio quintile were superior to those in the highest P/E ratio quintile.

- **Price-earnings / growth rate ratio** (referred to as the PEG ratio): Advocates have hypothesized an inverse relationship between the PEG ratio and subsequent rats of return. However, the results related to using the PEG ratio to select stocks are mixed.

- **The size effect:** the effect relates to the impact of size (measured by the total market value) on risk-adjusted rates of return. Some researchers found that the small firms outperformed the large firms after considering risk and transaction costs (assuming annual rebalancing).

- **Neglected firms and trading activity:** Attention is measured in terms of the number of analysts who regularly follow a stock. Small firms tend to be neglected by large institutional traders; information about such firms is less available. Because small and less-analyzed stocks as a rule are less liquid, the liquidity effect might be a partial explanation of their abnormal returns, and the effect of trading costs on small stocks can easily wipe out any apparent abnormal profit opportunity.

Book-value-market value ratio: Fama and French found that both size and BV/MV ratio are significant when included together, and they dominate other ratios. The dramatic dependence of returns on market-to-book ratio is independent of beta, suggesting either that low market-to-book ratio firms are relatively underpriced, or that the market-to-book ratio is serving as a proxy for a risk factor that affects equilibrium expected returns.

No single study has been able to explain the anomaly in terms of superior risk measurements, transaction costs, analysts' attention, trading activity, and differential information. The tests of publicly available ratios that can be used to predict the cross section of expected returns for stocks have provided substantial evidence in conflict with the semistrong-form EMH.

Event studies examine how fast stock prices adjust to specific significant economic events. The results for most of these studies have supported the semistrong-form EMH. About the only mixed results come from exchange listing studies.

- **Stock split:**

  One reason for expecting a price increase is that companies typically raise their dividends when they split their stock. The dividend change has an information effect that the company will have a new, higher level of earnings in the future. However, since nothing fundamentally affecting the value of the firm has occurred, most studies attribute no short-run or long-run positive impact on security returns because of a stock split.

- **Initial public offerings:**
  Because of uncertainty about price and the risk involved in underwriting stocks of previously closely held companies, it has been hypothesized that underwriters tend to underprice these new issues. Although there is some underpricing of IPOs (about 15 percent) when they are offered, the price adjustment takes place within one day after the offering. Investors who acquire the stock after the initial adjustment do not experience abnormal returns.

- **Exchange listing:**
  When a stock becomes listed on a national exchange, it is believed that the marketed liquidity of the stock is increased and its prestige is added. Here the crucial question is: what happens between the listing announcement and the actual listing (a period of 4 to 6 weeks)? It is widely believed that listing on a national exchange does not cause a performance change in the long-run value of a firm, while some studies provide some evidence of short-run profit opportunities (which does not support semi strong-form EMH).

- **Unexpected world events and economic news:**
  Studies found the prices adjusted to such news (money supply, inflation, real economic activity, etc) before the market opened or before it reopened after the announcements.

- **Announcement of accounting changes:**
  Securities markets react quite rapidly to accounting changes and adjust security prices as one would expect on the basis of the true value.

Corporate events:
Prices react as one would expect based on the underlying economic impact of the action (mergers and acquisitions, reorganizations, and various security offerings).

LOS 1.C.e: identify six market anomalies and explain their implications/or the semistrong form of the EMH.

A market anomaly is evidence that seems inconsistent with the EMH.
Please refer to LOS 1.C.d for explanations.

LOS 1.C.f: explain the overall conclusions about each form of the EMH.

LOS 1.C.c, 1.C.d, 1.C.e have indicated the overall conclusions for weak- and semistrong-form EMH. Here we describe the tests and conclusions for strong-form EMH.

Strong-form EMH implies that no group of investors has access to private information that will allow them to consistently experience above-average profits. Four major groups of investors have been analyzed to test this form of EMH:

- **Corporate insiders:**
  They are required to report to the SEC each month their transactions in the stock of the firm for which they are insiders (corporate officers, members of the board of directors, and owners of 10 percent or more of any equity class securities). The overall results of various studies provide mixed support for the EMH.

- **Stock exchange specialists:**
  Specialists have monopolistic access to certain very important information about unfilled limit orders. However, recent study results indicate that specialists are experiencing much lower rates of return following the introduction of competitive rates and other trading practices that have reduced specialists' fees.

- **Security analysts:**
  The Value Line Enigma: Value Line (VL) includes in its report a timing rank, which indicates VL's expectation regarding a firm's common stock performance over the coming 12 months. Studies indicate that there is information in the VL rankings and in changes in the ranking, but it is not possible to derive abnormal returns from announcements after considering realistic transaction costs.

- **Professional money managers:**

The vast majority of money manager studies support the EMH with results that indicate mutual fund managers generally cannot beat a buy-and-hold policy.

To summarize:

- Weak-form EMH: most studies support it.
- Semistrong-form EMH: the test results of the semi strong-form EMH are mixed. Aside from exchange listing studies, all other event studies strongly support the semistrong efficiency. However, numerous studies on predicting stock returns over time or predicting a cross section of stock returns presented evidence against the semistrong efficiency.
- Strong-form EMH: most studies support the hypothesis. The results on corporate insiders and specialists counter to the hypothesis because both groups have monopolistic access to valuable information.

LOS C.1.g: explain the implications of stock market efficiency for technical analysis and fundamental analysis.

Technical Analysis

The assumptions of technical analysis directly oppose the notion of efficient markets.

- The process of disseminating new information takes time.
- Stock prices move to new equilibriums in a *gradual manner.*
- Hence, stock prices move in trends that persist.

Therefore, technical analysts believe that good traders can detect the significant stock price changes before others do. However, as confirmed by most studies, the capital market is weak-form efficient as prices fully reflect all market information as soon as the information becomes public. Though prices may not be adjusted perfectly in an efficient market, it is unpredictable whether the markets will over- or under-adjust at any time. Therefore, technical analysts should not generate abnormal returns and no technical trading system should have any value.

Fundamental Analysis

Fundamental analysts believe that

- At any time, there is a basic intrinsic value for the aggregate stock market, various industries, or individual securities.
- These values depend on underlying economic factors such as cash flows and risk variables.
- Though market price and the intrinsic value may differ across time, the discrepancy will get corrected as new information arrives.

Therefore, by accurately estimating the intrinsic value, a fundamental analyst can achieve abnormal returns by making superior market timing decisions or acquiring undervalued securities.

Fundamental analysis involves aggregate market analysis, industry analysis, and company analysis and portfolio management. However, using historical data to estimate the relevant variables is as much an art and a product of hard work as it is a science. A fundamental analysis must do a superior job to predict earnings surprises to beat the market.

Market analysis: analysis relying solely on historical data will not yield superior, risk-adjusted returns as the EMH asserts that the market adjusts rapidly to public information. The analyst must be good at estimating the relevant variables that cause long-run trends of market movements.

- Industry and company analysis: the EMH implies that to achieve abnormal returns, an analyst must correctly estimate future values for variables that influence rates of return and predict future earnings surprises. The estimates must differ from the consensus. There will no superior return if the analyst predict the consensus and the consensus is correct. Therefore, the analyst should pay more attention to areas where the market is inefficient, such as stocks that are neglected by other analysts, stocks with high book value/market value ratios, and stocks with small market capitalization.

LOS 1.C.h: discuss the implications a/efficient markets for the portfolio management process and the role of the portfolio manager.

Since the capital markets are primarily efficient, the majority of portfolio managers cannot beat a buy-and-hold policy on a risk-adjusted basis. However, in many occasions the market fails to adjust prices rapidly to public information, and it is likely to achieve superior investment performance through active security valuation and portfolio management. This relies on superior analysts who can time major market trends or identify undervalued securities. Hence, the decision of how one manages the portfolio (actively or passively) should depend on whether the manager has access to superior analysts.

If a portfolio manager has access to superior analysts, he can manage a portfolio actively, looking for undervalued securities based upon superior fundamental analysis (including predicting earnings surprise), and attempting to time the market wherein asset allocation is shifted between aggressive and defensive positions. The portfolio manager should ensure that the risk preferences of the client are maintained.

If a portfolio manager does not have access to superior analysts, he should:

- Determine and quantify his risk preferences;
- Construct the appropriate risk-level portfolio by dividing the total portfolio between lending or borrowing risk-free assets and a portfolio of risky assets.
- Diversify completely on a global basis to eliminate all unsystematic risk.
- Maintain the specific risk level by rebalancing when necessary.
- Minimize taxes and total transaction costs (reduce trading turnover and trade relatively liquid stocks to minimize liquidity costs).

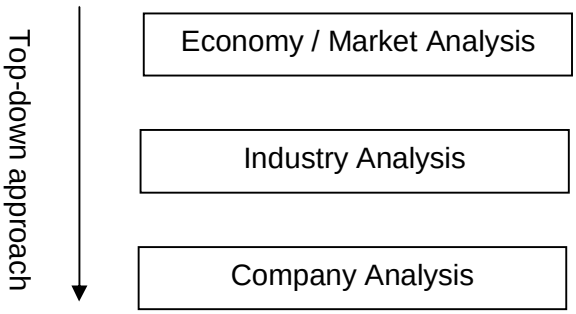
LOS 1.C.i: explain the rationale/or in vesting in index funds.

If you don't have superior analysts who can beat the market, then simply attempt to match the market at the lowest cost. **Index Funds** (also referred to as **market funds)** are security portfolios designed to duplicate the composition and therefore the performance of a selected market index series, and minimize costs of research and trading. During most of the time periods, index funds have provided the same or better performance than do most of active portfolio managers.

AN INTRODUCTION TO SECURITY VALUATION

LOS 1.A.a: explain the top-down approach, and its underlying logic, to the security valuation process.

The **top-down approach** (also called **three-step approach**) is a process by which one examines a particular investment opportunity. First, one examines the general economy, then a particular industry and. finally, individual firms within a particular industry. It assumes that both economy/market and the industry have a substantial impact on individual stocks. In contrast, the bottom-up approach analyzes the individual companies to find undervalued stocks, regardless of the economy/market and the industry.



- Because aggregate economic events have a profound effect on all industries and companies within these industries, these macroeconomic factors should be considered before industries- are analyzed.

  When we examine the economy as a whole, we must examine certain factors that affect monetary and fiscal policy. Fiscal policy initiatives such as tax credits or tax cuts can encourage spending, while added taxes reduce spending. Both have an effect on the economy. Government spending also has an effect on the economy, a strong multiplier effect. Monetary policy has an effect on the economy. A restrictive monetary policy reduces the growth rate of the money supply. It reduces funds for working capital and expansion projects. This will cause interest rates to increase; this inhibits borrowing and therefore reduces economic growth. Another important factor to examine is the inflation rate, which has a negative effect on investment and on exchange rates. It is important to examine all of these factors because it is very difficult to conceive of any industry or company that can avoid the impact of macroeconomic development that affect the total economy.

  Once an investment specialist has chosen a country to invest in, he must determine how the portfolio will be weighted. The analyst should underweight a portfolio in a country, which has a bad economic outlook, and overweight it a country that has a strong economy.

- An industry's prospects within the global business environment will determine how well or poorly an individual firm will fare, so industry analysis should precede company analysis.

  This step includes the process of scanning the economic environment for industries that exhibit stability and growth potential. One may examine taxes on goods in a

particular industry, import quotas, government intervention in the market place, the stage of the industry is in the business cycle, whether the industry is "internationalized", and whether it is dominated by a monopoly. It is just as hard for a company to perform well in an unfavorable industry as for an industry to flourish in a poor economy.

- After finishing the first two steps an investor can analyze and compare individual firms' performance within the entire industry using financial ratios and cash flow values. There are many techniques for looking at particular companies. One may use a quantitative approach, a qualitative method, or a mixture of both. The different models for security analysis will be discussed in the next section. After one has chosen a particular company to invest in, one should use common sense: Do not invest in an industry that exhibits poor attributes or in a company that is going bankrupt. With this said, asset allocation is a subjective process.

Studies have found that:

- Most changes in an individual firm's earnings could be attributed to changes in aggregate corporate earnings and changes in the firm's industry, with the aggregate earnings changes being more important.
- A relationship exists between stock prices and economic expansions and contractions.
- Most of the changes in rates of return for individual stocks could be explained by changes in the rates of return for the aggregate stock market and the stack's industry.

Remember that the most important investment decision is the asset allocation decision.

- Allocate the portfolio among each individual country.
- Allocate the assets among stocks, bonds, etc within each country.
- Allocate each asset class (e.g. stocks) within selected industries.

LOS 1.A.b: explain the various forms of investment returns.

The value of an investment is the present value of its expected returns. The process of valuation involves 4 steps:

1. Estimate the streams of expected returns, addressing all of the following aspects:
    - Size of returns.
    - Form of returns: earnings, cash flows, dividends, interest, or capital gains.
    - Time pattern of returns.
    - Growth rate of returns.
2. Estimate the required rate of return.
3. Calculate the estimated present value of the investment by discounting the expected returns at the required rate of return.
4. Make the investment decision: if estimated value > market price then buy it.
5. The returns from an investment can take many forms:

- **Earnings** are a firm's net income for a period. It reflects revenues adjusted for costs of doing business, depreciations, interest, taxes and all other expenses. It is an accounting figure on an accrual basis.

- **Cash flows** represent the actual amount of cash a firm receives from its operations during the period. This is typically called cash flows from operations: cash flows = earnings (net income) + non-cash expenses + changes in net working capital. Depreciations and amortizations are the major non-cash expenses. Cash flows, not earnings, determine how much dividends a firm can pay.

- **Dividends** are the portion of the firm's earnings paid to common and preferred shareholders. Many firms often retain part of the earnings to fund investment projects. A firm's ability to pay dividends is determined by its cash flows from operations, not earnings.

- **Interest** is the price received for lending money (e.g. buying bonds).

- **Capital gains/losses** are the difference between the net sales price of a stock and its net cost.

You must consider all of these forms to evaluate an investment accurately.

LOS 1.A.c: calculate the value of a preferred stock, assuming a perpetual dividend.

Preferred stock pays a fixed dividend for an infinite period. Thus, preferred stock is a perpetuity since it ha no maturity. Payments of preferred dividends are made only after the firm pays its bond interest. Thus,

$$\text{Preferred Stock Value} = \frac{\text{Dividend}}{k_p}$$

Where:

k_p = the required rate of return on preferred stock, and dividend is assumed to be perpetual.

Eighty percent of intercompany preferred dividends are tax-exempt, making the effective tax rate on them about 6.8 percent, assuming a corporate tax rate of 34%. This tax advantage stimulates the demand for preferred stocks by corporations and the yield on them has generally been below that on the highest-grade corporate bonds.

LOS 1.A.d: calculate the value of a common stock, using the dividend discount model (DDM)for both a one-year holding period and a multiple-year holding period.

Under the DDM, the value of common stock is the present value of all future dividends. If the stock is sold at some point in the future, its value at that time will be the present value of all future dividends. In fact, the buyer is paying for the remaining dividend stream. If a stock does not pay dividend for some early years, investors expect at some point in the future the firm will start to pay dividends. Thus, valuation of stocks paying no dividends uses the same DDM approach, except that some of the early dividends are 0.

$$V = \frac{D_1}{1+k} + \frac{SP_1}{1+k}$$

One-Year Holding Period

Assume an investor wants to buy the stock, hold it for one year, and then sell it. To determine the value of the stock using DDM, we must estimate the dividend to be received during the period (D_1), the expected sale price at the end of the holding period (SP_1), and the investor's required rate of return (k). Then:

Multiple-Year Holding Period

If you anticipate holding the stock for several years and then selling it, the valuation estimate is harder. You must forecast several future dividend payments and estimate the sale price of the stock several years in the future.

$$V = \frac{D_1}{(1+k)^1} + \frac{D_2}{(1+k)^2} + \frac{D_3}{(1+k)^3} + \ldots + \frac{D_n}{(1+k)^n} + \frac{SP_n}{(1+k)^n}$$

LOS 1.A.e: calculate the value of a common stock, using the infinite period DDM.

Assume the future dividend stream will grow at a constant rate g for an infinite period, k is greater than g, and Dl is the dividend to be received at the end of period 1, then:

$$V = \frac{D_1}{(k-g)}$$

From the formula we can see that the crucial relationship that determines the value of the stock is the spread between the required rate of return (k) and the expected growth rate of dividends (g). Anything that causes a decline in the spread will cause an increase in the computed value, whereas any increase in the spread will decrease the computed value.

The process of estimating the inputs to be used in the DDM:

- Estimate the required rate of return (k):
  - Estimate the real risk-free rate.
  - Estimate the expected rate of inflation.
  - Calculate the nominal risk-free rate: (1 + real risk free rate) x (1 + expected rate of inflation) - 1.
  - Estimate the risk premium of the stock.
  - Calculate the required rate of return on the stock: nominal risk-free rate + risk premium.
- Estimate the dividend growth rate (g):
  - Estimate the firm's retention ratio.
  - Estimate the firm's expected return on equity (ROE).
  - Calculate the dividend growth rate: Retention rate (b) x Return on equity (ROE)

LOS 1.A.f: calculate the value of a common stock for a company experiencing temporary supernormal growth.

