

# **CHAPTER 13**

## **Capital Structure and the Cost of Capital**

- **Choosing between debt and equity**
  - **Impact on risk and return**
  - **Capital structure theory**
- **Cost of capital**
  - **Estimating the cost of capital**
  - **Interpretation and use**

## The Capital Structure Decision

- The funds used to finance a business's assets are called **capital**.
- **Capital structure** is the financing mix on the *right side* of the balance sheet.
- The **capital structure decision** involves these questions:
  - Is there an optimal mix of debt and equity?
  - If so, what is it for any given business?

## Impact of Capital Structure on Risk and Return

- Consider a new *for-profit* walk-in clinic that needs **\$200,000** in assets to begin operations.
- The business is expected to produce **\$50,000** in operating income (EBIT).
- The clinic has only two capital structure alternatives:
  - **No** debt financing (all equity).
  - **\$100,000** of **10%** debt (50/50 mix).

## Pro Forma Balance Sheets

	<u>All Equity</u>	<u>50% Debt</u>
Current assets	\$100,000	\$100,000
Fixed assets	<u>100,000</u>	<u>100,000</u>
Total assets	<u><u>\$200,000</u></u>	<u><u>\$200,000</u></u>
Debt (10% cost)	\$ 0	\$100,000
Common stock	<u>200,000</u>	<u>100,000</u>
Total claims	<u><u>\$200,000</u></u>	<u><u>\$200,000</u></u>

# Pro Forma Income Statements

	<u>All Equity</u>	<u>50% Debt</u>
Net revenue	\$150,000	\$150,000
Operating costs	<u>100,000</u>	<u>100,000</u>
Operating income	\$ 50,000	\$ 50,000
Interest expense	<u>0</u>	<u>10,000</u>
Taxable income	\$ 50,000	\$ 40,000
Taxes (40%)	<u>20,000</u>	<u>16,000</u>
Net income	<u><u>\$ 30,000</u></u>	<u><u>\$ 24,000</u></u>
ROE	<u><u>?</u></u>	<u><u>?</u></u>
Total \$ to investors	<u><u>?</u></u>	<u><u>?</u></u>

## Pro Forma Income Statements (Cont.)

- ? Based on net income, should the clinic use debt financing?
- ? What is the total dollar return to investors, including both owners and creditors?
- ? Where did the extra **\$4,000** come from?

## Conclusions

- Although the use of debt financing *lowers* net income, it *increases* the return to equityholders.
- Debt financing allows more of a business's operating income to flow through to investors.
- Because debt financing *levers up* (increases) return, its use is called **financial leverage**.

## Conclusions (Cont.)

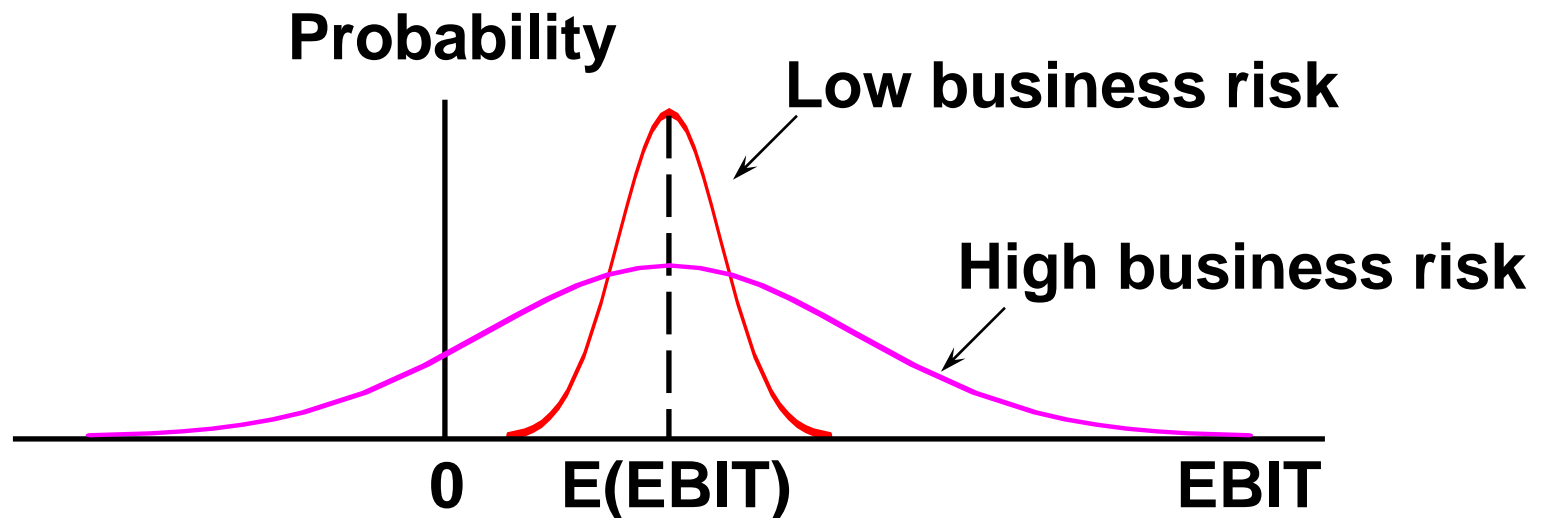
- However, our analysis has ignored the fact that operating income is not known with certainty. When *uncertainty* is considered:
  - The use of debt financing *increases* owners' risk.
  - The greater the amount of financial leverage, the greater the risk.
- Thus, rather than being clear cut, the capital structure decision involves a classical *risk/return trade-off*.

