

# Part II: Share Valuation Theories

## 2 How to Value a Share

### Introduction

The key to understanding how markets work and the basic measures used by investors to analyse their performance (price, dividend yield, cover, and the P/E ratio) requires a theoretical appreciation of the relationship between a share's price, its return (dividend or earnings) and growth prospects using various models based on discounted revenue theory.

Chapter Two of *CVT* set the scene, by outlining the determinants of *ex-div* share price using discounted techniques to define current price in a *variety* of ways. Each depends on a definition of future periodic income (either a dividend or earnings stream) under growth or non-growth conditions discounted at an appropriate cost of equity (either a dividend or earnings yield) also termed the equity capitalisation rate, within a time continuum.

For example, given a forecast of periodic future dividends ( $D_t$ ) and a shareholder's desired rate of return ( $K_e$ ) based on current dividend yields for similar companies of equivalent risk, we defined the *finite-period dividend valuation model*.

The present *ex-div* value ( $P_0$ ) of a share held for a *given* number of years ( $n$ ) should equal the discounted sum of future dividends ( $D_t$ ) plus its eventual *ex-div* sale price ( $P_n$ ) using the current dividend yield ( $K_e$ ) as a capitalisation rate.

Expressed algebraically, using the Equation numbering from the *CVT* text, which we shall adhere to wherever possible throughout the remainder of this study:

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$$(6) \quad P_0 = \sum_{t=1}^n D_t / (1+K_e)^t + P_n / (1 + K_e)^n$$

Likewise, given a forecast for periodic future earnings ( $E_t$ ) and a desired return ( $K_e$ ) based on current earnings yields of equivalent risk, we defined the *finite-period earnings valuation model* as follows:

$$(7) \quad P_0 = \sum_{t=1}^n E_t / (1+K_e)^t + P_n / (1 + K_e)^n$$

The present *ex-div* value ( $P_0$ ) of a share held for a *given* number of years ( $n$ ) should equal the discounted sum of future earnings ( $E_t$ ) plus its eventual *ex-div* sale price ( $P_n$ ) using the current earnings yield ( $K_e$ ) as a capitalisation rate.

We eventually focussed on a far simpler model using the *capitalisation of a perpetual annuity* favoured by stock exchanges worldwide, which enables the daily publication of price data, the current dividend yield and earnings yield, in the form of a price-earnings ( $P/E$ ) ratio, by newspapers across the globe. This assumes that if shares are held indefinitely and the latest reported dividend or profit per share remains constant, current *ex div* price can be expressed using the *constant dividend valuation model* as follows:

$$(8) \quad P_0 = D_1 / K_e$$

Next year's dividend ( $D_1$ ) and those thereafter are represented by the latest reported dividend (*i.e.* a constant). Rearranging terms, ( $K_e$ ) the shareholders' prospective rate of return (equity capitalisation rate) is also a constant represented by the current yield, which is assumed to be *maintainable* indefinitely.

$$(9) \quad K_e = D_1 / P_0$$

Turning to published earnings data we observed that:

$$(10) \quad P_0 = E_1 / K_e$$

Next year's earnings ( $E_1$ ) and those thereafter are represented by the latest reported profit (*i.e.* a constant). Rearranging terms, ( $K_e$ ) the shareholders prospective rate of return (equity capitalisation rate) is also a constant represented by the current earnings yield, which is assumed to be *maintainable* indefinitely.

$$(11) \quad K_e = E_1 / P_0$$

Because a company's shares cannot sell for different prices at a particular point in time we then noted that:

$$(12) \quad P_0 = D_1 / K_e = E_1 / K_e$$

If management pursue a policy of full distribution (whereby  $D_1 = E_1$ ) then the current dividend and earnings yields must also be identical.

$$(13) \quad K_e = D_1 / P_0 = K_e = E_1 / P_0$$

But if a company retains a proportion of earnings for reinvestment ( $D_1 < E_1$ ) the dividend yield will be lower than the earnings yield:

$$(14) \quad K_e = D_1 / P_0 < K_e = E_1 / P_0$$

For example, if a company's, latest reported dividend and earnings per share are £1.00 and £1.60 respectively, trading at a current price of £8.00 then because earnings *cover* dividends 1.6 times, the dividend yield is only 62.5 per cent of the earnings yield (12.5 per cent and 20 percent respectively).

