Stock – Chapt. 9 in RWJJ

**Common Stock** = Stock = Equity: Ownership shares in a corporation.

**Preferred Stock**: A hybrid between stock and a perpetual bond. Receives a fixed dividend, but generally has no voting rights. Priced as you would price a perpetuity.

**Dividends**: Cash distributions from the corporation to the stockholders. Usually distributed quarterly, but for simplicity, we will assume they are distributed

 Annually (annual compounding instead of quarterly compounding).

**Market Value** = Current Price of the stock = Present Value of future cash flows

**Short sale** – borrowing shares of a stock, selling them, buying them back later, and returning them

## Fundamental Principle of Finance:

## Price of a stock (or any financial asset) = PV of all expected future CF

**Where do a stock’s cash flows come from?**

Dividends and Capital Gains

Expected Return = E(R) = E(Div1) + E(P1) - P0

 P0

**Example:**

Freeman Industries: P0 = $80 E(P1) = $85 E(Div1) = $3

 E(R) = $3 + ($85 - $80) = $8 = .10 = 10%

 $80 $80

Note that we are dealing with expected return, which is a statistical term. The actual return is a random variable.

Now remove the expectations operators (for simplicity), use a lower-case “r” (typically done) and rearrange to solve for today’s price (P0)

r = Div1 + P1 - P0 ⇒ Po ⋅ r = Div1 + P1 - P0

 P0

 ⇒ P0 + (P0 ⋅ r) = Div1 + P1

 ⇒ P0 (1 + r) = Div1 + P1

 ⇒ P0 = Div1 + P1 - note this is just the PV formula.

 1+ r where ‘r’ is the expected return that is

 required by investors based on the

 level of risk

For Freeman Industries: P0 = $3 + $85 = $88 = $80

 1.10 1.1

Based on the expectations of P1 and Div1, an $80 price will give you a 10% expected return

Note that at any point in time, all securities of the same risk (we will see how investors define risk later) are priced to offer the same expected rate of return. Freeman’s price will adjust to give it the same expected return as other similar investments.

If the price increases, the expected return decreases and if price decreases, expected return increases.

 If, as we said: P0 = Div1 + P1

 1 + r

 Then it is clear that: P1 = Div2 + P2

 1 + r

 and P2 = Div3 + P3

 1 + r

Substituting,

 = Div1 + Div2 + \_\_P2\_\_

 1+r (1+r)2 (1+r)2

By carrying this out indefinitely, we get:

P0 = Div1 + Div2 + Div3 + .........

 1 + r (1+r)2 (1+r)3

**Value of a Stock** - The present value of the expected future dividends discounted at the required rate of return. This is true even for stocks that don’t currently pay dividends.

It doesn’t matter how long you plan to hold the stock - the value is the same. The future price is in the equation implicitly. It’s the value of the dividends from that point forward.

But how do we forecast dividends forever?

We must – at some point in the future – assume that the dividends will grow at a constant rate forever (note: the constant rate can be zero). The point in time when the constant growth is assumed to begin is called the **terminal value**. It is the projected value of the stock at that point in time. Alternatively, we can project that the stock will have a terminal value by some other method, such as the use of comparables. Either way, we are saying that at some point in the future, this terminal value is the present value of the stock’s future cash flows as of that point in time.

**Constant Growth** – This works like a growing perpetuity.

P0 = Div1 This is if the constant growth starts at time zero

 r - g

P3 = Div4 This is if the constant growth starts at time 3

 r - g

P5 = Div6 This is if the constant growth starts at time 5

 r - g

Note: as g → r; Price → ∞ because each subsequent dividend has a greater value than the one before it. So r must be greater than g.

Note: What if you don’t know Div1 but you do know Div0?

P0 = Div1 = Div0 (1+g) Div1 = Div0 (1 + g)

 r - g r - g

At what rate can a company grow **forever**?

* It can’t grow faster than the economy
* It can’t grow faster than its ROE times its Retention Ratio (called the sustainable growth rate)

Solving for r when you have constant growth:

Start with: P0 = Div1 ⇒ P0 (r - g) = Div1

 r - g

 ⇒ r - g = Div1

 P0

 ⇒ r = Div1 + g The Gordon Growth Model

 P0

 ⇒ Expected Return = Dividend Yield + Growth Rate

 For a stock that is growing at a constant rate forever.

How do investors price a stock?

**Method #1 – The Dividend Discount Model**

1. Look at company and industry financials to project dividends for the next five years (or however far into the future you can project them).
2. Determine a ‘**Terminal Value**’ for the stock in year five (or whatever year you stop projecting specific dividends) This is what you think the price of the stock will be at that point in time.
3. Since these cash flows (the dividends) only go to the stockholders, we need to determine what the stockholders’ required rate of return is, based on the riskiness of this stock. Increased risk means increased required rate of return and thus a higher ‘r’. We will see how to calculate this value later in the course.

