

# THE COST OF CAPITAL

Chapter 14

# OUTLINE

1. The Cost of Capital
2. Cost of Equity
3. Cost of Debt
4. The Weighted Average Cost of Capital

# THE COST OF CAPITAL

## WHAT WE'VE LEARNED SO FAR

When valuing an investment, we *discount* the cash flows to the present by using a *discount rate*.

Similarly, when finding the NPV of a project, we *discount* the incremental and relevant cash flows to the present.

## REQUIRED RETURNS

When we say the required return on an investment is 10%, we usually mean that the investment will have a positive NPV only if its returns exceed 10%.

The firm must return 10% on the investment to compensate investors for the use of the capital needed to finance the project.

10%, in this case, would be the COST OF CAPITAL.

# THE COST OF CAPITAL

The **COST OF CAPITAL** is the minimum required return associated with a project.

The return an investor in a security receives is the cost of that security to the company that issued it. Therefore, the **Cost of Capital** to a firm is a required return to an investor.

# THE COST OF EQUITY AND THE COST OF DEBT

A firm has both equity holders and debt holders, and each have a required return.

We will calculate the WEIGHTED AVERAGE COST OF CAPITAL (WACC) which includes both the COST OF EQUITY and the COST OF DEBT.

The COST OF EQUITY (DEBT) is the return that equity (debt) holders require on their investment in the firm.

# THE COST OF EQUITY



# THE COST OF EQUITY

The Cost of Equity is the required return to shareholders of a stock.

We can use either the DIVIDEND GROWTH MODEL or the CAPITAL ASSET PRICING MODEL to find this required return, both of which we've seen before.

## THE COST OF EQUITY: DIVIDEND GROWTH MODEL

Kramerica Industries paid a \$4 dividend last year. The stock currently sells for \$60 per share. The dividend is expected to grow steadily at 6% per year. What is the cost of equity?

$$R_E = \frac{D_1}{P_0} + g$$

$$R_E = \frac{\$4 \times (1.06)}{60} + 0.06 = 13.07\%$$

## THE COST OF EQUITY: CAPM

Kramerica Industries has a beta of 1.85. Last year, the S&P 500 returned 7.1%. The return on T-bills is 0.10%. What is the cost of equity?

$$R_E = R_f + \beta_E(R_M - R_f)$$

$$R_E = 0.001 + 1.85(0.071 - 0.001) = 13.05\%$$

## TO SUMMARIZE

To find the Cost of Equity, which is the return that equity holders require, we can use either the dividend growth model or the CAPM.

# THE COST OF DEBT

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The Cost of Debt is the return that a firm's creditors require on new borrowing.

This is the yield to maturity.

## THE COST OF DEBT

Kramerica Industries issued a 30 year, 7% (annual coupon) bond 8 years ago. Today, the bond sells for 96% of its face value, or \$960. What is the cost of debt?

Find the YTM:  $N = 30$ ,  $PMT = 70$ ,  $FV = 1000$ ,  $PV = -960$

CPT  $I/Y = 7.33\%$

The Cost of Debt is 7.33%. This is *not* the coupon rate, because this is not a new debt issue.

## TO SUMMARIZE

The Cost of Debt is the yield to maturity or the cost of new borrowing



# THE WEIGHTED AVERAGE COST OF CAPITAL

## DEBT AND EQUITY

The firm finances capital budgeting activities through debt and equity, the costs of which we've just found.

The value of the firm, therefore, is the *market* value of debt and the *market* value of the equity.

$$V = E + D$$

# CAPITAL STRUCTURE WEIGHTS

The CAPITAL STRUCTURE WEIGHTS are the percentage of debt and equity that comprise the firm.

Example: If the total market value of the firm's equity is \$200 million and the total market value of the firm's debt is \$500 million, then  
 $E/V = 200/(200+500) = 28.6\%$  and  $D/V = 500/(200+500) = 71.4\%$

# THE WEIGHTED AVERAGE COST OF CAPITAL

To determine the overall cost of capital, multiply the weights of debt and equity by their costs in the WACC formula:

$$WACC = \frac{E}{V}R_E + (1 - T_C)\frac{D}{V}R_D$$

Recall that interest payments are tax deductible. Multiply the return on debt by 1 minus the tax rate to arrive at our after-tax cost of debt.

## WACC EXAMPLE

Tech Enterprises has 1.4 million shares outstanding, and the stock sells for \$20 per share. The firm's debt has a total face value of \$5 million, is priced to yield 11%, and was recently quoted at 93% of par. The rate on T-Bills is 8%, the market risk premium is 7%, and the beta is 0.74. Assuming a corporate tax rate of 34%, what is the WACC?

# WACC EXAMPLE

## Step 1: Cost of Equity

$$R_E = R_f + \beta_E(R_M - R_f)$$

$$R_E = 0.08 + 0.74(0.07) = 13.18\%$$

## Step 2: Cost of Debt

From the problem, the debt is priced to yield 11%.

# WACC EXAMPLE

## Step 3: Market Value of Equity

$$1.4 \text{ million shares} \times \$20 = \$28,000,000$$

## Step 4: Market Value of Debt

$$0.93 \times \$5,000,000 = \$4,650,000$$

# WACC EXAMPLE

## Step 5: Capital Weights

$$E/V = 28M / (28M + 4.65M) = 0.8576$$

$$D/V = 4.65M / (28M + 4.65M) = 0.1424$$



# WACC EXAMPLE

## Step 6: WACC

$$WACC = \frac{E}{V}R_E + (1 - T_C)\frac{D}{V}R_D$$

$$WACC = 0.8576(0.1318) + (1-0.34)(0.1424)(0.11) = 12.34\%$$

The overall cost of capital is 12.34%

## USING THE WACC

Now that we know how to calculate the WACC, we can use it to find the present value of future cash flows .

## USING THE WACC: EXAMPLE

A firm is considering a project that will result in initial after-tax cash savings of \$5,000,000 at the end of the first year. These savings will grow at a rate of 5% per year. The firm is comprised of 2/3 Equity and 1/3 Debt, has a cost of equity of 29.2%, a cost of debt of 10%, and a tax rate of 34%. Assuming the project costs \$15 million, should the firm accept?

## USING THE WACC: EXAMPLE

$$\text{WACC} = (2/3) \times 0.292 + (1/3) \times 0.1 \times (1-0.34) = 21.67\%$$

Then, we plug in the WACC as our required return in the present value of a growing perpetuity formula:

$$P_0 = \frac{D_1}{R - g}$$

And  $P_0 = 5 / (0.2167 - 0.05) = \$30$  million, accept.

## TO SUMMARIZE

The WACC provides the overall cost of capital for a firm, using the cost of equity, debt, their weights, and the tax rate. We can use the WACC to discount future cash flows.



# TAKEAWAYS

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1. The firm's cost of capital consists of the cost of equity and the cost of debt.
2. The cost of equity can be found using the dividend growth model or the CAPM.
3. The cost of debt is the YTM.
4. The WACC is the overall cost of equity considering the weights of equity and debt.
5. The WACC can be used when discounting future cash flows to value a capital budgeting activity.

**END.**