The infinite period DDM has four assumptions:

1. The stock pays dividends.
2. Dividends grow at a constant rate (g).
3. The constant growth rate will continue *forever.*
4. The required rate of return is *greater than* the growth rate, otherwise the model breaks. down since the denominator is negative.

Growth companies are firms that have the opportunities and abilities to earn rates of return on investments that are consistently above their required rate of return. They may experience this high growth for some finite periods of time, and the infinite period DDM cannot be used to value these true growth firms because these high-growth conditions are temporary and therefore inconsistent with the assumptions of the DDM. The higher growth rate cannot be maintained forever, and the growth rate probably exceeds its required rate of return.

In analyzing the initial years of exceptional growth, you examine each year individually. Due to competition, the growth rate of a supernormal growth company is expected to decline and eventually stabilize at a constant level. When the firm's growth rate stabilizes at a rate below the required rate of return, you can compute the remaining value of the firm assuming constant growth using the DDM.

Note there is no automatic relationship between growth and risk: a high-growth company is not necessarily a high-risk company.

Example:

A stock paid $10 dividend last year. Dividends are expected to grow for year 1 and 2, 15% for year 3 to 5, and then 5% from year 6. The required rate of return on equity is 10%.

- The present value of the first stage supernormal growth:

$$V_1 = \frac{\$10\times(1+0.3)}{(1+0.1)^1} + \frac{\$10\times(1+0.3)^2}{(1+0.1)^2} = \$25.8$$

- The present value of the second stage supernormal growth:

$$V_2 = \frac{\$10(1+0.3)^2\times(1+0.15)}{(1+0.1)^3} + \frac{\$10(1+0.3)^2\times(1+0.15)^2}{(1+0.1)^4} + \frac{\$10(1+0.3)^2\times(1+0.15)^3}{(1+0.1)^5} = \$45.9$$

- The terminal value of constant growth at the end of the 5th year:

$$\text{Terminal Value} = \frac{\$10\times(1+0.3)^2\times(1+0.15)^3\times(1+0.05)}{(10\%-5\%)} = \$539.8$$

- The present value of constant value:

$$V_{\text{constant growth}} = \frac{\$539.8}{(1+0.1)^5} = \$335.3$$

- The total value of the stock: $25.8 + $45.9 + $335.3 = $407.

LOS 1.A.g: show how to use the 11DM to develop an earnings multiplier model and explain the factors in the 11DM that affect a stack's price-to-earnings (P/E) ratio.

Unlike the DDM, the earnings multiplier model is a relative valuation model which determines the value of a stock by comparing it to similar stocks based on selected ratios. It compares the stocks on the basis of how many dollars an investor is willing to pay for a dollar of expected earnings.

$$\text{Earnings Multiplier} = \frac{\text{Current Market Price (P)}}{\text{Expected 12 - Month Earnings (E1)}}$$

The P/E ratio is also called the **earnings multiplier.**

- If you can project the expected earnings, multiplying it by the P/E ratio will give you the current stock price.
- Studies show that the P/E ratio is more volatile than EPS.

You can use the DDM to develop the earning multiplier model:

- From DDM: $P = \frac{D1}{(k-g)}$
- Divide both side of the above equation by E1: $P/E1 = \frac{(D1/E1)}{(k-g)}$

For example, a stock has an expected dividend payout ratio of 90%, a required rate of return of 15%, and expected growth rate of 10%. The P/E ratio is 0.9/(0.15 - 0.1) = 18. If you have projected next year's earnings to be $5, the current value of the stock is %4 x 18 = 90.

Thus the P/E ratio is determined by:

- the expected dividend payout ratio.
- the estimated required rate of return on the stock (k).
- the expected growth rate of dividends for the stock.

Since a firm's long-run target payout ratio is rather stable, the spread between k and g is the main determinant of the size of the P/E ratio.

LOS 1.A.h: explain how an investor's required rate of return changes with respect to changes in the real risk-free rate, the expected rate of inflation, and a risk premium.

The required rate of return is approximately equal to the sum of

1. the economy's real risk-free rate;
2. the expected inflation rate.
3. the investment's risk premium.

Therefore, an investor's required rate of return increases as the real risk-free rate, the expected inflation rate, and/or the risk premium increase. As the nominal risk-free rate (which equals to the sum of real risk-free rate and inflation rate) is the same for any investment,

Required Rate Of Return = Nominal Risk Free Rate + Risk Premium.

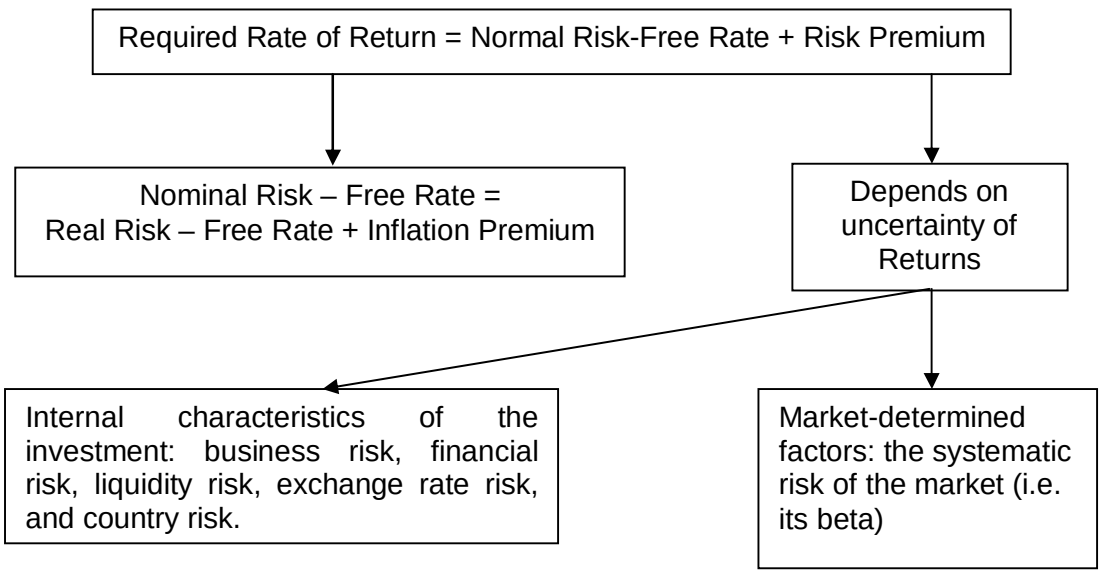
The real **risk-free rate (RRFR)** is the absolute minimum rate that an investor should require. It depends on the real growth rate of the investor's home economy because capital invested should grow at least as fast as the economy. This rate can be affected for a short period of time by temporary tightness or ease in the capital markets.-

Nominal Risk-Free Rate (NRFR) = [1 + RRFR][1 + E(I)] - 1

Where: E(I) = expected rate of inflation.

As a proxy: Nominal Risk Free Rate = Real Risk Free Rate + Expected Inflation Rate.

The **risk premium** is the factor that causes the difference between the required rates of return for individual investments. It is determined by the uncertainty of returns from the investment. The uncertainty of the returns depends on internal characteristics of the investment (business risk, financial risk, liquidity risk, exchange rate risk and country risk), and market-determined factors (the systematic risk of the investment).



LOS 1.A.i: discuss the risk factors to be assessed in determining a country risk premium for use in estimating the required return for foreign securities.

The five risk components differ substantially between countries: business risk, financial risk, liquidity risk, exchange rate risk and country risk. You must evaluate these differences in fundamental risk factors and assign a unique risk premium for each country.

- **Business risk** is determined by the variability of economic activities in each country and operating leverages used by firms within each country.
- **Financial risk:** firms in different countries have significantly different financial risks.
- **Liquidity risk:** some emerging markets have very high liquidity risks.
- The **exchange rate risk** is the additional uncertainty of returns caused by changes in the exchange rates for the currency of another country. The level of volatility for the exchange rate risk differs between countries.
- The **country risk** arises from unexpected events in a country, such as upheavals in its political or economic environment.

The five risk components vary significantly across countries. Thus, a unique risk premium must be assigned for each country when estimating the required return for foreign securities.

LOS 1.A.j: estimate the dividend growth rate, given the components of return on equity and incorporating the retention rate.

Dividend growth rate is determined by:

- The proportion of earnings paid out in dividend (the payout ratio); and
- The growth rate of the earnings.

Since the long-term payout ratio of a firm is pretty stable, its dividend growth rate primarily depends on earnings growth rate. The earnings growth rate depends on:

- the proportion of earnings retained and reinvested (the retention ratio); and
- The rate of return on new investment.

Assuming no external financing, the growth rate of earnings is as follows:

g = Retention Rate (b) x Return on Equity (ROE)

Note that:

$$\text{ROE} = \text{Profit Margin}\,\frac{\text{Net Income}}{\text{Sales}} \times \text{Total Asset Turnover}\,\frac{\text{Sales}}{\text{Total Assets}} \times \text{Financial Leverage}\,\frac{\text{Total Assets}}{\text{Equity}}$$

LOS 1.A.k: describe a process for developing estimated inputs to be used in the DDM, including the required rate of return and expected growth rate of dividends.

In order to use the DDM to estimate the value of a stock, estimates are required for the required rate of return and the expected growth rate of dividends. Data on growth in the economy, inflation, historical risk premiums, and company profitability and growth are typically used to estimate these inputs.

Recall that the required rate of return (k), is influenced by three factors:

1. the real risk-free rate of the economy
2. the expected rate of inflation, and
3. the equity risk premium.

The real risk-free rate can be estimated from the growth rate of real Gross Domestic Product (GDP) of the country being analyzed. The expected rate of inflation can be estimated from data on changes in consumer prices. For example, using estimated data for the U.S. for the year 2000, real GDP growth is estimated at 1.8% and expected inflation is estimated at 2.3%. Summing the two yields an estimate of the nominal risk-free rate of 4.1%. The equity risk premium is influenced by the risk of equity securities relative to a risk-free asset.

The expected growth rate of dividends can be estimated either from the fundamentals of the company, or by projecting from historical growth rates. Considering a company's fundamentals, growth can be computed as:

g = (Retention Rate) x (Return on Equity)

The retention rate is computed as one minus the dividend payout ratio for the company (dividends divided by earnings). Return on equity is the company's net income divided by equity. The DuPont formula may be used to decompose ROE into profit margin times total asset turnover times the equity multiplier (assets divided by equity).

Growth may also be estimated by analyzing a company's historical growth rates of sales, earnings, cash flow, and dividends. Time series of these variables should be considered for both long run past periods and more recent sub-periods. Three techniques that may be applied are:

1. arithmetic or geometric averages,
2. linear regression, and
3. log linear regression.

Arithmetic or geometric averages measure the averages of annual growth rates. The geometric mean is preferred because it provides an average annual compound growth rate.

The linear regression model regresses a dependent variable (e.g., dividends) on time as the independent variable. The slope represents the average absolute change in the data series for the period studied.

Similarly, a log linear regression model regresses the log of the dependent variable against time. With a log linear regression, the slope represents the average percentage change in the data series.

STOCK-MARKET ANALYSIS

LOS 1.B.a: calculate the earnings per share (EPS) of a stock market series.

To estimate a stock market index we use the relative valuation approach, which involves three steps:

1. Estimate future earnings per share (EPS) for the stock market series.
2. Estimate an earnings multiplier (P/E ratio) for the stock market series.
3. Index value = EPS x P/E ratio.

The process of estimating EPS will consider the outlook for the aggregate economy and for the corporate sector. Take S&P 400 series as an example.

1. Estimate sales per share for the series.

As GDP measures the aggregate economic activity, we can use the estimate of nominal GDP to estimate corporate sales based on the historical strong relationship between S&P 400 sales per share and aggregate economic activity (GDP). Time-series analysis or regression analysis is often used to forecast the sale per share of the market index using the GDP estimate.

2. Estimate the operating profit margin for the series.

The **operating profit** is defined as earnings before interest, taxes, and depreciation **(EBITDA).** The **operating profit margin** equals operating profit divided by sales.

Three alternative procedures are possible depending on the desired level of aggregation:

- direct estimate of the net profit margin based on recent trends.
- estimate the net before tax (NBT) profit margin. Once the NBT margin is derived, a separate estimate of tax rate is obtained based on recent tax rates and current government tax pronouncements.
- estimate the operating profit margin as a percentage of sales. It is a stable series and is our focus of study.

Finkel and Tuttle hypothesized the following four variables affected the aggregate profit margin:

- **Capacity utilization rate;** it *is positively* related to the profit margin since if production increases as a proportion of total capacity, there is a decrease in per-unit fixed production costs and fixed financial costs.

- **Unit labor cost:** it has two components (1) changes in wages per hour and (2) changes in worker productivity. It is *negatively* related to the profit margin.

- **Rate of inflation:** the precise effect of inflation on the aggregate profit margin is unsolved: the question is whether all firms can completely pass increased costs (caused by inflation of production inputs) along to their customers.

- **Foreign competition;** there is a divergence of expectations regarding the ultimate effect of foreign trade on the operating profit margin, so it is likewise an empirical question.

When estimating the operating profit margin you need to focus on the direction of the change from current levels.

3. Estimate depreciation per share for the next year.

Since the fixed-asset base increases over time, we need to estimate not whether it will increase or decrease, but by how much it will increase. You can utilize time series analysis to estimate the recent (1) capital expenditures and (2) property, plant and equipment (PPE) since depreciation should be closely related to them. If recent capital expenditures are high, depreciation should be expected to grow at an above-average rate. Note depreciation is a fixed expense and it is independent of sales.

4. Estimate interest per share for the next year.

The estimate should be based on an estimate of debt outstanding and the level of interest rates. To estimate debt outstanding you need to estimate (1) the amount of total assets for the firm based upon the firm's expected total asset turnover, and (2) the expected capital structure based upon the average total debt to total asset ratio.

5. Estimate corporate tax rate for the next year.

It is difficult because it depends on political action.

6. Forecast the EPS for the next year

EPS = [(Sales per share) x (Operating profit margin) -D-A-I] x (1-T)

A is amortization amount.

LOS 1.B.b: calculate the expected P/E ratio (earnings multiplier) of a stock market series, using the series' expected dividend payout ratio, required rate of return, and expected growth rate of dividends.

Use the formula:

$$P/E = \frac{(D_1 / E_1)}{(k - g)}$$

- To estimate k, the required rate of return, you need to get NRFR, E(I) and the risk premium RP.
- To estimate g, the growth rate of dividends, you can use formula g = b x ROE. -An appropriate long-run retention rate (b) is suggested to be 55 percent, and ROE can be deduced from DuPont analysis.
- The dividend-payout ratio (D_1 / E_1) is equal to one minus the earnings retention rate b. There is a partial offset between changes in the dividend payout rate and the expected growth rate g.

As you can see that the two critical estimates that are necessary for both the present value of cash flows models and the earnings multiplier approach are k and g.

LOS 1.B.c: estimate the value of and explain the level of and changes in, the earnings multiplier of a stock market series.

The P/E ratio (or earnings multiplier) tends to be more volatile than earnings per share and therefore has a larger impact on changes in stock prices than does earnings per share. The variables that impact the P/E ratio can be seen from the following equation, derived from the dividend discount model (DDM):

$$\text{P/E} = \frac{(D_1 / E_1)}{(k - g)}$$

where:

D_1 = dividends expected in period 1, {(D0 x (1 + g)}
E_1 = earnings expected in period 1
D_1 / E_1= the dividend payout ratio expected in period 1
k = the required rate of return
g = the expected growth rate of dividends.

In this model, the major variables impacting the P/E ratio are the dividend payout ratio, the required rate of return on common stock, and the expected growth rate of dividends. The model assumes a constant growth rate of dividends for an infinite period.

The P/E ratio is inversely related to the required rate of return, k. The required rate of return is determined by the real risk-free rate, the expected rate of inflation, and the equity risk premium. Estimates for k range from 6.4 percent, using a short-term risk-free rate and a small risk premium, to 11.7 percent, using a long-term risk-free rate and a historical risk premium.

The growth rate of dividends can be estimated as the retention rate (one minus the dividend payout ratio) times the return on equity (ROE). An estimate of the long run retention rate is 55 percent, and a long run ROE (using data from the S&P 400) is 14 percent, implying a long run *C* growth rate of dividends of 7.7 percent. There is a positive relation between the dividend payout ratio and the P/E ratio. Historical data from the S&P 400 suggests that the annual dividend payout ratio is inversely related to earnings changes, or, equivalently, there is a positive relation between the retention rate and earnings changes. Because of the volatility in dividend payout, it is important to use a long run estimate of the ratio.

