3 The Role of Dividend Policy

Introduction

For simplicity, so far we have assumed that if a share is held indefinitely and future dividends and earnings per share remain constant, the current *ex-div* price can be expressed using the *capitalisation of a perpetual annuity* based on its current dividend or earnings yields. The purpose of this Chapter is to refine the *constant* valuation model by considering two inter-related questions.

- What happens to a share's current price if its forecast dividends or earnings are not constant in perpetuity?
- When valuing a company's shares, do investors value current dividends more highly than earnings retained for future investment?

3.1 The Gordon Growth Model

Chapter One began with a discussion of investment principles in a perfect capital market characterised by certainty. According to Fisher's Separation Theorem (1930), it is irrelevant whether a company's future earnings are paid as a dividend to match shareholders' consumption preferences at particular points in time. If a company decides to retain profits for reinvestment, shareholder wealth will not diminish, providing that:

- Management's *minimum* required return on a project financed by retention (the discount rate, r) matches the shareholders' *desired* rate of return (the yield, K_e) that they can expect to earn on alternative investments of comparable risk in the market place, i.e. their *opportunity* cost of capital.
- In the interim, shareholders can always borrow at the market rate of interest to satisfy their income requirements, leaving management to invest current unpaid dividends on their behalf to finance future investment, growth in earnings and future dividends.

From the late 1950's, Myron J. Gordon developed Fisher's theory that dividends and retentions are *perfect substitutes* by analysing the impact of different dividend and reinvestment policies (and their corresponding yields and returns) on the current share price for all-equity firms using the application of a *constant growth* formula.

What is now termed the *Gordon dividend-growth model* defines 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.

Using Gordon's original notation 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.

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

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

In a *certain world*, Gordon confirms Fisher's relationship between corporate reinvestment returns (r) and the shareholders' opportunity cost of capital (K_e). Share price only responds to profitable investment opportunities and not changes in dividend policy because investors can always borrow to satisfy their income requirements. To summarise the dynamics of Equation (16).

(i) Shareholder wealth (price) will stay the same if r is equal to K_e
(ii) Shareholder wealth (price) will increase if r is greater than K_e
(iii) Shareholder wealth (price) will decrease if r is lower than K_e

Activity 1

To confirm the impact of retention financed investment on share price defined by Gordon under conditions of *certainty*, use the following stock exchange data for Jovi plc with an EPS of 10 pence and a full dividend distribution policy to establish its current share price.

Dividend Yield 2.5%

Now recalculate price, with the same EPS forecast of 10 pence, assuming that Jovi revises its dividend policy to reinvest 50 percent of earnings in projects with rates of return that equal its current yield.

Comment on your findings.

- Full Distribution (Zero Growth)

Without future injections of outside finance, a forecast EPS of 10 pence and a policy of *full distribution* (*i.e.* dividend per share also equals 10 pence) Jovi currently has a *zero growth rate*. Shareholders are satisfied with a 2.5 per cent yield on their investment. We can therefore define the current share price using either a *constant* dividend or earnings valuation for the capitalisation of a *perpetual annuity*, rather than a growth model, because they are all financially equivalent.

$P_0 = E_1 / K_e = D_1 / K_e = 10 \text{ pence} / 0.025 = D_1 / K_e - g = 10 \text{ pence} / 0.025 - 0 = £4.00$

- Partial Distribution (Growth)

Now we have the same EPS forecast of 10 pence but a reduced dividend per share, so that 50 percent of earnings can be reinvested in projects with rates of return equal to the current equity capitalisation rate of 2.5 percent.

According to Gordon, dividends will *grow at a constant rate in perpetuity*. Thus, Jovi's revised current *ex-div* share price is determined by capitalising next year's dividend at the amount by which the desired rate of return exceeds the constant annual growth rate of dividends.

Using Equations (16) or (17):

$P_0 = (1\text{-}b)E_1 / K_e - rb = P_0 = D_1 / K_e - g = 5 \text{ pence} / 0.025 - 0.0125 = £4.00$

- Commentary

Despite abandoning a constant share valuation in favour of the growth model to accommodate a change in economic variables relating to dividends retention, reinvestment and growth, Jovi's share price remains the same.

According to Gordon, this is because movements in share price relate to the profitability of corporate investment opportunities and not alterations to dividend policy. So, if the company's rate of return on reinvestment (r) equals the shareholders' yield (K_e) price will not change. It therefore follows logically that:

(i) Shareholder wealth (price) will only increase if r is greater than K_e
(ii) Shareholder wealth (price) will only decrease if r is lower than K_e

Activity 2

Can you confirm that if K_e = 2.5%, b = 0.5 but r moves from 2.5% to 4.0%, or down to 1.0%, then P_0 moves from £4.00 to £10.00 or £2.50 respectively, just as Gordon's model predicts.

