## Stock Valuation and Dividend Policy

## Lecture Outline

- Common stock
- Cash Dividends and Dividend Payment
- Dividend Policy in Practice
- Determining common stock values (Dividend Discounted Model)
- Preferred stock
- Alternative Valuation Models
- Information in Stock Prices


## Facts about common stock

- Represents ownership
- Ownership implies control
- Stockholders elect directors
- Directors elect management
- Management's goal: Maximize the stock price


## Stock Basics: Stock Quote

Apple Inc. (Public, NASDAQ:AAPL) Watch this stock

| $390.48-1.34(-0.34 \%)$ | Rane | 384.00-395.15 |  | .018 | Shares | 7.09M |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | 52 week | 235.56-404.50 | P/E | 15.46 | Beta | 1.34 |
|  | Open | $387.64$ | Diwiyi |  | nst. own | 70\% |
| Jul 29 - Close |  | 17.98 M |  | 5.26 |  |  |

NASDAQ real-time data - Disclaimer
Currency in USD


## Cash Flows for Stockholders

- If you buy a share of stock, you can receive cash in two ways
- The company pays dividends
- You sell your shares, either to another investor in the market or back to the company
- The price of the stock is the present value of these expected cash flows


## Cash Dividends

- Regular cash dividend - cash payments made directly to stockholders, usually each quarter
- Extra cash dividend - indication that the "extra" amount may not be repeated in the future
- Special cash dividend - similar to extra dividend, but definitely won't be repeated
- Liquidating dividend - some or all of the business has been sold


## What is dividend policy?

- The decision to pay out earnings versus retaining and reinvesting them.
- Dividend policy includes
- High or low dividend payout?
- Stable or irregular dividends?
- How frequent to pay dividends?


## Dividend Policy in Practice

- Constant dividend policy
- Constant growth dividend policy dividends increased at a constant rate each year
- Constant payout ratio - pay a constant percent of earnings each year
- Residual dividend policy - pay a nonconstant percent of earnings each year


## What is the "residual dividend policy"?

- Find the retained earnings needed for the capital budget.
- Pay out any leftover earnings (the residual) as dividends.
- This policy minimizes cost to the firm.


## Residual Dividend Policy

- Determine capital budget
- Determine target capital structure
- Finance investments with a combination of debt and equity in line with the target capital structure
- Remember that retained earnings are equity - If additional equity is needed, issue new shares
- If there are excess earnings, then pay the remainder out in dividends


## Example: Residual dividend policy

Dividends $=$ Net Income $-\left[\left(\begin{array}{c}\text { Target } \\ \text { equity } \\ \text { ratio }\end{array}\right) \times\left(\begin{array}{c}\text { Total } \\ \text { capital } \\ \text { budget }\end{array}\right)\right]$

- Capital budget - \$800,000
- Target capital structure - 40\% debt, $60 \%$ equity
- Forecasted net income - \$600,000
- How much of the forecasted net income should be paid out as dividends?


## Residual dividend model: Calculating dividends paid

- Calculate portion of capital budget to be funded by equity.
- Of the $\$ 800,000$ capital budget, $0.6(\$ 800,000)=$ $\$ 480,000$ will be funded with equity.
- Calculate excess or need for equity capital.
- With net income of $\$ 600,000$, there is more than enough equity to fund the capital budget. There will be $\$ 600,000-\$ 480,000=\$ \mathbf{1 2 0 , 0 0 0}$ left over to pay as dividends.
- Calculate dividend payout ratio
- \$ $20,000 / \$ 600,000=0.20=20 \%$


## Residual dividend policy:

What if net income drops to $\$ 400,000$ ? Rises to $\$ 800,000$ ?

