

# The Cost of Capital

Chapter 14

# Principles Applied in This Chapter

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- ▶ Principle 1: Money Has a Time Value.
- ▶ Principle 2: There is a Risk-Return Tradeoff.
- ▶ Principle 3: Cash Flows Are the Source of Value.
- ▶ Principle 4: Market Prices Reflect Information.
- ▶ Principle 5: Individuals Respond to Incentives.



# Learning Objectives

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1. Understand the concepts underlying the firm's overall cost of capital and the purpose for its calculation.
2. Evaluate a firm's capital structure, and determine the relative importance (weight) of each source of financing.
3. Calculate the after-tax cost of debt, preferred stock, and common equity.

# Learning Objectives

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4. Calculate a firm's weighted average cost of capital.
5. Discuss the pros and cons of using multiple, risk-adjusted discount rates and describe the divisional cost of capital as a viable alternative for firms with multiple divisions.
6. Adjust the NPV for the costs of issuing new securities when analyzing new investment opportunities

# The Cost of Capital: An Overview

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- ▶ A firm's **Weighted Average Cost of Capital, or WACC** is the weighted average of the required returns of the securities that are used to finance the firm.
- ▶ WACC incorporates the required rates of return of the firm's lenders and investors and also accounts for the firm's particular mix of financing.



# The Cost of Capital: An Overview

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The riskiness of a firm affects its WACC as:

- ▶ Required rate of return on securities will be higher if the firm is riskier, and
- ▶ Risk will influence how the firm chooses to finance i.e. proportion of debt and equity.



# The Cost of Capital: An Overview

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WACC is useful in a number of settings:

- ▶ WACC is used to value the entire firm.
- ▶ WACC is often used for determining the discount rate for investment projects
- ▶ WACC is the appropriate rate to use when evaluating firm performance



# WACC equation

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$$\begin{aligned} \text{Weighted} \\ \text{Average Cost} \\ \text{of Capital (WACC)} &= \left[ \left( \text{After-tax Cost} \right. \right. \\ &\quad \left. \left. \text{of Debt } (k_d) \right) \times \left( \begin{array}{c} \text{Proportion of} \\ \text{Capital Raised} \\ \text{by Debt } (w_d) \end{array} \right) \right] \\ &+ \left[ \left( \begin{array}{c} \text{Cost of Common} \\ \text{Stock } (k_{cs}) \end{array} \right) \times \left( \begin{array}{c} \text{Proportion of} \\ \text{Capital Raised} \\ \text{by Common Stock } (w_{cs}) \end{array} \right) \right] \end{aligned}$$





# Three Step Procedure for Estimating Firm WACC

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1. **Define the firm's capital structure** by determining the weight of each source of capital.
  2. **Estimate the opportunity cost of each source of financing.** These costs are equal to the investor's required rates of return.
  3. **Calculate a weighted average of the costs of each source of financing.** This step requires calculating the product of the after-tax cost of each capital source used by the firm and the weight associated with each source. The sum of these products is the WACC.
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# A Template for Calculating WACC

(1)	(2)		(3)		(4)
Source of Capital (Note a)	Market Value Weights (Note b)	×	After-tax Cost of Financing (Note c)	=	Product of (2) and (3) (Note d)
Debt	$w_d$	×	$k_d(1 - T)$	=	$w_d \times k_d(1 - T)$
Preferred stock	$w_{ps}$	×	$k_{ps}$	=	$w_{ps} \times k_{ps}$
Common equity	$w_{cs}$	×	$k_{cs}$	=	$w_{cs} \times k_{cs}$
Sum =	<u>100%</u>				<u>WACC</u>

**Notes:**

Note a—The sources of capital included in the WACC calculation include all interest-bearing debt (short- and long-term) but exclude non-interest-bearing debt such as accounts payable and accrued expenses. In addition, preferred stock and common equity are included. The total of all the market values of all the capital sources included in the WACC computation is generally referred to as the firm's *enterprise value*, and the mix of debt and equity defines the firm's capital structure.

Note b—The weights used to average the costs of each source of capital should reflect the relative importance of each source of capital to the firm's value on the date of the analysis. This means that the proper weights are based on the market values of each source of capital as a percent of the sum of the market values of all sources.

Note c—The investor's required rate of return is the basis for estimating the cost of capital for each source of financing to the firm. However, because interest on the firm's debt is tax deductible to the firm, we must adjust the lender's required rate of return to an after-tax basis. The required rates of return for each source of financing, like the weights used to average them, should reflect current estimates based on current market conditions.

