Equity Valuation: Concepts and Basic Tools

Abstract

12a	Calculate and interpret price, income and cross-price elasticities of demand and describe factors that affect each measure
12b	Compare substitution and income effects
12c	Distinguish between normal goods and inferior goods
12d	Describe the phenomenon of diminishing marginal returns
12e	Determine and interpret breakeven and shutdown points of production
12f	Describe how economies of scale and diseconomies of scale affect costs

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1. Major Categories of Equity Valuation Models

Present Value Models (or **Discounted Cash Flow Models**). These models estimate the intrinsic value of a security as the present value of the future benefits expected to be received from the security. In PVM, the benefits defined in terms of expected cash flows can be either **Dividend Discount Models** or in terms of cash flow available after meeting capital expenditures and working capital requirments (Free-Cash-Flow-to-Equity Models).

Multiplier Models (or Market Multiple Models). These models are based on share **price multiples** or **enterprise value multiples** (enterprise value measures the hypothetical takeover price).

Asset-based Valuation Models . These models estimate intrinsic value by estimating the value of the assets minus liabilities. This estimated value is often calculated by making adjustments to the market value of the assets (book7carrying value of the assets/liabilities and company)

2. Present Value Models: The Dividend Discount Model

2.1 Terminology

2.1.1 Dividend Terminology

A **dividend** is a distribution paid to shareholders based on the number of shares owned. Cash dividends are typically paid out regularly at know intervals - such dividends are know as **regular cash dividends**.

In contrast, an **extra dividend** or **special dividend** is a dividend paid by a company that doesn't pay dividends on a regular basis or a dividend that supplements regular cash dividends.

Companies in cyclical industries or companies undergoing financial restructuring are among those who use extra dividends.

In addition, dividends can also be stock based - **stock dividends** (or **bonus issue of shares**) - which is a type of dividend in which a company distributes additional shares of its common stock instead of cash.

2.1.2 Stock Events

Stock splits and reverse stock splits do not have economic effect on the company nor shareholders. A **stock split** involves an increase in the number of shares outstanding with a consequent decrease in share price. For example, in an two-for-one stock split, each shareholder would receive an additional share for each share currently owned.

A **reserve stock split** involves the reduction in the number of outstanding shares. In a *one-for-two* reverse stock split, each investor would receive one share per two shares owned.

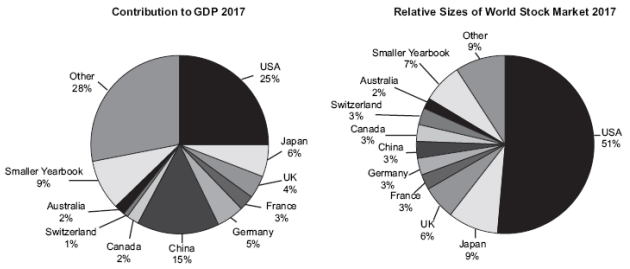
An alternative to stock dividends is the **share repurchase** or **share buyback** which is a transaction where companies use available cash to buy back its own shares, reducing the overall amount of outstanding shares. Shares that have been repurchased are not considered for voting nor dividends purposes, and therefore it increases shareholder wealth by pushing up earnings per share.

Share buybacks are usually used for the following reasons:

- Signaling belief that their shares are undervalued, by providing price support
- Flexibility in the amount and timing of distributing cash to investors
- Tax efficiency if tax rates on dividends are higher than tax rates on capital gains
- Absorb increases in outstanding shares because of the exercise of stock options (usually employee's)

2.1.3 Timeline of Dividends

The payout of dividends is first authorized by the board. The **declaration date** is the day that the company issues a statement declaring a specific dividend. Afterwards, the **ex-dividend date** (or ex-date) is the first day that shares trade without the dividend. One or two business days later, in the **holder-of-the-record date**, the shareholder listed on the company's books at such date will be deemed to have ownership of the shares for purposes of receiving the upcoming dividend. The final date is the **payment date** or payable date which is the day that the company actually transfers a dividend payment to shareholders.