Two methods used to estimate the P/E ratio are **the direction of change approach** and **the specific estimate approach.**

The direction of change approach begins with the current P/E ratio and estimates the direction and amount of change based on expectations of changes in the major components: the dividend payout ratio (D/E), the required rate of return (k, based on changes in the real risk-free rate, the rate of inflation, and the equity risk premium), and the growth rate in dividends (g, based on the retention rate and ROE).

Example: Suppose recent data were to suggest the dividend payout ratio will increase in the future and there will be a small increase in the required rate of return and a small decline in the growth rate. This would imply a small decline in the P/E ratio of the market. The specific estimate approach estimates a value for the P/E ratio by estimating specific values for the variables in the P/E equation. The required rate of return (k) can be estimated by using the interest rate on government bonds plus an estimate of the equity risk premium. Estimates of the long run k range from 9.7 to 11.7 percent. The growth rate of dividends (g) should be

based on current and expected ROE and the retention rate. These inputs can vary widely depending on the current state of the economy and the assumptions used. Calculation of the P/E ratio is best illustrated by an example.

Example: Given the following inputs, for the economy and a stock market index, estimate the earnings multiplier (P/E ratio) for the index.

Dividend/Earnings 0.50
Yield on U.S. Treasury Securities 5.5%
Equity Risk Premium 6.0%
ROE 15.0%

First, estimate k as the yield on Treasury securities plus the equity risk premium (5.5% + 6.0%) = 11.5%. Then estimate gas ROE times the retention rate (15.0 x [1 - 0.50]) = 7.5%. Finally, estimate P/E as $\frac{(\text{D/E})}{(k-g)}$, or $\frac{(0.50)}{(.115\text{-}.075)} = 12.5 \text{ times}$

LOS 1.B.d: calculate the expected rate of return for a stock market series.

$$E(R_t) = \frac{(EV - BV + Div)}{BV}$$

where:

ER_t: the expected rate of return during period t (we will assume a i-year period).
EV: the ending value for the stock-market series.
BV: the beginning value for the stock-market series.
Div: the expected dividend payment on the stock-market series during the investment horizon.

LOS 1.B.e: explain how the top-down approach can be used to analyze the valuation of world stock markets.

Please see LOS 1.A.a for the explanation of the top-down approach and its logic. In addition to the P/E ratio approach, other relative valuation ratios are:

The top-down approach can be used to analyze world stock markets.

1. Examine the major indicators (GDP, capital investment, industrial production, inflation, interest rates, etc) of an individual country's economy.
2. Estimate the corporate earnings and dividend growth for individual countries.
3. Estimate the market valuation variables such as P/E ratios and dividend yields for individual countries.
4. Forecast the expected value and rate of return of major stock market indexes for individual countries.

In addition to the P/E ratio approach, other relative valuation ratios are:

- the price-to-book-value ratio (P/BV)
- the price-to-cash-flow ratio (P/CF)
- the price-to-sales ratio (P/S)

To understand these valuation ratios, it is necessary to consider what factors drive the particular valuation ratio and whether these factors have changed over time. Similar to valuation using the P/E ratio, you will estimate the valuation variable (i.e. BV, CF, or Sales) and then apply an appropriate future multiple to the valuation variable to derive a price estimate.

INDUSTRY ANALYSIS

LOS 1.C.a: describe how business cycles may affect relative industry performance.

Industry performance is related to the stage of the business cycle, and every business cycle is different. To determine which industry groups will benefit from the next state of the cycle, investors need to identify and monitor key assumptions and variables related to economic trends and industry characteristics.

- Toward the end of a recession, financial stocks begin to rise in value as investors begin to anticipate the end of the recession and an increase in load demand, security trading and *r* offerings, and mergers and acquisitions.
- Once the economy hits bottom and begins its recovery, consumer durable stocks (cars, personal computers, refrigerators) typically make attractive investments as the recovering economy will boost consumer confidence and personal income.
- Once businesses finally recognize the economy is recovering and current levels of consumer spending are sustainable:

    - capital goods industries (heavy equipment manufacturers, machine and tool die makers, and airplane manufacturers) become attractive investments as businesses increase capital investments.
    - cyclical industries are attractive at the early stage of the recovery because of their high operating leverage.
    - industries with high financial leverage are attractive because they also benefit greatly from rising sales volume.

- Toward the business cycle peak, inflation rate rises because demand starts to exceed supply. Basic material industries (oil, gold, timber industries) become investor favorites because they can increase prices while inflation has little effect on their cost.

- During a recession, some industries (food, beverages, and pharmaceuticals) typically do better than others because people still buy necessities. If the weak economy causes a weak currency, industries with large export are attractive because their products become less expensive overseas.

However, investors should not invest based on the current economic environment because the efficient market has already incorporated current economic news into security prices. Rather, it is necessary to forecast important economic variables (inflation, interest rates, consumer sentiment and international economics) at least 3 to 6 months in the future and invest accordingly.

LOS 1.C.b: differentiate between cyclical and structural changes and describe how structural changes (e.g., demographics, technology, politics, regulation) may affect industries.

Economic trends affect industry performance. They can take two basic forms:

- **Cyclical changes** in the economy arise from the ups and downs of the business cycle. There are no fundamental changes in the economic system.
- **Structural changes** occur when the economy is undergoing a major change in organization or in how it functions, particularly in demographics, technology, politics, and regulatory environment.

Demographics and changes in technology as well as political and regulatory environments all play a role in affecting the cash flow and risk prospects of different industries.

- **Demographics:** demographic factors include population growth, age distribution, ethic mix and income distribution, etc. For example, the influx of the baby boom and "the graying of the baby boom" have had a large impact on US consumption. The aging of US population leads to more savings, which benefits the financial service industry but hurts the retail industry.

- **Lifestyles:** they deal with how people live, work, form households, consume, enjoy leisure and educate themselves. For example, clothing industry is sensitive to changes in consumer tastes. The increase in divorce rates, double-income families, and computer-based entertainment have affected many industries as well.

- **Technology:** trends in technology can affect both the industry product and the manufacturing and delivery process. As an example, think about how the Internet has changed our world.

- **Politics and Regulations:** regulatory changes affect many industries such as financial services, utilities and telecommunications. International commerce is influenced by regulatory changes such as in tax laws, tariffs, quotas and other trade barriers. Because political changes reflect social values, today's social trend may be tomorrow's law, regulation or tax. Some regulations and laws are based on economic reasoning, and some are based on concerns about fairness.

LOS 1.C.c: describe the industry life cycle and identify an industry's stage in its life cycle.

An industry can be viewed over time and its development can be divided into stages:

- **Pioneering development:** modest sales growth, very small or negative profit margins, small market.
- **Rapid accelerating growth:** substantial market demand, limited number of firms and little competition, high profit margin, rapid growth of sales.
- **Mature growth:** future sales growth maybe above normal but not accelerates, profit margin begins to decline to normal levels.
- **Stabilization and market maturity:** longest phase, growth rate declines to the point where it matches the growth rate of the aggregate economy, tight profit margin.
- **Deceleration of growth and decline:** sales growth declines because of shifts in demand or growth of substitutes, some firms experience low profits or even losses.

This analysis is useful when estimating sales, profit margins and earnings growth.

LOS 1.C.: describe the basic forces that determine industry competition.

Porter believes that the competitive environment of an industry (the intensity of competition among the firms in that industry) determines the ability of the firms to sustain above average rate of return on investment. The intensity is determined by the five competitive factors:

- Rivalry among the existing competitors increases when:
  - Many firms of relatively equal size compete in the industry.
  - Slow growth causes competitors to fight for market share.
  - High fixed costs lead to price cutting since firms want to operate at full capacity.
  - Exit barriers (e.g. specialized facilities) lock firms in the industry despite poor *("^* rates of return.

- Threat of new entrants increases when there are low barriers to entry such as:
  - High current prices relative to costs.
  - Low capital requirements.
  - High availability of capital.
  - Low economies of scale.
  - Low switching cost.
  - Poor brand identity of current players.

- Substitutes limit the prices the industry can charge, and thus limit the profit potential of the industry. Threat of substitute products increases when the industry's products are more commodity like.

- Bargaining power of buyers is buyer's ability to demand lower prices or higher quality. It increases when:
  - They buy a large volume relative to the seller's sales.
  - They have lots of information about the costs of the suppliers.
  - They feel significant pressure from their customers to lower prices.

- Bargaining power of suppliers refers to suppliers' ability to increase prices or reduce the quality of supplies. It increases when:
  - There are only a few suppliers.
  - The suppliers are more concentrated than their buyers.
  - Their products are critical inputs to their buyers.
  - Few substitutes exist for their products.

An investor needs to assess the effect of this competition on the industry's long-run profit potential.

LOS 1.C.e: describe the process for estimating earnings per share (EPS) for an industry and estimate the EPS for an industry.

The relative valuation approach of industry analysis involves three steps:

- Estimate future earnings per share (EPS) for the industry.
- Estimate an earnings multiplier (P/E ratio) for the industry.
- Industry index value is estimated as EPS x P/E ratio.

To estimate earnings per share for an industry:

- forecast sales per share:
  You need to perform the macroanalysis of the industry, examining the impact of business cycle and structure changes on the industry, and where the industry is in its life cycle. Three complementary and supplementary techniques can be useful in the forecast:
  - Time-series analysis: a time-series plot of the industry sales versus time reflects the pattern and the growth rate for industry sales. Time-series should be analyzed along with the business cycle periods. For industries with constant growth, the sales can be estimated by extrapolating the time series.
  - Input-output analysis: you can identify the future demand of the customers and the growth potential of the industry's suppliers, and analyze the impact of these factors on the industry sales.
  - Industry-aggregate economy relationship: you can identify the economic variables that affect the demand for the industry and examine the impact of these variables on industry demand, and the interaction between these variables.

- forecast operating profit margin:
  We can assume that movements in industry profit margin variables (capacity utilization, unit labor cost, inflation and net exports) are related to movements in similar economy variables, and we can use regression analysis or time-series techniques, along with critical events analysis, to estimate the near-term operating profit margin for an industry. We can also use the five forces model to analyze the competitive environment of the industry and its impact on pricing and profitability.

- industry depreciation:
  The series generally is increasing; the only question is by how much. We can estimate the depreciation expense as: (Estimated PPE) x Estimated (Depreciation Expense/PPE) Ratio.
  Subtracting an estimate of depreciation expense from the operating profit figure indicates the industry's net income before interest and taxes (EBIT).

- industry interest expense:
  It should be based on two separate estimates: (1) changes in the amount of debt outstanding for this industry during the year, and (2) an estimate of the level of interest rates (will they increase or decline?).

- industry tax rate:

- EPS = [(Sales per share) *x* (Operating profit margin) - D - A -1] x (1 - T)

An industry's P/E ratio is as follows:

P/E = Payout ratio / (k - g)

LOS 1.C.f: describe two techniques/or estimating an earnings multiplier/or an industry and estimate the earnings multiplier/or an industry.

Macroanalysis: examine the relationship between the multiplier for the industry and the market.

Because the major factor causing a change in the P/E ratio for the aggregate market and alternative industries is a change in the k - g spread, and these variables have several components that move together, it is reasonable to look for an overall (macro) relationship between changes in an industry's P/E ratio and the market P/E ratio.

Using macroanalysis to estimate industry P/E ratio includes the following steps:

1. Identify the projected market P/E multiple.
2. Use time series analysis to examine the relationship between the P/E ratios for the industry and the market.
3. Estimate the industry P/E ratio by adjusting the market P/E multiple upwards or downwards based on the relationship in step 2.

Microanalysis: estimate the industry P/E ratio by examining the specific variables (b, k and g) that influence it. Specifically, we can compare the two sets (industry and market) of variables. There are two approaches for microanalysis.

The direction of change approach

1. Estimate the changes for three variables that determine P/E (dividend payout ratio D/E, required rate of return k, and the expected growth rate of earnings and dividend g).
2. Based on changes for the variables, we can estimate the change for the P/E ratio from its current value.

The specific multiplier approach

1. Estimate the dividend payout ratio (D/E) based on industry trend and current economic events.

2. Estimate the required rate of return (k) using the CAPM formula:

$$\text{k - industry} = \text{Risk - Free Rate of Return} + \text{Beta - Industry} \times (\text{Market Rate of Return - Risk - Free Rate of Return})$$

3. Estimate the expected growth rate (g) using the following formula:

   g = retention rate (b) x return on equity (ROE).

4. Estimate the projected industry P/E ratio:

$$\text{P/E} = \frac{\text{dividend payout ratio}}{(\text{k-g})}$$

COMPANY ANALYSIS AND STOCK VALUATION

LOS 1.D.a: differentiate between 1) a growth company and a growth stock, 2) a defensive company and a defensive stock, 3) a cyclical company and a cyclical stock, and 4) a speculative company and a speculative stock.

Company analysis focuses on finding *attractive firms* by:

- Analyzing individual firms.
- Understanding each firm's strengths and risks.
- Identifying attractive firms with superior management and strong performance (measured by sales and earnings growth).

Stock selection focuses on finding *attractive stocks* by:

- Computing each stock's intrinsic value.
- Comparing the intrinsic value to the stock's market price.
- Identifying attractive stocks which are substantially undervalued.

Common stocks of good companies are not necessarily good investments: you need to compare the intrinsic value of a stock to its market value to determine if it should be purchased. The stock of a wonderful firm with superior management and strong performance measured by sales and earnings growth can be priced so high that the intrinsic value of the stock is below its current market price. In contrast, the stock of a company with less success based on its sales and earnings growth may have a stock market price that is below its intrinsic value. In this sense, although the company is not as good, its stock could be the better investment.

A growth company is defined as a firm with the management ability and the opportunity to make investments that yield rates of return greater than the firm's required rate of return (actually WACC). As a result, the firm's sales and earnings grow faster than those of similar risk firms and the overall economy. The firm should retain a large portion of its earnings to fund these superior investments projects.

A growth stock is a stock with a higher rate of return than other stocks in the market with similar risk characteristics. Growth stocks are not necessarily limited to growth companies. A future growth stock can be issued by any type of company; the stock need only be undervalued by the market. Several studies have found that the stocks of growth companies have generally not been growth stocks: any undervalued stock can be a growth stock,

Defensive companies are those whose future earnings are likely to withstand an economic downturn. One would expect them to have relative low business risk and not excessive financial risk. Typical examples are public utilities or grocery chains - firms that supply basic consumer necessities.

A defensive stock's rate of return is not expected to decline during an overall market decline, or decline less than the overall market. A stock with low or negative systematic risk may be considered a defensive stock according to the CAPM theory because its returns are unlikely to be harmed significantly in a bear market. Note that the stock of a defensive company is not necessarily defensive.

A cyclical company's sales and earnings will be heavily influenced by aggregate business activity. Examples would be firms in the steel, auto, or heavy machinery industries. They will do well during an economic expansion and poorly during economic contractions. This volatile earnings pattern is typically a function of the firm's business risk and can be compounded by financial risk.

- The greater a firm's business risk, the more volatile its financial performance.
- The firm's financial risk exacerbates the volatility of its performance.

A cyclical stock will experience changes in its rates of return greater than changes in overall market rates of return. This is the stock with a high beta. Note that the stock of a cyclical company is not necessarily cyclical.

A speculative company is one whose assets involve great risk, but that also has a possibility of great gain. A good example is one involved in oil exploration. Biotech firms that focus on developing new cancer treatments are also speculative companies.

A speculative stock possesses a high probability of low or negative rates of return and a low probability of normal or high rates of return. Specifically, a speculative stock is one that is overpriced, leading to a high probability that during the future period when the market adjusts the stock price to its true value, it will experience either low or possibly negative rates of return. An example is an excellent growth company whose stock is selling at an extremely high price/earnings ratio. Note that the stock of a speculative company is not necessarily speculative.

LOS 1.D.b: describe and estimate the expected earnings per share (EPS) and earnings multiplier for a company.

The relative valuation approach of company analysis involves three steps:

1. Estimate future earnings per share (EPS) for the company.
2. Estimate an earnings multiplier (P/E ratio) for the company.
3. Therefore, the future stock value is estimated as EPS x P/E ratio.

Estimate the EPS:

Expected earnings per share are a function of the sales forecast and the estimated profit margin. Time-series analysis is often used here.

- Company sales forecast: it includes an analysis of the relationship of company sales to various relevant economic series and to the company's industry series.
- Profit margin estimate: you need to identify and evaluate the firm's
  - Specific competitive strategy — i.e. low-cost (the firm seeks to become the low-cost producer in the industry)? Differentiation (the firm seeks to identify itself as unique in some attributes that are important to the customers)?
  - Internal performance.
  - Relationship with its industry, which should indicate whether the company's past performance is attributable to its industry or if it is unique to the firm.

- Compute EPS: $\text{EPS} = \dfrac{(\text{Sales} \times \text{Net Profit Margin})}{\text{Number of Outstanding Shares}}$

Estimate the P/E:

Assuming a firm has constant dividend growth rate, the value of its stock is determined by $P = D_1/(k - g)$. Therefore, the firm's P/E ratio is: P/E = Payout ratio / (k - g), where the payout ratio is D_1/EPS.

