

# **Financial Management**

## **AFIN253**

### **Lecture 2 Addendum**

# **Advanced Equity and Debt Valuation**

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## ***Calculation Examples: DDM***

**Question 1:** A start-up company is forecast to pay its first dividend of \$1 per share in 5 years. From then on, this annual dividend will grow by 2% pa. The required return on the stock is 10% pa. All rates are given as effective annual rates. What is the value of the stock?

**Answer:**

This question is slightly trickier than simply applying the DDM since the first cash flow is not 1 year away, it is 5 years away.

What we will do is value the stock using the DDM which will give a value at  $t=4$ , one year before the first dividend at  $t=5$ , then discount that price back to the present ( $t=0$ ).

$$V_0 = \frac{C_1}{r_{eff} - g_{eff}}$$

$$V_4 = \frac{C_5}{r_{eff} - g_{eff}}$$

$$= \frac{1}{0.1 - 0.02} = 12.50$$

But this is a value at t=4. To find the current price at t=0,

$$V_0 = \frac{V_4}{(1 + r_{eff})^4}$$

$$= \frac{12.50}{(1 + 0.1)^4} = 8.537668192$$

So the stock price should be \$8.54 right now.

**Question 2a:** The Telstra (TLS) stock price is \$3. It just paid its **semi-annual** dividend of \$0.14 per share. Dividends are not expected to change in the future. What is the stock's required return on equity, given as an effective annual rate?

**Answer:**

$$V_0 = \frac{C_1}{r_{eff} - g_{eff}}$$

$$3 = \frac{0.14}{r_{eff,6mth} - 0}$$

$$r_{eff,6mth} \times 3 = 0.14$$

$$r_{eff,6mth} = \frac{0.14}{3} = 0.04667$$

$$\begin{aligned} r_{eff,annual} &= (1 + 0.04667)^2 - 1 \\ &= 0.095518 = 9.5518\% \end{aligned}$$

**Question 2b:** What is the total return, dividend yield, and capital return on the stock? You may express them all as effective 6 month rates.

**Answer:**

The total return is what we just found:

$$r_{total,eff\ 6mth} = 0.04667$$

The dividend yield (also called the income return) is:

$$r_{dividend,eff\ 6mth} = \frac{D_1}{P_0} = \frac{0.14}{3} = 0.04667$$

The capital return is the growth in share price. Since the dividend is constant, the dividend has zero growth. Since the dividend growth rate is zero, the capital growth rate must also be zero.

$$r_{capital,eff\ 6mth} = \text{growth rate in perpetual dividend} = 0$$

Let's check that the total return is consistent with the dividend yield and the capital return:

$$r_{total,eff} = r_{income,eff} + r_{capital,eff}$$

$$0.04667 = 0.04667 + 0$$

$$0.04667 = 0.04667, \text{ phew!}$$

**Question 2c:** How much do you expect the stock price and dividend to be in 3 years?

Both are have zero growth, so they will be the same. The dividend will still be \$0.14 and the share price will be \$3.

**Question 3a:** The BHP stock price is \$37.50. It will pay its next **semi-annual** dividend of \$0.46 per share in 6 months. The dividend is expected to grow by 2% every 6 months (2% as an effective semi-annual rate). What is the stock's required return on equity, given as an effective annual rate?

$$V_0 = \frac{C_1}{r_{eff} - g_{eff}}$$

$$37.50 = \frac{0.46}{r_{eff,6mth} - 0.02}$$

$$37.50 \times (r_{eff,6mth} - 0.02) = 0.46$$

$$r_{eff,6mth} - 0.02 = \frac{0.46}{37.50}$$



$$r_{eff,6mth} = \frac{0.46}{37.50} + 0.02$$

$$= 0.032266667$$

$$r_{eff,annual} = (1 + 0.032267)^2 - 1$$

$$= 0.065574471 = 6.557\%$$

**Question 3b:** What is the total return, dividend yield, and capital return on the stock? You may express them all as effective 6 month rates.