- If $\mathrm{NI}=\$ 400,000$...
- Dividends $=\$ 400,000-(0.6)(\$ 800,000)=-\$ 80,000$.
- Since the dividend results in a negative number, the firm must use all of its net income to fund its budget, and probably should issue equity to maintain its target capital structure.
- Payout = \$0 / \$400,000 = 0\%
- If $\mathrm{NI}=\$ 800,000$...
- Dividends $=\$ 800,000-(0.6)(\$ 800,000)=\$ 320,000$.
- Payout $=\$ 320,000 / \$ 800,000=40 \%$


## Dividend Discounted Model

## One Period Example

- Suppose you are thinking of purchasing the stock of Moore Oil, Inc. and you expect it to pay a $\$ 2$ dividend in one year and you believe that you can sell the stock for $\$ 14$ at that time. If you require a return of $20 \%$ on investments of this risk, what is the maximum you would be willing to pay?
- Compute the PV of the expected cash flows
- Price $=(14+2) /(1.2)=\$ 13.33$
- Or FV = $16 ; 1 / Y=20 ; \mathrm{N}=1 ;$ CPT PV $=-13.33$


## Two Period Example

- Now what if you decide to hold the stock for two years? In addition to the dividend in one year, you expect a dividend of $\$ 2.10$ in and a stock price of \$14.70 at the end of year 2 . Now how much would you be willing to pay?
- $\mathrm{PV}=2 /(1.2)+(2.10+14.70) /(1.2)^{2}=13.33$
- $\operatorname{Or} \mathrm{CF}_{0}=0 ; \mathrm{COI}=2 ; \mathrm{FOI}=\mathrm{I} ; \mathrm{CO2}=\mathrm{I} 6.80 ; \mathrm{FO2}=\mathrm{I}$;

NPV; I = 20; CPT NPV = 13.33

## Three Period Example

- Finally, what if you decide to hold the stock for three periods? In addition to the dividends at the end of years I and 2 , you expect to receive a dividend of $\$ 2.205$ at the end of year 3 and a stock price of $\$ 15.435$. Now how much would you be willing to pay?

$$
\begin{aligned}
& -\mathrm{PV}=2 / 1.2+2.10 /(1.2)^{2}+(2.205+15.435) /(1.2)^{3} \\
& =13.33 \\
& \text { Or CF } \\
& \text { C }=0 ; \mathrm{COI}=2 ; \mathrm{FOI}=1 ; \mathrm{CO2}=2.10 ; F 02=1 ; \\
& \mathrm{C} 03=17.64 ; \mathrm{FO}=1 ; \mathrm{NPV} ; 1=20 ; C P T N P V=13.33
\end{aligned}
$$

## Common Stock Valuation

- Similar concept to Time Value of Money
- TVM:The present value is the discount of all expected future cash flow
- Common Stock:The price of the stock today is really just the present value of all expected future dividends


# Common Stock Valuation using Dividend Discounted Model 

- Scenario I: Constant Dividend
- The firm will pay a constant dividend forever
- The price is computed using the perpetuity formula
- Scenario 2: Constant Growth of Dividend
- The firm will increase the dividend by a constant percent every period
- Scenario 3: Nonconstant Growth
- Dividend growth is not consistent initially, but settles down to constant growth eventually


## Scenario I: Constant dividend

- If dividends are expected at regular intervals forever, then this is a perpetuity and the present value of expected future dividends can be found using the perpetuity formula
- $P_{0}=D / r$
- Suppose stock is expected to pay a $\$ 0.50$ dividend every quarter and the required return is $10 \%$ with quarterly compounding. What is the price?
- $P_{0}=.50 /(.1 / 4)=\$ 20$


## What would the expected price today?

- The dividend stream would be a perpetuity.

$\hat{P_{0}}=\frac{P M T}{k}=\frac{\$ 2.00}{0.13}=\$ 15.38$


## Quick Quiz

- A company has just paid a dividend of $\$ 2$. What is the value of its stock if it expects to maintain this level of dividend every year? Assume that the required return is $15 \%$. (I3.33)


## Scenario 2: Constant growth of dividend

- A stock whose dividends are expected to grow forever at a constant rate, g.

$$
\begin{aligned}
& D_{1}=D_{0}(l+g)^{1} \\
& D_{2}=D_{0}(I+g)^{2} \\
& D_{t}=D_{0}(I+g)^{t}
\end{aligned}
$$