We can use two approaches here, as in the industry analysis:

- **Microanalysis:** estimate a P/E ratio from the relationship among the firm, its industry and the market.
  - Identify the projected P/E multiples of the market and the industry.
  - Use time series analysis to examine the relationship among the P/E ratios for the firm, the industry and the market.
  - Estimate the firm's P/E ratio by adjusting the market or industry P/E multiple upwards or downwards.

- **Microanalysis:** estimate a multiplier based on three components:
  - The dividend payout ratio (based on the firm's dividend payout history, investment plans, industry trend and current economic events).
  - The required rate of return: consider fundamental factors and market-determined risk (beta) based on CAPM.
  - The rate of growth: use DuPont model.

TECHNICAL ANALYSIS

LOS 1.E.a: explain the underlying assumptions of technical analysis.

Technical analysis involves the examination of past market data, such as prices and the volume of trading, which leads to an estimate of future price trends and, therefore, an investment decision. Several assumptions lead to this view of price movements:

- The market value of any good or service is determined solely by the interaction of supply and demand.

- Supply and demand are governed by numerous rational and irrational (such as moods, guesses and opinions) factors. The market weighs all these factors continuously and automatically.

- The prices for individual securities and the overall value of the market tend to move in trends, which persist for appreciable lengths of time. That is, the new information enters the market *over a period of time,* leading to a *gradual* adjustment of stock prices.

- Prevailing trends change in reaction to shifts in supply and demand relationship. These shifts can be detected sooner or later in the action of the market itself.

LOS 1.E.b: explain how technical analysis differs from fundamental analysis.

The philosophy behind technical analysis is in sharp contrast to the efficient market hypothesis and **fundamental analysis,** which involves making investment decisions based on the examination of the economy, an industry, and company variables that lead to an estimate of value for an investment, which is then compared to the prevailing market price of the investment.

Although both agree that, the price of a security is determined by the interaction of supply and demand, technical analysts and fundamental analysis have different opinions on the influence of irrational factors. A technical analyst might expect that the irrational influence to persist for some time, whereas other market analysts would expect only a short-run effect with rational beliefs prevailing over the long run.

A bigger difference exists between the two regarding the speed of adjustments of stock prices to changes in supply and demand. Technical analysts believe that new information comes to the market over *a period of time* because of different sources of information or because certain investors receive the information or perceive fundamental changes earlier than others. Based on C_, this belief they expect stock prices to move in trends that persist for long periods, and a gradual price adjustment to reflect the gradual flow of the information. However, fundamental analysts believe that new information comes to the market very quickly and they expect stock prices to change abruptly.

To summarize the differences:

- How do they make investment decisions?
  - Technical analysts make investment decisions by examining *past market data* to estimate *future price trends.* They identify new trends and take appropriate actions.
  - Fundamental analysts make investment decisions by examining the economy, the industry and the company to estimate the *intrinsic value* of a stock. They then compare the intrinsic value to the prevailing market price and take actions.

- What data do they use?
  - Technical analysts use *market data and non-quantifiable variables* such as psychological factors.
  - Fundamental analysts use *economic data* (including accounting data which is subject to management manipulation).

LOS 1.E.c: discuss the advantages of technical analysis.

According to technical analysts, it is important to recognize that the fundamental analysts can experience superior returns only if they obtain new information before other investors and process it correctly and quickly. However, technical analysts don't believe that most investors do so consistently.

Technical analysts claim that their method is not heavily dependent on financial accounting statements which have several major problems:

- Financial statements lack a great deal of information that security analysts need.
- Alternative accounting procedures can produce vastly different values for expenses, income and return on assets. Comparing two firms in the same industry is sometimes problematic.
- Many psychological factors and other non-quantifiable variables do not appear in financial statements.

Therefore, technicians consider it advantageous not to depend on financial statements.

Technicians believe that it's difficult for fundamental analysts to pinpoint when to take investment actions even if they have identified the under- or over- valued securities.

Technicians need only quickly recognize a movement to a new equilibrium value for whatever reason - they need not know about an event and determine the effect of the event on the value of the firm and its stock. In addition, because they don't invest until the move to the new equilibrium is under way, they contend that they are more likely to experience ideal timing compared to the fundamental analysts.

LOS 1.E.d: discuss the challenges to technical analysis.

Challenges to technical analysis assumptions

The major challenge is based on the results of empirical tests of the efficient market hypothesis (EMH). Technical analysis assumes that new information enters the market over a period of time. Therefore, the stock prices adjust slowly to the new information, and thus move in prevailing trends. However, the EMH contends that new information enters the market at one point of time, and the stock prices adjust instantaneously to the new information. Therefore, the market would have to be *inefficient for* technical analysis to work. However, almost all studies testing the weak-form efficient market hypothesis using statistical analysis have found that prices do not move in trends based on statistical tests of autocorrelation and runs.

Challenges to technical trading rules

Although numerous technical trading rules exist that have not been or cannot be tested, the vast majority of the results for the trading rules tested support the EMH.

- Past price patterns or relationships between specific market variables and stock prices may not be repeated.
- Many price patterns become self-fulfilling prophecies.
- The success of a particular trading rule will encourage many investors to adopt, and this popularity and the resulting competition will eventually neutralize the value of the technique.
- All trading rules require a great deal of subjective judgment.
- The standard values that signal investment decisions can change over time.

LOS 1.E.e: identify examples of each of the major categories of technical indicators.

Almost all technical analysts watch many alternative rules and decide on a buy or sell decision based on a consensus of the signals because complete agreement of all the rules is rare.

Contrary-Opinion Rules

Many technical analysts believe that the majority of investors are wrong as the market approaches peaks and troughs. Therefore, these technicians try to determine when the majority of investors are either strongly bullish or bearish and then trade in the opposite direction.

- **Mutual Fund Cash Positions**

  Mutual funds hold some part of their portfolio in cash. The cash ratios or liquid asset ratios (ratios of cash as a percentage of the total assets in mutual funds' portfolio) are usually from 5-13 percent. High percentage of cash means bearish, and vice versa. Contrary-opinion technicians consider the mutual funds as a good proxy for the institutional investor, and they believe that mutual funds usually are wrong at peaks and troughs. A high mutual fund cash position also can be considered as a bullish indicator because of potential buying power since technicians believe that these cash funds will eventually be invested and will cause stock prices to increase, and vice versa. Therefore, technicians would tend to buy when the cash ratio approaches 13 percent and to sell when the cash ratio approaches 5 percent. However, a couple of relevant studies concluded that the mutual fund liquid asset ratio was not as strong a predictor or market cycles as suggested by technical analysis.

- **Credit Balances in Brokerage Accounts**

  Credit balances result when investors sell stocks and leave the proceeds with their brokers, expecting to reinvest them shortly. Because technical analysts view these credit balances as pools of potential purchasing power, they interpret a decline in these balances as bearish because it indicates lower purchasing power as the market approaches a peak, and vice versa.

- **Investment Advisory Opinions**

  Many technicians believe that if a large proportion of investment advisory services have a bearish attitude; this signals the approach of market trough and the onset of a bull market. They use the **bearish sentiment index,** which is the ratio of the number of advisory services that are bearish as a percentage of the number of services expressing an opinion. An index of 60 is believed by contrarians as a bullish indication, and an index of 20 is interpreted as a bearish indication.

- **OTC Versus NYSE Volume**

  The ratio of OTC volume on the NASDAQ system to NYSE volume is considered by technicians as a measure of speculative trading. Speculative trading typically peaks at market peaks. Contrarians use the direction of the volume ratio as a guide.

- **The Chicago Board Options Exchange (CBOE) Put/Call Ratio**

Put options are believed to be signals of bearish attitude Technicians reason that a higher put/call ratio indicates a more pervasive bearish attitude, which they consider a bullish indicator. The ratio fluctuates between 0.5 and 0.3. It typically has been substantially less than 1 since investors tend to be bullish and avoid selling short or buying puts.

- **Futures Traders Bullish on Stock Index Futures**

  It is the percentage of speculators in stock index futures that are bullish. Specifically, an advisory service (Market Vane) surveys other firms that provide advisory services for the futures market along with individual traders involved in the futures market to determine whether these futures traders are bearish or bullish regarding stocks.

Follow the Smart Money
Some technical analysts expect to study the behavior of smart, sophisticated investors and create rules to follow them.

- **The Confidence Index**

  It is the ratio of Barren's average yield on 10 top-grade corporate bonds to the yield on the Dow Jones average of 40 bonds. It measures the difference in yield spread between high-grade bonds and a large cross section of bonds. It should never exceed 100 since the yields on high-grade bonds always should be lower than those on a large cross section of bonds. If the index increases, technicians will interpret it as a bullish indicator because, during periods of high confidence, investors are willing to invest more in lower-quality bonds for the added yield and thus cause a decrease in the average yield for the large cross section of bonds relative to the yield on high-grade bonds. The opposite is true (vice versa). However, this interpretation does not consider the supply of bonds which can also cause the yield spread change. Several studies have found that this index has been of little use in predicting stock price movements.

- **T-Bill-Eurodollar Yield Spread**

  It is the spread between T-bill yields and Eurodollar rates. The spread is reasoned to widen at times of international crisis as money flows to safe heaven US T-bills.

- **Short Sales by Specialist**

  The normal ratio of specialists' short sales to total short sales has been approximately 40 percent; a decline in this ratio below 30 percent is viewed as a bullish sign while a ratio above 50 percent is a bearish sign. Note this is a short-run indicator and there is a 2-week reporting lag.

- **Debt Balances in Brokerage Accounts (Margin Debt)**

  Debt balances in brokerage accounts represent borrowing by knowledgeable investors from their brokers. These balances indicate the attitude of a sophisticated group of investors who engage in margin transactions. An increase would be a bullish sign while a decline would indicate selling as these sophisticated investors liquidate their positions and could indicate less capital available for investing.

Other Market Environment Indicators

Some indicators can measure the overall market sentiment.

- **Breadth of Market**

  It measures the number of issues that have increased each day and the number of issues that have declined. It refers to the stock price movements of all firms, large and small. It is possible for a stock-market series to increase but the majority of the individual issues will not, as the majority of the listed firms are medium or small firms that have much less influence on the indexes. This is a problem since it means most stocks are not participating in the rising market. A **diffusion index** shows the daily total stocks advancing plus one-half the number unchanged, divided by the total number of issues traded. It is used to measure intermediate trends and to signal overbought levels if it reaches very high levels of 56 to 60, and oversold when it gets down to 40 - 44. A technician would look for the advance-decline series to indicate a change in trend before the composite stock-market series.

- **Short Interest**

  It is the cumulative number of shares that have been sold short by investors and not covered. A short interest ratio is the outstanding short interest divided by the average daily volume of trading on the exchange. Technicians consider a high short interest bullish because it indicates potential demand for the stock by those who previously sold short and have not covered the short sale.

- **Stocks Above Their 200-Day Moving Average**

  The average is used to determine a stock or market series' general trend. The market is considered overbought and bearish when more than 80 percent of the stocks are trading above their 200-day moving average, and it is considered oversold and bullish when less than *20.* Percent of the stocks are selling above their 200-day moving average.

- **Block Uptick-Downtick Ratio**

  About 50 percent of NYSE volume comes from block trading by institutions. If the block trade price is above (or below) the prior transaction price, it is referred to as an uptick (or downtick). It is assumed that if the block trade was initiated by a buyer (a seller); you would expect an uptick (a downtick). The uptick - downtick ratio indicates institutional investor sentiment, and it is generally has fluctuated from 0.70 (bullish) to 1.10 (bearish).

Stock Price Volumes Techniques
They analyze price patterns and corresponding volume movements to make investment decisions.

- **The Dow Theory**

  Dow described stock prices as moving in trends analogous to the movement of water. There are three types of trends: major trends (like tides), intermediate trends (like waves) and short-run trends (like ripples). Technicians hope to detect the direction of major price trend (tide), recognizing that intermediate movements (waves) may occasionally move in the opposite direction. They recognize that a major market advances does not go straight up, but rather includes small price declines as some investors decide to take profits.

- **Importance of Volume**

  Price change alone does not tell us how widespread the excess demand or supply at that *time*. Technicians look for a price increase on heavy volume relative to the stock's normal trading volume as an indication of bullish activity.

- **Support and Resistance Levels**

  A support level is the price range at which the technician would expect a substantial increase in the demand for a stock. Generally, a support level will develop after a stock has enjoyed a meaningful price increase and the stock has begun to experience profit taking. A **resistance level** is the price range at which the technician would expect an increase in the supply of stock and any price increase to reverse abruptly. It tends to develop after a stock has experienced a steady decline from a higher price level.

- **Moving-Average Line**

  Technicians use moving-averages to eliminate the effects of minor price fluctuations and thus have a clearer picture about the overall price trends. Moving-average lines are combined with trading volume to examine the market sentiment and price trends. For example, a 50-day moving average (MA) price line is compared to a 200-day MA line to reflect the overall trend.

- **Relative Strength**

  It is believed that once a trend begins, it will continue until some major event causes a change in direction. Technicians compute relative-strength (RS) ratios for individual stocks and industry groups as the ratio of the price of a stock or an industry index relative to the value for some stock market series. If this ration increases over time, it shows that the stock or industry is outperforming the market, and a technician would expect this superior performance to continue.

- **Bar Charting**

  Charts are used to show daily, weekly or monthly time series of stock prices. For a given interval, the technical analysts plots the high and low prices and connects the two points to form a bar, and then draw a small horizontal line across this vertical bar to indicate the closing price.

- **Multiple Indicator Charts**

- **Point-And-Figure Charts**

  It includes only significant price changes, regardless of their timing. A technician would speculate during a period of consolidation.

INTRODUCTION TO PRICE MULTIPLES

LOS 2.a: discuss the rationales for the use of price to earnings (P/E), price to book value (P/By), price to sales (P/S), and price to cashflow (P/CF) in equity valuation.

Price multiples are ratios of a stock market price to some measure of value per share. The intuition behind price multiples is that what a share represents in terms of assets, earnings, or some other measure of value is important for estimating its value.

Two approaches to using price multiples to select stocks:

- The method of comparables: **comparison across stocks.**

  The economic rationale for this approach is that two stocks that are comparable in all aspects (e.g. risk, profit margins, growth prospects, etc) should have approximately the same price multiples. This approach compares a price multiple to a benchmark value to evaluate whether an asset is relatively fairly valued.

- The method based on forecasted fundamentals: **compare the stock to itself.**

  The economic rationale for this approach is that stock price should reflect the stack's intrinsic value, which is driven by fundamentals of the Firm (e.g. sales, growth prospects, etc). This method uses the firm's fundamentals to estimate a fair value of the multiple, and then compares the fair value to the actual market value of the multiple to make an investment decision.

LOS 2.b: discuss the possible drawbacks to the use of each price multiple.
LOS 2.c: define, calculate, and interpret P/E.

Rationales for Using P/E Ratios

- Earning power is a chief driver of investment value, and EPS is perhaps the chief focus of security analysts' attention.
- P/E is widely recognized and used by investors.
- Differences in P/Es may be related to differences in long-run average returns.
- As with other price multiples, the numerator of the P/E is the market price of the stock, which is readily determinable. In addition, there is no important interpretation issue associated with the market price.

Drawbacks to using P/Es

- The denominator of the P/E is EPS, which is based on complex standards of accrual accounting. As a result, there is a number of important interpretation issues associated with EPS.
- EPS can be negative and the P/E does not make economic sense with a negative denominator. Thus, P/Es can only be used to value stocks with positive EPS.
- The ongoing or recurring components of earnings are the most important in determining intrinsic value. Earnings often have volatile, transient components, however, making the analyst's task difficult.
- Within allowable accounting practices, management can exercise its discretion to distort EPS. Distortions can affect the comparability of P/Es across companies.

In calculating a P/E, the current price for publicly traded companies is generally easily obtained and unambiguous. Two issues must be considered to determine the earnings figure:

- The time horizon over which earnings are measured

  A stock's trailing P/E (current P/E) is its current market price divided by the most recent four quarters' EPS. The P/E published in financial newspapers' stock listings is trailing P/E. The leading P/E (forward P/E or prospective P/E) is a stock's current price divided by next year's expected earnings. For companies with rising earnings, the leading P/E will be smaller than the trailing P/E because the denominator in the leading P/E calculation will be larger. In using P/Es, the same definition should be applied to all companies and time periods under examination.

- The adjustments to accounting earnings so that P/Es can be compared across companies.

  - Transitory, non-recurring components of earnings that are company specific. They are not expected to reappear in future earnings and should be excluded to get underlying earnings. Examples are: gains and losses from the sale of assets, asset write-downs, provisions for future losses, and changes in accounting estimates. These components often appear in the income from continuing operations portion of a business's income statement, the footnotes to the income statement, and management's. Since future cash flows determine stock value, an analyst should focus on estimating underlying earnings which are expected to continue into the future.

