

Foundations of Accounting & Finance

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Lecture – 47

Stock Valuation

Stock valuation: An introduction

Typically, when considering equity, or shares, I anticipate returns in two forms. Firstly, in the form of dividends directly distributed by the entity in which I have invested in the form of equity. Secondly, I anticipate capital gain when I sell this equity in the secondary market, and someone purchases it at a price higher than the price at which I bought. Capital gain is increase in the value of investment over time.

Thus, returns can occur in two primary forms: dividends and capital gains. Dividends represent a portion of a company's profits distributed to shareholders, while capital gains reflect the appreciation in the value of the stock over time. These combined aspects constitute the return on investment in equities or stocks, and the resulting cash flows are essential for valuation purposes.

Base case

Let us consider a base case scenario where we focus solely on dividends and exclude capital gains. Imagine you are interested in purchasing a stock with the intention of holding onto it indefinitely, without any plans to sell it.

Now, what would be the price of that specific stock? The value of the stock is determined by discounting all the expected cash flows from to the value as of today. Let us examine a dividend-paying stock, particularly one that consistently issues dividends. In such cases, the significance of capital gains is less. There are numerous publicly traded stocks, especially in the public sector, that offer substantial dividend payouts with minimal capital gain prospects.

The Present Value of Common Stocks

How do we determine the value of a stock? It is essentially that the present value of all the dividends expected from that stock, particularly if it is a consistent dividend-paying stock. We take into account all the dividends anticipated from today and discounted at a certain rate to reflect their current value. Consequently, this calculation yields the price of the stock.

In other words, the price of a common stock is equal to the present value of all the anticipated future dividends, as expressed in the equation below:

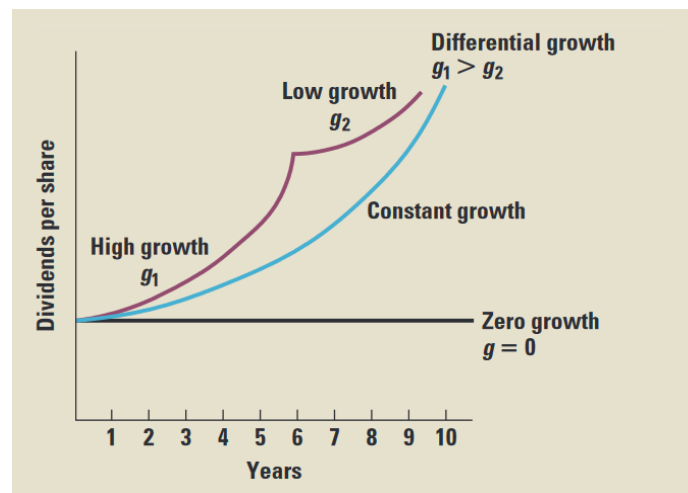
$$P_0 = \frac{\text{Div}_1}{1 + R} + \frac{\text{Div}_2}{(1 + R)^2} + \frac{\text{Div}_3}{(1 + R)^3} + \dots = \sum_{t=1}^{\infty} \frac{\text{Div}_t}{(1 + R)^t}$$

Valuation of Different Types of Stocks

But dividends can vary in three forms:

1. **Zero Growth:** Dividends remain constant year on year, staying the same.
2. **Constant Growth:** Dividends consistently grow at a steady rate over time.
3. **Differential Growth:** The rate at which dividends grow varies significantly from year to year.

In the zero growth scenario, dividends remain constant, resulting in a simple, straight line on the graph depicted below. Conversely, in constant growth, the curve steadily rises over time. In differential growth, there are fluctuations between low and high growth rates, as depicted on the graph.



As for the formula shown below, we will discuss them later. For now, focus on understanding the concepts behind these different dividend growth scenarios.

Dividend growth models

$$\text{Zero growth: } P_0 = \frac{\text{Div}}{R}$$

$$\text{Constant growth: } P_0 = \frac{\text{Div}}{R - g}$$

$$\text{Differential growth: } P_0 = \sum_{t=1}^T \frac{\text{Div}(1 + g_1)^t}{(1 + R)^t} + \frac{\text{Div}_{T+1}}{R - g_2} \times \frac{1}{(1 + R)^T}$$

Case 1: Zero Growth

In the case of zero growth dividends, where dividends remain constant, we use a method called perpetuity to measure their value. What is perpetuity? It is essentially the constant dividend divided by the discounting rate.

To find the value of a stock with zero growth dividends, we sum up all the expected dividends from year 1 to year n and discount them to the present value using the discounting rate. Since we are currently focusing only on dividends and ignoring capital gains, this calculation gives us the value of the equity held in perpetuity.

In this base case scenario, we are concentrating only on dividends, disregarding capital gains for now. So, we sum up the dividends from each year and discount them to their present value using the discounting rate.

