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News, Rational Expectations and Present Values

The Present Value Model

We assume for now Rational Expectations. Hence the expectations operator refers to the conditional mathematical expectations operator. In one-period:

$$P_t = \frac{D_{t+1}}{1+k_e} + \frac{E_t P_{t+1}}{1+k_e} \qquad (1)$$

Where $E_t(Z) = E(Z \mid Information\_available\_at\_time\_t)$. Assume at time t, that D_t is known.

Then the **Generalized Dividend Valuation Model** is given by

$$P_t = \frac{D_{t+1}}{1+k_e} + \frac{E_t D_{t+2}}{(1+k_e)^2} + ... + \frac{E_t D_{t+n}}{(1+k_e)^n} + \frac{E_t P_{t+n}}{(1+k_e)^n} \qquad (2)$$

Note that this expression (2) implies, under certain conditions:

$$P_t = \frac{D_{t+1}}{1+k_e} + \frac{E_t D_{t+2}}{(1+k_e)^2} + \frac{E_t D_{t+3}}{(1+k_e)^3} + ... + \frac{E_t D_{t+\infty}}{(1+k_e)^\infty} = \sum_{n=1}^{\infty} \frac{E_t D_{t+n}}{(1+k_e)^n} \qquad (3)$$

Equation (2) rules out “bubbles”. The Gordon Growth Model assumes that dividends are expected to grow deterministically at rate *g*, such that $D_{t+n} = (1+g)^n \times D_t$

$$P_t = \frac{D_t \times (1+g)^1}{(1+k_e)^1} + \frac{D_t \times (1+g)^2}{(1+k_e)^2} + ... + \frac{D_t \times (1+g)^\infty}{(1+k_e)^\infty} \qquad (4)$$

$$P_t = D_t \times \left[\frac{(1+g)^1}{(1+k_e)^1} + \frac{(1+g)^2}{(1+k_e)^2} + ... + \frac{(1+g)^\infty}{(1+k_e)^\infty} \right] = \frac{D_t}{(k_e - g)} \qquad (5)$$

News in the Context of the PVM

By analogy to (1), price of an asset in period t+1 is then given by:

$$P_{t+1} = \frac{D_{t+2}}{1+k_e} + \frac{E_{t+1} P_{t+2}}{1+k_e} \qquad (1')$$

$$E_t P_{t+1} = \frac{E_t\, D_{t+2}}{1+k_e} + \frac{E_t (E_{t+1} P_{t+2})}{1+k_e} = \frac{E_t\, D_{t+2}}{1+k_e} + \frac{E_t P_{t+2}}{1+k_e} \qquad (1'')$$

The last term after the second equal sign in (1”) obtains by the “Law of Iterated Expectations”, *viz.*,

$$E_t (E_{t+1}(Z_{t+3})) = E_t Z_{t+3}$$

Now decompose the change in the price of the asset:

$$P_{t+1} - P_t \equiv (E_t P_{t+1} - P_t) + [(P_{t+1} - E_t P_{t+1})] \qquad (i)$$

The first term is the expected portion of the price change. The second term in the brackets is the unexpected portion. This second portion can be further broken up.

$$P_{t+1} - P_t = (E_t P_{t+1} - P_t) + \left[\frac{D_{t+2} - E_t D_{t+2}}{(1+k_e)} + \frac{E_{t+1} P_{t+2} - E_t P_{t+2}}{(1+k_e)} \right] \qquad \text{(ii)}$$

"News" includes the dividends announced for period t+2. It is unforecastable. This news may also affect people's expectations regarding *D* in the future, and hence *P* in the future (which in turn affects expectations of *P* in period t+2). Hence, new information directly results in a new price, and revisions in expectations. Notice the second term in the square bracket is

$$\frac{E_{t+1} P_{t+2} - E_t P_{t+2}}{(1+k_e)}$$

which is the change in the expectations regarding the asset price in period t+2, based upon what the market knew in period t+1 versus what it knew in period t.

Note that other "news" that doesn't affect *D* in period t+2 could still affect expected asset prices in the future, and hence the asset price today.

Example: Announcement of GE Earnings