  - Transitory components of earnings due to cyclicality (business or industry

cyclicality). Because business cycles repeat, such effects (although transitory) can be expected to recur over subsequent cycles, and the most recent four quarters of earnings may not accurately reflect the average or long-term earnings power of a business. This is particularly true for cyclical businesses such as automobile manufacturing, residential construction. The performance of cyclical businesses typically tracks the direction of general economic cycle. At the bottom of a cycle, cyclical businesses often have high P/Es due to depressed EPS; at the top of a cycle, cyclical businesses often have low P/Es due to high EPS.

To eliminate the cyclic effects, analysts typically estimate the level of EPS that the firm could achieve under normal business conditions. Such an EPS level is called normalized earnings per share. Two of several available methods are:

- § Historical average EPS: normal EPS (business-cycle-adjusted EPS) is calculated as average EPS over the most recent full cycle. However, this method fails to account for changes in the firm's size.

- § Average return on equity: normal EPS is calculated as the average return on equity (ROE) from the most recent full cycle, multiplied by current book value per share. This method reflects more accurately the effect on EPS of growth or shrinkage in the company's size and is sometimes preferred.

- o Differences in accounting methods.

Example: in late October 1999, Coachmen Industries (COA) was trading at a price of $16 per share and had trailing twelve months EPS of $1.99. COA's P/E was thus 8.04. At the same time, Winnebago Industries (WGO) was trading at a price of $17 per share and had trailing twelve months EPS of $1.99 for a P/E of 8.54. COA uses the FIFO method of accounting for its inventory. WGO uses the LIFO method of accounting for its inventory. Adjusting WGO's results for differences between the LIFO and FIFO methods produces an adjusted EPS of $2.02 and an adjusted P/E of 8.42. Adjusting EPS for WGO for consistency with COA's inventory accounting method narrows the difference between the two companies' P/Es.

- o Potential dilution of EPS: companies are required to present both basic EPS and diluted EPS.

Example:

Melvin Stewart, CFA, a telecommunications analyst, is performing a P/E-based comparison of two telecom companies as of early 2003. He has the following data for Hall Wire (HLLW) and RuffWire (RFFW) for 2002.

- HLLW is priced at $44 with basic EPS of 2.00. RFFW is priced at $22 with basic EPS of $1.5.
- HLLW has not issued stock options or other instruments with dilutive effects. RFFW does have substantial stock option issuance; RFFW has not expensed the cost of stock options. If the stock option were exercised, RFFW's shares outstanding would increase by 10 percent.
- RFFW's 2002 EPS of $1.50 includes $0.50 of earnings that Stewart believes will not recur in the future. Stewart believes that all of HLLW's earnings reflect items that will contribute to future earnings.

A. Calculate P/E for HLLW and RFFW without making any EPS adjustments.

For HLLW: $44/$2 == 22.
For RFFW: $22/$ 1.50= 14.7.

B. Calculate the price to earnings ratio for HLLW and RFFW based on estimated underlying earnings, making no other EPS adjustments.

For HLLW, all of EPS of $2.00 represents underlying earnings. For HLLW, $1.50 - $0.50 = $1.00 represents underlying earnings. Therefore, with a focus on underlying earnings, the P/E of HLLW would still be 22, but RFFW's P/E would increase from 14.7 to 22.

C. Contrast the conclusions an analyst might draw from the calculations in A and B, and select the calculation that would be preferred in practice.

Holding all else equal, RFFW might appear to be undervalued using P/E without any earnings adjustments because it's P/E is smaller. With the specified adjustment the apparent valuation difference disappears.

Because valuation looks toward the future, and non-recurring earnings are not expected to re-appear in future earnings, the calculation of P/E focusing on underlying earnings affords a more accurate comparison of the valuation of HLLW and RFFW.

D. Calculate the P/E of HLLW and RFFW taking account of only underlying earnings, and reflecting the effects, if any, of possible share dilution.

HLLW's P/E remains at 22. For RFFW, with potential 10 percent dilution, dividing underlying earnings by 1.10 yields $1.00/1.10 = $0.91, and the P/E would be 24.2, contrasting to 14.7 calculating in Part A and 22 calculated in Part B.

The Problem of Negative P/E Multiple

The P/E multiple represents how much an investor has to spend to get a dollar of earnings from the stock. When the P/E multiple is used to select stocks, stocks are ranked by their P/E ratios from the highest to the lowest. The stocks with the highest (lowest) P/E has the highest (lowest) purchase cost. The decision rule is: all else equal, buy stocks with the lowest P/E.

However, negative earnings render the P/E multiple meaningless. To address this problem, analysts can rank stocks by their earnings yield. It is the reciprocal of the P/E multiple. It represents the amount of earnings an investor can get from a stock for each dollar spent on the stock. When ranked by the E/P ratio, the stock with the highest (lowest) E/P has the highest (lowest) return. The decision rule is: all else equal, buy stocks with the highest P/E. Since a stock with negative earnings will have the lowest E/P ratio, it is the most expensive stock. Thus, the earnings yield ratio can be used to correctly rank all stocks from the cheapest to the most expensive.

LOS 2.d: define, calculate, and interpret P/B V.

The computation is as follows:

- (Shareholders' equity) - (Total value of equity claims that are senior to common stock) = Common shareholders' equity (also called book value of equity)
- $$\frac{\text{(Common shareholders equity)}}{\text{(Number of common stock shares outstanding)}} = \text{Boook value per share.}$$
- $$\frac{\text{P}}{\text{BV}} = \frac{\text{Current stock price}}{\text{Book value per share (BVPS)}}$$

Possible senior claims to common stock include the value of preferred stock and dividends in arrears on preferred stock.

Studies found that stocks with low P/B ratios had higher risk-adjusted returns than those with high P/V ratios. The larger the spread between the firms's return on equity (ROE) and its cost of equity, the higher the P/B ratio.

Part of Balance Sheet

Shareholders' Equity
Common Stock ($2.50 par value. Authorized 40,000,000; issued 21,249,860) 53,125,000
Additional paid-in capital 1,040,000
Retained earnings 127,817,000
Treasury stock (cost of 4,979,095 shares repurchased in 2001) (90,442,000)
Total Shareholders' Equity 91,540,000
The book value per share - 91,540,000/16,270,765 = $5.63

Rationales for Using P/B Ratios

- Book value is generally positive even when EPS is negative.
- Since book value per share is more stable than EPS, P/B may be more meaningful than P/E when EPS is abnormally high or low, or is highly variable.
- Book value per share is viewed as appropriate for valuing companies composed chiefly of liquid assets.
- Book value can be used to value companies that are not expected to continue as a going concern.
- Differences in P/Bs may be related to differences in long-run average returns.

Drawbacks to using P/Bs

- Other assets (i.e. human capital) besides those recognized in accounting may be critical operating factors. This explains why service firms have very high P/BV ratios. For many service firms, human capital is more important than physical capital, but human capital is not recognized in accounting.
- P/B may be misleading when significant differences exist in terms of the level of assets used. Such differences may reflect differences in business models, for example. In this case, it is inappropriate to use the P/BV ratio to compare firms. For example. Dell sells made-to-order computers directly to end users. It requires smaller investments in fixed assets and inventories than other manufacturers such as HP. This implies that Dell has lower book value per share than its competitors.

- Accounting effects on book value may compromise book value as a measure of shareholders' investment in the company. For example, R&D costs are usually expensed. Such expenditure often positively affects income over many periods and in principle they create assets.

Book value normally reflects historical purchase costs of assets. However, inflation and technological change eventually drive a wedge between the book value and the market value of assets.
Book value is often adjusted to more accurately reflect the value of shareholders' investment and improve the comparability of P/BV across firms and countries. There are three common adjustments:

- Tangible book value per share: computation involves subtracting reported intangible assets from common shareholders' equity.
- The balance sheet may be adjusted for significant off-balance-sheet assets and liabilities, and for differences in the fair value of these assets/liabilities (such as land, equipment, marketable securities) from recorded accounting amounts.
- Other adjustments. For example, one company uses FIFO but a peer company uses LIFO. An analyst should restate the book value of the company using LIFO to what it would be on a FIFO basis.

LOS 2.e: define, calculate, and interpret P/S.

The price/sales (P/S) ratio is defined as the current price of a firm's stock to its sales per share:

$$\text{PS} = \frac{\text{Current stock price}}{\text{Sales per share}}$$

It can also be expressed as:

$$\text{P/S} = \frac{\text{Price}}{\text{Earnings}} \times \frac{\text{Earnings}}{\text{Sales}} = \text{P/E ratio} \times \text{Net Profit margin}$$

Therefore, the P/S ratio is influenced by the firm's profit margin, sales growth and sales volatility.

Rationales for Using P/S Ratios

- Sales are generally less subject to distortion or manipulation than are other fundamentals. For example, management can manipulate EPS by changing depreciation methods. However, sales come prior to any expenses, and therefore are not affected by distortion of depreciation expense.
- Sales are positive even when EPS is negative.
- Sale is generally more stable than EPS, so P/S may be more meaningful than P/E when EPS is abnormally high or low.
- P/S has been viewed as appropriate for valuing the stock of mature, cyclical and zero-income companies.
- Differences in P/S ratios may be related to differences in long-run average returns.

Drawbacks to using P/Ss

- A business may show high growth in sales even when it is not operating profitably (as measured by earnings and cash flows), while the stock value is ultimately determined by the firm's profitability.
- P/S ratio does not reflect a company's expenses (cost structure).
- Book value is often adjusted to more accurately reflect the value of shareholders' investment and improve the comparability of P/BV across firms and countries. There are three common adjustments:
- Tangible book value per share: computation involves subtracting reported intangible assets from common shareholders' equity.
- The balance sheet may be adjusted for significant off-balance-sheet assets and liabilities, and for differences in the fair value of these assets/liabilities (such as land, equipment, marketable securities) from recorded accounting amounts.
- Other adjustments. For example, one company uses FIFO but a peer company uses LIFO. An analyst should restate the book value of the company using LIFO to what it would be on a FIFO basis.
- Revenue recognition practices offer the potential to distort P/S.

Analysts usually use annual sales from the company's most recent fiscal year in the calculation. They should evaluate a company's revenue recognition practices, in particular those tending to speed up the recognition of revenues. For example, sales **on a bill-and-hold basis** involve selling products buy not delivering those products until a later date. Sales

on this basis have the effect of accelerating sales into an earlier reporting

Under a *Barter Revenue Arrangement*, a firm provides goods or services to another in exchange for that firm's goods or services. Both firms recognize revenues, often at prices higher than the fair market price. However, neither of the two firms has any net income or cash flow. For example, two Internet companies, A and B, exchange $100 worth of banner advertising with each other. Each will report $100 of revenue and $100 of expense. Neither generates any net income or cash flows from this batter transaction. However, the batter arrangement does increase both firms' revenue, leading to favorable P/S ratios.

LOS 2.f: define, calculate, and interpret P/CF.

It is defined as the current market price of the firm's stock to cash flows per share:

$$\text{P/CF} = \frac{\text{Current stock price}}{\text{Expected cash flows per share}} = \frac{\text{Current stock price}}{\left(\frac{\text{Exptected cash flows}}{\text{\# of shares outstanding}}\right)}$$

For example: a firm's current stock price is $200. Its expected cash flow for the next year is $400 million. The firm has 10 million shares outstanding.

$$\text{P/CF} = \frac{\$200}{\left(\frac{\$400}{10}\right)} = 5$$

There are several alternative measures of cash flow (CF), such as cash flow from operating activities (CFO) and free cash flow to equity (FCFE). For level 1 exam, just remember that cash flow can be approximated by adding noncash charges back to earnings.

Rationales for Using P/CF Ratios

- Cash flow is less subject to manipulation by management than earnings. Thus, P/CF ratios can be used to compare firms with different degrees of accounting aggressiveness.
- Cash flow is generally more stable than earnings. When EPS is abnormally high, low or volatile, P/CF ratios are more reliable than P/Es.
- Using P/CF rather than P/E addresses the issue of differences in accounting conservatism between companies (differences in the quality of earnings).
- Differences in P/CF ratios may be related to differences in long-run average returns.

Drawbacks to using P/CFs

- When the EPS plus non-cash charges approximation to cash flow from operations is used, items affecting actual cash flow from operations, such as non-cash revenue and net changes in working capital, are ignored.
- Theory views free cash flow rather than cash flow as the appropriate variable for valuation. We can use price to free cash flow to equity (P/FCFE) ratios but FCFE does have the possible drawback of being volatile compared to CF, for many businesses. FCFE is also more frequently negative than CF.

Note: FCFE is the cash flow available to common stockholders, and equals operating cash flow less capital expenditures and all payments to debtholders.

DISCOUNTED CASH FLOW APPLICATIONS

LOS 3.a: describe the components and the assumptions underlying the constant growth dividend discount model.

Under the dividend discount model (DDM), the current price of common stock (Po) is determined by the present value of all future dividends. If the stock is sold at some point in the future, its value at that time will be the present value of all future dividends. In fact, the buyer pays for the remaining dividend stream.

- The single period DDM: if an investor sells the stock after holding it for 1 year, the value of the stock is the present value of dividend payment at the end of year 1 and expected sale price at the end of year 1.

- The two periods DDM: if an investor sells the stock after holding for 2 years, the value of the stock is the present value of dividend payments at the end of year 1 and 2, and expected sale price at the end of year 2.

- Assume a firm pays the same amount of dividend period after period. The stock is perpetuity since it has no maturity. Thus, the current price of the stock is the annual (^ dividend divided by the required rate of return (r).

- If dividends grow at a constant rate (g) forever, the price of the stock is

$$P_0 = D_0 \times \frac{(1+g)}{(r-g)} = \frac{D_1}{(r-g)}$$

Where: D_0 is the dividend payment in the current period.

The r - g has substantial impact on stock value

- If the r - g spread increases, the stock value will decline.
- If the r - g spread decreases, the stock value will rise.
- Small changes in the r - g spread can cause significant changes in the stock's value.

The assumptions are:

- Dividends grow at a constant rate of g forever.
- The growth rate is less than the required rate of return r; otherwise the model breaks down since the denominator would be negative.

$$P_0 = D_1 / (r - g)$$

LOS 3.b: calculate the price of a stock using the constant growth dividend discount model.

LOS 3.c: explain supernormal growth and calculate the price of a stock using the two-stage dividend discount model.

In some cases, companies experience initial periods of unusually high growth (called **supernormal growth)** that are expected to last for a finite amount of time. In these cases, the high growth may be larger than the required rate of return. Such companies face two growth (^) rates: the first period of growth might last for a period of time, H. The second period, beginning with the dividend at t = H + 1, has dividend reflecting a long-term growth rate strictly less than the required rate of return.

$$P_0 = \frac{SD_t}{(1 + r)^t} + \frac{P_H}{(1+r)^H}$$

This is called the two-stage dividend discount model.

If a stock does not pay dividend for some early years, investors expect at some point in the future the firm will start to pay dividends. Thus, valuation of stocks paying no dividend uses the same DDM approach, except that some of the early dividends are 0.

LOS 3.d: distinguish between dollar-weighted and time-weighted rates of return.

Refer to LOS 3.e please.

LOS 3.e: calculate the dollar-weighted and time-weighted rates of return on a portfolio.

The **dollar-weighted rate of return** is essentially the internal rate of return (IRR) on the portfolio. The approach considers the timing and amount of cash flows. *This approach is affected by the timing of cash flows.* If funds are added to a portfolio when the portfolio is performing-*well* (poorly), the dollar-weighted rate of return will be *inflated* (depressed).

The **time-weighted rate of return** measures the compound growth rate of $1 initial investment over the measurement period. Time weighted means that returns are averaged over time. *This approach is not affected by the timing of cash flows;* therefore it is the preferred method of performance measurement.

Example:

Jayson bought a share of IBM stock for $100 on Dec 31, 2000. On Dec 31, 2001 he bought another share for $150. On Dec. 31, 2002 he sold both shares for $140 each. The stock paid a dividend of $10 per share at the end of each year.

To calculate the dollar-weighted rate of return, you need to determine the timing and amount of cash flows for each year, and then set the present value of net cash flows to be 0: $- 100 - 140/(1 + r) + 300/(1 + r)^2 = 0$. You can use the IRR function on a financial calculator to solve for r to get the dollar-weighted rate of return: r = 17%.

To calculate the time-weighted rate of return:

- Split the overall measurement period into equal subperiods on the dates of cash flows. For the first year:
  - Beginning price: $ 100.
  - Dividends: $10.
  - Ending price: $150.

  For the second year:
  - Beginning price: $300 (150 x 2).
  - Dividends: $20 (10 x 2).
  - Ending price: $280 (140 x 2).

