Issues in using the Dividend Discount Model

The dividend discount model's primary attraction is its simplicity and its intuitive logic. There are many analysts, however, who view its results with suspicion because of limitations that they perceive it to possess. The model, they claim, is not really useful in valuation, except for a limited number of stable, high-dividend paying stocks. This section examines some of the areas where the dividend discount model is perceived to fall short.

(a) Valuing non-dividend paying or low dividend paying stocks

The conventional wisdom is that the dividend discount model cannot be used to value a stock that pays low or no dividends. It is wrong. If the dividend payout ratio is adjusted to reflect changes in the expected growth rate, a reasonable value can be obtained even for non-dividend paying firms. Thus, a high-growth firm, paying no dividends currently, can still be valued based upon dividends that it is expected to pay out when the growth rate declines. If the payout ratio is not adjusted to reflect changes in the growth rate, however, the dividend discount model will underestimate the value of non-dividend paying or low-dividend paying stocks.

(b) Is the model too conservative in estimating value?

A standard critique of the dividend discount model is that it provides too conservative an estimate of value. This criticism is predicated on the notion that the value is determined by more than the present value of expected dividends. For instance, it is argued that the dividend discount model does not reflect the value of 'unutilized assets'. There is no reason, however, that these unutilized assets cannot be valued separately and added on to the value from the dividend discount model. Some of the assets that are supposedly ignored by the dividend discount model, such as the value of brand names, can be dealt with simply within the context of the model.

A more legitimate criticism of the model is that it does not incorporate other ways of returning cash to stockholders (such as stock buybacks). If you use the modified version of the dividend discount model, this criticism can also be countered.

(c) The contrarian nature of the model

The dividend discount model is also considered by many to be a contrarian model. As the market rises, fewer and fewer stocks, they argue, will be found to be undervalued using the dividend discount model. This is not necessarily true. If the market increase is due to an improvement in economic fundamentals, such as higher expected growth in the economy and/or lower interest rates, there is no reason, a priori, to believe that the values

from the dividend discount model will not increase by an equivalent amount. If the market increase is not due to fundamentals, the dividend discount model values will not follow suit, but that is more a sign of strength than weakness. The model is signaling that the market is overvalued relative to dividends and cashflows and the cautious investor will pay heed.

Tests of the Dividend Discount Model

The ultimate test of a model lies in how well it works at identifying undervalued and overvalued stocks. The dividend discount model has been tested and the results indicate that it does, in the long term, provide for excess returns. It is unclear, however, whether this is because the model is good at finding undervalued stocks or because it proxies for well-know empirical irregularities in returns relating to price-earnings ratios and dividend yields.

A Simple Test of the Dividend Discount model

A simple study of the dividend discount model was conducted by Sorensen and Williamson, where they valued 150 stocks from the S&P 400 in December 1980, using the dividend discount model. They used the difference between the market price at that time and the model value to form five portfolios based upon the degree of under or over valuation. They made fairly broad assumptions in using the dividend discount model.

(a) The average of the earnings per share between 1976 and 1980 was used as the current earnings per share.

(b) The cost of equity was estimated using the CAPM.

(c) The extraordinary growth period was assumed to be five years for all stocks and the I/B/E/S consensus forecast of earnings growth was used as the growth rate for this period.

(d) The stable growth rate, after the extraordinary growth period, was assumed to be 8% for all stocks.

(e) The payout ratio was assumed to be 45% for all stocks.

The returns on these five portfolios were estimated for the following two years (January 1981-January 1983) and excess returns were estimated relative to the S&P 500 Index using the betas estimated at the first stage and the CAPM. Figure 13.6 illustrates the excess returns earned by the portfolio that was undervalued by the dividend discount model relative to both the market and the overvalued portfolio.