Note d—The weighted average of the individual costs of each source of capital is found by summing the product of the weights and costs of each source.



# Determining the Firm's Capital Structure Weights

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The weights are based on the following sources of financing:  
Debt (short-term and long-term),  
Preferred Stock and  
Common Equity.



# Calculating WACC

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After completing her estimate of Templeton's WACC, the CFO decided to explore the possibility of adding more low-cost debt to the capital structure.

With the help of the firm's investment banker, the CFO learned that Templeton could probably push its use of debt to 37.5% of the firm's capital structure by issuing more debt and retiring (purchasing) the firm's preferred shares.

This could be done without increasing the firm's costs of borrowing or the required rate of return demanded by the firm's common stockholders.

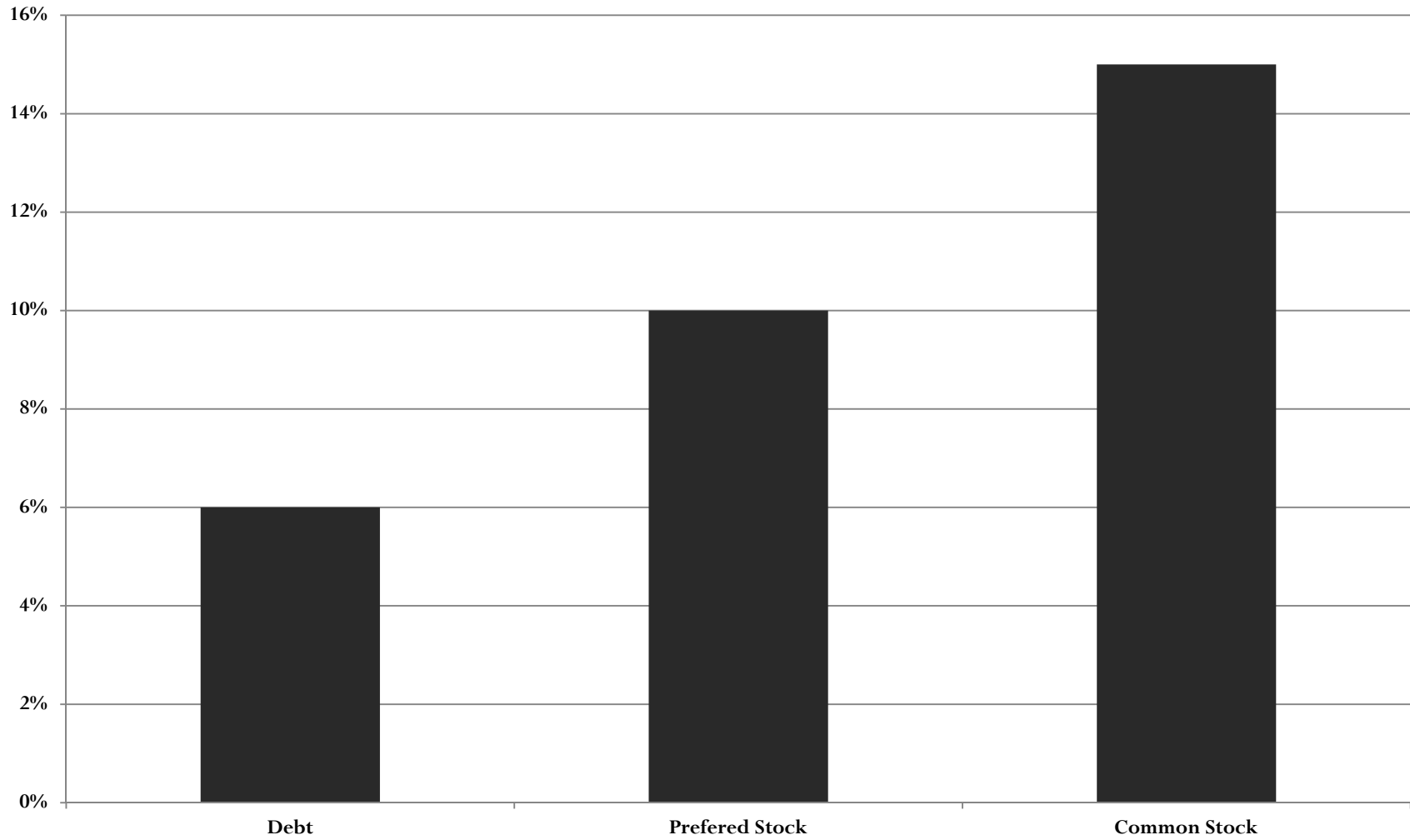
What is your estimate of the WACC for Templeton under this new capital structure proposal?