Summary of zero growth

Assume that dividends will remain at the same level forever

$$\text{Div}_1 = \text{Div}_2 = \text{Div}_3 = \dots$$

Since future cash flows are constant, the value of a zero growth stock is the present value of a perpetuity:

$$P_0 = \frac{\text{Div}_1}{(1 + R)^1} + \frac{\text{Div}_2}{(1 + R)^2} + \frac{\text{Div}_3}{(1 + R)^3} + \dots$$
$$P_0 = \frac{\text{Div}}{R}$$

Case 2: Constant Growth

In the scenario of constant growth, certain stocks exhibit a consistent increase in dividends year after year. The growth rate remains constant, with the same percentage increase each year.

For instance, let us consider a stock where the dividend grows at a rate of 3 percent annually. Similar to the concept of growing perpetuity, we use a formula where the dividend is divided by the discount rate minus the growth rate. It is straightforward — these two aspects simplify the valuation process significantly.

This is reflected in the formulas provided below:

$$P_0 = \frac{\text{Div}_1}{R - g}$$

When evaluating the constant growth aspect, we apply the same principle as we did for growing perpetuity. Given that the future cash flows grow at a constant rate indefinitely; we can represent the value of the stock using the formula: dividend in year 1 divided by (discount rate minus growth rate).

Summary of constant growth

Assume that dividends will grow at a constant rate, g , forever, *i.e.*,

$$\text{Div}_1 = \text{Div}_0(1 + g)$$

$$\text{Div}_2 = \text{Div}_1(1 + g) = \text{Div}_0(1 + g)^2$$

$$\text{Div}_3 = \text{Div}_2(1 + g) = \text{Div}_0(1 + g)^3$$

Since future cash flows grow at a constant rate forever, the value of a constant growth stock is the present value of a growing perpetuity:

$$P_0 = \frac{\text{Div}_1}{R - g}$$

Case 3: Differential Growth

In this case, dividends are expected to grow at varying rates in the foreseeable future before stabilizing at a constant rate.

Imagine a situation where dividends experience fluctuating growth rates for a number of years before settling to a consistent pattern. This pattern mirrors many industries' growth trajectories, where initial growth is rapid and then stabilizes as the industry matures.

To determine the value of stocks with differential growth, we need to estimate future dividends and future stock prices when the stock transitions to constant growth. Then, we calculate the present value of these future dividends and stock prices.

Summary of differential growth

- Assume that dividends will grow at different rates in the foreseeable future and then will grow at a constant rate thereafter.
- To value a Differential Growth Stock, we need to:
 - Estimate future dividends in the foreseeable future.
 - Estimate the future stock price when the stock becomes a Constant Growth Stock (case 2).
 - Compute the total present value of the estimated future dividends and future stock price at the appropriate discount rate.

$$P = \frac{C}{R - g_1} \left[1 - \frac{(1 + g_1)^T}{(1 + R)^T} \right] + \frac{\left(\frac{\text{Div}_{N+1}}{R - g_2} \right)}{(1 + R)^N}$$

Example:

Martin's Yachts is expected to pay annual dividends of \$1.40, \$1.75, and \$2.00 a share over the next three years, respectively. After that, the dividend is expected to remain constant. What is the current value per share at a discount rate of 14 percent?

Solution:

First, let us focus solely on dividends without considering capital gains. We will calculate the present value of dividends for the next three years and beyond.

Using an Excel sheet, we will consider the number of years: the first, second, and third year, and beyond the third year.

For the next three years, the dividends are \$1.40, \$1.75, and \$2.00, respectively. Applying the discount rate of 14 percent, we calculate the discounting factor for each year.

Now, let us calculate the present value of these dividends for the next three years. After the third year, the dividend remains constant at \$2.00. This represents zero growth beyond the third year.

The present value of the dividends beyond the third year, or perpetuity, is calculated using the formula for constant growth perpetuity. This value, at the end of the third year, is \$14.286.

To find the present value of the constant dividend, we divide this value by the discount factor for the third year.

Finally, to determine the value of the stock, we sum up the present value of dividends for each year: the constant dividend from the fourth year onwards, plus the present value of dividends for the third, second, and first years.

This total (13.567) represents the value of the stock. This exercise demonstrates how we calculate the value of stocks using dividends in different growth scenarios. The detailed calculation is depicted below:

		Discount rate	14%
Year	Dividend	PVIF	PV
1	1.4	0.877	1.228
2	1.75	0.769	1.347
3	2	0.675	1.350
Beyond 3 yrs	2		
value of the dividend as at the end of 3rd year that you would receive from the 4th year onwards is			14.286
PV of the constant dividend			9.64245
Value of the stock			13.567

Estimates of Parameters

The value of a firm depends upon its growth rate, g , and its discount rate, R .

Where does g come from?