This difference in yields is not a problem for investors who know what they are looking for. Some prefer their return as current income (dividends and perhaps the sale of shares). Some look to earnings that incorporate retentions (future dividends plus capital gains). So, their respective returns will differ according to their consumption preferences and the risk-return profile of their portfolio of investments. This is why share price listings in the newspapers focus on dividends *and* earnings, as well as the *interrelationship* between the two measured by dividend cover.

However, you will recall that to avoid any confusion between dividend and earnings yields when analysing a company's performance, published listings adopt a universal *convention*. The right-hand terms of the current earnings yield defined by Equation (11) are inverted to produce the return's *reciprocal*, namely a *valuation multiplier*: the price-earnings (P/E) ratio.

$$(15) \quad P/E = P_0 / E_1 = 1/K_e$$

## Exercise 2: The Dividend Yield, Cover and the P/E Ratio

Unlike the dividend yield and the earnings yield, which are *percentage* returns, the P/E ratio is a *real* number that analyses price as a *multiple* of earnings. On the assumption that a firm's current post-tax profits are maintainable indefinitely, the ratio therefore provides an alternative method whereby a company's distributable earnings can be capitalised to establish a share's value. However, it does not stand alone when we analyse a company's performance. With information on dividend yield, or dividend cover it is possible to construct a comprehensive investment profile for the basis of analysis.

Consider the following data relating to four companies whose dividends are covered twice by earnings.

Company	A	B	C	D
Dividend Yield (%) = $D_1 / P_0 = K_e$	1.25	2.5	5	10

### Required:

1. Tabulate the earnings yield and corresponding P/E ratio for each company.
2. Comment on the mathematical relationship between these two measures and its utility.

### An Indicative Outline Solution

1. The corresponding earnings yields and P/E ratios for each company can be tabulated as follows:

Company	A	B	C	D
Earnings Yield ((%) = $E_1 / P_0 = K_e$	2.5	5	10	20
P/E = $P_0 / E_1 = 1/K_e$	40	20	10	20

**Table 2.1: The Relationship between the Earnings Yield and the P/E Ratio**

2. The Mathematical Relationship

Because the two measures are reciprocals of one another, whose product always equals one, there is always a *perfect inverse* relationship between a share's earnings yield and its P/E ratio.

The interpretation of the P/E is that the *lower* the figure, the *higher* the earnings yield and *vice versa*. Because investors are dealing with an *absolute* P/E value and not a *percentage* yield, there is no possibility of confusing a share's dividend and earnings performance when reading share price listings, articles or commentaries from the press, media, analyst reports, or internet downloads.

## Summary and Conclusions

Not only is the previous exercise useful for future reference throughout this text once we begin to interpret the interrelationships between price, dividend yield and the P/E ratio in Part Three. But in the interim your regular reading of the financial press as a guide to further study outlined in Chapter One should also fall into place. However, before we analyse this practical methodology for analysing corporate, stock market performance, we need to consider its theoretical limitations with answers to the following questions.

What happens to current share prices listed in the financial press if the latest reported dividends, or earnings, are not constant in perpetuity?

For the purpose of equity valuation, are dividends (yields) more important than earnings (P/E ratios) or *vice versa* within the investment community?

To understand the debate, I suggest that you do some preparation by reading the remainder of CVT Part Two (Chapters' Three and Four) which evaluates the theoretical and real-world implications of dividend policy, rather than earnings, as a determinant of equity prices and shareholder wealth maximisation.

## Selected Reference

Hill, R.A., *Corporate Valuation and Takeover: Parts One and Two*, [bookboon.com](http://bookboon.com) (2011).