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 \( D_{t+n} = (1+g)^n \times D_t \)

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

(4)

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

(5)

News in the Context of the PVM

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

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

(1’)

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

(1’’)

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

\[ E_t(E_t(Z_{t+3})) = E_t Z_{t+3} \]

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.

\[
P_{t+1} - P_t = (E_tP_{t+1} - P_t) + \left[ \frac{D_{t+2} - E_tD_{t+2}}{(1 + k_e)} + \frac{E_{t+1}P_{t+2} - E_tP_{t+2}}{(1 + k_e)} \right] \tag{ii}
\]

“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

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

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 Consumer Confidence**

![Graph of NASDAQ Composite Index](http://finance.yahoo.com/)

**Consumer Confidence**

10 am 9/26/06 for Sept. 2006

**Confidence Index, Level**

- **Consensus**: 101.0
- **Actual**: 104.5

![Graph of 10-Year Treasury Note](http://finance.yahoo.com/)