- Calculate the holding period return (HPR) on the portfolio for each subperiods:

$$\text{HPR} = \frac{\text{Dividends + Ending Price}}{\text{Beginning Price}}$$

For the first year, HPR 1:

$$\frac{150 + 10}{100} = 1.60$$

For the second year, HPR2:

$$\frac{280 + 20}{300} = 1.00$$

- Calculate the time-weighted rate of return:
  - If the measurement period < 1 year, compound holding period returns to get an annualized rate of return for the year.
  - If the measurement period > 1 year, take the geometric mean of the annual returns. $(1 + r)^2 = 1.60 \times 1.00 > r = 26\%$.

ALTERNATIVE INVESTMENTS

1.a: describe the general features of alternative investments and distinguish between alternative assets and alternative strategies.

Both alternative assets and alternative strategies are classified as alternative investments.

- Alternative assets are assets not traded on exchanges. Examples include real estate, venture capital, etc.
- Alternative strategies are strategies that mostly use traded assets for the purpose of isolating bets and generating alpha. Examples include hedge funds and mutual funds.

Whether an investor invests directly or through an intermediary in alternative investments, he must know the investment's characteristics. Alternative investments usually involve:

- *illiquidity:* since most alternative investments are not traded on exchanges, they usually cannot be quickly converted to cash at a price close to fair market value. As a result, alternative investments beckon investors to areas of the market where alpha is more likely to be found than in more liquid and efficient markets. A liquidity premium compensates the investor for the investor's inability to continuously rebalance the alternative investments in the portfolio.

- *difficulty in the determination of current market values.*

- *limited historical risk and return data:* the requirement for extensive investment analysis.

- *a segmentation risk premium:* the premium compensates investors for the risk of alternative assets that, by nature, are generally nor priced in a fully integrated global market.

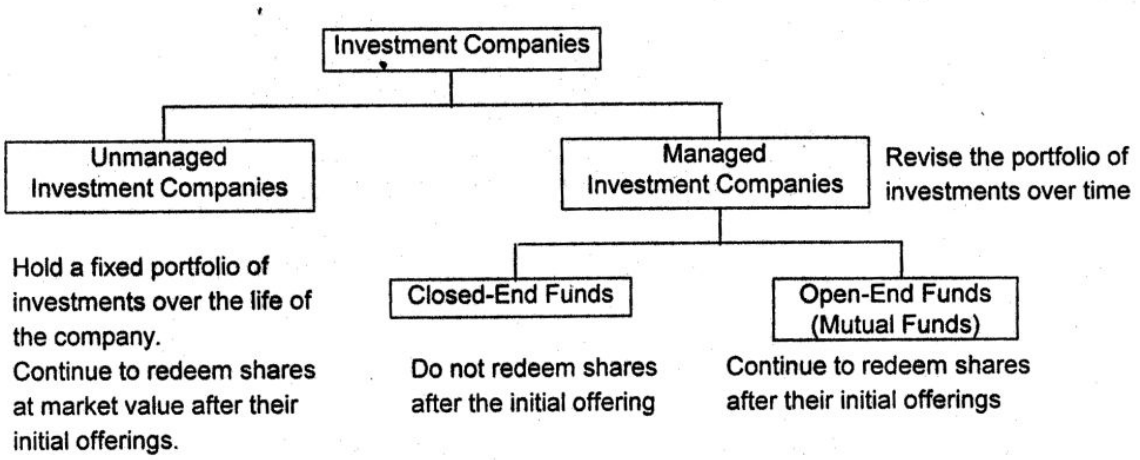
- *Unique legal and tax considerations:* many alternative investments use special legal structures to avoid some taxes or regulations.

Illiquidity, limited information, and less efficiency do not suit all investors, but can be attractive features to those looking for likely places to add value through investment expertise.

Note: alpha is risk-adjusted return in excess of the required rate of return, but, more colloquially, stands for positive excess risk-adjusted return, the goal of active managers.

LOS 1.b: distinguish between an open-end and a closed-end fund and between a load and a no load fund.

An **investment company** invests a pool of funds belonging to many individuals in a single portfolio (referred to as a fund) of securities. The major duties of the investment management company include investment research, the management of the portfolio and administrative duties, such as issuing securities and handling redemptions and dividends. The management of the portfolio of securities and most of the other administrative duties are handled by a separate **investment management company** hired by the board of directors of the investment company. To achieve economics of scale, many management companies start numerous funds with different characteristics. This "family of funds" promotes flexibility and increases the total capital managed by the investment firm.



Investment companies are classified according to whether or not they stand ready to redeem investor shares.

- An open-end investment company, or a mutual fund, continues to sell and repurchase shares after its initial public offering. It stands ready to redeem investor shares at market value.

- A closed-end investment company operates like any other public firm. It is initiated through a stock offering to raise capital. Its stock trades on the regular secondary market and the market price is determined by supply and demand. A typical closed-end investment company offers no further shares and does not repurchases the shares on demand (no funds can be withdrawn). Therefore, investors must trade in public secondary markets (e.g. NASDAQ) to buy or sell shares.

Various fees charged by investment companies:

- Investment companies charge fees for their efforts of setting up funds. **Sales commissions** are charged at purchase (**front-end load**) as a percentage of the investment.
  - A **load fund** has sales commission charges. A load fund's offering price = NAV of the share + a sales charge (7.5 - 8% of the NAV). The NAV price is the redemption (bid) price, and the offering (ask) price equals the NAV divided by 1 minus the percent load.
  - A no-load fund imposes no initial sales charge, so it sells at NAV. Some charge a small redemption fee of about 0.5%.

  - A low-load fund typically imposes 3 percent sales charge.

- Redemption fee (back-end load): a charge to exit the fund. They discourage quick trading turnover and are set up so that the fees decline the longer the shares are held (in this case, the fees are sometimes called contingent deferred sales charges). Load funds generally charge no redemption fees.

- All mutual funds charge annual fees.

  - They are composed of operating expenses including management fees, administrative expenses and continuing distribution fees. For example, distribution fees are fees paid back to the party that arranged the initial sale of the shares and are thus another type of sales incentive fee.
  - Annual charges are typically calculated as a percentage of the average net assets of the fund. For example, a 12b-l plan permits funds to deduct as much as 0.75%nof average net assets per year to cover distribution costs.
  - The ratio of operating expenses to average assets is often referred to as the fund's *"expense ratio".*

LOS 1.c: explain how the net asset value of a fund is calculated.

The per-share value of the investment company is known as its net asset value (NAV). It is like the share price of a corporation's common stock.

$$\text{Fund NAV} = \frac{[(\text{Total Market Value of Fund Portfolio}) - (\text{Fund Liabilities})]}{(\text{Number of Fund Shares Outstanding})}$$

- Fund liabilities are mainly fees owed to the fund manager.
- Share value equals NAV for unmanaged and open-end investment companies because they stand ready to redeem their shares at NAV.
- The price of a closed-end investment company's shares is determined by the supply and demand in the secondary markets in which they trade, and, consequently, can be at a premium or discount to NAV.

LOS 1.d: explain the nature of various fees charged by mutual funds and the impact of such fees on fund performance.

In addition to selling charges, all investment firms charge annual **management fees** to compensate professional managers of the fund. Such a fee typically is from 0.25 to 1.00 percent of the average net assets of the fund. These management fees are a major factor driving the creation of new funds: once the research staff and management structure have been established, the incremental costs do not rise in line with the assets under management.

- Loads, redemption fees, and distribution fees are sales incentives.

- Only management fees can be considered a portfolio management incentive fee. However, as management fees are based on net assets of the fund instead of its rate of return, they are not an effective performance incentive. Researches have also found out that good performance is associated with low expense ratios.

LOS 1.e: distinguish among style, sector, index, global, and stable value strategies in equity investment.

Investment companies primarily invest in equity. Investment strategies can be characterized as the following strategies:

- **Style strategies** focus on the underlying characteristics common to certain investments. Growth is a different style than value, and large capitalization investing is a different style than small stock investing. A growth strategy may focus on high price-to-earnings stocks, and a value strategy on low price-to-earnings stocks. Clearly there are many styles.

- A **sector investment fund** focuses on particular industries (e.g. technology).

- An **index fund** tracks an index. In the simplest implementation, the fund owns the securities in the index in exactly the same proportion as the market value weights of those securities in the index.

- A **global fund** includes securities from around the world and might keep portfolio weights similar to world market capitalization weights. An international fund is one that does NOT include the home country's securities, whereas a global fund includes the securities from the home country.

- A **stable value fund** invests in securities such as short-term fixed income instruments and guaranteed investment contracts which are guaranteed by the. issuing insurance company and pay principal and a set rate of interest. It focuses on preservation of capital while earning stable current income.

LOS 1.f: distinguish between a closed-end fund and an exchange traded fund (ETF).

Exchange-traded funds (ETF) are a special type of mutual funds traded on a stock market like shares of public companies. They are designed to closely track the performance of a specified stock market index.

- ETFs can be traded at any time during market hours.
- ETFs can be sold short or margined.
- ETFs are shares of a portfolio, not of an individual company.

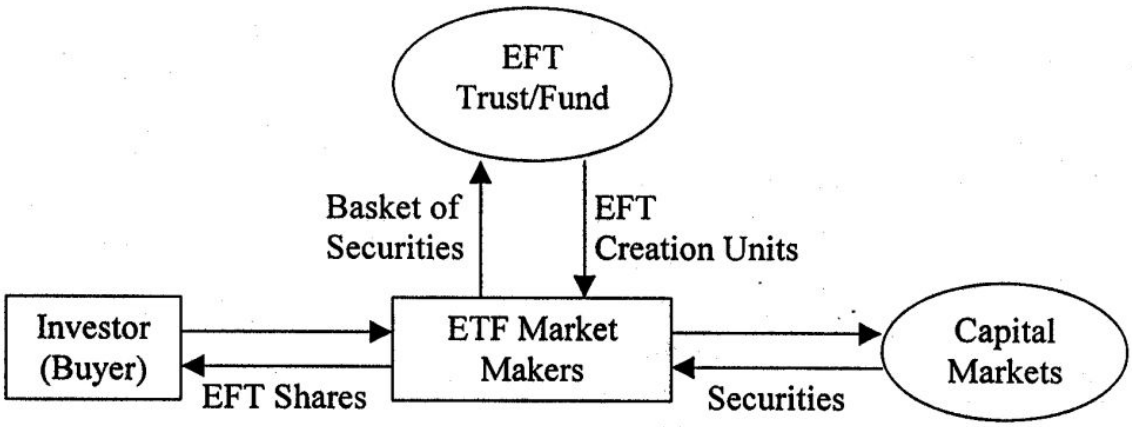
Legal Structures of ETFs

- **Managed Investment Companies** are open-ended investment companies registered under the Investment Company Act of 1940.
    - They offer the most flexible ETF structure.
    - The index can be tracked using various techniques.
    - Dividends paid on the securities can be immediately reinvested in the fund.
- **Unit Investment Trusts (UITs)** are also registered investment companies but operate under more constraints because they don't have a manager per se (but trustees)
    - They are required to be fully invested in all underlying securities forming the index.
    - They must hold dividends received on securities in cash until the ETF pays a dividend to shareholders: this could result in a slight cash drag on performance.
    - They are not permitted to lend securities and do not generally use derivatives.
- **Grantor Trusts** are a structure that allows investors to indirectly own an unmanaged basket of stocks rather than tracking an index. They are not registered investment companies.
    - Because a grantor trust is fully invested in the basket of securities, no investment discretion is exercised by the trust. This is basically an unmanaged (and (unregistered) investment company with a limited life.
    - The trust passes all dividends on the underlying securities to shareholders as soon as practicable.
    - Securities lending and use of derivatives are generally not practiced.

In the traditional mutual fund structure, no market makers are involved in the creation and redemption process.

- When investors want to purchase the shares of a fund, the fund manager will issue new shares to the investors and take the cash to the capital markets to buy securities that fit the fund's objective.
- When investors want to sell the shares of the fund, the manager will sell securities back to the capital markets, and use the cash raised to redeem shares from the investors.

Unlike close-end funds, open-end and UIT ETFs use market makers in the unique "in-kind" creation and redemption process.



Creation and redemption units are created in large multiples of individual ETF shares, for example, 50,000 shares. These units are available to exchange specialists (authorized participants or creation agents) that are authorized by the fund and who will generally act as market makers on the individual shares. The fund publishes the index tracking portfolio that it is willing to accept for in-kind transactions.

- When there is excess demand for ETF shares, an authorized participant will create a creation unit by depositing with the trustee of the fund the specified portfolio of stocks used to track the index. In return, the authorized participant will receive ETF shares that can be sold to investors on the stock market. A purchase order to buy ETF shares is not directed to the fund but to the market makers on the exchange. In contrast, in the traditional mutual fund structure an increase in demand for the shares of the mutual fund is met by the mutual fund, which simply issues new shares to the investor (and the fund manager will take the cash to the capital markets and buy securities appropriate to the fund's objective).

- If there is an excess number of ETF shares sold by investors, an authorized participant will decide to redeem ETF shares by exchanging with the fund a redemption unit for a portfolio of stocks held by the fund and used to track the index. As opposed to traditional open-end funds, this process means that no capital gain will be realized in the fund's portfolio on redemption. If the redemption were in cash, the fund would have to sell stocks and if their price had appreciated, the fund would realize a capital gain and a tax burden for all existing fund shareholders. This is not the case with ETFs. Certainly individual ETF shareholders can require in-cash redemption but the practice is discouraged:
  - A large fee is charged on in-cash redemptions.
  - In-cash redemptions are based on the NAV computed several days after the transactions, not the current NAV. As a result, investors will be reluctant to redeem in cash because the redemption value is unknown at the time of redemption.
  - Therefore, it is more advantageous for them to sell their shares on the market than to redeem them in cash.

LOS 1.g: discuss the advantages, disadvantages, and risks of ETFs.

Advantages:

- Diversification can be obtained easily with a single ETF transaction.
- They trade similarly to a stock.
- They trade throughout the whole trading day instead of trading once a day, as do the traditional open-ended mutual funds.
- The management of their risk is augmented by futures and options contracts on them.
- Transparency of portfolio holdings.
- Cost effective: no load fees, low expense ratio since they are passively managed and there is no shareholder accounting at the fund level.
- Avoidance of significant premiums or discounts to NAV because of their unique structure: arbitrage helps keep the traded price of an ETF much more in line with its underlying value. This is contrast to closed-end index funds, which offer a fixed supply of shares, and as demand changes, they frequently trade at appreciable discounts from — and sometimes premiums to — their NAVs.
- Tax savings from payment of in-kind redemption.
- Immediate dividend reinvestment for open-end ETFs.

Disadvantages:

- Only a narrow-based market index tracked in some countries.
- Intraday trading opportunity is not important for long-horizon investors.
- Large bid-ask spreads on some ETFs. As a result, investing in these funds is very costly.
- Possibly better cost structures and tax advantages to direct index investing for large institutions. Such a portfolio may also have lower taxes than an ETF.

The following risks do not affect all ETFs to the same extent.

- Market risk: similar to those of holders of other diversified portfolios.
- Asset class/sector risk: the returns from the type of securities in which an ETF invests may underperform returns from the general securities markets or different asset classes.
- Trading risk: bid-ask spread can be large for some ETFs with low trading volumes. Trading prices of some ETFs may differ markedly from their NAVs due to the fluctuations in the securities markets.
- Tracking error risk: ETFs may not be able to exactly replicate the performance of the indexes because of fund expenses and other factors.
- Derivative risk: this affects only those funds that employ derivative in their investment strategies. These derivatives may cause additional risk, such as counterparty credit risk or high leverage.
- Currency risk and country risk: they apply to ETFs that are based on international indexes. Currency risk is the risk of capital loss due to unfavorable changes in currency exchange rates. Country risk is the risk caused by economic and political turbulences in different countries. In general emerging markets have greater country risk than developed countries.

LOS 1.h: describe the forms of real estate investment.

In general, real estate refers to buildings and buildable lands, including residential homes, raw land, income-producing properties such as warehouses, office and apartment buildings. Real estate is a type of tangible assets, which are investment assets that can be seen and touched. In contrast, financial assets are only recorded as pieces of paper.

There are several forms:

- **Free and Clear Equity**. Also called **fee simple**, it refers to full ownership rights for an indefinite period of time, giving the owner the right, for example, to lease the property to tenants and resell the property at will.

- **Leveraged Equity**. It refers to the same ownership rights but subject to debt (such as a promissory note) and a pledge (mortgage) to hand over real estate ownership rights if the loan terms are not met.

- **Mortgages.** They represent a type of debt investment as a mortgage provides the investor a stream of bond like payments. This is a form of real estate investment as the creditor may end up with owning the property being mortgaged. To diversify risks a typical investor often invests in securities issued against a pool of mortgages.

- **Aggregation Vehicles**. They aggregate investors and serve the purpose of giving investors collective access to real estate investments.

    - Real Estate Partnerships (RELPs). A RELP is a professionally managed real estate syndicate that invests in various types of real estate. The purpose of the RELP varies from raw land speculation to investments in income producing properties. Managers assume the role of general partner with unlimited liability, while other investors are treated like limited partners with limited liability.