Source: The WorldBank Databank *2017*, and Dimson, Marsh, and Staunton (2018).

Figure 1. Example Timeline of Dividends

Rank	Name of Market	Total US Dollar Market Capitalization	Total US Dollar Trading Volume	Number of Listed Companies
1	NYSE Euronext (US)	$22,081.4	$16,140.1	2,286
2	NASDAQ OMX	$10,039.4	$33,407.1	2,949
3	Japan Exchange Group[a]	$6,220.0	$6,612.1	3,604

Figure 2. Hypothetical Company of Ex-Dividend Date

The *ex-dividend* is effectively the date at which holders of securities will be deemed the owners of dividends. Buying such securities after the *ex-dividend date* will not receive the dividend.

2.2 The Dividend Discount Model

The **Dividend Discount Model** (DDM) denotes the present value of expected dividends in infinite maturity securities (where investor doesn't plan to sell) and the present value of expected dividends plus the present value of price appreciation if investors plan to sell at time t.

The expected value of the share at the end of the investment horizon is referred as the **terminal value**.

2.2.1 DDM in infinite maturity valuation

$$V_0 = \sum \frac{D_t}{(1+r)^t} \tag{1}$$

where,

V_0 = value of a share of the stock at t=0
D_t = expected dividend in year t
r = required rate of return of the stock

2.2.2 DDM in finite maturity valuation

$$V_0 = \sum \frac{D_t}{(1+r)^t} + \frac{P_t}{(1-r)^t} \tag{2}$$

2.2.3 FCFE Approach

The **free-cash-flow-to-equity** (FCFE) assumes that *expected dividends* are directly tied to the *dividend-paying capacity* of the firm. That is, the free cash flow available after investment in working capital and fixed capital investment.

$$FCFE = CFO - FC_{investment} + NetBorrowing \tag{3}$$

$$V_0 = \sum \frac{FCFE_t}{(1+r)^t} \tag{4}$$

2.2.4 Required Rate of Return: CAPM

The required rate of return used in present value models can be estimated in different ways. The CAPM model is:

$$R_i = \text{Current expected risk} - \text{risk free rate} + Beta_i[\text{Market risk premium}] \tag{5}$$

2.3 Preferred Stock Valuation

Preferred stock is a form of equity with fixed (or infinite) maturity at the end of which the par value is guaranteed. It is also important to distinguish callable, convertible and perpetual preferred stock.
For a non-callable, non-convertible preferred stock with maturity at time n, the estimated intrinsic value is:

$$V_0 = \sum \frac{D_t}{(1+r)^t} + \frac{F}{(1+r)^n} \tag{6}$$

2.4 The Gordon Growth Model

The **Gordon Growth Model** is based on the simple assumption that dividends will grow at a constant rate over the foreseeable future. That's why it is also called the **constant growth model**.
This model is particularly useful when valuing the equity of dividen paying companies that are relatively insensitive to the business cycle and are in mature industries, with slow but surely mature growth.

$$V_0 = \sum \frac{D_0(1+g)^t}{(1+r)^t} \tag{7}$$

Assuming the required rate of return r is strictly greater than growth rate g, then:

$$V_0 = \frac{D_0(1+g)}{r-g} = \frac{D_1}{r-g} \tag{8}$$

2.4.1 Assumptions

There are some important assumptions which are made when applying this model, and thus they should be tested beforehand.

- Dividends are the correct metric to use for valuation purposes
- The dividend growth rate is forever: perpetual and barely changes
- The required rate of return is also constant over time
- The dividend growth is strictly less than the required rate of return

Other solutions to the problem, in case these assumptions aren't verified, are.

- The use of a multistage DDM for varying paterns of growth or a more robust DDM
- Use cash flow measures other than dividends for valuation purposes like FCFE
- Use another approach other than DDM (such as multiplier method)

2.4.2 Estimating the perpetual growth rate

In order to estimate the long-term growth rate g, analusts use a variety of methods including in industry benchmark.

$$g = b \cdot ROE \tag{9}$$

where, g = dividend growth rate
b = earnings retention rate

2.5 Multistage Dividend Discount Models

Multistage DDM are often used to model growing companies where using different growth rates at different times might be appropriate.

