



# Cost of Capital

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BUS207 Financial Management



# Capital Budgeting Overview

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Capital budgeting is the set of valuation technique for real asset investment decisions.

## Capital Budgeting Steps:

- Estimating expected future cash flows for the proposed real asset investment
- Estimating the firm's cost of capital based on the firm's optimal capital structure
- Using a decision-making valuation technique which depends on the company's cost of capital to decide whether to accept or reject the proposed investment



## Cost of Capital

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The weighted average of the cost of individual types of funding

One possible decision rule is to compare a project's expected return to the cost of the funds that would be used to finance the purchase of the project

Accept if: project's expected return  $>$  cost of capital



## Cost of Capital Terms

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Capital Component = type of financing such as debt, preferred stock, and common equity

$K_d$  = cost of new debt, before tax

$K_d(1-T)$  = after-tax component cost of debt

$K_p$  = component cost of new preferred stock

$K_s$  = component cost of common stock (or retained earnings, or internal equity)

$K_e$  = component cost of external equity raised through selling new common stock

WACC = the weighted average cost of capital which is the weighted average of the individual component costs of capital

$W_i$  = the fraction of capital component  $i$  used in the firm's capital structure



## Component Cost of Debt

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Remember, a corporation can deduct their interest expense for tax purposes

Therefore, the component cost of debt is the after-tax interest rate on new debt

where  $T$  is the company's marginal tax rate



## Cost of Debt Example

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We want to estimate the cost of debt for BellSouth which has a marginal tax rate of 35%. Let's assume BellSouth would issue 10 year bonds, and we find the following bond quote.

	Coupon	Maturity	Last Price
Bell South	8.5	11/2026	102.15

Annual coupon =

,  $n =$

Price =

, semiannual coupons.



## Cost of Debt Example – cont'd...

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Find YTM

$$\begin{aligned} PV &= \quad , FV = \quad , PMT = \quad , \\ N &= \quad , \end{aligned}$$

Solve for  $I/Y = YTM/2 =$

$$YTM = k_d = \quad , k_d(1 - T) =$$



## Cost of Preferred Stock, $k_{ps}$

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Cost of new preferred stock

$$K_p = D_p / P_p$$

$D_p$  = annual preferred stock dividend

$P_p$  = price per share from sale of preferred stock





## Cost of Preferred Stock Example

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BellSouth has preferred stocks. The par value is \$50 a share. The preferred stocks are sold at par value, if the dividend yield is 7%. What is the cost of this preferred stock?

$$D_p =$$

$$P_p =$$

$$K_p =$$



## Cost of Common Stock, $k_s$

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CAPM Approach

Discount Cash Flow Approach



## CAPM Approach

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The CAPM Approach: is the required rate of return

$$k_S = k_{RF} + b_i (k_M - k_{RF})$$

— Example: The risk free rate is 4.1% and the historical market risk premium is 9%. What would BellSouth's CAPM cost of common stock be if its beta is 0.95



## Discount Cash Flow Approach

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The expected return formula derived from the constant growth stock valuation model.

$$k_S = D_1 / P_0 + g = D_0(1+g)/P_0 + g$$

In practice, the tough part is estimating  $g$ .

Security analysts' projections of  $g$  can be used.



## Discount Cash Flow Approach – cont'd...

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— DCF estimate for the Cost of Common Stock for BellSouth

Recent stock price ( $P_0$ ) = \$78

Current dividend ( $D_0$ ) = \$1.44

According to Value Line Investment Survey, earnings are expected to grow by 14%, and their dividend growth estimate is 2.5%.

What to do?

Our growth estimate ( $g$ ) :



## Cost of Common Stock, $k_s$ – cont'd...

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BellSouth between the two approaches

CAPM estimate for cost of common stock: 12.62%

DCF estimate for cost of RE: 10.3%

Why?



## Cost of Common Stock, $k_s$ – cont'd...

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- Other growth rate projections for BellSouth

Value Line has a cash flow growth rate estimate of 11%:  
BETTER – would yield a higher estimate of  $k_s$  using the DCF approach: 13.0%

A  $g$  estimate method:

$$g = (\text{Retention rate})(\text{expected ROE}) = (1 - \text{dividend payout ratio})(\text{expected. ROE})$$

Expected ROE and dividend payout for 2002 for BellSouth according to Value Line: 20% and 44%

$$g =$$



## Cost of Common Stock, $k_s$ – cont'd...

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What to do about the different cost of common stock estimate?

CAPM: 12.7%

DCF: 10.3%

Average the two or choose one or the other?

Choosing DCF estimate makes for an easier cost of new common stock estimate





## Cost of Common Stock, $k_s$ – cont'd...

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- Adjusting for flotation costs of new security issues.

Include flotation costs for funds raised for a project as an additional initial costs of the project. OR adjust the component cost of capital. For example, for selling new common stock,

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

where  $F$  = flotation (underwriting) cost % (or fraction)

$P_0(1 - F)$  is the net price per share the company actually receives from selling new stock



## Cost of Common Stock, $k_s$ – cont'd...

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BellSouth's estimated cost of newly issued common stock,  $k_e$

Let's go back to our original DCF estimates:

$P_0$ : \$78,  $D_0$ : \$1.44,  $g = 8.3\%$

Assume new stock can be sold at the current market price and BellSouth will incur a 10% flotation cost per share.

$k_e =$

DCF  $k_s =$

Difference =



## Weighted Average Cost of Capital, WACC

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

$w_i$  = the fraction of capital component  $i$  used in the firm's capital structure

What is BellSouth's WACC if BellSouth's target capital structure of 35% debt, 10% preferred stock, and 55% common equity financing?



## Some Problems in Cost of Capital

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- Small firms without dividends: DCF approach is out.
- Firms that aren't publicly traded: no beta data, CAPM approach is difficult.
- WACC is just for average risk projects.



## Adjusting for project risk

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The WACC is for average risk projects.

A company should adjust their WACC upward for more risky projects and downward for less risky projects = project's Risk-Adjusted Cost of Capital

A company can also make this adjustment on a divisional basis as well.



## Measuring beta risk for projects and divisions

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- Pure Play Method:

- (1) Identify several companies whose only business is to produce the product in question.
- (2) Calculate the beta for each of these companies
- (3) Average the individual company betas for the estimate of the project's (or division's) beta.