15.407 Recitation

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MIT Sloan School of Management

Things to cover today:

Pricing Risky Cashflows:

1. DDM
2. Financial Ratios
3. Examples
4. Past Problem Sets (PS1 Q4, PS2 Q6)

DDM: The idea of DDM is:

$$P_t = E_t[\frac{D_{t+1}+P_{t+1}}{1+r_{t+1}}]$$

Where r_{t+1} is a discount rate specific to the cashflow. If we assume that the discount rate is fixed for each period, then by using the formula for $P_{t+1}, P_{t+2}, ...$ we arrive at the DDM model:

$$P_t = \sum_{\tau=1}^{\infty} \frac{E_t[D_{t+\tau}]}{(1+r_{t+\tau})^{\tau}}$$

Common names for r_t:
Risk Adjusted Discounted Rate
Market Capitalization Rate
Cost of Capital
Required Rate of return

Special Cases:

Constant discount rates and growth:

$P_0 = \frac{E_0[D_1]}{r-g}$

This is the Gordon Growth Formula
Multiple-stage Growth: E.g. Company grows at 20% for first 5 years, then slow down to 10%.
(i)Use the Gordon Growth formula to get the value of company 5 years from now.
(ii)Discount the dividends and the FV of the company back to today.

Plowback:
Consider a company with gross earning of $20, and initial dividend of $10 (i.e. payout ratio of 50%).
What happens to the other $10?
It must be used to re-invest in the company's business, therefore, will earn the corresponding return, usually denoted Return-on-Equity

(ROE),say 15%.

Therefore, we can now compute the dividend growth rate, assuming the company retain the current policy:
Next year's earning will be \$20 + \$10*.15 = \$21.5
Next year's dividend will be \$10.75
So, dividend growth rate = 7.5% = 15%*50% = $ROE * b$

Exercises:

1. Company XYZ's year-end dividend will be \$1. It will grow at 10% for 10 years and then slows down to 5% per year forever. The cost of capital for XYZ is 15%. What is the price of company XYZ?

2. MetaTrend Corps. earns a book rate of return (ROE) of 12%. It reinvests one-half its earnings and pays out the other half as cash dividends. The nominal cost of capital is 12%.

   (a) Given this ROE and dividend payout ratio, what is the growth rate of MetaTrend's earnings and dividends?

   (b) Assume this growth rate is expected to continue in perpetuity. What is the present

value of MetaTrend shares? Assume that book value per share is $10.

(c) Suppose MetaTrend decideds to pay out all its earnings as cash dividends. Therefore it does not grow. What is the change, if any, in MetaTrend's stock price? Why?

Homework,briefly:

• It is useful to use Excel, and don't round your answers until you write them down. It will make your answers more accurate and easier for me to grade.

• Show your steps, and show the equations if you use Excel.

PS1:

Be careful when discounting. Make sure that you are matching the timing of the cashflow, and also whether it is nominal, or real (normalized to the same reference point). Many of your have problem with Q4.