When we discuss a firm, we often mention that its returns are expected to grow. As returns grow, so does the stock price. But how does this growth in returns occur?

Consider this scenario: Let us say I invest 1 lakh in a business that has reached a steady state, facing competition and operating at full capacity. I sell my product with a 10 percent margin on the cost, resulting in a net profit of 15,000 rupees. Now, ignoring taxes for simplicity, this 15,000 rupees represents a 15 percent return on my 1 lakh investment.

The 15,000 rupees is expected to be consistently earned year after year, with the return on investment remaining at 15 percent annually.

The core question?

The Core Question is where does growth happen and how does it influence price movement? To achieve growth, some might suggest increasing profit margins. But if I were to raise my margin from 10 to 11 percent, I would likely run my business to the ground as increasing margin leads to increase in price in a competitive market. In a highly competitive and mature market, where raising prices is not feasible, I might need to reduce my margin to stay ahead. So, increasing margins is

not the answer. Another option could be to boost volume. While increasing volume could lead to growth, it is not that simple. The market is nearly saturated, meaning I am already operating at full capacity. Though demand potential might be high, I simply cannot sell more because my capacity is maxed out. Therefore, the solution seems clear: increase capacity. But, increasing capacity also means increasing investment. Even if I double my output, from 15,000 to 30,000, my return on investment remains the same at 15 percent.

How does growth happen?

Typically, growth occurs when there is an increase in equity or investment. In other words, growth happens when we invest more in the business. So, as we mentioned earlier, one way to achieve growth is by investing in additional machinery or equipment. However, I am not referring to raising new capital to expand capacity in this context.

Example

Let's illustrate this with an example. Suppose in the first year, I invest one lakh rupees and earn a net income of 15,000 rupees. If I don't distribute this as dividends, but instead reinvest it, in the second year, my investment would be one lakh rupees plus the 15,000 rupees from the first year, totalling 1,15,000 rupees. Assuming I earn the same 15 percent return on my investment in the second year, my net income would be 17,250 rupees. So, what is happening here? There is growth, and that growth stems from the reinvestment of earnings.

You might ask, "How can I reinvest when my capacity is already reached?" Well, additional investment does not necessarily mean expanding capacity. It could involve treasury operations, exploring new markets, or enhancing product appeal through better packaging, for instance.

In essence, growth depends on how much money is being reinvested in the business. This is often measured by the retention ratio, which indicates the percentage of net income retained by the company. For example, if a company has a retention ratio of 60 percent, it means they retain 60 percent of their net income for reinvestment.

The belief is that this retained amount will also earn returns, ideally at the same rate as the original capital. However, sometimes the returns on reinvested earnings may be slightly lower due to factors like different investment opportunities or lower returns on certain investments.

So, growth essentially comes from the combination of the retention ratio and the return earned on the reinvested earnings. The value of a firm depends on its growth rate and discount rate, where growth is driven by how much profit is retained within the firm and reinvested for future growth.

Where does R come from?

- The discount rate can be broken into two parts.
 - The dividend yield

- The growth rate (in dividends)

The discount rate can be dissected into various components such as growth rates and dividend deals, among others. For now, let us set aside the estimation of the dividend discount part and focus on the growth rate. We will delve deeper into the discounting rate and related concepts, like the cost of capital, at a later stage.

Equity Valuation Using Comparable

Now, let us explore other methods of equity valuation. One such method is the Price-Earnings (PE) Ratio.

1) Price-Earnings Multiple

$$\text{P/E ratio} = \frac{\text{Price per share}}{\text{EPS}}$$

The PE multiple is calculated by dividing the price per share by the earnings per share (EPS). Essentially, it represents how many times the company's earnings are reflected in its share price. This metric is commonly used for comparable companies.

For instance, if a listed company has a known market price and EPS, we can determine the PE multiple by dividing the market price by the EPS. Then, if we have an unlisted entity in a similar business and size, we can use this PE multiple as a proxy to estimate its value. This allows us to establish a ballpark figure for investing in the unlisted company, providing a range of potential investment values.

2) Enterprise value (EV) to EBITDA ratio

Enterprise value represents the total market value of the firm, calculated by multiplying the share price by the number of equity shares outstanding, adding the market value of the firm's debt, and subtracting cash reserves. This formula gives us the enterprise value.

Next, we assess the relationship between enterprise value and EBITDA (earnings before interest, tax, depreciation, and amortization). EBITDA is a measure of a company's profitability before accounting for certain expenses. We use EBITDA because it excludes non-cash expenditures such as depreciation and amortization. The enterprise value to EBITDA ratio indicates how many times the company's EBITDA equals its enterprise value. This ratio provides insights into the company's valuation.

To calculate the enterprise value to EBITDA ratio, divide the enterprise value by EBITDA. This ratio helps in benchmarking and comparing companies in the same industry.