**Answer:**

The total 6 month return is what we just found:

$$r_{total,eff\ 6mth} = 0.032266667$$

The dividend yield (also called the income return) is:

$$r_{dividend,eff\ 6mth} = \frac{D_1}{V_0} = \frac{0.46}{37.50} = 0.012266667$$

The capital return is the growth in share price. The dividend growth rate is 2% per 6 months. The share price growth rate must be the same as the dividend growth rate.

$$r_{capital,eff\ 6mth} = \text{growth rate in perpetual dividend} = 0.02$$

Let's check that the total return is consistent with the dividend yield and the capital return:

$$r_{total,eff} = r_{income,eff} + r_{capital,eff}$$

$$0.032266667 = 0.012266667 + 0.02$$

0.032266667 = 0.032266667, so our numbers must be correct.

**Question 3c:** How much do you expect the stock price and dividend to be in 3 years?

**Answer:**

The stock price and dividend will both grow by 2% every 6 months.

The dividend of \$0.46, paid in 6 months, needs to be grown by 2.5 years (5 six-month periods):

$$D_{3\text{ years}} = D_{6\text{ mths}} \times (1 + g_{\text{eff},6\text{ mth}})^5$$

$$= 0.46 \times (1 + 0.02)^5$$

$$= \$0.507877169$$

The share price of \$37.50, which is at the present time ( $t=0$ ), needs to be grown by 3 years (6 six-month periods):

$$V_{3\text{ years}} = V_0 \times (1 + g_{eff,6mth})^6$$

$$= 37.50 \times (1 + 0.02)^6$$

$$= \$42.23109072$$

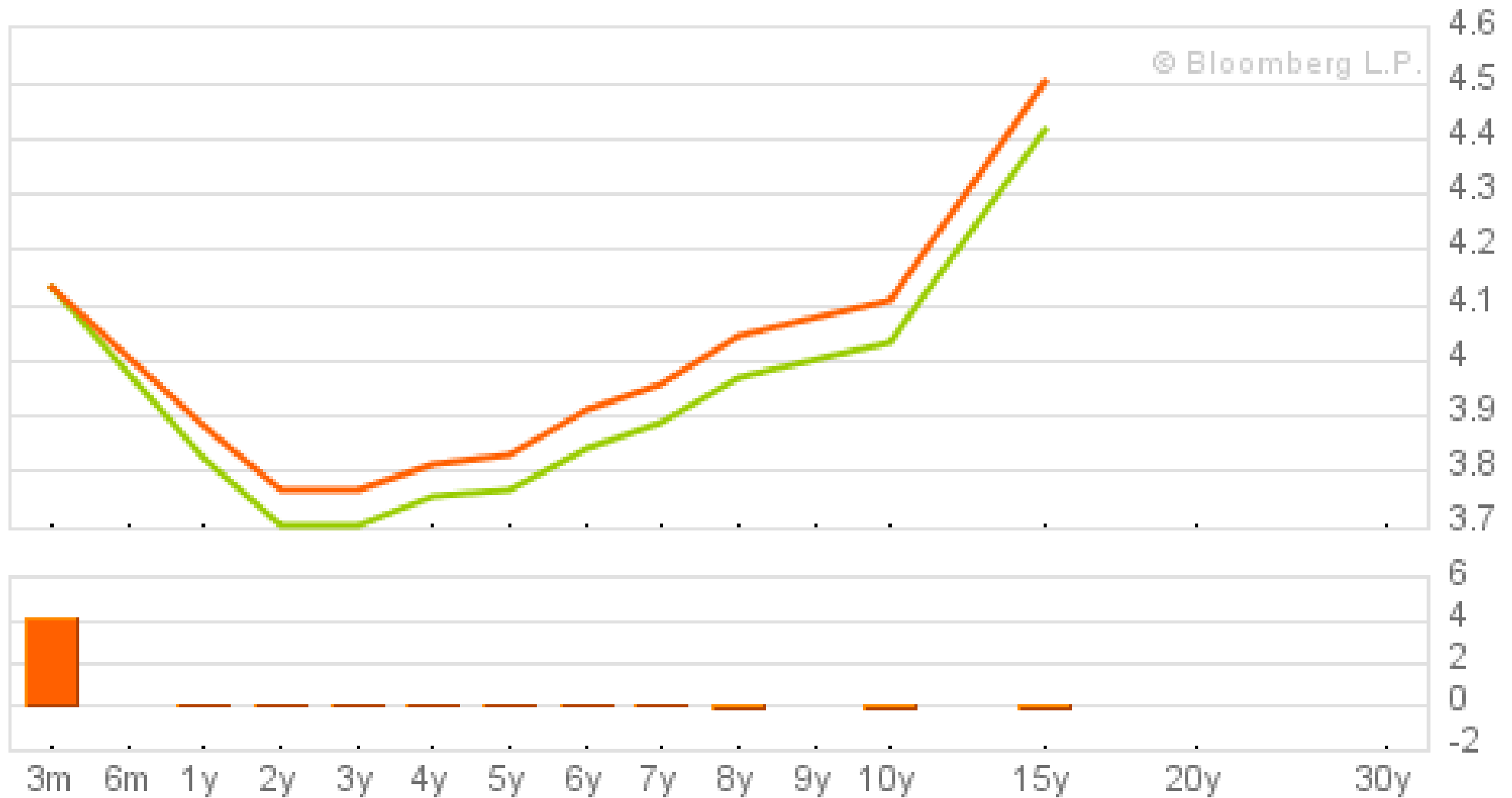
# ***Real World Example: Yield Curves and Term Structure of Interest Rates***