2.5.1 Two Stage DDM

The **two stage DDM** assumes that the company will begin to pay dividends at a faster growing rate in its early stages before decelerating into a long term sustainable rate of growth.
Therefore the *two stage DDM* makes use of two growth rates: an *high growth rate* for an initial period followed by a *lower sustainable rate* into perpetuity. These change in growth rates should follow the company's life cycle: 1) *growth* stage and 2) *maturity*.

2.5.2 Three Stage DDM

For many publicly traded companies it is appropriate to consider a **three stage DDM** because one can assume growth will ultimately fall into three stages: 1) *growth*, 2) *transition* and 3) *maturity*.

3. Multiplier Models

The concept of **multiplier models** consist in analyzing **price multiples** in order to make a relative assessment of the company's stock. Examples of such multiples are:

- Price-to-Earnings ratio (P/E)
- Price-to-Book ratio (P/B)
- Price-to-Sales ratio (P/S)
- Price-to-Cash-Flow ratio (P/CF)

3.0.1 Limitations

A common drawback from this method is that it doesn't consider the future as multiples are calculated from trailing values which can be quite different from future results.
Practitioners seek to counter this criticism by using a variety of techniques, including forecasting fundamental values one or several periods into the future. This result is forward looking (prospective).

3.0.2 Summary

In short, the major advantage of using price multiples is that they are computationally inexpensive to calculate and thus can be quickly applied to a wide range of securities for *screening* - that is, identify the expected best performing stocks within that sector.

3.1 Relationships between Price Multiples, Present Value Models and Fundamentals

Price multiples are frequently used independently of present values. These approaches are very different and can be connected through **justification**. That is, the act of finding a *justified value* of a multiple - explaining multiple results based on *fundamentals* or *cash flow predictions*.
In short, analysts can make a wide array of analysis with different tools, namely *price multiples*, *PV models* and *fundamental analysis*. The key of understanding those models relies on the understanding of those connection between different models - *different models must come to similar results* such that the end result is that every model is in harmony with each other (they are justified/supported by one another).

3.2 Method of Comparables

This method compares relative values estimated using multiples. The underlying economic rationale for the method of comparables is the **law of one price**: identitical securities should sell for the same price.
This metodology involves using a price multiple to evaluate either securities are undervalued, fairly valued or overvalued in relation to a *benchmark*. The benchmark can be the average value of the stock's industry or peer companies - the *comparables* or *"comps"*.

3.3 Enterprise Value

An alternative to estimating the value of equity is to estimate the value of enterprise. Enterprise value is most frequently determined as market capitalization plus market value of preferred stock plus market value of debt minus cash and short-term investments. The enterprise value (EV) is often viewed as the cost of a takeover.
In practice, finding the enterprise value can be difficult if analysts don't have access to its market value (market quotations) nor company's debt. When current market quotations are not available, bond values may be estimated from bonds with similar maturity, sector and credit characteristics.

4. Asset-Based Valuation

Asset-based valuations consist in the estimates of the market or fair value of the company's assets and liabilities. Thus asset-based valuations work best for companies that do not have a high proportion of intangible assets (hard to value) or "off the books" assets and liabilities.
There are important considerations to bear in mind though, when making asset-based valuations:

- Companies with assets that do not have easily determinable market values or determined markets are very difficult to analyze and are subject to higher error margins (such as level 2 assets - assets whose values can't be determined because there is no active market so other data -less reliable - is used)
- Assets and liability fair values can be very different from the values at which they are carried on the balance sheet of the company. This is also important due to, among other factors, the deprecation methods
- Some intangible assets aren't shown on the books. The value of synergistic effects, consumer loyalty and brand value might not show. For situations with a lot of intangibles, the asset-based valuation is better off as a "floor" value than a reference value.

References

[cfa, 2019] 2019. *CFA program curriculum*. CFA Institute.