Figure 13.6 Performance of the Dividend Discount Model: 1981-83
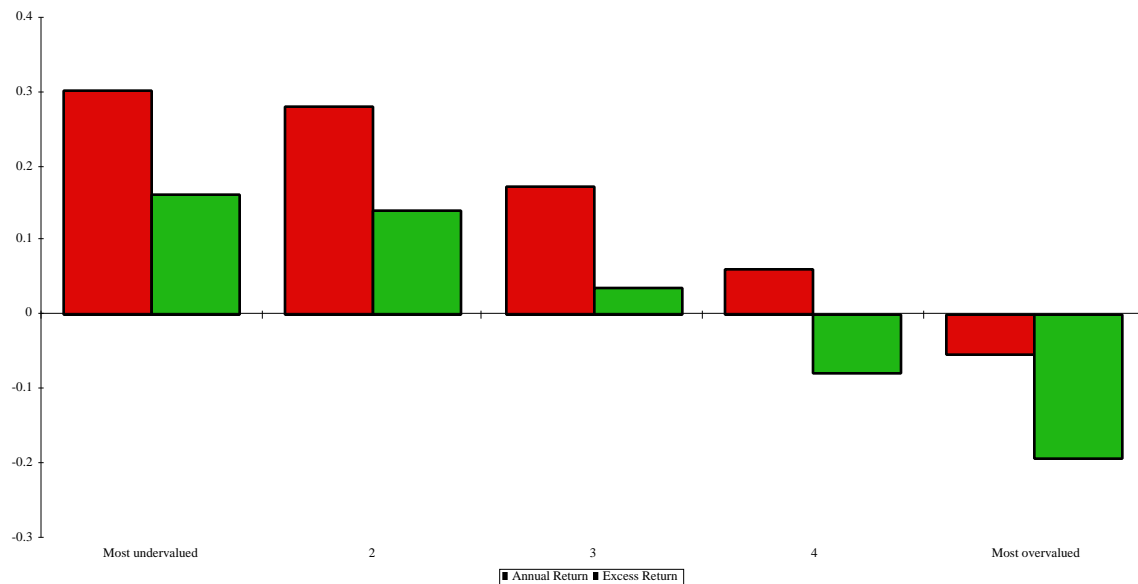
The undervalued portfolio had a positive excess return of 16% per annum between 1981 and 1983, while the overvalued portfolio had a negative excess return of 15% per annum during the same time period. Other studies which focus only on the dividend discount model come to similar conclusions. In the long term, undervalued (overvalued) stocks from the dividend discount model outperform (under perform) the market index on a risk adjusted basis.

Caveats on the use of the dividend discount model

The dividend discount model provides impressive results in the long term. There are, however, three considerations in generalizing the findings from these studies.

The dividend discount model does not beat the market every year

The dividend discount model outperforms the market over five-year time periods, but there have been individual years where the model has significantly under performed the market. Haugen reports on the results of a fund that used the dividend discount model to analyze 250 large capitalization firms and to classify them into five quintiles from the first quarter of 1979 to the last quarter of 1991. The betas of these quintiles were roughly equal. The valuation was done by six analysts who estimated an extraordinary growth rate for the initial high growth phase, the length of the high growth phase and a transitional phase for each of the firms. The returns on the five portfolios as well as the returns on all 250 stocks and the S&P 500 from 1979 to 1991 are reported in Table 13.4.

