3 The Role of Dividend Policy

Introduction

We began Part Two with an overview of share price valuation theory as a basis for stock market analysis using the dividend yield, dividend cover and the P/E ratio The following Exercises focus on the impact of managerial dividend and reinvestment policies on current share price, the market capitalisation of equity and shareholders' wealth, as a prelude to whether dividends (yields) and earnings (P/E ratios) are *equally* valued by investors.

Exercise 3.1:The Gordon Growth Model

Throughout the late 1950's, Myron J. Gordon (initially working with Ezra Shapiro) formalised the impact of distribution policies and their associated returns on current share price using the derivation of a *constant growth* formula, the mathematics for which are fully explained in the *CVT* text.

What is now termed the *Gordon dividend growth model* determines the current *ex-div* price of a share by capitalising next year's dividend at the amount by which the shareholders' desired rate of return exceeds the constant annual rate of growth in dividends.

Required:

1. Present a mathematical summary of the Gordon Growth Model under conditions of *certainty*.
2. Comment on its hypothetical implications for corporate management seeking to maximise shareholder wealth.

An Indicative Outline Solution

These questions not only provide an opportunity to test your understanding of the companion text, but also to practise your written skills and ability to editorialise source material.

1. The Gordon Model
   According to Gordon (1962) movements in *ex-div* share price (P_0) under conditions of *certainty* relate to the profitability of corporate investment and not dividend policy.

   Using Gordon's original notation and our Equation numbering from *CVT* (Chapter Three) where K_e represents the equity capitalisation rate; E_1 equals next year's post-tax earnings; b is the proportion retained; (1-b) E_1 is next year's dividend; r is the return on reinvestment and r.b equals the constant annual growth in dividends:

(16) $P_0 = (1\text{-}b)E_1 / K_e - rb$ subject to the proviso that $K_e > r.b$ for share price to be *finite*.

You will also recall that in many Finance texts today, the equation's notation is simplified with D_1 and g representing the dividend term and growth rate, subject to the constraint that $K_e > g$

(17) $P_0 = D_1 / K_e - g$

2. The Implications
   In a world of *certainty*, Gordon's analysis of share price behaviour confirms the importance of Fisher's relationship between a company's return on reinvestment (r) and its shareholders' opportunity cost of capital rate (K_e).

Because investors can always borrow, or sell part of their holding to satisfy any income requirements, movements in share price relate to the profitability of corporate investment opportunities and not alterations in dividend policy. To summarise the dynamics of Equation (16):

1. Shareholder wealth (price) will stay the same if r is equal to Ke
2. Shareholder wealth (price) will increase if r is greater than Ke
3. Shareholder wealth (price) will decrease if r is lower than Ke

Exercise 3.2: Gordon's 'Bird in the Hand' Model

Moving into a world of uncertainty, Gordon (*op cit*) explains why rational-risk averse investors are no longer indifferent to managerial decisions to pay a dividend or reinvest earnings on their behalf, which therefore impacts on share price.

Required:

1. Present a mathematical summary of the difference between the Gordon Growth Model under conditions of *certainty* and *uncertainty*.
2. Comment on its hypothetical implications for corporate management seeking to maximise shareholder wealth.

An Indicative Outline Solution

Again, these questions provide opportunities to test your understanding of the companion text and practise your written and editorial skills.

1. The Gordon Model and Uncertainty
   According to Gordon (*ibid*) movements in share price under conditions of *uncertainty* relate to dividend policy, rather than investment policy and the profitability of corporate investment. He begins with the basic mathematical growth model:

(16) $P_0 = (1\text{-}b)E_1 / K_e - rb$ subject to the proviso that $K_e > r.b$ for share price to be *finite*.

This again simplifies to:

(17) $P_0 = D_1 / K_e - g$ subject to the constraint that $K_e > g$

But now, the *overall* shareholder return (equity capitalisation rate) is no longer a *constant* but a function of the *timing* and *size* of the dividend payout. Moreover, an increase in the *retention ratio* also results in a further rise in the periodic capitalisation rate. Expressed mathematically:

$$K_e = f (K_{e1} < K_{e2} < \dots K_{en})$$

2. The Implications
   According to Gordon's uncertainty hypothesis, rational, risk averse investors adopt a "bird in the hand" philosophy to compensate for the non-payment of future dividends.

   They *prefer dividends now, rather than later*, even if retentions are more profitable than distributions (i.e. $r > K_e$).

   They prefer *high dividends to low dividends* period by period. (i.e. $D_1 > D_{2 \dots}$).

   Near dividends and *higher* payouts are discounted at a lower rate (K_{et} now dated) ,

   Thus, investors require a higher overall *average* return on equity (K_e) from firms that retain a higher proportion of earnings with obvious implications for share price. It will fall.

Gordon presents a plausible hypothesis in a *world of uncertainty*, where dividend policy, rather than investment policy, determines share price.

The equity capitalisation rate is no longer a *constant* but an *increasing* function of the *timing* and *size* of a dividend payout. So, an *increased* retention ratio results in a *rise* in the discount rate (dividend yield) and a *fall* in the *ex-div* value of ordinary shares:
Share prices are:

Positively related to the dividend payout ratio
Inversely related to the retention rate
Inversely related to the dividend growth rate

To summarise Gordon's position:

The lower the dividend, the higher the risk, the higher the yield and the lower the price.