- Value of a stock is the present value of the future dividends expected to be generated by the stock.

$$
\hat{P}_{0}=\frac{D_{1}}{\left(1+r_{s}\right)^{1}}+\frac{D_{2}}{\left(1+r_{s}\right)^{2}}+\frac{D_{3}}{\left(1+r_{s}\right)^{3}}+\ldots+\frac{D_{\infty}}{\left(1+r_{s}\right)^{\infty}}
$$

Assumption

- The firm lasts forever
- Dividends expected to grow at a constant rate, g, forever
- The expected return on equity remains constant at $r$, where $r>g$


## Scenario 2: Constant growth of

 dividend (cont.)- Dividends are expected to grow at a constant percent per period.
- $\mathrm{P}_{0}=\mathrm{D}_{1} /\left(1+\mathrm{Rs}_{\mathrm{s}}\right)+\mathrm{D}_{2} /\left(1+\mathrm{Rs}^{2}\right)^{2}+\mathrm{D}_{3} /\left(1+\mathrm{R}_{\mathrm{s}}\right)^{3}+$
...
- $P_{0}=D_{0}(I+g) /\left(I+R_{s}\right)+D_{0}(I+g)^{2} /\left(I+R_{s}\right)^{2}+$ $D_{0}(I+g)^{3} /\left(I+R_{s}\right)^{3}+\ldots$
- With a little algebra and some series work, this reduces to:

$$
\mathrm{P}_{0}=\frac{\mathrm{D}_{0}(1+\mathrm{g})}{R_{s}-\mathrm{g}}=\frac{\mathrm{D}_{1}}{R_{s}-\mathrm{g}}
$$

If $D_{0}=\$ 2$ and $g$ is a constant $6 \%$, find the expected dividend stream for the next 3 years, and their PVs.


## What is the stock's market value?

- Using the constant growth model:

$$
\begin{aligned}
P_{0} & =\frac{D_{1}}{r_{s}-g}=\frac{\$ 2.12}{0.13-0.06} \\
& =\frac{\$ 2.12}{0.07} \\
& =\$ 30.29
\end{aligned}
$$

What is the expected market price of the stock, one year from now?

- $D_{1}$ will have been paid out already. So, $P_{1}$ is the present value (as of year I) of $D_{2}, D_{3}, D_{4}$, etc.

$$
\begin{aligned}
\hat{P}_{1} & =\frac{D_{2}}{k_{s}-g}=\frac{\$ 2.247}{0.13-0.06} \\
& =\$ 32.10
\end{aligned}
$$

- Could also find expected $\mathrm{P}_{\mathrm{I}}$ as:

$$
\hat{P}_{1}=P_{0}(1.06)=\$ 32.10
$$

## What happens if $g>R_{s}$ ?

- If $g>R_{s}$, the constant growth formula leads to a negative stock price, which does not make sense.
- The constant growth model can only be used if:
- $R_{s}>g$
${ }^{\circ} g$ is expected to be constant forever


## Quick Quiz

- A company has just paid a dividend of $\$ 2$. What if the company starts increasing dividends by $3 \%$ per year, beginning with the next dividend? The required return stays at I5\%. (I7.17)


## Scenario 3: Nonconstant Growth

- Can no longer use just the constant growth model to find stock value.
- Two growth rates of dividend
- Must apply TVM concept


## Nonconstant Growth Problem

## Statement

- Suppose a firm is expected to increase dividends by $20 \%$ in one year and by $15 \%$ in two years. After that dividends will increase at a rate of 5\% per year indefinitely. If the last dividend was \$I and the required return is $20 \%$, what is the price of the stock?
- Remember that we have to find the PV of all expected future dividends.