## **Business Risk Versus Financial Risk**

- **A business has some overall (total) level of risk.**
  - **In a stand-alone risk sense, it can be measured by the standard deviation of ROE.**
  - **In a market risk sense, it can be measured by the stock's beta.**
- **This overall risk can be decomposed into business risk and financial risk.**

## Business Risk

- **Business risk** is the uncertainty inherent in a business's *operating income (EBIT)*; that is, how well can managers predict EBIT?



- Business risk does *not* consider how the business is financed.

## Factors that Influence Business Risk

- Uncertainty about *sales volume*.
- Uncertainty about *sales prices*.
- Uncertainty about *costs*.
- *Liability* uncertainty.
- The degree of *operating leverage*.  
(Note: Operating leverage is the amount [proportion] of fixed costs in a business's cost structure.)

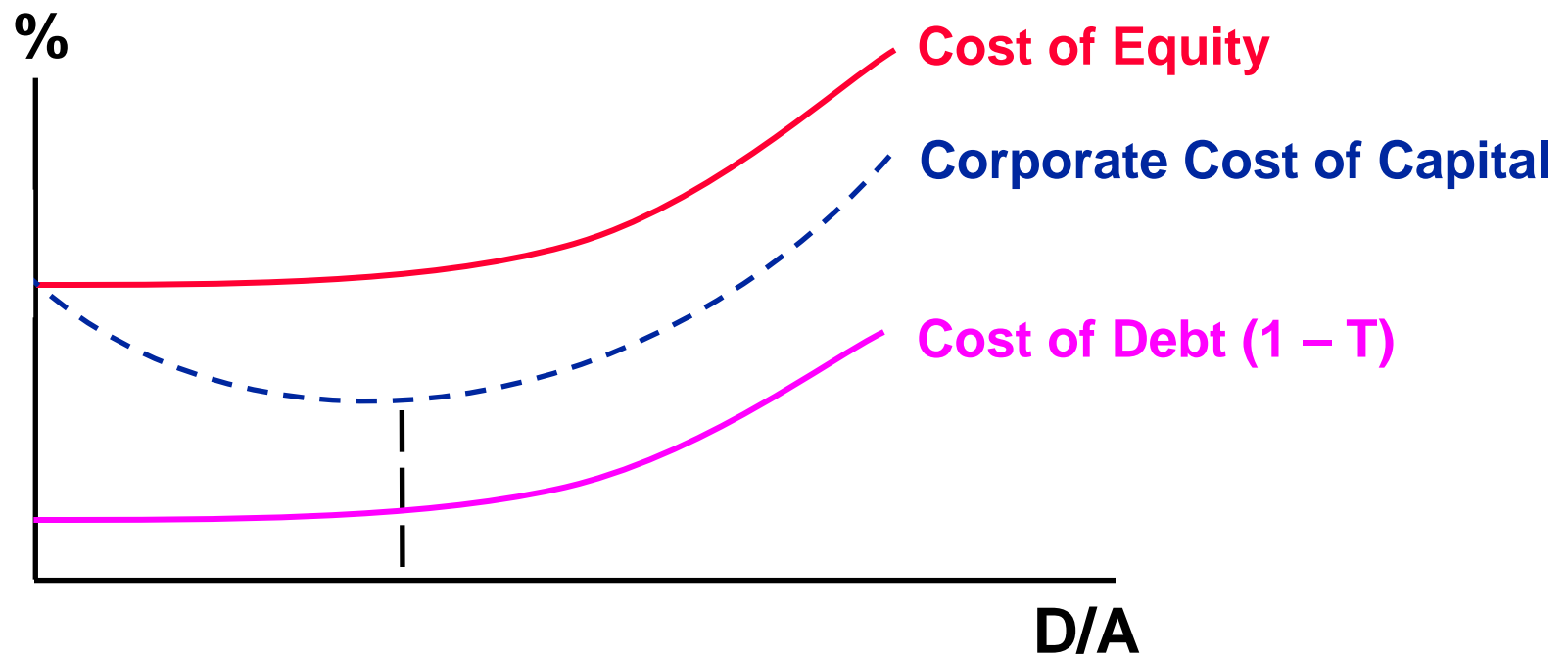
## Financial Risk

- **Financial risk** is the additional risk placed on owners when debt financing is used.
- The greater the proportion of debt financing in a business's capital structure, the greater the financial risk.

# Capital Structure Theory

- **Capital structure theory** attempts to define the relationship between debt financing and equity value for *investor-owned businesses*.
- The most widely accepted theory is the **trade-off theory**:
  - There are *tax-related benefits* to debt financing.
  - But there are also costs, primarily those associated with *financial distress*.

# Trade-Off Theory



? What is the optimal capital structure?

## Implications of the Trade-Off Model

- Both too little and too much debt is bad.
- There is an **optimal**, or **target**, **capital structure** for every *investor-owned* business that balances the *costs* and *benefits* of debt financing.
- Unfortunately, capital structure theory *cannot* be used in practice to find a business's optimal structure. Why?