    - Commingled Funds. They are pools of capital created largely by like-minded institutional investors organized together by an intermediary to invest chiefly in real estate investment projects. They can be either open or closed end. For example, an open-ended commingled fund does not have a termination date, accepts new investors after initiation of the fund, and amends the real estate portfolio over time.

    - Real Estate Investment Trusts (REITs). A REIT is a type of closed-end investment company that sells shares to investors and invests the proceeds in various types of real estate and real estate mortgages.
        - It allows small investors to receive both the capital appreciation and the income returns without the headache of property management.
        - Its shares are traded on a stock market.
        - It provides a tax shelter.
        - It also has strong restriction on the use, and distribution of funds.

LOS 1.i: explain the characteristics of real estate as an investable asset class and describe the various approaches used in the valuation of real estate.

Some characteristics of real estate as an investable asset class:

- Properties are immovable and basically indivisible so they are generally illiquid.
- Every property is unique, primarily because no two properties can share the same location. In addition, terms and conditions of transactions may differ significantly. Therefore properties are only approximately comparable to other properties.
- There is no national, or international, auction market for properties. Therefore it is difficult to assess the market value of a given property.
- Transaction costs and management fees for real estate investments are high.
- Real estate markets suffer inefficiencies because of the nature of real estate itself and because information is not freely available.

Appraisal is the process for estimating the current market value of a piece of property. Because of both technical and informational shortcomings, this estimate is subject to substantial error.

There are three commonly used approaches to real estate market value:

- The Cost Approach: the real estate valuation approach based on the idea that an investor should not pay more for a property than it would cost to rebuild it at today's prices. It generally works well for new or relatively new buildings. Most experts use it as a check against a price estimate. Limitations:

  - an appraisal of the land value is not always an easy task.
  - the market value of an existing property could differ significantly from its construction cost.

- The Sales Comparison Approach: this approach uses as the basic input the sales prices of properties (benchmark value) that are similar to the subject property. The price must be adjusted to reflect its superiority or inferiority to comparable properties. This approach can give a good feel for the market.

  Hedonic Price Estimation:

  - Identify the major characteristics (age, size, location, etc) of a property that can affect its value.
  - Give a quantitative rating for each characteristic.
  - Perform regression analysis of sales price for all recent transactions in the benchmarks on their characteristics ratings.
  - The estimated slope coefficients are the valuation of each characteristic in the transaction price. It is a benchmark monetary value associated with each characteristic's rating.
  - It is then possible to estimate the selling price of a specific property by taking into account its rating on each feature.

- The Income approach: this approach calculates a property's value as the present value of all its future income. It assumes that the annual net operating income (N01) of a property can be maintained at a constant level forever (that is, N01 is a perpetuity). The most popular income approach is called **direct capitalization:**

$$\text{Market Value} - \frac{\text{(Annual Net Operating Income)}}{\text{(Market Capitalization Rate)}}$$

- Net **operating income (N01)** equals the amount left after subtracting vacancy and collection losses and property operating expenses from an income property's gross potential rental income.
- The **market capitalization rate** is obtained by looking at recent market sales figures to determine the rate of return required by investors.

$$\text{Market Cap Rate} = \frac{\text{Benchmark NOI}}{\text{Benchmark Transaction Price}}$$

  Where benchmark refers to a comparable property, or the median or mean of several comparable properties.
- As long as inflation can be passed through, it will not affect valuation, because the market cap rate also incorporates the inflation rate.

- The Discounted After-Tax Cash Flow Approach: if the investor can deduct depreciation and any interest payments from NOI, then the investor's after-tax cash flows depend on the investor's marginal tax rate.

LOS 1.j: calculate the net operating income (N01) from a real estate investment.

Here is a sample of income statement of a real estate property (an apartment building):

Gross rental income (8 x 335 x 12)		$32,160
Operating expenses:		
-Utilities	$2,830	
-Trash collection	675	
-Repairs and maintenance	500	
-Promotion and advertising	150	
-Property insurance	840	
-Property taxes	3,200	
Less: Total operating expenses		8,195
Net operating income (N01)		$23,965

This should give you a rough idea income and expense components of a real estate property.

Note that:

- **Depreciation expenses** are not subtracted from gross rental income, as it is assumed that repairs and maintenance will keep the property in good condition forever.
- **Interest expenses** are also not subtracted from gross rental income as this approach is used to estimate the value of the property independently of how the investment is financed.

LOS 1.k: calculate the value of a property under the sales comparison and income approaches.

Sally Hopper owned an apartment building in London that consisted of 50 units and 60,000 square ft. of living area. The building had a 5% vacancy rate. Monthly rentals averaged $4000 per unit with an average collection loss of 1% per year (on gross rental income). Annual property operating expenses averaged $1100 per month/per unit whether it was rented or not. Insurance plus property taxes averaged another $600 per month/per unit. Sophie assumes that properties in her area earn at least 10% per year based on recent sales figures. What is the value of Sally's property using the N01 approach?

Solution:
Number of Units 50
Monthly Rental 4000
Total Potential Rent (annual) 2,400,000
Vacancy Rate - 5% 120,000
Collection Loss - 1% 22,800
Operating Expenses 660,000
Property taxes + insurance 360,000
Total Annual Adjustments & Expenses 1,162,800
NOI 1,237,200
Cap Rate. 10
Market Value $12,372,000

Income Approach: The income approach uses a discounted cash flow approach of future income. The most common approach of this methodology is referred to as the direct capitalization method.

The direct capitalization method presumes that the annual net operating income continues as a perpetuity (infinity), earning the investor his opportunity cost of funds or market capitalization rate. The net operating income formula is formula is:

$$\text{Market Value} = \frac{\text{Annual Net Operating Income}}{\text{Market Capitalization Rate}}$$

$$V = \frac{NOI}{R}$$

Note: the collection loss is based on the amount of accrued rent, not potential rent. In this case, the accrued rent is $2,400,000 less the 5% vacancy of $120,000. Thus the collection loss (or bad debt) is $22,800 (($2,400,000 - $120,000) x .01).

The market capitalization rate examines recent market sales figures to determine the rate of return currently demanded by investors. For example, assuming a N01 of $1,237,200 and a market cap rate of 10%, the value of the firm is $12,372,000 shown below.

NOI =$1,237,200
Market Capitalization Rate = .10
V = 1,237,200/.10 = $12,372,000

If there are numerous properties an appraiser may use an average of N0I and the market capitalization rates.

LOS 1.l: calculate the after-tax cash flows, net present value, and yield of a real estate investment.

To move from NOT to after-tax cash flows we need to perform some calculations. The following is the cash flow analysis for an apartment building from year 1999 to 2003:

	1999	2000	2001	2002	2003
Income Tax Computation					
NOI	$22,822	$24,419	$26,128	$27,957	$29,914
-Interest	20,350	20,259	20,146	20,022	19,877
-Depreciation	6,545	6,545	6,545	6,545	6,545
Taxable income (loss)	-4,073	-2,385	-563	1,390	3,492
Marginal tax rate	0.31	0.31	0.31	0.31	0.31
Tax savings (+) or taxes (-)	+1,263	+739	+175	-431	-1,083
After-Tax Cash Flow (ATCF) Computations					
N0I	$22,822	$24,419	$26,128	$27,957	$29,914
-Mortgage payment	21,280	21,280	21,280	21,280	21,280
Before-tax cash flow	1,542	3,139	4,848	6,677	8,634
Tax savings (+) or taxes (-)	+1,263	+739	+175	-431	-1083
ATCF	2,805	3,878	5,023	6,246	7,551

In this case, potential tax savings accrue during the first 3 years because the allowable tax deductions of interest and depreciation exceed the property's net operating income; in the final 2 years, income exceeds deductions, so taxes are due.

The "magic" of simultaneously losing and making money is caused by depreciation. Tax statutes incorporate this tax deduction, which is based on the original cost of the building to reflect its declining economic life. However, because this deduction does not require a current cash outflow by the property owner, it acts as a non-cash expenditure that reduces taxes and increases cash flow. Usually depreciation is subtracted from NOT to compute after-tax net income, and is then added back to reflect its positive impact on after-tax cash flows. In other words, in the 1999 - 2001 period the property ownership provides the owner with a tax shelter. Also note that mortgage payments have two components: interest payment which is tax deductible, and principal repayment, which is no tax deductible.

LOS 1.m: explain the various stages in venture capital investing.

Private equity refers to equity investments that are not traded on exchanges. Venture capital is financing for privately held companies, typically in the form of equity and/or, long-term debt. Venture capital becomes available when financing from banks and public debt or equity markets is either unavailable or inappropriate. It is one of the main categories of private equity. Investors typically invest in private equity through limited partnerships, where the general partners are private equity experts and manage the investments of the venture capital funds.

Venture capital investing is done in many stages from seed through mezzanine. These stages can be characterized by where they occur in the development of the venture itself.

- **Seed-stage financing**: this is capital (typically less than $50,000) that is provided at the "idea" stage, which goes for product development and market research.
- **Early-stage financing** is capital provided for companies moving into operation and before commercial manufacturing and sales have occurred.
  - **Start-up:** this capital is used in product development and initial marketing for firms in business under one year and has not sold their product commercially.
  - **First-stage:** this is capital provided to initiate commercial manufacturing and sales.

Formative-stage financing includes seed stage and early stage.

- Later-stage financing is capital provided after commercial manufacturing and sales have begun but before any initial public offering.
  - **Second-stage:** this capital is used for initial expansion of a company that has already been selling a product but perhaps not yet profitably.
  - **Third-stage:** capital provided to fund major expansion, such as physical plant expansion, product improvement, or a major marketing campaign.
  - **Mezzanine (bridge)** financing is capital provided to prepare for the step of going public and represents the bridge between the expanding company and the IPO.

Expansion-stage financing includes second and third stage. **Balanced-stage financing** is a term used to refer to all the stages, seed through mezzanine.

LOS 1.n: discuss venture capital investment characteristics and the challenges to venture capital valuation and performance measurement.

Venture capital investment characteristics include:

- Illiquidity: venture capital investments do not provide an easy or short-term path for cashing out. Liquidation or divestment of each venture within a portfolio is dependent on the success of the fund manager in creating a buy-out or IPO opportunity. Venture capitalists expect to actually realize their returns only when they are able to cash out, which hopefully is less than ten years, and preferably in three to seven.

- Long-term commitment required: this is due to the time lag to liquidity. If the average investor is averse to illiquidity, this will create a liquidity risk premium on venture capital. This is why an investor with longer than average time horizon (i.e. university endowments) can expect to profit from this premium.

- Difficulty in determining current market values: this is because there is no continuous trading of the investments within a venture fund portfolio.

- Limited historical risk and return data: this makes it difficult to estimate risks.

- Limited information: it's therefore difficult to estimate cash flows or the probability of success of these ventures.

- Entrepreneurial/management mismatches: entrepreneurs may not be good managers although fund managers rely on entrepreneurs to create value. Particularly, entrepreneurs who can run small ventures successfully may not have the ability to manager larger companies. Entrepreneurs may not have the incentive to work in the best interest of the fund managers. For example, entrepreneurs may be more interested in turning their favorite idea into reality, whereas fund managers are interested in the financial success of the ventures.

- Fund manager incentive mismatches: it is the investors, not the fund managers, who contribute the capital. Fund managers may be rewarded by size of their fund rather than performance of their fund. Investors should motivate fund managers to make sure an aligned interest together.

- Lack of knowledge of how many competitors exist: as entrepreneurs operate in uncharted territory, there is often little way for analysts to perform competitive analysis (i.e. how many other entrepreneurs are developing substitute ideas or products at the same time).

- Vintage cycles: some years are better than others. For example, if too many investors are willing to supply fund for venture capital, many entrepreneurs with mediocre ideas or products will get financing easily, thereby depressing the returns on venture capital. This may happen particularly if there is a strong IPO market and/or a perception that a promising new technology can generate valuable investment opportunities.
  - Poor financial market conditions can cause venture capital to dry up.
  - Performance by vintage year often varies significantly due to differences in the performance of both real and financial markets over the life of the fund.
  - Historically, venture funds formed in high growth years for the industry experience lower returns. The venture capital market is subject to supply and demand.

- Extensive operations analysis and advice may be required: more than financial engineering skill is required of fund managers. The venture capital manager must be able to act as both a financial and an operations management consultant to the venture.

Valuing a prospective venture capital project is challenging:

- It's difficult to estimate future cash flows. There are simply too many significant uncertainties.
- Many projects will fail along the way to IPO. Those who can provide the anticipated large payoff at the time of exit are really few. Even if the ventures eventually succeed, the investment horizon is long and uncertain.
- Some of the unique risks come from their investment characteristics as described above.

The risk of a portfolio of venture capital investments is less than the risk of any individual venture project because of risk diversification.

There are also several challenges to performance measurement:

- The difficulty in determining precise valuations. This is mainly because their investments are not publicly traded and thus their current market values are typically estimated using arbitrary techniques.
- The lack of meaningful benchmarks against which fund manager and investment success can be measured.
- The long-term nature (probably a number of years after the initial investments) of any reliable performance feedback in the venture capital asset class.

LOS 1.o: calculate the net present value (NPV) of a venture capital project given the project's possible payoff and conditional failure probabilities.

The expected net present value of a venture capital project with a single, terminal payoff and a single, initial investment can be calculated, given its possible payoff and its conditional failure probabilities, as the present value of the expected payoff minus the required initial investment.

LOS 1.p: discuss the descriptive accuracy of the term "hedge fund" and define hedge fund in terms of objectives, legal structure, and f re structure.

To "Hedge", according to Webster's dictionary, is "a means of protection or defense (as against financial loss), or to minimize the risk of a bet". The term "hedge fund" includes a multitude of skill-based investment strategies with a broad range of risk and return objectives. A common element is the use of investment and risk management skills to seek positive returns regardless of market direction.

A hedge fund is a private "pool" of capital for accredited investors only and organized using the limited partnership legal structure. The general partner is usually the money manager and is likely to have a very high percentage of his/her own net worth invested in the fund.

The fund has an offering memorandum which is intended to provide much of the necessary information to support an investor's due diligence. Among several topics, the offering memorandum will specify the trading style, hedging strategies, and instruments to be employed by the fund at the discretion of the general partner (i.e. being long and /or short stock; use of puts, calls, and futures; use of OTC derivatives).

Hedge funds utilize alternative investment strategies for the purpose of achieving superior returns relative to risk (i.e. return vs. standard deviation). Performance objectives range from conservative to aggressive. The degree of hedging varies. In fact, some do not hedge at all while others simply use S&P put options and futures in lieu of shorting equities. Consequently, there is a broad spectrum of expected risk and return within the hedge fund universe.

The term **hedge fund** is not fully descriptive because the hedged position is generally designed to isolate a bet rather than to reduce risk. Hedge funds can be defined as:

- funds that seek absolute returns in all directions: hedge fund managers seek freedom to achieve high absolute returns (that is, alpha) and wish to be rewarded for their performance. In contrast, the money management industry has moved toward a focus on performance relative to pre-specified benchmarks (e.g. a market index).

- funds that have a legal structure avoiding some government regulations: these legal structures allow the fund manager to take short and long positions in any asset, to use all kinds of derivatives, and to leverage the fund without restrictions.
  - In the US hedge funds most often take the form of limited partnership. For example, organized under section 3(c)(l) of the Investment Company Act, a fund is limited to no more than 1,009 "accredited investors", and is prohibited from advertising.
  - **Offshore funds** are incorporated in locations such as the British Virgin Islands or other locations attractive fro a fiscal and legal point of view.

- funds that have option-like fees: this includes:
  - a base management fee: based on the value of assets under management. It is paid whatever the performance of the fund. It is typically 1 percent of the asset base.
  - an incentive fee: it is proportional to realized profits. It is typically 20 percent of the total profits. For some funds, the incentive fee is applied to profits above a pre-specified risk-free rate. For example, suppose the pre-specified risk-free rate is 6%. If the gross return on the fund is 5.5%, then no incentive fee will be paid. The incentive fee cannot fall below zero, even if the return on the fund is negative.

Finally, let's take a look at the key differences between mutual funds and hedge funds:

	Mutual Fund	Hedge Fund
Regulation	SEC registered investment vehicles	Private investment vehicles (not regulated)
Minimum Investment	Usually small minimum investments	Large minimum investments required (average $1 million)
Investors	Not limited to the number of investors and investors can purchase many funds	. Are limited to 499 investors ("limited partners") who can invest in any one fund
Availability	Available to the general public	Must be an accredited investor (net worth must exceed $1 million or individual income must have been in excess of $200,000, or joint income must have been in excess of $300,000 in the past two years, plus investor must expect the same level of income in the current year)
Liquidity	Daily liquidity and redemption	Liquidity varies from monthly to annually
Short Selling	Maximum 30% of profits from short sales-although other bear fund options exits	Manager may short sell often
Leverage	Less leverage	More leverage
Down Markets	Some funds are defensively managed and others, like index funds, hold during bad markets.	Most hedge fund strategies try to hedge against downturns in the markets, but effectiveness depends on the fund.
Definition	A public pool of investment capital organized to invest in a portfolio composed of often predetermined type of securities.	A private pool of investment capital organized into a limited partnership to invest in portfolio made up of a variety of securities.
Fees	Limits Imposed by the SEC	No Limits. Hedge funds typically charge high fees, usually a combination of 1-2% of your assets plus a percentage of the profits (usually 20%)

LOS 1.q: calculate the net return of a hedge fund, given an absolute return scenario and the fund's fee structure.