## Nonconstant Growth:

## Example

- Compute the dividends until growth levels off

$$
\begin{aligned}
\circ D_{1} & =I(I .2)=\$ 1.20 \\
\circ D_{2} & =1.20(1.15)=\$ 1.38 \\
\circ D_{3} & =1.38(1.05)=\$ 1.449
\end{aligned}
$$

- Find the expected future price
$\circ \mathrm{P}_{2}=\mathrm{D}_{3} /\left(\mathrm{Rs}_{\mathrm{s}}-\mathrm{g}\right)=1.449 /(.2-.05)=9.66$
- Find the present value of the expected future cash flows

$$
\circ P_{0}=1.20 /(1.2)+(1.38+9.66) /(1.2)^{2}=8.67
$$

Example 2: $D_{o}=2.00$ and $R s=13 \%$
What if $\mathrm{g}=30 \%$ for 3 years before achieving longrun growth of $6 \%$ ?


Example 3: What if $\mathrm{g}=0 \%$ for 3 years before long-run growth of $6 \%$ ?


## Stock Valuation Summary

## 1. The General Case

In general, the price today of a share of stock, $P_{0}$, is the present value of all of its future dividends, $D_{1}, D_{2}, D_{3}, \ldots$ :

$$
P_{0}=\frac{D_{1}}{(1+R)^{1}}+\frac{D_{2}}{(1+R)^{2}}+\frac{D_{3}}{(1+R)^{3}}+\cdots
$$

where $R$ is the required return.

## II. Constant Growth Case

If the dividend grows at a steady rate, $g$, then the price can be written as:

$$
P_{0}=\frac{D_{1}}{R-g}
$$

This result is called the dividend growth model.
III. Supernormal Growth

If the dividend grows steadily after $t$ periods, then the price can be written as:

$$
P_{0}=\frac{D_{1}}{(1+R)^{1}}+\frac{D_{2}}{(1+R)^{2}}+\cdots+\frac{D_{t}}{(1+R)^{t}}+\frac{P_{t}}{(1+R)^{\prime}}
$$

where

$$
P_{t}=\frac{D_{t} \times(1+g)}{(R-g)}
$$

## IV. The Required Return

The required return, $R$, can be written as the sum of two things:

$$
R=D_{1} / P_{0}+g
$$

where $D_{1} / P_{0}$ is the dividend yield and $g$ is the capital gains yield (which is the same thing as the growth rate in dividends for the steady growth case).

Preferred stock

## Preferred stock

- Hybrid security
- Like bonds, preferred stockholders receive a fixed dividend that must be paid before dividends are paid to common stockholders.
- However, companies can omit preferred dividend payments without fear of pushing the firm into bankruptcy.
- Preferred stock generally does not carry voting rights

If preferred stock with an annual dividend of \$5 sells for \$50, what is the preferred stock's expected return?
$V_{p}=D / r_{p}$ $\$ 50=\$ 5 / r_{p}$

$$
\begin{aligned}
k_{p} & =\$ 5 / \$ 50 \\
& =0.10=10 \%
\end{aligned}
$$

## Quick Quiz

- You observe a stock price of \$18.75. You expect a dividend growth rate of $5 \%$, and the most recent dividend was $\$ 1.50$. What is the required return? (13.4\%)
- What are some of the major characteristics of common stock?
- What are some of the major characteristics of preferred stock?


## Alternative Valuation Models

## Limitations of the Dividend-Discount Model

- Non-Dividend-Paying Stocks
- Many companies do not pay dividends, thus the dividend-discount model must be modified.
- Share Repurchases
- The firm uses excess cash to buy back its own stock
- Consequences:
- The more cash the firm uses to repurchase shares, the less cash it has available to pay dividends
- By repurchasing shares, the firm decreases its share count, which increases its earnings and dividends on a per-share basis.


## Alternative I－Total Payout Model

－In the dividend－discount model，a share is valued from the perspective of a single shareholder，discounting the dividends the shareholder will receive：

－Total Payout Model（总支出模型）
－Values all of the firm＇s equity，rather than a single share
－To use this model，discount the total payouts that the firm makes to shareholders，which is the total amount spent on both dividends and share repurchases


## Alternative 2 - Discounted Free Cash Flow Model

- The Discounted Free Cash Flow Model focuses on the cash flows to all of the firm's investors, both debt and equity holders.
Enterprise Value $=$ Market Value of Equity + Debt - Cash
- Valuing the Enterprise
- To estimate a firm's enterprise value, we compute the present value of the firm's free cash flow available to pay all investors.
FreeCash Flow $=E B I T \times(1-$ Tax Rate $)+$ Depreciation
-Capital Expenditures - Increases in Net Working Capital