3.2 Gordon's 'Bird in the Hand' Model

Gordon's initial analysis of the determinants of share price depends critically on the assumptions of *certainty*. For example, our previous Activity data incorporated a constant equity capitalisation rate (K_e) *equivalent* to a managerial assessment of a constant return (r) on new projects financed by a constant retention (b). This ensured that wealth remained constant (effectively Fisher's Separation Theorem). We then applied this mathematical logic to demonstrate that share price and hence shareholder wealth stays the same, rises or falls only when:

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

But what if the future is *uncertain*?

According to Gordon (1962 onwards) rational, risk averse investors should *prefer dividends earlier, rather than later* (a "bird in the hand" philosophy) even if retentions are more profitable than distributions (i.e. $r > K_e$). They should also prefer *high dividends to low dividends* period by period. Thus, shareholders will discount near dividends and higher payouts at a lower rate (K_{et} now dated) and require a higher overall *average* return on equity (K_e) from firms that retain higher earnings proportions, with obvious implications for share price. Expressed mathematically:

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

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 value of ordinary shares:

To summarise Gordon's plausible hypothesis in a *world of uncertainty*, where dividend policy, rather than investment policy, determines share price:

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

Review Activity

According to Gordon, the theoretical policy prescription for an *all-equity* firm in a world of uncertainty is unambiguous.

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

But from 1959 to 1963 Gordon published a body of theoretical and empirical work using real world stock market data to prove his "bird in the hand philosophy" with conflicting statistical results.

To understand why, analyse the two data sets below for Jovi plc in a world of *uncertainty*. The first represents a dividend policy of full distribution. The second reflects a rational managerial decision to retain funds, since the company's return on investment exceeds the shareholders' increased capitalisation rate (Fisher's theorem again).

- Explain why the basic requirements of the Gordon growth model under conditions of uncertainty are satisfied.
- Confirm whether the corresponding share prices are positively related to the dividend payout ratio, as Gordon predicts.

Dividend Policy, Growth and Uncertainty

Forecast EPS	Retention Rate	Dividend Payout	Return on Investment	Growth Rate	Overall Shareholder Returns
E_1	(b)	(1-b)	(r)	rb = g	K_e
£0.10	0	1.0	-	-	0.025
£0.10	0.5	0.5	0.075	0.0375	0.050

- The Basic Requirements

Under conditions of *certainty* Gordon asserts that movements in share price relate to the profitability of corporate investment and not dividend policy. However, in a world of *uncertainty* the equity capitalisation rate is no longer constant but an increasing function of the timing of dividend payments. Moreover, an increase in the retention ratio results in a further rise in the periodic discount rate.

So far so good, since our data set satisfies these requirements. Moving from full distribution to partial distribution elicits a rise in K_e even though withholding dividends to finance investment accords with Fisher's wealth maximisation criterion ($r > k_e$) and also satisfies the mathematical constraint of the Gordon growth model ($K_e > rb$).

- Has share price fallen with dividend payout?

Rational, risk averse investors may prefer their returns in the form of dividends now, rather than later (a "bird in the hand" philosophy that values them more highly). But using the two data sets, which satisfy all the requirements of the Gordon model under conditions of uncertainty, reveals that despite a change in dividend policy, share price remains unchanged!

Uncertainty, *Differential* Dividend and Growth Rates with a *Uniform* Price: $P_0 = (D_1/K_e\text{-}g) = £4.00$

Forecast EPS E_1	Retention Rate (b)	Dividend Payout (1-b)	Return on Investment (r)	Growth Rate rb = g	Overall Shareholder Returns Ke
£0.10	0	1.0	-	-	0.025
£0.10	0.5	0.5	0.075	0.0375	0.050

Summary and Conclusions

The series of variables in the previous table were deliberately chosen to ensure that share price remained unchanged. But the important point is that they all satisfy the requirements of Gordon's model, yet contradict his prediction that share price should fall. Moreover, it would be just as easy to provide another data set that satisfies these requirements but produces a rise in share price. No wonder Gordon and subsequent empirical researchers have often been unable to prove with statistical significance that *real world equity values* are:

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

Explained simply, Gordon confuses dividend policy (*financial risk*) with investment policy (*business risk*). For example, an increase in the dividend payout ratio, without any additional finance, reduces a firm's operating capability and *vice versa*.

Using Equation (17)

$$P_0 = D_1 / K_e - g$$

the weakness of Gordon's hypothesis is obvious. Change D_1, then you change K_e and g. So, how do investors unscramble their differential effects on price (P_0) when all the variables on the *right hand side* of the equation are now affected? And in our example cancel each other out!

For the moment, suffice it to say that Gordon encountered a very real world problem when testing his theoretical model empirically. What statisticians term *multicolinearity*. Fortunately, as we shall discover, two other academic researchers were able to provide the investment community with a more plausible explanation of the determinants of share price behaviour.

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.