The net performance of a hedge fund can be calculated by subtracting its fees from its gross performance.

Example

A hedge fund has an annual fee of 1 percent base management fee plus a 20 percent incentive fee applied to profits above the risk-free rate, taken to be the T-Bill rate. Hence the incentive fee is applied to annual profits after deduction of the T-Bill rate applied to the amount of assets under management at the start of the year. The gross return during the year is 40%. What is the net return (the return after fees) for an investor, if the risk-free rate is 5 percent?

Solution

Fee = 1% + 20% x (40% - 5%) = 8%.
Net return: 40% - 8% = 32%.

LOS 1.r: describe the various classifications of hedge funds.

Hedge funds can be classified in a variety of ways. Here is one classification (by investment strategy):

- **Long/short funds:** Funds employing long/short strategies generally invest in equity and fixed income securities taking directional bets on either an individual security, sector or country level.
  - For example, a fund might do pairs trading, and buy stocks that they think will move up and sell stocks they think will move down. Or go long sectors they think will go up and short countries they think will go down.
  - Long/Short strategies are not automatically market neutral. That is, a long/short strategy can have significant correlation with traditional markets, and surprisingly have seen large down turns in exactly the same times as major market downturns.
  - Long/short funds represent a large amount of hedge fund assets.

- **Market-neutral funds:** They are a form of long/short funds that attempt to be hedged against a general market movement. They attempt to produce return series that have no or low correlation with traditional markets such as the US equity or fixed income markets. Market neutral strategies are characterized less by what they invest in than by the nature of the returns. They often are highly quantitative in their portfolio construction process, and market themselves as an investment that can improve the overall risk/return structure of a portfolio of investments. The key feature of market neutral funds is the low correlation between their returns and the traditional asset's.

- **Global macro funds** take bets on the direction of a market, a currency, an interest rate, a commodity, or any macroeconomic variable.
  - There are many subgroups in this category, including futures funds (or managed futures funds) and emerging-market funds.
  - These funds seek to take advantage of shifts and stresses in global financial markets that impact currencies, crude oil, interest rates and stock indices.
  - For example, George Soros of the Quantum fund took a billion dollar profit from his historic bet against sterling and the Bank of England in September 1992.
  - Leverage is the lifeblood of global macro hedge funds. Global macro investing, not surprisingly, has acquired a reputation as a high risk, high return and extremely volatile investment strategy.

- **Event-driven funds** seek to make profitable investments by investing in a timely manner in securities that are presently affected by particular events. Such events include:
  - **distressed debt investing;** the securities of companies having financial problems usually sell at deeply discounted prices. Distressed securities funds take bets on the debt and/or equity securities of such companies. For example, if a fund manager believes such a company will successfully return to profitability, he will buy its securities. If he believes the company's situation will deteriorate, he will take a short position in its securities.
  - **merger arbitrage** (sometimes called **risk arbitrage**): before the effective date of a merger, the stock of the acquired firm typically sells at a discount to its announced acquisition value. A risk arbitrage involves buying stocks of the acquired firm and simultaneously selling the stocks of the acquirer. However, there is the risk that the merger may fall though.
  - **corporate spin-offs and restructuring.**

LOS 1.s: discuss the benefits and drawbacks to fund of funds investing.

Funds of funds(FOF) have been created to allow easier access to small investors. An FOF is open to investors and, in turn, invests in a selection of hedge funds. An FOF provides investors with several benefits:

- **Retailing:** investing in a single hedge fund typically requires at least $100,000. An FOF allows small investors to get exposure to a large selection of hedge funds.

- **Access**: many attractive hedge funds are closed to individual investors because the maximum number of investors has been reached. Through an FOF, investors can still get access to these funds that are closed to new investors.

- **Diversification:** an FOF allows investors to diversify the risk of a single hedge fund.

- **Managerial expertise:** not every investor has the skills to invest in hedge funds. The manager of the FOF is supposed to have expertise in finding reliable and good-quality hedge funds in a world where information on the investment strategies of hedge funds is difficult to obtain.

- **Due diligence process:** the due diligence (both at the outset and ongoing) that has to be performed by an institutional investor when selecting a hedge fund is highly specialized and time consuming, given the secretive nature of hedge funds and their complex investment strategies.

There are drawbacks with an FOF:

- **Fee:** the obvious drawback of FOFs is the fees (the added layer of fees) they charge on top of the substantial fees charged by the hedge funds they invest in. Never one to be dismayed, Ineichen tells us this is like "Paying the farmer as well as the milk man".

- **Performance:** The FOF typically selects individual hedge funds based on their past experience. However, there is little evidence of persistent performance as past performance gives little implication of future performance.

- **Diversification:** it is a two-edged sword. The overall FOF expected return will be lowered by the diversification but the fees paid are still very high.

What does **Due Diligence** mean?

- An investigation or audit of a potential investment. Due diligence serves to confirm all material facts in regards to a sale.

- Generally, due diligence refers to the care a reasonable person should take before entering in an agreement or transaction with another party.

- Offers to purchase an asset are usually made dependent upon the results of due diligence analysis. It includes reviewing all financial records plus anything else deemed material to the sale. Sellers could also perform a due diligence analysis on the buyer. Items that could be considered are the buyer's ability to purchase, as well as other items that would affect the purchased entity or the seller, after the sale has been completed.

- Due diligence is essentially a way of preventing unnecessary harm to either party, or the entity involved, in a transaction.

LOS 1.t: discuss the leverage and unique risks of hedge funds.

Although some hedge funds don't use leverage at all, most of them do. Leverage in hedge funds often runs from 2:1 to 10:1, depending on the type of assets held and strategies used. High leverage is often part of the trading strategy and is an essential part of some strategies in which the arbitrage return is so small that leverage is needed to amplify the profit. As in any other investments, however, leverage also amplifies losses when the market direction turns out to be unfavorable. Hedge funds typically use three methods to create leverage:

- Borrowing external funds.
- Borrowing through a brokerage margin account.
- Using financial instruments and derivatives that requires posting margins. By using margins, hedge funds only pay a fraction of the value of the position.

In addition to market and trading risks in different markets, hedge funds face the following unique risks:

- **liquidity risk:** the lack of liquidity under extreme market conditions can cause irreversible damage to hedge funds whose strategies rely on the presence of liquidity in specific markets.

- **pricing risk:** hedge funds often invest in complex securities traded over-the-counter. Pricing securities that trade infrequently is a difficult task, especially in periods of high volatility.

- **counterparty credit risk:** this is the risk that the other party to an agreement will default. Because hedge funds deal with broker-dealers in most transactions, counterparty credit risk can arise from many resources.

- **settlement risk;** this risk refers to the failure to deliver the specified security or money by one of the parties to the transaction on the settlement day.

- **short squeeze risk:** a short squeeze arises when short sellers must buy in their positions at rising prices. Because some hedge fund strategies require short selling, this risk can affect fund performance significantly.

- **financing squeeze risk:** if a hedge fund has reached or is near its borrowing capacity, its ability to borrow cash is constrained. This risk puts the hedge fund in a vulnerable position when it is forced to reduce the levered positions, say, in an illiquid market at substantial losses.

LOS 1.u: discuss the performance of hedge funds and the biases present in hedge fund performance measurement.

In terms of performance, hedge funds are generally viewed as having

- Net returns higher than those available for equity or bond investments.
- Lower risk than traditional equity investments. Note the risk is measured by the volatility of return.
- A Sharpe ratio that is comparable to bonds and higher than that of equity investments.
- A low correlation with conventional investments.

The performance data from hedge fund databases and indexes suffer from serious biases.

- **Self-selection bias:** hedge fund managers decide themselves whether they want to be included in a database, and managers that have funds with an unimpressive track record will not wish to be included.

Instant history bias: as only hedge funds with good track records enter the database, this creates a positive bias in past performance in the database.

Survivorship bias on return: As unsuccessful funds tend to disappear over time, only successful ones search for new clients and present their track record. This is particularly true for hedge funds, since they do not have to adhere to performance presentation standards. As underperforming funds disappear from the database used by investors to select funds, the reported average return of hedge funds is inflated.

Survivorship bias on risk: A similar survivorship bias applies to risk measures. Hedge funds that exhibited highly volatile returns in the past tend to disappear. Reported volatility of existing funds will tend to be low.

Smoothed pricing on infrequently traded assets: Some assets trade infrequently. Hedge funds often use illiquid exchange-traded .securities or OTC instruments. Because prices used are often not up-to-date market prices, but estimates of fair value, their volatility is reduced (smoothing effect).

Option-like investment strategies: Traditional risk measures used in performance appraisal assume that portfolio returns are drawn from normal or at least symmetric distributions. Many investment strategies followed by hedge funds have some option-like features that violate these distributional assumptions. Instead they have asymmetric return distributions: if the market moves in the favorable direction, the pay-off will generally be small. If the market moves in the unfavorable direction, the loss can be enormous. Therefore, traditional risk measures understate the risk of losses of investment strategies followed by hedge funds.

Fee structure and gaming: The compensation structure is option like and it encourages excessive risk taking. Fund managers are paid to take risks. For example, if the total return on a hedge fund is positive, the manager charges an incentive fee of 20% of the total return. If it's negative, however, the incentive fee will not fall below zero. . Therefore, fund managers are encouraged to take excessive risks, particularly if their recent performance is poor.

LOS 1.v: explain the effect of survivorship bias on the reported return and risk measures for a hedge fund database.

LOS 1.w: explain how the legal environment affects the valuation of closely held companies.

Closely held companies are those that are not publicly traded. **Inactively traded securities** are securities of companies that are not traded frequently. Such securities generally do not trade on major exchanges such as NYSE.

Closely held companies may be organized in various legal forms, such as partnerships and sole proprietorships. These forms have tax implications as well as ownership differences for the investor. Ownership is a bundle of rights and these rights differ depending on the business form. Because valuations can be required to provide evidence in litigation — for example, minority shareholder claims — much case law defines terms such as intrinsic value, fundamental value, and fair value. These definitions may vary in different jurisdictions. Even what is judged as evidence for a valuation can vary. There has long been a tension between the theory of value as based on projected cash flows and the acceptance of the hard evidence of recent cash flows. In a real sense, then, valuation of closely held and inactively traded securities requires extensive knowledge of the law and the purposes of the valuation.

LOS 1.x: describe alternative valuation methods for closely held companies and distinguish among the bases for the discounts and premiums for these companies.

Here are the basic types of valuation:

- **The Cost Approach:** it attempts to determine what it would cost to replace the company's assets in their present form.

- **The Comparables Approach**; it estimates market value relative to a benchmark value. The benchmark value may be the market price of a similar but actively traded company. The estimate needs to be adjusted for changing market conditions, the possibility that the benchmark itself is mispriced, and the unique features of the company relative to the benchmark.

- **The Income Approach:** it estimates market value by discounting any anticipated future economic income streams.

To estimate the discounts and premiums an analyst must carefully define the amount or base to which the discount or premium should be applied.

- As shares of closely held companies lack a public market (lack marketability) and so their valuation should reflect a marketability discount. To estimate this the analyst identifies a publicly traded comparable company with a liquid market. The comparable's market value of equity is the base to which the marketability discount is applied.

- A minority discount is applied if the interest will not be able to influence corporate strategy and other business decisions. To estimate it the base is an estimate of that company's value of equity inclusive of the value arising from ownership of all rights of control.

- To estimate a control premium, the base is an estimate of that company's value of equity not reflecting control (the value of equity from a minority shareholder perspective).

LOS 1.y: discuss distressed securities investing and the similarities between venture capital investing and distressed securities investing.

Distressed securities are securities of companies that have filed or are close to filing for bankruptcy, or that seeking out-of-court debt restructuring to avoid bankruptcy. Valuation of such securities requires legal, operational and financial analysis.

Investing in distressed securities usually means investing in distressed company bonds with a view toward equity ownership in the eventually reconstituted company. In this regard such investments have characteristics somewhat similar to those of venture capital investing.

- illiquid nature.
- requires a long investment horizon.
- requires intense investor participation in guiding the venture to a successful outcome.
- possibility of mispricing. In fact, due to business volatility and high leverage, mispricing in distressed securities is inevitable.

Distressed-security investing may be viewed as the ultimate in value investing. The primary question is the question of the distress source. For example, is the company weak financially or operationally? Distressed-security investing requires intense industry analysis, as well as analysis of business strategies and of the management team that will conduct the restructuring.

LOS 1.z: explain the role of commodities as a vehicle for investing in production and consumption and identify the ways to indirectly invest in commodities.

There are three major categories of commodities:

- Agricultural products (often called soft commodities) include grains, fibers, food and livestock, etc.
- Energy includes crude oil, heating oil and natural gas, etc.
- Metals include copper, gold, and silver etc.

Investing directly in agricultural products and other commodities gives the investor a share in the commodity components of the country's production and consumption. Commodities complement the investment opportunities offered by shares of corporation that extensively use these raw materials in their production processes. However, most investors do not want to get involved in storing commodities such as cattle or crude oil. A common investment objective is to purchase indirectly those real assets that should provide a good hedge against inflation risk. Commodity derivatives are financial instruments that derive their value from the value of the underlying commodities.

- Futures contracts. This is the most common strategy. Commodity trading advisers (CTAs) offer managed futures funds that take positions in exchange-traded derivative on commodities and financials.
- Bonds indexed on some commodity price.
- Stocks of companies producing the commodity.

LOS 1.aa: describe the motivation for investing in commodities and commodities derivatives by both passive and active investors.

Commodities are sometimes treated as an asset class because they represent a direct participation in the real economy. The motivation for investing in commodities ranges from the diversification benefits by a passive investor to the speculative profits sought by an active investor.

- Commodities have a negative correlation with stock and bond returns and a desirable correlation with inflation. A **passive investor** would buy commodities for their risk-diversification benefits. When inflation accelerates, commodity prices go up, whereas bond and stock prices tend to go down. A passive investor would typically invest through a collateralized position in a futures contract. A collateralized position in futures is a portfolio in which an investor takes a long position in futures for a given amount of underlying value and simultaneously invests the same amount in government securities such as T-bills.

- In periods of rapid economic growth, commodities are in strong demand to satisfy production need, and their prices go up. Because of productivity gains, the prices of finished goods are unlikely to rise as fast as those of raw materials. This suggests an **active management strategy** in which specific commodities are bought and sold at various times.

An example of collateralized futures:

Assume that the futures price is currently $100. If $100 million is added to the fund, the manager will take a long position in the futures contract for $100 million of underlying value and simultaneously buy $100 million worth of T-bills (part of this will be deposited as margin). If the futures price drops to $95 the next day, the manager will have to sell $5 million of the 1-bills to cover the loss (marked to market). Conversely, if the futures price rise to $105, the manager will receive a profit of $5 million. The total return on the collateralized futures position comes from the change in futures price and the interest income on the 1-bills.

LOS 1.bb: explain the sources of return on a collateralized commodity futures position.

See LOS 1.aa please.

LOS 1.cc: explain how to manage risk for managed futures.

Jaeger (2002) proposes several principles for the risk management of managed futures portfolios:

- Diversify into a large universe of contracts.
- Liquidity monitoring, because diversification into a larger universe of contracts can include illiquid contracts.
- Volatility dependent allocation where the weight of the different contracts in the portfolio is determined by their historical or implied volatility.
- Quantitative risk management techniques such as value at risk (VaR) and stress tests.
- Risk budgeting on various aggregation levels to detect undesired risk concentrations.
- Limits on leverage.
- Use of derivatives to hedge any unwanted currency risk.
- Care in model selection with respect to data mining, in and out of sample performance, and adequate performance adjustments for risks.

LOS 1.dd: describe the motivation for investing in commodity linked securities.

Commodity-linked securities are securities that are indexed on some commodity prices. The return on commodity-linked securities has two components: the increase in commodity prices and the income on the securities. In contrast, holding commodities provides no income so the sole return to the owner is through price increase. Therefore, investors who wish to have some income stream on their investments may prefer to invest in commodity-linked securities.

There are two major types of commodity-linked securities:

- **Commodity-linked bonds:** interest payments and/or principal repayments of such bonds are indexed to the price of the underlying commodities or an inflation index. For example, a company may issue bonds indexed to oil prices.

- **Commodity-linked equity:** the equity value of some companies is directly affected by commodity prices. This is particularly true for energy companies, such as those in oil and gas industries. As large companies tend to diversify across different types of activities within the industries, the link between prices and stock prices for large companies is typically weaker than that for small undiversified companies.