## Alternative 2 －Discounted Free Cash Flow Model

－Discounted Free Cash Flow Model（自由现金流估值模型）
－V0＝PV（Future Free Cash Flow of Firm）

$$
\mathrm{V}_{0}=\frac{F C F_{1}}{1+r_{\text {wacc }}}+\frac{F C F_{2}}{\left(1+r_{\text {wacc }}\right)^{2}}+\ldots+\frac{F C F_{\mathrm{N}}}{\left(1+r_{\text {wacc }}\right)^{\mathrm{N}}}+\frac{\mathrm{V}_{\mathrm{N}}}{\left(1+r_{\text {wacc }}\right)^{\mathrm{N}}}
$$

－Stock Price is therefore：

$$
\mathrm{P}_{0}=\frac{\mathrm{V}_{0}+\mathrm{Cash}_{0}-\text { Debt }_{0}}{\text { Shares Outstanding }}
$$

## Alternative 3 －Valuation Based on Comparable Firms

－Method of Comparables（比较法）
－Estimate the value of the firm based on the value of other，comparable firms or investments that we expect will generate very similar cash flows in the future．
－Valuation Multiple（估值乘数）
－A ratio of firm＇s value to some measure of the firm＇s scale or cash flow

## Alternative 3 －Valuation Based on Comparable Firms

－The Price－Earnings Ratio（市盈率）
$P / E$ ratio $=\frac{\text { Price per share }}{E P S}$
Forward P／E $=\frac{P_{0}}{E P S_{1}}=\frac{D i v_{1} / E P S_{1}}{r_{\mathrm{E}}-g}=\frac{\text { Dividend Payout Rate }}{r_{\mathrm{E}}-g}$
－Firms with high growth rates，and which generate cash well in excess of their investment needs so that they can maintain high payout rates，should have high P／E multiples．

## Alternative 3 -Valuation Based on Comparable Firms

## Valuation Using the Price-Earnings Ratio

## Problem

Suppose furniture manufacturer Herman Miller, Inc., has earnings per share of $\$ 1.38$. If the average $\mathrm{P} / \mathrm{E}$ of comparable furniture stocks is 21.3, estimate a value for Herman Miller using the $\mathrm{P} / \mathrm{E}$ as a valuation multiple. What are the assumptions underlying this estimate?

## Solution

We estimate a share price for Herman Miller by multiplying its EPS by the P/E of comparable firms. Thus $P_{0}=\$ 1.38 \times 21.3=\$ 29.39$. This estimate assumes that Herman Miller will have similar future risk, payout rates, and growth rates to comparable firms in the industry.

## Alternative 3 －Valuation Based on Comparable Firms

－Enterprise Value Multiples（企业价值乘数）

$$
\frac{V_{0}}{E B I T D A_{1}}=\frac{F C F_{1} / E B I T D A_{1}}{r_{\text {wacc }}-g_{\text {FCF }}}
$$

－This valuation multiple is higher for firms with high growth rates and low capital requirements（so that free cash flow is high in proportion to EBITDA）．

# Alternative 3 -Valuation Based on Comparable Firms 

## Valuation Using an Enterprise Value Multiple

## Problem

Suppose Rocky Shoes and Boots (RCKY) has earnings per share of \$2.30 and EBITDA of $\$ 30.7$ million. RCKY also has 5.4 million shares outstanding and debt of $\$ 125$ million (net of cash). You believe Deckers Outdoor Corporation is comparable to RCKY in terms of its underlying business, but Deckers has no debt. If Deckers has a P/E of 13.3 and an enterprise value to EBITDA multiple of 7.4, estimate the value of RCKY's shares using both multiples. Which estimate is likely to be more accurate?

