Test 3, Lecture 6-7 Review

Weighted Average Cost of Capital

There are 3 Types of Investors:

1. Debt ($r\_{D}$ )
2. Preferred Stock ( $r\_{P}$)
3. Common Stock ( $r\_{E}$)

PREFERRED STOCK

Features of Preferred Stock

* Preferred Stock is considered equity, but it has characteristics of both stocks and bonds
* No maturity date
* No tax benefits
	+ Unlike interest, you cant write off on PS
* No voting rights
* No ownership
* Fixed dividend payments
* Par value
* Paid before CS
* Doesn’t actively trade
	+ No stock market

Valuing PS Compared to Debt and CS

1. Debt (low risk)
2. PS
3. CS (high risk)

Pricing PS (perpetuity)

$$P\_{0}=\frac{D\_{P}}{r\_{P}}$$

$P\_{0}$ = price of one share today

$D\_{P}$ = preferred dividend = par value x dividend rate

$r\_{P}$ = required return to hold PS

COST OF CAPITAL

Cost of Capital is concerned with what a firm has to pay for the capital is uses to finance its projects

* For a firm, cost of capital consists of debt, PS, and CS
	+ These items are found in the liability side of the firms balance sheet and are called capital components
* The firms cost of capital is a weighted average of the return investors require for each of these components
	+ Cost of capital is also known as the firms weighted average cost of capital (WACC)

$$r\_{WACC}=\frac{D}{D+P+E}\*r\_{D}\*\left(1-T\right)+\frac{P}{D+P+E}\*r\_{P}+\frac{E}{D+P+E}\*r\_{E}$$

D = market value of interest paying debt

P = market value of preferred shares

E = market value of common equity

$\frac{D}{D+P+E}$ = $W\_{D}$ = weight in debt from debt holders

$\frac{P}{D+P+E}$ = $W\_{P}$ = weight in PS

$\frac{E}{D+P+E}$ = $W\_{E}$ = percentage of value from common equity

$D+P+E$ = value of firm

$$r\_{WACC}=W\_{D}\*r\_{D}\*\left(1-T\right)+W\_{P}\*r\_{P}+W\_{E}\*r\_{E}$$

\*\*\*IRR must be greater than $r\_{WACC}$ for the project to be a good one

What do the individual components of WACC mean and where do they come from?

* Cost of Debt
	+ $r\_{D}$ = required return to purchase new debt for a project (coupon rate on new debt)
	+ $r\_{D}\*\left(1-T\right)$ 🡪 interest is tax deductible
	+ Estimating $r\_{D}$:
		- Find the YTM on existing firms debt
		- Use YTM on firms with similar risk
* Preferred Stock
	+ $r\_{P}$ = required return for an investor to buy a new preferred share (dividend rate on a new share)
	+ Find $r\_{P}$ using a currently trading share

$$r\_{P}=\frac{D\_{P}}{P\_{0}}$$

* Cost of Equity
	+ $r\_{E}$ = required return to invest in CS
	+ There are 2 ways to estimate $r\_{E}$:
1. CAPM

$$r\_{E}=r\_{f}+β(E\left(r\_{m}\right)-r\_{f})$$

1. Use stock pricing model

$P\_{0}=\frac{D\_{0}\*(1+g)}{r\_{E}-g} $🡪 $r\_{E}=\frac{D\_{0}\*(1+g)}{P\_{0}}+g$

* + There are 2 sources of equity financing:
1. Internal Financing: using existing retained earnings to finance a project (shareholders should earn $r\_{E}$)
2. External Financing: issuing new shares to raise capital (costly due to floatation costs, which comes from the equity underwriter)
	* You will usually (hopefully) see a firm with more equity than debt

Steps in Finding WACC

1. Determine the weight for each capital component and how much money is needed from each capital component
	1. Use market values of debt, PS, and equity (rather than the balance sheet or book value of these sources) because market values reflect current values placed on firm sources of capital by investors
		1. Firm value can be thought of as the market value of equity plus the market value of debt

D = market value of debt

E = market value of equity

V = firm value = D + E

$$V=\frac{D}{V}+\frac{E}{V}=\frac{D}{D+E}+\frac{E}{D+E}$$

1. Determine the cost of debt ($r\_{D}$)
	1. $r\_{D}$ = YTM = I

$$P\_{0}=\frac{coupon}{r\_{D}}\*\left[1-\left(\frac{1}{1+r\_{d}}\right)^{N}\right]+\frac{Face}{(1+r\_{D})^{N}}$$

Solve for $r\_{D}$ = YTM = I on calculator using TVM keys

1. Determine the cost of equity ($r\_{E}$)
2. Find WACC

Is the WACC constant for a firm for any level of financing?

* No
	+ Outside financing is costly
		- Internal funds run out at a certain point and when that happens a firm has to “float,” creating a higher cost of capital

So far, we’ve assumed that firms are pursuing new projects that are similar to their current activities (risk is largely the same). How do we handle a project that isn’t a typical project for the firm?

* Ex: Pepsi bought KFC, Taco Bell, and Pizza Hut. Fast food is a fad, though, so when the economy is up, people buy less and when the economy is down, people buy more
* We need a project WACC that reflects project risk
	+ For a project that’s riskier than normal, $β\_{project}>β\_{firm}$ and $WACC\_{project}>WACC\_{firm}$ because they run a danger of accepting a project with a negative NPV
		- \*\*\*Adjust WACC to reflect risk
* How to Adjust WACC:
	+ Pure Play: find terms in the same industry as your risk project (find comparables)
		- Ex: McDonalds and Burger King
			* Use the $β$ of these comparable firms to find the WACC