## **Factors that Influence Capital Structure Decisions in Practice**

- **Inherent business risk**
- **Lender and rating agency attitudes**
- **Reserve borrowing capacity**
- **Industry averages**
- **Asset structure**

## Not-for-Profit Businesses

- So far, the discussion has focused on *investor-owned* businesses.
- The same general concepts apply to *not-for-profit* businesses:
  - There is a benefit to debt financing.
  - There also are costs.
- However, not-for-profit firms do *not* have the same financial flexibility as do investor-owned businesses.

## Cost of Capital Basics

- The **corporate cost of capital** is a blend (weighted average) of the costs of a business's *permanent* financing sources.
- It is used as a *benchmark* rate of return in the evaluation of proposed projects.
- Key considerations:
  - Capital components to include
  - Handling of tax benefits (for FP businesses)
  - Historical versus marginal costs

## Estimating the Component Cost of Debt

- Discuss debt costs with banker:
  - *Investment banker* if bonds are used
  - *Commercial banker* if loan is used
- Look at YTM on outstanding bond issues if they are *actively traded*.
- Look to the debt markets for guidance.
  - Find the interest rate on debt recently issued by similar companies.
  - Find out the *prime rate*.

## Component Cost of Debt (Cont.)

- For a *not-for-profit* organization, the **cost of debt** is the *unadjusted* interest rate.
- An investor-owned organization must consider the *tax benefits* of debt:
  - Assume that Major Hospital Chain (MHC) has a **40%** tax rate. According to its bankers, a new bond issue would require an interest rate of **10%**.
  - Its component (effective) cost of debt would be  $10\% \times (1 - T) = 10\% \times 0.6 = \mathbf{6.0\%}$ .
  - This adjustment will be built into the corporate cost of capital formula.