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# Step 1: Picture the Problem

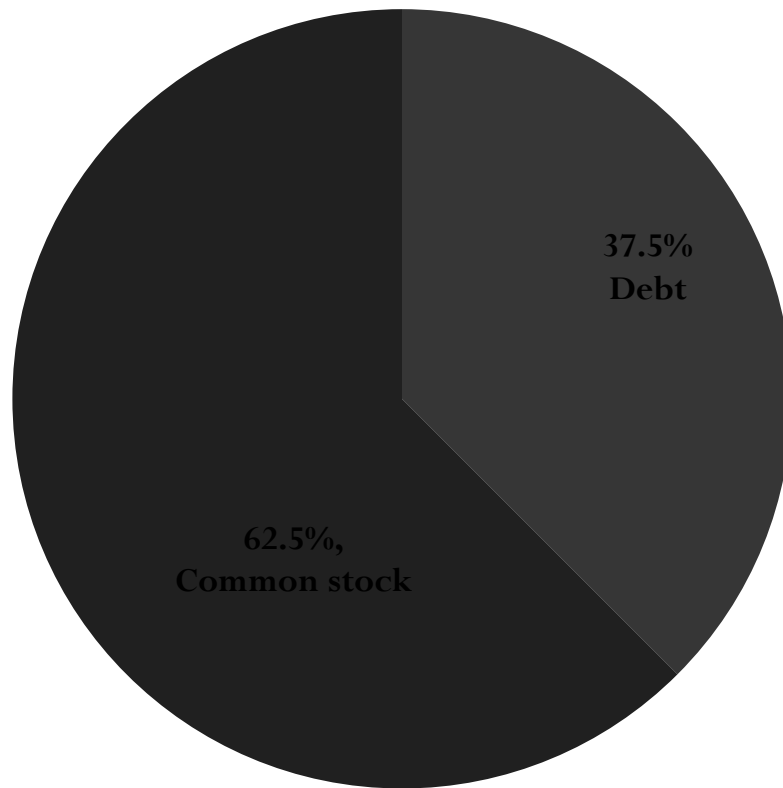
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# Step 1: Picture the Problem

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Capital Structure Weights



## Step 2: Decide on a Solution Strategy

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We need to determine the WACC based on the given information:

- ▶ Weight of debt = 37.5%;
- ▶ Cost of debt = 6%
- ▶ Weight of common stock = 62.5%;
- ▶ Cost of common stock = 15%



## Step 2: Decide on a Solution Strategy

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We can compute the WACC based on the following equation:

$$\begin{aligned} \text{Weighted} \\ \text{Average Cost} \\ \text{of Capital (WACC)} &= \left[ \left( \text{After-tax Cost} \right. \right. \\ &\quad \left. \left. \text{of Debt } (k_d) \right) \times \left( \begin{array}{c} \text{Proportion of} \\ \text{Capital Raised} \\ \text{by Debt } (w_d) \end{array} \right) \right] \\ &+ \left[ \left( \begin{array}{c} \text{Cost of Common} \\ \text{Stock } (k_{cs}) \end{array} \right) \times \left( \begin{array}{c} \text{Proportion of} \\ \text{Capital Raised} \\ \text{by Common Stock } (w_{cs}) \end{array} \right) \right] \end{aligned}$$





## Step 3: Solve

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The WACC is equal to 11.625% as calculated below.

	Weights	Cost	Product
Debt	0.375	0.06	0.0225
Common Stock	0.625	0.15	0.09375
Preferred Stock	0	0.1	0
	1	<b>WACC</b>	<b>0.11625</b>



## Step 4: Analyze

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We observe that as Templeton chose to increase the level of debt to 37.5% and retire the preferred stock, the WACC decreased marginally from 12.125% to 11.625%.

Thus altering the weights will change the WACC.



# The Cost of Debt

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**The cost of debt** is the rate of return the firm's lenders demand when they loan money to the firm.

We estimate the market's required rate of return on a firm's debt using its yield to maturity and not the coupon rate.



# The Cost of Debt

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After-tax cost of debt = Yield (1 - tax rate)

▶ Example What will be the yield to maturity on a debt that has par value of \$1,000, a coupon interest rate of 5%, time to maturity of 10 years and is currently trading at \$900? What will be the cost of debt if the tax rate is 30%?



