Bangor University
Introduction to Finance
Main Exam Revision

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Firm's cost of equity is estimated using the capital asset pricing model (CAPM).

- The first step estimates the beta of the firm's common stock by regressing the returns on the stock on the market returns using historical data. The expected stock return is estimated using CAPM:
- $E(R) = r_f + (\text{beta})(r_m - r_f)$
- Expected return is the estimate of the firm's cost of equity.

When using the CAPM, which value should be used for the risk-free interest rate?

- Generally, the value used for the risk-free rate is the short-term U.S. Treasury bill rate.

Factors that determine asset betas

- Asset betas are determined by the cyclical nature of the cash flows. Generally, cyclical firms have higher betas. Operating leverage also affects the asset beta of a firm. Firms with high fixed costs tend to have higher asset betas.

The certainty equivalent approach to estimating the NPV of a project

- In the certainty equivalent approach, certainty equivalent cash flows are discounted at the risk-free rate to calculate the NPV of a project. First, risky cash flows have to be converted to certainty-equivalent cash flows by using individual risk factors. One advantage of this method is that the risk adjustment is separated from the time value of money. Conceptually this is a more sensible method than the risk-adjusted discount rate method. However, estimating certainty equivalent cash flows could be cumbersome.

The risk-adjusted discount rate approach to estimating the NPV of a project.

- The risk-adjusted discount rate approach uses the discount rate to adjust for both risk and the time value of money
- The main advantage of this approach is simplicity. Risky project cash flows are discounted using risk adjusted discount rates (higher rates) to calculate the NPV of a project.

Stock Tiny and Stock Big have had the following returns for the past three years: -12%, 10%, 32%; and 15%, 6%, 24%, respectively. Calculate the covariance between the two securities.

- $E(R_{tiny}) = (-12 + 10 + 32)/3 = 10\%$;
  $E(R_{big}) = (15 + 6 + 24)/3 = 15\%$;
  $Cov(R_{ting}, R_{big}) = [(-12 - 10)(15 - 15) + (10 - 10)(6 - 15) + (32 - 10)(24 - 15)]/(3 - 1) = 99$.

The market value of Ubez Corporation's common stock is $20 million, and the market value of its risk-free debt is $5 million. The beta of the company's common stock is 1.25, and the market risk premium is 8%. If the Treasury bill rate is 5%, what is the company's cost of capital? (Assume no taxes)

- $r_E = 5 + 1.25(8) = 15$;
- $r_D = 5\%$.
  Company cost of capital = 5% (5/25) + 15% (20/25) = 1 + 12 = 13%.

- The market value of Funny Corporation's common stock is $40 million and the market value of its risk-free debt is $60 million. The beta of the company's common stock is 0.8, and the expected market risk premium is 10%. If the Treasury bill rate is 6%, what is the firm's cost of capital? (Assume no taxes.)
- $r_E = 6 + 0.8(10) = 14\%$;
- $r_D = 5\%$;
- cost of capital = (60/100)(6%) + (40/100) (14%) = 9.2%.

- Company Alpen's historical returns for the past three years are: 6%, 15%, and 15%. Similarly, the market portfolio's returns were: 10%, 10%, and 16%. Calculate the beta for Stock Alphine
- Beta = Cov(R_A, R_M)/Var(R_M) = 0.75;
  Cov(R_B, R_M) = [(6 - 12)(10 - 12) + (15 - 12)(10 - 12) + (15 - 12)(16 - 12)]/(3 - 1) = 9;
  Var(R_M) = [(10 - 12)^2 + (10 - 12)^2 + (16 - 12)^2]/(3 - 1) = 12.

- The market portfolio's historical returns for the past three years were 10%, 10%, and 16%. Suppose the risk-free rate of return is 4%. Estimate the market risk premium?

- MahaCo. pays out 60% of its earnings as dividends. Its return on equity is 15%. What is the stable dividend growth rate for the firm?
- $g = (1 - 0.60) \times 15 = 6\%$.

- Hardworking Co. just paid a dividend of $2.00 per share. Analysts expect future dividends to grow at 20% per year for the next four years and then grow at 6% per year thereafter. Calculate the expected dividend in year 5.
- Div_5 = (2.00) × (1.20^4) × (1.06) = 4.40.

- Tiotal Motor Company just paid a dividend of $1.40. Analysts expect its dividend to grow at a rate of 18% for the next three years and then a constant rate of 5% thereafter. What is the expected dividend per share at the end of year 5?
- $D5 = (1.40) \times (1.18^3) \times (1.05^2) = 2.54$

- Sea Co. just paid a dividend of $3 per share out of earnings of $5 per share. If its book value per share is $40, what is the expected growth rate in dividends?
- g = (1 - 3/5)(5/40) = .05, or 5%.

- The In-Tech Co. just paid a dividend of $1 per share. Analysts expect its dividend to grow at 25% per year for the next three years and then 5% per year thereafter. If the required rate of return on the stock is 18%, what is the current value of the stock?
- *P* = (1.25/1.18) + (1.5625/1.18^2) + (1.9531/1.18^3) + (2.0508/(0.18 - 0.05))/(1.18^3) = 12.97.

- Sea Co. just paid a dividend of $2 per share out of earnings of $4 per share. If its book value per share is $25 and its stock is currently selling for $40 per share, calculate the required rate of return on the stock.
- $g = (1 - 0.5)(4/25) = 0.08$, or 8%;
- $r = [(2 \times 1.08)/40] + 0.08 = 13.4\%$.

