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Modified Dividend Discount Model

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Abstract

This article presents a generalized dividend discount model, in relation to which a number of well-known models of the discount and capitalization of the revenue stream (dividends) are only special modifications possible under certain circumstances.

Keywords: Dividend discount model; Modified dividend discount model; Exchange rate returns; Dividend yield

Classification JEL: D46, G12, G13

Introduction

One of the factors undervaluation of the share capital is the incorrect use of the dividend discount model. These models may underestimate the value of the share capital of the company paying the dividends is less than could afford (this may be due, for example, the accumulation of funds for the implementation of large-scale investment program), or do not pay them at all. Typically, appraisers, using the dividend discount model, tThe definition of the discount rate are the same as for the discounted cash flow model (for example, using CAPM). Such an approach can lead to adequate results only if equality of expected dividends and cash flow, as well as reasonable, but highly unlikely, assuming that the holders of the shares are going to stay for a long time by their owners (more justified for major shareholders and less justified for the minority Shareholders, however, the reality is that the dividend discount model was initially focused precisely on passive (minority) investors in shares). In other cases, the calculation result will be incorrect. The reason for this lies in the fact that the dividend discount model was originally derived from the model calculation of the cost of the coupon bonds, which in view of the conditions of release at the end of a predetermined period must be repaid face value [1]. In respect of the shares of the issuer no obligations to repurchase. Currently in the traditional cost model assessment bonds used to estimate the value of the shares is recorded as redemption in the infinitely distant future - so far as the last member of a number of cost (which characterizes the reverse "repurchase denomination") because of the effect of discounting is negligible. However, the majority of investors in the purchase of shares is not planned to be the owners of these shares indefinitely, and are counting on a profitable sale of shares through the not too distant future. In this regard, following an attempt to reflect the factor of limited ownership of shares in the model itself.

Modified the dividend discount model

Suppose there is an investor who buys shares in the expectation that the period of ownership of these shares (holding period) be k periods (years). Then if the forecast for k periods (years) has a dividend payout ratio, as well as forecast changes in the market value of the shares, the calculation of the value of shares may be carried out in accordance with the two-phase model the discounted dividends [2].

$$V = \sum_{i=1}^{k} \frac{div_i}{(1+r)^i} + \frac{P_k}{(1+r)^k}, \quad (1)$$

Where V - calculated value of the estimated cost of the shares,

div_i-expected dividends in the i- th year of the forecast period,

r-the expected k periods for the average full market average (industry average) yield equal to the sum of exchange rate and dividend yield,

P_k-expected (predicted) the selling price of shares on the expiration of a holding period k years,

k-the number of years of the forecast period.

Expression (1) involves the sale of shares at the end of the forecast period at a price:

$$P_k = V \times (1 + R_{rES})^k, \quad (2)$$

where R_{rES}-expected average exchange rate yields of the estimated shares for the years k per 1.

It should be noted that the yield on the investment in the shares depends on many factors: conditions of acquisition, duration of share ownership (full or partial period), and whether you were at the period of subscription for new shares. These details are well described in [3].

Substituting (2) value for P_k in equation (1) to obtain [4]:

$$V = \frac{\sum_{i=1}^{k} \frac{div_i}{(1+r)^i}}{1 - \left[\frac{1+R_{rES}}{1+r}\right]^k}. \quad (3)$$

Analysis of the expression (3) shows:

- for k=1 expression (3) becomes:

$$V = \frac{div_1}{r - R_{rES}} = \frac{div_1}{r_r + r_{div} - R_{rES}}, \quad (4^1)$$

where r_r-expected within the k periods of the average market growth in share price,

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r_{div}-the expected average market dividend yield on the stock market,

div_1-amount of dividends expected in the next period.

In case of equality of the expected growth rate of the market value of the shares being valued (R_{rES}) and the expected growth rate of the market value of the total market (r_r) (i.e in fact the expected change in the stock index), the expression (4) can be reduced to the model of capitalization:

$$V = \frac{div_1}{r_{div}} \quad (5)$$

where r_{div}-average market dividend yield.