## Component Cost of Debt (Cont.)

- **Issuance costs** are typically small and hence can be ignored in the debt cost estimate.
- Also, the difference between the *stated rate* and *EAR* is typically small, so the stated rate generally is used.
- ? Does ownership (FP versus NFP) have a significant effect on the *effective* cost of debt?

## Component Cost of Equity

- The component cost of debt is the return required by debt suppliers, and the **component cost of equity** is defined similarly.
- For now, we will consider large *investor-owned* businesses. The primary sources of equity are:
  - Retained earnings
  - New equity (common stock) sales

## Component Cost of Equity (Cont.)

- The cost of new common stock is the return that investors *require* on that stock.
- There is an **opportunity cost** associated with retained earnings:
  - If earnings are retained rather than returned to owners, the owners bear an *opportunity loss*.
  - These funds could be reinvested in alternative investments of similar risk.

## Component Cost of Equity (Cont.)

- Thus, retained earnings have roughly the *same cost* as does new common stock.
- There are three methods that might be used to estimate the cost of equity in a large, publicly traded, for-profit business:
  - Capital Asset Pricing Model (CAPM)
  - Discounted cash flow (DCF) model
  - Debt cost plus risk premium

## CAPM Method

- The **Capital Asset Pricing Model (CAPM)** is an equilibrium model that relates market risk to required rate of return.
- The equation used is the **Security Market Line (SML)**:

$$R(R_e) = RF + [R(R_M) - RF] \times b.$$

## CAPM Method (Cont.)

- Where do we get the input values?
  - RF is the rate on *T-bonds*.
  - $R(R_M)$  can come from:
    - Brokerage house estimates
    - Historical data
  - Betas come from investment analysts and from **proxy companies**.
- ? Which input is the “weak link” in the CAPM method?

## Some Beta Estimates

Baxter	Medical supplies	0.99
HMA	Acute care hospitals	0.50
Manor Care	Nursing homes	0.88
Merck	Diversified drugs	1.11
St. Jude Medical	Medical equipment	1.46
WellPoint	Managed care	0.65

Source: *Yahoo Finance Online Company Report Pages (June 2007)*.

? What do these values tell us?

## CAPM Method (Cont.)

What is MHC's component cost of equity if  $RF = 6.0\%$ ,  $RP_M = 6\%$ , and it has a market beta of  $1.33$ ?

$$\begin{aligned} R(R_e) &= RF + [R(R_M) - RF] \times b \\ &= 6.0\% + (6.0\% \times 1.33) = 14.0\%. \end{aligned}$$

? What does  $RP_M$  stand for?

## DCF Method

- The **discounted cash flow (DCF)** approach, which is applicable primarily to dividend-paying firms, assumes that a business's stock price is the present value of the expected dividend stream.
- The DCF method can be used both with constant and nonconstant growth, but the calculations are more complicated when growth is nonconstant.

## DCF Method (Cont.)

Under *constant growth* assumptions, the DCF model is as follows:

$$E(R_e) = R(R_e) = \frac{E(D_1)}{P_0} + E(g).$$

## DCF Method (Cont.)

- Where do we get the input values?
  - $P_0$  comes from the *Wall Street Journal* (or many other sources).
  - $E(D_1)$  can come from:
    - Analyst's estimates
    - Historical  $D_0$  multiplied by  $[1 + E(g)]$
  - $E(g)$  from stock analyst's forecasts.
- ? Which input is the “weak link” in the DCF method?

## DCF Method (Cont.)

Assume that  $P_0 = \$40$ ,  $E(D_1) = \$3.60$ , and  $E(g) =$  a constant  $5.0\%$  for MHC. Then,

$$\begin{aligned} R(R_e) &= \frac{E(D_1)}{P_0} + E(g) = \frac{\$3.60}{\$40} + 5.0\% \\ &= 9.0\% + 5.0\% = 14.0\%. \end{aligned}$$

## Debt Cost Plus Risk Premium Method

- The difference between the cost of equity and the pretax cost of debt *for a given business* reflects the *risk premium* for bearing ownership risk versus creditor risk.
- Historically, this premium has been estimated at three to 6 percentage points for *large businesses*.
- Current estimate can be based on the premium for an average (A-rated,  $b = 1.0$ ) firm.