Issues a company must take into consideration when determining the firms' dividend policy

- In determining the firm's dividend policy, two issues are important: the dividend payout ratio and the stability of the dividend payment over time.
- In this regard, the financial manager should consider the investment opportunities available to the firm and any preference that the company's investors have for dividend income or capital gains. Also, stock dividends, stock splits, or stock repurchases can be used to supplement or replace cash dividends.

The trade-offs in setting a firm's dividend policy

- A. If a company pays a large dividend, it will thereby:
- 1. Have a low retention of profits within the firm.
- 2. Need to rely heavily on a new common stock issue for equity financing.
- B. If a company pays a small dividend, it will thereby:
- 1. Have a high retention of profits within the firm.
- 2. Not need to rely heavily on a new common stock issue for equity financing. The profits retained for reinvestment will provide the needed equity financing.
- C. The importance of a firm's dividend policy depends on the impact of the dividend decision on the firm's stock price. That is, given a firm's capital budgeting and borrowing decisions, what is the impact of the firm's dividend policies on the stock price?

Real options associated with capital budgeting projects

- There are four types of real options. They are:

  - options to expand.
  - options to abandon.
  - production options.
  - timing options.

  Options to expand provide a firm with flexibility to expand but do not commit the firm to expand. Therefore, they add value to the project. These are call options.
  In many cases, the ability to terminate a project or abandon a project adds flexibility to the project. This is useful when the project fails to be profitable. Abandonment options are put options.

- Production options provide a firm with additional flexibility to alter inputs or processes. These have value when an input becomes scarce and needs to be replaced with an alternative. These production options add value to the project.
  In many cases, a positive-NPV project need not be undertaken right away. It might be even more valuable if undertaken in the future. The ability to postpone a project also provides a firm with additional flexibility. These options add value to the project.
  A project may have multiple real options associated with it. Many projects might become positive-NPV projects if the real options associated with them are properly recognized and evaluated.

Dividend Policy Matter to Stockholders?

- Three views about the importance of a firm's dividend policy.
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- View 1: Dividends do not matter.
- 1. Assume that the dividend decision does not change the firm's capital budgeting and financing decisions.
- 2. Assume perfect markets, which means:
- a. There are no brokerage commissions when investors buy and sell stocks.
- b. New securities can be issued without incurring any flotation cost.
- c. There is no income tax, personal tax, or corporate tax.
- d. Information is free and equally available to all investors.
- e. There are no conflicts of interest between management and stockholders.

- 3. Under the foregoing assumptions, it may be shown that the market price of a corporation's common stock is unchanged under different dividend policies. If the firm increases the dividend to its stockholders, it has to offset this increase by issuing new common stock in order to finance the available investment opportunities. If on the other hand, the firm reduces its dividend payment, it has more funds available internally to finance future investment projects. In either policy, the present value of the resulting cash flows to be accrued to the current investors is independent of the dividend policy. By varying the dividend policy, only the type of return is affected (capital gains versus dividend income), not the total return.

- View 2: High dividends increase stock value.
- 1. Dividends are more predictable than capital gains because management can control dividends, while they cannot dictate the price of the stock. Thus, investors are less certain of receiving income from capital gains than from dividend income. The incremental risk associated with capital gains relative to dividend income should, therefore, cause us to use a higher required rate in discounting a dollar of capital gains than the rate used for discounting a dollar of dividends. In so doing, we would give a higher value to the dividend income than we would the capital gains.
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- Criticisms of view 2.
- a. Since the dividend policy has no impact on the volatility of the company's overall cash flows, it has no impact on the riskiness of the firm.
- b. Increasing a firm's dividend does not reduce the basic riskiness of the stock; rather, if dividend payment requires management to issue new stock, it only transfers risk and ownership from the current owners to new owners.

- View 3: Low dividends increase value.
- Stocks that allow us to defer taxes (low dividends-high capital gains) will possibly sell at a premium relative to stocks that require us to pay taxes currently (high dividends-low capital gains). Only then will the two stocks provide comparable after-tax returns which, suggests that a policy to pay low dividends will result in a higher stock price. That is, high dividends hurt investors, while low dividends-high retention helps the firm's investors. But wait, then came 2003 and Congress again felt the need to change the tax code as it pertained to both dividend income and capital gains income. On May 28 President Bush signed into law the "Jobs and Growth Tax Relief Reconciliation Act of 2003." Recall that part of the impetus for this Act was the recession that commenced in 2001 and the slow rate of payroll jobs creation that followed that recession.

Sensitivity analysis as used for project analysis.

- By using sensitivity analysis one can determine the factors which may have the largest impact on project cash flows. For some projects, say, labor costs might have a large impact on the cash flows. That means that small changes in labor costs will cause a large change in the cash flows of the project. This helps the financial manager and the project manager to focus on a few key variables and take corrective or preventive actions wherever possible. One drawback of sensitivity analysis is that it gives ambiguous results because variables are often interrelated.

The term *price-earnings (P/E) ratio*

- The P/E ratio is a widely used financial indicator, but is also quite ambiguous. Generally, a high P/E ratio indicates that the investors think a firm has good growth potential. It is the ratio of current market price and earnings of a stock. However, a high P/E ratio can result from very low earnings

The assumptions associated with the constant dividend growth formula.

- There are two important assumptions that are necessary for the formula to work correctly. The first assumption is that the expected growth rate of dividends is constant. The second assumption is that the discount rate is greater than the expected growth rate in dividends.