# The Cost of Debt

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Enter:

- ▶  $N = 10; PV = -900; PMT = 50; FV = 1000$
- ▶  $I/Y = \mathbf{6.38\%}$
  
- ▶ After-tax cost of Debt = Yield (1-tax rate)  
= 6.38 (1-.3)  
= **4.47%**



# The Cost of Debt

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It is not easy to find the market price of a specific bond.

It is a standard practice to estimate the cost of debt using yield to maturity on a portfolio of bonds with similar *credit rating* and *maturity* as the firm's outstanding debt.



## Figure 14-2 A Guide to Corporate Bond Ratings

Moody's	S&P	Fitch	Definitions
Aaa	AAA	AAA	Prime. Maximum Safety
Aa1	AA+	AA+	High Grade High Quality
Aa2	AA	AA	
Aa3	AA-	AA-	
A1	A+	A+	Upper Medium Grade
A2	A	A	
A3	A-	A-	
Baa1	BBB+	BBB+	Lower Medium Grade
Baa2	BBB	BBB	
Baa3	BBB-	BBB-	
Ba1	BB+	BB+	Non-Investment Grade
Ba2	BB	BB	Speculative
Ba3	BB-	BB-	
B1	B+	B+	Highly Speculative
B2	B	B	
B3	B-	B-	
Caa1	CCC+	CCC	Substantial Risk
Caa2	CCC	-	In Poor Standing
Caa3	CCC-	-	
Ca	-	-	Extremely Speculative
C	-	-	May be in Default
-	-	DDD	Default
-	-	DD	
-	D	D	



## Figure 14-3 Corporate Bond Yields: Default Ratings and Term to Maturity

Rating	1 yr	2 yr	3 yr	5 yr	7 yr	10 yr	30 yr
Aaa/AAA	0.22	0.31	0.42	0.76	1.26	2.00	3.41
Aa1/AA+	0.26	0.43	0.58	0.96	1.46	2.17	3.62
Aa2/AA	0.29	0.55	0.74	1.16	1.66	2.35	3.83
Aa3/AA-	0.31	0.58	0.77	1.20	1.70	2.39	3.88
A1/A+	0.32	0.60	0.80	1.23	1.73	2.43	3.93
A2/A	0.55	0.80	0.98	1.40	1.89	2.57	4.03
A3/A-	0.62	0.95	1.18	1.66	2.19	2.92	4.51
Baa1/BBB+	0.83	1.19	1.42	1.91	2.45	3.18	4.80
Baa2/BBB	1.00	1.39	1.65	2.17	2.73	3.48	5.17
Baa3/BBB-	1.49	1.87	2.11	2.62	3.16	3.91	5.56
Ba1/BB+	2.27	2.64	2.90	3.41	3.98	4.75	6.37
Ba2/BB	3.04	3.41	3.68	4.21	4.79	5.58	7.19
Ba3/BB-	3.82	4.18	4.47	5.00	5.61	6.42	8.00
B1/B+	4.60	4.95	5.25	5.79	6.42	7.26	8.82
B2/B	5.38	5.72	6.04	6.59	7.24	8.10	9.63
B3/B-	6.15	6.49	6.82	7.38	8.06	8.93	10.45
Caa/CCC+	6.93	7.26	7.61	8.17	8.87	9.77	11.26
U.S. Treasury Yield	0.18	0.25	0.32	0.60	1.00	1.59	2.76

**Legend:**

These data are actually reported as "spread to Treasury yields," so for a 30-year Baa1/BBB+ corporate bond the yield would be reported as 204 basis points over the 30-year Treasury yield of 2.76%. A basis point is 1/100th of a percent, so 204 basis points correspond to 2.04%.



# The Cost of Preferred Equity

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The **cost of preferred equity** is the rate of return investors require of the firm when they purchase its preferred stock.

$$k_{ps} = \frac{Div_{ps}}{P_{ps}}$$



## The Cost of Preferred Equity (cont.)

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Example The preferred shares of Relay Company that are trading at \$25 per share.

What will be the cost of preferred equity if these stocks have a par value of \$35 and pay annual dividend of 4%?

Using equation 14-2a

$$k_{ps} = \$1.40 \div \$25 = \mathbf{.056 \text{ or } 5.6\%}$$



# The Cost of Common Equity

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The **cost of common equity** is the rate of return investors *expect* to receive from investing in firm's stock.

This return comes in the form of dividends and proceeds from the sale of the stock).