Table 13.4: Returns on Quintiles: Dividend Discount Model

	Quintile						
	Under Valued	2	3	4	Over Valued	250 Stocks	S&P 500
1979	35.07%	25.92%	18.49%	17.55%	20.06%	23.21%	18.57%
1980	41.21%	29.19%	27.41%	38.43%	26.44%	31.86%	32.55%
1981	12.12%	10.89%	1.25%	-5.59%	-8.51%	28.41%	24.55%
1982	19.12%	12.81%	26.72%	28.41%	35.54%	24.53%	21.61%
1983	34.18%	21.27%	25.00%	24.55%	14.35%	24.10%	22.54%
1984	15.26%	5.50%	6.03%	-4.20%	-7.84%	3.24%	6.12%
1985	38.91%	32.22%	35.83%	29.29%	23.43%	33.80%	31.59%
1986	14.33%	11.87%	19.49%	12.00%	20.82%	15.78%	18.47%
1987	0.42%	4.34%	8.15%	4.64%	-2.41%	2.71%	5.23%
1988	39.61%	31.31%	17.78%	8.18%	6.76%	20.62%	16.48%
1989	26.36%	23.54%	30.76%	32.60%	35.07%	29.33%	31.49%
1990	-17.32%	-8.12%	-5.81%	2.09%	-2.65%	-6.18%	-3.17%
1991	47.68%	26.34%	33.38%	34.91%	31.64%	34.34%	30.57%
1979-91	*1253%*	*657%*	*772%*	*605%*	*434%*	*722%*	*654%*

The undervalued portfolio earned significantly higher returns than the overvalued portfolio and the S&P 500 for the 1979-91 period, but it under performed the market in five of the twelve years and the overvalued portfolio in four of the twelve years.

Is the model just a proxy for low PE ratios and dividend yields?

The dividend discount model weights expected earnings and dividends in near periods more than earnings and dividends in far periods., It is biased towards finding low price-earnings ratio stocks with high dividend yields to be undervalued and high price-earnings ratio stocks with low or no dividend yields to be overvalued. Studies of market efficiency indicate that low PE ratio stocks have outperformed (in terms of excess returns) high PE ratio stocks over extended time periods. Similar conclusions have been drawn about high-dividend yield stocks relative to low-dividend yield stocks. Thus, the valuation findings of the model are consistent with empirical irregularities observed in the market.

It is unclear how much the model adds in value to investment strategies that use PE ratios or dividend yields to screen stocks. Jacobs and Levy (1988b) indicate that the marginal gain is relatively small.

Attribute	*Average Excess Return per Quarter: 1982-87*

Dividend Discount Model	0.06% per quarter
Low P/E Ratio	0.92% per quarter
Book/Price Ratio	0.01% per quarter
Cashflow/Price	0.18% per quarter
Sales/Price	0.96% per quarter
Dividend Yield	-0.51% per quarter

This suggests that using low PE ratios to pick stocks adds 0.92% to your quarterly returns, whereas using the dividend discount model adds only a further 0.06% to quarterly returns. If, in fact, the gain from using the dividend discount model is that small, screening stocks on the basis of observables (such as PE ratio or cashflow measures) may provide a much larger benefit in terms of excess returns.

The tax disadvantages from high dividend stocks

Portfolios created with the dividend discount model are generally characterized by high dividend yield, which can create a tax disadvantage if dividends are taxed at a rate greater than capital gains or if there is a substantial tax timing[6] liability associated with dividends. Since the excess returns uncovered in the studies presented above are pre-tax to the investor, the introduction of personal taxes may significantly reduce or even eliminate these excess returns.

In summary, the dividend discount model's impressive results in studies looking at past data have to be considered with caution. For a tax-exempt investment, with a long time horizon, the dividend discount model is a good tool, though it may not be the only one, to pick stocks. For a taxable investor, the benefits are murkier, since the tax consequences of the strategy have to be considered. For investors with shorter time horizons, the dividend discount model may not deliver on its promised excess returns, because of the year-to-year volatility in its performance.

Conclusion

When you buy stock in a publicly traded firm, the only cash flow you receive directly from this investment are expected dividends. The dividend discount model builds on this simple propositions and argues that the value of a stock then has to be the present value of expected dividends over time. Dividend discount models can range from simple growing perpetuity models such as the Gordon Growth model, where a stock's value is a function of

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[6] Investors do not have a choice of when they receive dividends, whereas they have a choice on the timing of capital gains.

its expected dividends next year, the cost of equity and the stable growth rate, to complex three stage models, where payout ratios and growth rates change over time.