 4. Use PTV = DivTV+1 to find the terminal value if assuming constant growth

 r – g

1. Discount the forecasted dividends and terminal value to the present.

**Example**: Freeman expects dividends of $3, $3, $4, $4.50, $5, and then constant growth of 3% forever. Investors require a 10% expected return. P5 is our terminal value.

P0 = \_3\_ + \_3\_ + \_4\_ + 4.5 + \_5\_ + P5 where P5 = \_5(1.03)\_ = 5.15 = $73.57

 1.1 (1.1)2 (1.1)3  (1.1)4  (1.1)5  (1.1)5  .1 - .03 .07

P0 = 2.73 + 2.48 + 3.01 + 3.07 + 3.10 + 45.68 = $60.07

Note that if we project only 2% constant growth instead of 3%, we have:

 P5 = \_\_5(1.02)\_\_ = $63.75 \_P5\_ = 39.58 P0 = 53.97

 .1 -.02 (1.1)5

Or if, instead, we decide that investors require a 12% return on the stock, we have:

P0 = \_3\_ + \_3\_ + \_4\_ + 4.5 + \_5\_ + P5 P5 = \_5(1.03)\_ = 57.22

 1.12 (1.12)2 (1.12)3  (1.12)4  (1.12)5  (1.12)5  .12 - .03

P0 = 2.68 + 2.39 + 2.85 + 2.86 + 2.84 + 32.47 = $46.09

**Method #2 – Discounting Free Cash Flows**

Very similar to dividend discount model except that you discount the free cash flows instead of the dividends.

Free cash flows are dollars that are available to whoever has supplied capital to the company (stockholders, bondholders, preferred stockholders, and banks) after all other expenses have been paid. We will learn how to calculate them later in the course.

Once we discount the free cash flows, we have the present value of the entire firm – the enterprise value (technically, you should subtract the value of cash assets to get the enterprise value). The free cash flows should be discounted at the WACC (to be covered later).

Subtract the value of debt and any preferred stock to obtain the value of the common stock.

Divide by the number of shares outstanding to determine the appropriate price per share

**Example**:

You have the opportunity to buy the stock of Green Wave Inc. In order to determine the value of the shares, you have decided to apply the free cash flow approach. Your forecast of Green Wave’s future free cash flows are shown below. If all cash flows come at the end of each year, what is a fair price for Green Wave Inc. at the beginning of 2017?

Financial Data:

Free Cash Flow in 2017: $1 million

Free Cash Flow in 2018: $1.5 million

Growth rate of FCF, beyond 2018 to infinity: 5%

Discount Rate: 9%

Market value of all debt: $3.9 million

Number of shares of common stock outstanding: 1 million

PVFCF = 

 = 35,321,101

$35,321,101 - $3.9 million = $31.42 million

$31.42 million / one million shares = $31.42 per share

**Method #3 – Comparables**

Decide on a ratio to examine which includes both an accounting number and a market-based number in it. Typical ratios using stock price are P/E, M/B, or Price/Sales.

Determine the “appropriate” ratio for the firm you want to value. This should be based on the ratio of other firms that are similar to the one you are valuing. They should come from the same industry, have a similar capital structure (debt-to-equity ratio), and similar growth opportunities.

Apply the “appropriate” ratio to the accounting number that you have for the firm you want to value to determine the “market-based” value of the stock.

Example: Your firm had earnings per share last year of $2.50. There are five other firms in the same industry, with the same capital structure and growth opportunities as your firm. They have P/E ratios of 12, 13, 14, 15, and 16. What do you calculate your share price to be?

Suppose you decide to average the P/E ratios for these five comparable firms and use that value as your estimate of what the P/E ratio should be for the firm you are trying to value:

(12 + 13 + 14 + 15 + 16) / 5 = 14.0

 (E) x (P/E) = P

(14.0) ($2.50) = $35.00

Another commonly used ratio is EV/EBITDA.

EV = Enterprise Value = value of debt + value of equity – cash and cash equivalents

EBITDA = Earnings before interest, taxes, depreciation and amortization.

Note that with EV/EBITDA, both debt and equity are included, both in the numerator and the denominator.

As with the example above, find the EV/EBITDA ratio for similar firms, multiply the “appropriate” ratio times the EBITDA for the firm you want to value, and you will have your valuation of the firm’s enterprise value.

Once you have the enterprise value, subtract the value of debt, add the value of the cash, and divide by the number of shares outstanding to find the price per share.

The key to using comparables is in choosing the right firms to compare with and knowing if those comparable firms are, themselves, properly valued by the market.