***Calculation Examples: DDM***

**Question:** The Telstra (TLS) stock price is $**6**. Its next annual dividend of $**0.30** will be paid in exactly one year from now. Dividends are expected to grow by **2**% pa forever.

What is the stock's required return on equity, given as an effective annual rate?

**Answer:**

$$P\_{0}=\frac{C\_{1}}{r\_{total}-g}$$

$$6=\frac{0.30}{r\_{total}-0.02}$$

$$r\_{total}=\frac{0.3}{6}+0.02$$

$$ =0.07=7\% pa$$

**Question:** Estimate the future stock price in 2 years and 6 months (2.5 years).

**Answer:** We can use a number of methods to find the price. All are best visualised by following the path of the ‘saw tooth’ diagram of price versus time.

*Method 1:* Grow the current price by g from trough to trough for two periods, then by r for half a period from trough to peak.

$$P\_{2.5}=P\_{0}\left(1+g\right)^{2}\left(1+r\right)^{0.5}$$

$$ =6\left(1+0.02\right)^{2}\left(1+0.07\right)^{0.5}$$

$$ =6.457188769$$

*Method 2:* Grow the current price by r from trough to peak, then subtract the dividend, and repeat for another one and a half periods. Note that $C\_{2}=C\_{1}\left(1+g\right)^{1}$.

$$P\_{2.5}=\left(\left(P\_{0}\left(1+r\right)^{1}-C\_{1}\right)\left(1+r\right)^{1}-C\_{2}\right)\left(1+r\right)^{0.5}$$

$$ =\left(\left(P\_{0}\left(1+r\right)^{1}-C\_{1}\right)\left(1+r\right)^{1}-C\_{1}\left(1+g\right)^{1}\right)\left(1+r\right)^{0.5}$$

$$ =\left(\left(6\left(1+0.07\right)^{1}-0.30\right)\left(1+0.07\right)^{1}-0.30\left(1+0.02\right)^{1}\right)\left(1+0.07\right)^{0.5}$$

$$ =6.457188769$$

*Method 3:* The price in 2.5 periods will be the price in 2 periods, grown forward from trough to peak by r for half a period.

$$P\_{2.5}=P\_{2}\left(1+r\right)^{0.5}$$

$$ =\frac{C\_{3}}{r-g}\left(1+r\right)^{0.5}$$

$$ =\frac{C\_{1}\left(1+g\right)^{2}}{r-g}\left(1+r\right)^{0.5}$$

$$ =\frac{0.30\left(1+0.02\right)^{2}}{0.07-0.02}\left(1+0.07\right)^{0.5}$$

$$ =6.457188769$$

***Questions: Dividend Discount Model***

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