While the dividend discount model is often criticized as being of limited value, it has proven to be surprisingly adaptable and useful in a wide range of circumstances. It may be a conservative model that finds fewer and fewer undervalued firms as market prices rise relative to fundamentals (earnings, dividends, etc.) but that can also be viewed as a strength. Tests of the model also seem to indicate its usefulness in gauging value, though much of its effectiveness may be derived from its finding low PE ratio, high dividend yield stocks to be undervalued.

Problems

1. Respond true or false to the following statements relating to the dividend discount model:

   A. The dividend discount model cannot be used to value a high growth company that pays no dividends.

   B. The dividend discount model will undervalue stocks, because it is too conservative.

   C. The dividend discount model will find more undervalued stocks, when the overall stock market is depressed.

   D. Stocks that are undervalued using the dividend discount model have generally made significant positive excess returns over long time periods (five years or more).

   E. Stocks which pay high dividends and have low price-earnings ratios are more likely to come out as undervalued using the dividend discount model.

2. Ameritech Corporation paid dividends per share of $3.56 in 1992 and dividends are expected to grow 5.5% a year forever. The stock has a beta of 0.90 and the treasury bond rate is 6.25%.

   a. What is the value per share, using the Gordon Growth Model?

   b. The stock was trading for $80 per share. What would the growth rate in dividends have to be to justify this price?

3. Church & Dwight, a large producer of sodium bicarbonate, reported earnings per share of $1.50 in 1993 and paid dividends per share of $0.42. In 1993, the firm also reported the following:

   Net Income   = $30 million
   Interest Expense = $0.8 million
   Book Value of Debt = $7.6 million
   Book Value of Equity = $160 million

The firm faced a corporate tax rate of 38.5%. (The market value debt to equity ratio is 5%.) The treasury bond rate is 7%.

   The firm expected to maintain these financial fundamentals from 1994 to 1998, after which it was expected to become a stable firm with an earnings growth rate of 6%. The firm's financial characteristics were expected to approach industry averages after 1998. The industry averages were as follows:

   Return on Capital = 12.5%
   Debt/Equity Ratio = 25%
   Interest Rate on Debt = 7%

Church and Dwight had a beta of 0.85 in 1993 and the unlevered beta was not expected to change over time.

a. What is the expected growth rate in earnings, based upon fundamentals, for the high-growth period (1994 to 1998)?

b. What is the expected payout ratio after 1998?

c. What is the expected beta after 1998?

d. What is the expected price at the end of 1998?

e. What is the value of the stock, using the two-stage dividend discount model?

f. How much of this value can be attributed to extraordinary growth? to stable growth?

4. Oneida Inc, the world's largest producer of stainless steel and silverplated flatware, reported earnings per share of $0.80 in 1993 and paid dividends per share of $0.48 in that year. The firm was expected to report earnings growth of 25% in 1994, after which the growth rate was expected to decline linearly over the following six years to 7% in 1999. The stock was expected to have a beta of 0.85. (The treasury bond rate was 6.25%)

a. Estimate the value of stable growth, using the H Model.

b. Estimate the value of extraordinary growth, using the H Model.

c. What are the assumptions about dividend payout in the H Model?

5. Medtronic Inc., the world's largest manufacturer of implantable biomedical devices, reported earnings per share in 1993 of $3.95 and paid dividends per share of $0.68. Its earnings were expected to grow 16% from 1994 to 1998, but the growth rate was expected to decline each year after that to a stable growth rate of 6% in 2003. The payout ratio was expected to remain unchanged from 1994 to 1998, after which it would increase each year to reach 60% in steady state. The stock was expected to have a beta of 1.25 from 1994 to 1998, after which the beta would decline each year to reach 1.00 by the time the firm becomes stable. (The treasury bond rate was 6.25%)

a. Assuming that the growth rate declines linearly (and the payout ratio increases linearly) from 1999 to 2003, estimate the dividends per share each year from 1994 to 2003.

b. Estimate the expected price at the end of 2003.

c. Estimate the value per share, using the three-stage dividend discount model.