## Debt Cost Plus RP Method (Cont.)

- Assume that the current risk premium is estimated to be **4** percentage points.
- Then, the debt cost plus risk premium estimate for MHC's cost of equity is **14.0%**:

$$\begin{aligned} R(R_e) &= R(R_d) + \text{Risk premium} \\ &= 10.0\% + 4.0\% = \mathbf{14.0\%}. \end{aligned}$$

## Equity Issuance Costs

- Issuance costs on equity sales are larger than on debt sales.
- Two methods are used to adjust the cost of equity for issuance costs:
  - Adjust project cost
  - Adjust cost of equity, which produces two costs: one for *retained earnings* and one for *new stock sales*
- We will *ignore* equity issuance costs.

## Cost of Equity Final Estimate

- When estimates for the cost of equity differ, judgment must be applied.
- For MHC, the CAPM  $R(R_e) = 14.0\%$ , the DCF  $R(R_e) = 14.0\%$ , and the debt cost plus risk premium  $R(R_e) = 14.0\%$ .
- Therefore, we feel confident of a final estimate is **14.0%**.
- ? What happens when the estimates differ, perhaps by a wide margin?

**Assume target weights of 35% debt and 65% equity. What is MHC's corporate cost of capital (CCC)?**

$$\begin{aligned}\text{CCC} &= w_d \times R(R_d) \times (1 - T) + w_e \times R(R_e) \\ &= (0.35 \times 10\% \times 0.6) + (0.65 \times 14.0\%) \\ &= (0.35 \times 6.0\%) + (0.65 \times 13.9\%) \\ &= 2.1\% + 9.1\% \\ &= \mathbf{11.2\%}.\end{aligned}$$

## What if the business is for-profit but does not have publicly traded stock?

$$CCC = w_d \times R(R_d) \times (1 - T) + w_e \times R(R_e).$$

- The biggest problem is the *cost of equity* estimate.
- $R(R_e)$  can be estimated by:
  - Examining the cost of equity for similar publicly traded businesses (**pure-play method**) or by debt cost plus risk premium method.
  - Then, apply the build-up method.

## Build-Up Method

The **build-up method** uses these steps:

- Use the pure-play or bond-yield plus risk premium method to set the base cost of equity rate.
- Add a **size premium** if business is small (up to **4** percentage points).
- Add a **liquidity premium** if stock is rarely or not traded (often about **2** percentage points).
- Add an **additional premium** if necessary to account for risk unique to the business (i.e., new technology risk).

## What if the business is not-for-profit?

$$\text{CCC} = w_d \times R(R_d) \times (1 - T) + w_e \times R(R_e).$$

- Again, the biggest problem is the *cost of equity* estimate.
- There are three possible approaches:
  - Use the cost of equity for a similar publicly traded business.
  - Use the business's long-run growth rate.
  - Use the  $R(R_e)$  specified by rating agencies to maintain creditworthiness.

