Ch. 10 Common Stock Valuation

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Fundamental Analysis

- Usually involves using large amounts of ***company financial data,*** understanding the nature of the ***firm's business, the industry*** it operates in (competitors, etc.) and the ***economic environment.***
- Usually involves ***predicting future earnings or dividends.***
- ***May*** involve using ***valuation models to estimate a present value*** for the stock (like we do for bonds).

Equity Valuation Methods

- ***Fundamental analysis*** usually considers the present value of future cash flows
- Sometimes called ***"Intrinsic Value".***
- One-period Model: assume you receive <u>all</u> cash flow after one year. We ***assume one annual dividend*** although ***dividends are usually quarterly***. Assume we have estimated a price target, P_1 for year-end.
- ***Then*** $PV = (D_1+P_1)/(1+r)$. Current Price, P_0, ***may or may not equal*** intrinsic value, **PV.**

Equity Valuation Methods: DDM

- ***Dividend Discount Model*:** assume you receive cash flow from dividends forever**.**
- $PV = D_1/(1+k) + D_2/(1+k)^2 + \ldots D_n/(1+k)^n + \ldots$
- This method is manageable ***only*** if we make simplifying assumptions about D.
- ***(1) Assume D grows at a constant rate "g".***
- D_0 is the most recent dividend (***already paid!***).
- **So** $D_0(1+g) = D_1$; $D_0(1+g)^2 = D_2$; **etc.**
- $PV = \Sigma D_0(1+g)^t/(1+k)^t$ for years 1,2,3,…,∞

Equity Valuation Methods: DDM

- This can only be solved if it is a ***geometric series*** and can ***summed to a finite PV***.
- *Ex:* ***1/2+ 1/4 + 1/8 + 1/16 … and so on, forever*** is an infinite series but clearly it sums to a finite value. ***Any infinite series that declines by a certain percent each time period is a geometric series and will have a finite sum.***
- For the PV formula to have a sum, **it must not blow up** - this would be where the dividend <u>increases at a rate "g"</u> **equal to or faster** than we shrink the dividend using its rate if discount "k".

Equity Valuation Methods: DDM

- **So we have** $PV = \Sigma D_0(1+g)^t/(1+k)^t$, t = 1,..., ∞
- 1) g must be constant over the period we are evaluating the PV.
- 2) g must be less than k.
- The formula for the $PV = D_0(1+g)/(k-g)$
- Consider no growth, then g= 0 and all dividends are equal $PV = D(1+0)/(k-0) = D/k$
- The above special case is sometimes called a ***perpetuity*** and is also useful in evaluating preferred stock.

Equity Valuation Methods: DDM

- **A stock <u>last</u> paid a $1 dividend and you expect the dividend to grow at a rate "g" indefinitely. You assign the stock a RRR of k = 9%.**
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- **"g" = -6% 0% 6% 7% 10%**
- **PV = ? ? ? ? ?**

- **For g = 6% PV = $1.06/(.09 - .06) = $35.33**

Equity Valuation Methods: DDM

- **For the rest:**
- **"g" = -6% 0% 6% 7% 10%**
- **PV = $35.33 ∞**
- **Note, this model allows for negative growth, an example being a gold mine gradually exhausting it's profitable resources.**
- **Only the 10% does not work (negative value the formula predicts is really *positive infinity***
- ***Note how a slight increase in expected growth to 7% affects the PV.***

Equity Valuation Methods: RRR

- What determines k (RRR) and g (growth)?
- In the ***risk-return chapter*** we looked at theories of return: notably the ***CAPM with its reliance on b to measure a security's relative market risk*** (filtering out diversifiable company risk).
- However, there is only weak evidence, ***if any***, that high β firms reward the risk-taker with higher returns. Even when we incorporate company risk to get get ***total risk s (sigma),*** we find little or no relationship.

Equity Valuation Methods: RRR

- We ***may*** be able to construct an objective measure of risk using leverage measures & measure how cyclical sales are, etc.
- However we obtain the β's value the **text assumes the CAPM is *still* the best method** (and in theory it ***should*** work).
- $k = r_f + \beta(MRP)$ MRP: market risk premium
- $= \mathbf{r_f + \beta (E(r_M) - r_f)}$ $E(r_M)$: expected return of the stock market

Equity Valuation Methods: DDM

- **We also write PV = $D_1/(k-g)$**
- RRR vs. IRR: write the above as **$P_0 = D_1/(k-g)$, *we have a price and wish to estimate an expected rate of return.***
- ***This is like YTM for bonds or IRR for capital budgeting.***
- **$(k-g) = D_1/P_0$ $k = D_1/P_0 + g$**
- ***In this formula we are not solving for k=RRR, rather the IRR. Using k is a common and confusing practice.***