See the below sources for an interesting view of yield curves and the term structure of interest rates.

## Table of yields on evening of 5/3/2012. Source: Bloomberg.

Australian Government Bonds					
	COUPON	MATURITY	PRICE/YIELD	PRICE/YIELD CHANGE	TIME
3-Month	0.000	06/08/2012	4.15 / 4.15	98.943 / 4.150	02/24
1-Year	6.500	05/15/2013	103.06 / 3.83	0.058 / -0.055	00:39
2-Year	6.250	06/15/2014	105.48 / 3.71	0.131 / -0.061	00:39
3-Year	6.250	04/15/2015	107.39 / 3.71	0.181 / -0.062	00:39
4-Year	4.750	06/15/2016	103.87 / 3.76	0.237 / -0.060	00:39
5-Year	6.000	02/15/2017	109.95 / 3.77	0.284 / -0.061	00:39
6-Year	5.500	01/21/2018	108.60 / 3.85	0.374 / -0.069	00:39
7-Year	5.250	03/15/2019	108.25 / 3.90	0.452 / -0.071	00:39
8-Year	4.500	04/15/2020	103.63 / 3.97	0.537 / -0.077	00:39
10-Year	5.750	05/15/2021	113.05 / 4.04	0.649 / -0.080	00:39
15-Year	4.750	04/21/2027	103.53 / 4.43	0.931 / -0.084	00:38

Orange line: current yield, Green line: previous close (yesterday's) yield. As at 5/3/2012. Note the humped curve.



ASX's Target Rate Tracker as at 5/3/2012, the day before the Tuesday 6 March 2012 RBA board meeting.

The table below highlights how market expectations of the **probability** of cash rate decrease at the next RBA Board meeting has evolved in recent days. Since 7/12/2011 the RBA cash rate has been 4.25%.

Trading Day	No Change	Decrease to 4.00%
23 February	75%	25%
24 February	80%	20%
27 February	80%	20%
28 February	80%	20%
29 February	80%	20%
1 March	85%	15%
2 March	85%	15%
5 March	88%	12%