There are two approaches to estimating the cost of equity:

1. The dividend growth model (from chapter 10)
2. CAPM (from chapter 8)



# The Dividend Growth Model – Discounted Cash Flow Approach

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1. Estimate the expected stream of dividends that the common stock is expected to provide.
2. Using these estimated dividends and the firm's current stock price, calculate the internal rate of return on the stock investment.



# Pros and Cons of the Dividend Growth Model Approach

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▶ **Pros** – easy to use

▶ **Cons** – severely dependent upon the quality of growth rate estimates

- Assumption of constant dividend growth rate may be unrealistic



# Dividend Growth Model

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- ▶ Recall that the dividend growth model is
- ▶  $P_{cs} = D_1 / (k_{cs} - g)$
- ▶ Then the required return on the stock is
- ▶  $k_{cs} = D_1 / P_{cs} + g$

# The Problem

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Prepare two estimates of Pearson's cost of common equity using the dividend growth model where you use growth rates in dividends that are 25% lower than the estimated 6.25% (i.e., for  $g$  equal to 4.69% and 7.81%)



# Step 1: Picture the Problem

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We are given the following:

- ▶ Price of common stock ( $P_{cs}$ ) = \$19.39
- ▶ Growth rate of dividends ( $g$ ) = 4.69% and 7.81%
- ▶ Dividend ( $D_0$ ) = \$0.49 per share
  
- ▶ Cost of equity is given by dividend yield + growth rate.





## Step 2: Decide on a Solution Strategy

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We can determine the cost of equity using

$$k_{cs} = \frac{D_1}{P_{cs}} + g$$



## Step 3: Solve

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At growth rate of 4.69%

$$k_{cs} = \{\$0.49(1.0469)/\$19.39\} + .0469$$
$$= \mathbf{.0733 \text{ or } 7.33\%}$$

At growth rate of 7.81%

$$k_{cs} = \{\$0.49(1.0781)/\$19.39\} + .0781$$
$$= \mathbf{.1053 \text{ or } 10.53 \%}$$



## Step 4: Analyze

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- ▶ Pearson's cost of equity is estimated at 7.33% and 10.53% based on the different assumptions for growth rate.



# Estimating the Rate of Growth, $g$

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- ▶ Thus growth rate is an important variable in determining the cost of equity.
- ▶ However, estimating the growth rate is not easy.
- ▶ The growth rate can be obtained from
  - ▶ websites that post analysts forecasts, and
  - ▶ using historical data to compute the arithmetic average or geometric average.



# Estimating the Rate of Growth, $g$

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Year	Dividend	\$ Change	% Change
2009	\$0.800		
2010	0.825	\$0.025	3.1%
2011	0.840	0.015	1.8%
2012	0.875	0.035	4.2%
2013	0.900	0.025	2.9%
	Arithmetic Average		3.0%
	Geometric Average		2.99%



# The Capital Asset Pricing Model

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CAPM (from chapter 8) was designed to determine the expected or required rate of return for risky investments.

$$\text{Cost of Common Equity } (k_{cs}) = \text{Risk-Free Rate } (r_f) + \underbrace{\text{Equity Beta Coefficient } (\beta_{cs}) \left( \underbrace{\text{Expected Return on the Market Portfolio } (r_m) - \text{Risk-Free Rate } (r_f)}_{\text{Market Risk Premium}} \right)}_{\text{Risk Premium for Common Equity } (= \text{Equity Beta} \times \text{Market Risk Premium})}$$



# The Capital Asset Pricing Model

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The expected return on common stock is determined by three key ingredients:

- ▶ The risk-free rate of interest,
- ▶ The beta of the common stock returns, and
- ▶ The market risk premium.



# Advantages and Disadvantages of the CAPM approach

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**Pros** – easy to use, does not depend on dividend or growth assumptions.

**Cons** – Choice of risk-free is not clearly defined,  
- Estimates of beta and market risk premium will vary depending on the data used.





# **CHECKPOINT 14.3:**

## ***CHECK YOURSELF***

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### **Estimating the Cost of Common Equity Using the CAPM**

Prepare two additional estimates of Pearson's cost of common equity using the CAPM where you use the most extreme values of each of the three factors that drive the CAPM.



# Step 1: Picture the Problem

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CAPM describes the relationship between the expected rates of return on risky assets in terms of their systematic risk. Its value depends on:

- ▶ The risk-free rate of interest,
- ▶ The beta or systematic risk of the common stock returns, and
- ▶ The market risk premium.