Equity Valuation Methods: DDM

- ***So if we have a RRR in mind and want to estimate an intrinsic value, we use*** **PV = $D_1/(k-g)$**
- *If* ***we have a price and wish to estimate an expected rate of return (IRR) , we use***
- **$E(r) = D_1/P_0 + g$**

Multiple-Growth (Two-Stage) DDM

- What if we are able to estimate earnings and dividends over the next two or three years that reflect some one time events, but want to assume constant growth thereafter.
- Very common approach in among analysts.
- Assume **last irregular dividend** (before the one that grew at rate "g" is like D_0. Assume **two** such dividends, then
- $\mathbf{PV}=\boldsymbol{D_1}/(1+\mathbf{k})+\boldsymbol{D_2}/(1+\mathbf{k})^2+[\boldsymbol{D_2}(1+\mathbf{g})/(\mathbf{k}-\mathbf{g})]\ /(1+\mathbf{k})^2$
- $=\boldsymbol{D_1}/(1+\mathbf{k})+\boldsymbol{D_2}/(1+\mathbf{k})^2 + [\boldsymbol{P_2}]\ /(1+\mathbf{k})^2$

Two-Stage DDM

- If the first dividend is $1 and the second is $2 and growth is 6% thereafter: RRR = 10%
- $\mathbf{PV}=\boldsymbol{D_1}/(1+\mathbf{k})+\boldsymbol{D_2}/(1+\mathbf{k})^2+[\boldsymbol{D_2}(1+\mathbf{g})/(\mathbf{k}-\mathbf{g})]\ /(1+\mathbf{k})^2$
- $= \boldsymbol{\$1}/(1+.10)+\boldsymbol{\$2}/(1+.10)^2$
  (continue) $+[\$\boldsymbol{2}(1+.06)/(.10-.06)]\ /(1+.10)^2$
- $= \boldsymbol{\$0.91}+\boldsymbol{\$2}/(1+.10)^2 + [\$53]\ /(1+.10)^2$
- $= \boldsymbol{\$0.91}+[\$55]\ /(1+.10)^2 =$
- $= \boldsymbol{\$0.91}+\boldsymbol{\$45.45} = \$46.36$

Price/Earnings Ratios

- The P/Es in the WSJ and other stock quote sources are ***ex post***: they are the ***current price and the last 4 quarter's earnings***
- $\mathbf{PE} = \mathbf{P_0}/\mathbf{E_0}$
- The P/Es in the text are anticipated and we use expected earnings for the next four quarters.
- $\mathbf{PE} = \mathbf{P_0}/\boldsymbol{E_1} = [\boldsymbol{D_1}/(\mathbf{k}-\mathbf{g})]\ /\ \boldsymbol{E_1}$
- $= [\boldsymbol{D_1}/\boldsymbol{E_1}]/(\mathbf{k}-\mathbf{g})$
- $= \boldsymbol{PayoutRatio}/(\mathbf{k}-\mathbf{g})$

Price/Earnings Ratios

- How does P/E change with growth?
- With risk?
- ***Inverting the P/E ratio gives the earnings yield*** $= \boldsymbol{E_1}/\mathbf{P_0}$,
- The earnings yield has limited use, we cannot discount future earnings as some are usually retained and ***thus not part of that year's cash flow***. Still it is an estimate of shareholder return - especially in the no growth scenario and where the payout ratio is one.

Equity Valuation Methods

- ***Bookvalue*** of a company (or more usually bookvalue/share) is an ***accounting measure of value*** and represents the ***historical cost*** of the assets in place, less depreciation and less liabilities (debt and preferred stock).
- Bookvalue is also called net worth or common equity. Finding bargains through buying stocks with low-price to book ratios is one the possible ***anomalies*** (exceptions) in ***Efficient-markets Theory.***

Equity Valuation Methods

- ***Bookvalue can be easily distorted with stock buybacks***: A company selling at three times book ($30 vs. $10) uses funds from retained earnings to buy back shares. By accounting rules, they pay $30 for something worth $10 and lose $20 a share purchased. If 10% of stock is repurchased, the firm loses $2 per share overall and bookvalue drops to $8 share. Buybacks are considered a good thing for shareholders (if the shares are retired and not handed out to executives - which is too often the case).

Price/Sales Ratio

- ***No evidence*** that buying stock with low prices relative to sales delivers superior returns***.***
- ***P/S is often largely a function the industry the company is in.*** (Retail has low P/S ratios)
- ***P/S ignores leverage.***
- That is, according to the DuPont equation ***earnings depend on sales but sales depends on assets, which are purchased with debt or equity.***
- ***Use EV/S,*** where EV is ***enterprise value: the per share market price of the stock and the debt.***