## Solution

Using Decker's P/E, we would estimate a share price for RCKY of $P_{0}=\$ 2.30 \times 13.3=$ $\$ 30.59$. Using the enterprise value to EBITDA multiple, we would estimate RCKY's enterprise value to be $V_{0}=\$ 30.7$ million $\times 7.4=\$ 227.2$ million. We then subtract debt and divide by the number of shares to estimate RCKY's share price: $P_{0}=(227.2-125) / 5.4=$ $\$ 18.93$. Because of the large difference in leverage between the firms, we would expect the second estimate, which is based on enterprise value, to be more reliable.

## Alternative 3 －Valuation Based on Comparable Firms

－Other Multiples

- Price／Sales（销售乘数）
- Market to Book Ratio（每股股票的市净率）
－price divided by book value of equity，which is measured as assets－liabilities
－Enterprise value per subscriber（每用户的企业价值）
－Used in cable TV industry


# Alternative 3 －Valuation Based on Comparable Firms 

## facebook．

MCAP： 63 billion

Users： 1 billion as of October，2012
$\$ 63$ per user

新浪微博
500 million users as of Dec，2012
Valuation＝31．5 billion

## Limitations of Multiples

- When valuing a firm using multiples, there is no clear guidance about how to adjust for differences in expected future growth rates, risk, or differences in accounting policies.
- Comparables only provide information regarding the value of a firm relative to other firms in the comparison set.
- Using multiples will not help us determine if an entire industry is overvalued,


## Comparison with Discounted Cash Flow Methods

- Discounted cash flows methods have the advantage that they can incorporate specific information about the firm's cost of capital or future growth.
- The discounted cash flow methods have the potential to be more accurate than the use of a valuation multiple.

| Ticker | Name | Stock Price <br> (\$) | Market Capitalization (\$ million) | Enterprise Value (\$ million) | P/E | Price / <br> Book | Enterprise Value / Sales | Enterprise Value / EBITDA |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| NKE | Nike | 84.20 | 21,830 | 20,518 | 16.64 | 3.59 | 1.43 | 8.75 |
| PMMAY | Puma AG | 312.05 | 5,088 | 4,593 | 14.99 | 5.02 | 2.19 | 9.02 |
| RBK | Reebok International | 58.72 | 3,514 | 3,451 | 14.91 | 2.41 | 0.90 | 8.58 |
| WWW | Wolverine World Wide | 22.10 | 1,257 | 1,253 | 17.42 | 2.71 | 1.20 | 9.53 |
| BWS | Brown Shoe Co. | 43.36 | 800 | 1,019 | 22.62 | 1.91 | 0.47 | 9.09 |
| SKX | Skechers U.S.A. | 17.09 | 683 | 614 | 17.63 | 2.02 | 0.62 | 6.88 |
| SRR | Stride Rite Corp. | 13.70 | 497 | 524 | 20.72 | 1.87 | 0.89 | 9.28 |
| DECK | Deckers Outdoor Corp. | 30.05 | 373 | 367 | 13.32 | 2.29 | 1.48 | 7.44 |
| WEYS | Weyco Group | 19.90 | 230 | 226 | 11.97 | 1.75 | 1.06 | 6.66 |
| RCKY | Rocky Shoes \& Boots | 19.96 | 106 | 232 | 8.66 | 1.12 | 0.92 | 7.55 |
| DFZ | R.G. Barry Corp. | 6.83 | 68 | 92 | 9.2 | 8.11 | 0.87 | 10.75 |
| BOOT | LaCrosse Footwear | 10.40 | 62 | 75 | 12.09 | 1.28 | 0.76 | 8.30 |
|  |  |  |  | Average | 15.01 | 2.84 | 1.06 | 8.49 |
|  |  |  |  | Maximum | +51\% | +186\% | + 106\% | +27\% |
|  |  |  |  | Minimum | -42\% | -61\% | -56\% | -22\% |

## Stock Valuation Techniques:The Final Word

- No single technique provides a final answer regarding a stock's true value.All approaches require assumptions or forecasts that are too uncertain to provide a definitive assessment of the firm's value.
- Most real-world practitioners use a combination of these approaches and gain confidence if the results are consistent across a variety of methods.


## End of Lesson