# Step 1: Picture the Problem

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However, there can be wide variation in the estimates for each one of these variables. Here we are given the following estimates:

- ▶ The risk-free rate of interest (.01% or 2.80%)
- ▶ The beta or systematic risk of the common stock returns (.8 or 1.2)
- ▶ The market risk premium (4% or 8%)



# Step 1: Picture the Problem

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The cost of equity can be estimated using the CAPM equation:

$$\text{Cost of Common Equity } (k_{cs}) = \text{Risk-Free Rate } (r_f) + \underbrace{\text{Equity Beta Coefficient } (\beta_{cs}) \left( \underbrace{\text{Expected Return on the Market Portfolio } (r_m) - \text{Risk-Free Rate } (r_f)}_{\text{Market Risk Premium}} \right)}_{\text{Risk Premium for Common Equity } (= \text{Equity Beta} \times \text{Market Risk Premium})}$$



## Step 2: Decide on a Solution Strategy

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Since we have been given the estimates for market factors (risk-free rate and risk premium) and firm-specific factor (beta), we can determine the cost of equity using CAPM.



## Step 3: Solve

$$\text{Cost of Common Equity } (k_{cs}) = \text{Risk-Free Rate } (r_f) + \overbrace{\text{Equity Beta Coefficient } (\beta_{cs}) \left( \underbrace{\text{Expected Return on the Market Portfolio } (r_m) - \text{Risk-Free Rate } (r_f)}_{\text{Market Risk Premium}} \right)}^{\text{Risk Premium for Common Equity} \text{ ( = Equity Beta } \times \text{ Market Risk Premium)}}$$

$$\blacktriangleright k_{cs} = 0.01 + 0.8(4) = \mathbf{3.21\%}$$

$$\blacktriangleright k_{cs} = 2.80 + 1.2(8) = \mathbf{12.40\%}$$



## Step 4: Analyze

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- ▶ Pearson's cost of equity is shown to be sensitive to the estimates used for risk-free rate of interest, beta and market risk premium.
- ▶ Based on the estimates used, the cost of common equity ranges from 3.21% to 12.40%.



## Summing Up: Calculating the Firm's WACC

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When estimating the firm's WACC, following issues should be kept in mind:

- ▶ Weights should be based on market rather than book values of the firm's securities.
- ▶ Use market based opportunity costs rather than historical rates (such as coupon rates).
- ▶ Use forward-looking weights and opportunity costs.





# Estimating Project Cost of Capital

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- ▶ Should the firm's WACC be used to evaluate all new investments?
- ▶ In theory, No ... since all projects may have unique risk. However, in practice, many firms use a single firm WACC for all projects.