## What factors influence a business's corporate cost of capital?

### ■ Market conditions

- Level of interest rates
- Overall level of risk aversion

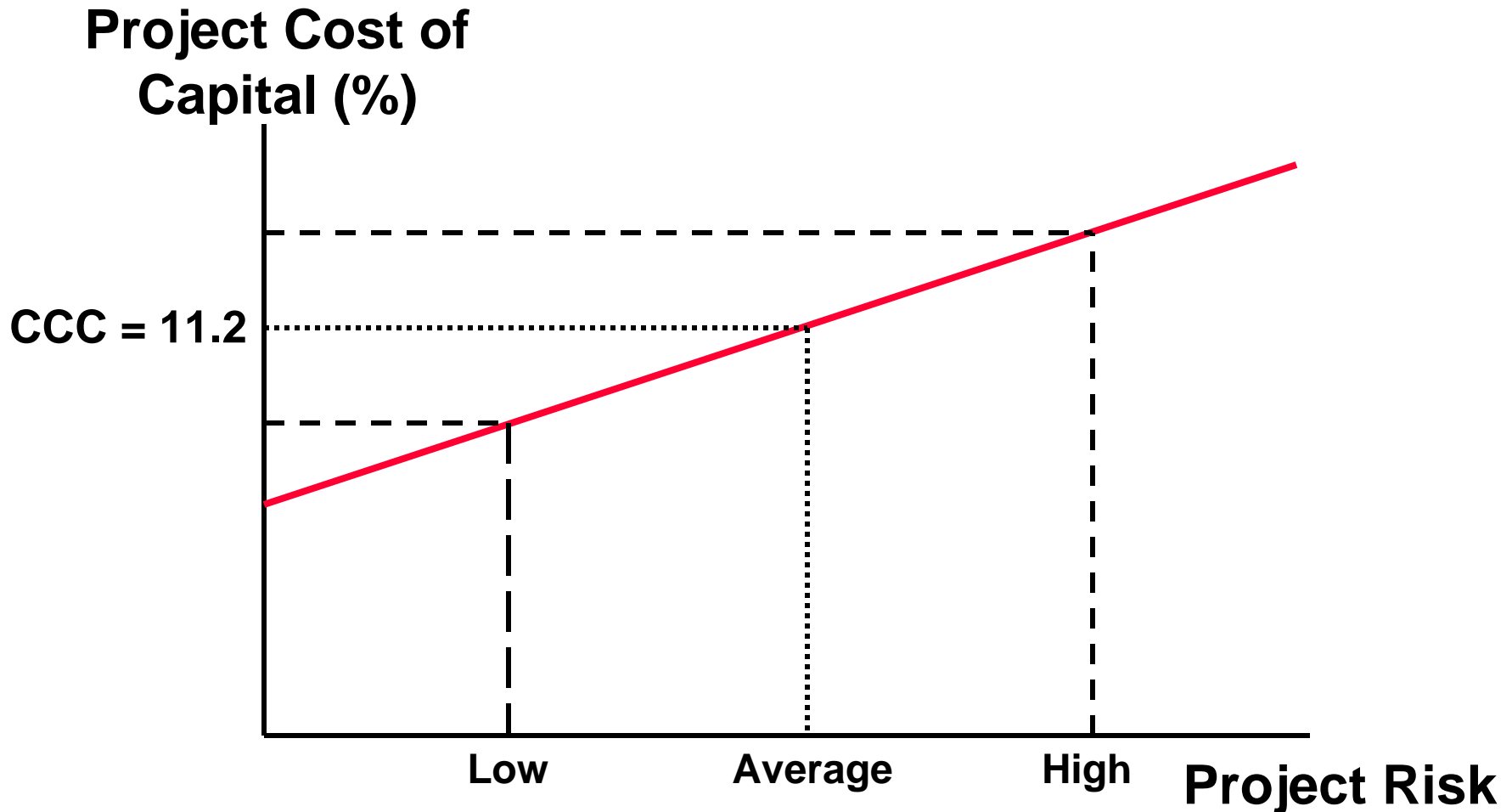
### ■ The firm's risk:

- ***Business risk***, as reflected by the inherent risk in the business line and the firm's use of operating leverage.
- ***Financial risk***, as reflected by the amount of financial leverage (debt financing) used.

The corporate cost of capital will be used as the “hurdle rate” for evaluating capital projects. Would the same rate be applied to all projects?

- No. The corporate cost of capital reflects the risk of the business’s **average project**. It can be used only for projects with average risk.
- The corporate cost of capital must be ***adjusted*** when the project being evaluated has nonaverage risk.

# Risk and the Cost of Capital



## Divisional Costs of Capital (DCC)

- Often, large organizations have subsidiaries that operate in different business lines.
- In this situation, it is best to estimate **divisional costs of capital** that reflect the unique risk (and possibly unique capital structure) of each division.
- Then, differential project risk is measured on a divisional basis.

## Conclusion

- This concludes our discussion of *Chapter 13* (Capital Structure and the Cost of Capital).
- Although not all concepts were discussed in class, you are responsible for all of the material in the text.
- ? Do you have any questions?