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:

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

(1)

Where \( E_t(Z) = E(Z \mid \text{Information available at time } t) \). Assume at time \( t \), that \( D_t \) is known.

Then the Generalized Dividend Valuation Model is given by

\[ P_t = \frac{D_{t+1}}{1+k_e} + \frac{E_t D_{t+2}}{(1+k_e)^2} + \ldots + \frac{E_t D_{t+n}}{(1+k_e)^n} + \frac{E_t P_{t+n}}{(1+k_e)^n} \]

(2)

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

\[ P_t = \frac{D_{t+1}}{1+k_e} + \frac{E_t D_{t+2}}{(1+k_e)^2} + \ldots + \frac{E_t D_{t+n}}{(1+k_e)^n} = \sum_{n=1}^{\infty} \frac{E_t D_{t+n}}{(1+k_e)^n} \]

(3)

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

\[ P_t = \frac{D_t \times (1+g)^1}{(1+k_e)^1} + \frac{D_t \times (1+g)^2}{(1+k_e)^2} + \ldots + \frac{D_t \times (1+g)^\infty}{(1+k_e)^\infty} \]

(4)

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

(5)

News in the Context of the PVM

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

\[ P_{t+1} = \frac{D_{t+2}}{1+k_e} + \frac{E_{t+1} P_{t+2}}{1+k_e} \]

(1')

\[ E_t P_{t+1} = \frac{E_t D_{t+2}}{1+k_e} + \frac{E_t (E_{t+1} P_{t+2})}{1+k_e} = \frac{E_t D_{t+2}}{1+k_e} + \frac{E_t P_{t+2}}{1+k_e} \]

(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:

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

(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.

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

\[
\frac{E_t P_{t+2} - E_t P_{t+2}}{(1 + k_e)}
\]

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**

![Graph showing stock price changes](http://finance.yahoo.com)