In case of equality of the expected growth rate of the market value of the shares being valued (R_{rES}) zero, expression (4) becomes:

$$V = \frac{div_1}{r} \quad (6)$$

• If $k=\infty$, expression (3) reduces to:

$$P_0 = \sum_{i=1}^{\infty} \frac{div_i}{(1+r)^i}. \quad (7^2)$$

If we assume that for an infinitely long period of ownership of shares will change their course evenly rate R_{rES}, and dividend payments increase at the same rate[3], the expression (3) is essentially reduced to the expression (4), and the result of settlement of these expressions becomes numerically equal result calculations performed on the basis of the standard model of infinite growth (Gordon-Shapiro model).

An important advantage of the expression (3) is no need to apply the model of constant growth (Gordon model) to estimate the terminal value of the shares in the framework of the two-period model of discounting, which is why there is no need to justify the expected rate of growth in the post-forecast dividend (=infinite) period (known parameter «g ")-should instead justify the expected rate of growth of the market value of the shares being valued over the expected holding period[4]. According to the author of this article, the rationale for the value of a parameter for a limited period of time (for example, setting R_{rES}) is much easier thing compared with the justification value of a parameter for an indefinite (infinite) period. To a certain extent we can say that the model (3) is invariant with respect to a specific length of holding period, the value of (k), because in this model, each specific value of the expected growth in the market value of the shares being valued (R_{rES}) is determined for a particular value of a one-to-one extension a holding period (i.e, for each value of a holding period of its expected value exists R_{rES}). At constant the expected market trends estimates obtained on the basis of the model (3) are essentially independent of the length of the holding period. Consequently, the choice itself values the length of holding period (k) in isolation from the value of the expected growth rate of the market value of the shares being valued in the model (3) is unimportant.

[1]Note that the expression(4) resemblance to the model of constant growth has two basic differences. Firstly, as stated above, this expressionis applicable for k=1 (but notan infinite period dividend income as it is incorporated in the model of permanent growth). Secondly, in the denominator of (4) the discount rateis deducted from the expected exchange rate yield sestimated shares (RrES), rather than the expected growth rate of dividends, as the model of constant growth.

[2]All designations (7) correspond to the previously received.

[3]Another wayit cannot be, if we consider thereallylong periods.

[4]The expected periodof ownership of shares.

It should also be noted that the convergence of the model (3) with a model of infinite growth reached only at the agreed parameters of the model, which are easily achieved only with relatively long expected holding period, which in practice is not as common. More specifically, the condition that the calculations carried out on the basis of the model (3) with calculations based on a "standard" two-stage model (including the terminal value, calculated based on the model of infinite growth), is as follows:

$$V = \frac{div_{k+1}}{(r-g)(1+R_{rES})^k} \quad (8)$$

where div_{k+1}-the expected dividend payments in the first terminal period (in the first year after the holding period), g-expected growth rate of dividend payments in the terminal period.

Conclusion

In general, the evaluation of stocks using the dividend discount model should be carried out with the use of the expression (3). As can be seen from (3), the traditional version of the dividend discount model (7) reflects a reality only under certain proportions: expectations regarding changes in dividend payments must be directly proportional combined with expectations of changes in share prices. In other words, the expected size of the period paid dividends of share ownership must be correlated with the rate of dividend yield (r_{div}), expected in the forecast period (i.e. share price growth should also increase dividend payments, and vice versa, if this proportion is broken for the calculations in future periods to be applied values r_{div}, other than current).

Note that the problem of application of the dividend discount model is that investors usually do not suggest that the period of ownership of shares is quite significant, while the traditional dividend discount model is historically based on such assumptions. If the expected holding period of shares k is much greater than one, it is logical to assume that the rate of growth stocks of the course, as well as the growth rate of dividends will be positive. Moreover, for a long period, it is logical to expect equality of average annual rates of change of dividend payments and the market value of shares. Accordingly, as a result of the application of the dividend discount model should apply the expression (3) (if there is the assumption that the sale of shares by k periods) or the expression (4) (the expected holding period 1 period (year)). As regards traditional expressions (7), its use is justified only in cases where the expected holding period of shares valued large and expected dividend yield is so low that it can be neglected in comparison with the expected exchange rate returns.

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