# The Rationale for Using Multiple Discount Rates

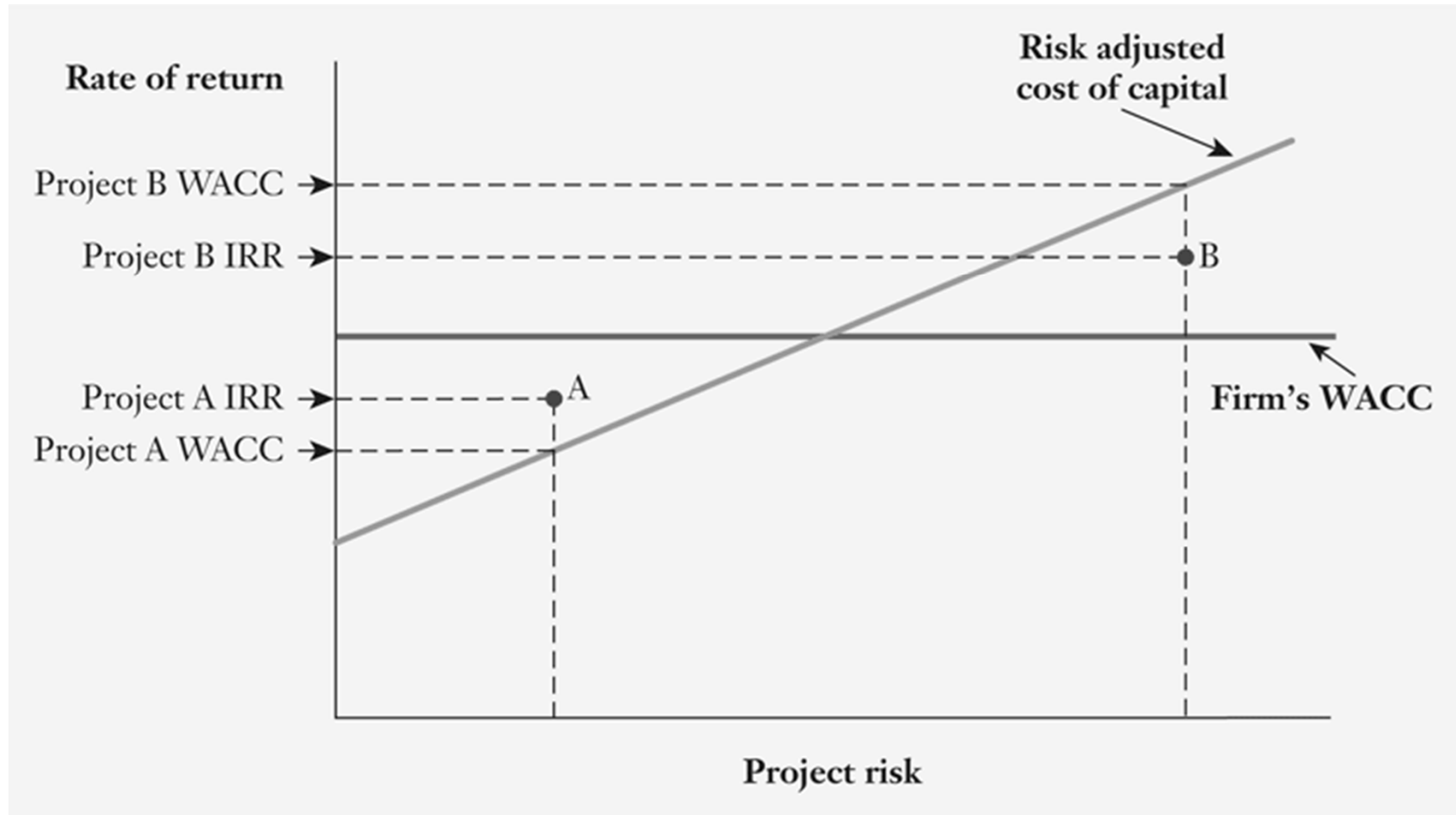
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Figure 14.4 illustrates the danger of using a single discount rate to evaluate investment projects with different levels of risk.

There will be a tendency to take on too many risky investment projects, and pass up good investment projects that are relatively safe.



Figure 14.4 Using the Firm's WACC Can Bias Investment Decisions toward Risky Projects



# Why Don't Firms Typically Use Project Cost of Capital?

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1. It may be difficult to trace the source of financing for individual project since most firms raise money in bulk for all the projects.
2. It adds to the time and cost in getting approval for new projects.



# Estimating Divisional WACCs

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- ▶ If a firm undertakes investment with very different risk characteristics, it will try to estimate **divisional WACCs**.
- ▶ The divisions are generally defined either by geographical regions (e.g., Asian region versus European region) or industry (e.g., pipeline, exploration and production)



## Using Pure Play Firms to Estimate Divisional WACCs

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- ▶ Here a firm with multiple divisions may identify a comparable firm with only one division (called a “pure play” comparison firms or “comps”).
- ▶ The estimate of pure play firm’s cost of capital can then be used as a proxy for that particular division’s cost of capital.



# Figure 14.5 Choosing the Right WACC: Discount Rates and Project Risk

Method	Description	Advantages	Disadvantages	When to Use
WACC	Estimated WACC for the firm as an entity; used as the discount rate on <i>all</i> projects.	<ul style="list-style-type: none"> <li>• Familiar concept to most business executives.</li> <li>• Minimizes estimation costs, as there is only one cost of capital calculation for the firm.</li> <li>• Reduces the problem of influence cost issues.</li> </ul>	<ul style="list-style-type: none"> <li>• Does not adjust discount rates for differences in project risk.</li> <li>• Does not provide for flexibility in adjusting for differences in project debt in the capital structure.</li> </ul>	<ul style="list-style-type: none"> <li>• Projects are similar in risk to the firm as a whole.</li> <li>• Using multiple discount rates creates significant problems with influence costs.</li> </ul>
Divisional WACC	Estimated WACC for individual business units or divisions within the firm; used as the only discount rates within each division.	<ul style="list-style-type: none"> <li>• Uses division-level risk to adjust discount rates for individual projects.</li> <li>• Reduces influence costs to the competition among division managers to lower their division's cost of capital.</li> </ul>	<ul style="list-style-type: none"> <li>• Does not capture intra-division risk differences in projects.</li> <li>• Does not account for differences in project debt capacities within divisions.</li> <li>• Potential influence costs are associated with the choice of discount rates across divisions.</li> <li>• Difficult to find single-division firms to proxy for divisions.</li> </ul>	<ul style="list-style-type: none"> <li>• Individual projects within each division have similar risks and debt capacities.</li> <li>• Discount rate discretion creates significant influence costs within divisions but not between divisions.</li> </ul>



# Divisional WACC – Estimation Issues and Limitations

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While divisional WACC is a significant improvement over the single, company-wide WACC, it has a number of potential limitations that arise due to the challenge of finding comparable firms.