Exercise 3.3: Growth Estimates and the Cut-Off Rate

The derivation of variables that comprise the Gordon model under conditions of certainty based on Equation (17) is not problematical. With *zero* growth, the model is equivalent to Equation (8), the *constant dividend valuation model* explained in Chapter Two, which simply discounts the next dividend (D_1) at a *constant* equity capitalisation rate (K_e) using the current yield.

If growth is *positive*, Gordon determines the current *ex-div* price of a share by capitalising next year's dividend at the amount by which the shareholders' desired rate of return exceeds (g) the *constant* annual rate of growth in dividends. This growth rate (g = r.b)) is *equivalent* to the multiplication of a *constant* return (r) on new projects financed by a *constant* retention rate (b).

Subject to the mathematical proviso that Ke> g, it follows that if

$$K_e = r;\ K_e > r\ ;\ K_e < r$$

Then shareholder wealth, measured by *ex-div* share price, stays the same, rises or falls, which confirms Fisher's Separation Theorem (1930) outlined at the beginning of our study.

So far so good, but if management finance future projects by retaining profits and shareholders wish to incorporate this data into their analysis of corporate performance in their quest for wealth, how do they calculate the growth rate?

In the real world, dividend-retention policies are rarely constant. Even if they are uniform, management and those to whom they are ultimately responsible still need annual growth estimators. A simple solution favoured by the investment community, even if the future is uncertain, is to assume that the past and future are *interdependent*. Without information to the contrary, Gordon (*op cit*) also believed that a company's anticipated growth could be determined from its financial history and incorporated into his model.

Consider the following data available from the published accounts for the Adele company.

Year	Dividend per Share ($)
2008	20.00
2009	22.00
2010	24.20
2011	26.62
2012	29.28

Required:

1. Using a mathematical growth formulae of your choice, calculate the company's *average* periodic growth rate, as a future *estimator* of g
2. Use your answer to derive the forecast dividend for 2013 and assuming the company's shares are currently trading at $268.40 *ex-div*, calculate the dividend yield, namely the equity capitalisation rate (managerial cut-off rate for new investment) according to the Gordon Growth model.

An Indicative Outline Solution

1. The Annual Growth Rate
   Using the formula $(D_t - D_{t-1})/D_{t-1}$ or alternatively $(D_t - D_{t-1}) - 1$, we can determine *annual* dividend growth rates.

Year	Annual Growth Rate
2008-9	(22.00/20.00) -1 = 0.1
2009-10	(24.20/22.00) -1 = 0.1
2010-11	(26.62/24.20) -1 = 0.1
2011-12	(29.28/26.62) -1 = 0.1
Total	0.4

The *average* periodic growth rate, as an *estimator* of g, is therefore given by the sum of annual growth rates divided by the number of observations.

g = 0.4 / 4 = **10%**

Alternatively, we can calculate dividend growth by solving for g in the following equation and rearranging terms.

$\$20\ (1+g)^4 = \$29.28.$

$(1 + g) = \sqrt[4]{(29.28/20.00)}$

g = 1.10 - 1.00 = 0.10 = **10%**

2. The Forecast Dividend and Yield
   Using the previous data and the appropriate equations:

The forecast dividend per share for 2013 should be

$\$29.28\ (1.1) =$ **$32.21**

If Adele's shares are currently priced at $268.40 and dividends are expected to grow at ten per cent per annum beyond 2013, the current yield is 22 per cent. This is derived by solving for K_e in the Gordon Growth model as follows:

(17) $P_0 = D_1 / K_e - g = \$32.21 / K_e - 0.10 = \$268.40$

Rearranging terms:

$K_e = (D_1 / P_0) + g = (\$32.21 / \$268.40) + 0.10 =$ **22%**

Summary and Conclusions

Our Exercises have focused on the inter-relationships between dividend policy, the behaviour of the dividend yield and the price of a company's shares in the presence of growth financed by retentions. They illustrate why Myron J. Gordon believed that movements in share price relate to:

1. Corporate investment policy, rather than dividend policy under conditions of certainty.
2. Dividend policy, rather than corporate investment policy, under conditions of uncertainty.

According to his "bird in the hand" hypothesis, the policy objective for an all-equity firm in a real world of uncertainty is *unambiguous*:

Maximise the dividend payout ratio and you minimise the equity capitalisation rate (yield) which maximises share price and hence shareholder wealth.

But as we explained in *CVT*, when Gordon published empirical evidence designed to test his hypothesis and theoretical conclusions, his results were *inconclusive*. The reasons for which, we shall now analyse in Chapter Four

Selected References

1. Fisher, I., *The Theory of Interest*, Macmillan (New York), 1930.
2. Gordon, M. J., *The Investment, Financing and Valuation of a Corporation,* Irwin, 1962.
3. Hill, R.A., *Corporate Valuation and Takeover:* Parts One and Two, bookboon.com (2011).