# Floatation Costs and Project NPV

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**Floatation costs** are fees paid to an investment banker and costs incurred when securities are sold at a discount to the current market price.



## WACC, Floatation Costs and Project NPV

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Because of floatation costs, the firm will have to raise more than the amount it needs.

$$\frac{\text{Flotation Cost Adjusted Initial Outlay}}{\text{Financing Needed}} = \frac{1}{\left(1 - \frac{\text{Flotation Cost as a Percent}}{100}\right)}$$



## WACC, Floatation Costs and Project NPV

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Example If a firm needs \$100 million to finance its new project and the floatation cost is expected to be 5.5%, how much should the firm raise by selling securities?



## WACC, Floatation Costs and Project NPV (cont.)

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$$\frac{\text{Flotation Cost Adjusted}}{\text{Initial Outlay}} = \frac{\text{Financing Needed}}{\left(1 - \frac{\text{Flotation Cost}}{\text{as a Percent}}\right)}$$

$$= \$100 \text{ million} \div (1 - .055) = \$105.82 \text{ million}$$

- ▶ Thus the firm will raise \$105.82 million, which includes floatation cost of \$5.82 million.



# The Problem

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Before Tricon could finalize the financing for the new project, stock market conditions changed such that new stock became more expensive to issue.

In fact, floatation costs rose to 15% of new equity issued and the cost of debt rose to 3%.

Is the project still viable (assuming the present value of future cash flows remain unchanged)?



# Step 1: Picture the Problem

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The NPV will be equal to the present value of the future cash flows less the initial outlay and floatation costs.

$$\text{NPV} = \text{PV}(\text{inflows})$$

- Initial outlay
- Floatation costs



## Step 2: Decide on a Solution Strategy

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We need to first estimate the average floatation costs that Tricon will incur when raising the funds. This can be done using equation 14-5.

$$\text{Weighted Average Flotation Cost} = \left( w_d \times \begin{array}{l} \text{Flotation Cost} \\ \text{of Debt as a Percent} \end{array} \right) + \left( w_{cs} \times \begin{array}{l} \text{Flotation Cost} \\ \text{of Equity as a Percent} \end{array} \right)$$



## Step 2: Decide on a Solution Strategy

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Next, the “grossed-up” investment outlay can be estimated using equation 14-6 and subtracted from the present value of the expected future cash flows to determine whether the project has a positive NPV.

$$\frac{\text{Flotation Cost Adjusted Initial Outlay}}{\text{Initial Outlay}} = \frac{\text{Financing Needed}}{\left(1 - \frac{\text{Flotation Cost as a Percent}}{100}\right)}$$





## Step 3: Solve

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We can use equation 14-5 to estimate the weighted average flotation cost as follows:

$$\text{Weighted Average Flotation Cost} = \left( w_d \times \begin{array}{l} \text{Flotation Cost} \\ \text{of Debt as a Percent} \end{array} \right) + \left( w_{cs} \times \begin{array}{l} \text{Flotation Cost} \\ \text{of Equity as a Percent} \end{array} \right)$$

$$= .40 \times .03 + .60 \times .15$$

$$= .102 \text{ or } 10.2\%$$



## Step 3: Solve

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The “grossed up” initial outlay for \$100 million project can be estimated using equation 14-6:

$$\frac{\text{Flotation Cost Adjusted}}{\text{Initial Outlay}} = \frac{\text{Financing Needed}}{\left(1 - \frac{\text{Flotation Cost}}{\text{as a Percent}}\right)}$$

$$= \$100 \text{ million} \div (1 - 0.102) = \$111.36 \text{ million}$$



## Step 3: Solve

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- ▶ Thus, floatation costs is equal to \$11.36 million.
- ▶ NPV = \$115 million - \$111.36 million  
= **\$3.64 million**



## Step 4: Analyze

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- ▶ The project is feasible even after consideration of higher floatation costs as the NPV is positive at \$3.64 million.
- ▶ However, the problem illustrates that floatation costs can be significant and cannot be ignored while evaluating projects.

